

Contents

Transformation of old city hall grounds_____	1
Planning and decision-making process_____	2
Procurement: Tendering material for sale of grounds_____	3
Change of project _____	5
Adaptive reuse vs demolition _____	5
Pre-demolition screening & selective demolition_____	6
Soil management _____	6
Reflections on collaboration _____	7
Lessons learned _____	8

This text describes Høje-Taastrup's experience in planning and procuring circular demolition for the old city hall. The sections come from Høje-Taastrup's CityLoops demonstration report available [here](#).

Transformation of old city hall grounds



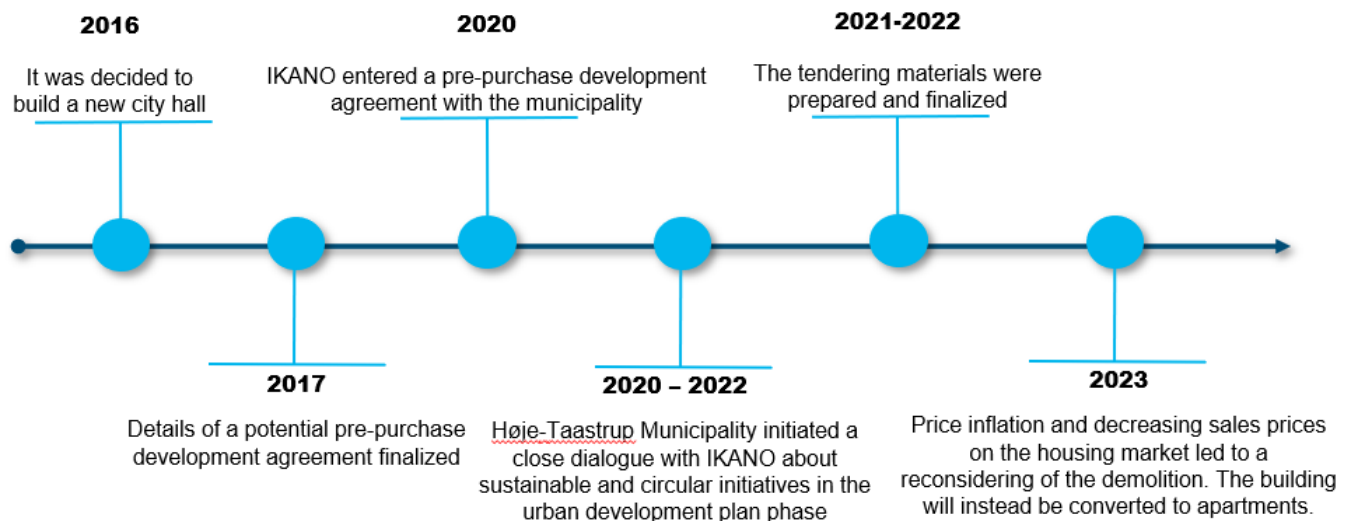
In 2016 it was decided that Høje-Taastrup would build a new city hall due to the need for extensive renovations in the existing city hall. It was furthermore decided that the municipality would sell the old city hall, and that the area would be developed into a residential area resembling the nearby old village of Høje-Taastrup. The old city hall and surrounding property would therefore be sold for demolition.

Høje-Taastrup municipality owned the property and was therefore responsible for selling it. The CityLoops project managers sought the opportunity to impose circular conditions in the tender about how the demolition should take place and how soil should be handled. The aim was to impose criteria ensuring that as much building material as possible should be reused, if possible, on-site, and as much soil as possible should be kept on-site.

According to the original plan, the demolition was planned to start in 2023. During the demolition process, the CityLoops project managers would be in close dialogue with the developer and the demolition contractor as well as potential buyers of the materials from the demolition. The reusable materials would be incorporated into new buildings or crushed on-site and used as filler. Some materials could also be used in other (yet unidentified) building projects off-site. Soil would be, as much as possible, either prevented from being dug up or reused on site. However, the high quality of the foundation and load-bearing structures of the building as well as price inflation and decreasing housing prices led the developer to reconsider demolition, and they are now working towards adaptive reuse for (part of) the old

city hall as apartments. Soft-stripping and partial demolition will still take place, but not within the CityLoops timeline.

Timeline for demonstration action 1: Selling the old city hall



Planning and decision-making process

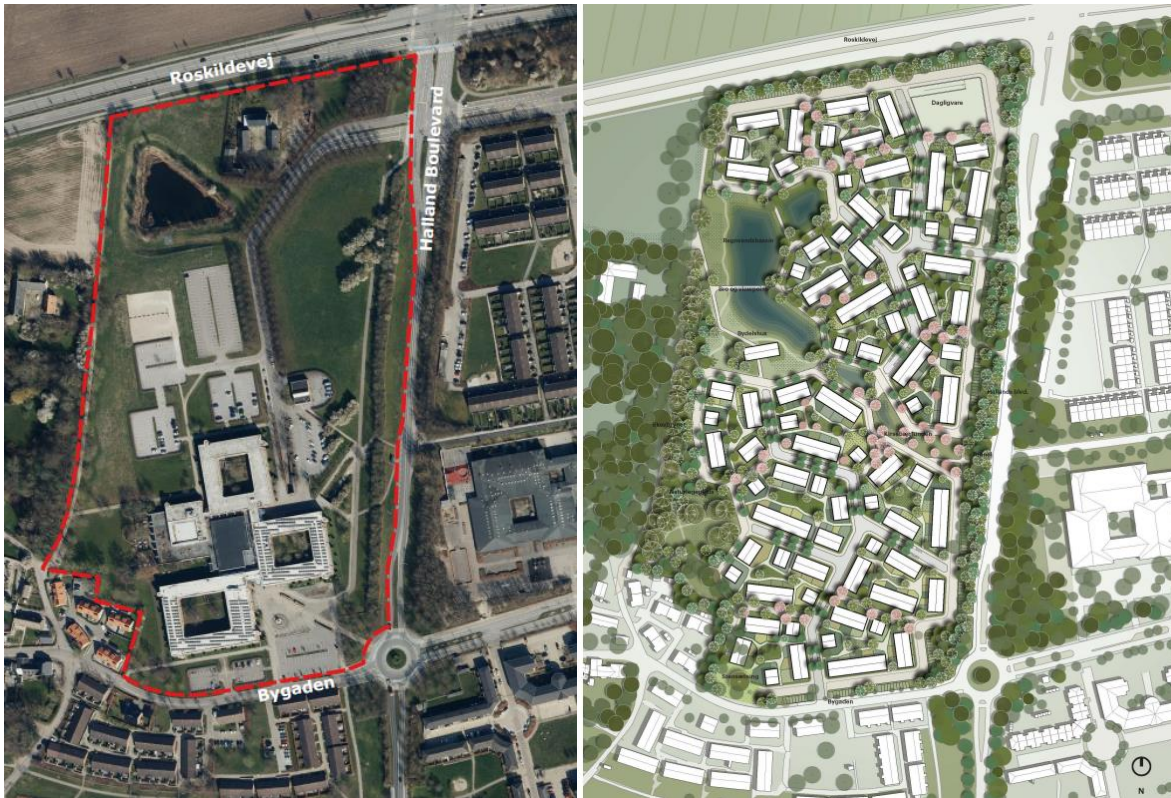
Pre-purchase development agreement

Danish procurement law allows private companies to participate in the planning of the development of urban areas under special circumstances. Hoping to secure such an agreement, in 2017 (pre-CityLoops) the municipality outlined the parameters of an agreement for developers to consider. IKANO approached the municipality hoping to make a pre-purchase development agreement with the urban development department based on this outline. An agreement was signed in 2020, and this allowed IKANO to influence how the property would be developed after the sale of the grounds. The city hall had to be sold on the open market, but the pre-purchase development agreement ensured that IKANO had the advantage of the opportunity to re-bid with a new price if another developer outbid IKANO. Particulars of the agreement were finalized before CityLoops and needed to be respected. This limited somewhat the scope of influence CityLoops could have as nothing could be changed in the project without IKANO's agreement.

Urban development plan

IKANO made a proposal for urban development of the area (including maps, sketches, materials, infrastructure, parking etc.) which constituted the basis for a formal urban development plan which was prepared by the urban planners in the municipality. The draft urban development plan for the area was in public hearing, after which the final development plan was rectified by the City Council. The final urban development plan is public: [Lokalplan 2.05.3](#)

The CityLoops project managers in cooperation with the development department initiated a close dialogue with IKANO about sustainable and circular initiatives in this phase. IKANO showed a great interest in circular and sustainable initiatives.



Existing city hall and map from the urban development plan showing the suggested locations of buildings, roads, green areas, parking etc.

Procurement: Tendering material for sale of grounds

The tendering material was prepared in 2020 and 2021 and finalized in early 2022. The urban development department in collaboration with the legal department were in charge of preparing the tendering material. The CityLoops project managers contributed sustainability and circularity criteria to the tender.

Formulation of circularity criteria

Circular requirements were formulated over the course of extensive dialogue with IKANO and the urban development department, and finally with help from consultant Niels Trap from TRE who has extensive experience with circular requirements in tendering. The criteria were limited by a combination of what legally can be required in public tendering (according to the Danish municipal power of attorney and fair competition), by political mandate to prioritize earnings from the sale over sustainability, as well as by the pre-purchase development agreement, which had to be complied with. It was not possible to make any major divergences from the agreement, as IKANO had the right to refuse any extra criteria that was not outlined in the agreement. The fact that this agreement was finalized pre-CityLoops

meant that it did not necessarily favor circular initiatives. Luckily, IKANO was open to most sustainability initiatives since sustainability is an important part of IKANO's company policy. Specific sustainability criteria were used where possible in the tendering materials under the limitations of the development plan. For instance, the initial urban development plan left no room for keeping some of the building as it is and reconstructing it into residential buildings.

The environmental department listed several other sustainability criteria (beyond CityLoops) as visions or intentions e.g., biodiversity in urban green areas, solar panels on the roofs, and excess heat from the grocery store to be rerouted to the district heating system. If IKANO did not win the bid for purchasing the property, the municipality's focus on sustainability would thus still be evident based on these criteria.

Circularity criteria in tender

The included requirements for demolition and recycling were (translated from Danish):

“Høje-Taastrup municipality participates in the EU-supported Horizon2020 project CityLoops, and the demolition of the old city hall is included as a demonstration project within circular construction. The goal is that as much building material as possible must be recycled/reused, and as much soil as possible must be kept on site. The municipality therefore requires that demolition of the existing city hall abides by selective demolition and circular criteria upon selling the existing city hall:

- *The buyer is obligated to abide by the requirements in appendix X when demolishing the parts of existing buildings which will not be used in conjunction with the development of the grounds. Appendix X describes requirements and documentation requirements in relation to:*
 - *Resource mapping/ pre-demolition screening – based on the identification of resources and the preparation of a resource mapping report, selective demolition is carried out ensuring that min. 80 percent by weight of the uncontaminated materials from the demolition of the city hall must be reused, recycled or recovered.*
 - *Requirements for reuse and recycling of materials in connection with the construction of a new communal building in the area.*
 - *Requirements for sustainable soil management including preparing an estimate of soil flux in conjunction with the development.”*

Selected relevant sections of Appendix X: Criteria for demolition of Høje-Taastrup city hall and subsequent development of the area” are listed here (translated from Danish):

Requirements for reuse and recycling of material in the construction of the communal building:

“The community building must be constructed as much as possible with recycled materials. At least 5 percent by weight of the total new construction or 10 different types of building components/materials. The recycled components/materials can be either from the demolition of the city hall or from other suppliers.

At least 30 percent by weight of material used for the parking areas, paths and spaces around the new community building must be reused, recycled, or recovered material.”

Requirements for sustainable soil management:

“The developer must prepare a plan for soil balance and estimation of soil flux for the development of the area. In conjunction with this, the developer must assess possibilities for limiting the amount of soil that is handled or removed from the area, for example based on knowledge of existing soil types in the area via geotechnical drilling as well as specific knowledge of future construction sites in the area.

The developer must assess the possibility of alternative foundation methods for buildings or roads/paths/parking areas such as lime stabilization to reduce the amount of soil that must be handled.

To support the sustainable soil management in the area CO2 calculations must be carried out using the CityLoops CO2 calculator.”

Change of project

Due to market conditions as a result of increasing prices and discrepancies with the utilities company about a rainwater pond, IKANO has temporarily paused the development of the area.

IKANO is considering changing the whole project into transforming the existing buildings into housing instead of demolishing them. However, this will require a new urban plan, and therefore postpone the project significantly.

The CityLoops project managers have drafted a revised version of the circular criteria which come into effect if IKANO goes forward with the plan to leave the majority of existing structures standing. The updated criteria specify that structures do not need to be demolished, but the components that are still demolished or stripped still need to be demolished selectively with maximum direct recycling. It also specifies that structures that remain standing will be counted as 100% recycled.

At the time of publishing, the details of the project have not been finalized. The exact degree to which the building will be transformed rather than demolished has yet to be determined, as it will be based on the intersection of constantly changing market factors and the project budget.

Adaptive reuse vs demolition

Upon measuring the avoided CO₂-emissions that would result from leaving the city hall building standing and converting it to housing rather than demolishing, it becomes very clear that this trumps all other circular initiatives that are based on recycling demolition waste by several orders of magnitude. A conservative estimate results in 2000 tons of CO₂-savings (in

comparison, recycling concrete for the foundation of the new city hall resulted in 6.6 tons of CO₂-savings). In addition, a rough estimate reveals a potential savings of more than 20.000 tons of raw materials.

This must therefore be emphasized as a first priority – both to others planning on doing circular building projects and internally within the municipality: If you can avoid demolishing and instead maintain and renovate the buildings you have, that is what you should do. Part of the reason the initiative to demolish the old city hall and build a new one even started was that the old city hall had not been well-maintained. This meant that the cumulative damage to the building due to things like leaky roofs made potential renovation seem like an insurmountable task. If you maintain the buildings you have, use them to their fullest potential, and renovate if you need them for another use, this will give the greatest natural resource and CO₂-savings rather than building a new building (even if it is made of recycled materials).

Pre-demolition screening & selective demolition

A preliminary pre-demolition screening and resource mapping has taken place. The mapping outlines the different material types in the building and their potential uses, including how the material must be taken down or demolished depending on the planned reuse. For instance, direct reuse involves careful disassembly, while materials that will be transformed in the recycling process can be handled less delicately.

The demolition or stripping of the building has not yet taken place.

Soil management

Preparations

The CityLoops project managers are in close dialogue with IKANO regarding soil balance and opportunities for reusing soil on site as well as local re-use off site. IKANO and their consultant (WSP) are working to identify local off-site reuse locations. WSP will create a log documenting effort to reuse as much soil as possible.

Additional geotechnical drillings were performed with extra focus on reuse potential of the soil.

Most probably the greatest challenge will be reuse of topsoil, since there is a general surplus of topsoil on the market as a result of urban development areas on former agricultural areas generating large amounts of excess topsoil. Initial soil accountancy shows a surplus of approximately 60-70 000 m³ of topsoil on the city hall grounds.

IKANO's schedule is being adjusted due to market conditions challenging the project finances (increasing prices). Therefore, focus is currently on the parts of the grounds that do not currently contain buildings and therefore would not require demolition. A clarification about the schedule for the remaining areas is expected soon.

An advantage of the delays is that IKANO had more time to engage in market dialogue regarding circular potential.

It is likely that the potential change in project to adaptive reuse rather than demolition will result in the generation of less excess topsoil, as fewer new areas will need to be dug up. Seeing as the project details are not yet finalized, no results can yet be presented for comparative soil balance prognoses.

Reflections on collaboration

The pre-purchase development agreement resulted in a very fruitful collaboration with the possible developer – with a practical and targeted vision of how the area could be developed. Pre-purchase development agreements are in general quite common in Denmark.

At an early stage, while the details of the pre-purchase development agreement were still being outlined (pre-CityLoops), one of the future CityLoops project managers, working in the environmental department, approached the urban development department to discuss the opportunities for including sustainability criteria when selling the old city hall. At the time, economic interests and perceived costs of sustainability initiatives dissuaded the urban development department from integrating any specific sustainability initiatives into the material. The pre-purchase development agreement was thus entered without specific sustainability criteria, but rather a recognition of intent towards sustainability. In the years since, there has been a change in focus such that sustainability has been a higher priority. When the idea of implementing circularity was brought up again in conjunction with more detailed planning of the tendering material for selling the grounds of the old city hall, the idea was embraced. The CityLoops project manager offered help formulating the criteria for the tendering material, and furthermore offered assistance from an experienced consultant. The collaboration and understanding between the urban development department, the urban planning department and the CityLoops project managers in the environmental department was a great advantage. The collaboration helped break down barriers between possible municipal silos.

While focus within the organization has shifted towards a higher prioritization and focus on sustainability, it is still largely left to chance on a case-by-case basis whether or not the people involved consider it or are given specific mandate to prioritize it. In order to ensure that circularity criteria are implemented in future similar cases/projects, a more structured approach must be established. This would involve, among other things, a requirement that sustainability is considered at specific checkpoints in a project. This approach will be suggested in the future citywide sustainability strategy and action plan which the CityLoops project managers in the environmental department are in charge of, in cooperation with the internal sustainability group.

Lessons learned

The process described above led to the following lessons learned:

- The CO₂ and raw material savings from adaptive reuse of a building instead of demolishing it and constructing a new building far exceeds the potential savings from recycling building materials or other circular initiatives and should therefore be prioritized in future projects.
- The collaboration and understanding between the urban development department, the urban planners and the CityLoops project managers in the environmental department was a great advantage. The collaboration helped break down barriers between possible municipal silos.
- A fruitful pre-purchase collaboration is a great support in identifying possible circular actions. Future pre-purchase development agreements should include sustainability and circularity criteria, rather than leaving this for later in the process when the development partner can potentially refuse such initiatives or when previous agreements which are financially or legally difficult to modify can present barriers to circular initiatives.
- It is possible to successfully implement circularity criteria in the tendering of a building for demolition.
- A structured approach is required if sustainability criteria in the sale of municipal property is to become standard practice. Such an approach would involve sustainability being considered at specific checkpoints in a project. This approach will be suggested in the upcoming municipal sustainability strategy and action plan.
- IKANO has provided the feedback that the selective demolition tool developed through CityLoops is too long and heavy to read. The Danish standards for demolition already include a high degree of sorting, so for the consulting engineers reading the demolition guide it seemed merely to be a description of standard practice.

CITYLOOPS

CityLoops is an EU-funded project focusing on construction and demolition waste (CDW), including soil, and bio-waste, where seven European cities are piloting solutions to be more circular.

Høje-Taastrup and Roskilde (Denmark), Mikkeli (Finland), Apeldoorn (the Netherlands), Bodø (Norway), Porto (Portugal) and Seville (Spain) are the seven cities implementing a series of demonstration actions on CDW and soil, and bio-waste, and developing and testing over 30 new tools and processes.

Alongside these, a sector-wide circularity assessment and an urban circularity assessment are to be carried out in each of the cities. The former, to optimise the demonstration activities, whereas the latter to enable cities to effectively integrate circularity into planning and decision making. Another two key aspects of CityLoops are stakeholder engagement and circular procurement.

CityLoops started in October 2019 and will run until September 2023.



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