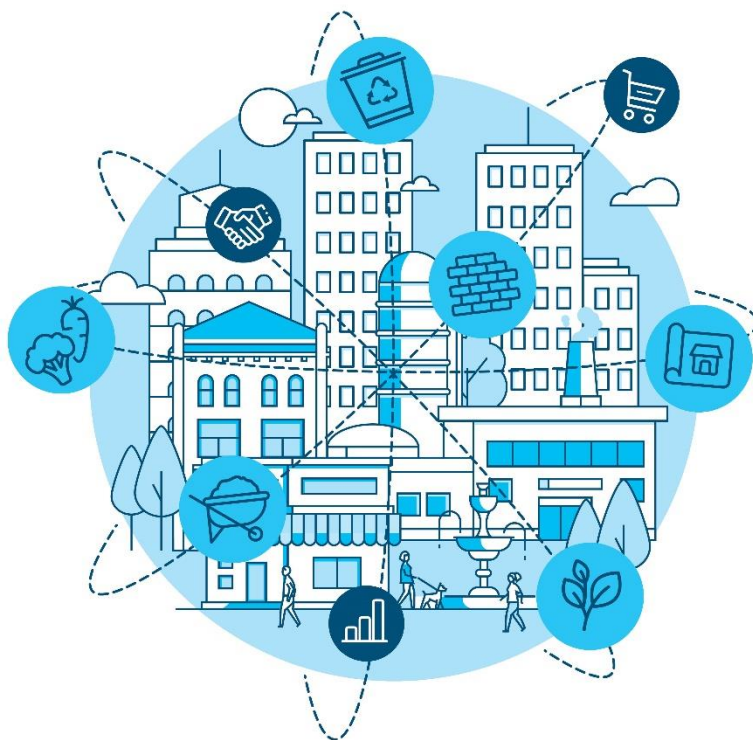





Høje Taastrup

Optimised Implementation Plan – CDW

Høje Taastrup Kommune



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Abstract	This Optimised Implementation Plan explains how Høje Taastrup will implement the tools and processes developed in the project preparation phase in its demonstration action, and how relevant local stakeholders and CityLoops project partners will be involved.
Keywords	Demonstration; implementation; plan
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Høje Taastrup's demo projects

The municipality does not own most of the pilot construction projects. The demonstration actions of Høje Taastrup (HTK) address this challenge by aiming to influence a large number of construction and demolition projects with different ownership in order to encourage circular practices. Some projects are municipal while others are private, and they are at different stages of planning and execution at the start of the project. This enables HTK to see what impact the municipality can have by getting involved at various phases of each project and to develop and test planning and decision-making frameworks through these cases.

1. Demo 1: Implementing circularity when selling town hall for demolition

1.1. Short description

HTK intends to implement selective demolition and circularity when selling the existing town hall for demolition. The municipality is preparing a sales tender of the grounds the building is on. The sale includes demolition of the existing building. The municipality has the opportunity to impose conditions in the tender about how the demolition will take place. The aim is to impose a criterion that as much building material as possible should be reused and as much soil as possible should be kept on-site. During the demolition process, the municipality will be in close dialogue with the demolition company and the developers, as well as other potential buyers of the materials from the demolition. The recoverable materials will be incorporated into new buildings or crushed on-site and used as filler. Some materials may also be used in other (as of yet unidentified) building projects off-site. Soil is either prevented from being dug up or reused on site.

1.2. Activities

Activities	Timeline	Responsible partner
Planning and decision-making process with owner/ developer and town hall	Oct 2019 – May 2021	HTK + Ikano
Tendering materials for sale of grounds	June 2021	HTK

Pre-demolition screening	June-Dec 2022	Consultant as of yet not chosen, overseen by HTK and CRD
LCA calculations for concrete and soil	June-Dec 2022	HTK and Danish CityLoops partners
Assessing soil reuse potential by Geotechnical drilling tests	June-Dec 2022	HTK and Danish CityLoops partners
Demolition works, with circular CDW and soil management	Oct 2022 – Oct 2023	Demolition contractor, with oversight by developer and HTK
Recovery and transformation of materials for future uses	Oct 2022 – Oct 2023	Demolition company and developer, with support from HTK and CityLoops partners

1.3. CityLoops tools/processes tested

Lifecycle CO₂ calculator for construction materials

The CO₂ calculator tool for concrete will be applied to building materials to see the comparative benefit of keeping them in the new structures to be built, and LCA tool for soil will be used to estimate the potential CO₂-savings of keeping the soil on site. This will be used as an argument for a circular approach.

Screening tool for selective demolition

The Danish Technological Institute has done a preliminary resource mapping of the Town Hall. The consultant has used this screening to do an initial inventory of the old town hall. A more detailed screening based on the tool for selective demolition, including guidelines for pre-demolition audit and selective demolition, is needed and will be performed, paid for by either the municipality or the buyer. The Royal Danish Academy on Architecture is likely to contribute research on this by identifying suitable uses for the materials.

Framework for developing a circular soil strategy

The experiences from this demo-action will feed into developing the framework for a circular soil strategy. HTK is trying to influence the developers to reuse the soil, in dialogue about reusing as much as possible on site. The idea is to use it for landscape features. The incentive is saving transport, but the municipality has no legislative handle to force this.

Tool/methodology for assessing soil reuse potential

Geotechnical drilling tests will show what kinds of soil are present on site, to identify the types of soil and the reuse potential for different purposes. The intention is to use it in a recreational park on-site. It's mostly not polluted soil, so it should be suitable for the planned use.

The tools can be seen here: [CityLoops Tool Factsheets](#)

2. Demo Action 2: Høje-Taastrup's New City Hall

2.1. Short description

A new town hall will be built using recycled concrete in the building foundation and other components. The concrete comes from demolition of eight apartment blocks at Taastrupgård (Demo action 3) owned by KAB, a social housing company. Excess soil from the construction of the town hall will be used in Taastrupgård. It is not possible to use it on-site as it is a very small site with no space for storing the soil.

2.2. Activities

Activities	Timeline	Responsible partner
Tendering process for construction of new town hall	Jan – Dec 2020 (M3-12)	HTK
Construction of new city hall, including use of crushed concrete from Taastrupgård as recycled aggregates in new concrete for the foundation structure	Oct 2020 – Sept 2022 (M12-36)	HTK, CRD, CASA, UNICON, MUNCK , Norrecco, Pelcon, CityLoops partners
Local reuse of excavated soil	Jan - July 2021	HTK and KAB
LCA on soil and concrete	June - Oct 2021	HTK

2.3. CityLoops tools/processes tested

Lifecycle CO₂ calculator for construction materials

The CO₂ calculator tools will be applied to concrete and soil to see the comparative benefit of keeping them in the new structures to be built, thus demonstrating the environmental impact from circular construction.

The tool can be seen here: [CityLoops Tool Factsheets](#)

3. Demo Action 3: Taastrupgård:

3.1. Short description

This action consists of demolishing eight apartment blocks and recycling the concrete. KAB, owners of Taastrupgård, have agreed to allow the municipality to have some of the concrete, and the demolition company Søndergaard has agreed to deliver the concrete from the demolition to other projects. The demolition was carried out in 2020. It resulted in 10,000 tonnes of concrete for recycling. Afterwards, the concrete underwent testing of quality, crushing and storing. Of this, 2,000 tonnes will go into making the foundation and other components of the future city hall (See demo action 2); the other 8,000 tonnes will go into other projects such as filler under a learning centre, which will be built at the same location as the demolished apartment blocks, and filler in the nearby neighborhood development area Høje-Taastrup C.

Gadehavegård is a potential replication project in Høje Taastrup. These building blocks are owned by DOMEA, and some of them are also going to be demolished. The municipality will try to instigate recycling of concrete based on the experiences from Taastrupgaard, transferring the experiences from Taastrupgård about testing the quality of the concrete, screening the buildings etc.

3.2. Activities

Activities	Timeline	Responsible partner
Dialogue with owners KAB, demolition contractors, and companies for logistics (moving, cleaning, crushing, storing concrete)	Oct 2019 – March 2021	HTK
Demolition with separate collection of recoverable concrete	November 2019- November 2020	Søndergaard demolition with oversight by HTK
LCA calculation on concrete	June-Oct 2020	HTK
Transformation: Crushing, cleaning and storage of concrete – for uses elsewhere	August 2020- March 2021	Norrecco, with oversight by HTK
Using recycled concrete in new construction	March 2021 – April 2021	HTK is responsible for the volume used for the new town hall.

3.3. CityLoops tools/processes tested

Lifecycle CO₂ calculator for construction materials

The CO₂ calculator tools are applied to concrete to see the comparative benefit of recycling concrete.

The tool can be seen here: [CityLoops Tool Factsheets](#)

4. Demo Action 4: Recycled sidewalk tile

4.1. Short description

The concrete factory IBF will develop and produce a tile from 30% recycled concrete from excess concrete in their own production. It is locally produced in Hedehusene. Høje Taastrup will look for possible test areas to try out the tiles in an area where the sidewalk is renovated (approximately 100m sidewalk). After the first winter it is evaluated, and it is evaluated again after five years. Based on the first evaluation the municipality will decide whether they will use these tiles in other areas, and eventually in all of Høje Taastrup.

4.2. Activities

Activities	Timeline	Responsible partner
Negotiations with tile factory	Aug 2020 – Mar 2021	HT
Procurement of tiles	Nov 2022	HT
Laying tiles in test area	Nov 2022	HT
First evaluation with regard to possible upscaling	June 2023	HT
Evaluation after five years	June 2028	HT

5. Demo Action 5: Circular soil management

5.1. Short description

The focus of this action is on creating circular soil management at city level in order to keep excavation of soil to a minimum and use excess soil locally, instead of driving it farther away. A draft of the circular soil framework (tool 3) will be tested in this demo action, and results will feed into a template for the municipal soil strategy developed at later stage in the project.

In HTK, the framework will be used for developing a politically adopted soil strategy, which will be used for managing soil from construction projects. An instrument for predicting how much soil will be excavated in the municipality will be developed and tested (tool 4), thus making it possible to feed into a soil strategy which adequately meets future challenges. A basic tool will be developed and tested for assessing the re-use potential of soil (tool 5) focusing on types of soil suitable for different purposes of re-use, e.g. substitution of sand in roads/construction works or for landscaping or other use. A methodology will be developed and tested for the identification and assessment of relevant sites/projects fit for soil reuse (tool 6), based on a wide range of readily accessible (geospatial) data combined with cost-benefit analyses by applying the ecosystem services methodology.

5.2. Activities

Activities	Timeline	Responsible partner
Prognosis: Prediction of future excess soil in HTK, as a baseline study (tool 4)	April 2020 – March 2021	CRD and HTK
Interviewing stakeholders (developers and contractors) identifying barriers to why soil is not reused	November 2020 – March 2021	CRD, HTK, RK
Methodology for assessing soil reuse potential will be tested with a small number of developers in 1-2 sites in the two urban development projects called “Høje Taastrup C” and “Nærheden”.	Jan – Aug 2021	HTK
Methodology for identifying sites/projects fit for soil reuse will be used in HTK	Jan – Aug 2021	HTK, RK, CRD
Developing a circular soil strategy for HTK	Oct 2019 – Sep 2023	HTK assisted by CRD

Adoption of the circular soil strategy by the City Council in HTK	Mar - Sep 2023	HTK
Evaluating effect of circular soil initiatives on amounts of excess soil	Sep 2021 - Sep 2023	HTK assisted by CRD

5.3. CityLoops tools/processes tested

Framework for developing a circular soil strategy

HTK will develop the framework for a circular soil strategy at municipal level with Roskilde and CRD and use this framework to develop a circular soil strategy for the municipality of Høje Taastrup. The effect will be evaluated on an annual basis by comparing predicted soil volumes with soil volumes actually produced in corresponding years. Provided that construction and development activities are carried out according to data used for modelling and prediction, the predicted annual soil volumes can serve as a baseline. Any relevant behavioral change can be compared with this baseline. If municipal plans or construction works are adjusted in 2021 in order to prevent or reduce production of excavated soil, the volumes predicted for the years after 2021 will exceed the volumes realized.

Instrument for predicting future excavated soil production

HTK has developed this tool together with Niras, CRD and Roskilde and has used it to predict annual volumes of future excavated soil within a period of 12 years (2020-2031). It will be evaluated by comparing predicted soil volumes with annual soil volumes reported for a period of 12 years. The prediction is based on a “business as usual” scenario, i.e. a situation where municipal planning and construction activities are performed without paying special attention to excavation and production of excavated soil.

Tool/methodology for assessing soil reuse potential

HTK will develop a tool to assess soil re-use potential with CRD and use it in demo-projects at 1-2 sites in urban development projects in Høje Taastrup C and Nærheden with a small number of developers.

Tool/methodology for identification and assessment of sites/projects fit for soil reuse

HTK will develop a methodology for identification and assessment of sites fit for soil reuse with Roskilde and CRD and use it to identify sites fit for soil re-use in Høje Taastrup, assessing the benefits and applying this knowledge when planning how to dispose of soil from construction sites within the municipality.

The general soil policy and strategic approach will focus on minimising the production of excavated soil and, secondarily, to keep excavated soil on-site if possible. Thus, it is

important that this mapping of sites fit for soil reuse is used in an appropriate manner to ensure that it is not counterproductive to the general objectives of the soil strategy.

The tools can be seen here: [CityLoops Tool Factsheets](#)

6. Expected outcomes & evaluation

The future town hall and the neighbourhood around Taastrupgård and Høje Taastrup C are built partially with materials from Taastrupgård and the current town hall, and/or have crushed materials from the demolition as filler. All excess soil is reused on-site or locally, minimising the number of trucks in the city transporting soil.

10,000 tonnes of crushed concrete from Taastrupgaard will have been prepared for recycling: 2,000 tonnes have been crushed and sorted to aggregates for new concrete foundations and components for the new town hall, and 8,000 tonnes have been used as backfill in local construction projects at the Taastrupgård site and in the nearby Høje Taastrup C.

The procedures for construction and demolition projects in HTK will start changing. It becomes expected practice in municipal tenders to take reused or recycled materials into account already from the planning phase and include these in the tendering, and a circular mindset will permeate each stage of construction and demolition project execution.

HTK will have a politically adopted circular soil strategy defining goals and procedures for keeping soil on-site or using it locally.

Further information on Høje Taastrup's demonstrations can be seen at:

<https://cityloops.eu/cities/hoeje-taastrup>

7. Planning & Decision Making Guidelines

Experiences from the tendering and other preparatory works as well as from the process on demolishing and recycling the old town hall will feed into the guidelines, as will experiences from recycling the concrete from Taastrupgård for the new town hall. The process of transferring the concrete from Taastrupgård to the new town hall will be described for each step of the value chain, including barriers and how they have been negotiated, providing a valuable input for these guidelines.

8. Business Cases

At the existing town hall values of materials and transport will be estimated in order to make a comparison, and HTK will assist the buyer in trying to find a market for the materials that are not used on-site. If possible a business case showing the economic output of the selective demolition will be prepared. The business case for using recycled materials will be investigated at the new town hall, where recycled concrete from Taastrupgård is being used in the new concrete. Regarding soil, the impact of the soil strategy on the total cost of handling excess soil will be evaluated.

9. Risks

Potential risk	Mitigation approach
As HTK doesn't own the buildings/ sites in many of the demo cases, they cannot force the owners/ developers to use circular methods. HTK CityLoops team can only have dialogue and encourage them to use a circular approach.	Ensure HTK internal team is knowledgeable about levers to influence the project outcomes, initiate and maintain dialogue with key decision makers, present clear and sensible arguments for why to use a circular approach (economic, environmental, for achieving city's policy goals, positive image for businesses).
High risk aversion (due to fear of increased costs) of those writing the tendering materials to incorporate conditions on selective demolition and reuse of materials for the sale of the existing city hall grounds; Aversion of buyer to build with recycled materials due to perceived barriers such as higher cost, lower quality, lack of product guarantees or aesthetic considerations. Risk of the project ambition being lowered for political (economic) reasons	Presentation of stronger evidence of quality and price of recycled materials to those writing the tendering; Dialogue with demolishers in order to encourage them to use selective demolition; identification of buyers of materials in order to reinforce the business case of recycled materials; Compromise with buyer to only use the materials from the demolition crushed on site as filler and not as building material as a last resort. There is a strong business case for keeping the material on-site so the risk that they will not want to do this is very low.

In the case of soil, aversion to apply circular soil practices (resistance in internal dept. of HTK).	New criteria in the DGNB certification gives points for soil balance on site – which has proven an extra motivator for those not otherwise interested in this approach.
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CityLoops is an EU-funded project focusing on construction and demolition waste (CDW), including soil, and organic waste (OW), 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 OW, 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 aspect of CityLoops are stakeholder engagement and circular procurement.

CityLoops runs from October 2019 until September 2023.



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