

## SMART USE OF SPACE

### How to deal with the growing pressure of urbanization in Flanders

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#### Keywords

smart use of space, spatial policy, reuse of space, previously developed land (PDL)

#### Abstract

Due to urbanization, Flanders, the northern part of Belgium, is one of the most densely built and inhabited regions in Europe. The growing pressure of urbanization is expressed by an increasing built-up surface. Projections indicate that 30 to 50 per cent of the area of Flanders will be built-up in 2050 (Poelmans, Van Rompaey & Batelaan, 2010). To slow down this urbanization trend, a more sustainable spatial development with less use of undeveloped land has to be considered. In the framework of the Spatial Policy Plan Flanders 2020-2050 this principle is translated into the concepts of 'smart' and 'careful' use of space, related to the 'Three R principle' of waste management: reduce, reuse and recycle. Translated to spatial planning objectives, the growing pressure on greenfield areas should be reduced and existing structures should be reused and recycled by constantly reusing them.

This article presents the results of a research for the Flemish Spatial Planning Department and focuses on the localization of reusable space, the stimulating and obstructing factors, its potentials and the integrated implementation in spatial policy. Currently, there is no 'tool' to locate reusable space and the majority of new developments still focus on greenfields. Firstly, the study introduces the idea of 'reuse of space' in Flemish spatial planning. Contrary to the restricted definition of the concept in the field of brownfield development, in this research reuse of space is defined broader than merely the development of contaminated sites. The concept has more resemblance with the term previously developed land (PDL): "land or premises which have been previously used or developed and are available for use with or without intervention" (Ganser & Williams, 2007, p.603). Secondly, the potentials of reusing space are analyzed through different case studies and the amount of reusable space in Flanders is quantified in a GIS-analysis. Finally, in order to implement reuse of space in spatial policy, the resulting data are used to construct different spatial typologies in Flanders, based on the potential reusable space.

The research shows that focusing on previously developed land can be a method to reduce the growing pressure on greenfield sites, resulting in less use of space.

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## 1. Introduction: Sustainable spatial planning in Flanders

Flanders, the northern part of Belgium, is coping with a growing urbanization. A large transformation in land use from open space (agriculture) to urbanized land takes place, which makes it one of the most urbanized regions in Europa. This transformation results in a fragmented urbanizing pattern and an increasing built-up surface. The proportion of built-up land is significantly higher in Flanders than in the neighboring countries (Poelmans and Van Rompaey, 2009; Poelmans et al., 2010). Today, more than 25 per cent of the Flemish area is developed and according to the different scenarios, this will increase up to 30 to 50 per cent towards 2050.<sup>2</sup> This leads to a growing pressure on undeveloped areas.

If we want to find an answer to this increasing pressure, we should learn to cope in a sustainable way, with the available space in Flanders. In the Spatial Structure Plan for Flanders<sup>3</sup>, the concept of sustainable spatial planning has already been introduced: *“a development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs”* (Vlaamse Overheid, 2011 - own translation). As a follow-up for this structure plan, the department of Spatial Planning of Flanders is now preparing the new Spatial Policy Plan Flanders 2020-2050<sup>4</sup> (BRV). In this policy plan, the concept of sustainable spatial planning is translated into the concepts ‘smart’ and ‘careful’ use of space. The preparation of the Green Paper for this BRV proposes to let Flanders evolve into a region in which the total amount of built-up land won’t increase. With this proposal, they take part in the ambitious objective of the European Commission to run down the additional use of undeveloped land in the European region to zero. At the same time, Flanders has to cope with a population growth from 6.3 million people in 2010 to 7.5 million people in 2050. Consequently, one of the main challenges in spatial policy in the coming years will be to tackle the expected growing pressure on undeveloped land in a sensible way.

Although different studies on the theoretical concept of reuse have been carried out, less attention has been paid to the implementation of reuse in practice. The objective of the study at hand on reuse of space<sup>5</sup>, subject of this article, was to provide inspiration to introduce and translate the concepts ‘reuse of space’ and ‘reversible space’ into the future spatial policy (BRV) (van Acker et al., 2012). The reuse of space (in addition to intensive and reversible use of space) can be one of the main thoughts for offering living and working space in Flanders in the future.

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<sup>2</sup> Percentage of built-up land in surrounding countries: The Netherlands 11.5%, France 5%, United Kingdom 7.5%, Germany 8%

<sup>3</sup> Ruimtelijk Structuurplan Vlaanderen (RSV).

<sup>4</sup> Beleidsplan Ruimte Vlaanderen (BRV).

<sup>5</sup> The study ‘Slim Ruimtegebruik door hergebruik en omkeerbaar ruimtegebruik’ (Smart use of space by reuse and reversible use of space) was conducted by TRITEL and the Center for Mobility and Spatial Planning of Ghent University, under the supervision of the Flemish Department of Spatial Planning, Housing Policy and Immovable Heritage.

In this article a theoretical framework for ‘reuse’ as a part of ‘smart use of space’ is explored. Furthermore, in order to implement reuse of space in the Flemish spatial planning policy, a tool to locate and quantify the amount of reusable space in Flanders is proposed and the categorization of different spatial typologies of reusable areas with a selection of ‘hotspots’ is introduced.

## **2. Theoretical framework: Reuse of space within the context of smart use of space**

The translation of a more sustainable spatial development into the concept of smart use of space with a focus on reuse of space, asks for a further exploration of the different concepts.

### **Smart and careful use of space**

Careful use of space is defined by Van Den Broeck et al. (2010) as the active and critical use of space to prevent wastage (economical use of space) and to solve wastage (reuse, joint use and new use of space, with renewable sources and materials). It takes into account the carrying capacity of an area and its context and goes beyond individual needs in order to create public added value. This definition is related to the principle of ‘reduce - reuse - recycle’ as will be described later.

Literally, reuse is described in the Oxford Dictionary as “*use again or more than once; the action of using something again for the second or further time*”. It is not possible to translate this definition unambiguously into a context of spatial planning. Therefore, the next paragraphs try to explain related words and definitions.

### **Reduce - reuse - recycle**

The conceptual framework and the principles of sustainable spatial development have strong parallels with the sustainability principles that were created for waste disposal. By analogy with the principles of waste management, the ‘Three R-principle’ (reduce-reuse-recycle), also known as ‘the ladder of Lansink’<sup>6</sup>, may be utilized to reduce pressure on greenfields. If we apply the 3R-principle in the context of smart use of space, in order to do more with the existing built-up space and consequently stop further urbanization, we can describe the basic principles as follows. In the first place (reduce), additional activities should always find a place within the existing and available urban area. By bringing activities in close proximity to each other or even interweave them, possibilities arise for multiple use of the same space. As a result, the demand for space, which leads to a pressure on new undeveloped areas or greenfields, is reduced. Secondly, the reuse opportunities of well-located but insufficiently used space should be maximally utilized (reuse). This is not an easy task, because of the many practical difficulties that are involved with the transformation of existing buildings or decontamination of soils. Nevertheless, through a consistent policy in terms of reuse, brownfield development could be made

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<sup>6</sup> The ladder of Lansink is named after the Dutch Politician Ad Lansink, who introduced this method of working in 1979 in the Netherlands.

more competitive compared to greenfield development. Thirdly, we must encourage forms of reversible space (recycle), especially in cases where new open space will be developed. This means that space is conceived as recyclable, with future possibilities to return to an original condition.

### **Adaptive Reuse and Previously Developed land**

In the context of architecture and urbanism, the concept ‘adaptive reuse’ is used for reuse of industrial heritage. Peter Suzuki defines it as follows:

*“Adaptive reuse, [...] refers to the rehabilitation of a building/set of buildings or district for a use, or uses, different from what the original purpose(s) of the structure/structures or neighborhood had been.”* (Suzuki, 1996, p.562)

He describes adaptive reuse as the counterpart of ‘demolition in the name of urban renewal’, one of the two options for ‘previously-developed land’ (PDL). In the Planning Policy Statement of London on Housing, following definition is used for PDL:

*“Previously-developed land is that which is or was occupied by a permanent structure, including the curtilage of the developed land and any associated fixed surface infrastructure.”* (Communities and local Government: London, 2006, p.26)

The initial use of this definition has often led to confusion. Although not intended, agricultural land and private gardens were part of the description. This is the reason why the definition is revised in more recent policy documents. In this way, a better definition is given by Ganser and Williams (2007): *“land or premises which have been previously used or developed and are available for use with or without intervention”*. To extend this definition, the authors emphasize that the focus is on built-up space.

### **Brownfield - Greenfield**

Reuse is often named in combination with brownfield development. During the last decade, the definition of brownfields has evolved from contaminated areas to a broader definition of underutilized, sometimes contaminated, formerly developed areas.

*“In common usage brownfields refer to previously developed land or derelict, encompassing a range of sites in terms of size and location.”* (CABERNET, 2010)

In this way, the concept has resemblance with the previously-developed land defined by Ganser and Williams. The definition in the Flemish policy documents is similar to the definition of CABERNET. The decree on brownfield development of the Flemish Government states that these wastelands or brownfields have a potential to reuse, but it involves considerable development costs. For this reason, investors and project developers prefer greenfields to brownfields (Vlaamse Overheid, 2007). In the

broadest sense of the Flemish brownfield policy document, brownfields are thus 'reusable areas'.

## **Reuse**

In the context of sustainable spatial development in Flanders, reuse is one of the methods to cope with the available (free) space. Complementary to reducing the demand for space, it is another method to decrease the development of new (undeveloped) space. The term reuse as used in the study 'Smart use of Space', therefore encompasses more than just the development of contaminated sites, but refers to the broadest definition of brownfields as reusable areas.

Reuse can therefore be defined as using existing built elements, structures or buildings for new or similar functions or destinations, mainly in built-up or developed areas. It is essential that by reusing space, no new (greenfield) areas are used and that it remains possible to reuse space again in the future (reversible use of space). From this point of view, reuse is one of the strategies to achieve a smart or careful use of space.

### **3. Localization and quantification of the amount of reusable space**

Despite several studies on sustainable spatial development and reuse, today, the majority of new developments in Flanders are still focused on undeveloped space or greenfields. If we want to change this policy, it is necessary to be able to indicate and locate reusable space. The remaining part of this article focuses on a tool to locate and quantify reusable space in Flanders and on a way to implement reuse of space in spatial policy. Besides indicating reusable locations, we also try to indicate the reuse potentials. How likely is it that reuse will function at this location? What are the preconditions? This will result in a reuse potential map for Flanders.

#### **Adaptive reuse potential**

Shen and Langston (2010) present an interesting study on the reuse potential, introducing the concept 'adaptive reuse potential' (ARP) to measure the reusability of buildings. They make a difference between the useful and physical life of the building stock and propose an integrated model to predict the potential reusability of buildings on a micro scale and to advise policymakers on how to deal with it.

To give an ARP score to a building, a number of data (building age, any refurbishment, prediction of physical life of the building, ...) have to be available, which makes this mapping impossible on the scale of Flanders. However, the application of the ARP score could help with assigning a priority to the different buildings with high reuse possibilities that should be taken into account by the policymakers. Thus, when the reusable space is located, in particular the reusable buildings, calculating the ARP score could be a next step.

## Localization and quantification of reusable space in Flanders

In order to develop a method to identify reusable space in Flanders, the hot-cold method of Eric Frijters and Atelier Verborgten Land, introduced in the publication 'Tussenland' (2004), can give inspiration. In their research, a list of indicators that indicate the occurrence of one type of wasteland, intermediate land<sup>7</sup>, is compiled. These indicators are included in 'condition maps' reflecting conditions which stimulate intermediate land (warm conditions) or hinder the emergence of it (cold conditions). If these 'warm' and 'cold' maps lay on top of each other, an overall picture of 'hot areas' and 'cold fronts' emerges. These maps show the possibility of existence of intermediate land in gradations from white to red. The redder, the more possibilities for intermediate land to emerge. The methodology used in this book is intended to track intermediate land, but with the right adjustments it can be used to locate reusable land.

### Screening: hot-cold analysis

The hot-cold analysis in the study at hand on reuse of space is a cartographic tool to locate and quantify interesting reusable areas in Flanders based on GIS analysis. Similar to the methodology described in the publication 'Tussenland', different condition maps are the result. The selection of areas eligible for reuse is formed by several steps.

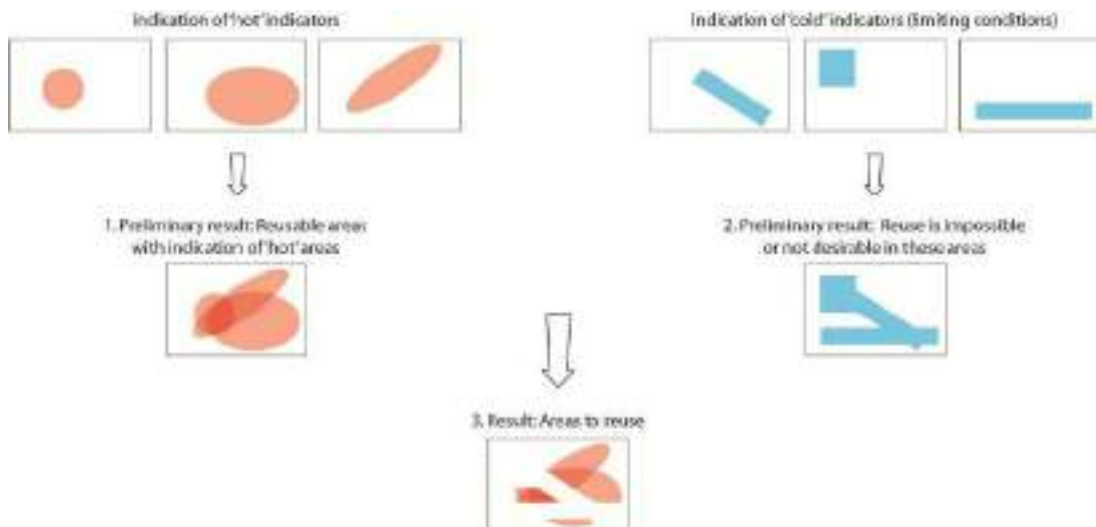


Figure 1. Hot-cold analysis: diagram

At first the hot indicators are presented, an indication of all areas that may be reused (figure 1 - point 1). In a GIS environment, several data layers were collected and represented. By giving a certain transparency to the layers, those places with different 'hot' indicators on top of each other are represented darker. In this way, 'hot areas' appear in which different indicators point to high reusability potentials. Examples of these data layers are empty buildings, contaminated land, architectural

<sup>7</sup> Intermediate land is a kind of wasteland, lying between city and countryside. It has characteristics of both, but cannot be reduced to one of them (Frijters, 2004).

heritage, mining areas, etc. Then, cold indicators provide limiting conditions: in these areas, reuse is impossible or not desirable (figure 1 - point 2). The related GIS data are merely based on nature conservation and development, flood risk, ... A part of the area that was first marked as reusable (point 1), is therefore excluded (figure 1 - point 3). We can illustrate this way of working with an example: in the first phase all contaminated sites are selected as reusable and form a 'hot' layer. Then nature reserves are designated as non-reusable areas; new developments for which nature must yield, are -in accordance with the spatial policy- not desirable. The contaminated areas lying in a nature reserve will therefore not be part of the areas to reuse.<sup>8</sup>

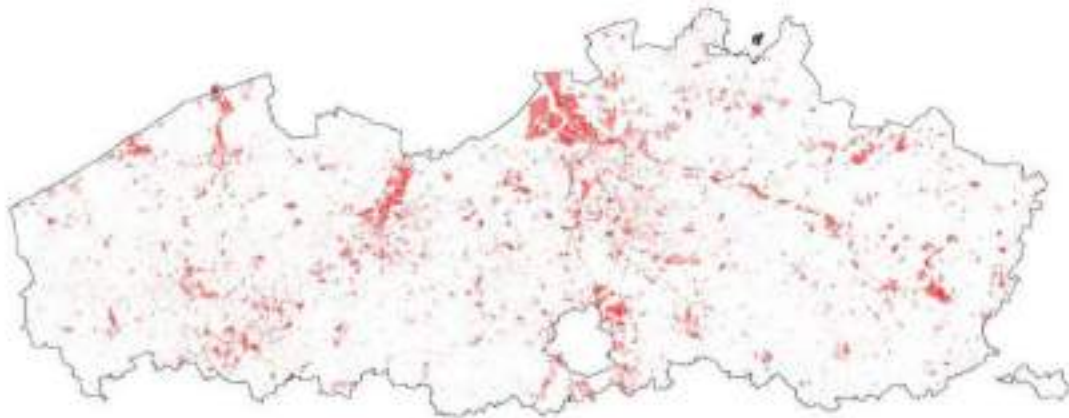


Figure 2. Areas with a high reuse potential in Flanders

The result of the hot-cold analysis is a map of Flanders, with an indication of the areas in which reuse is possible. A distinction is made between areas without opportunities to reuse and areas with a low or high reuse potential. Figure 2 shows the areas with a high potential for reuse. This is about 10 per cent of Flanders. The darker the area, the more factors that indicate potential reuse. The zone that isn't filled in in figure 2 has a lower or even no reuse potential.

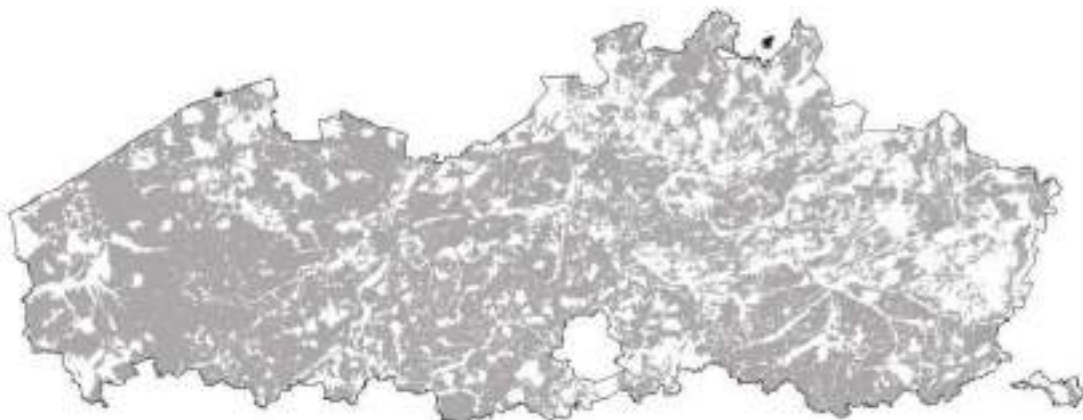


Figure 3. Areas with a lower/no reuse potential in Flanders (gray/white)

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<sup>8</sup> This is in line with the reuse definition: reuse is situated in built-up areas.

The distinction between low and no reuse potential is made in figure 3. The gray-colored areas (approx. 63 per cent of Flanders) on this map have a reuse potential, but this potential is lower than for the colored zones on figure 2. The white colored zone in figure 3 was identified as ‘cold indicator’ (figure 1) and is therefore not reusable. Table 1 shows the reuse potential in Flanders, with a distinction between areas without potential to reuse and areas with a low or high reuse potential. We can conclude that 72.5 per cent of Flanders is reusable in a certain way.

Table 1. Reuse potential in Flanders in hectares and in proportion to the total area

Reuse potential	Area	% of Flanders
Reuse is impossible or not desirable in these areas (white on figure 3)	373.691 ha	27,50 %
Areas with a low reuse potential (gray on figure 3)	850.900 ha	62,63 %
Areas with a high reuse potential (figure 2)	134.174 ha	9,87 %

### Analysis on a micro-level: potentials of reusing space

This screening with a hot-cold analysis indicates reuse possibilities in varying degrees. In a second step, nine case studies were analyzed at the micro level in order to check the screening.<sup>9</sup> The reversibility and reusability profiles were examined, in order to start a research by design (with the desired development in the framework of smart use of space). We do not discuss this analysis on a micro-level in this paper, but focus immediately on the conclusions. Are the areas, indicated as reusable on the Flemish level, also reusable in reality? In most cases they were. If the selection in the general screening was not successful and as a consequence reuse was not appropriate, this could be reduced to three reasons: missing data, opposing factors from the context and terrains that were not immediately available. The case study makes clear that the localization and quantification of reusable area by means of a hot-cold analysis on a scale of Flanders is valuable, but that not all potentially reusable space is (immediately) reusable.

## 4. Implementation in spatial policy

Ganser and Williams describe that

*“Urban brownfield sites are a major planning concern across Europe, and most European countries have strategies to reuse them. [...] However, approaches developed to tackle these sites vary considerably.”* (Ganser and Williams, 2007, p.603)

They admit that the definitions of brownfields are progressive, but in reality the national policies just focus on restricting pollution and decontamination. Integrated

<sup>9</sup> Three cases at a regional level (the 19<sup>th</sup> century developments of Ghent, the region of Kortrijk-Waregem and the basin of the Rupel) were selected, with three micro-cases in each regional case.

strategies are rather the exception. Schulze Baing compares different policies and admits that

*“only for a few countries, namely the UK, France, Germany and Belgium, brownfield land and brownfield regeneration has been identified as a national issue, [...]”*(Schulze Baing, 2010, p.25)

Flanders, as a part of Belgium, has indeed a brownfield policy, but the sites that are dealt with are merely contaminated sites. Reuse of space, broader than only contaminated areas, is still not adopted in Flemish Spatial policy. After localization and quantification of reusable space in Flanders, it is thus necessary to make some suggestions how to use these results in spatial policy.

Flanders aims at a more sustainable spatial planning with less use of undeveloped land or greenfields. Reuse is one of the strategies to achieve this target. With the current spatial instruments, nothing obstructs a broad implementation of reuse. However, it is evident that not the total amount of reusable area (as mentioned in table 1) can be considered now. Therefore, the study categorizes the areas in Flanders with a high potential on reuse (figure 2) in different spatial typologies, with specific reuse potentials, and selects some ‘hotspots’ for reuse to stimulate reuse of space (figure 4).

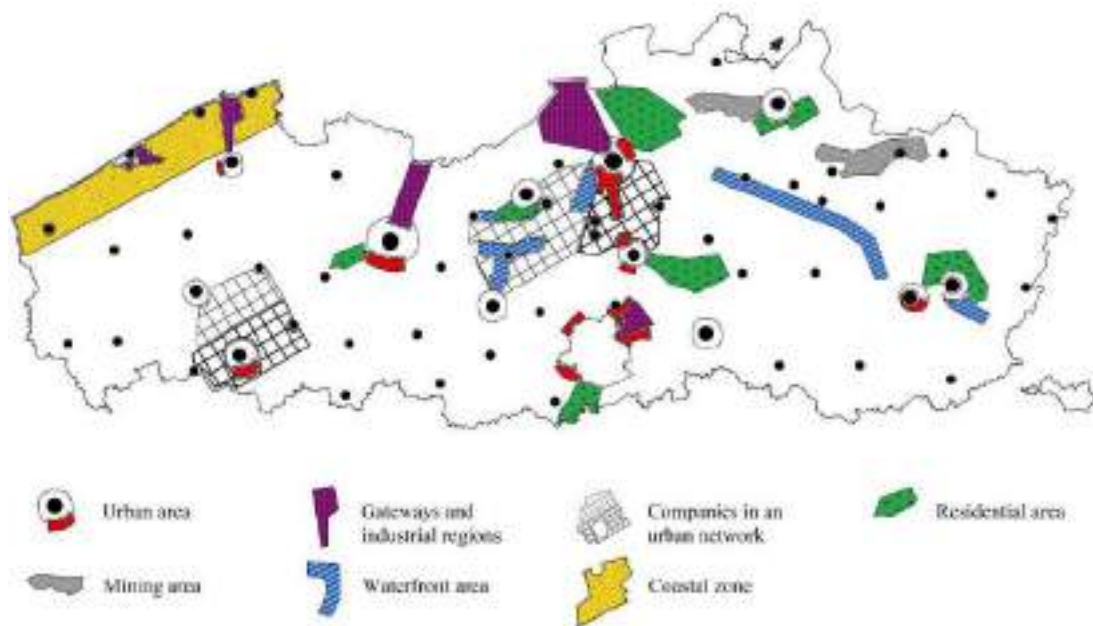


Figure 4. Different spatial typologies of reusable space in Flanders

By categorizing the reusable area, the findings and outcomes can be put together more easily. For example in urban areas (and especially in the city center), reuse is particularly applicable to the level of buildings. Cultural heritage plays an important role in this typology. Typical elements are churches, chapels and monuments, mainly (re)usable for public functions (library, museum,...). In this category, reuse is already a common phenomenon. One city learns from another and some realizations in one city can trigger other cities.

Next to the categorization of different typologies of reusable space, the study offers the possibility to select ‘hotspots’ of reuse to transform the theoretical analysis into realization. Hotspots were defined as areas with the highest reuse potential and with policy priority. This concept of selecting hotspots is in line with the ‘brownfield covenants’ in Flanders. These covenants are used by the government to make agreements with developers and investors (with some juridical, administrative and financial advantages) in order to promote the development of brownfield areas. Similar to these covenants, we suggest the development of charters between the Flemish government and the different actors to promote reuse of space in important reusable areas (hotspots). To determine which reusable areas are eligible to be selected as a hotspot, a yearly updated list can be set up. This list can be linked to the action program of the new spatial policy plan as mentioned before.

## **5. Conclusion**

With the expected population growth in Flanders, the growing pressure on greenfields will not decrease. At the same time Flanders wants to evolve towards a region in which the built-up area no longer increases. Reuse is one of the crucial keys to keep offering space in this context.

The study reveals that by focusing on reuse, it is possible to reduce the extra demand of space without letting it form a threat on societal developments. From the hot-cold analysis we can deduce that there are many reusable places in Flanders. Moreover, the analysis shows that only 27.50 per cent of Flanders certainly cannot be reused (table 1).

To what extent can we reduce or even stop the use of greenfields in Flanders with the principle of reuse of previously developed land? More than 25 per cent of the Flemish space is built-up and projections indicate that without a specific spatial policy, 30 to 50 per cent of Flanders would be built-up by 2050. This means an increase in built-up surface of about 5 to 25 per cent of the Flemish area. By focusing on reuse in the approximately 10 per cent of space with a high potential for reuse, in theory it is possible to limit the increasing hardening at 15 per cent instead of 25 per cent. In the most ideal scenario, it would even be possible to reduce the existing built-up space with 5 per cent by 2050 (instead of an increase of 5 per cent).

This assumption should be nuanced; most likely this scenario can’t be achieved just by applying reuse. This paper is therefore primarily an argument to deal more carefully with the available space and to change the state of mind. The results of the GIS analysis should be understood as a support of this idea instead of exact calculations. The main lesson that can be learned from the analysis is that we can do more with less use of undeveloped space in Flanders, .if we deal ‘smarter’ with the available space.

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