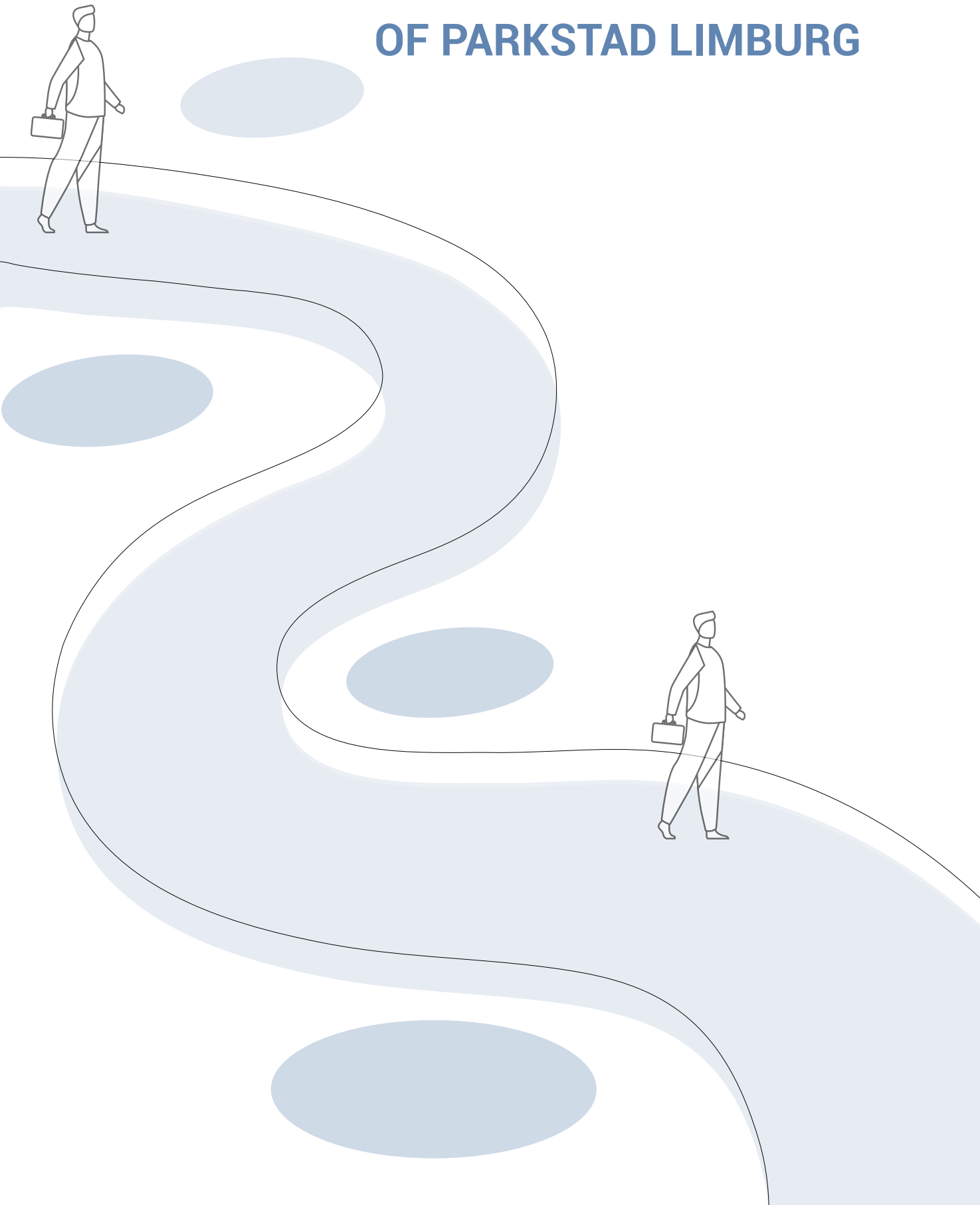
REVITALIZATION OF SHRINKING CITIES: A CASE OF PARKSTAD LIMBURG



ABSTRACT

In today's times, where population is growing at a very high rate at some place, some places are facing a severe decline in their population. It is very important to address this issue. In this report, a typical of shrinking city of Parkstad, Limburg has been discussed. A very detailed analysis of Parkstad and Kerkrade has been done. In the design process a holistic approach to design scenarios has been used. This approach is quite different from the regular concepts or models that have been applied for shrinking cities. The concept of a 'urban connector' and catalyst have been analysed and tested on the design scenario on one of the municipality as a case. The similar process can be scaled up or scaled down according to the context and requirement. The concept of design scenario works to develop the entire region unanimously with all the municipalities and people living in these areas together. This approach focuses on a combine effort to improve the area as a single entity, rather than seven different municipalities. This kind of approach can be fruitful for the stopping of shrinkage.

TITLE PAGE

Project:	Revitalization of shrinking cities: A case of Parkstad Limburg
Education:	Architecture & Design, Aalborg University
Semester:	MSc04 Urban Design
Time duration:	03.02.2020 - 17.06.2020
Pages:	172
Supervisor:	Lea Holst Laursen
Authors:	Harshita Vishway Venkata Lalita Apoorva Jayanti

ACKNOWLEDGEMENT

The project group would firstly like to thank the supervisor, Lea Holst Laursen, for the constant support, helpful supervision, constructive criticism and great engagement throughout the thesis. Furthermore, the group would also like to express gratitude towards Mr. Peter Bertholet (Director-secretary, Stadsregio Parkstad Limburg), Mr. Koen van Nieuwenhoven (Program officer, Stadsregio Parkstad Limburg) and Mr. Michel Lemaire (Historian, Historisch Goud, Municipality of Heerlen), who gave valuable information and insights about the case of Parkstad Limburg through online interviews, despite the lockdown situation posed due to COVID-19 pandemic.

READING GUIDE

This report is divided in 10 chapters, except from the last chapter which includes the appendix. First chapter of the report provides a general introduction about the topic of shrinking cities and then introducing the case of Parkstad, Limburg. This chapter ends with an initial aim, research question and scope for this project. This will be further investigated in the report. The second chapter explains the methodology and steps taken to fulfil the research gap. This explains the way chosen to explore the problem and ideas. The next chapter gives a detailed Introduction and Analysis of the Parkstad, Limburg. The story of Parkstad has been discussed in the chapter to understand the major reason behind the shrinkage and how it began in the first place. Further, in this chapter a detailed explanation of all the municipalities have been done, narrowing down to Kerkrade. Chapter four represents the detailed analysis of the area to get a better understanding of the context. This analysis will then become the base for further development strategies. After a detailed analysis of Kerkrade, chapter five explains the need for a comprehensive approach towards the development of the area. This chapter derives the points from the last chapter and summarizes various challenges and potentials the city has to offer. Chapter six explores various ideas and concepts that can be applied in such an area. This has been done with the help of peer reviewed papers, books and a lot of articles. Studying various approaches, and models of development to analyse the various conceptual ideas. This chapter ends with a theoretical reflection on how the approach of network cities can be used to develop the strategic framework.In the next chapter a holistic approach towards the problem of shrinking is discussed. This chapter consists of the vision for the project. It also discusses the problem statement and the framework to go about that problem statement. Chapter eight represents a conceptual scenario building for the Kerkrade. Here, the concept of scenario building has been discussed in detail, through various design proposals. This chapter further leads into chapter nine, to analyse the concept at a local level. This chapter represents zoning of the creative core along with the design scenarios for each zone in the creative hub. This represents the design scenarios for different activities happening inside the creative core and how they are related with each other. Last chapter concludes the thesis and further discusses the reflection and the limitations of the project, and gives a design framework to further work on the similar topic.

DICTIONARY

Shrinking cities- Shrinking is a phenomenon, when a city starts loosing its popution.There could be many possible reasons for the shrinking of a city like de-industrialization, Emigration, Ageing, etc. In this thesis, shrinking city has been used interchangeably with shrinking areas, shrinking zones, shrinking region, shrinking territories.

Shrinkage - It is a complex process where the city starts dereasing in population. Shrinkage explains the amount of shrinking in a city.

Shrinking - sensititve urban design -It may be interpreted as a way of designing shrinking cities, taking into consideration the various adverse affects of shrinkage at multiple scales i.e. from a social perspective to an overall city perspective, including physical terms. Moreover, this sort of an approach emphasizes the importance of involving social capital in the process of regeneration for a more sociable and liveable place for citizens, thus placing people before form

Scenario building - Scenario building is the terminology used in the report to highlight the development of the neighbourhood cores with respect to the proposed urban connector for the development of the city of Kerkrade. These developments should be a treated as a whole.

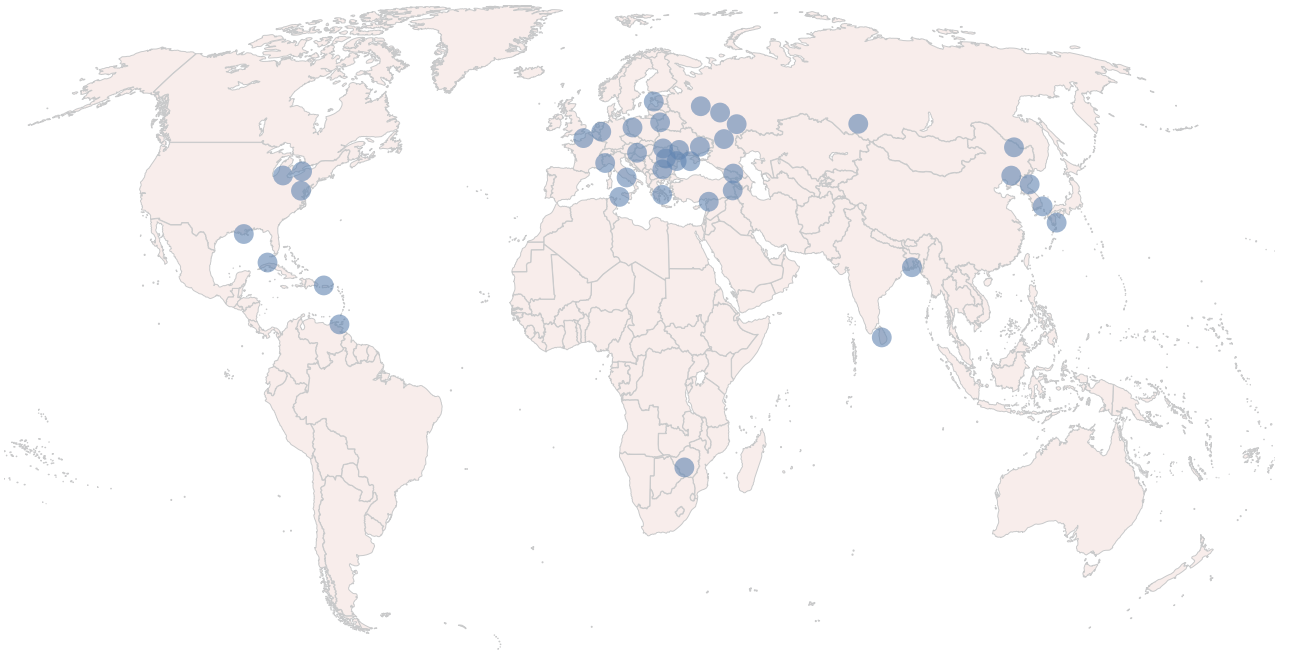
Types of shrinkage - Shrinkage is a fact about the decline in population of a city. There are many reasons for shrinkage but there are four types of shrinkage- Economic shrinkage, Demographic shrinkage, Physical shrinkage and Socio-cultural shrinkage.

Liveability - Liveability is a very subjective term, as it may vary from person to person. But in this report, liveability is referred to creating anenvironment which which is comfortable, happy and opportunistic for every citizen.

Social sustainability - Social sustainability is a process of creating a healthy and content environment for all the citizens. Where their needs are examined and are fulfilled by each other.

TABLE OF CONTENTS

POINT OF DEPARTURE



World cities with population decline (2000-2018)

Ill. 1 Cities that experienced population decline between 2000 and 2018

SETTING THE SCENE

Increased rate of urbanization has led to a rise in the number of cities and megacities in the world. Consequently, there has been a growth in the urban population, which forms about 55.5% of the world population (as of 2018). On the other hand, several cities or areas face a reverse trend of shrinkage. As of 2018, 94 cities were said to have observed population decline due to various reasons such as economic contraction, low fertility rate (United Nations, 2019). The phenomenon of shrinking cities has become more prominent in the western world, especially in European cities (Ročak, Hospers and Reverda, 2016).

Shrinking cities or shrinkage may be described differently by different disciplines based on their respective stand points. For instance, economists might consider employment decline or poor economic structure as the main characteristic of a shrinking city, while sociologists might view a shrinking city as one with increasingly poor residents with lack of social capital (Moudon, 2019). A range of definitions exist for shrinkage put forward by various researchers and academics. According to Ganser and Piro (2012, pp.2), '*the term – shrinking cities – refers to municipalities or urban regions that have experienced a dramatic loss in population, often due to the loss of industries or commerce and out migration*'. Hasse, Bernt, Grossmann, Mykhnenko and Rink (2016, pp.89) state that urban shrinkage is a '*phenomenon resulting from the interplay of changing drivers of shrinkage (for example economic decline, demographic change and settlement system changes) that produces a decline in a population on a local scale*'. Despite multiple perspectives, it may be noted that, there are two criteria that are often mentioned in most definitions: population decline and economic decline (Ročak, 2020).

Shrinking cities entail different characteristics, different experiences and different reasons for their shrinkage such as natural calamities, political movements, demographic trends and others; one of the major reasons being de-industrialization (Ganser and Piro, 2012; Ročak, 2020). The booming industrialization (post- Industrial Revolution) accelerated the growth of many cities across the globe, however, when these industries were taken down, many industrial cities began to observe shrinkage. As a result, in general terms, many of these cities experienced loss of jobs, out migration, socio- economic deprivation, thus causing population, economic and physical decline. In a way, these cities have now become incapable of coping up with the current post-industrial circumstances (Ročak, 2020).

Ill. 2 Location of Parkstad Limburg

The impact of shrinkage is not limited to the aforementioned aspects. For instance, at a local level, other consequences to be considered include ageing, selective out migration, changing patterns of population decline, vacancy of buildings, abandoned sites, scarcity of basic amenities, scattered and isolated neighborhoods and lack of proper connectivity (Ročak, 2020).

Furthermore, shrinking territories may be of varying sizes, not all of them are big cities like Detroit; there are several small and medium-sized, unpopular shrinking urban areas, especially in Europe, that are usually neglected in both academic and practical terms (Ročak, 2020). One such case is Parkstad Limburg, which is in the South Limburg region of the Netherlands.

INTRODUCING PARKSTAD LIMBURG

Parkstad Limburg is a conurbation of seven municipalities located in the South of the Limburg Province in the Netherlands, as highlighted in ill.2. Earlier, Parkstad Limburg was known as 'Ostelijke Mijnstreek' or 'Eastern Mining District', which formed the primary coal mining region of the Netherlands (demijnen.nl, n.d.-a; demijnen.nl, n.d.-b). The region was recently renamed as 'Parkstad Limburg' to boost the inter-municipal collaboration towards tackling shrinkage. The coal mining in the region emerged around the 1900s and lasted until 1974. The shutdown of the coal mining industry led to shrinkage in Parkstad Limburg, resulting in major economic and demographic decline. In the earlier phases, shrinkage affected certain large cities of the Netherlands, but recently it has been limited to rural areas, thus making Parkstad Limburg the only urbanized area struggling with shrinkage (Elzerman and Bontje, 2013).

Parkstad Limburg is relatively farther from the economic core of the Netherlands- Randstad (constitutes of cities like Amsterdam, Rotterdam, The Hague, Utrecht) compared to a number of international cities such as Brussels, Cologne, Aachen. Due to its peripheral location with respect to Randstad and the Dutch scenario, Parkstad Limburg is considered to be of less potential to contribute to the development of the country in terms of economy, international competitiveness by the policymakers of the Dutch Government. Thus, there is relatively less focus on it. However, it may be argued that it hosts a rather significant location in the context of Euregio Meuse-Rhine as it shares international borders with Belgium and Germany, making it a region with high potential for revitalization (ibid.).

INITIAL AIM AND RESEARCH QUESTIONS

Generally, due to the fact that shrinking cities are rather scattered, undefined in nature and are associated with many complexities, the questions 'why must one then consider revitalization of shrinking cities? Is it feasible?' are often raised. Probably, these doubtful questions arise due to the negative perception that lies about shrinking cities. While growth is considered to be positive, decline is often related to the 'not-so-good'. Parkstad Limburg also suffers with a negative image, as stated by one of the interviewees, Mr. Peter Bertholet (Appendix xx). However, it may be noted that shrinkage is not necessarily bad. Instead, some aspects may be understood in a different perspective and transformed into positives. For instance, the lesser population may be viewed as lesser crowd which in some cities are considered as important factors for improved quality of place and life. Additionally, the reduced property values, especially of housing, may be considered as favourable conditions to foster future development (Moudon, 2019).

Moreover, it is not solely about the place itself. It is necessary to put people over place. Despite less population, it is vital to secure a good everyday life for the existing citizens. Therefore, the shrinking cities must be revitalized keeping in mind about the quality of life that citizens experience due to shrinkage.

This discussion leads to shaping of the initial aim and research questions with respect to Parkstad Limburg.

Initial Aim:

This thesis seeks to derive a comprehensive framework for revitalization of Parkstad Limburg by taking advantage of the contextual conditions and designing for the existing population in order to enhance social sustainability of the place, liveability of citizens and gradually reverse the negative image of the place.

Initial Research questions:

• How to stop any further shrinkage of Parkstad Limburg, and contribute towards social sustainability of the place and liveability for citizens?

• What are the perceived contextual negative aspects of Parkstad Limburg? How can they be taken advantage of while deriving the framework?

• What aspects can influence gradual change of the negative image of Parkstad Limburg into a positive one? How?

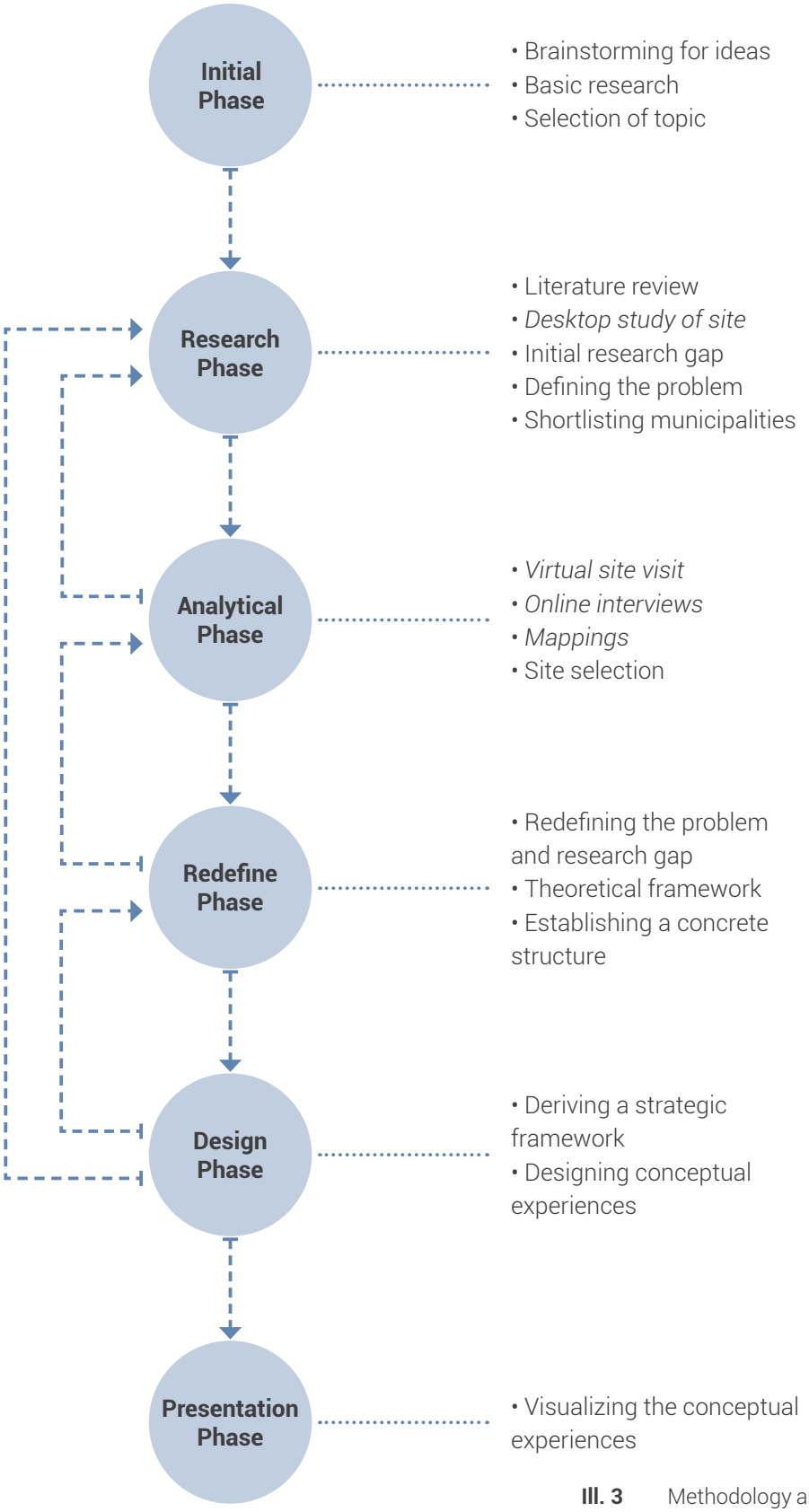
SCOPE OF THE THESIS

Shrinkage needs to be understood as a complex multi-dimensional process and the related issues cannot be resolved in one go. For instance, Parkstad Limburg has been under the process of shrinkage for about five decades, thus, has several challenges associated with it at multiple scales ranging from individual to national and international levels. Hence, it could be said that this region cannot be suddenly revived at once.

Therefore, this thesis does not by any means claim that the presented attempt towards revitalization shall completely solve the problem. Infact, it is quite a lengthy process and there is no limit to when this process might end. However, the thesis seeks to propose a step forward in a comprehensive manner that might be helpful in beginning the process of revitalization in the right direction, which might in turn contribute towards social sustainability of the place, liveability of citizens and gradually reversing the negative image of the place.

Moreover, a conceptual comprehensive approach is proposed at the level of one municipality in Parkstad Limburg. Meaning, the reflection of the same at the regional level and further is not explored. However, it may be stated that exploration and study of the reflection of this approach at the regional level and further might be taken up as further research.

METHODOLOGY AND THESIS PROCESS



Ill. 3 Methodology and thesis process

METHODOLOGY AND THESIS PROCESS

This thesis goes through several phases to reach the proposed holistic framework as a step towards revitalization of the Parkstad Limburg region in the Netherlands, presented in the *'Scenario building as a step forward for Parkstad Limburg'* and *'Conceptual scenario building for Kerkrade'* chapters of this report. As the project evolved, new data or information made the process rather iterative, where the project had to revisit certain phases and channel the process in the required direction. The methodological process of this thesis has been illustrated in ill.3.

In the *'initial phase'*, several ideas were brainstormed to find a topic of interest for the thesis. A basic research was conducted for the shortlisted topics. Subsequently, the topic related to Parkstad Limburg, which has been a case of shrinking territory for almost five decades, motivated the group to explore the case further.

Through the *'research phase'*, literature review related to the selected topic was carried out to gain a better understanding of both shrinking cities and the region of Parkstad Limburg. Based on the same, a problem was defined, and initial research questions were identified. Simultaneously, a desktop study of the site was initiated to get a better understanding of it prior to our scheduled site visit. Additionally, as the group figured that the region of Parkstad Limburg (consisting of seven municipalities) as a whole, would be quite large to be dealt with within a single project, it was decided to narrow down to one municipality based on its potentials and challenges. Thus, according to a developed set of criteria, data was collected for all municipalities, which proved to be helpful in narrowing down to two municipalities. The further narrowing down was decided to be carried out post the site visit.

As a part of *'analytical phase'*, the idea was to get a deeper insight about the case of Parkstad Limburg, through a site visit and some interviews which were pre-scheduled. However, due to the outbreak of COVID-19 pandemic, both Denmark and the Netherlands announced severity of the situation and lockdowns of the respective countries. As a result, our physical site visit converted into a 'virtual site visit' and our face-to-face interviews became 'online interviews'. Although it was a difficult phase, due to the fact that the basis of the project was quite site-specific, the situation forced the group to find out ways to deal with it digitally. While, certain information was available

directly, some other information was not obtainable through online sources, due to which some assumptions were made on the basis of related indirect information that was gathered. Thus, the process continued and based on the collected information, one municipality was selected to proceed with, and mappings were generated for both Parkstad Limburg region and the selected municipality, Kerkrade.

Post the *'analytical phase'*, there was a better understanding of the case, challenges faced by it and potentials that it hosts. This led to *'redefine phase'*, in which the research gap and the problem were fine-tuned, based on which theoretical studies were explored that might be helpful in addressing the issues. In a way, a rather concrete idea and structure of the project were established.

Later, the project entered the *'design phase'*, in which a step forward for the revitalization of Parkstad Limburg is proposed, and the strategic framework is conceptually explored at varying scales ranging from municipality level to a zoomed-in site level. Further, to give a conceptual image of the design ideas, the same were visualized in the *'presentation phase'.*

METHODS APPLIED

Desktop study

A thesis process with a structure similar to this project, would usually comprise of varying modes of study as the project progresses such as: digital mode, in which the initial study and research phases are generally carried out; and embodied experience mode, in which the site is physically visited, interviews are conducted face-to-face (not always), thus, a deeper insight of site and case studies (if any) is often gained through embodied experience of the place. However, in this case, unfortunately due to the emergence of COVID-19 pandemic, the whole process had to be carried out in the digital mode.

Virtual site visit

As mentioned earlier in the 'methodology and thesis process' section of this chapter, due to the unavoidable circumstances, the physical site visit to Parkstad Limburg in the Netherlands was cancelled. Although it was difficult to understand how to proceed further (as the project was rather site-specific), it was figured that the same could be done virtually through on-

line sources. Thus, the physical site visit was transformed to a 'virtual site visit', which gave an opportunity to explore the immense advancements in technology. Using several applications such as 'Google Earth' and 'Google maps', an understanding of the site could be developed in the form of both two-dimensional maps and street views. While, there are certain challenges with this approach such as not being able to completely understand the sense of place and its atmosphere, not all available information is up to date, there are also certain advantages to it, such as: as opposed to the physical site visits which might have to be limited due to the travel distance, virtual site visits can be conducted any number of times.

Online interviews

Similar to the site visits, the face-to-face interviews were changed into online interviews. Fortunately, some of the interviewees agreed to continue having the interviews through digital medium. The online interviews did not turn out to be very different from the face-to-face interviews, thus helped in gathering the required data. However, the idea of interviews also included conversing with a few residents of the place for more qualitative data to support the proposed hypothesis, which could not be conducted due to difficulties in getting in contact with them digitally.

Mappings

Mappings were generated for Parkstad Limburg region and Kerkrade municipality based on the information gathered through digital medium such as virtual site visits, the regional and municipal websites and online interviews. At a macro-scale, mapping the location of Parkstad Limburg and nearby surroundings, alongside important international highlights helped in understanding the strategic context of the place. The mappings such as connectivity, major developments, landuses, activity distribution gave an insight on infrastructural and social qualities at both municipal level of Kerkrade and regional level of Parkstad Limburg, and sometimes at cross-border level. As mentioned previously, not all information could be directly retrieved from online sources, which led to the assumption of certain elements based on indirectly related data. This method helped in consolidating the required information of the site and led to understanding the opportunities and constraints of the place, based on which the *'design phase'* was carried out.

THE STORY OF PARKSTAD LIMBURG

Until late 19th century, Parkstad Limburg was mostly an agricultural region

1890s

1890s marked the rise of modern coal mining in Parkstad Limburg

In early 1900s, new mines were rapidly established to meet the demand

1900s

Between 1900 and 1965, the region observed rapid transformation and economic growth followed by population growth

Dutch national government decided to shutdown coal mines

1965 - 1974

III. 4 Timeline of Parkstad Limburg - Part I (Rijckheyt, n.d.-a; Regionaal historisch centrum limburg, 1920; Rijckheyt, 1976)

THE HISTORY OF PARKSTAD LIMBURG

Originally, the Parkstad Limburg region consisted of small and scattered villages dominated by agricultural lands. As shown in ill.4, until the late nineteenth century i.e. until around the period 1880s – 1890s, agriculture formed the main economic source for this region (Elzerman and Bontje, 2013).

Later, 1890s marked the start of modern coal mining in Limburg. The oldest mines of the region were in the municipalities of Heerlen and Kerkrade. Around the 1900s, due to the sharp increase in the demand for coal, new mines were rapidly established to meet the demand (demijnen.nl, n.d.-c; demijnen.nl, n.d.-d; Elzerman and Bontje, 2013).

In the period between 1900 and 1965, the coal mining industry flourished, and the region observed a dramatic change. There was economic growth followed by demographic growth. The rise of mining immigrants resulted in transformation of villages into urban and sub-urban areas which housed 728,000 inhabitants in the year 1950 (demijnen.nl, n.d.-c; demijnen.nl, n.d.-d; Elzerman and Bontje, 2013; Beunen, Meijer and de Vreis, 2019).

The prospering coal mining industry was suddenly shut down between the years 1965 and 1974. It was because of the Dutch government's decision to shift the focus to the newly found natural gas source for provision of energy, in Groningen in the North of the Netherlands, as a part of black to green movement (ibid.).

Post shutdown of coal mines, the region observed a continued economic stagnation

Mid 1990s

The economic decline was accompanied by demographic decline

2020

The population still continues to decline

Ill. 5 Timeline of Parkstad Limburg - Part II (CBS, 2016)

THE POST-INDUSTRIAL PHASE

The impact of shutdown

Post shutdown of the coal mines, the region observed a continued economic stagnation, despite the efforts by the Dutch Government to introduce other economic sectors. The population, however, continued to grow in the initial phases. Around mid-1990s, Parkstad Limburg began to observe a demographic decline alongside the economic downturn. The population started to decline in a selective pattern, where the younger people started leaving for educational or employment purposes. The same pattern has continued ever since, and till date the region experiences shrinkage (Elzerman and Bontje, 2013).

Major reasons for shrinkage

The reasons behind shrinkage of Parkstad Limburg may be summed up as follows:

• Firstly, removal of the major economic sector i.e. the coal mining industry, which instilled a sense of loss of identity amongst the citizens.

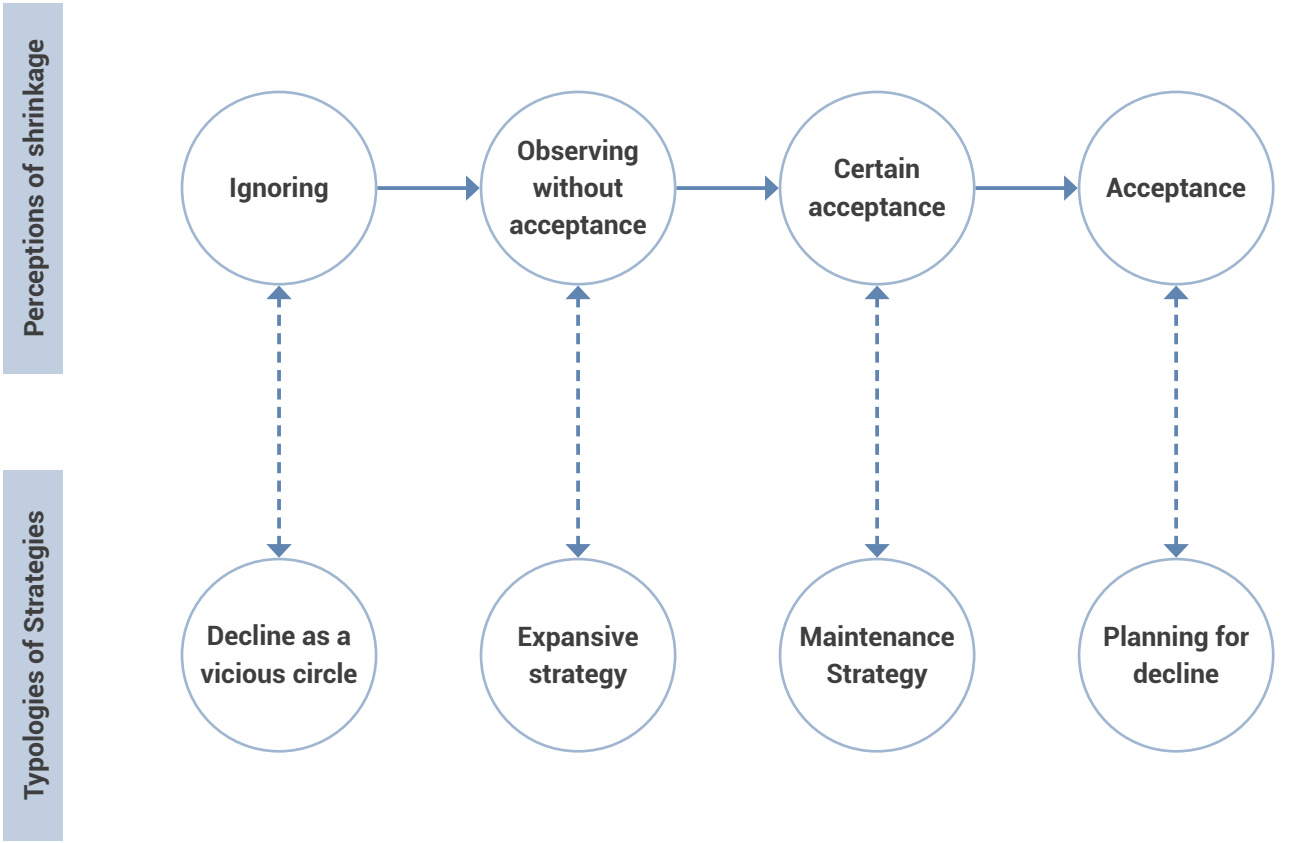
• Secondly, selective migration of people in search of educational and employment opportunities.

• Thirdly, its peripheral location which shares borders with Germany and Belgium, thus, encouraging people to move to these countries which provide better opportunities. Additionally, the location aspect also led to its decreased importance by the Dutch Government, in terms of development.

• Finally, socio-cultural factors, such as loss of identity and downfall of local economy due to closure of mines and reduced role of the Church, which formed the two main powers of the region (Pérez-Soba, van Eupen, Roupioz et al., 2013; Elzerman and Bontje, 2013).

Linking perceptions of shrinkage and planning perspectives

Most shrinking cities experience multiple shifts in their planning systems, planning styles and planning cultures in the process of identifying the appropriate ways to deal with the decline. The planning paradigm undergoes several changes, probably because not all shrinking cities are the same and certainly the same 'recipe' cannot be followed for all of them to deal with shrinkage. It may be said that the largely accepted perception of shrinkage in a city or region drives its choice of planning approaches. According to Pallagst, Fleschurz and Said (2017), to analyze the changing patterns of planning strategies and policies, it may be a good idea to understand the correlation between perception of shrinkage proposed by Farke in 2005 and the types of strategies applied at that time, as suggested by Danielzyk, Bernd and Zimmer-Hegmann in 2002.



Ill. 6 Link between 'perceptions of shrinkage' and 'typologies of strategies'

As illustrated in ill.6, the phases of perceptions of shrinkage may be classified into four categories (Farke, 2005):

• 'ignoring' is the phase where decline is considered as a temporary phenomenon and is thus ignored.

• 'observing without acceptance', in which the decline comes to light due to dramatic changes, however, is not accepted.

• 'certain acceptance', is the phase in which there is recognition of the problem and ways to cope up with the change are under deliberation.

• 'acceptance', where finally, shrinking is accepted and growth is not aimed at.

On the other hand, the typologies of strategies applied may be categorized as (Danielzyk, Bernd and Zimmer-Hegmann, 2002):

• 'decline as a vicious circle', in which there are not any specific goals to be achieved.

• 'expansive strategy' and 'maintenance strategy', where the idea is to spatially develop the area in terms of land use, creating attractive spaces etc. to counteract the shrinkage process.

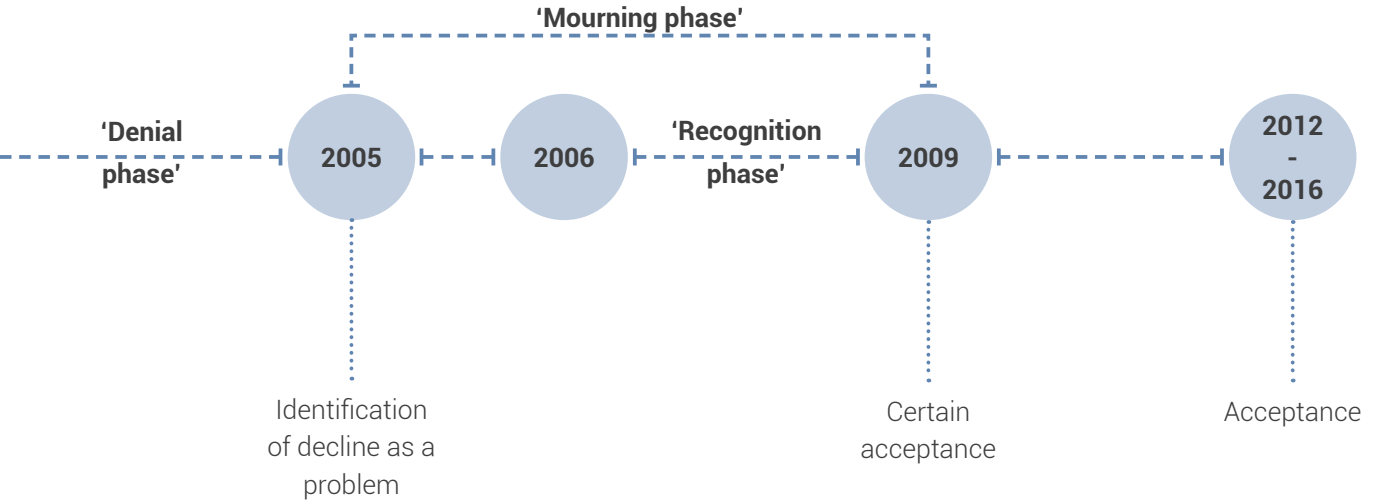
• 'planning for decline', in which the shrinkage-oriented planning strategies are employed.

The first category is rather 'passive' in which external support is hoped. While, the other three categories may be termed as 'active' strategies as it involves policy and spatial interventions to influence the process of shrinkage (Pallagst, Fleschurz and Said, 2017; Elzerman and Bontje, 2013).

It may be said that both sets of categories of perceptions and strategies correspond with each other in a way, and the same may be mapped for shrinking cities to analyze their patterns of planning and policy transformations in depth. However, due to the complexity of shrinkage, not all shrinking cities might follow the same pattern and there might be difficulties in inter-relating planning approaches with the perceptions (Pallagst, Fleschurz and Said, 2017).

Shifts in the planning perspectives of Parkstad Limburg

Post the closure of coal mines in the Parkstad Limburg region, several attempts were made to stabilize the economy by introduction of white-collar jobs through institutes like Statistics Netherlands (CBS), pension fund Algemeen Burgerlijk Pensioenfonds. However, due to the gap between white-collar and blue-collar jobs, the labor force or the ex-miners could not cope up, which led to continuation of the issue of unemployment and economic stagnation (Elzerman and Bontje, 2013). Consequently, the region observed drastic economic decline followed by population decline in around 1990s. Especially, the younger generation started moving out, thus resulting in 'brain-drain'. As presented in ill.7, until the year 2005, the governmental and provincial authorities were in denial of shrinkage and considered it as a temporary phenomenon. Even the municipal authorities refused to acknowledge the problem, since they did not have the financial resources to address it (Beunen, Meijer and de Vreis, 2019).

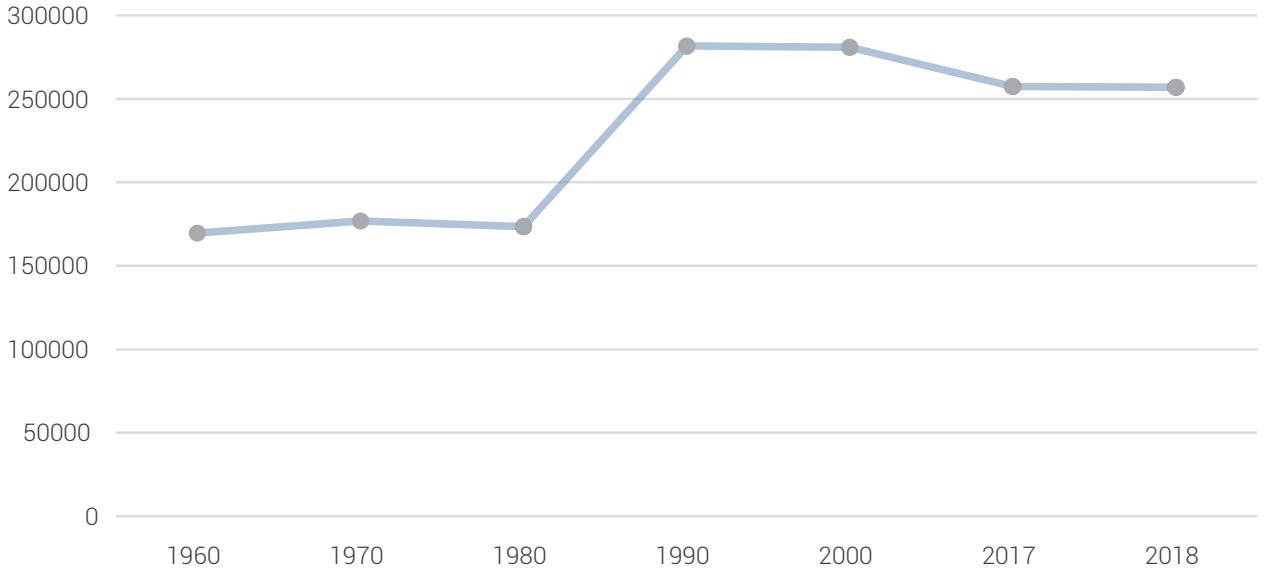


Ill. 7 Paradigm shift in planning perspectives of Parkstad Limburg

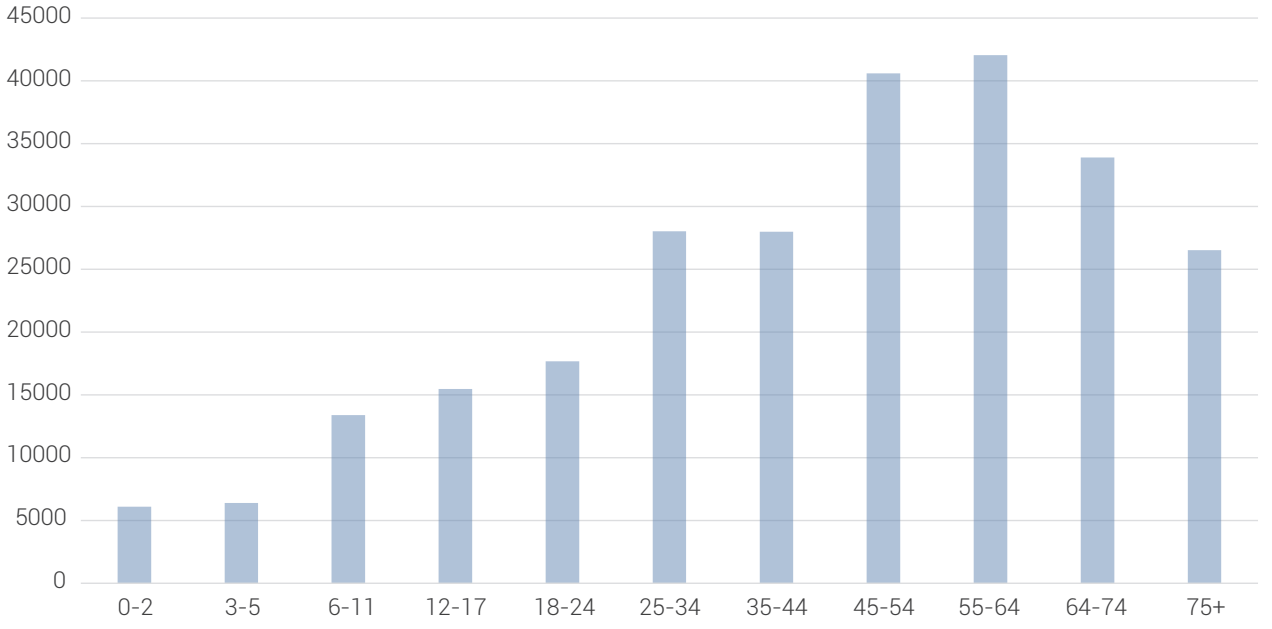
In the year 2005, the shrinkage was recognized, and population decline was identified as a problem by the governmental and regional authorities. It was also mentioned in their 'Strategic Spatial Vision' in the same year. Although the demographic outflow was recognized as a problem, there were no specific measures developed or policy changes made for its addressal. This phase has also been described as 'mourning phase' by some authors, which lasted for a few years (Beunen, Meijer and de Vreis, 2019; Elzerman and Bontje, 2013).

After the year 2006, it may be pointed that the region entered 'recognition phase'. Therefore, plans and measures were gradually developed to deal with the situation. In 2009, the Dutch Government even presented a 'National Shrinkage Strategy' to address the region-specific issues. Soon, there were a number of physical and policy interventions proposed in terms of restructuring, high-end housing, recreational spaces. Some of the examples include: the outer and inner ring roads for the region, shopping malls in Roermond, attractive housing developments in Sittard. In a way, most proposals were 'growth-oriented' and directed towards counteracting population downfall (ibid.).

It may be assumed that not until recently i.e. between 2012 and 2016, shrinkage was finally accepted. Therefore, national, regional and municipal action plans were developed towards planning for decline. The vision focused on joint development strategies amongst the municipalities of Parkstad Limburg. Thus, a 'Regio Deal' was drawn between the city regions of Parkstad Limburg (including all municipalities), the Province of Limburg and the Dutch national government to focus on the following themes for contribution towards development of the region: strengthening of the socio-economic structure, improving the housing stock and the quality of life, better safety, realizing a high-quality level of facilities and new entrepreneurship, strengthening cross-border cooperation with German partners and strengthening the regional center function of Heerlen (Bertholet and Nieuwenhoven, 2020a). Additionally, this was also the phase when the regional authorities collaborated with Internationale Bauausstellungen (IBA) (ibid.).



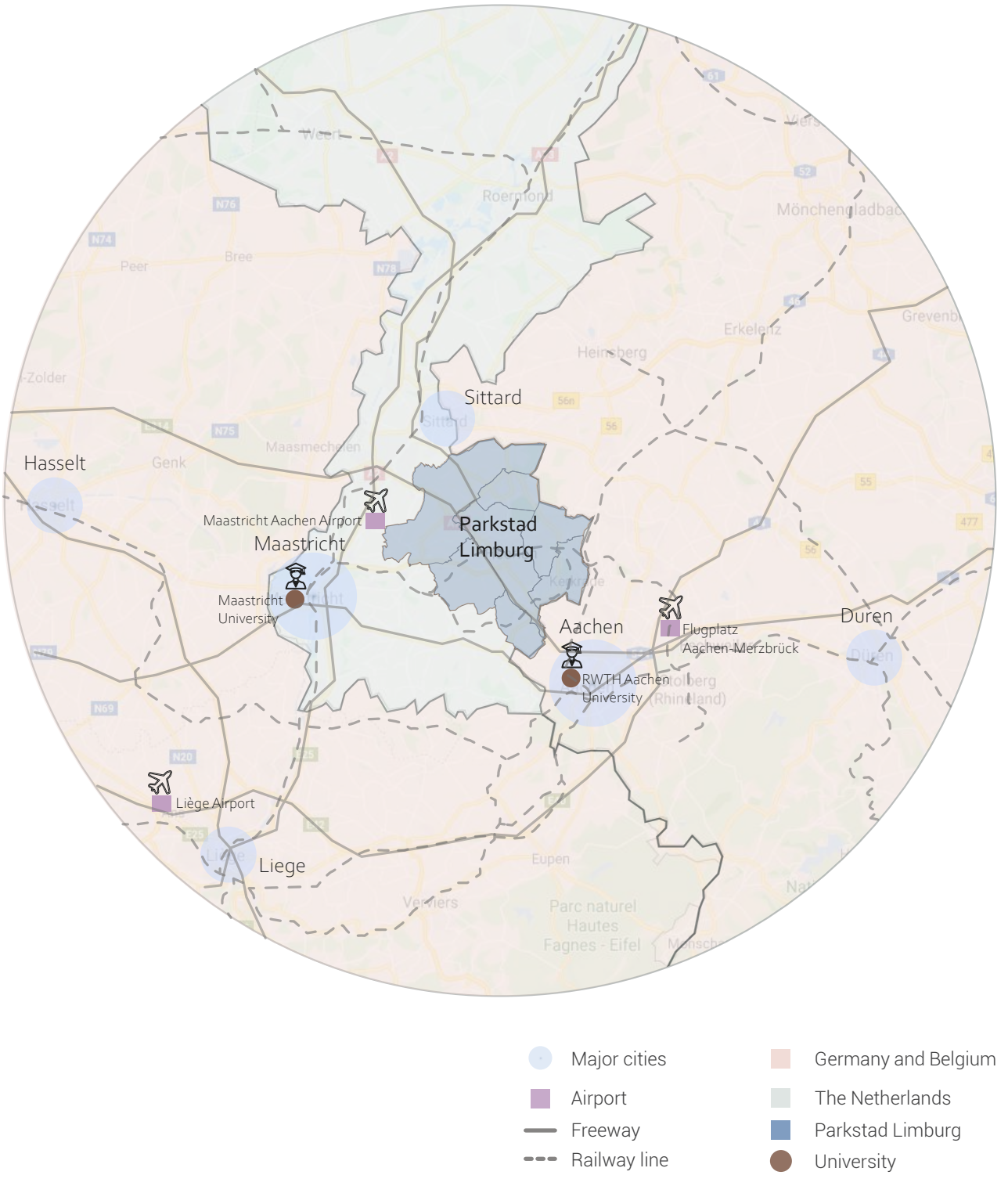
Ill. 8 Change in population of Parkstad Limburg (1960 - 2018)



Ill. 9 Age distribution in Parkstad Limburg (2016)

The demographic trend in Parkstad Limburg

Ill. 8, 9 show the graphs of population growth/decline, age distribution for the region. As evident from those, despite the several efforts by governmental, regional, municipal authorities and other organizations, the demographic trend doesn't seem to improve. The population of the region continues to fall due to migration and the ageing factor is also on the rise. The reason could probably be the rather late acknowledgement of shrinkage, due to which the authorities and other related organizations are still in experimenting phase to derive ways to deal with the current circumstances (Beunen, Meijer and de Vreis, 2019; Elzerman and Bontje, 2013).



Ill. 10 Strategic context of Parkstad Limburg

THE CURRENT PICTURE OF PARKSTAD LIMBURG

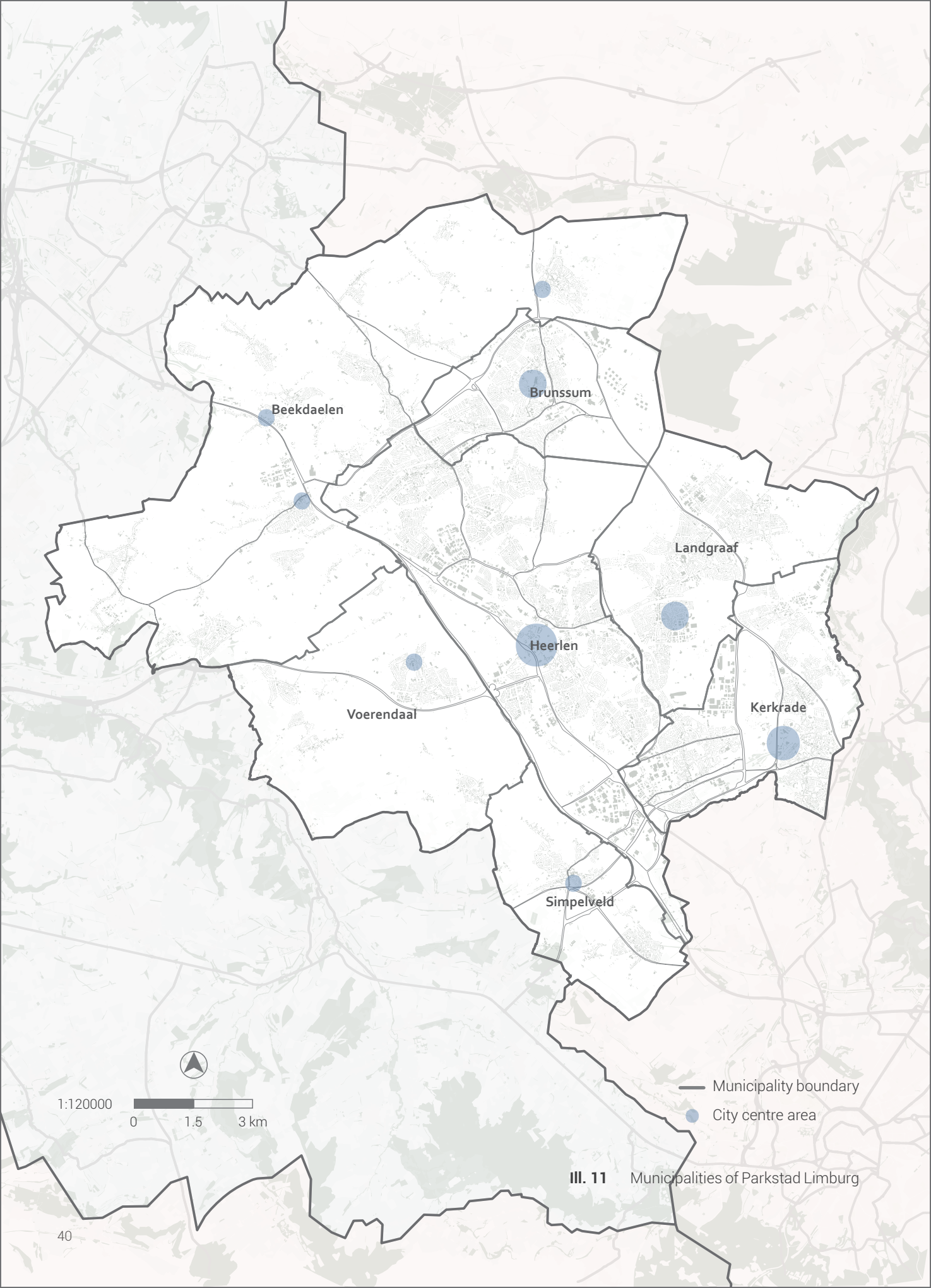
Strategic context of Parkstad Limburg

Parkstad Limburg, with current population of 257,000 inhabitants and an area of nearly 235 square kilometers, is located in the South of the Netherlands (CBS, 2019a; Bertholet, 2020b). Although Parkstad Limburg is peripherally located with respect to the Netherlands, it hosts a significant location with reference to its international context. Parkstad Limburg shares borders with Germany and is in close proximity to Belgium, thus making it a prime location with major cities like Aachen and Liege nearby.

As highlighted in ill.10, the region is accessible by air, due to the presence of Airports in the nearby regions. It is also well connected by road, with major freeways passing through Parkstad Limburg connecting both nationally and internationally.

The rail connectivity within the region and rest of the country may be said to be organized, making it easy to access important institutions such as Maastricht University. However, the cross-border rail connectivity is not as efficient as that of road and national rail. Aachen, a nearby major city (only approximately 17 kilometers away from the center of Parkstad Limburg, Heerlen), hosts one of the biggest and most important universities of Europe namely, RWTH Aachen University. Yet, there is no direct connectivity from this region to Aachen. Thus, a direct inter-city connection proposed by the authorities is under progress that would go from Aachen to Amsterdam, passing through Parkstad Limburg. The same is expected to be open to the public in a year from now (Bertholet, 2020b).

Overall, the study of the strategic context highlights the potentials of development of Parkstad Limburg not only within the country, but also beyond the borders.



Ill. 11 Municipalities of Parkstad Limburg

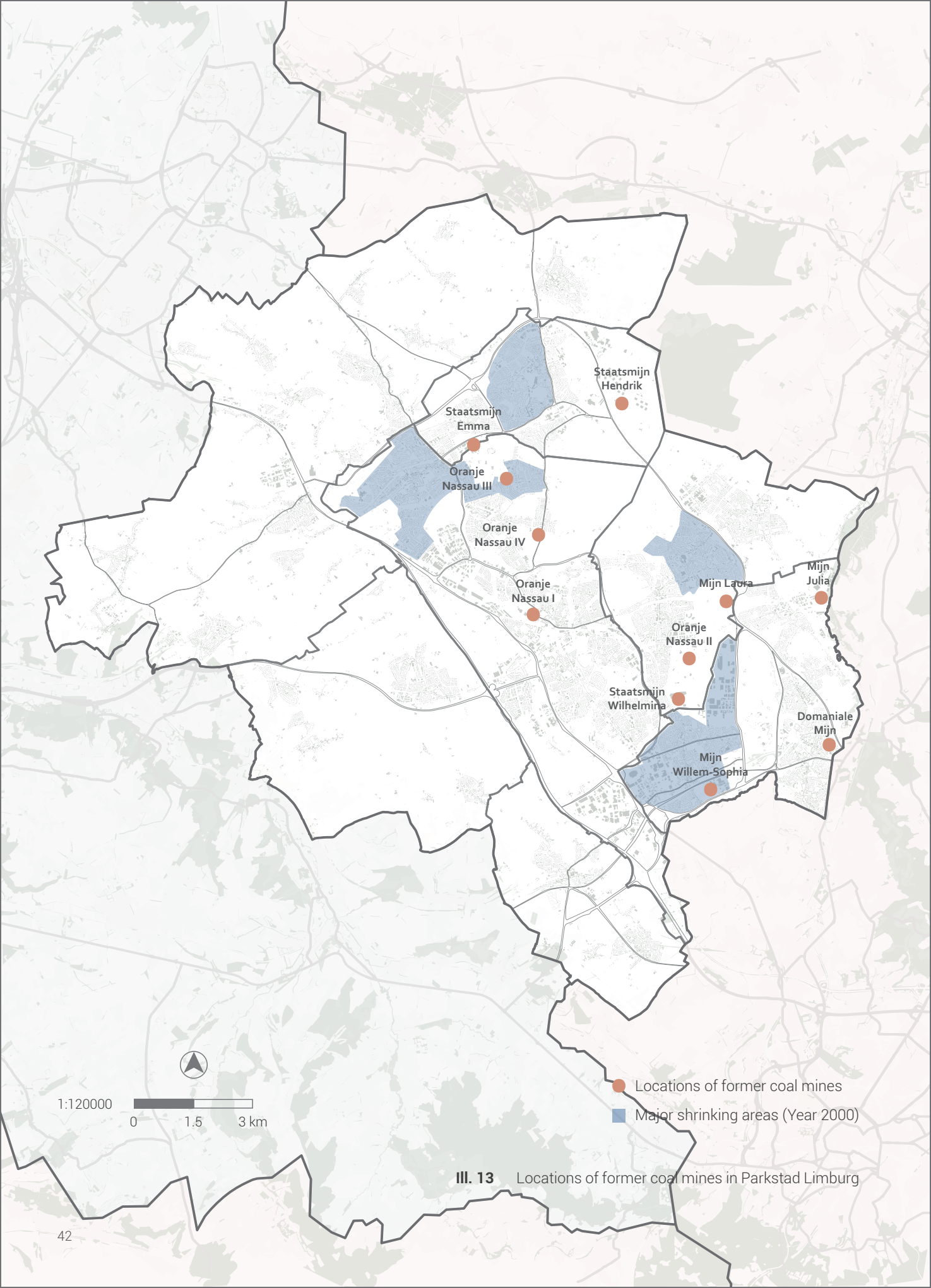
Introducing the municipalities

In the industrial era, the 'Eastern Mining District' consisted of eighteen municipalities. However, post-shutdown, in the year 1982, some of the municipalities were combined to form eight municipalities. The same was done because the former municipalities were very small in area and it was rather difficult to manage 18 municipalities at once considering the phase of economic stagnation. Further, in January 2019, some municipalities were combined again, forming seven municipalities(Bertholet and Nieuwenhoven, 2020b). Therefore, as presented in ill.11, currently the Parkstad Limburg region constitutes of seven municipalities namely Beekdaelen, Brunssum, Heerlen, Kerkrade, Landgraaf, Simpelveld and Voerendaal.

Each municipality varies significantly with one another in terms of population, area and population density, as summarized in ill.12. Clearly, Heerlen and Kerkrade are the most populated municipalities and Heerlen is the largest municipality in terms of area. Heerlen is considered as the center of development due to its central location, area and population.

Municipality	Beekdaelen	Brunssum	Heerlen	Kerkrade	Landgraaf	Simpelveld	Voerendaal
Population (2018)	35,853	28,108	86,832	45,642	37,591	10,516	12,452
Area in sq.km. (2020)	78.30	17.33	45.56	22.22	24.64	16.00	31.55
Population density (2020-est)	459.30 per sq.km.	1616.00 per sq.km.	1934.00 per sq.km.	2089.00 per sq.km.	1524.00 per sq.km.	658.70 per sq.km.	395.80 per sq.km.
Growth /decline (1990-2018)	-3168	-2292	-8317	-7640	-3178	-1351	-652

Ill. 12 Population (2018), Area (2020), Population density (2020-estimate) and Population growth/decline between 1990 and 2018 for seven municipalities of Parkstad Limburg Region



Ill. 13 Locations of former coal mines in Parkstad Limburg

Presence of coal mines

As shown in ill.13, there were 11 coal mines in the region, inclusive of both state mines and private mines. The oldest of these was in Kerkrade. The distribution of the former coal mines with respect to current municipalities is as follows:

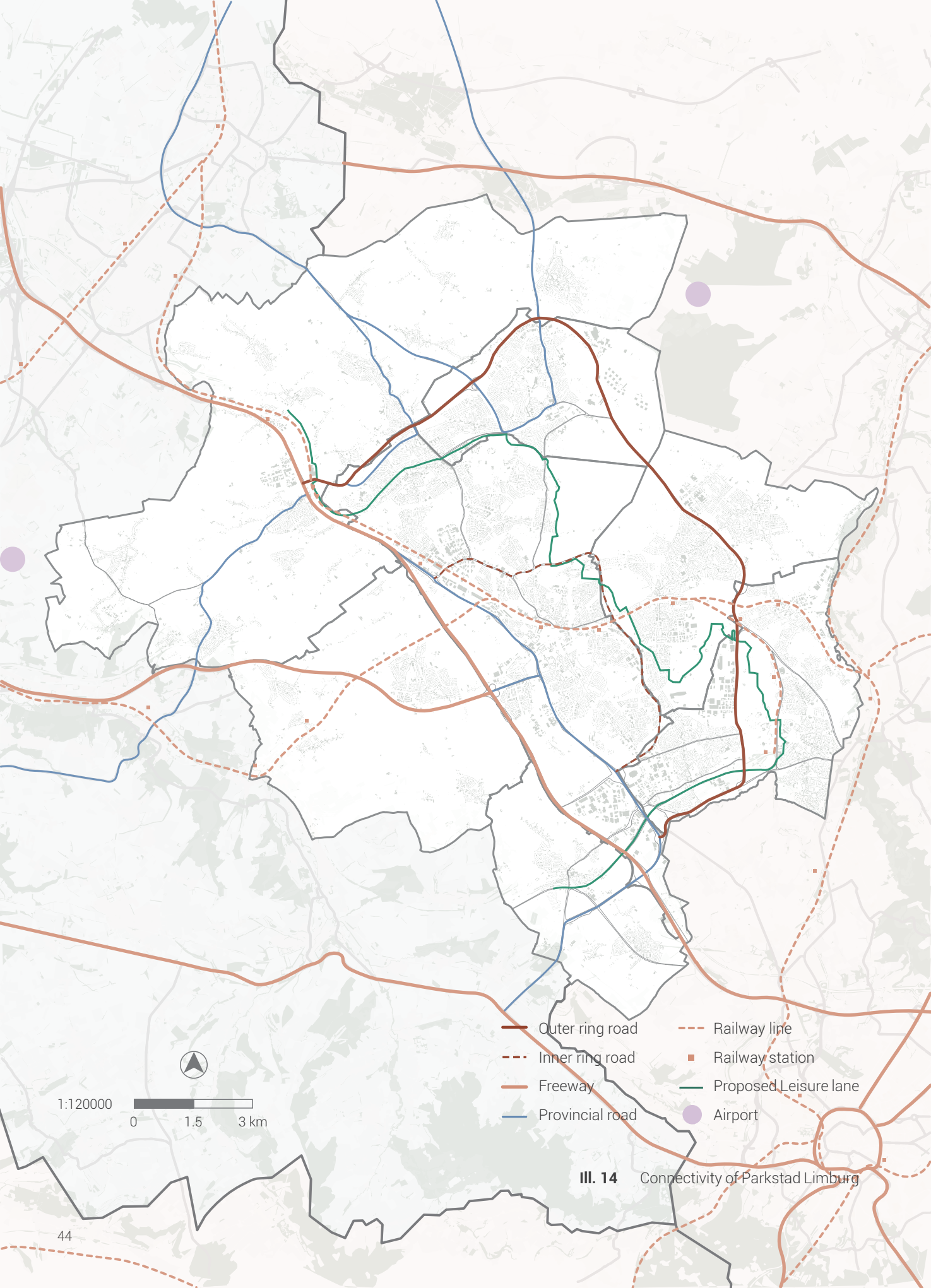
• Brunssum: 1 coal mine (Staatsmijn Hendrik)

• Heerlen: 4 coal mines (Oranje Nassau I, Oranje Nassau III, Oranje Nassau IV, Staatsmijn Emma)

• Kerkrade: 3 coal mines (Mijn Willem Sophia, Mijn Julia, Domaniale mijn)

• Landgraaf: 3 coal mines (Staatsmijn Wilhelmina, Oranje Nassau II, Mijn Laura)

Therefore, it may be said that the coal mines were situated in the four aforementioned municipalities and the resultant major shrinking areas post shutdown are majorly located around them (see ill.13). Additionally, all the coal mine related infrastructure was demolished and covered, therefore, there are almost no traces of industrial heritage (demijnen.nl, n.d.-b).



Ill. 14 Connectivity of Parkstad Limburg

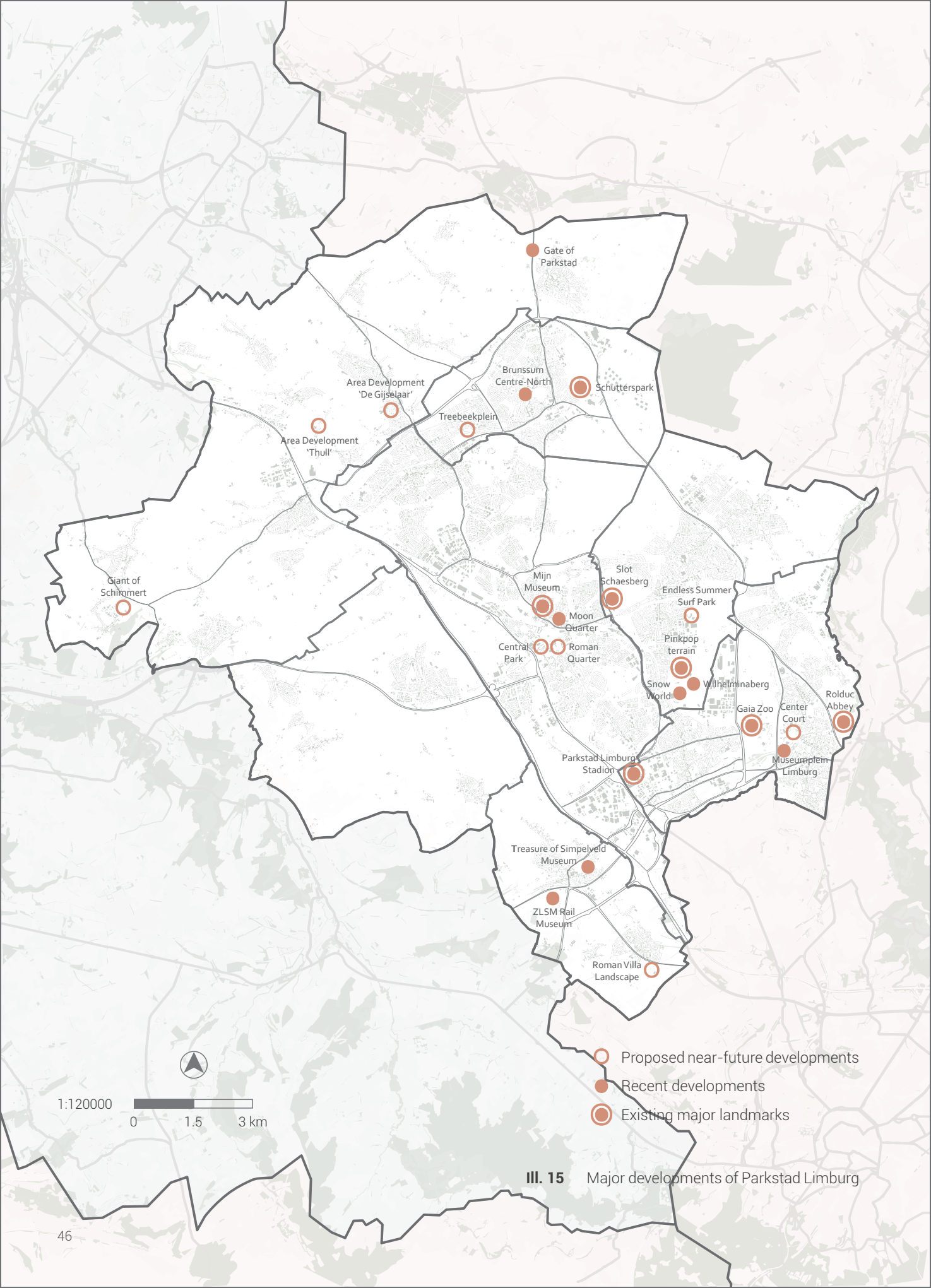
Connectivity

As illustrated in ill.14, the general road network within the region and with the neighboring context is well established with freeways (A76 and A79), multiple provincial roads (N281, N298, N299, N300), outer ring road and inner ring road.

The outer ring road is a new 4-lane construction of about 26 kilometers long road, which is a combination of 14 kilometers of adapted existing roads and 12 kilometers of newly built roads. The project was completed in 2019, making it accessible for the public. The provision of outer ring road significantly aims at improving the connectivity within the region, alongside national and international link. Moreover, it is believed that this infrastructure shall open-up opportunities for economic and touristic developments (Zuid-Limburg Bereikbaar.nl, n.d.; Strukton.com, 2020; Bertholet and Nieuwenhoven, 2020b). However, there has also been a debate about the requirement of the outer ring road of 4 lanes for a shrinking region (Marcha, 2010). Additionally, inner ring road almost holds the same purpose.

The rail connectivity is reasonable within the region; however, the cross-border connectivity is poor. The regional authorities have made proposals and plans to improve the rail network to Germany (Bertholet and Nieuwenhoven, 2020b).

Furthermore, a 'Leisure Lane' has also been proposed for active mobilities, majorly a cycling network to link with the international cycling routes. The path makes its way through both urban and nature-oriented spaces of the municipalities to give the users an experience of the landscape, culture and urban functions of the Parkstad Limburg region (iba-parkstad.nl, n.d.-a).



Ill. 15 Major developments of Parkstad Limburg

Major developments

There have been multiple interventions in the region since the shutdown of coal mines. As shown in ill.15, some of these developments were put forward before the 'acceptance' phase such as Pinkpop terrain in Landgraaf and similar touristic projects to attract people into the region (iba-parkstad.nl, n.d.-b). Various main interventions that were recently completed or are under progress or are proposed have also been highlighted.

It may be noted that most of the projects are concentrated in Heerlen and Kerkrade. Additionally, many interventions stand alone without a noticeable link with the other, for instance 'area development' projects which concern only with the specific neighborhood.

Criteria for case selection

1. Demographic trend of the municipalities

- Population of the municipality
- Population density of the municipality
- Age distribution of population
- Growth / decline in population post shut-down of coal mines

2. Area of the municipalities

3. Historic or cultural significance of the municipalities

- Presence of coal mines in the municipality
- The impact of shutdown of coal mines on people and infrastructure

4. Development status of the municipalities

- Interventions in the municipality, along with the direction of development
- Level of improvement due to interventions

Ill. 16 Criteria for case selection

NARROWING DOWN TO A CASE

The idea is to narrow down to one municipality to study the same in more detail and to develop a suitable approach or strategy and additionally, explore the possibility of projecting it onto a regional level and further. As presented in ill.16, a set of criteria was derived to compare and accordingly select one out of the seven municipalities.

The information that corresponds to these criteria was presented in 'The current picture of Parkstad Limburg' section of this chapter. Based on the presented information and the interviews conducted (see Appendix A), Kerkrade was chosen as the case for this thesis. The process behind site selection shall be explained in the following sub-section 'Why Kerkrade?'.

Why Kerkrade?

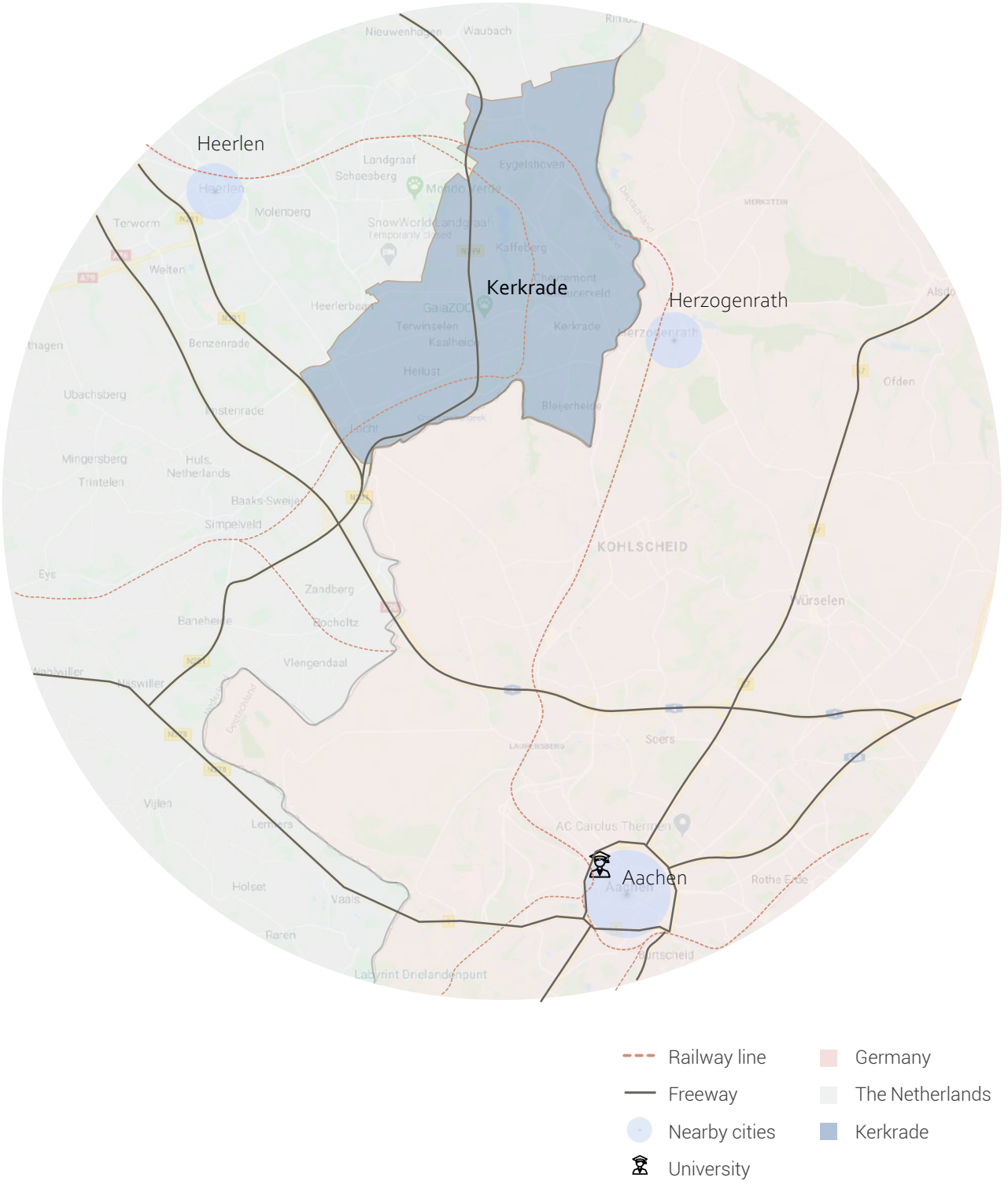
Firstly, based on the population, area and population density, it may be summed up that Heerlen and Kerkrade have the most population density followed by Brunssum and Landgraaf. However, when the growth/decline rate is considered from the year 1990/2000 to 2018, it is evident that Heerlen and Kerkrade have suffered the most in terms of demographic trend (see ill. 12).

Secondly, the presence of former coal mines contributes to the historic significance of the region. Additionally, as clearly noticeable from ill.xx, after the shut down the major shrinking areas are concentrated in Heerlen, Kerkrade, Brunssum and Landgraaf (see ill.13).

Thirdly, based on a brief study on recent developments (see ill.15) and interviews (Lemaire, 2020), it may be highlighted that there is a major emphasis on Heerlen. Although Kerkrade is equally important and holds a very strategic location sharing borders with Germany, the interventions in Kerkrade, in a way, do not justify its potential.

Based on the above discussion, Kerkrade was chosen as the prospective case for development of a conceptual strategic framework. A deeper understanding of Kerkrade shall be presented in the next chapter 'The case of Kerkrade'.

THE CASE OF KERKRADE

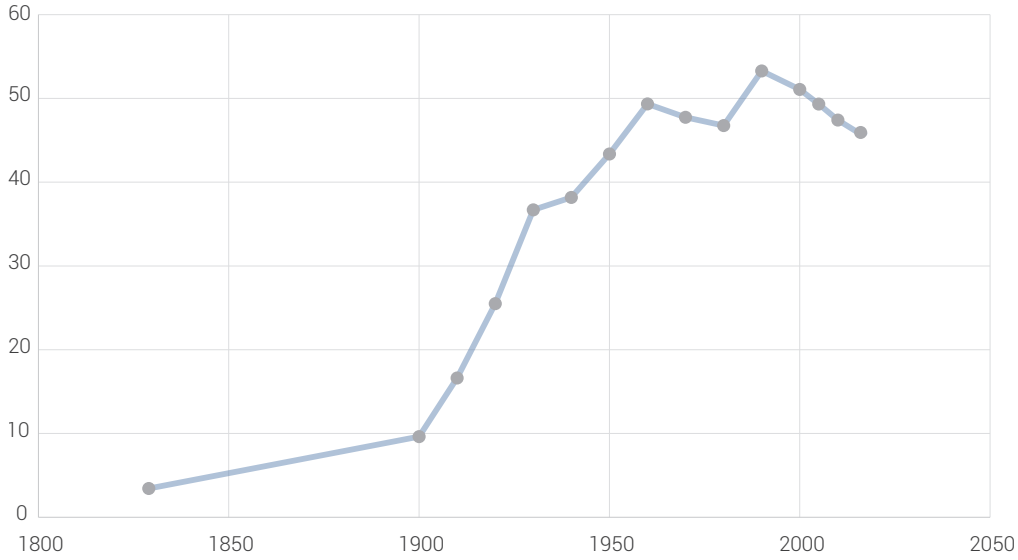


Ill. 17 Strategic context of Kerkrade

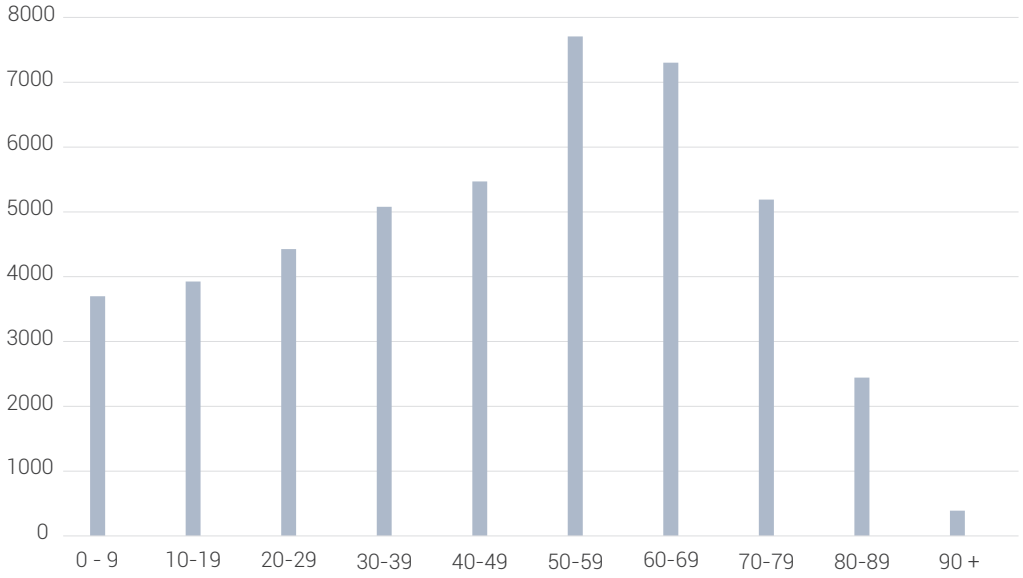
A GENERAL IDEA OF KERKRADE

Kerkrade was one of the municipalities that observed a lot of development and urbanization due to the presence of oldest and important coal mines and was also one of the most affected post the shutdown of mines.

As shown in ill.17, Kerkrade shares a border with Germany and is surrounded by Heerlen and Landgraaf municipalities. Ill. 18 and 19 present a general idea about the population trend and population distribution as per age groups in Kerkrade.



Ill. 18 Change in population of Kerkrade (1800 - 2018)



Ill. 19 Age distribution in Kerkrade (2018)

Kaalheide neighborhood

Former coal mine

Outer ring road

Mijn Speelpark West

Museumplein

Rolduc Abbey

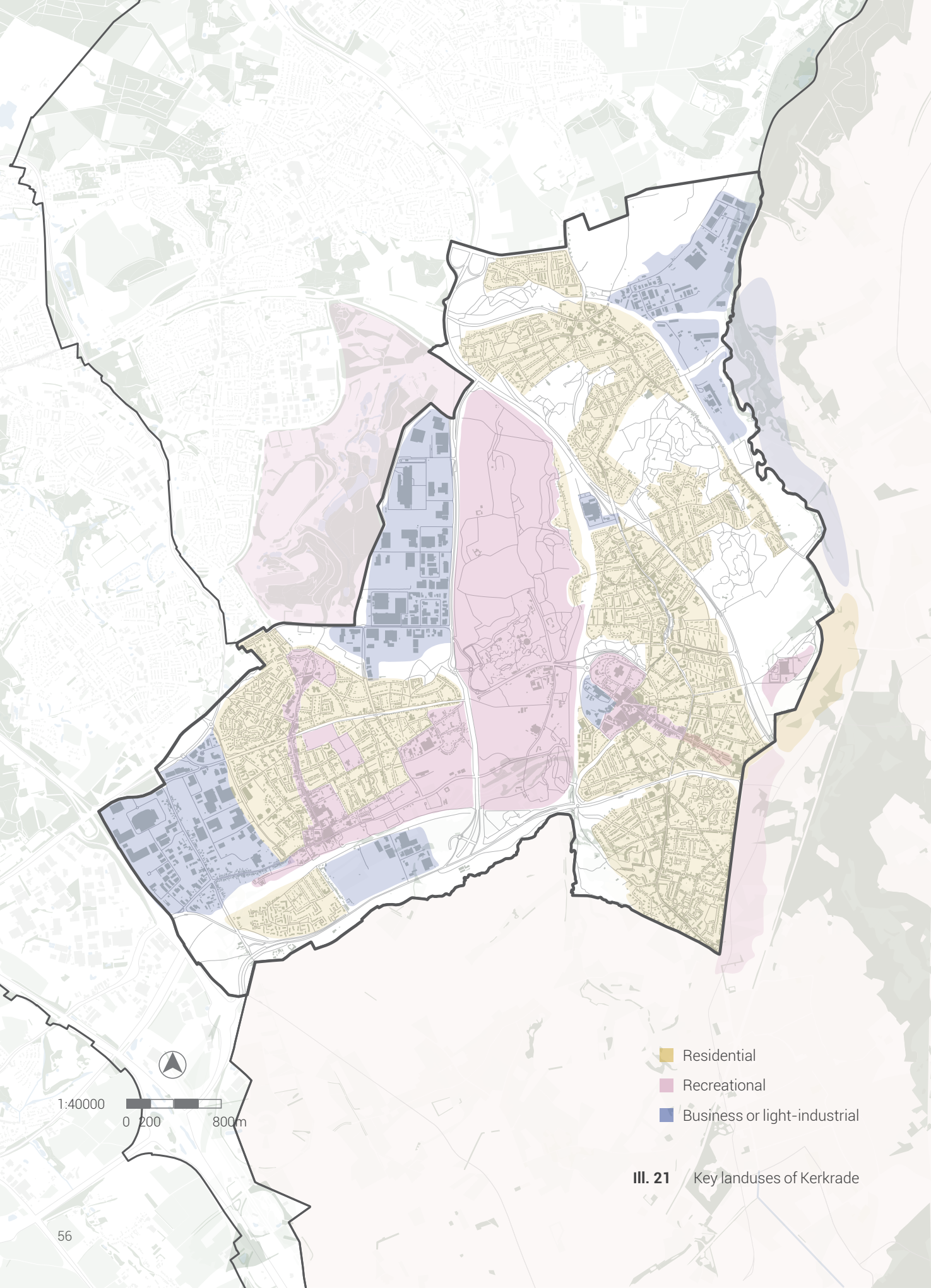
Ill. 20 Atmosphere of Kerkrade (Google Maps, 2015a; Google Maps, 2009a; Google Maps, 2018a; Google Maps, 2015b; Museum congress, 2019; Pruci, 2012)

UNDERSTANDING KERKRADE

Atmosphere of Kerkrade

Ill. 20 represents some photographs showcasing a general atmosphere of Kerkrade. A photograph of 'Kaalheide neighborhood' may be said to be a general representation of most of the residential areas in Kerkrade. The photograph of former coal mine 'Mijn Willem Sophia' shows the ost-industrial landscape, which might be integrated in the development based on the feasibility. The 'Outer ring road' highlights that it acts as an edge for Kerkrade as it does not offer any visual connectivity to the city. The photograph of 'Mijn Speelpark West' is a representation of how only huge green pockets define them. The 'Museumplein', which hosts three museums namely, Continium, Cube and Columbus is one of the major contemporary landmarks of Kerkrade. Finally, the 'Rolduc Abbey' is known for its history, which is now preserved as a heritage monument.

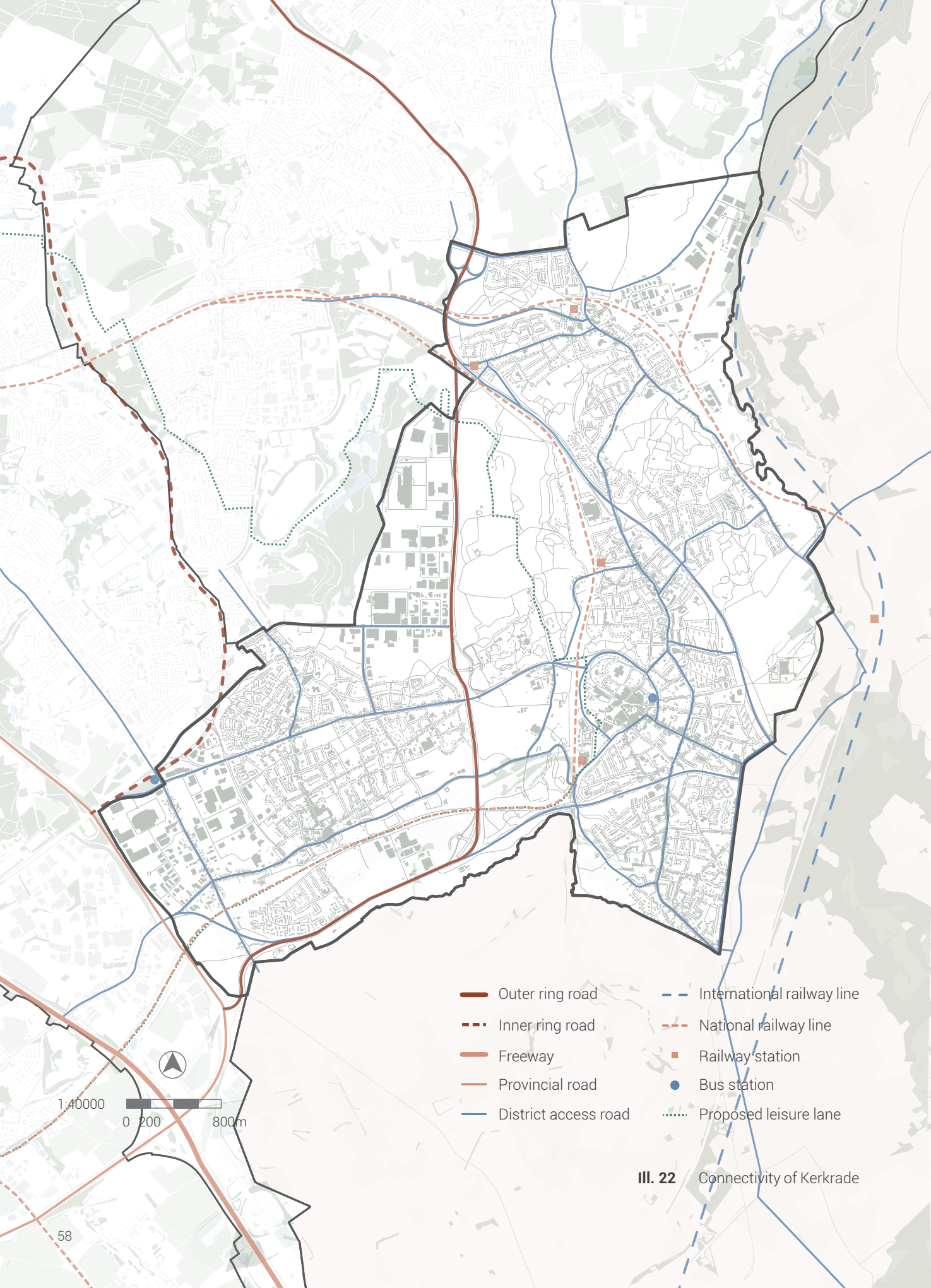
Overall, it may be said that Kerkrade has a good variety of landscapes, ranging from industrial, historical to contemporary, which must be taken advantage of in the development process.



Ill. 21 Key landuses of Kerkrade

Key landuses

Ill. 21 highlights the key landuses in Kerkrade, which are residential, recreational and light industrial or business. It may be said that there is not much diversity in landuses. Most of the area is dominated by residential and the other landuses, for instance recreational activities, are not proportional to the residential.

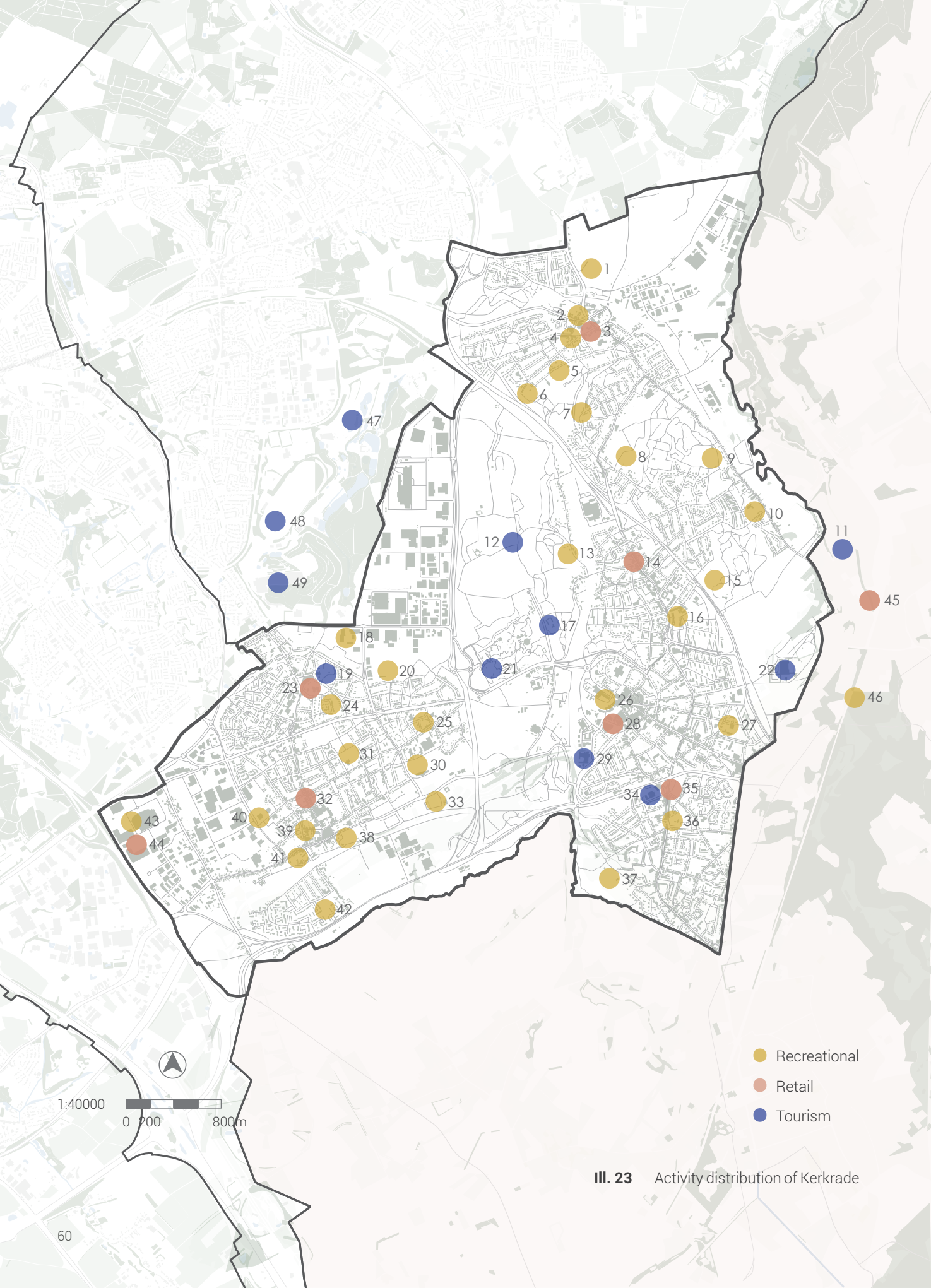


Ill. 22 Connectivity of Kerkrade

Connectivity

As shown in ill.22, the outer ring road passes through the center of Kerkrade, acting like a division which splits the city into two parts. The inner ring road does not play a big role in Kerkrade itself. The railway connection is good with four railway stations in the municipality. However, there is no direct link with the international railway. The proposed leisure lane is oriented mainly towards soft users i.e. cyclists and pedestrians. Rest of the city (mostly) has a regular infrastructure for active mobilities with for instance, sidewalks and bicycle paths

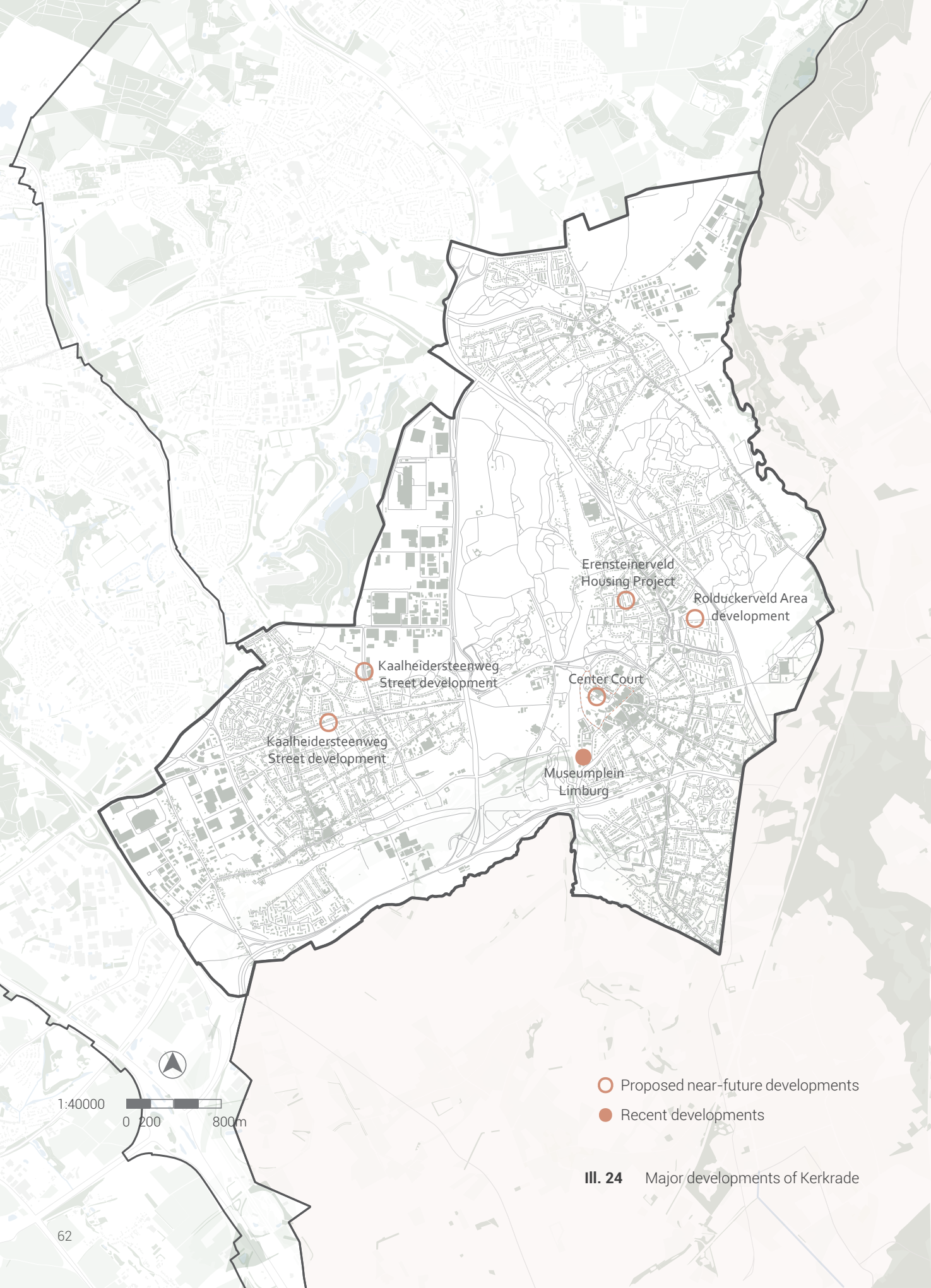
In terms of infrastructure, it may be said that Kerkrade is well-connected, however the question arises: does connectivity only mean infrastructural connection?



Ill. 23 Activity distribution of Kerkrade

Activity distribution

Ill. 23 shows the major activity-oriented areas in Kerkrade. They have been classified into three categories: recreational, retail and tourism. The recreational activities include the areas with neighborhood interest such as parks, Theatre, sports-related areas. Retail activities include shopping markets, food markets, malls etcetera. Additionally, the tourism category includes areas of rather national and international interest such as GaiaZoo, Snow World and Rolduc Abbey.

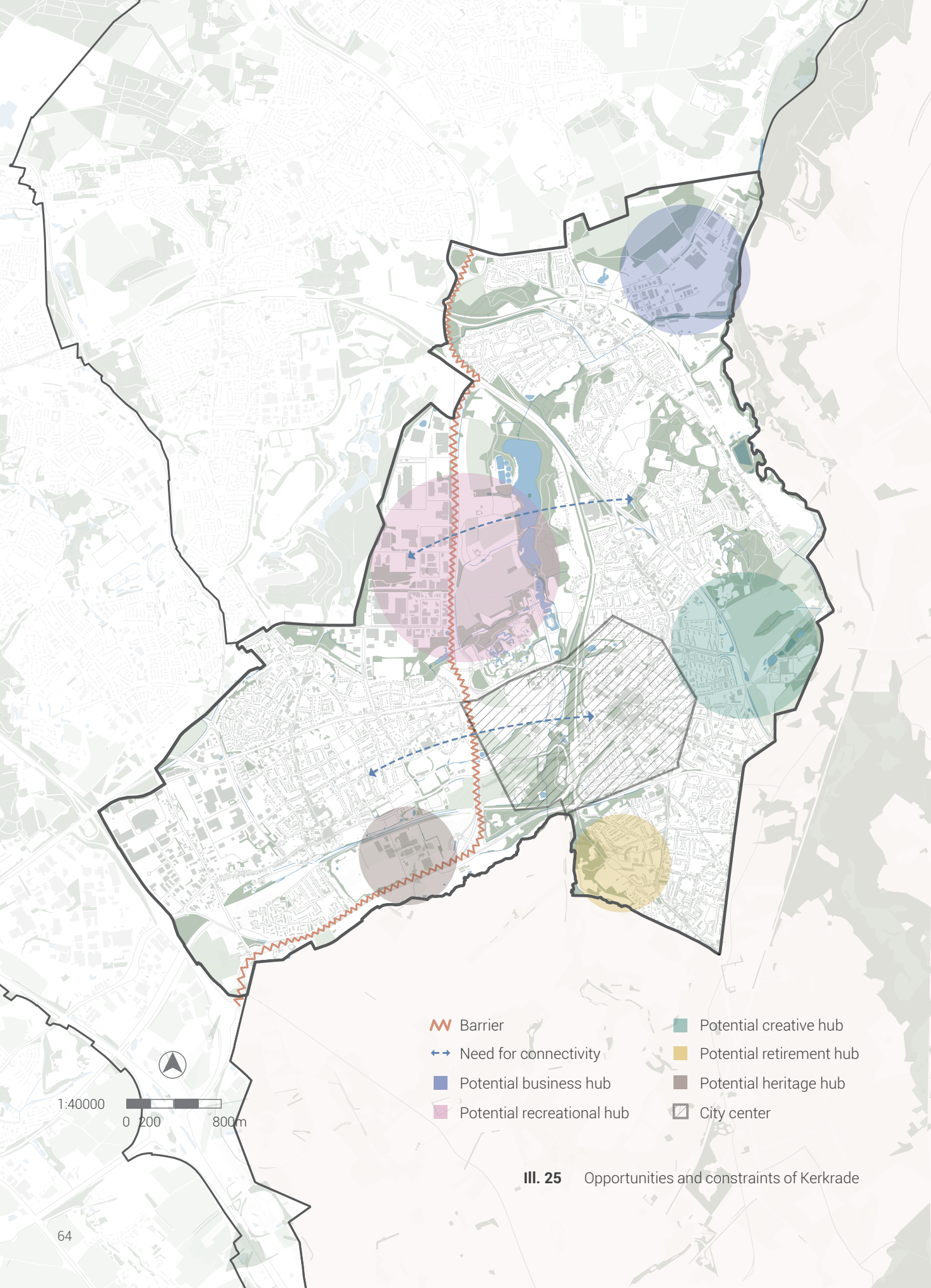


Ill. 24 Major developments of Kerkrade

Major developments

Firstly, it is important to note that Kerkrade is divided into four zones: North, South, East, West and the development strategies or plans are developed separately for each of the zones. As a result, most projects might remain unconnected with the rest of the city.

Moreover, the recent development projects as marked in ill.24, are kind of individual and sometimes lack link with rest of the city, for instance, Monique Mathissen (2016), an employee at Neimed, mentions in her blog '..every day I drive past this place and I wonder if visitors can find their way to the renovated Museumplein...'. Additionally, certain projects, for example, area developments and street developments, portray a rather 'maintenance strategy' or 'growth-oriented' image.



Ill. 25 Opportunities and constraints of Kerkrade

OPPORTUNITIES AND CONSTRAINTS

An initial analysis of opportunities and constraints based on the previously presented information in this chapter is shown in ill.25. The outer ring road acts as a barrier through the center, which calls for reconnecting the two sides of the ring road. Furthermore, based on the major activities and developments, potential cores for certain activities were identified. A design approach developed for Kerkrade presented in 'Conceptual Design scenario building for Kerkrade' chapter evolves from certain aspects drawn from this analysis.

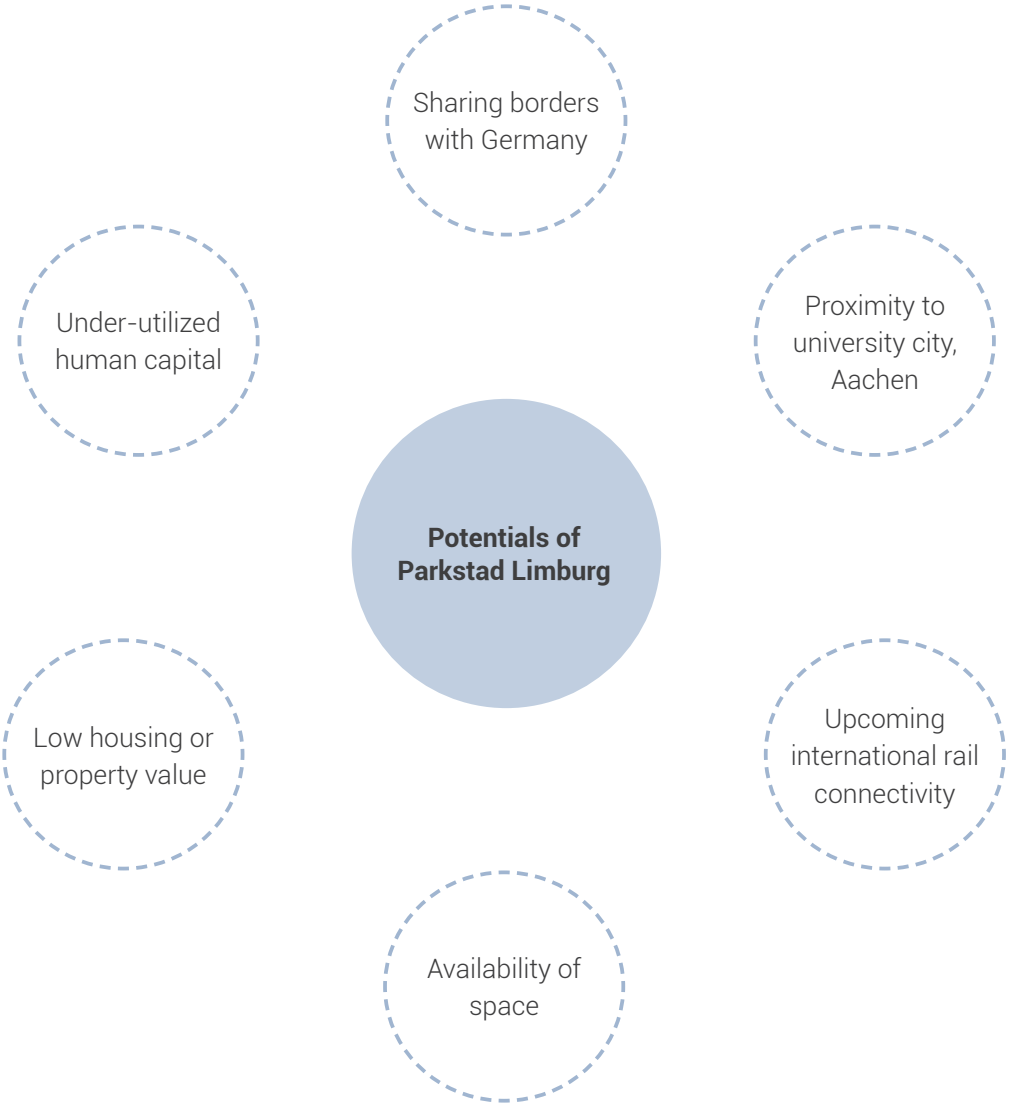
NEED FOR A COMPREHENSIVE APPROACH

Ill. 26 Challenges faced by Parkstad Limburg

Various conclusions can be drawn from the analytical study of Parkstad Limburg region and Kerkrade municipality, previously presented in chapters 'The story of Parkstad Limburg' and 'The case of Kerkrade'. It could be said that there has been a considerable amount of effort made in terms of spatial development by the authorities and other organizations like IBA. However, the figures related to population, ageing, employment make it clear that there has not been an improvement in the situation.

Several challenges of the current scenario at Parkstad Limburg and Kerkrade may be drawn based on their analytical study. The same have been represented in ill.26. It could be summed up as mentioned. The proposed developments and interventions act as individual entities and do not link with rest of the city and region. The same led to multiple under-utilized public spaces, undefined and vacant spaces. Moreover, most approaches look similar to what they might be in growing cities, for instance, street renovation. Additionally, several investments have been made on big-scale projects which are tourism oriented. Thus, the strategies may be said to be rather growth-oriented or maintenance-oriented. Furthermore, the demolition and covering up of the coal mines post shutdown, left the region with no traces of industrial history. Also, the continued efforts by authorities towards introduction of job markets do not succeed due to their mismatch with the blue-collar way of working, which leads to identity crisis amongst citizens.

On the other hand, Parkstad Limburg and Kerkrade do not only pose challenges, but also host a set of potentials that are important to acknowledge for gaining a better picture of the place. The same have been represented in ill.27. In a nutshell, the location of the region, with proximity to several international cities like Brussels, Cologne and sharing borders with Germany, is one of its biggest advantages. Additionally, one of Europe's biggest universities, RWTH Aachen University, is only about 17 kilometers from Heerlen, giving Parkstad Limburg a chance to consider the future prospective of collaboration with Aachen in terms of university expansion or related activities. Moreover, the proposed upcoming rail connection from Aachen to Amsterdam, passing through Parkstad Limburg might further boost its potentiality. Furthermore, like many other shrinking cities, Parkstad Limburg consists of a generous amount of vacant space, thus opening up opportunities to introduce new activities and also offer future adaptability, if need be. Parkstad



Ill. 27 Potentials of Parkstad Limburg

Limburg and Kerkrade also experience lower property values in comparison to other major cities of the Netherlands, which may thus be carefully re-imagined with help from human capital which is generally under-utilized.

Overall, the mentioned challenges may be said to result in lack of social interactions and inclusivity, lack of social sustainability and lack of identity. Consequently, due to not-so-good quality of life in the territory, the population decline, ageing, rate of unemployment do not observe a positive change. However, the potentials of the place may be acknowledged and carefully considered to help tackle the challenges.

The circumstances might improve if it is understood that shrinkage is not limited merely to economic and population decline, it is a rather complex phenomenon. The understanding of shrinkage would be incomplete without considering some other important aspects such as physical shrinkage and socio-cultural shrinkage; and the inter-dependence between these types of shrinkage (Laursen, 2009). The four important kinds of shrinkage may be briefly described as follows:

• Economic shrinkage is one of the very noticed indicators of shrinkage. The first factor, for example in case of de-industrialization, is usually the high rate of unemployment, which leads to deterioration of physical, social and cultural structures, alongside population decline. Consequently, many businesses run into losses and thus, close down. Gradually, the local market and its potential to attract new investments drops because of weak physical infrastructure and image of the city (ibid.).

• Demographic shrinkage may be stated as one of the main indicators that determines shrinkage in a city. Reasons behind this kind of shrinkage may include de-industrialization, high unemployment, economic decline amongst others. Often, this leads to selective migration of young people for educational and employment purposes and results in ageing of the shrinking territory (ibid.).

• Physical shrinkage could be referred to as the most visible indicator of shrinkage, as it may be directly seen through vacant buildings, empty streets, abandoned lands and others. It is usually linked with the above stated kinds of shrinkage and results from them (ibid.).

• Socio-cultural shrinkage is probably the most unnoticed form of shrinkage. As a result of mainly economic and population downfall, the social and cultural infrastructures such as public amenities i.e. schools, hospitals, theatres etcetera start undergoing decay due to their reduced activity. The social and cultural structures observe struggle to survive. Consequently, the living standards of the inhabitants are dramatically affected (ibid.).

Ill. 27 Types of shrinkage

Overall, it may be concluded that shrinkage has a multi-faceted impact on places in terms of several aspects like demography, economy, social, cultural and physical. However, most attention is drawn towards the noticeable aspects and soft aspects like social, cultural structures are often neglected. There is more emphasis on spatial planning and policy making, in comparison to social sustainability and livability. While there is some attention to the social aspects in literature, it is still an under-researched area. This calls for a need to understand that it is necessary to give heed to social transformation in shrinking cities, alongside other aspects, because it is the socio-cultural dimension that drives the development of a place (Ročak, 2020). Moreover, as shown in ill.xx, it is not an independent entity, it is in fact linked with other kinds of shrinkage, and of course, forms an equally important aspect to be considered in the process of shrinkage.

Similarly, in the case of Parkstad Limburg, as mentioned previously, it could be argued that most spatial developments relate merely to physical interventions i.e. there is major emphasis on built form. Additionally, there is a lack of a comprehensive and shrinking-oriented scheme. These factors are the reasons due to which the negative image of the place persists and the liveability of citizens deteriorates. These approaches lack the addressal of socio-cultural aspects, which leads to questioning: Why is the built environment prioritized over people? What about the needs of the inhabitants of the place? What about social sustainability of the place and inhabitants' liveability?

In this regard, it could be highlighted that there is a gap between the measures being taken by the authorities or related organizations (what is being done) and the desired image of the place and citizens' liveability (what needs to be achieved). While at the visionary level, addressal of socio-cultural aspects are mentioned, the interventions themselves fail to convey the same. This states that Parkstad Limburg needs a rather comprehensive approach which takes into account the potentials associated with the place and range of aspects involved in the process of shrinkage, and answers the raised questions. Therefore, this thesis seeks to explore approaches towards shrinking cities and derive a holistic strategy (what needs to be done), which fits into the contextual scenario of Parkstad Limburg. It aims to address the aforementioned gap in order to retain the existing population and enhance their quality of life, instead of working towards attracting newer population.

TOWARDS REGENERATION OF SHRINKING CITIES

Duisberg-Nord Landscape Park, Emscher Park, Germany

Emscher Park, Germany

Postplatz development, Germany

The salmon of knowledge, Belfast

Saxony-Asphalt, Germany

Saxony-Asphalt, Germany

Ill. 29 Approaches towards regeneration of shrinking cities (Urban green-blue grids for resilient cities, n.d.; Gab(ph)oto, 2010; CG Gruppe, n.d.; visitBelfast, 2019; Internationale Bauausstellungen (IBA), n.d.)

POPULAR APPROACHES TOWARDS SHRINKING CITIES

The increase in awareness of shrinking cities across the globe proved to be a starting point for several actions to deal with the problem. Different cities employed different approaches in order to address shrinkage. While on one hand, some cities applied approaches which could reverse the shrinkage, on the other hand, certain cities developed policies or plans that accepted shrinkage as the actuality. Consequently, several forms of planning strategies evolved in the context of shrinking cities (Kim, 2019; Pallagst, 2019). Some of the popular strategies or concepts include greening and 'green' design, right-sizing and infill development, reintroducing a major economic sector and 'soft planning tools', which shall be briefly described in this section.

Greening and 'green' design

Although greening is not a new planning concept, it has been used in various ways to drive the urban development in a shrinking city. Developing green infrastructure through environmentally and socially allowable practices and enhancing the accessibility to these landscapes has proved to be effective ways to deal with shrinkage in some cities. In some cases, 'green' design has also been employed, in terms of the direction of sustainable development and ecological enhancement (Pallagst, 2019).

One of the best examples for greening can be found in Emscher Park. Emscher Park is located in Ruhr region of Germany, where a post-industrial abandoned space was transformed into the so-called Duisburg-Nord Landscape Park by Internationale Bauausstellungen (IBA). This project attracted a lot of public attention, even at an international level (Pallagst, 2019; Ryan, 2019). Additionally, the concept of 'green' design can be found in the city of Herne in Germany, where the building which was circumscribed by a park was developed as an energy park with installation of photovoltaic panels on its roof (Pallagst, 2019).

Right-sizing and infill development

Right-sizing may be referred to as strategic reduction of the city area in order to make it affordable for the local government in terms of maintenance of the city. Such an approach has been employed in Detroit and Youngstown. In some cities, strategies include planned shrinkage through conversion

of less dense areas into open-space amenities or green infrastructure (right-sizing) and densification of relatively stabilized neighborhoods with vacant or undefined spaces, which is also termed as infill development. An example for such a development is Postplatz development in Dresden in Germany (Kim, 2019).

Reintroducing a major economic sector

Several shrinking cities have worked towards introducing a new major economic sector to boost the economy of the place. Such an initiative could vary from place to place and could include development of tourism industry, creative industry, education-based industry or manufacturing industry. Examples of cities with such approaches include Leipzig where media, music and gaming industries have been introduced, Belfast where entertainment and public art was introduced, Manchester where knowledge-based industry was introduced (ibid.).

'Soft' planning tools

The 'soft' planning tools are a part of 'weak planning' which were proposed by Oswalt (2005). This approach calls for consideration of aspects such as cultural development, communication strategies and the empowerment of social networks, instead of conventional methods of dealing with the situation. It may be said that these tools could prove to be important in enhancing the liveability of citizens in shrinking cities. This approach has been applied in one of the Internationale Bauausstellungen (IBA) projects in Saxony-Asphalt (Elzerman and Bontje, 2013). This project aimed at focusing on introducing activities that motivated civic participation, such as walking tours of the city, installation of artistic and architectural elements in urban spaces (Internationale Bauausstellungen, n.d.).

A TEMPLATE TO DEAL WITH SHRINKAGE

Every shrinking city is different and each one entails its own set of complexities and uncertainties. Therefore, the approaches adopted to deal with any specific shrinking city might vary significantly from another. Moreover, most of the approaches are not always enough to single-handedly deal with shrinkage. Furthermore, some of the approaches such as infill development or greening of vacant lands in a city might have some short-lived advantage such as reducing the chances of decrease in surrounding property value. However, such approaches do not

contribute to the liveability of citizens or social quality of the place. Therefore, it may be said that a template for regeneration of shrinking cities does not always work because there is not enough knowledge on 'what needs to be done' to deal with the decline in cities with respect to its contextuality (Kim, 2019).

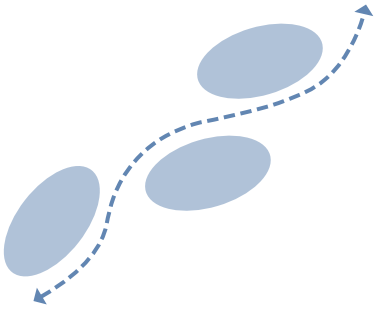
Clearly, a single-handed approach is not always enough to deal with shrinking cities. Using only one way of dealing is either unsuitable or inefficient, taking into note the complex scenarios associated with shrinking cities. Additionally, employing only top-down approaches might not be acceptable and on the other hand, citizens themselves might not have enough resources to deal with the situation (Ryan, 2019).

It may be said that a set of strategies that involve addressal of not only economic, demographic and physical factors of shrinkage, but also soft aspects like social sustainability, liveability must be employed for responding towards shrinking cities. Thus, probably developing a framework with a range of strategies is recommendable to offer rather flexible solutions for upcoming regeneration of shrinking cities. A set of strategies suggested by Saehoon Kim (2019) may be said to fit the aforementioned perspectives towards future development of shrinking cities (Pallagst, 2019).

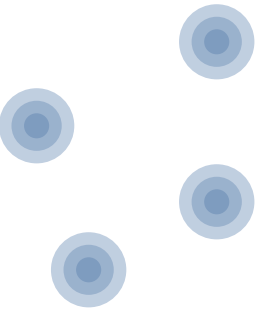
A FRESH PERSPECTIVE

Saehoon Kim (2019) identifies some generalized aims for urban designers towards remediation of issues faced by shrinking cities in his paper 'Design strategies to respond to the challenges of shrinking city'. In the suggested principles, the term 'design' does not always refer to development of built form, it instead refers to a prescription for enhancement of aspects that are often neglected, for example social sustainability and liveability. It could be said that many shrinking cities are undergoing degradation in terms of local economy and population. Thus, it is important to accept shrinkage and respond to the situation accordingly in order to prevent further loss of population and design for the liveability of the remaining citizens. In a way, this calls for shrinking-sensitive urban design (Kim, 2019).

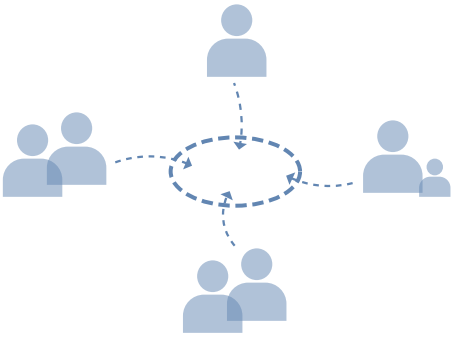
'Shrinking-sensitive urban design' may be interpreted as a way of designing shrinking cities, taking into consideration the various adverse affects of shrinkage at multiple scales i.e. from



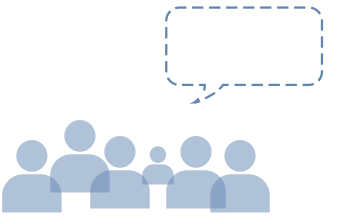
Urban connector strategies



Place patchwork strategies



Social incubator strategies



Process-based strategies

Ill. 30 Shrinking-sensitive urban design strategies

a social perspective to an overall city perspective, including physical terms. Moreover, this sort of an approach emphasizes the importance of involving social capital in the process of regeneration for a more sociable and liveable place for citizens, thus placing people before form.

The shrinking-sensitive approach leads to establishment of some goals for constructive influence of design strategies on shrinking cities. The goals include:

• Building a visible safety net, which focuses on forming self-sustainable neighborhoods with basic amenities geographically close to the places of stay.

• Creating place-based social networks, which highlights that it is important to carefully design in a way that encourages social interactions, both in participatory and physical interventions aspects.

• Reconfiguring the stigmatized image of the city, which emphasizes on consideration of aspects such as industrial heritage, cultural heritage or countering the same with genuine aspects such as social engagement, in order to fade the negative image of shrinking cities.

Based on these goals, Kim (2019) proposes four strategies namely 'Urban connector strategies', 'Place patchwork strategies', 'Social incubator strategies' and 'Process-based strategies' to address some of the adverse effects of shrinkage. It could be stated that designing in alignment with these aspects at a conceptual design phase holds potential to address the various issues faced by shrinking cities (ibid.).

Urban connector strategies

In shrinking cities, it may be assumed that most of the meaningful sites and spaces are often fragmented or scattered, which causes further decrease in the levels of social activity. Thus, it is advisable to connect the activity hubs or socially meaningful places to re-activate the social interactions amongst citizens. In this regard, an urban connector may be proposed which stimulates the social activities by linking them and also gives a direction to the future development. The manner in which the connector is developed may vary, for example, it could be a pedestrianized zone, a linking green infrastructure,

a common design element along the connector. Additionally, it need not always be a major road in the city, it could also be smaller streets bustling with activities that attract the citizens (ibid.).

Place patchwork strategies

These strategies favor spatial decentralization, in which unlike the 'urban connector strategies' the fragmented and scattered sites are left the way they are in terms of connectivity. The focus is instead on designing each of these places in a manner such that it attracts the citizens from nearby neighborhoods. This way, an intervention in such places might drive gradual transformation of the surrounding neighborhoods, thus, enhancing the social activity and quality of the neighborhoods. It may also be termed as 'patchwork urbanism' as suggested by MIT professor Brent Ryan or 'urban acupuncture' as coined by Architect Manuel de Solà-Morales (ibid.)

Social incubator strategies

As urban designers, it is necessary to realize that there is a need to reactivate social interactions in shrinking cities. Additionally, it is also important to nurture the social capital by involving citizens in the process of designing to address shrinkage. Therefore, creating or refurbishing of socially valued places for the citizens such as community centers, nearby parks etcetera will motivate the people to work towards regeneration of their city. Thus, these spaces may act as social incubators, as a result of which the social interactions are enhanced and the atmosphere of a neighborhood changes into a positive one (ibid.).

Process-based strategies

Most shrinking cities experience loss of culture, identity crises and multi-dimensional social tensions. For instance, while some residents might favor transforming the whole city by giving it a new identity, some others might feel nostalgic and might want to retain the existing character of the place. Therefore, developing a rather flexible framework instead of establishing a concrete idea for a shrinking city is a recommended approach. This is because dealing with shrinkage is a rather long process and cannot be solved at once.

Furthermore, this strategy also encourages citizen involvement, where with enough time, the empowered citizens may come up with ideas for a specific public space or neighborhood (ibid.).

In summary, the proposed strategies might have several benefits as it offers a range of approaches to apply along with flexibility within each one of them and considers social capital as an essential entity as well. It is important to note that these should not be considered as final, because with the growing experiences of each shrinking city, there might be new strategies that may be added to this list. Additionally, these strategies may have to be customized according to the contextualities of a shrinking city (ibid.).

THEORETICAL REFLECTION

The shrinking-sensitive perspective reminds urban designers to design in a way that places people before form. Urban designers should act as a medium to express the needs of the citizens, for instance through transformation of the atmosphere of a neighborhood, impression of a public space, which might be beyond the control of individual citizens. Moreover, these elements should be a part of a wider design framework. As a result, multiple issues of shrinkage are addressed at varying scales ranging from a neighborhood level to a city level and further (ibid.). This leads to the realization that every city is constituted of complex networks within itself and forms an important element in the regional, national and even international network system (Massey, 1994).

As Mehaffy and Salingaros (2013) highlight Jane Jacobs' theory, cities, when looked at in micro scale, are series of connectivity amongst people, activities and places. When the perspective is scaled down slightly, a city may be viewed as a web of evolving, connected networks. When the view is further scaled down, a city forms a connective tissue for the global networks that pass through it (Mehaffy and Salingaros, 2013). A sense of place does not necessarily lie with their independent identity, it can be thought of as progressive and outward-looking (Massey, 1994).

Similarly, in the case of Parkstad Limburg, there is a need to understand that individual stand-alone projects are hardly enough to deal with shrinkage. Every intervention should be looked at as a part of a bigger strategy at a city or municipality level. It doesn't end there, the framework must reflect at a regional level and further. This way, it leads to overall development of the region.

It may be noted that this way of designing solely cannot solve the problems of shrinkage, however, may be applied to develop a basis as a step forward to guide the development of Kerkrade and ultimately Parkstad Limburg, which might be beneficial in gradually coping with the shrinking scenario. A proposal for a comprehensive framework for Parkstad Limburg, inspired from these 'shrinking-sensitive urban design' strategies shall be presented in 'Scenario building as a step forward' chapter of this thesis.

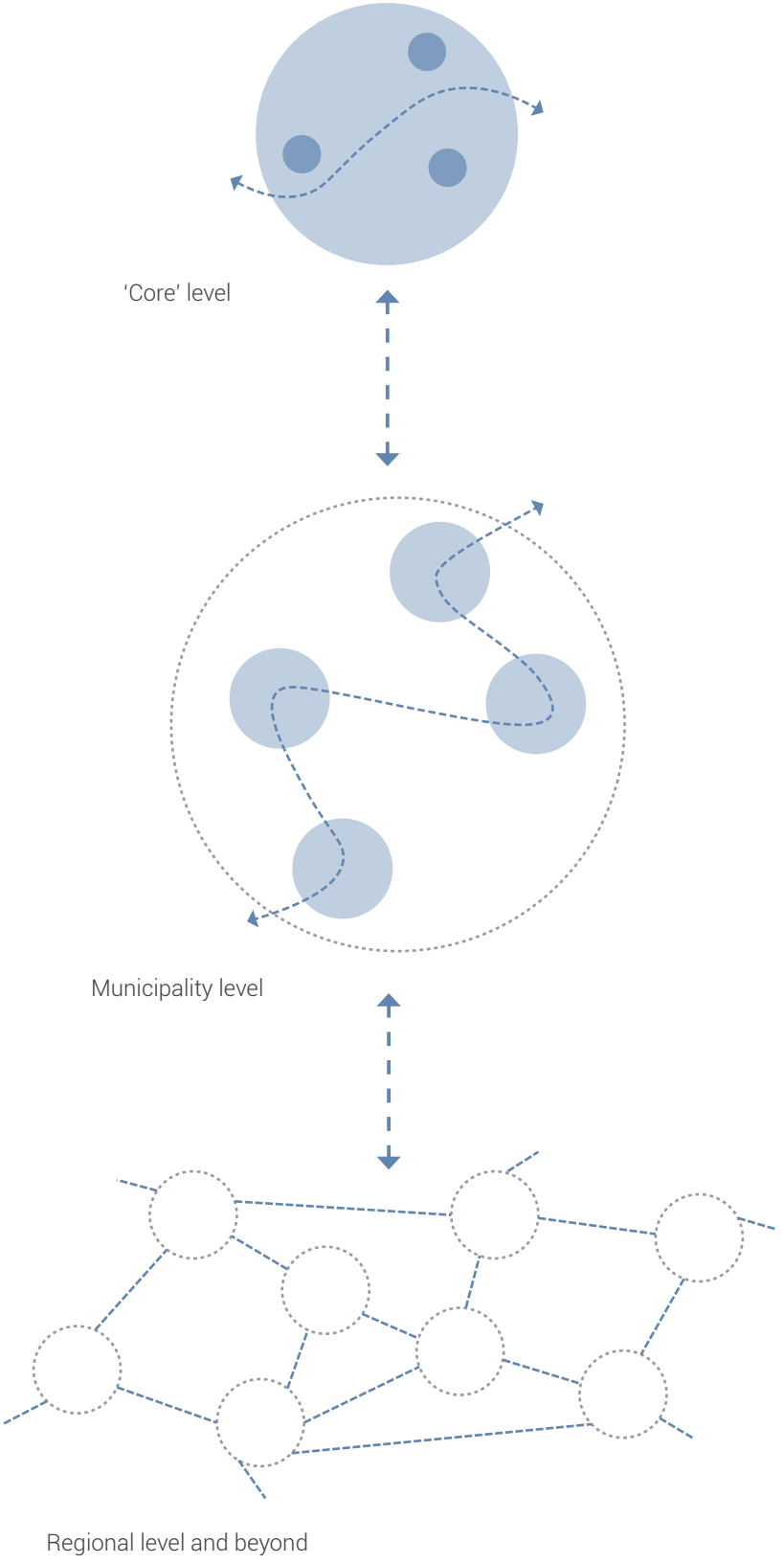
‘SCENARIO BUILDING' AS A STEP FORWARD FOR PARKSTAD LIMBURG

VISION

The vision is to challenge the traditional ways of dealing with shrinking cities by application of shrinking-sensitive urban design. This calls for exploring the potentials of shrinking cities by shifting from development of concrete built forms or single-handed interventions to a rather holistic framework with open-ended and flexible approaches, that drive the future regeneration. This direction for revitalization of Parkstad Limburg shall prove to be beneficial in designing for the existing population, thus, shall contribute towards enhancement of social sustainability of the place, liveability of citizens and gradual reversal of the negative image associated with the place.

PROBLEM STATEMENT

How can the shrinking-sensitive urban design strategies be tailored as per the contextualities of Parkstad Limburg region and Kerkrade municipality to realize the vision and provide the citizens with a more sociable, liveable future?



Ill. 31 Concept illustration - framework

HOLISTIC FRAMEWORK FOR PARKSTAD LIMBURG

Concept

The idea is to derive a framework for Parkstad Limburg theoretically anchored to the shrinking-sensitive urban design strategies presented in the previous chapter. The concept plays at varying levels ranging from a core in a municipality to a regional level, as a result of which multiple issues of shrinkage at different scales shall be addressed in order to realize the vision for Parkstad Limburg.

At a municipality level, the idea revolves around programming multiple activity cores, each with a dominant character, with respect to the contextual conditions of the place. For instance, the municipalities could include cultural core, business core, recreational core, creative core. Furthermore, these cores and the socially valuable spaces within them shall be connected effectively to enhance accessibility and visibility of each core, and ultimately the whole city. In a way, this refers to scenario building for a specific municipality which shall set guidelines to drive future development in that place.

At a core level, this approach would imply careful designing of socially valuable spaces and meaningful sites which shall encourage social interactions amongst people, resulting in enhanced liveability. The core-connector relationship shall be defined with multiple socially engaging activities, thus motivating people to explore and experience cores of their interest.

The municipalities of Parkstad Limburg are relatively smaller than many cities, yet the development of those is looked at individually. It may be stated that there is more potential in developing the region as a whole than looking at the municipalities individually. Therefore, there is a need to view at addressing the shrinking scenario at a regional level. Meaning, developing each municipality and connecting all of them shall lead to development of the complete region of Parkstad Limburg.

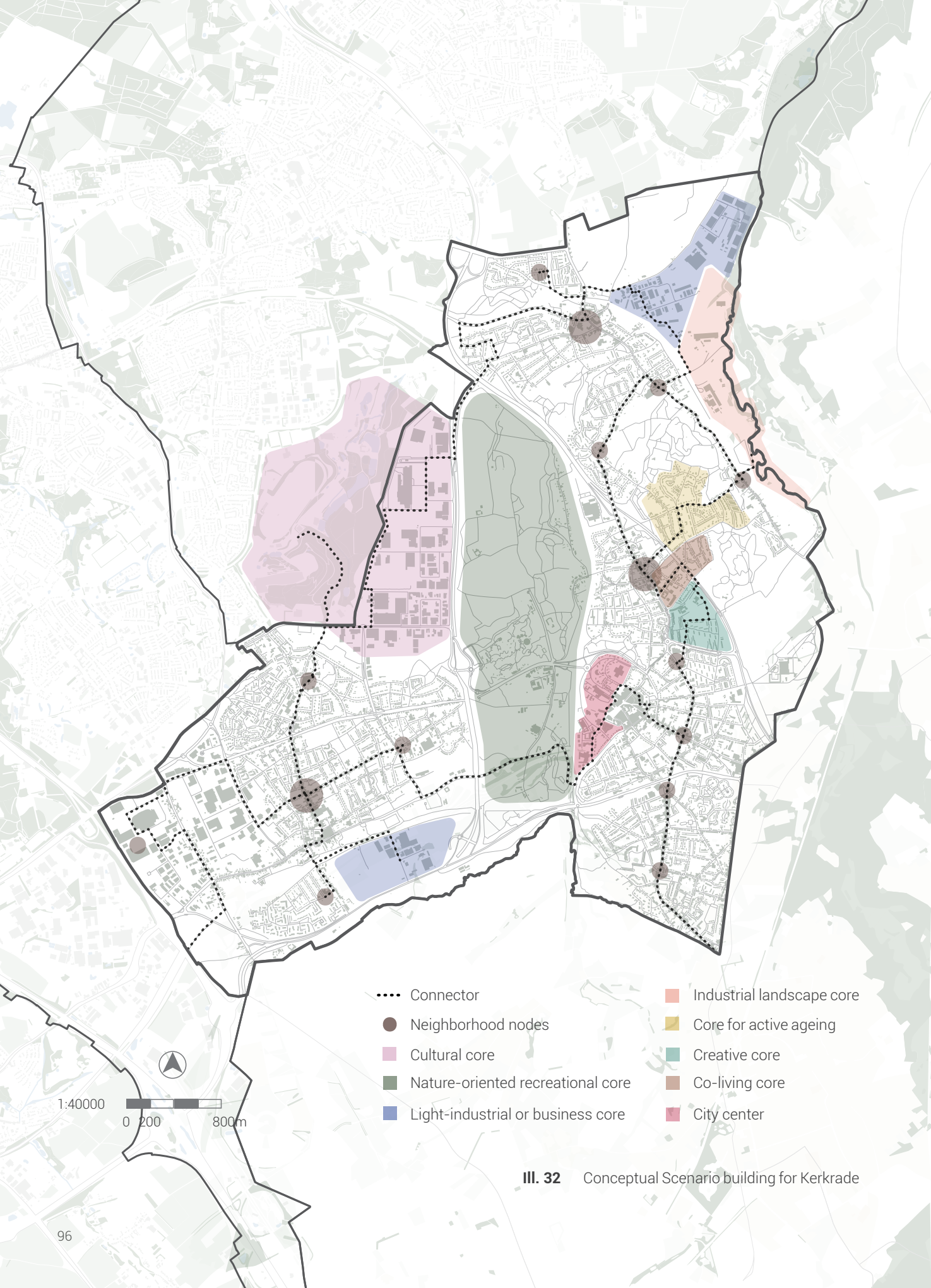
As Koolhaas and Mau (1995) put it, there are multiple interconnected scales in design, in which small and medium address problems related from domestic to public; large addresses the so called 'the architecture of bigness'; and finally, extra large which emphasize the urban scale. Thus, it may be said that the network does not end with the region of Parkstad Limburg, it grows further, and all the entities of this network system are in some or the other way interdependent and interconnected.

SCENARIO BUILDING

The holistic framework devised for Parkstad Limburg suggests creation of multiple activity cores with defined character at a municipality level according to its contextualities and connecting them in a manner that drives the citizens towards these cores. The cores shall be proposed to take advantage of the qualities and address the challenges of each municipality. The same may be referred to as 'scenario building' of the municipality, where various areas are demarcated for defined purposes, yet offering flexibility towards its contents. This sort of an approach brings the like-minded people and activities closer together to enhance the social interactions and liveability of citizens, in otherwise scattered and undefined neighborhoods of a shrinking territory. At a larger scale, this approach also acts as a guideline to foster future development.

An example to illustrate this concept could be proposing a 'industrial heritage core', where the idea revolves around preserving the industrial heritage and proposing activities that encourage interaction between the people and their cities' history, however, the way in which that core is developed could vary based on ideas generated through involvement of several actors such as citizens, municipal authorities, urban planners. Additionally, the way in which this core is designed could be flexible, temporary and adaptable to new ideas in future instead of establishing concrete and inflexible solutions. In a nutshell, 'what needs to be done' shall be defined for a core, but 'how it needs to be done' remains a variable and shall be dependent on the decisions of various actors.

CONCEPTUAL SCENARIO BUILDING FOR KERKRADE

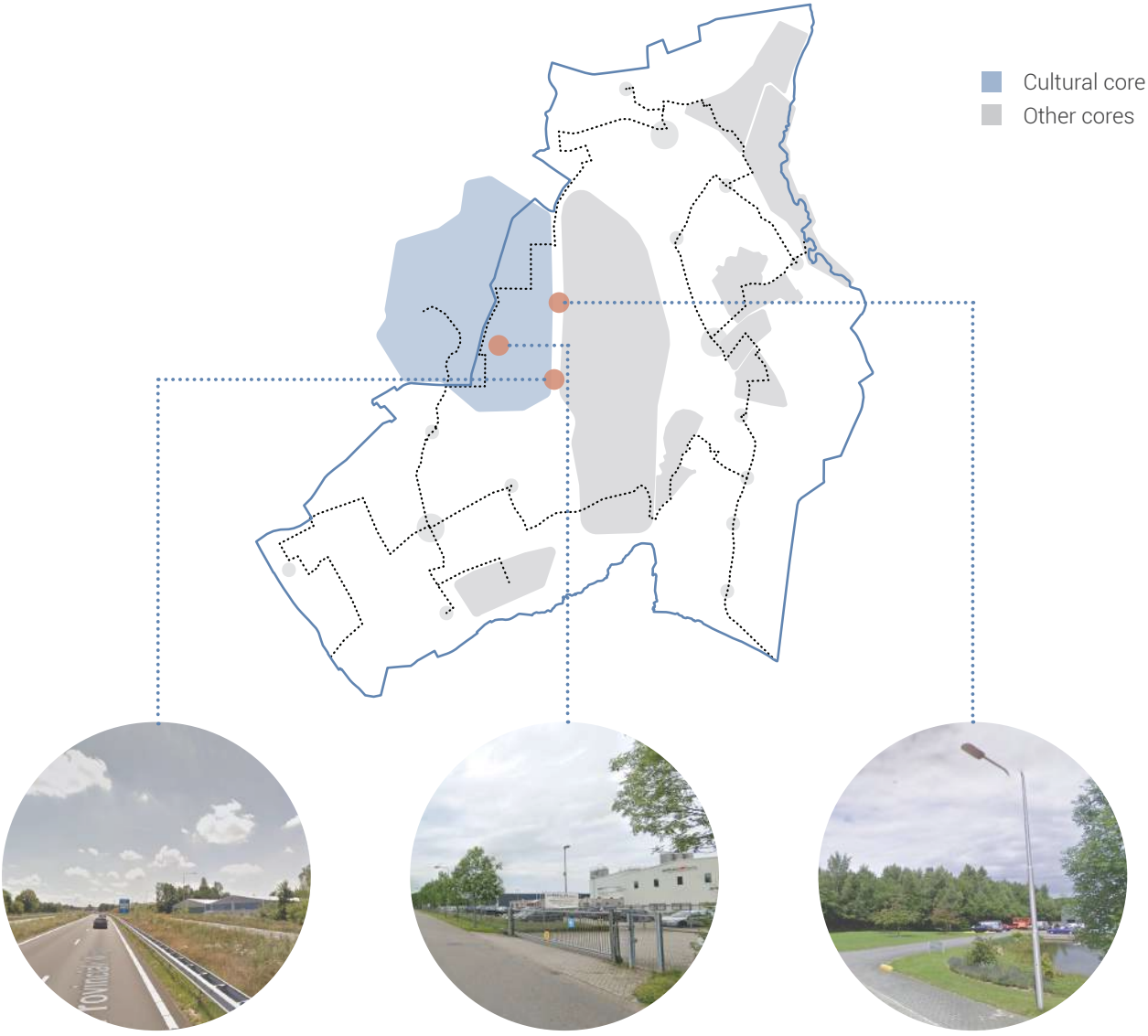


Ill. 32 Conceptual Scenario building for Kerkrade

CONCEPTUAL SCENARIO BUILDING FOR KERKRADE

To illustrate the concept of 'scenario building' at a municipality level, a conceptual scenario building for the chosen municipality 'Kerkrade', has been presented in ill.32. Understanding the potentials, challenges of Kerkrade and a careful study of the atmosphere of the municipality leads to proposal of the following activity cores in Kerkrade on a conceptual basis: Cultural core, Nature-oriented recreational core, Light-industrial or business core, Industrial landscape core, Core for active ageing, Creative core, Co-living core, City center, Neighborhood nodes. Finally, a 'connector' linking these cores has also been proposed, which shall give a direction of flow for people and guide them towards the cores of their interest. It may be noted that the proposed cores and 'connector' are conceptual (based on related information and certain assumptions) and are flexible to adapt as per actual current and future scenarios in the place; meaning, if Kerkrade hosts activities other than the ones addressed in this 'scenario building' currently and in future, which are important for the people, more cores may be added to build the scenario and the 'connector' may be modified accordingly.

The cores and 'connector', along with their location, purpose and inspiration for probable future scenarios shall be briefly presented in the upcoming sections of this chapter.



Ill. 33 Cultural core- location and atmosphere (Google Maps, 2018b; Google Maps, 2019a; Google Maps, 2009b

BIG Haizhu Bay | Muy Guemes | Taihang Village

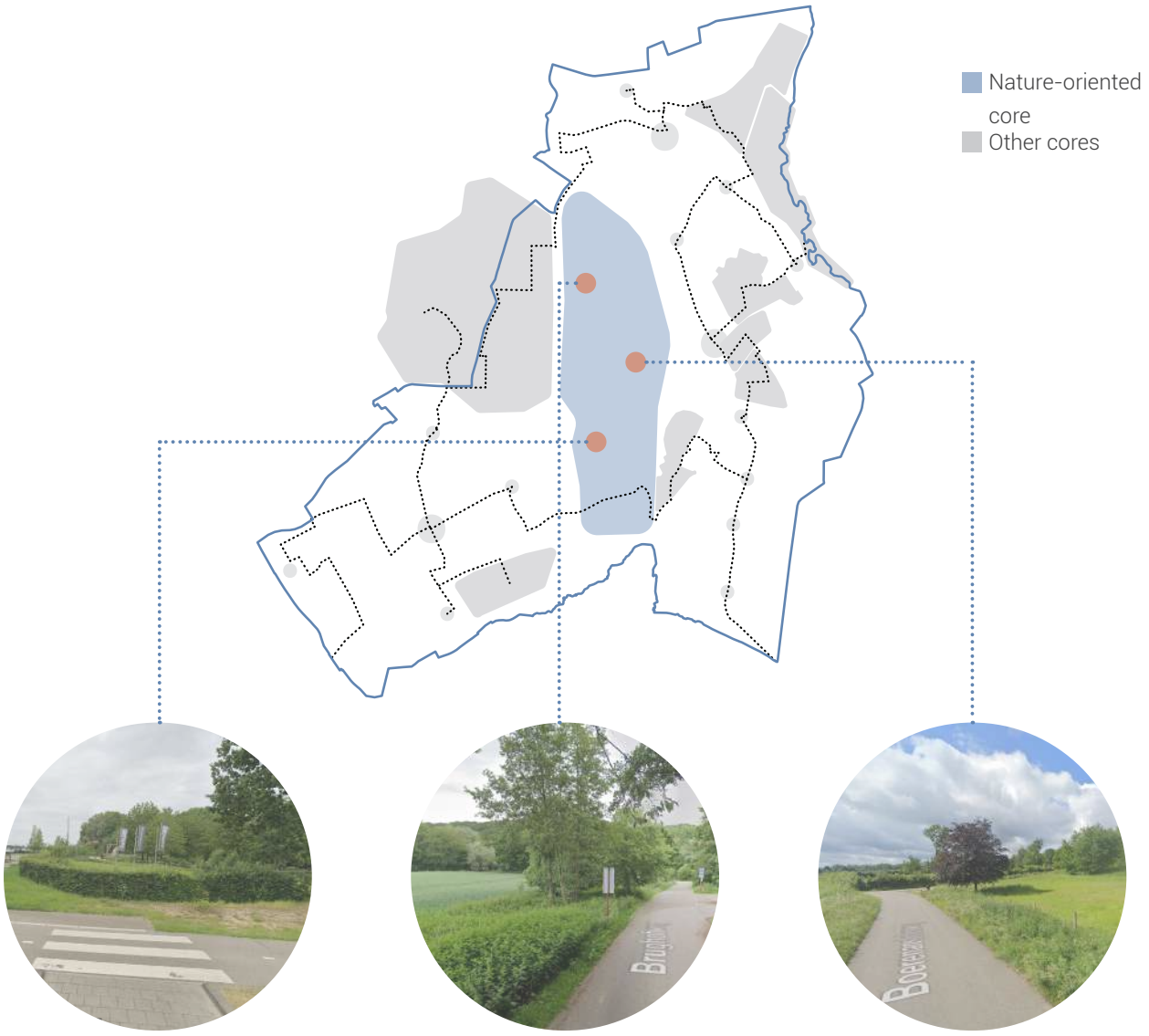
Ill. 34 Cultural core-inspiration (Archdaily, 2019a; Archdaily 2015a; Archdaily, 2019b)

THE 'CORES' AND 'CONNECTOR'

Cultural core

The cultural core of Kerkrade (shared with Landgraaf municipality) is proposed to house activities important for the cultural life of citizens. Additionally, this core also acts as a potential location for tourists, thus holding a value at local, regional, national and international level. Therefore, the placement of cultural core (as shown in ill.33) takes into account the locations of existing well-known tourist attractions such as the Snow World, Pinkpop terrain. The light industrial buildings located in this zone are proposed to be relocated to the 'Light-industrial or business core'.

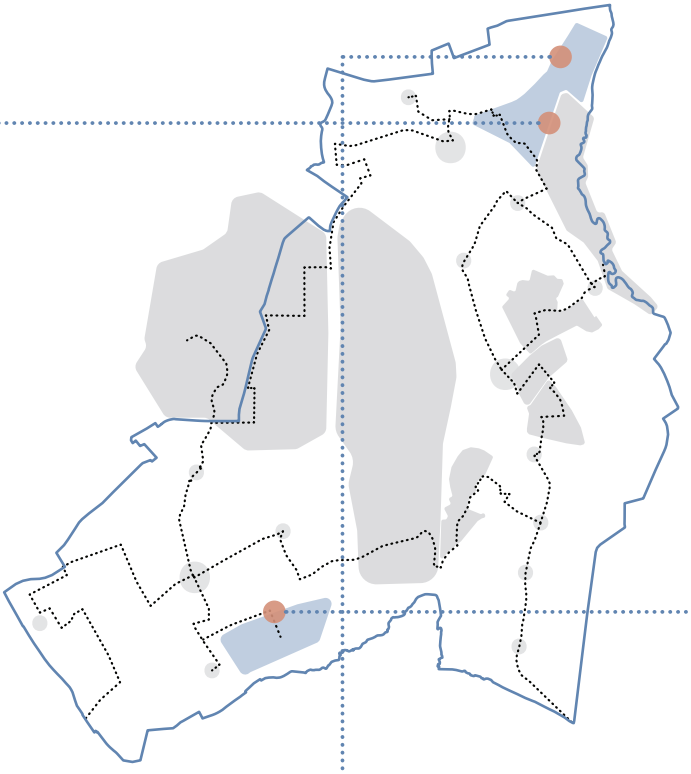
Through the coal mining era, Kerkrade observed a development of a lively music culture. The inhabitants found interest in music bands and soon it became an important component in the citizens' social and cultural life. In this regard, post the second world war, The World Music Competition, a four-yearly event, was initiated in Kerkrade and the tradition goes on till date (wmc Kerkrade, n.d.). Therefore, the core also proposes to house space required for the event and related activities. It may be noted that it is a four-yearly event and the core might remain under-utilized for the remaining period. In order to address that, the idea is to invite more cultural activities such as arts and crafts related, literature festivals. The same might result in economic value and also encourage citizens to involve in such activities through workshops, exhibitions and similar. Ill.xx shows the present atmosphere of the cultural core and the images shown in ill.34 may give an idea to perceive the core.



Ill. 35 Nature-oriented core- location and atmosphere (Google Maps, 2019b; Google Maps, 2019c; Google Maps, 2019d)

Nature-oriented recreational core

The nature-oriented recreational core may be assumed to be one of the cores which is well defined and entails a scenario for both present and future. Most of its area is covered by Gaia Zoo, which is an important recreational zone for both local visitors and tourists. The remaining area in the south of this core, is rather nature-oriented, thus, activities such as camping, nature-trails related activities may be proposed in this zone to boost the recreational aspect of Kerkrade. The 'leisure lane' proposed by the municipal and regional authorities passes through this core, thus enhancing its value through attracting visitors. Ill.35 shows the atmosphere of this core.



Ill. 36 Light-industrial or business core- location and atmosphere (Google Maps, 2019e; Google Maps, 2017a; Google Maps, 2019f)

Babylon Garden Spa

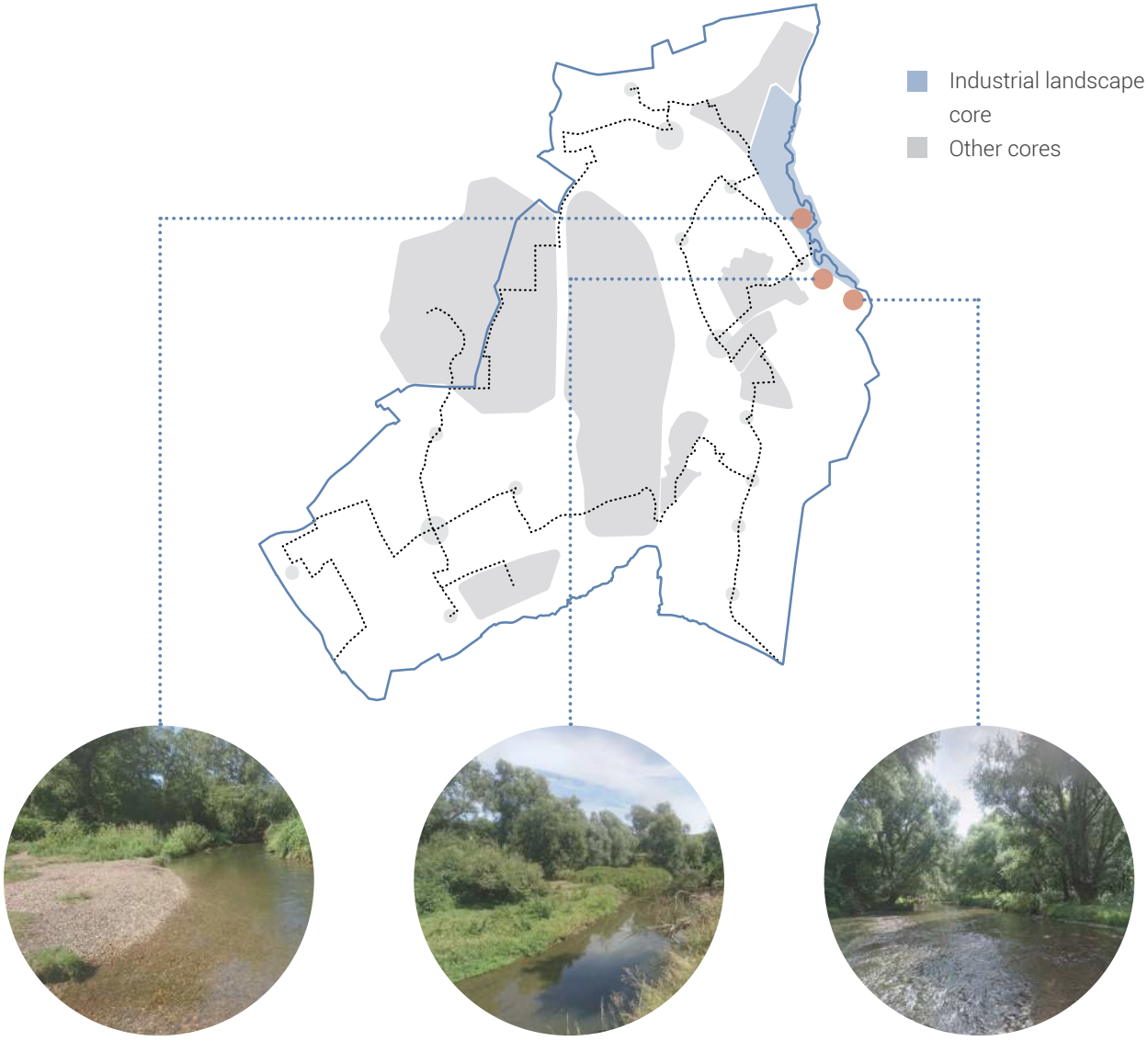
Summerhill

Titan Integrity Campus

Ill. 37 Light-industrial or business core- inspiration (Archdaily, 2020a; Archdaily, 2011a; Archdaily, 2018a)

Light-industrial or business core

Through the landuse analysis of Kerkrade (see page 56), it may be deduced that the business areas are rather scattered and disconnected. Therefore, the idea of this core is to bring the citizens' work places together into two major zones as highlighted in ill.36. Bringing various offices, workshops, light industries together and clubbing them with recreational zones might motivate the citizens to head for work. Additionally, infusing some recreation into business areas might reduce the disconnect by inspiring people to socially interact. Thus, overall this shall result in enhanced quality of work life and social life for working inhabitants of Kerkrade. The images shown in ill.37 give an idea on how combining work and recreation may add value to this core.



Ill. 38 Industrial landscape core- location and atmosphere (Google Maps, 2018c; Google Maps, 2018d; Google Maps, 2018e)

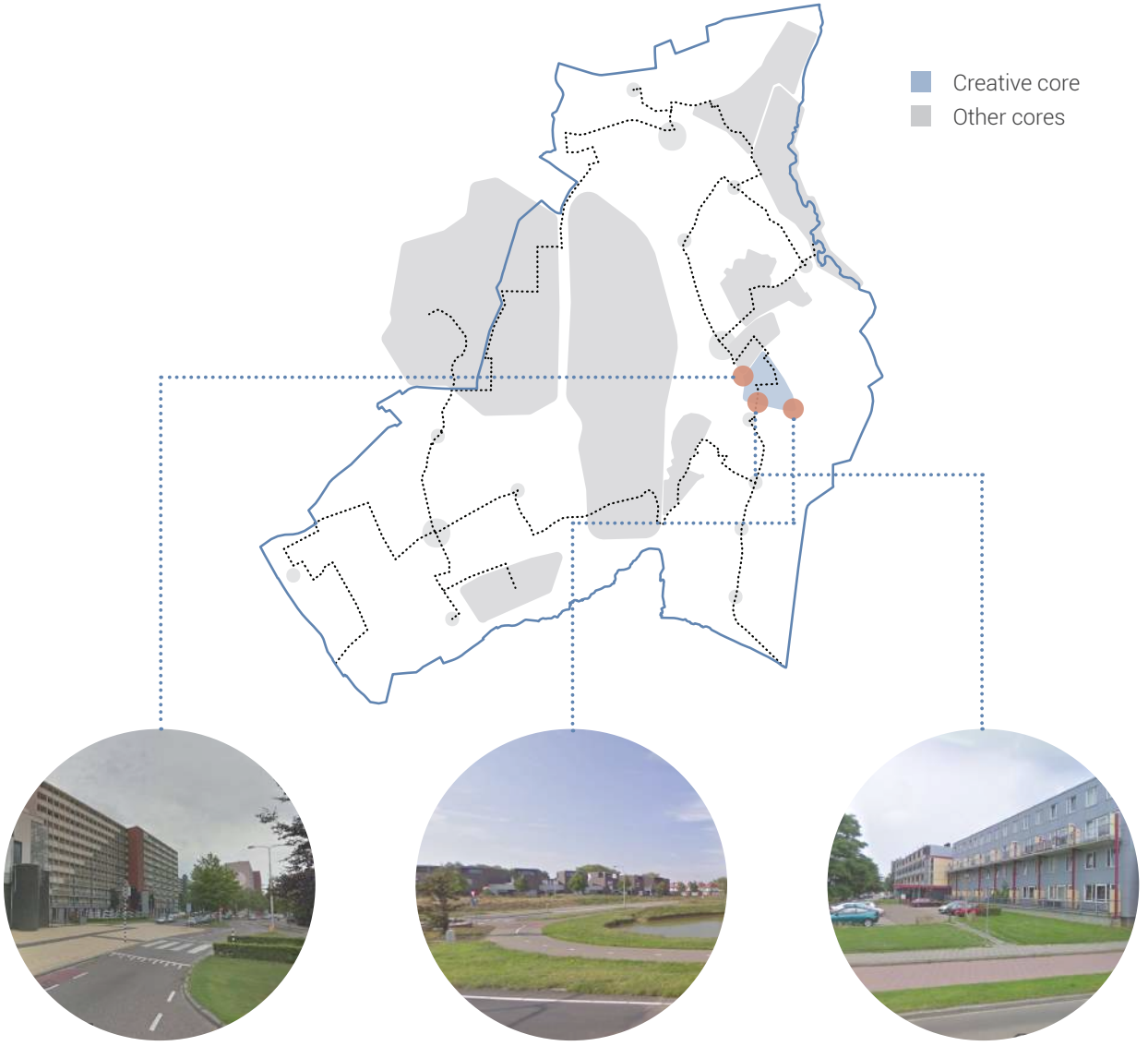
Ferndell trail | Trails Cafe | Westergasfabriek

Ill. 39 Industrial landscape core- inspiration (Hikespeak, 2018; Elisabeth, 2014; Archdaily, 2017a)

Industrial landscape core

In the process of atmospheric study of Kerkrade, the highlighted area in ill.38 was identified as an unexplored and untouched natural area. Through the photographs and its proximity to the former coal mine (Mijn Julia) location, it may be assumed that the waterbody forms a part of the industrial history. Since the place lacks any form of industrial remains or heritage, the framework for revitalization seeks to preserve the remaining few traces of industrial (or post-industrial) landscape.

Thus, the idea is to imagine this area as the 'industrial landscape core', which emphasizes revival of this landscape through minimal intervention, as the natural beauty of this core must be retained. Therefore, through the process of re-imagination of this core, care should be taken to not manicure the area and make it too grand. Some ideas could include opening this area up for public access by introducing small cafés, reading corners or cottages at intervals, trails, and minor elements like signage, benches along the river. Such an approach might allow the citizens to calmly interact with nature and the traces of their industrial landscape. A few images to inspire re-imagine this area have been presented in ill.39.



Ill. 40 Creative core- location and atmosphere (Google Maps, 2015c; Google Maps, 2009c; Google Maps, 2009d)

Barzok Bharat Bhawan Horbelev Kulturgård WERK

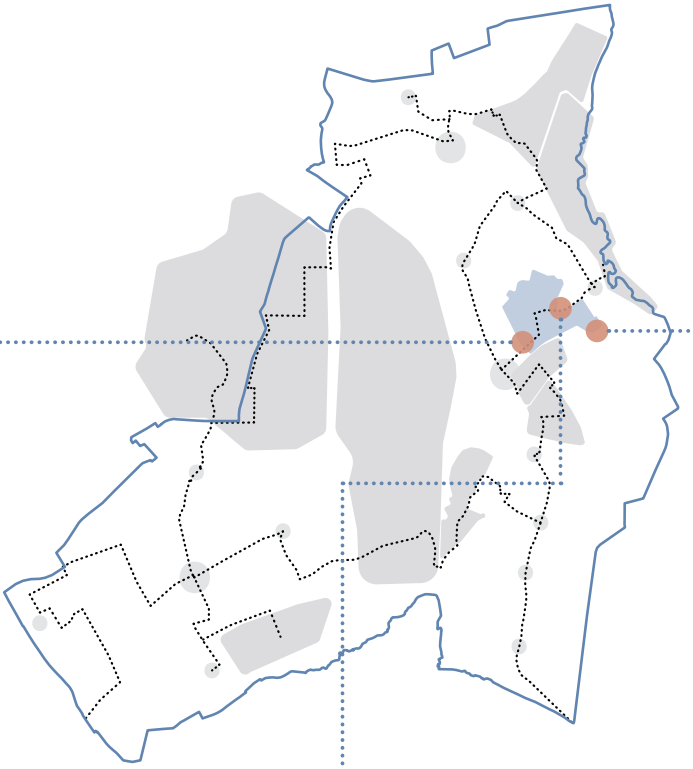
Ill. 41 Creative core- inspiration (Archdaily, 2020b; Archdaily, 2016a; Archdaily, 2018b)

Creative core

Many young people leave the place for study or jobs, due to lack of opportunities in Kerkrade itself. Additionally, a lack of infrastructure for younger people is also an issue (Lemaire, 2020). Therefore, the creative core is proposed, dedicated for the younger generation, to create space for pursuing their interests related to study or work.

The location for the creative core has been identified based on its connectivity with the RWTH Aachen University. Although, there is no direct rail connectivity currently, the nearest railway station- Herzogenrath in Germany (3-4 kilometers from 'creative core') has a direct rail connection to the University. Additionally, this area is also well connected with RWTH Aachen University by road. Moreover, the municipality mentions the vacancy rate of the area of Rolduckerveld to be an issue, which makes it a potential location to establish a creative core (Gemeente Kerkrade, n.d.-c).

The vision is to propose spaces for creative young people to inspire creative interactions at several levels. This core could entail different kinds of spaces such as study rooms, study cafés, incubators, innovation centers, artists' workshops, exhibition spaces. In a way, creating such a core will motivate the younger people to stay in their city and yet, pursue their interest. Furthermore, this core also invites interactions between the young people of this place and students of RWTH University and other nearby study places. Some inspiration may be drawn from ill.xx to perceive the environment of this core.



Ill. 42 Core for active ageing- location and atmosphere (Google Maps, 2009e; Google Maps, 2017b; Google Maps, 2018f)

Retirement Home / Atelier Zündel & Cristea

Nursing and Retirement Home / Dietger Wissounig Architekten

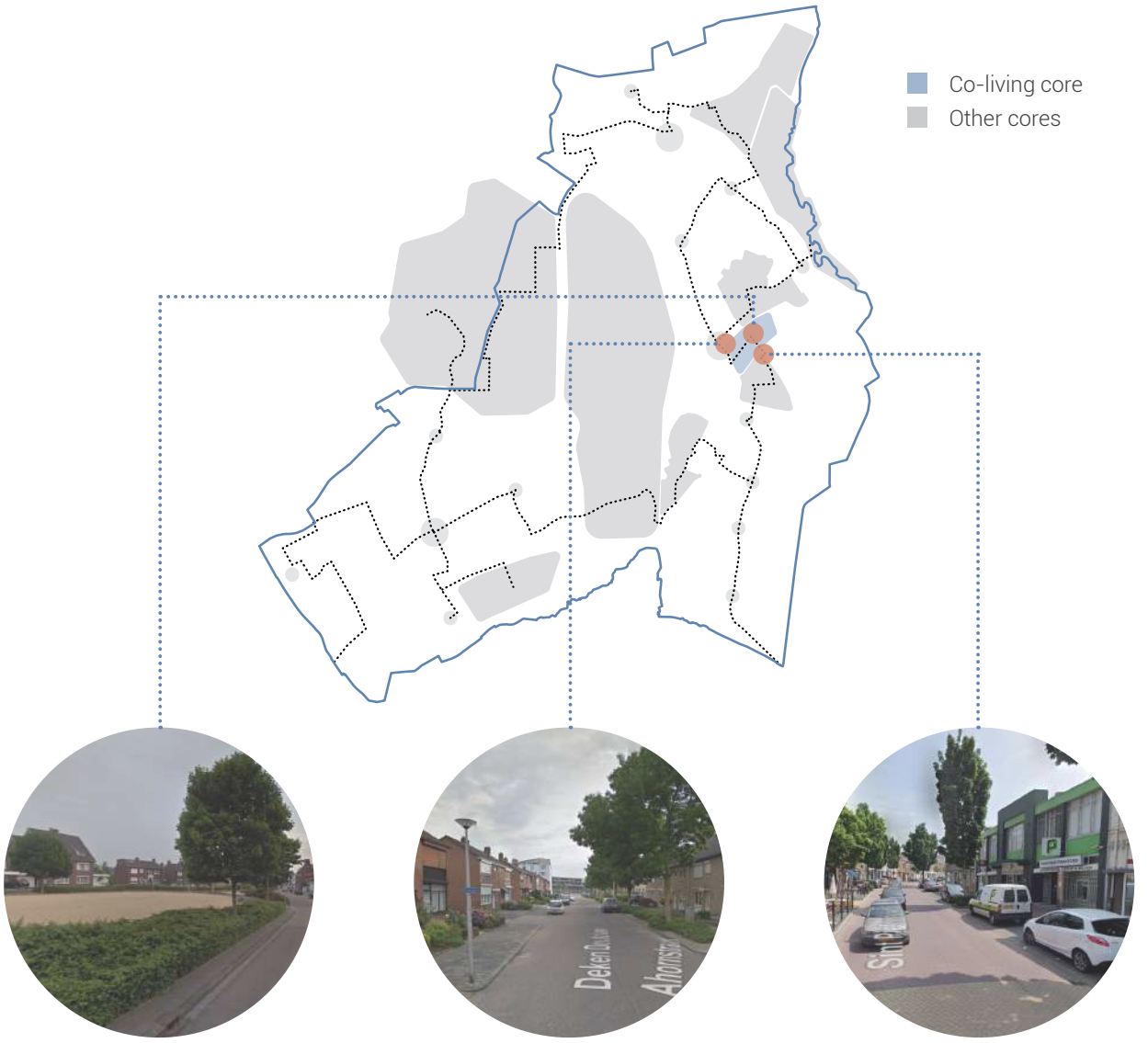
Parkside Retirement Homes / Mindspace

Ill. 43 Core for active ageing-inspiration (Archdaily, 2011b; Archdaily, 2015b; Archdaily, 2018c)

Core for active ageing

From the age distribution of Kerkrade (see page 53), the ageing factor is high in Kerkrade. Additionally, the 'loneliness' factor is becoming an issue, especially in elderly people towards which the municipality of Kerkrade has been taking steps and wishes to invest more in tackling this issue (Gemeente Kerkrade, n.d.-b). Even though ageing is seen as a negative aspect, it is important to give proper care to the elderly. Designing for elderly does not only mean physical accessibility, it is more than that. The 'core for active ageing' is, thus, located in proximity with the creative core and well connected with other cores through the 'connector' to address the loneliness and insecurity aspects amongst the elderly.

This proposal envisions active ageing for the elderly by proposing activities that engage them, increase their social activity to reduce loneliness and insecurity in them. While designing spaces for these activities, care must be taken that not all elderly people like the same scale of social interactions; meaning, some might prefer smaller groups of people and some others might prefer a larger scale of interaction. Therefore, the spaces must be flexible and adaptable to people with different mindsets. In those lines, this core could consist of care homes that also include voluntary services, fitness and exercise centers, accessible green pockets, spaces for various clubs such as reading clubs, singing clubs, community gardening, innovation clubs and spaces for inter-generational activities.



Ill. 44 Co-living core- location and atmosphere (Google Maps, 2015d; Google Maps, 2015e; Google Maps, 2019g)

Co-living core

The need for co-living core arises from the problems mentioned in the 'core for active ageing' section of this chapter. It may be highlighted that loneliness and insecurity not only affects elderly people; it also sometimes occurs to be a problem in other age groups. Therefore, this core suggests a co-living condition, where various age groups can live together (majorly young and elderly people) to tackle the issues faced due to loneliness and insecurity. This core is situated between the 'core for active ageing' and 'creative core' to facilitate easier access from those cores. This core could house community kitchens, recreational spaces alongside residential areas to enhance the social conditions of people.

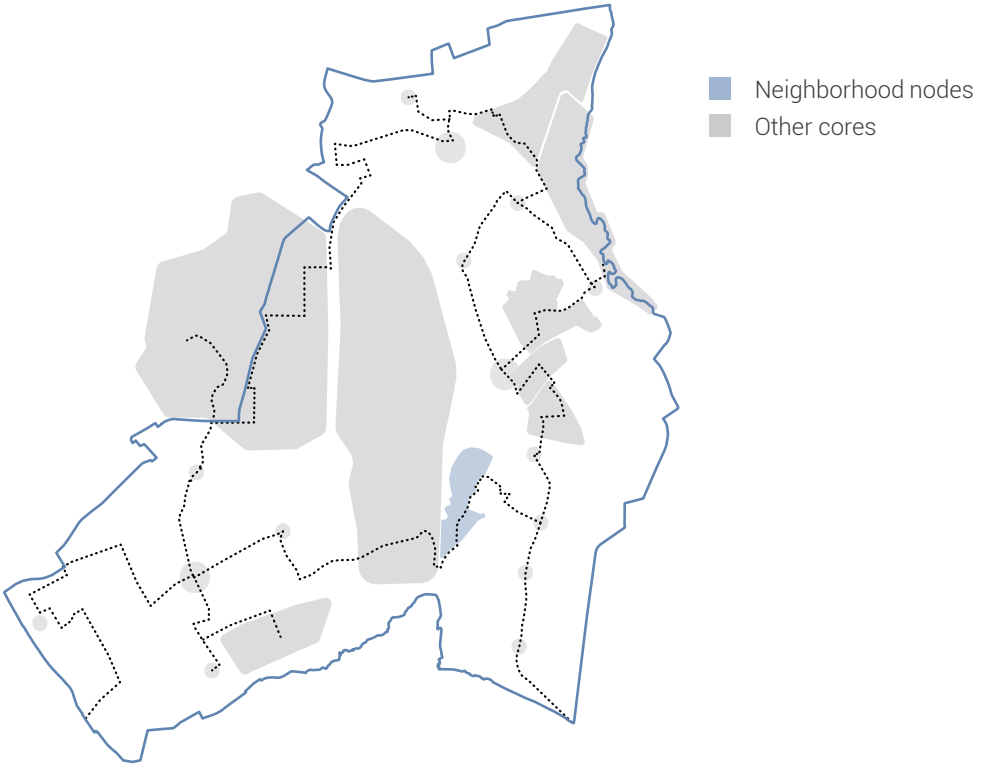
Ill. 45 City center- location and atmosphere (Google Maps, 2019h; Google Maps, 2019i; Google Maps, 2019j)

Delft Prague Rotterdam

Ill. 46 City center- inspiration (Holland, n.d.; Amdoit, n.d.; Sallie, 2014)

City center

Although the city center of Kerkrade has a demarcated area, it fails to capture the essence of a city center. This area consists of multiple important landmarks and spaces, however, there is a disconnect and lack of smooth flow between them. The idea of creating a core for the city center revolves around enhancement of the area through better visibility and accessibility throughout the core. The core could be enhanced with use of interactive signages, stand-out design elements to highlight some areas, change in flooring material, improving visual angles through use of soft elements like trees.



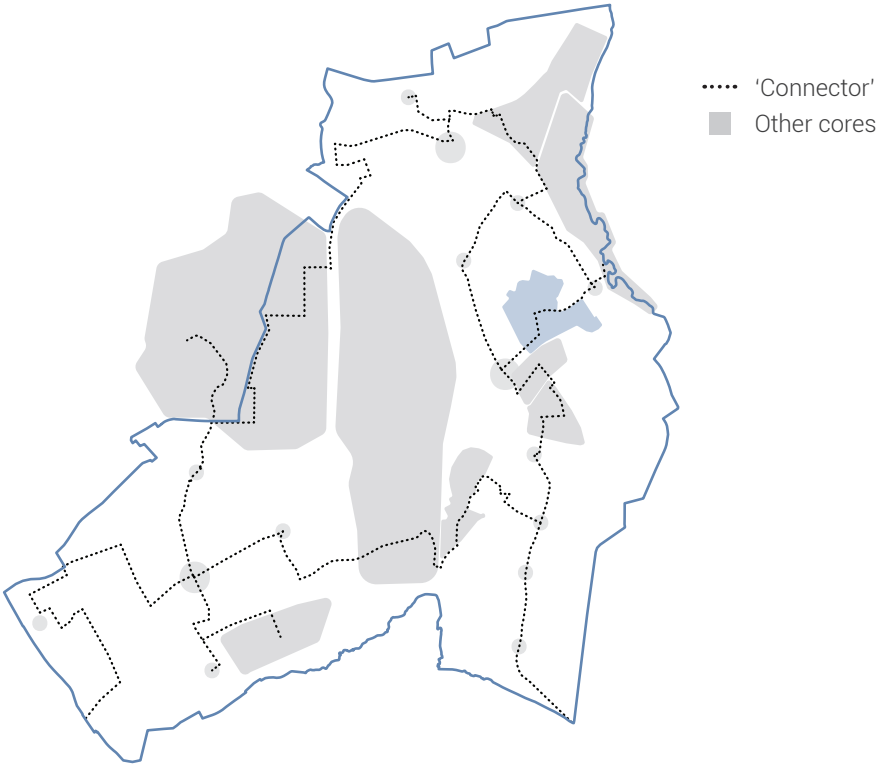
Ill. 47 Neighborhood nodes- location

Colorado Omaha Santana

Ill. 48 Neighborhood nodes- inspiration (Forge Partners, n.d.; Visit Omaha, n.d.; Hardwick, 2015)

Neighborhood nodes

The neighborhood nodes may be referred to as a common space of the neighborhood which consists of basic or essential amenities such as retail shops, supermarkets, community clubs, small recreational spaces, cafés and restaurants. These act as important entities at a neighborhood level, close to residential areas, in order to prevent longer travel time to a dedicated core for basic amenities. These cores could either be major or minor based on the size of the neighborhood. Moreover, such small cores near the residential zones might prove to be beneficial for re-activating the neighborhoods.



Ill. 49 Connector- Path

Lonsdale Street

Superkilen

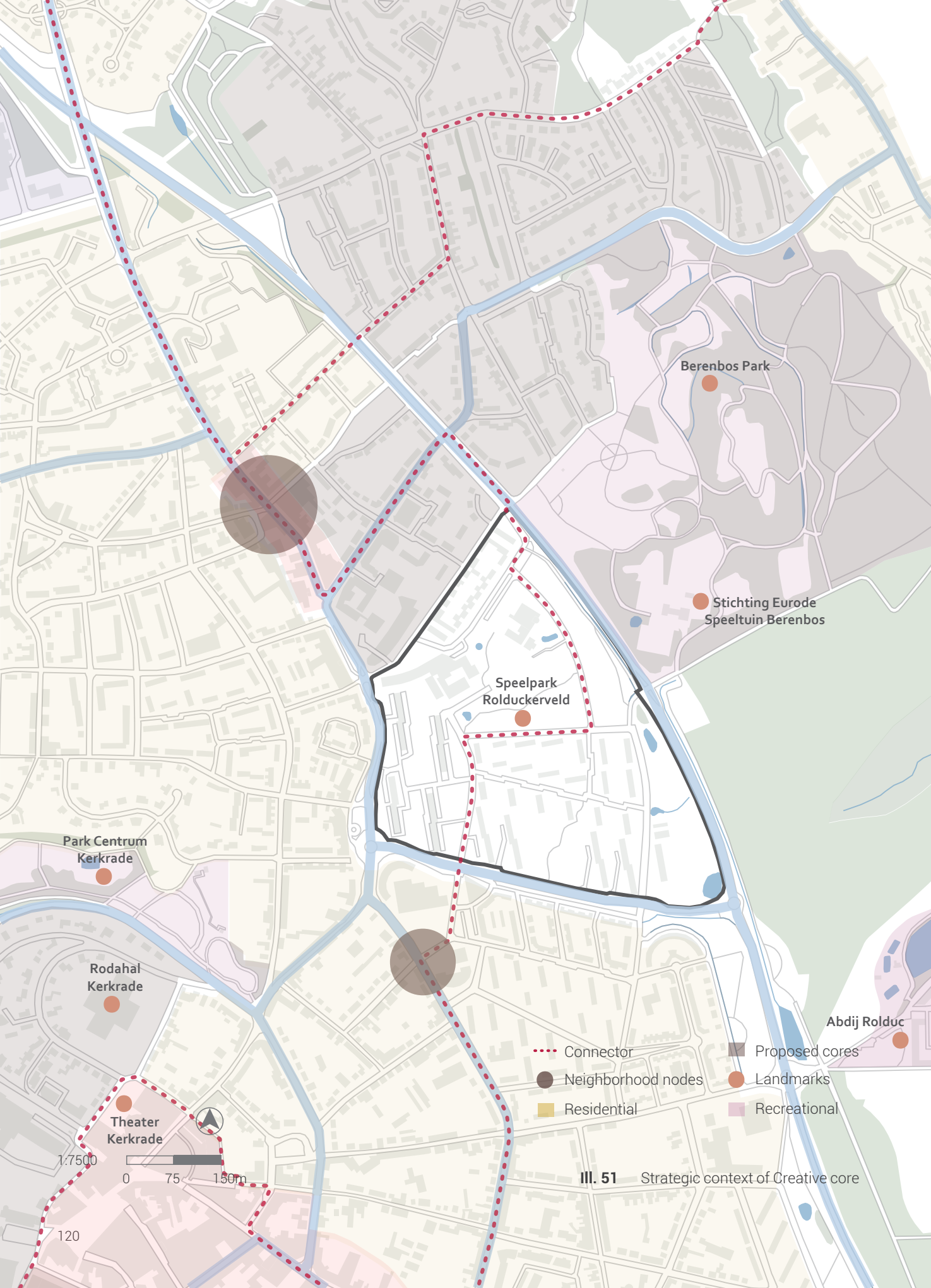
Vercorin

Ill. 50 Connector- inspiration (Archdaily, 2013a; Baan, 2013; Hofer, 2012)

The ‘connector’

The ‘connector’ links all the proposed cores of Kerkrade, thus, enhancing the visibility and accessibility of cores. The mode of connection may vary according to what suits the best for the context, it could be a specific type of lighting, a pattern on the floor that follows throughout or signage. Overall, the connector motivates the people to explore the qualities of various cores, the visibility is enhanced. Additionally, since the connector is majorly occupied with activities that enhance social interactions, it holds the potential to foster the development of the whole city.

DESIGN PERSPECTIVE FOR THE ‘CREATIVE CORE’



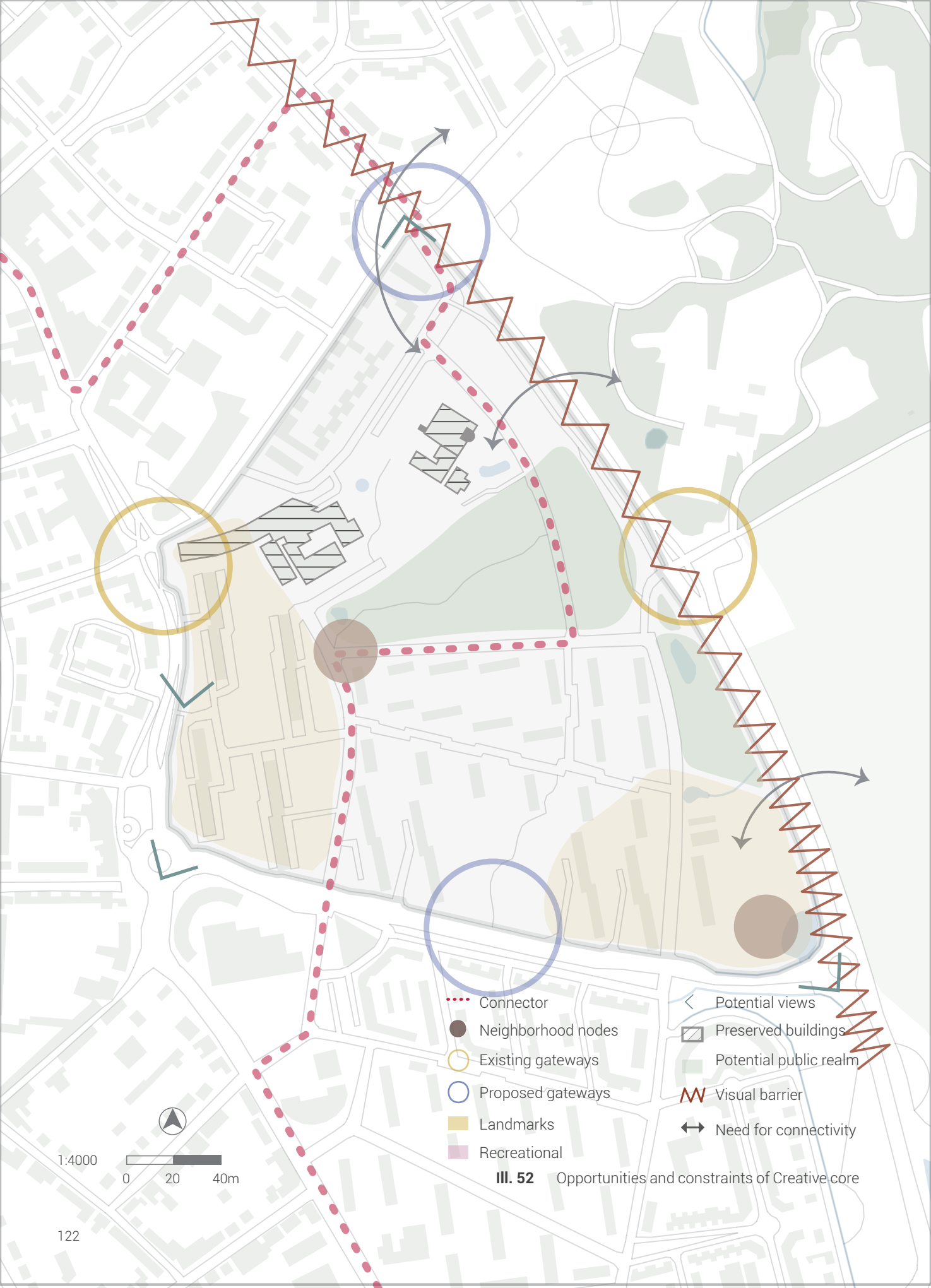
Ill. 51 Strategic context of Creative core

STRATEGIC CONTEXT OF THE SITE

The concept of scenario building, where multiple activity cores have been introduced as a catalyst throughout Kerkrade, according to their context, to improve the connectivity and liveability of the city. Currently the area (0.25 square kilometers in area) has around 200 residential homes, most of which are empty. Municipality has decided to demolish those houses and create new houses.

To further demonstrate this concept, 'Creative core' has been developed as an example to explore the design parameters and propose a living scenario suitable for the stability of shrinkage. As discussed briefly in the 'creative core' section of the previous chapter, this core would be focusing on developing infrastructure for young minds. In this chapter, a detailed analysis and design scenarios have been proposed to test the concept of scenario building at a zoomed in level.

To understand the 'creative core' site in a better way, it is very important to understand the strategic context for the area. Being very close to the city center and nearby Residential area, it serves a very good connectivity with the nearby areas in the city. The area is surrounded by provincial roads, one of which is directly connected with Germany. Urban connector passes from the middle of the site, improving the potential of the area to connect with other parts of the city, not just physically. The east of the side is surrounded by the nature oriented areas, providing a perfect scene for the development of a creative zone.

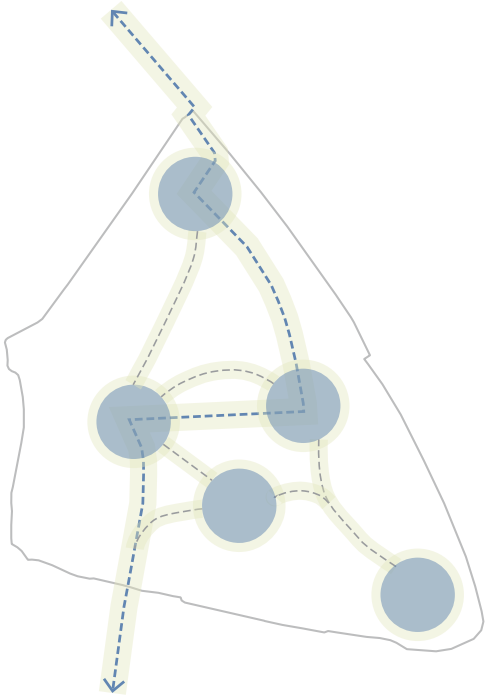


Ill. 52 Opportunities and constraints of Creative core

OPPORTUNITIES AND CONSTRAINTS OF THE SITE

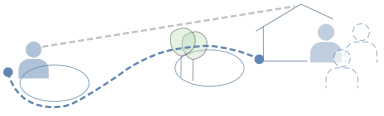
The site currently has two gateways to enter, both on the east and west side of the site. There is a potential for two more gateways on the north and south end of the site, to increase the accessibility of the area. The west end of the site acts as a barrier with the context, because of the provincial road passing through, thus making it difficult for people to cross. Because of this visual barrier there is a potential to improve connections from the west side of the site. There are two preserved buildings, one of which is a church while the other is a school. The central area of the site has an opportunity to be improved a public realm to drive people inside.

Core-connector relationship



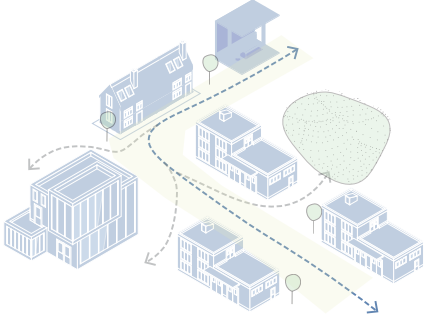
Connector-catalyst relationship

Ill. 53 Concept evolution for creative core



Visual and physical connection

Compact planning with proportion amount of open spaces



Easy flowing design

Different and modern fusion

Ill. 54 Design parameters for creative core

CONCEPT AND DESIGN PARAMETERS FOR 'CREATIVE CORE'

The idea is to further develop the concept of scenario building with the help of a connector and catalyst concept. As explained earlier, the concept is very flexible depending upon the scale of the project. The various cores, their connection with each other and the connector is very important. For understanding the concept on a scaled down level, one of the cores has been selected to develop a scenario.

The concept revolves around the connector and different catalysts introduced in the design, as shown in ill.53. The main purpose of the connector is to link various activity areas, on a municipality level, as well as on a core level. This acts as driver to various activities in the core. However, at a site level the connector is not enough to sustain the liveability of the area. Hence, some catalysts have been introduced. The relationship between the catalyst and the connector is essential. These catalysts consists of socially valuable spaces and activities. The design of these nodes should be done in a way so that it can facilitate an active atmosphere and link further with the connector to make a chain.

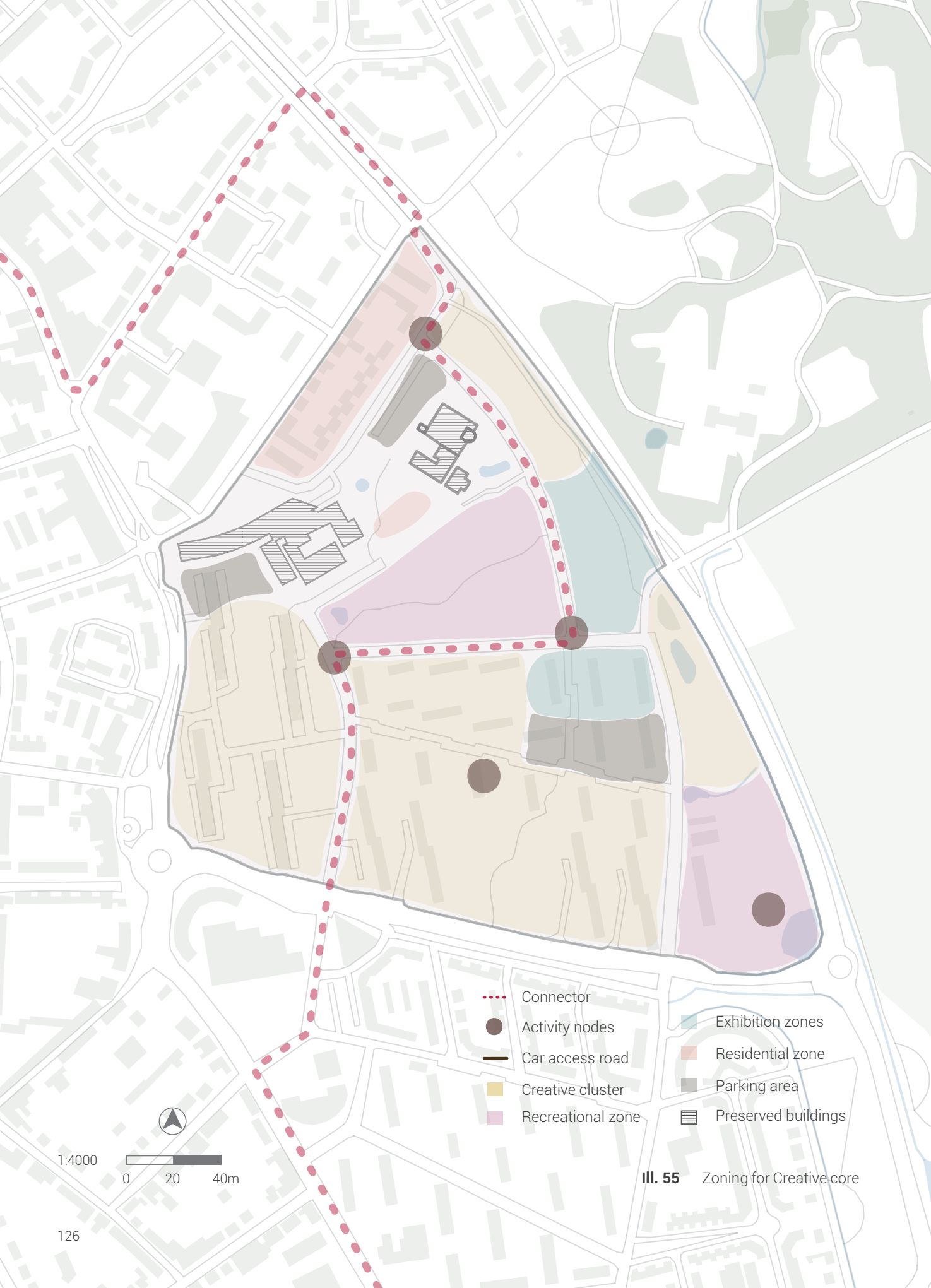
Certain design parameters,as represented in ill.54., based on the site context have been derived to support the concept:

• Visual and Physical connection - The idea is to achieve maximum connection between the areas to reduce the insecurity and loneliness factor in the area.

• Compact planning with proportionate amount of open space - Compact or close planning is one of the most important criteria for development in Kerkrade., to bring the citizens closer.

• Easy flowing design - The idea is to remove the solid boundaries between various sectors in the city. Different activities can merge and still have their own identity.

• Different and Modern fusion - One of the major problems is that the current architecture of the zone is quite dilapidated. The idea is to bring different and creative buildings to bring in the interest of the people, based on citizens' ideas.



Ill. 55 Zoning for Creative core

THE PROPOSED ACTIVITIES

The 'creative core' aims at encouraging creative interactions with different categories of people, especially student-student interactions and student-citizen interactions. To achieve the same, activities have been broken down into various zones and clusters, as mentioned:

• Creative clusters - These clusters shall be of semi-public nature and may consist of work spaces, workshop areas, study cafes and spaces, incubators, minor exhibition areas and interactive courtyards. This zone provides people with an infrastructure to explore their creativity and imagination

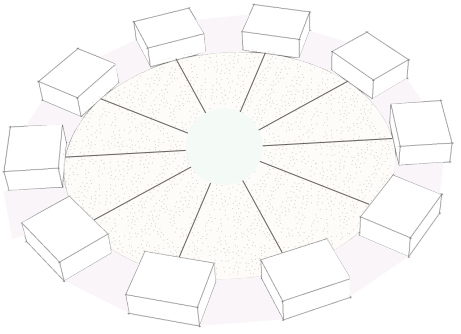
• Exhibition zones - These zones shall be publicly accessible, consisting of public exhibit areas, cafes, interactive refreshment areas.Thus allowing users to exhibit or present their work.

• Recreational zone- These clusters shall be open to public with Cafes, open air theatres, green pockets, thus creating a positive atmosphere for the citizens.

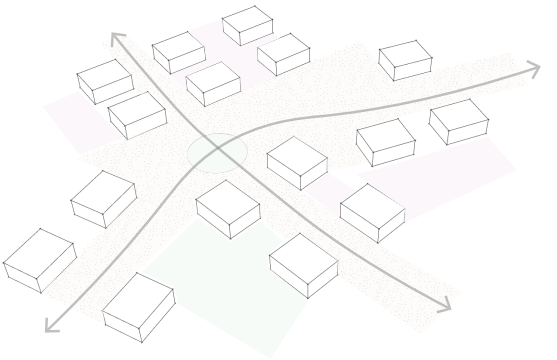
• Residential zone - This shall form very minor part of the site with few places of stay for users of this core on a temporary basis. The same shall also accommodate students looking for cheap housing, especially from nearby universities (RWTH, Maastricht).

ZONING

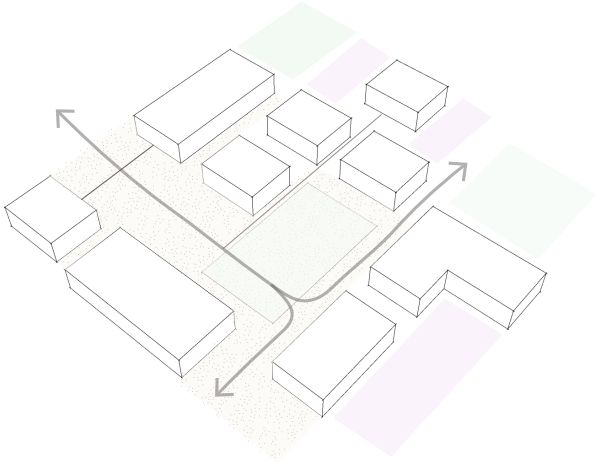
The aim of zoning was to understand how the activities must be distributed to achieve the proposed concept and design parameters. Therefore, various ideas were worked out, as shown in Appendix C, to understand the pros and cons of each way of zoning. The finalized zoning is shown in ill.55, where the idea revolves around proposing activities that have the potential to attract citizens, for instance, recreational areas, creative cum exhibition zones. Furthermore, proposing 'nodes' that act as catalysts, which draw people to explore the site further, for instance, an interactive courtyard in the creative clusters.



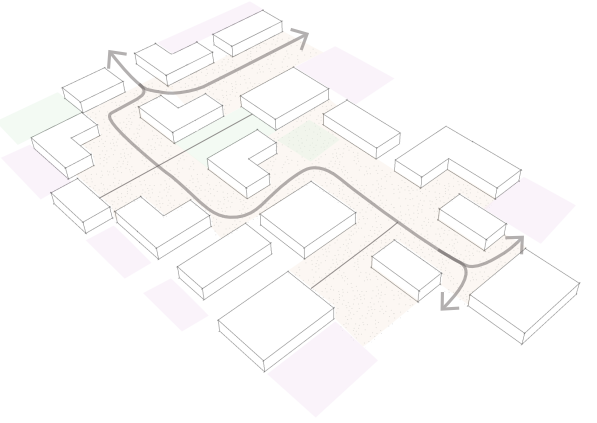
Radial distribution of activities



Linear distribution of activities



Mixed layout

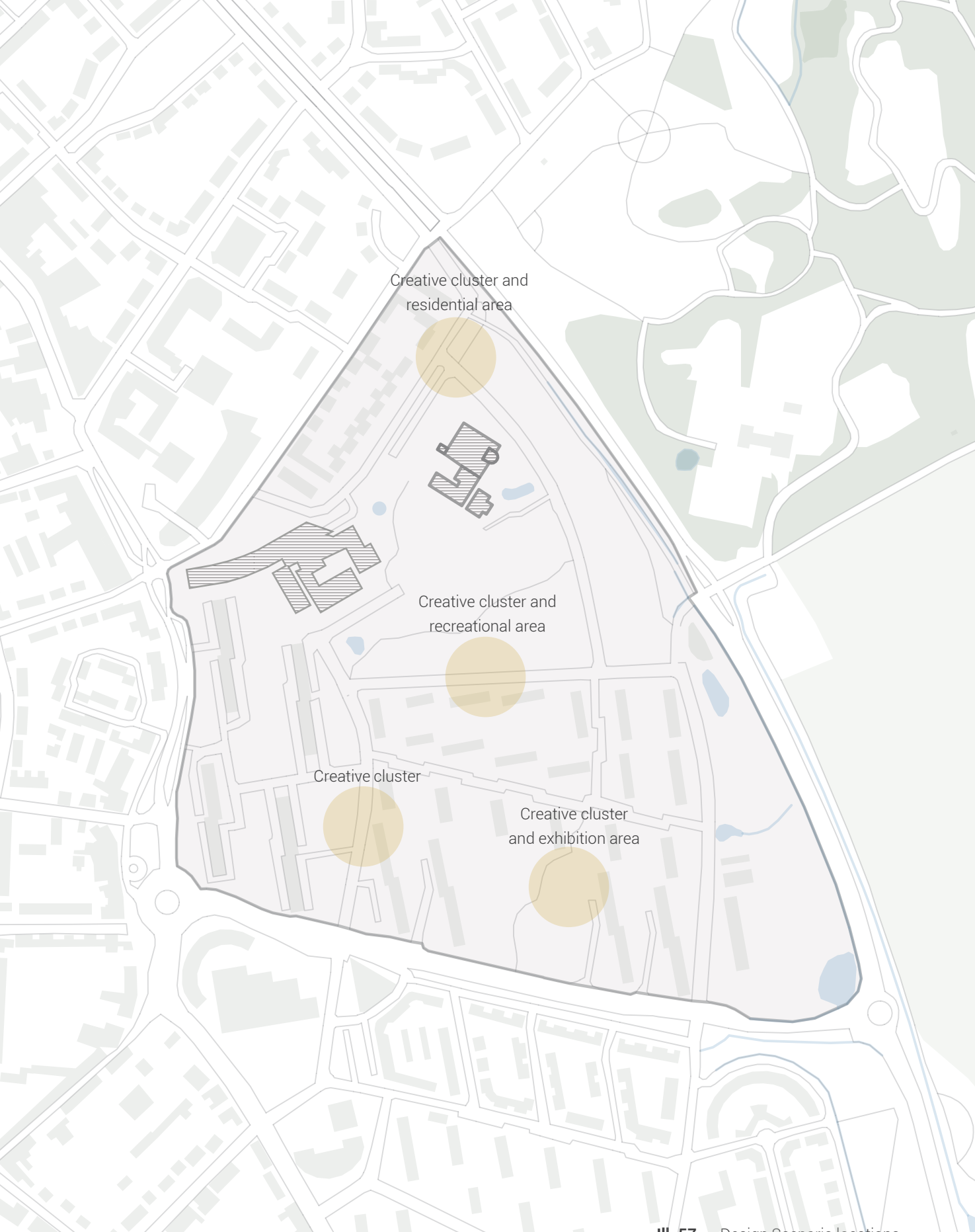


Cluster layout

Ill. 56 Testing typologies

TESTING TYPOLOGIES

Towards creating design scenarios, different typologies were tested, to understand distribution of activities and the level of interaction. The idea was to look for an approach which gives maximum common spaces but also provides some cozy corners. Linear, Radial, mixed and cluster building typologies were tested. Out of which cluster formation provides a maximum of shared space, good visibility and a better connection (physical or visual). Therefore, cluster layout se clusters were tested on the site to provide a proper connection throughout the site.

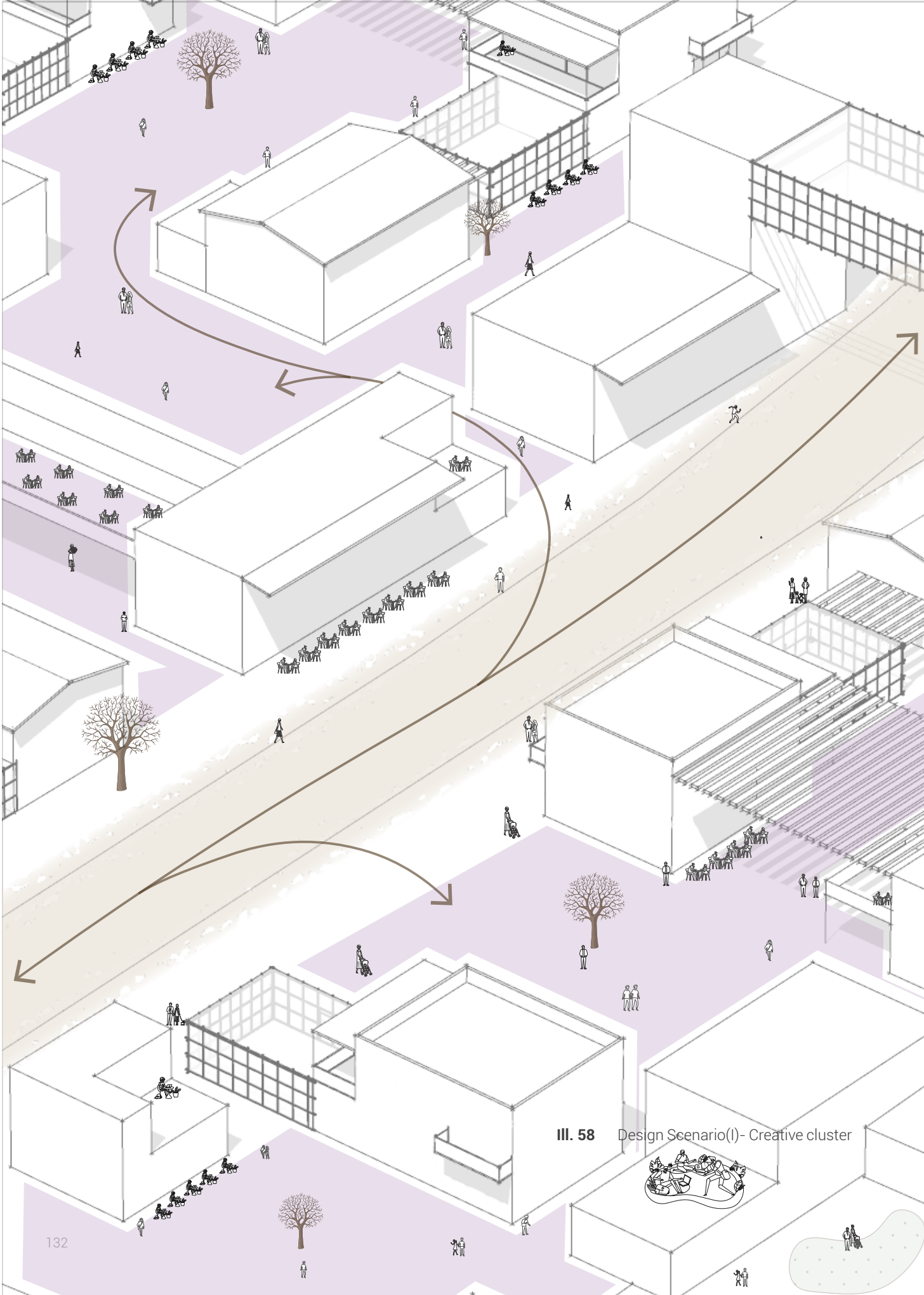


Ill. 57 Design Scenario locations

DESIGN SCENARIOS FOR CREATIVE CORE

To portray the idea and atmosphere of the site, design scenarios have been presented of different areas of the site. These scenarios do not depict a solid design but rather define the design parameters in detail. Four scenarios representing different activities have been selected for the development.

First Scenario focuses on the relation between the two creative zones and their relationship with the urban connector. Second scenario shows the relationship between exhibition zone and creative zone. Third scenario depicts the connection between the Recreational zone and creative zone and the last zone focuses on the connection between the residential and creative cluster. These scenarios represent the relationship of different activities with the catalyst- Urban connector and each other and their context.

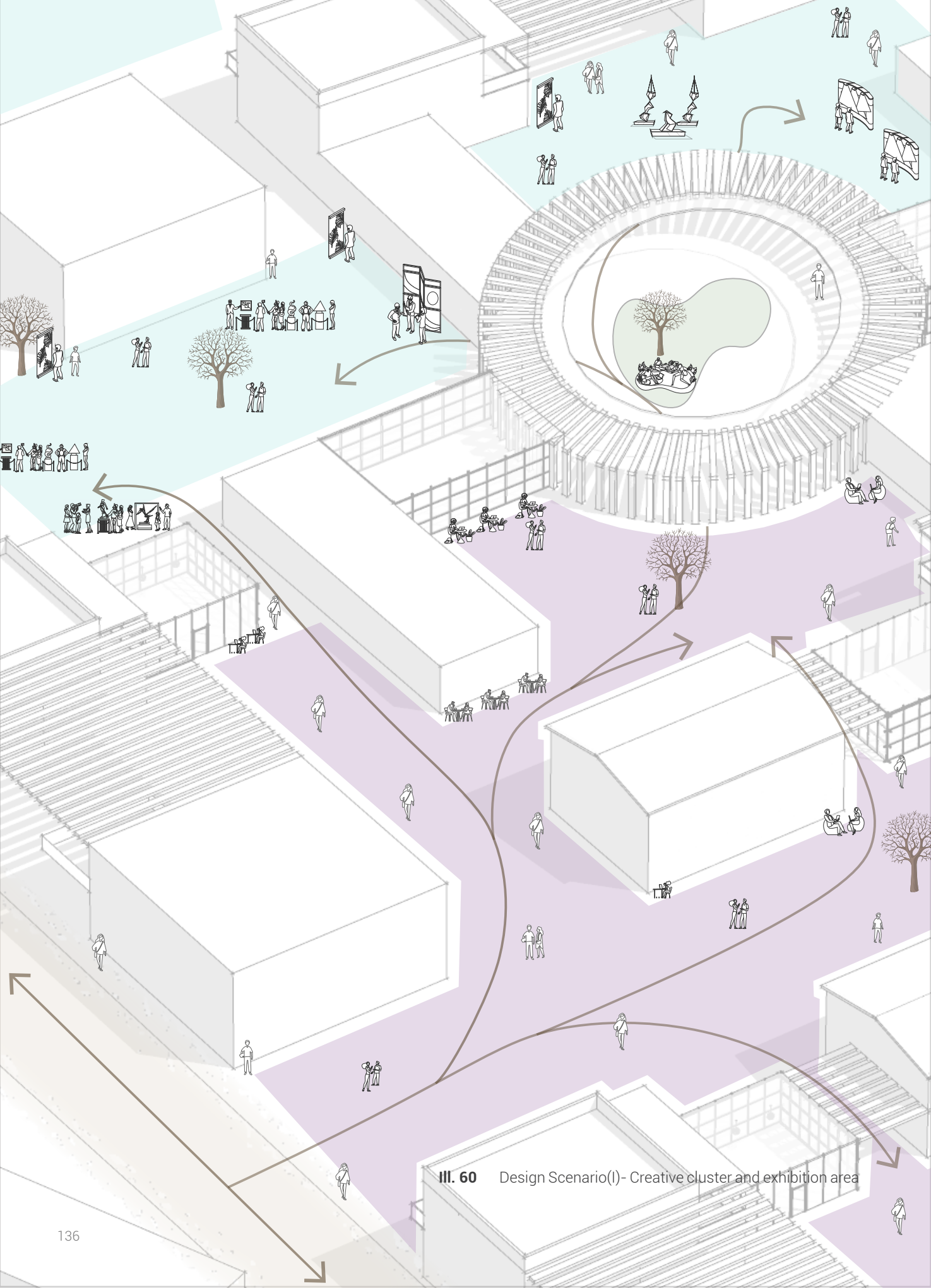


Ill. 58 Design Scenario(I)- Creative cluster

Scenario for creative cluster

The ill.58 Shows a scenario when there is an urban connector dividing the two creative zones. The map shows that the building typology is flowy and infused with little breakout areas. Urban connector has a direct visual and physical connection with the different parts of the zone. Creative zone comprises various activities like reading rooms, incubators, workshops, meeting rooms, studios etc. This is one of the roads where cars are allowed in the site, most of the site has been developed as pedestrian and bike friendly.

Ill. 59 Design Scenario(II)- Creative cluster



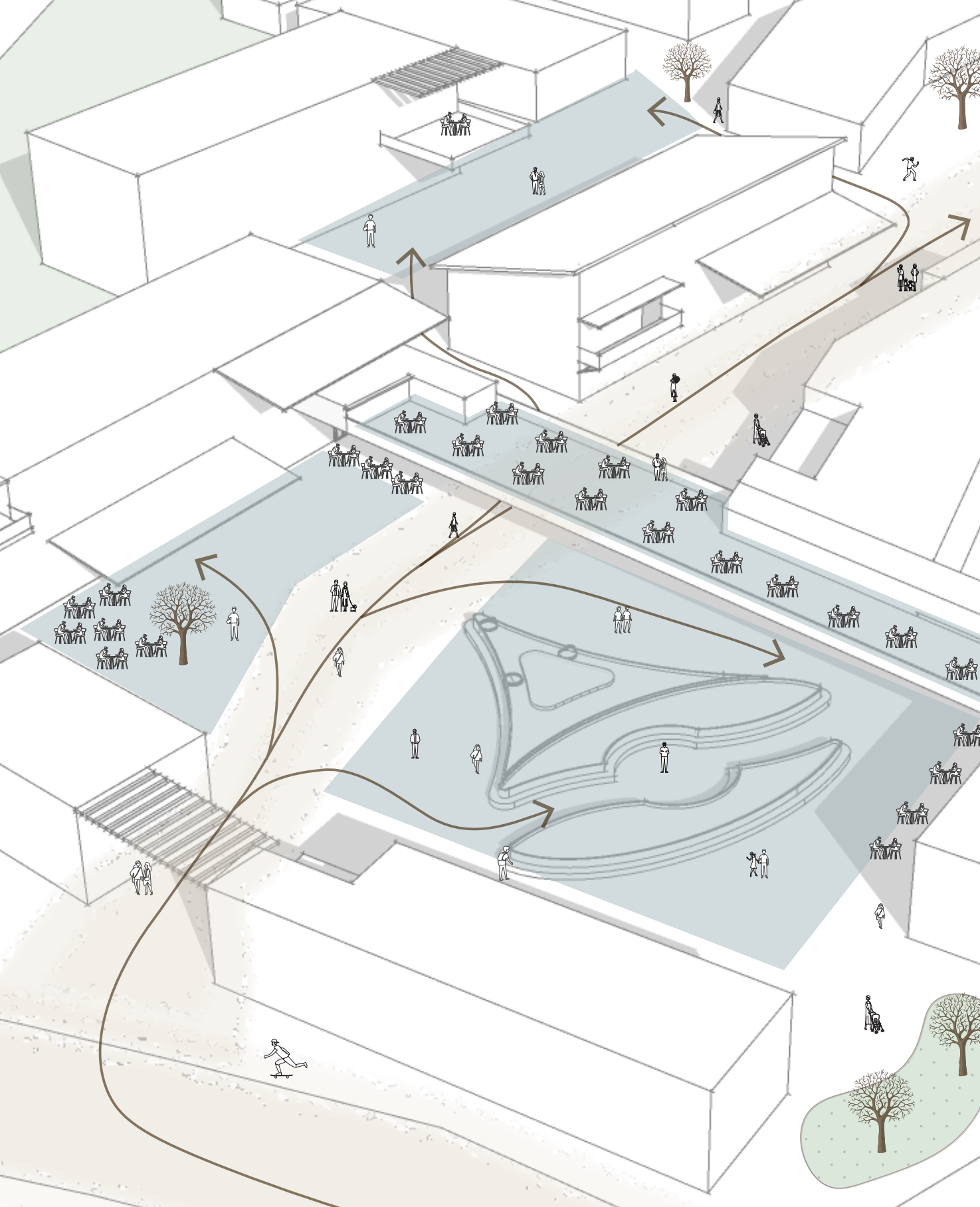
Ill. 60 Design Scenario(I)- Creative cluster and exhibition area

Scenario for creative cluster and exhibition area

The ill.60 depicts the relationship between the two different zones and their relation with the urban connector. There is no rigid boundary between the creative and exhibition zone. As it is evident from the map that the two cores quite mingled into each other. There is free flow of movement and activities.This zone is pedestrian friendly but cars are allowed at the rare end of the exhibition zone.


Directeur
Cortenstraat

Ill. 61 Design Scenario(II)- Creative cluster and exhibition area

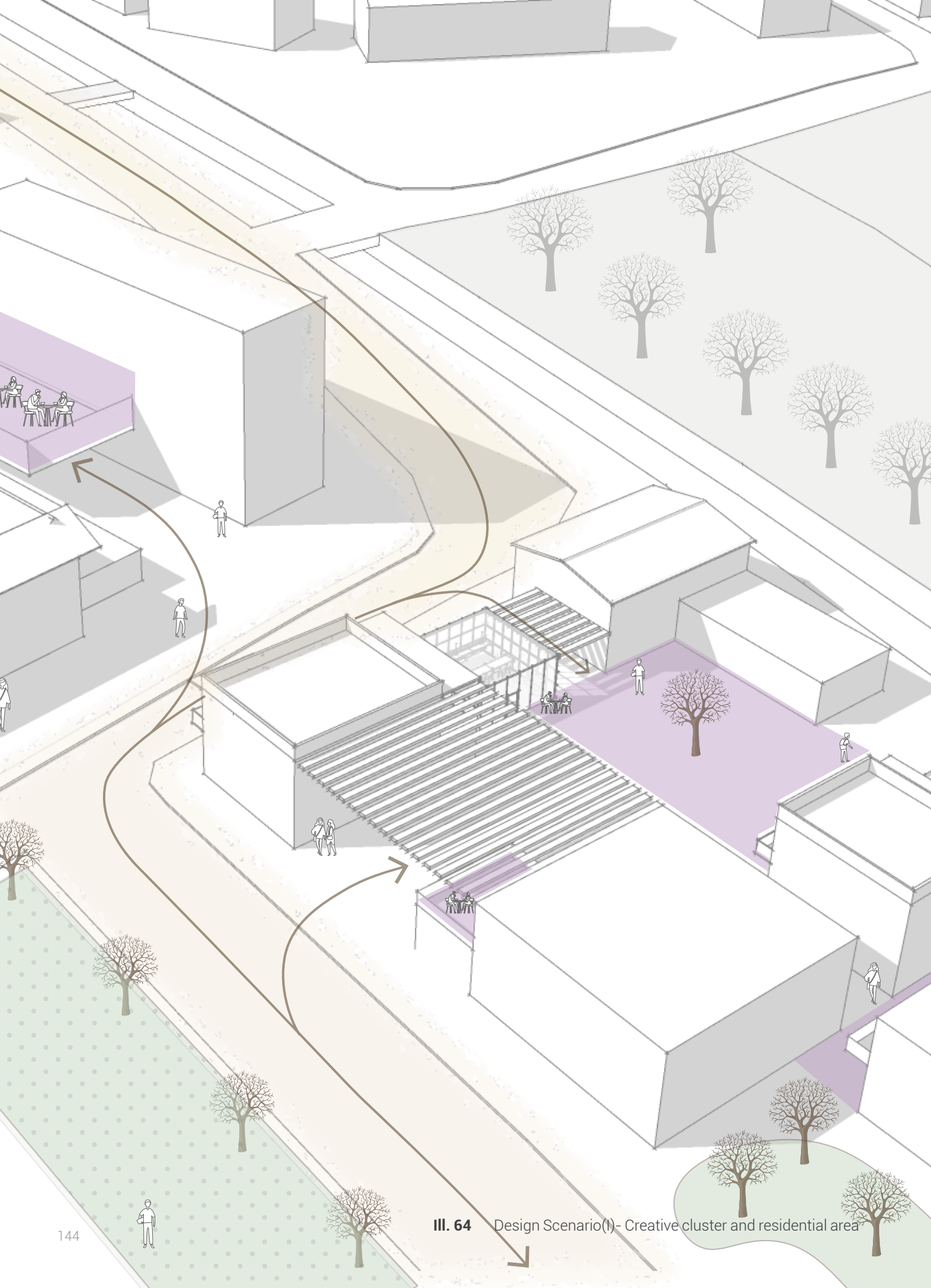


Ill. 62 Design Scenario(I)- Creative cluster and recreational area

Scenario for creative cluster and recreational area

This scenario is developed to show the connection between creative clusters and recreation zones. This zone is completely pedestrianized. The ill.62 Indicates the easy movement and proper visual connection between the two zones. Urban connector is passing from the middle of the two zones.

Ill. 63 Design Scenario(II)- Creative cluster and recreational area



Ill. 64 Design Scenario(I)- Creative cluster and residential area

Scenario for creative cluster and residential area

The ill.64 Depicts the relationship between the creative cluster, residential zone, urban connector and how it connects the zones with the context around the site. The urban connector connects both residential and cultural zones and brings them together.


Directeur
Cortenstraat

Ill. 65 Design Scenario(II)- Creative cluster and residential area

EPILOGUE

CONCLUSION

Exploration of the phenomena of shrinking cities and shrinkage, in general and in case of Parkstad Limburg, to understand their causes, consequences, nature, associated complexities and uncertainties marks the starting point for this thesis. Through the process of exploration, an understanding is developed that shrinkage has a multi-faceted impact on places. The impact is not merely limited to economic, demographic and physical aspects; soft aspects like social and cultural structures of the places are also affected, which are often neglected or forgotten about in the process of regeneration of shrinking cities. Therefore, this thesis sets to realize the importance of socio-cultural dimension in a shrinking city and in a way, address the issues faced by the same in case of Parkstad Limburg, located in the South Limburg region of the Netherlands.

Parkstad Limburg, a conurbation of seven municipalities, was a flourishing coal mining region since the late nineteenth century. However, Dutch government's shift of focus from coal to natural gas for energy provision led to shutdown of the coal mines in Parkstad Limburg region between 1965 and 1974. The closure of coal mines (de-industrialization) resulted in economic stagnation followed by population decline and selective migration. These factors further affected the socio-cultural aspects causing a sense of loss of identity amongst people, deteriorated quality of life, reduced social interactions and a negative perception towards the place.

A brief study of the planning approaches employed by the governmental, regional and local authorities, post identification of shrinkage as a problem, reveals that the policies, action plans and interventions were shaped in a growth-oriented direction. Despite the efforts by the authorities, there was no improvement in the demographic trend. Thus, recently (probably between 2012-2016) shrinkage was finally accepted and 'planning for decline' was called for. However, through the analytical study of the region, it came to light that there is a mismatch between the visions and the reality with respect to 'planning for decline' perspective. It was drawn that the proposed developments and interventions are inclined towards growth-oriented and maintenance strategies. Additionally, they act as individual entities and do not relate with rest of the region. Overall, there was more emphasis on spatial planning in comparison to social sustainability and liveability.

In this regard, the thesis seeks to respond to the aforementioned gap by challenging the traditional ways of dealing with shrinking cities. It envisions to develop a holistic framework for Parkstad Limburg through 'Scenario building' approach, theoretically inspired from shrinking-sensitive urban design. The concept plays at multiple scales of Parkstad Limburg, a core level in a municipality, municipality level and a regional level, as a result of which various issues of shrinkage at different scales are addressed in order to realize the proposed vision for Parkstad Limburg. The concept has been unpacked in 'Scenario building as a step forward' chapter of this thesis.

A conceptual scenario building, based on the derived holistic framework, has been explored for the Kerkrade municipality of Parkstad Limburg, taking into account its potentials, challenges and contextualities, as understood from the analytical study of Kerkrade. The same has been presented in 'Conceptual scenario building for Kerkrade' chapter. This approach involves developing scenarios for the municipality as a defining guideline yet offering flexibility towards design aspect of these scenarios. The main elements of this approach at a municipality level include 'cores' and a 'connector'. The 'cores' aim to bring the like-minded interest groups closer together and propose related activities to enhance social interactions amongst the citizens. The 'connector' aims to effectively link these 'cores' in a manner to enhance the accessibility and visibility of the place. Overall, application of 'scenario building' concept proposes a range of platforms for people to experience and explore, thus, infusing social interactions not only at selected intervals of time, but also in daily life of the citizens. Consequently, this approach has the potential to drive the future revitalization of the place, by enhancing social sustainability of the place and liveability of citizens, which shall indirectly influence a gradual reversal of the negative image associated with the place.

To explore the potential of this approach at a core level, this thesis further zooms in to the 'creative core' of Kerkarde in chapter 'Zooming in to the creative core'. This involves conceptual design scenarios for certain locations within the 'creative core' to understand how the core-connector relationship and connector-catalyst relationship may be perceived. The proposed design scenarios should be considered as examples and not concrete solutions, as this process must involve participation of various actors including citizens instead of a top-down approach for an adaptable, flexible solution.

Overall, this thesis stresses that the application of framework at core, municipal and regional level must be comprehensive. Meaning, each 'core' in a municipality must be carefully designed taking into consideration aspects such as the context, ideas of the citizens, citizens' quality of life, in order to create meaningful and socially valuable spaces for the citizens. These cores must be brought together and well connected to foster the development of the whole municipality and vice-versa. Furthermore, all the municipalities of the region must be developed with respect to the framework and then connected effectively to drive the future development of the whole region of Parkstad Limburg. Of course, the network does not end with the region, it grows further, as all entities of the network system are interdependent and interconnected in some or the other way.

REFLECTION FOR FURTHER SCOPE

Shrinking cities need to be understood as multi-dimensional entities which entail their own set of complexities and uncertainties, thus, the issues faced by those cities and their citizens cannot be resolved in one go. Parkstad Limburg, for that matter, has been undergoing the process of shrinkage for about five decades and has developed multiple problems through time at varying scales ranging from citizens to national and international levels. In this regard, the thesis seeks to develop a holistic framework for the region through application of a 'scenario building' approach theoretically inspired from shrinking-sensitive urban design. This approach aims to enhance the social sustainability of the place, liveability of citizens and influence a gradual reversal of the negative image associated with the place. Although, the presented framework is comprehensive, just the application of it is not enough to revive the whole region at once. It is a rather lengthy and complex process which includes consideration of many other layers such as inter-disciplinary insights, citizen involvement, practical implications. However, this thesis proposes a step forward in a shrinking-sensitive and comprehensive manner that marks a beginning towards revitalization of Parkstad Limburg.

One of the most important aspects to consider for further reinforcement of the proposed framework is the quality of life that the citizens experience due to shrinkage, because it is ultimately the citizens who are most affected by it. This might involve a careful and qualitative understanding of the everyday life of citizens. In this thesis, an idea of the same could have

been achieved through qualitative interviews of some citizens, which was not possible due to the lockdowns posed as a result of COVID-19 pandemic. The information from these interviews would have added an extra layer to the strategic framework to strengthen the concept and may have influenced the design scenarios developed for the 'creative core'.

At the current stage, the thesis aims to stop further shrinkage of the region by designing for the existing population. Consequently, at a later stage in the process, the better quality of life of citizens and improved social sustainability might act as stepping stones to attract new comers. This also highlights that a rather comprehensive and flexible framework as proposed in this thesis is a plus point to adapt to the newer population and changing temporalities that may result.

Given the limited time period, the application of the proposed framework is not explored at a regional level and beyond. Nevertheless, the framework has been investigated at a municipality level for Kerkrade, the insights from which may be reflected or projected for other municipalities and at a regional level, as further scope in this process.

Finally, although each shrinking city is different and entails varying characteristics and complexities, there are probably some aspects that remain common to most of them, for instance, impact on socio-cultural structures or physical structures due to shrinkage. Thus, the question that arises in mind through the design process is: Can the holistic framework proposed in this thesis be tailored for revitalization or regeneration of other shrinking cities? Or is it limited to Parkstad Limburg? This forms an open end and an aspect that needs further exploration and research. Based on the evaluation of the response of other shrinking cities to this framework, probably a toolkit may be developed that shall contribute to developing ways to deal with the challenges faced by shrinking cities.

REFERENCE LIST

Ročak, M., Hospers, G.-J. and Reverda, N. (2016) 'Searching for Social Sustainability: The Case of the Shrinking City of Heerlen, The Netherlands', Sustainability, 8(4),382, doi: 10.3390/su8040382. Available at: http://www.mdpi.com/2071-1050/8/4/382 (Accessed: 29th November 2019).

Ročak, M. (2020) 'The Experience of Shrinkage. Exploring Social Capital in the Context of Urban Shrinkage', Ph.D., Radboud University of Nijmegen.

Ganser, R., Piro, R. (2012) 'Parallel Patterns of Shrinking Cities and Urban Growth. Spatial Planning for Sustainable Development of City Regions and Rural Areas', Burlington, VT: Ashgate, pp.2.

Moudon, A.V. (2019) 'Framing the question: is shrinking good or bad?', Journal of Urban Design, 24(1), pp. 66-68, doi: 10.1080/13574809.2019.1553822. Available at: https://doi.org/10.1080/13574809.2019.1553822 (Accessed: 9th March 2020).

Demijnen.nl (n.d.-a) 'From green to black and back again' (translated) [Online]. Available at: https://www.demijnen.nl/van-groen-naar-zwart-en-weer-terug (Accessed: 18th March 2020).

demijnen.nl (n.d.-b) '12 mines in The Netherlands' (translated) [Online]. Available at: https://www.demijnen.nl/mijnen/opde-kaart (Accessed: 18th March 2020).

demijnen.nl (n.d.-c) 'The start of mining in the Netherlands' (translated) [Online]. Available at: https://www.demijnen.nl/mijnen/mijn/oranje-nassau-i (Accessed: 19th March 2020).

demijnen.nl (n.d.-d) 'Timeline' (translated) [Online]. Available at: https://www.demijnen.nl/mijnen/tijdlijn (Accessed: 19th March 2020).

Elzerman, K., Bontje M. (2013) 'Urban Shrinkage in Parkstad Limburg', European Planning Studies, 23(1), pp. 87-103, doi: 10.1080/09654313.2013.820095. Available at: https://doi.org/10.1080/09654313.2013.820095 (Accessed: 11th February 2020).

Hasse, A., Bernt, M., Grossmann, K., Mykhnenko, V., Rink, D. (2016) 'Varieties of shrinkage in European cities', European Urban and Regional Studies, 23(1), pp. 86-102, doi: 10.1177/969776413481985. Available at: https://journals-sagepub-com.zorac.aub.aau.dk/doi/full/10.1177/0969776413481985 (Accessed: 13th May 2020).

United Nations, Department of Economic and Social Affairs, Population Division (2019) 'World Urbanization Prospects: The 2018 Revision (ST/ESA/SER.A/420) [pdf], New York: United Nations. Available at: https://population.un.org/wup/Publications/Files/WUP2018-Report.pdf (Accessed: 13th May 2020).

Pérez-Soba, M., van Eupen, M., Roupioz, L. et al. (2013) 'GEOSPECS: Inner Peripheries: a socio-economic territorial specificity' [pdf]. Luxemburg: ESPON coordination unit, 2012. Available at: https://archive-ouverte.unige.ch/unige:79976 (Accessed: 19th January, 2020).

Pallagst, K., Fleschurz, R. and Said, S. (2017) 'What drives planning in a shrinking city? Tales from two German and two American cases', Town Planning Review, 88(1), pp. 15-28, doi: 10.3828/tpr.2017.3. Available at: https://doi.org/10.3828/tpr.2017.3 (Accessed: 9th March 2020).

Farke, A. (2005) 'Salzgitter will und wird nicht schrumpfen – Wahrnehmungs- und Akzeptanzprobleme im Umgang mit Schrumpfung exemplarisch erlautert an einer Pilotstadt des Stadtumbau West' in: Weiske, C., Sigrun, K. and Hannemann, C. eds., (2005) 'Kommunikative Steuerung des Stadtumbaus. Interessengegensätze, Koalitionen und Entscheidungsstrukturen in schrumpfenden Städten', Wiesbaden: VS Verlag für Sozialwissenschaften, pp. 185-205.

Danielzyk, R., Bernd, M., & Zimmer-Hegmann, R. (2002). 'Demographische Entwicklung – Schrumpfende Stadt', Bericht für die Sitzung des ILS- Beirates (2002). Dortmund: Institut für Landes- und Stadtentwicklungsforschung des Landes Nordrhein- Westfalen (ILS).

Beunen, R., Meijer, M. and de Vreis, J. (2019) 'Planning strategies for dealing with population decline: Experiences from the Netherlands', Land Use Policy, 93. Available at: https://doi.org/10.1016/j.landusepol.2019.104107 (Accessed: 20th January 2020).

Zuid-Limburg Bereikbaar.nl (n.d.) 'Parkstad outer ring road for better accessibility' [Online]. Available at: https://www.zuidlimburgbereikbaar.nl/en/our-products/infrastructure-projects/parkstad-outer-ring-road/ (Accessed: 5th April 2020).

Strukton.com (2020) 'Buitenring Parkstad Limburg' [Online]. Available at: https://strukton.com/en/projects/2019/08/buitenring-parkstad-limburg (Accessed: 5th April 2020).

Marcha (2010) 'Buitenring Parkstad' [Online]. Available at: https://www.ecotopiabiketour.net/2010/buitenring-parkstad (Accessed: 5th April 2020).

iba-parkstad.nl (n.d.-a) 'Leisure Ring and Leisure Lane' [Online]. Available at: https://www.iba-parkstad.nl/projecten/leisure-lane/ (Accessed: 5th April 2020).

iba-parkstad.nl (n.d.-b) 'iba 50' [Online]. Available at: https://www.iba-parkstad.nl/projecten (Accessed: 5th April 2020).

CBS (2019a) 'Population dynamics; birth, death and migration per region' [online]. Available at: https://opendata.cbs.nl/statline/#/CBS/en/dataset/37259eng/table?ts=1582630115578 (Accessed: 25th February 2020).

Mathissen, M. (2016) 'A new piece of Parkstad' (translated). Neimed.nl [blog] 24 May. Available at: https://www.neimed.nl/nl/blog/een-nieuw-stukje-parkstad (Accessed: 19th March 2020).

Laursen, L. L. H. (2009) 'Shrinking cities or urban transformation',Ph.D., Aalborg: Institut for Arkitektur og Medieteknologi, Aalborg University. Available at: https://vbn.aau.dk/en/publications/shrinking-cities-or-urban-transformation (Accessed: 13th January 2020).

Kim, S. (2019) 'Design strategies to respond to the challenges of shrinking city', Journal of Urban Design, 24(1), pp. 49-64, doi: 10.1080/13574809.2018.1554345. Available at: https://doi.org/10.1080/13574809.2018.1554345 (Accessed: 17th March 2020)

Pallagst, K. (2019) 'From urban shrinkage to urban qualities?', Journal of Urban Design, 24(1), pp. 68-70, doi: 10.1080/13574809.2019.1553823. Available at: https://doi.org/10.1080/13574809.2019.1553823 (Accessed: 9th March 2020)

Ryan, B.D. (2019) 'Designing for people and place in shrinking cities, Journal of Urban Design, 24(1), pp. 72-75, doi: 10.1080/13574809.2019.1553825. Available at: https://doi.org/10.1080/13574809.2019.1553825 (Accessed: 9th March 2020)

Mehaffy, M. and Salingaros, N. (2013) 'The network city'[Online] International Society of Biourbanism. Available at: http://www.biourbanism.org/network-city/ (Accessed: 11th May 2020)

Oswalt, P. (2005) 'Introduction' in: Oswalt, P. ed., (2005) 'Shrinking Cities', Volume 1: International Research, pp.12-17, Ostfildern: Hatje Cantz Verlag.

Internationale Bauausstellungen (IBA) (n.d.-a) 'IBA Stadt¬um¬bau' [Online]. Available at: https://www.internationale-bauausstellungen.de/en/history/2002-2010-iba-stadtumbau-less-is-future/ (Accessed: 19th May 2020).

Massey, D. (1994) 'A global sense of place' in Massey, D.B. ed., (1994) 'Space, place and gender', Cambridge: Polity, Ch.6

Koolhaas, R. and Mau, B. (1995) 'S, M, L, XL', New York, N.Y.: The Monacelli Press.

wmc Kerkrade (n.d.) 'History of the WMC' [Online]. Available at: https://wmc.nl/en/organization/about-wmc (Accessed: 15th May 2020)

Gemeente Kerkrade (n.d.-a) 'Projects' (translated) [Online]. Available at: https://www.kerkrade.nl/wonen-en-leven/projecten_3199/ (Accessed: 11th April 2020)

Gemeente Kerkrade (n.d.-b) 'Loneliness' (translated) [Online]. Available at: https://www.kerkrade.nl/wonen-en-leven/projecten_3199/item/eenzaamheid_3433.html (Accessed: 11th April 2020)

Gemeente Kerkrade (n.d.-c) 'Rolduckerveld: together towards the future' (translated) [Online]. Available at: https://www.kerkrade.nl/wonen-en-leven/projecten_3199/item/rolduckerveld-samen-naar-de-toekomst_7513.html (Accessed: 11th April 2020).

Bertholet, P., Nieuwenhoven, K. V. (2020a) 'Information regarding Parkstad Limburg' [questionnaire] (personal communication, 31st March 2020).

Bertholet, P., Nieuwenhoven, K. V. (2020b) 'Information regarding Parkstad Limburg' [interview] (personal communication, 31st March 2020).

Lemaire, M. (2020) 'Information regarding Parkstad Limburg' [interview] (personal communication, 25th March 2020).

ILLUSTRATION LIST

Ill. 1 Own illustration based on United Nations (2018) 'The World's cities 2018' [Online]. Available at: https://www.un.org/en/ events/citiesday/assets/pdf/the_worlds_cities_ in_2018_ data_booklet.pdf (Accessed: 13th May 2020).

Ill. 2 Own illustration

Ill. 3 Own illustration

Ill. 4 Own illustration based on Elzerman and Bontje (2013); Beunen, Meijer and de Vreis (2019)

Rijckheyt (n.d.-a) 'Molenberg (gemeente Heerlen)' [Online]. Available at: http://www.rijckheyt.nl/sites/rijckheyt/files/styles/token-image-medium/public/Hrl_Molenberg_3083.jpg?itok=haHaO0az (Accessed: 18th May 2020).

Regionaal historisch centrum limburg (1920) 'Overzicht Staatsmijn Wilhelmina met op de achtergrond de kerk van Terwinselen' [Online]. Available at: https://beeldbank.rhcl.nl/detail.php?nav_id=2-1&id=1059995&index=10 (Accessed: 18th May 2020).

Rijckheyt (1976) '264 Oranje-Nassaumijn I' [Online]. Available at: http://www.rijckheyt.nl/archief/resultaat?mivast=62&mizig=95&miadt=62&miaet=14&micode=519&minr=1835115&milang=nl&misort=plaatsnaam%7Cdesc&mibj=1975&miej=1976&mip4=Oranje-Nassau&miview=ldt (Accessed: 18th May 2020).

Ill. 5 Own illustration based on Elzerman and Bontje (2013); Beunen, Meijer and de Vreis (2019)

CBS (2016) 'CBS and the city of Heerlen start up Urban Data Center' [Online]. Available at: https://www.cbs.nl/en-gb/news/2016/48/cbs-and-the-city-of-heerlen-start-up-urban-data-center (Accessed: 18th May 2020).

Ill. 6 Own illustration based on Pallagst, K., Fleschurz, R. and Said, S. (2017, pp.17)

Ill. 7 Own illustration based on based on Elzerman and Bontje (2013); Beunen, Meijer and de Vreis (2019)

Ill. 8 Own illustration based on based on CBS (2019a) [Online]. Available at: https://opendata.cbs.nl/statline/#/CBS/en/dataset/37259eng/table?ts=1582630115578 (Accessed: 25th February 2020).

Ill. 9 Own illustration based on based on AdminStat Paesi Bassi (n.d.). Available at:

https://ugeo.urbistat.com/AdminStat/en/nl/demografia/dati-sintesi/brunssum/23055732/4 (Accessed: 25th February 2020).

https://ugeo.urbistat.com/AdminStat/en/nl/demografia/dati-sintesi/heerlen/23055523/4 (Accessed: 25th February 2020).

https://ugeo.urbistat.com/AdminStat/en/nl/demografia/dati-sintesi/kerkrade/23055990/4 (Accessed: 25th February 2020).

https://ugeo.urbistat.com/AdminStat/en/nl/demografia/dati-sintesi/landgraaf/23055945/4 (Accessed: 25th February 2020).

https://ugeo.urbistat.com/AdminStat/en/nl/demografia/dati-sintesi/nuth/28254316/4 (Accessed: 25th February 2020).

https://ugeo.urbistat.com/AdminStat/en/nl/demografia/dati-sintesi/onderbanken/28254317/4 (Accessed: 25th February 2020).

https://ugeo.urbistat.com/AdminStat/en/nl/demografia/dati-sintesi/simpelveld/23055745/4 (Accessed: 25th February 2020).

https://ugeo.urbistat.com/AdminStat/en/nl/demografia/dati-sintesi/voerendaal/23055763/4 (Accessed: 25th February 2020).

Ill. 10 Own illustration

Ill. 11 Own illustration

Ill. 12 Own illustration based on CBS (2019a) and AdminStat Paesi Bassi (n.d.).

Ill. 13 Own illustration based on demijnen.nl (n.d.-b)

Ill. 14 Own illustration based on Zuid-Limburg Bereikbaar.nl (n.d.); Strukton.com (2020); Bertholet and Nieuwenhoven (2020b); iba-parkstad.nl (n.d.-a)

Ill. 15 Own illustration based on iba-parkstad.nl (n.d.-b)

Ill. 16 Own illustration

Ill. 17 Own illustration

Ill. 18 Own illustration based on AdminStat Paesi Bassi (n.d.). Available at: https://ugeo.urbistat.com/AdminStat/en/nl/demografia/dati-sintesi/kerkrade/23055990/4 (Accessed: 25th February 2020).

Ill. 19 Own illustration based on City population (2020). Available at: https://www.citypopulation.de/en/netherlands/admin/limburg/0928__kerkrade/ (Accessed: 25th February 2020).

Ill. 20 Own illustration

Google Maps (2015a) '153 Kasperenstraat-Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8637708,6.0327214,21z (Accessed: 19th May 2020).

Google Maps (2009a) 'Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8492205,6.0308636,19z (Accessed: 19th May 2020).

Google Maps (2018a) 'Provinciale Weg-Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8597454,6.045594,21z (Accessed: 19th May 2020).

Google Maps (2015b) '62 Lupinestraat-Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8622131,6.0299202,21z (Accessed: 19th May 2020).

Museum congress (2019) 'Continium Discovery Center Kerkrade at night' [Online]. Available at: https://www.museumcongres.nl/home/attachment/continium-discovery-center-kerkrade-bij-nacht-2/ (Accessed: 24th April 2020).

Pruci (2012) 'Abdij Rolduc Kerkrade' [Online]. Available at: https://commons.wikimedia.org/wiki/File:Abdij_Rolduc_Kerkrade.jpg (Accessed: 24th April 2020).

Ill. 21 Own illustration

Ill. 22 Own illustration based on Zuid-Limburg Bereikbaar.nl (n.d.); Strukton.com (2020); Bertholet and Nieuwenhoven (2020b); iba-parkstad.nl (n.d.-a)

Ill. 23 Own illustration

Ill. 24 Own illustration based on Gemeente Kerkrade (n.d.-a). Available at: https://www.kerkrade.nl/wonen-en-leven/projecten_3199/ (Accessed: 11th April 2020).

Ill. 25 Own illustration

Ill. 26 Own illustration

Ill. 27 Own illustration

Ill. 28 Own illustration based on Laursen (2009)

Ill. 29 Urban green-blue grids for resilient cities (n.d.) 'Landscape Park Duisburg-Nord) [Online]. Available at: https://www.urbangreenbluegrids.com/uploads/Landschaftspark-Duisburg-010-LATZPARTNER-945x630.jpg (Accessed: 19th May 2020).

Gab(ph)oto (2010) 'Emscher Park' [Online]. Available at: https://www.flickr.com/photos/gabodiazm/4613958563/ (Accessed: 18th May 2020).

CG Gruppe (n.d.) 'Residence at Postplatz' [Online]. Available at: https://www.cg-gruppe.de/en/Locations/Dresden/Residence-at-Postplatz?sortBy=date&sortOrder=DESC (Accessed: 19th May 2020).

visitBelfast (2019) 'Public Art in Belfast' [Online]. Available at: https://s3.visitbelfast.com/app/uploads/2019/05/The-Big-Fish_1557873647-1280x720.jpg (Accessed: 19th May 2020).

Internationale Bauausstellungen (IBA) (n.d.-b) 'Staß¬furt: Relinquishing the old centre' [Online]. Available at: https://www.internationale-bauausstellungen.de/en/history/2002-2010-iba-stadtumbau-less-is-future/stasfurt-relinquishing-the-old-centre/ (Accessed: 18th May 2020).

Ill. 30 Own illustration based on Kim (2019)

Ill. 31 Own illustration

Ill. 32 Own illustration

Ill. 33 Own illustration

Google Maps (2018b) 'Provinciale Weg - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8755885,6.0429511,3a (Accessed: 19th May 2020).

Google Maps (2019a) 'Mercuriusstraat - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8770749,6.0425399,3a (Accessed: 19th May 2020).

Google Maps (2009b) '9 Mercuriusstraat - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8771459,6.0340536,3a (Accessed: 19th May 2020).

Ill. 34 Archdaily (2019a) 'B.I.G Haizhu Bay Creative Zone / Atelier cn°S' [Online]. Available at: https://www.archdaily.com/919209/big-haizhu-bay-creative-zone-atelier-cn-degrees-s/5d073dc3284dd17f300001b0-big-haizhu-bay-creative-zone-atelier-cn-degrees-s-photo (Accessed: 20th May 2020).

Archdaily (2015a) 'Muy Güemes / Agostina Gennaro + María José Péndola' [Online]. Available at: https://www.archdaily.com/775207/muy-guemes-agostina-gennaro-plus-maria-jose-pendola/560b14dfe58ecee23900000f-muy-guemes-agostina-gennaro-plus-maria-jose-pendola-photo (Accessed: 20th May 2020).

Archdaily (2019b) 'Taihang Village Co-living Space / f.i.t.' [Online]. Available at: https://www.archdaily.com/928576/taihang-village-co-living-space-fit/5dd13cb73312fdb7c0000091-taihang-village-co-living-space-fit-photo (Accessed: 19th May 2020).

Ill. 35 Own illustration

Google Maps (2019b) 'Kerkradersteenweg - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8668072,6.0474683,3a (Accessed: 19th May 2020)

Google Maps (2019c) 'Brughofweg - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8742227,6.0514386,3a (Accessed: 19th May 2020)

Google Maps (2019d) 'Boerenanstelerweg - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8803246,6.0477045,3a (Accessed: 19th May 2020)

Ill. 36 Own illustration

Google Maps (2019e) '29 Bart van Slobbestraat - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8964297,6.0723669,21z (Accessed: 19th May 2020)

Google Maps (2017a) 'Rimburgerweg - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.9011949,6.0722212,3a (Accessed: 19th May 2020)

Google Maps (2019f) '95 Hamstraat - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8521198,6.0365388,21z (Accessed: 19th May 2020)

Ill. 37

Archdaily (2020a) 'Babylon Garden Spa Renovation / Ho Khue Architects' [Online]. Available at: https://www.archdaily.com/939376/babylon-garden-spa-renovation-ho-khue-architects/5eb9900fb357658af6000052-babylon-garden-spa-renovation-ho-khue-architects-photo (Accessed: 20th May 2020).

Archdaily (2011a) 'Shops of Summerhill / AUDAXarchitecture' [Online]. Available at: https://www.archdaily.com/142288/shops-of-summerhill-audaxarchitecture/5014a3cd28ba-0d3950000a9c-shops-of-summerhill-audaxarchitecture-photo (Accessed: 20th May 2020).

Archdaily (2018a) 'Titan Integrity Campus / Mindspace' [Online]. Available at: https://www.archdaily.com/908221/titan-integrity-campus-mindspace?ad_source=search&ad_medium=search_result_projects (Accessed: 20th May 2020).

Ill. 38 Own illustration

Google Maps (2018c) 'Wurmtal, Merkstein - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8862168,6.07944,21z (Accessed: 19th May 2020)

Google Maps (2018d) 'Wurmtal, Merkstein - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8812696,6.0826127,21z (Accessed: 19th May 2020)

Google Maps (2018e) 'Wurmtal, Merkstein - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8822059,6.0817778,21z (Accessed: 19th May 2020)

Ill. 39

Hikespeak (2018) 'Ferndell Trail goes below Fern Dell Drive' [Online]. Available at: https://www.hikespeak.com/trails/ferndell-trail-griffith-park-western-canyon/ (Accessed: 20th May 2020).

Elisabeth, L. (2014) 'TRAILS CAFE' [Online]. Available at: https://laurelelisabeth.wordpress.com/2014/11/20/trails-cafe/ (Accessed: 20th May 2020).

Archdaily (2017a) 'Cultuurpark Westergasfabriek / Gustafson Porter + Bowman' [Online]. Available at: https://www.archdaily.com/803228/cultuurpark-westergasfabriek-gustafson-porter-plus-bowman/58755683e58ecea37600020e-cultuurpark-westergasfabriek-gustafson-porter-plus-bowman-photo (Accessed: 20th May 2020).

Ill. 40 Own illustration

Google Maps (2015c) 'Kerkrade, Limburg - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8725347,6.0682733,21z (Accessed: 19th May 2020)

Google Maps (2009c) 'Roderlandbaan - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8696267,6.0764091,21z (Accessed: 19th May 2020)

Google Maps (2009d) 'Ailbertuslaan - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8697789,6.0707065,21z (Accessed: 19th May 2020)

Ill. 41 Archdaily (2020b) 'Barzok Cultural Center / archoffice | architecture & construction office' [Online]. Available at: https://www.archdaily.com/934586/barzok-cultural-center-archoffice/5e58de166ee67e0f01000171-barzok-cultural-center-archoffice-photo (Accessed: 20th May 2020).

Archdaily (2016a) 'AD Classics: Bharat Bhavan / Charles Correa' [Online]. Available at: https://www.archdaily.com/791942/ad-classics-bharat-bhavan-charles-correa/579db147e58ece52e70000d0-ad-classics-bharat-bhavan-charles-correa-photo?next_project=no (Accessed: 20th May 2020).

Archdaily (2018b) 'Horbelev Kulturgård / WERK' [Online]. Available at: https://www.archdaily.com/902067/horbelev-kulturgard-werk/5b9a5a2ef197ccc03d000651-horbe-

lev-kulturgard-werk-photo (Accessed: 20th May 2020).

Ill. 42 Own illustration

Google Maps (2009e) '7 Frans Halsstraat - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8789888,6.0775851,3a (Accessed: 19th May 2020)

Google Maps (2017b) '33 Paulus Potterstraat - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.880755,6.0744765,21z (Accessed: 19th May 2020)

Google Maps (2018f) '64 Pastoor van der Heijdenlaan - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8767815,6.0690541,21z (Accessed: 19th May 2020)

Ill. 43 Archdaily (2011b) 'Retirement Home / Atelier Zündel & Cristea' [Online]. Available at: https://www.archdaily.com/107324/retirement-home-atelier-zundel-cristea (Accessed: 20th May 2020).

Archdaily (2015b) 'Nursing and Retirement Home / Dietger Wissounig Architekten' [Online]. Available at: https://www.archdaily.com/775831/nursing-and-retirement-home-dietger-wissounig-architekten/56283f47e58ece127a000345-nursing-and-retirement-home-dietger-wissounig-architekten-photo (Accessed: 20th May 2020).

Archdaily (2018c) 'Parkside Retirement Homes / Mindspace' [Online]. Available at: https://www.archdaily.com/901829/parkside-retirement-homes-mindspace/5b97cb34f197cc71e2000023-parkside-retirement-homes-mindspace-photo (Accessed 20th May 2020).

Ill. 44 Own illustration

Google Maps (2015d) '15 Olmenplein - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8764861,6.0683011,21z (Accessed: 19th May 2020)

Google Maps (2015e) '58 Deken Deutzlaan - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.874167,6.0704524,21z (Accessed: 19th May 2020)

Google Maps (2019g) '40 Sint Pieterstraat - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8749669,6.066214,21z (Accessed: 19th May 2020)

Ill. 45 Own illustration

Google Maps (2019h) 'Doctor Kreijenstraat - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.865401,6.0615387,21z (Accessed: 19th May 2020)

Google Maps (2019i) '37 Van Beethovenstraat - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8671281,6.0621559,21z (Accessed: 19th May 2020)

Google Maps (2019j) '28 Kapellaan - Google Maps' [Online]. Available at: https://www.google.com/maps/@50.8644263,6.0607902,21z (Accessed: 19th May 2020)

Ill. 46 Holland (n.d.) 'Shopping in Delft' [Online]. Available at: https://www.holland.com/global/tourism/destinations/more-destinations/delft/shopping-in-delft-1.htm (Accessed: 20th May 2020).

Amdoit (n.d.) 'Prague City Center - Android wallpapers' [Online]. Available at: https://million-wallpapers.com/world-1063-iphone/ (Accessed: 20th May 2020).

Sallie (2014) 'Underground SHopping Mall' [Online]. Available at: https://salliegoetsch.com/2014/12/05/rotterdam-gallery-2/#jp-carousel-1408 (Accessed: 20th May 2020)

Ill. 47 Own illustration

Ill. 48 Own illustration

Forge partners (n.d.) 'Streets at SouthGlenn Centennial, Colorado' [Online] Available at: https://www.weforgepartnerships.com/portfolio (Accessed: 20th May 2020).

Visit Omaha (n.d.) 'Omaha Outdoor Shopping Malls & Centers' [Online] Available at: https://www.visitomaha.com/things-to-do/shopping/outdoor-shopping-malls/ (Accessed: 20th May 2020)

Hardwick, J. (2015) 'Lifestyle centers: reinvented communities or dressed-up shopping malls?' [Online] Available at: https://theconversation.com/lifestyle-centers-reinvented-communities-or-dressed-up-shopping-malls-36752 (Accessed: 20th May 2020)

Ill. 49 Own illustration

Ill. 50 Archdaily (2013a) 'Lonsdale Street Dandenong' [Online]. Available at: https://www.archdaily.com/412359/lonsdale-street-dandenong-bkk-architects/520162c6e8e44e949b000054-lonsdale-street-dandenong-bkk-architects-photo (Accessed on 20th May 2020).

Baan, I. (2013) 'Urban Revitalization Superkilen Copenhagen' [Online]. Available at: http://landezine.com/index.php/2013/02/urban-revitalization-superkilen-by-topotek1-big-superflex/ (Accessed on 20th May 2020).

Hofer, R. (2012) 'A Swiss Village Becomes an Experiment in Modern Art' [Online]. Available at: https://www.citylab.com/design/2012/01/swiss-village-becomes-experiment-modern-art/1037/ (Accessed on 20th May 2020).

Ill. 51-Ill. 65 Own illustrations