shifting gravity.

Joris Viscaal

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post-Vinex: dealing with the ‘in-between’

Master thesis Urbanism

Rotterdam, June 18, 2010

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preface

This thesis aims to find an answer on present day questions within the field of Urbanism, that arise in urban areas which are the subject of change, now and in the future. The graduation track is an ultimate opportunity to shine a light on present day problems and challenges and make a statement about how we should deal with them. It was this final project where I could be free to explore my creative mind, without being held back by bureaucracy and demands that don't contribute to conceiving a beautiful and beloved urban place. Present day challenges in Urbanism are often about finding an innovative answer on problems that have been created by the field itself. It were the urban designers and planners of the 20th century which created some successful urban places, but it were the same craftsmen who made a lot of urban places which resulted in present day problematic areas. I believe that the urban designers and planners of the 21st century should learn from the mistakes, take a look back at was has been successful and what has not, and develop a set of conditions that guide the designs of the future. This is comparable to the way that Jane Jacobs recognized the quality of our beloved historical urban cores and made a statement about preserving them in her book in the year 1961. That is why her findings still influence the body of knowledge of urbanism and they also guided the final design of this project.

The fact that not only the TU Delft, but also the architectural and urban design office De Zwarte Hond, commissioned this graduation project, gives it a more practical underpinning. Reflecting between a relatively theoretical approach and a more practical approach allowed me to achieve the desired level of reality and it raised the level of the entire research. Therefore I would like to thank the urbanism team at De Zwarte Hond for shining their light on my project and guiding my towards my graduation. Special thanks go out to Matthias Rottmann, Bas van Bolderen, Miriam Ram, Jeroen de Willigen, John de Groot, Ilke van Engelen and Michiel van der Lugt for helping me extensively to lift the project to a higher level.

After I had passed my first year of Urbanism at the TU Delft, I entered the graduation year with my bag of collected knowledge and my personal fascination. To a large extend, thanks to the guidance of my mentors, I managed to develop the project in a successful direction, with the graduation within the prescribed time span as a result. Therefore, I would like to thank my first mentor, Roberto Rocco, for supporting me strategically throughout the year and for only letting my leave a meeting with a positive mind and new ideas. I would also

like to thank my second and third mentor, Meta Berghauser-Pont and Akkelies van Nes, for their support, mainly in the second half of the graduation year. Thanks to their specialism, I have managed to achieve the level that exceeded my first expectations at the beginning of the graduation year. The knowledge and guidance of my mentors helped me extensively to develop the relevance of the project and to create a solid scientific underpinning.

Joris Viscaal
June 2010, Rotterdam

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summary

The Netherlands follow a long tradition of `bundled deconcentration' policies in order to control the vast expansions of expanding cities, mainly after the Second World War. Large housing developments at the edge of Dutch cities, which are now being built, were guided by the fourth policy document extra, also known as the Vinex policy (Boeijenga and Mensink, 2008). The new housing areas are often so large that they cause the city to grow by more than 20% of its existing size. This means that the geographical centre of the city and the gravity point are moving and that certain areas, which used to be at the edge of the city, find themselves suddenly in the middle of the urban fabric and relatively close to the urban core. Hereijgers and Velzen (2001) state that the, often very large, neighbourhoods at the edge of Dutch cities are still very much depending on the existing qualities of the urban core and the axis therefore between the new neighbourhood and the existing city is very important. Recent policy changes are focusing more on densification, transformation, intensification and centralization of the existing cities in order to preserve the rural land and make cities function more efficiently (VROM, 2006). During the coming decade several large housing development areas at the edge of Dutch cities will be completed and, because of the recent policy changes, development opportunities will be sought more within the existing boundaries of the city and less in expansion possibilities. The recent policy changes, the shifting gravity point and the current post-vinex situations will result in a pressure on the area in between the expansion and the existing city core. This makes the 'in-between' area a challenging and very actual topic of research and it is therefore of great importance that we know how to deal with these situations, now and in the near future.

The aim of this research is to find an answer on the question of how we should deal with situations where there has been a very large expansion -which results in a shifting gravity point- and we have to search for densification opportunities within existing urban areas. In these situations the new basis of the housing area at the edge of the city can be used to add new facilities within the city and make new development more successful, mainly in the in-between area. To sustain a certain amount of facilities, an area needs a sufficient amount of people within the proximity (Montgomery, 1998) and the new expansion can provide this. The dependency of the housing expansions on the existing city for their daily needs (Hereijgers and Velzen, 2001) will probably result into an increasing amount of traffic flows. This means that the in between area can benefit from its new position within the city and use it as a potential. Therefore, the main research question of this

thesis is: *how can we implement new housing oriented developments within the area in between a large housing expansion and the urban core in growing Dutch cities, by dealing with a shifting gravity point and making use of the support provided by the housing expansion at the edge of the city?* The major challenge of this research is to reveal the development potential of areas that find themselves in comparable situations as described above, find out which developments will fit into these urban structures and how these developments should be implemented. The cities of Amsterdam, Den Haag, Utrecht and Amersfoort will provide interesting study cases for these analyses as they are realizing four of largest expansions in The Netherlands (Boeijenga and Mensink, 2008).

The introduction shows that Utrecht has the largest expansion of the four study cases and it is also the largest expansion within The Netherlands at the moment (Boeijenga and Mensink, 2008). The research chapter will reveal that Utrecht also has the largest shifting gravity point, due to this expansion, and it has the most clear in between area. Next to that, Leidsche Rijn, the expansion of Utrecht, is very well connected to the city centre, by three clear axes. These facts make it that Utrecht has the highest potential to elaborate the challenges stated in the introduction. Thus, this in between area should make the connection between expansion and centre, adapt to the shifting gravity point, densify and use the expansion as a support for development. Densification and the shifting gravity point result in a certain level of urbanization. This is a goal of the government (VROM, 2006) and the municipality (Kleef, 2004) and it is a logical consequence of the shifting gravity point of the city. Next to this urbanization, integrating the axis and making the connection, will enable the in between area to benefit from the expansion as a support for development and it will improve the connection between the existing city and the expansion. The southern axis of the in between area has the highest potential to be integrated and to function as a backbone for urbanization, as we will see in the conclusion of the research chapter. In order to develop a sustainable level of urbanization and integrate the axis, the area should have some important characteristics. These characteristics are found by comparing the scientific theory to the empirical analyses of four study cases, the Overtoom in Amsterdam, the Vleutenseweg and Amsterdamsestraatweg in Utrecht and the Rijswijkseweg in Den Haag. These axes all have a certain level of urbanization, as we will see in the comparison to the theory. The theory on urbanization of Jane Jacobs (1961) forms a basis for this comparison, combined with theory on creating an integrated and urban axis. A toolbox then is developed, in order to have a guideline for the final design. This results finally in a design which makes the in between area of Utrecht an urbanized and dense environment with an integrated axis as a backbone, using the support of Leidsche Rijn.

reading guide

This report contains four chapters: introduction, research, design and conclusion. The introduction of this thesis will start with the problem statement, where motivation, problems, challenges, aims and goals will be discussed. This will reveal the outline of this research and give an introduction to the study cases. An introduction to the policy of the large expansions and the recent policy changes set the goals and aims of the government, which largely determine the focus of developments in the future.
The introduction sets out the basis for the research chapter, which is divided between a theoretical and a practical research. The theoretical research contains the paper, which is written in the first half of the graduation year. This paper forms a basis for the practical research and explores the scientific research, which is available for this topic. More specific theoretical research has been added to support the final design project in the third chapter. The practical research starts with an introduction to the study cases, followed up by several analyses, which explore the potentials and threads of the areas of subject and set out the direction in which this research should develop. The practical research concludes with a decision between one of the study cases to zoom in on and define a design project.
The design chapter starts with an introduction to the perspective and vision for the chosen study case. This sets out the goals and aims for the design project and is the starting point for zooming in on one in between area. Additional practical analyses and scientific knowledge will then form a 'toolbox', which functions as a guideline for the design. The design chapter concludes with the master plan and the visualizations of the final design.
The conclusion evaluates the total process of the project and reflects back to the final interventions. This enables us to measure the improvements of implementing the proposed design. Reflecting back on the design process will make the design more generic and applicable to other cases, which face the same challenges. This enables us then to give recommendations for dealing with these situations, now and in the near future. The final chapter will give the answer on the main research question, which is the main aim of this project.

1. introduction

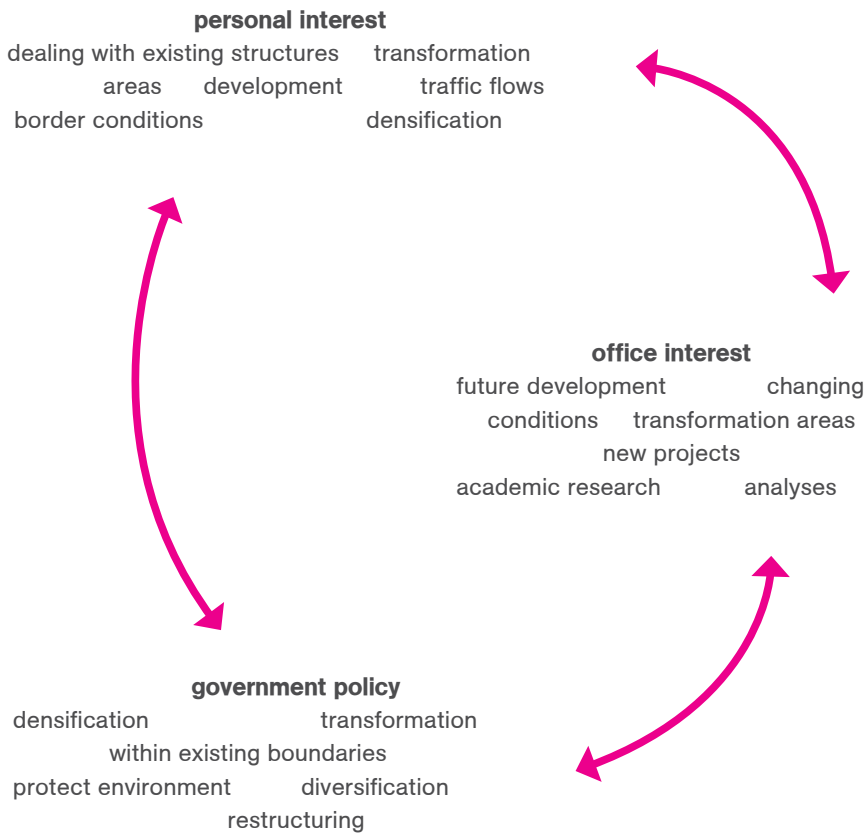
research

design

conclusion

1.1 Motivation

The project started with the motivation of the different stakeholders in this research and it is therefore a combination of different points of view. Because of the fact that the research is commissioned by both the TU Delft and the architectural and urban design office De Zwarte Hond, the assignment should fit different needs. First, I defined my personal interests and fascinations and then tried to fit it within the needs of the other parties. To be able to keep the project realistic and relevant, also the current policy of the Dutch government was taken into account. Future developments will have to be built according to the present policy and the subject of the project should fit within this policy. This also helps to make sure that the final product is a practical and useful research suiting the office desires and the university demands. This set up formed the starting point of the research and functioned as a basis which resulted in the final subject. On this page several important keywords are placed under the three points of view. These keywords together form the starting point of the graduation year. After having this vision clear a problem statement was developed and the project was given the current direction.

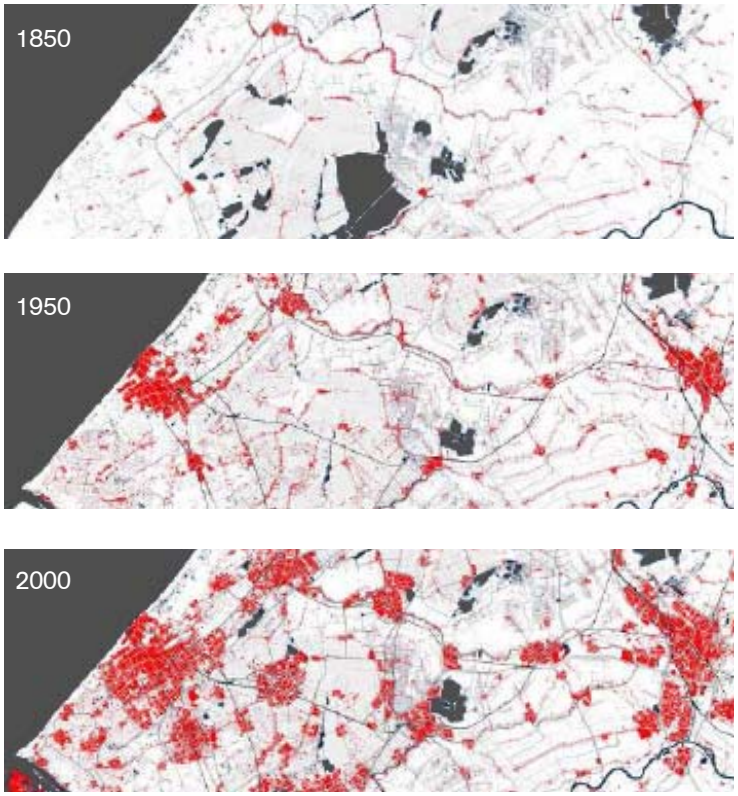


1.2 Problem statement

1.2.1 In between areas

The title of the project, Shifting Gravity, is related to the growth of cities in The Netherlands and the changing geographic centre point (the gravity point), due to recent large expansions. Cities have grown rapidly during the past century (figure 1) and a lot of green space is used for urban developments. Vast housing expansions at the edge of Dutch cities, due to the Vinex policy of the government, have been developed during the past years and some are still under development. These massive expansions place the former edge of the city currently in a new context. The edge is not any more at the periphery of its agglomeration, but it is suddenly the geographic centre. Utrecht is a very clear example of a city where this is happening at the moment. The vast expansion, Leidsche Rijn, at the west side of the city is causing it to grow with over 20% of its existing size. This means, as the images on the right explain, that the edge of the city, as it was about 10 years ago, is now relatively close to the urban core and in the geographic centre. What happens in these areas, which are the subject of similar changes, is one of the key questions of this master thesis. Next to the shifting gravity point, there is a lot more going one in these areas and a comparison between four study cases will give more insight into that. Amersfoort, Amsterdam, Den Haag and Utrecht are facing similar challenges during the coming decade, as they all have major housing expansions at the edge of the city. Next to the shifting gravity, as we will see, there will be also the issue of the connection between the centre and the expansion, the new policy of the government and the opportunity to use the expansion with its large numbers of inhabitants as a support for new facilities and amenities in the area between the expansion and the centre. A lot of challenges and problems are coming together now in the in-between spaces of cities in The Netherlands and they will be under development during the coming decades, as we can see in the Nieuwe Kaart (2010).

Development of urbanity in The Netherlands



Source: (Zandbelt, 2009)

1.2.2 Recent expansions

The Netherlands follow a long tradition of 'concentrated deconcentration' policies in order to control the vast expansions of emerging cities, mainly after the Second World War. Several large housing developments at the edge of Dutch cities, which are now being built, were guided by the fourth policy document extra, also known as the "vinex" policy. During the coming decade several large housing development areas at the edge of Dutch cities will be completed and -because of the recent policy changes- development opportunities will have to be sought more within the existing boundaries of the city and less in expansion possibilities outside of the city edge.

The Netherlands are well known for their effort to control the expansion of cities and protect the scarce nature areas within the national borders. Several policy documents have had their impact on the growth of cities. However, despite the 'bundled deconcentration' policies after the Second World War, urbanization has developed rapidly and cities have expanded a lot (figure 1). The effectiveness of the policy documents has been frequently questioned, but it is likely that the urban sprawl of our cities would have been higher without the compact urban development policies(Geurs and Wee, 2006). Several of the large 'vinex-expansions' at the edge of Dutch cities, which are now being completed, are causing the city to expand with 10 up to even 30% (Boeijenga and Mensink, 2008). These expansions are placing the in-between areas in a new context and they will probably have a significant impact on the entire city.

The vinex policy had basically two main targets: controlling the growing number of car movements and protecting the environment by spatial measures. This meant that planners and designers had to create compact housing areas at the edge of cities which were good accessibly by public transport and had a scale which was suitable for bicycle trips. Business developments should be centralized around important transport nodes with good accessibility. They were meant to be relatively self providing neighborhoods at the edge of the city with a good connection to the surrounding rural landscape on the one hand and to the existing urban core on the other hand. In that way they should be able to make use of the qualities of both, was the idea. The next page shows an example of a typical vinex location in The Netherlands: Ypenburg, near the residential city of Den Haag. We will see that the vinex housing areas received a lot of critics and didn't always proved themselves to be very successful.

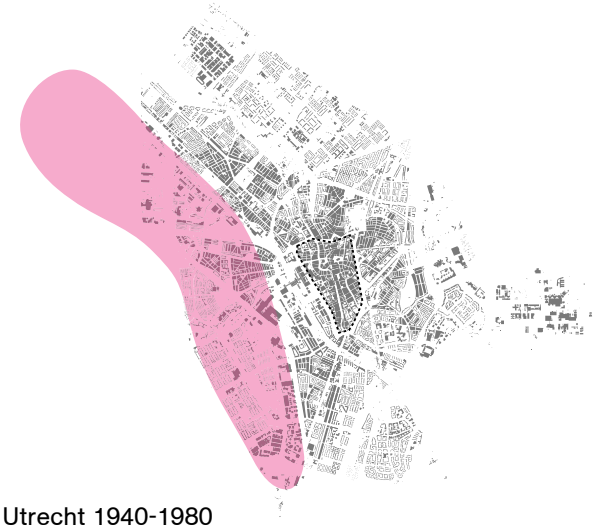
Recent policy changes are focusing more on densification and transformation of existing urban areas, which means developing within the existing boundaries of the city (VROM, 2006). Due to the recent policy changes developments must be sought largely in the existing part of the city which creates a new pressure on the urban structure. Boeijenga and Mensink (2008) state that the new expansions are often still depending on the existing urban cores of centralities in the vicinity. This implies that there must be significant movements in between the expansion and the core, which can be used as a support for new developments along the connecting axes. These flows will create a certain level of activity and liveliness which are key elements in order to obtain a certain level of urbanity according to Jacobs (1961) and Montgomery (1998). The theory about urbanization is further explained in the theory part of the research in this thesis.

The growth of Utrecht

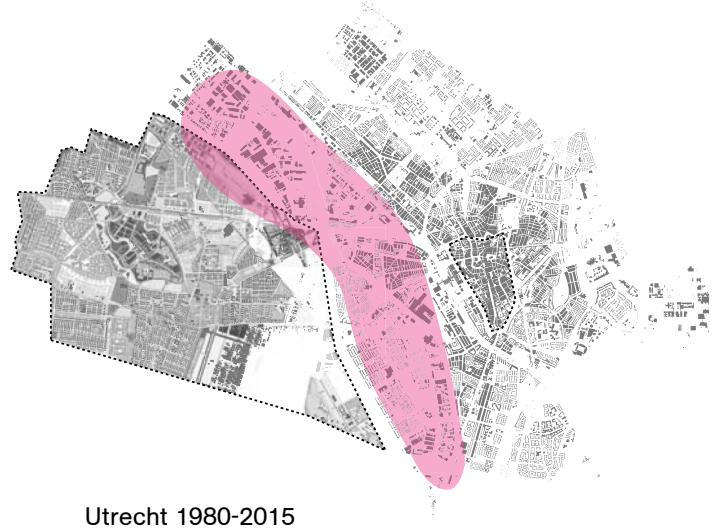
Utrecht <1850
30.000 inhabitants

Utrecht 1850-1900
100.000 inhabitants

Utrecht 1900-1940
150.000 inhabitants



Utrecht 1940-1980
250.000 inhabitants



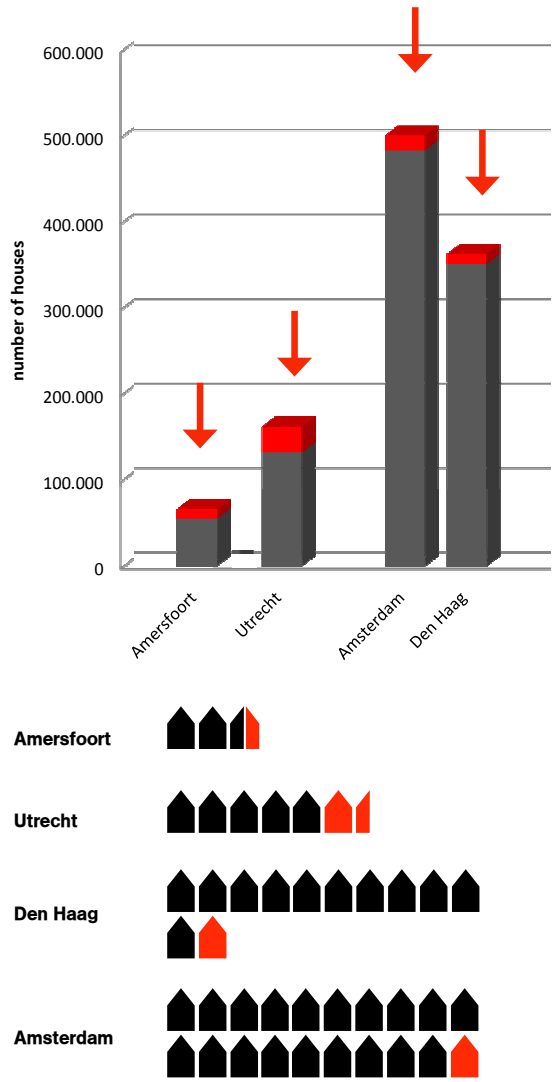
Utrecht 1980-2015
350.000 inhabitants

Source: (Kaartenkamer, 2010)

1.2.3 Recent large expansions

The vinex policy resulted in several cases of vast expansions at the edge of cities, causing existing cities to grow with up to around 30% of their existing size, as we can see in the figures on the right. The result of these expansions was that the geographic centre of several cities, in this thesis referred to as the gravity point, was moving from the urban core to the in between area. The impact of the expansion is of course very location specific and depending on the size of the existing city and the amount of houses being added to the existing stock. The cities of Amersfoort, Amsterdam, Den Haag and Utrecht are realizing four of the largest expansions at the moment. Because of the difference in size and typology, they form an interesting subject for a comparison in this research. The expansion “Leidsche Rijn” near Utrecht for example is causing the city to expand with more than 20% in terms of housing numbers (around 30.000 new dwellings). This is at the moment the largest housing expansion of The Netherlands (Boeijenga and Mensink, 2008) and therefore it receives a lot of public interest. On the other hand there is the example of Amsterdam, where another vast expansion is being realized (around 18.000 dwellings) and this one is also very well known. In this case the city is only growing with about 5% in size and the impact will probably be less. This difference in terms of housing numbers is already an interesting characteristic for a comparison between the four cities. Amersfoort has around 55.000 dwellings and is realizing Vathorst with 11.000 new dwellings. Finally there is Den Haag which already had 210.000 dwellings and is adding 12.000 with Ypenburg and Leidschenveen. In terms of size and change of the geographic centre, Utrecht seems to be most interesting, as the expansion Leidsche Rijn will probably have the largest impact. But what about the location of the expansion in relation to the existing city and the quality of the connection towards the centre? This question will be answered in the practical research chapter of this thesis.

Cities and their expansions



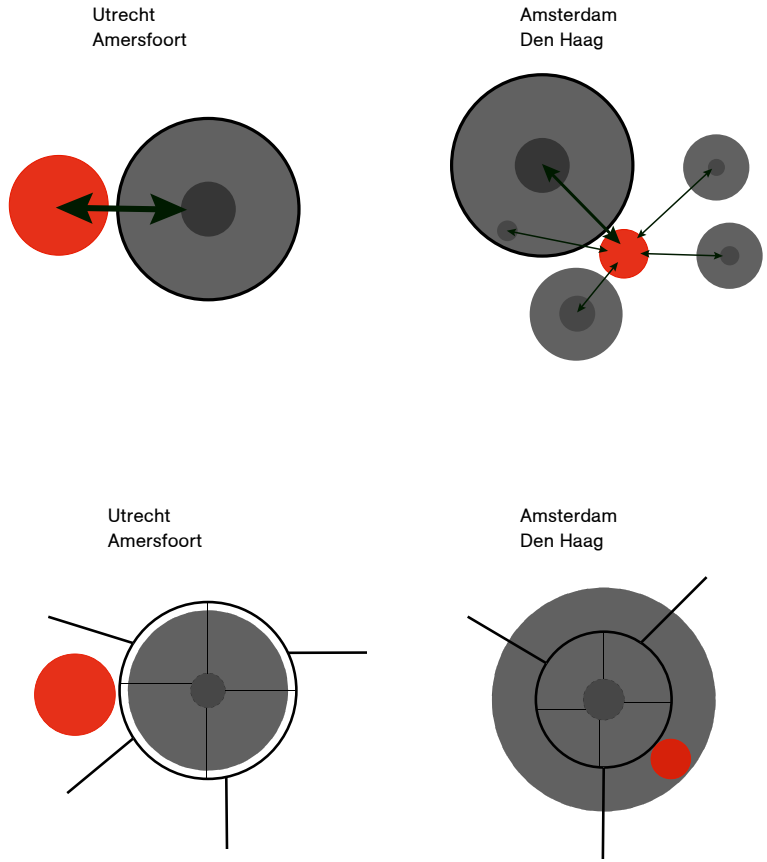
Source: (CBS, 2010)

1.2.4 Typology of the expansions

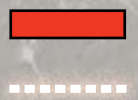
A comparison in terms of typology is another interesting characteristic of the four cities and their expansion. A quick analyses shows the difference between their typological situations. The two figures on the top of this page explain the difference in how the expansion is situated in comparison to the existing urban fabric. In Amsterdam and Den Haag, the new housing area is realized within the existing urban structure but outside the main ring road around the cities. In Utrecht and Amersfoort the neighbourhood is also outside of the ring road but it is also clearly outside of the urban structure. So, it might be interesting to see the difference of the two typologies in terms of connection, integration, infrastructure and morphology. What does this mean for the number of connections for example between the expansion and the urban core and what would the distance be in between?

The other two figures on the bottom explain the network of centralities where the new neighborhood is situated in. The model of Amsterdam and Den Haag has several centralities in the vicinity which are also well connected to the new expansion and the model of Utrecht and Amersfoort has basically only one main centrality where it is connected to. This comparison makes it even more interesting to take a look at the in between area, to see which spatial and economic changes are occurring, how we should deal with these changes and what the development potential is in the area. At first sight we could conclude that the vinex expansions in Amsterdam and Den Haag are depending on more than one core for their daily economic connections. Especially Ypenburg (Den Haag expansion) is very well connected to other centralities and is for example closer situated to Delft than Den Haag. The practical research in this thesis will provide a better insight in the spatial and economic conditions around the centralities and the expansions.

Typology schemes of study cases



Amersfoort and Vathorst



Amersfoort

55.000 houses

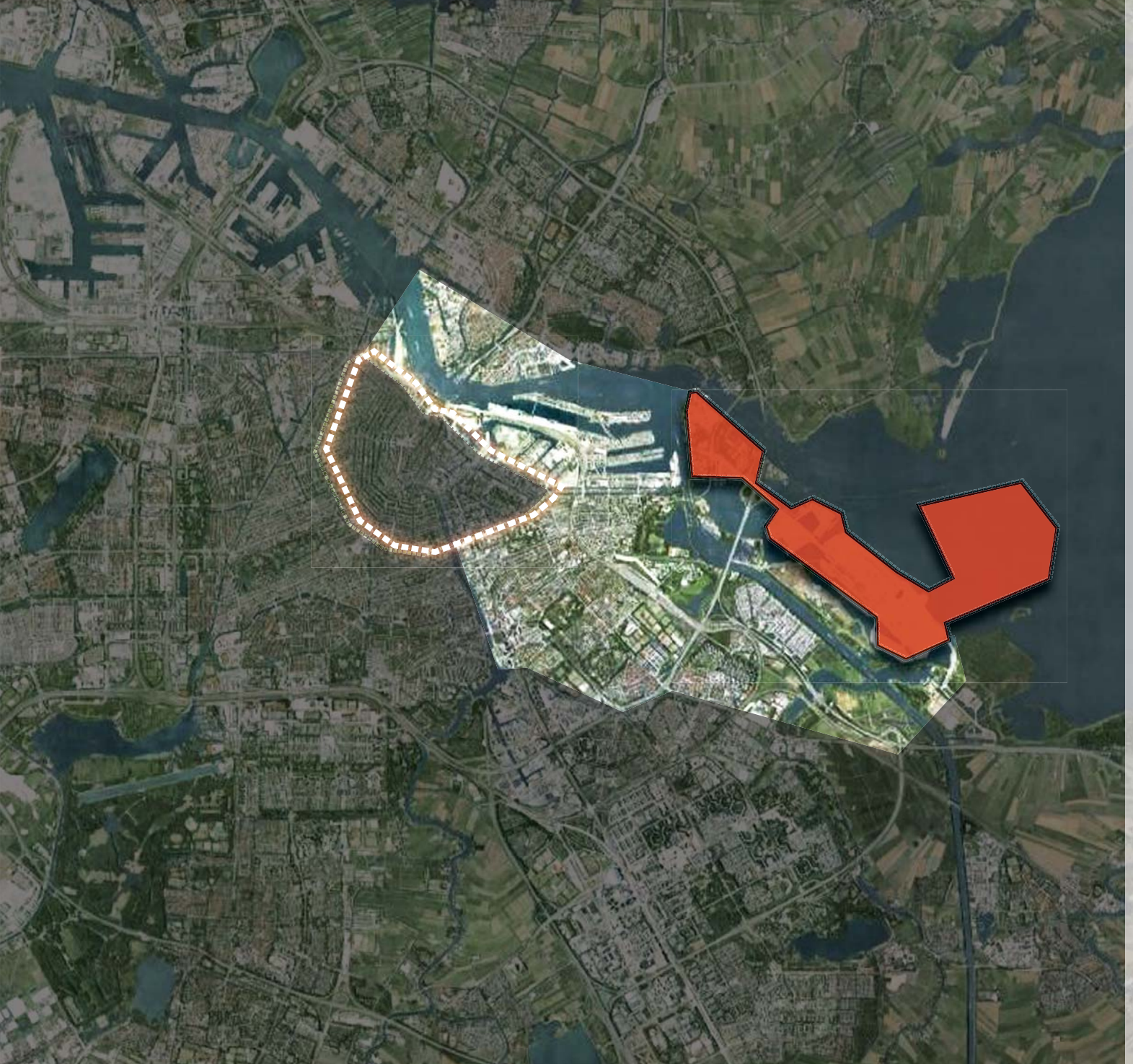
Vathorst

11.000 new houses

5.000 jobs

start: 2000
end: 2018

Source: (Google Maps 2010)



Amsterdam and IJburg

housing expansion

city centre

Amsterdam

380.000 houses

IJburg

18.000 new houses

12.000 jobs

start: 1997
end: 2012

Source: (Google Maps 2010)

Utrecht and Leidsche Rijn

housing expansion

city centre

Utrecht

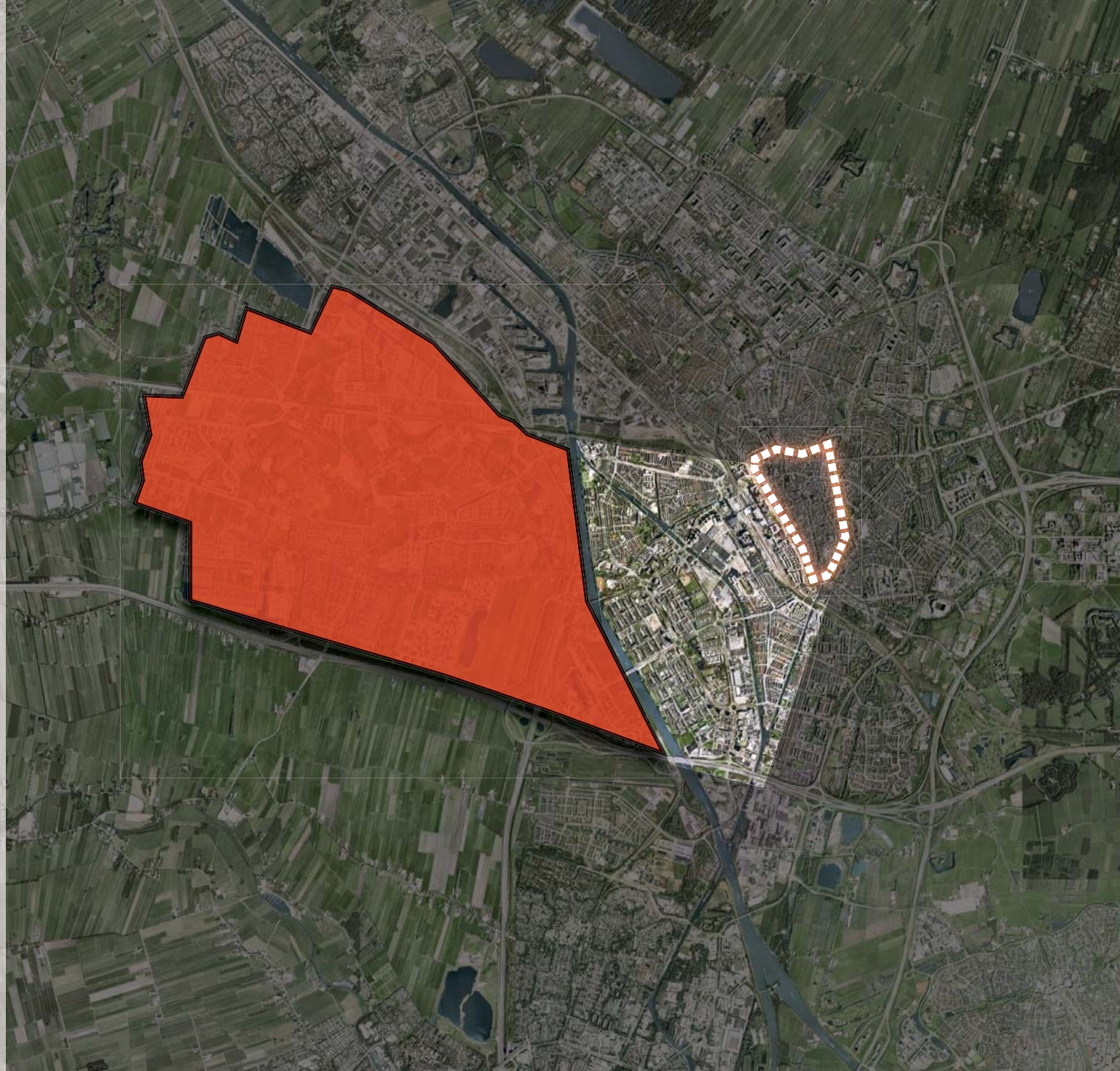
100.000 houses

Leidsche Rijn

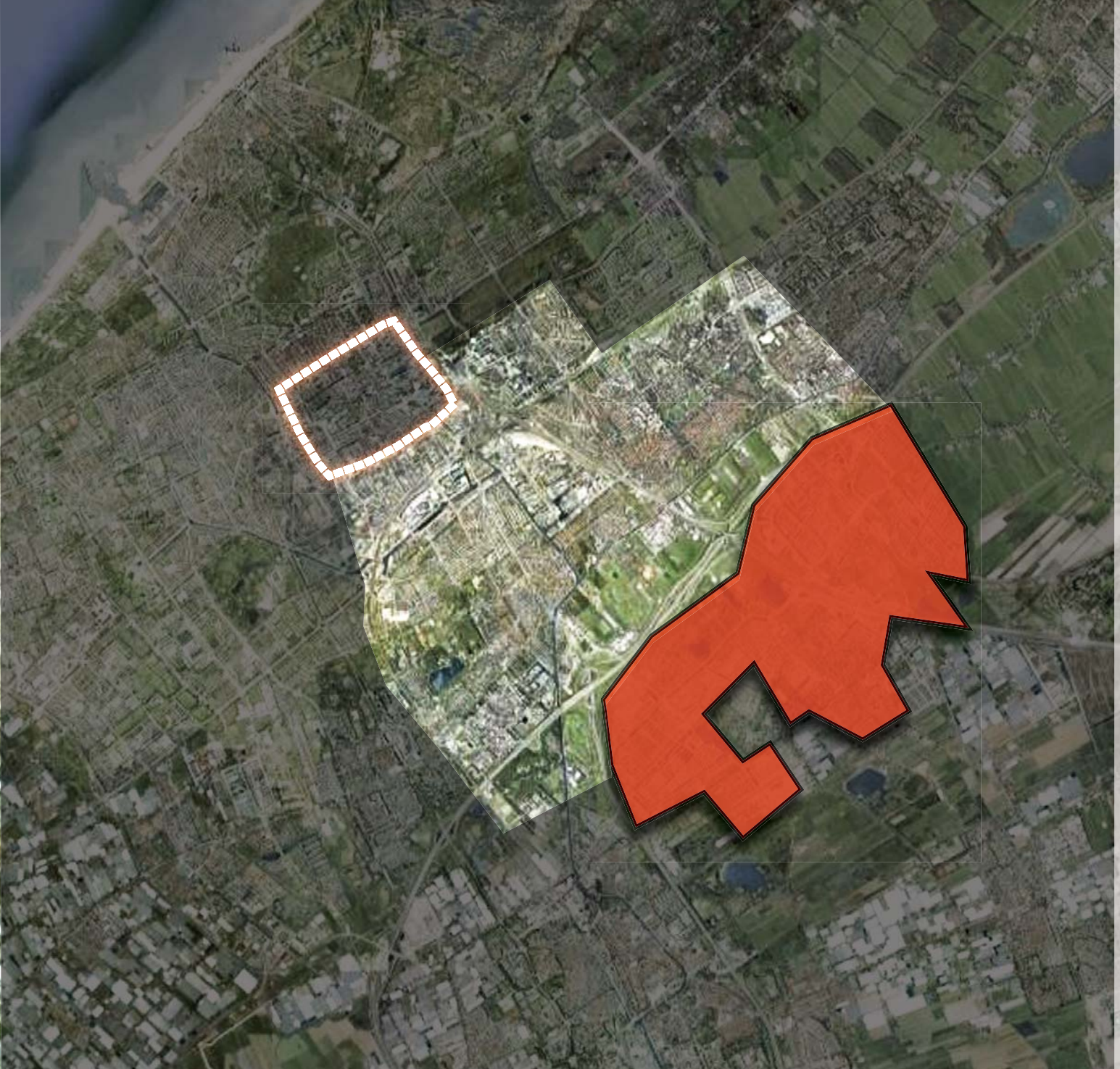
30.000 new houses

30.000 jobs

start: 1995
end: 2015



Source: (Google Maps 2010)



Den Haag and Ypenburg

housing expansion

city centre

Den Haag

210.000 houses

Ypenburg -
Leidschenveen

12.000 new houses

5.000 jobs

start: 1995
end: 2010

Source: (Google Maps 2010)

1.2.5 Criticism

After the first vinex neighbourhoods were starting to be realized, the government received a lot of critics on their policy. The new housing expansions appeared to be relatively introvert and self focused designed and in a lot of cases the connection to the existing city was lacking. In many situations, large barriers had to be overcome to reach the existing urban core in the vicinity. The connection to the rural land seemed to be a lot better, despite the fact that the new neighbourhood was lacking important urban qualities and the connection to the urban centre therefore was very important (Hereijgers and Velzen, 2001). Summarizing the critics, vinex neighbourhoods should open up towards the city and improve the connection to the urban core to be able to make better use of the urban qualities of the city. By improving this connection, the city can also make better use of the basis which the housing area has for new facilities in existing urban areas. In that way the new neighbourhood can make use of the city and the city can make use of the neighbourhood.

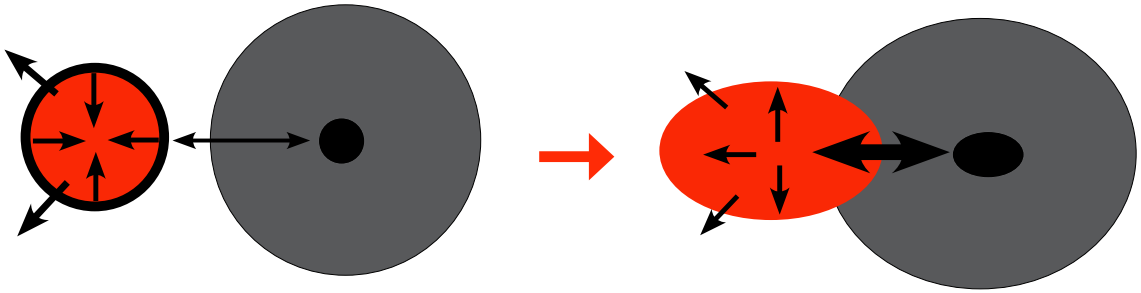
"The connection of the vinex neighborhood to the existing city is poor and it is better connected to the surrounding landscape."
(Haaft, 2001)

"Compact building with a multifunctional program, a social mix of the population, strong functional and morphological relation to the existing city are almost completely lacking."
(Boeijenga and Mensink, 2008)

"The urban and social embedding in the existing city is seldom convincing."
(Boeijenga and Mensink, 2008)

"The neighborhoods should not be placed in the middle of nowhere as a completely new world."
(Luijten, 2006)

Scheme of criticism on the Vinex expansions



Source: (Rengers and Uffelen, 2006)

Leefbaarheid Vinex-wijken beroerd

Van onze verslaggevers Merijn Rengers, Xander van Uffelen op

bijgewerkt 1 juni 2006 08:06

AMSTERDAM - Bij de bouw van Vinex-wijken besteed weinig aandacht aan de leefomgeving. Deze nieuwe daardoor te weinig parkeerplaatsen en voorziening en leefbaarheid in de nieuwbouwwijken laat sterk

Dat constateert milieuwetenschapper John van den promotie aan de Universiteit Utrecht. De conclusies overeen met recent onderzoek van de Volkskrant n wijken in de Randstad en Noord-Brabant. Daarin schaal groenstroken en sociale voorzieningen sch

'Het is slecht gesteld met de kwaliteit van Vinex- nu in zijn rapport PPS in de polder. De promove overheid te weinig rekening houdt met bewone projectontwikkelaars zijn te weinig betrokken

De gemeente hebben vooral weinig oog voo Vinex-wijken op de lange termijn. De onderzoeker een beperkte visie hebben op duurzame ruimtelijke kwaliteit. A gericht op functionaliteit en het stedenbouwkundig ontwerp. D speelt veel minder een rol. Volgens Van den Hof is dat juist noodzakelijk is om leegstand in de toekomst te voorkome

Uit enquêtes is gebleken dat bewoners desondanks t woning. Aan de kwaliteit van de woning wordt immers besteed. Over de woonomgeving zijn de bewoners minder

Source: (Luijten, 2006)

Vinex levert 'gewone woonwijken'

Vinex levert 'gewone woonwijken'

AMSTERDAM - Het ambitieuze rijksbeleid om met de Vinex-wijken levendige stadsdelen te creëren die de bestaande stad versterken, is mislukt. Het zijn 'gewone woonwijken' geworden. De doelstelling om het autoverkeer te beperken slaagt soms wel, al blijft het parkeerbeleid een lachertje.

Dit concludeert het gerenommeerde instituut Rigo in een landelijk onderzoek dat [illegible]kort verschijnt. Rigo-onderzoekers H. van Rossum en F. van Wijk bekeken of de V[illegible] jaar geleden gestelde doelen voldoen. Het rijk besloot toen grote nieuwbo[illegible] van de stad te bouwen. Minder autoverkeer, nieuwe impulsen voor de b[illegible] variatie op de woningmarkt waren belangrijke doelen.

Hoewel de wijken nog niet af zijn, durven de onderzoekers al de dro[illegible] het Vinex-beleid tot louter 'gewone woonwijken' heeft geleid. Hun simpel: de vraag naar bedrijven, kantoren en speciale attracties bl[illegible] investeerders. De onderzoekers verwerpen zo de veel geuite krit[illegible] 'wonen' en 'werken' te mengen of aan bijzondere parken of me[illegible]

Het resultaat stemt somber: omdat de wijken alleen standaa[illegible] naar binnen gekeerd, terwijl ze toch al vaak geïsoleerd ligge[illegible]

Gemeenten en ontwerpers filosoferen intussen graag ov[illegible] 'attractiepunten'. Volgens de onderzoekers gaat dit hel[illegible] economische en sociale leven. „Sociologen en ontwer[illegible] over wijkopbouw te hoeven praten, ze kunnen zich o[illegible] te vroeg dood verklaard.''

Mede om het autoverkeer terug te dringen, is he[illegible] wijken en de bestaande stad. Ook dit lukt niet. [illegible] stadsgewesten verscheidene kernen hebben. F[illegible] goed richten op Almere en Haarlem als op Ar[illegible] weinig met de centrale stad te maken heeft [illegible] doorgaand verkeer.''

De onderzoekers zijn wel positief over d[illegible]

Source: (Luijten, 2006)

Leren van Vinex

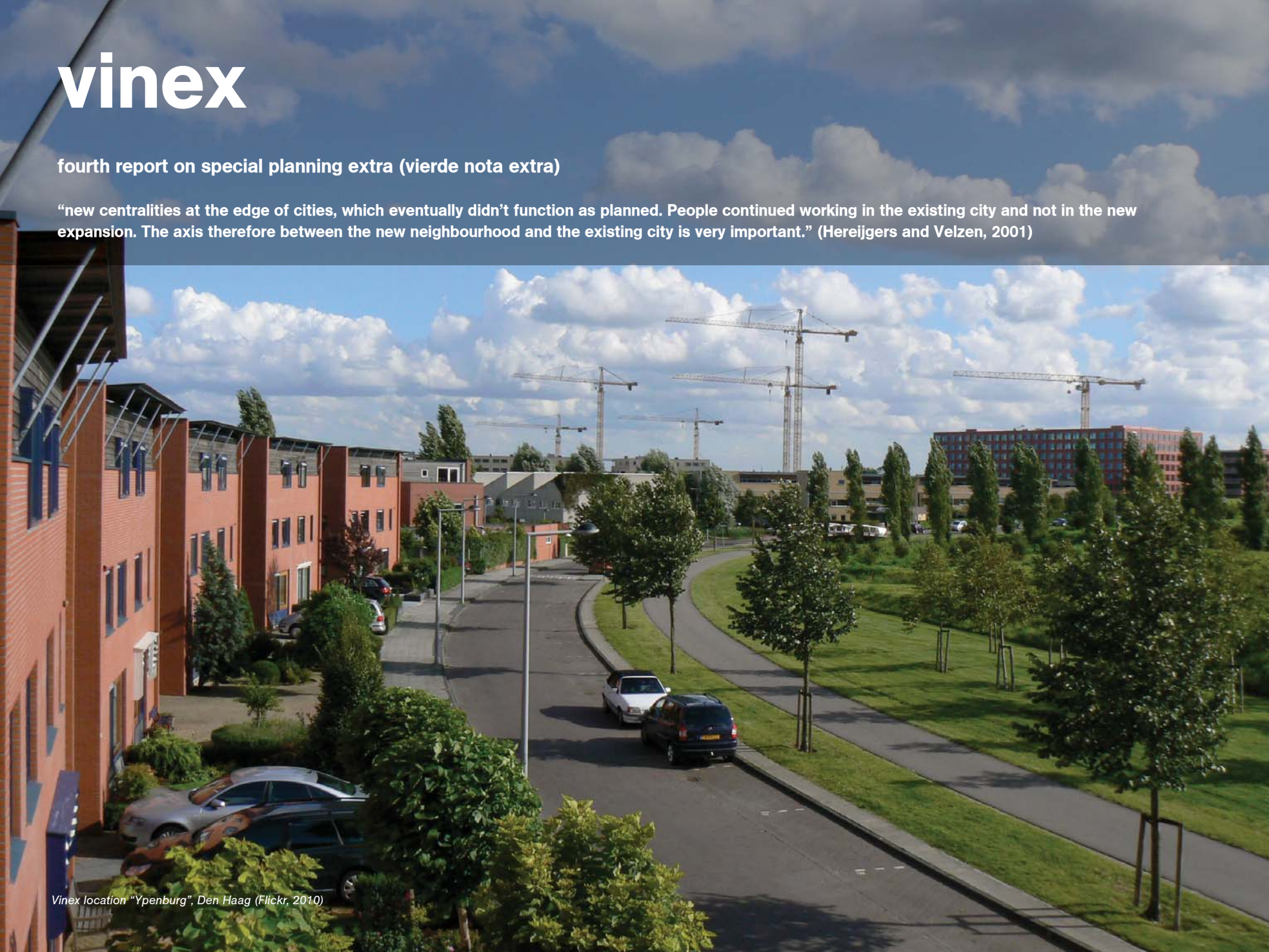
Al sinds de start van de ontwikkeling van Vinex-wijken is er discussie geweest over de kwaliteit. Met name de architectuur, de woningprijzen, de bereikbaarheid en het voorzieningenniveau zijn onderwerp van hevige kritiek. Nu de grote bulk van Vinex is gerealiseerd, blijkt uit onderzoek dat de bewoners over het algemeen heel tevreden zijn over hun wijk. NAW legde een aantal prominente 'smaakmakers' uit het publieke debat stellingen voor over de kwaliteit van Vinex. Met als insteek: hoe kunnen we leren van Vinex voor de grote woningproductie die er tot pakweg 2020 nog aan zit te komen?

De conclusie in de Volkskrant van een recent promotieonderzoek liegt er niet om: 'Leefbaarheid Vinex-wijken beroerd' kopt het dagblad. De kritiek spitst zich toe op de voorzieningen: te weinig parkeerplekken, buurtvoorzieningen en groen. De gemeenten zouden een te beperkte visie hebben op duurzame ruimtelijke kwaliteit. Over hun woning zijn de meeste bewoners tevreden, blijkt uit hetzelfde onderzoek. Hoe beroerd is het nou eigenlijk echt gesteld met Vinex?

vinex

fourth report on special planning extra (vierde nota extra)

“new centralities at the edge of cities, which eventually didn’t function as planned. People continued working in the existing city and not in the new expansion. The axis therefore between the new neighbourhood and the existing city is very important.” (Hereijgers and Velzen, 2001)



Vinex location “Ypenburg”, Den Haag (Flickr, 2010)

1.2.6 New policy

The current Dutch policy document “Space”, the “Nota Ruimte” dates from 2006 and defines the government policy for the coming decades. Urbanization has developed rapidly in the past, mainly after the Second World War and the government tends to control this in order to protect the scarce left over green space in The Netherlands. It is therefore not surprising that one of the most important quotes in the policy document is that “the available space in existing urban areas has to be used to an optimum by densification” (VROM, 2006). This means that building within existing city borders will be the challenge for planners and designers, according to the policy. Infrastructure and urbanization should be developed together and should be integrated with each other, which will result in a lot of developments along important axes which have the potential for a better integration and a certain urbanization. Public transport and slow traffic routes will also have to be key elements of new developments in order to protect the environment and stop the growing car movements.

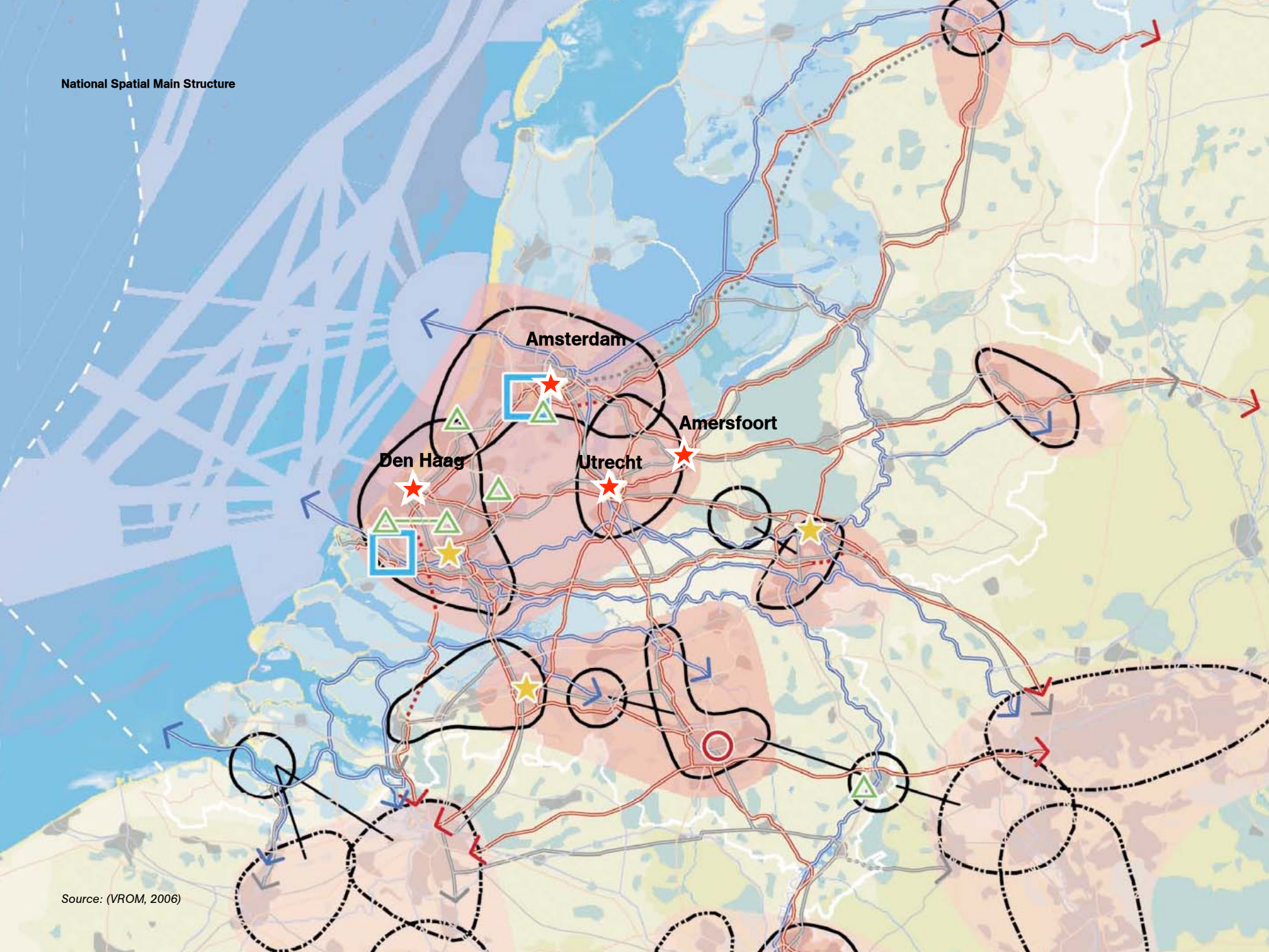
”40% of the new housing stock has to be realized within existing urban areas” (VROM, 2006)

Next to densification, another important goal of the government is to create a certain level of variety and diversification in urban central areas. City centres should be lively and diverse with a lot of facilities and amenities and developments should be centralized around nodes of transportation. The shifting gravity point of several cities in The Netherlands is causing places to be the subject of change of function areas. The government states that a lot of business and industrial areas should be restructured and changed into places with more urban centre quality, because the economy is changing and we need less of these large scale areas, especially in and around our urban centres (VROM, 2006, Korthals Altes and Tambach, 2008). The large scale business and industry which is still needed should then be moved to other places which are more suited for these kind of functions, for example around main transport nodes and at the new edge of the city. These change of function areas are very much suited for a diverse and urban environment, often located near the centre and with a lot of development space available (Korthals Altes and Tambach, 2008).

“the available space in existing urban areas, has to be used to an optimum by densification.” (VROM, 2006)

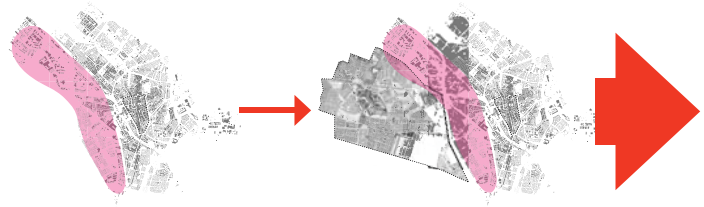
To elaborate the planned densification, the government has set the goal to realize 40% of the new housing stock within existing city boundaries. This results in a high pressure on the existing urban space and also on the in between spaces which are the subject of this thesis. The areas in between the large housing expansion and the centre will have to become more dense and urban in order to meet the targets for the amount of new dwellings. Utrecht, for example has the goal to realize around 30.000 houses towards 2030 and a large part of this should be build within the borders of the city (Kleef, 2004). Next to the housing goal, there is also the desire to realize more local oriented business within the existing city. Especially monogamous living areas with a lot of social rented housing and socio-economic problems will need the new development to be able to stop the decline and create more prosper (VROM, 2006).

Summarizing the new policy document, one could state that new urban developments should be realized within the existing city boundaries, creating diverse and highly urban environments with a high density. The large expansions at the edge of the city, causing a lot of urban sprawl should be controlled and the left over green space should be protected.

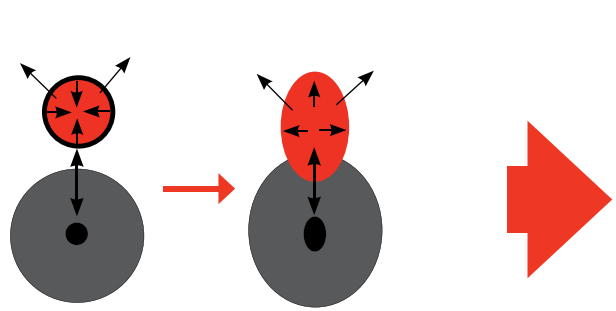

National Spatial Main Structure
Amsterdam
Amersfoort
Den Haag
Utrecht
Source: (VROM, 2006)

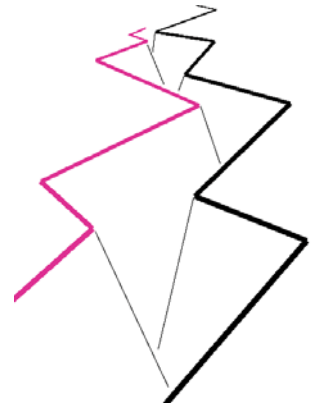
1.2.7 Summarizing problem statement

Shifting gravity point
The area which used to be at the edge of the city is now in the geographic centre of the city, due to the large expansion outside of the former edge. This means a more urban context for this area and developments towards more centre characteristics.



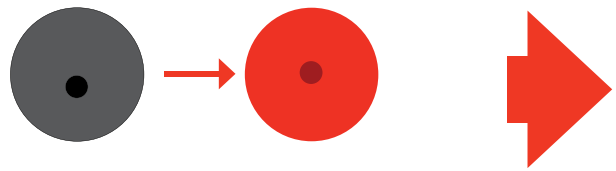
vinex-neigborhoods
Vinex neighbourhoods should open up towards the city and improve the connection to the urban core to be able to make better use of the urban qualities of the city. In that way the city can benefit more from the support that the expansion can give for new developments.





what about the in-between?

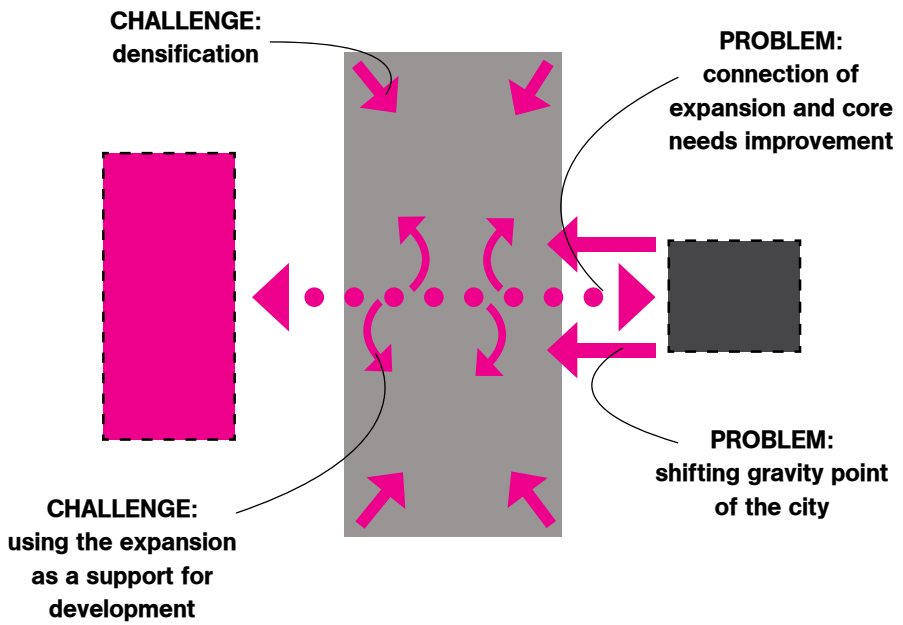
new policy
The new policy says that new urban developments should be realized within the existing city boundaries, creating diverse and highly urban environments with a high density. The large expansions at the edge of the city, causing a lot of urban sprawl should be stopped mainly and the left over green space should be protected.



1.2 Problems and challenges

From the summary on the last page we could derive four main objectives, problems and challenges. A lot of themes are coming together in the in-between areas as we saw in this chapter and it will be an area with a lot of changes during the coming decades. The shifting gravity point of the four cities was the motive and starting point of this research and during the project there appeared to be a lot more challenges in these areas. Next to this change of position in the city, there was the other fact that vinex neighborhoods were designed very self focused mainly and not very well connected to the existing urban core but better to the surrounding landscape. In that way, it seemed to be impossible to let the existing city benefit from the new amount of inhabitants residing in the expansion, which was another challenge. A growing city also needs more facilities and amenities around the urban core to fit the needs of its inhabitants. As we saw, the expansions are still very much depending on their urban core (Hereijgers and Velzen, 2001), but in this way they won't be able to benefit completely of the qualities which the existing city has. So, in many cases the connection between the expansion and the urban centre of the city should be improved. Next to these three challenges and problems, there is the fact that the government is changing their policy. The focus lies on stopping the vast expansions as they are being built at the moment and starting to densify, intensify and improve the quality of our existing urban areas. This means that there will be a new pressure on the in between areas, the pressure of densification. Together with the challenge of the shifting gravity this will mean urbanization, as the government and municipalities also state (Kleef, 2004; VROM, 2006).

Al these challenges and problems are making the project very interesting, actual and important, but it also makes it a hard nut to crack. This thesis tends to show what the opportunities of these in between spaces are and how we should deal with these kinds of situations. The four themes on the left page will be transformed into research questions on the next pages which will function as the backbone of this research.



Vinex location “Leidsche Rijn”, Utrecht

Source: (Flickr, 2010)

1.3 Research questions

1.3.1 Main research question

how can we implement new housing oriented developments within the area in between a large housing expansion and the urban core in growing Dutch cities, by dealing with a shifting gravity point and making use of the support provided by the housing expansion at the edge of the city?

This question forms the basis of the problem analyses. Sub research questions immediately arise when starting with the analyses and create the structure of the research. The sub research questions will form the structure of the research project and have therefore a great practical value.

1.3.2 Practical research questions

Analyses, four study cases

- Which areas can be defined as the “in-between” space, between the new expansion and the existing urban core?
- What is the current demographic makeup of these in-between areas?
- What are the main infrastructural connections between the expansion and the centre?
- What is the integration of these main connections in the in-between areas?
- What are the spatial, economic and social characteristics of the in-between areas to the new expansion and the urban core?

Design

- Which development typologies will fit in the perspective of the project?
- How can these new developments be implemented spatially in the area between the expansion and the centre?
- How can the development make use of the basis provided by the housing expansion at the edge of the city, by using spatial design measures?
- How can the morphological and infrastructural connection of the new neighborhood with the existing city be emphasized?
- How can the in between area adapt to the shifting gravity point due to the new context?

1.3.3 Theoretical research questions

Which spatial and economic conditions create a high investment potential for economic development in areas which find themselves in between a recent expansion and the urban core in expanding Dutch cities?

Economic development

- What is the definition of economic development?
- What is the relation of economic development to the development in the project?
- Which kinds of economic developments can be implemented in the design project?

Change of function areas

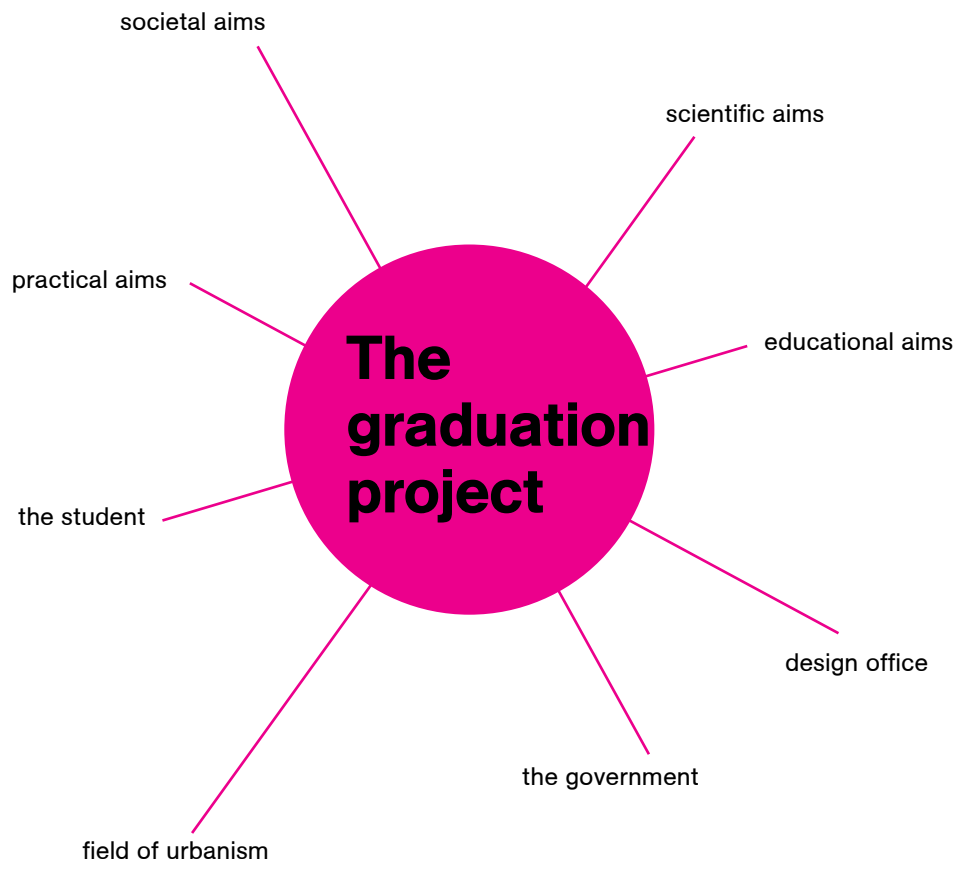
- What are change of function areas?
- Do the areas of subject comprise change of func tion areas?
- How can the theory of change of function areas be implemented in the design project?

1.4 Aims and goals

From the main research question one could basically derive two main objectives. The first is to answer the question about how to implement the new policy of the government in existing “post-vinex” situation and the other one is to give an answer to how future designs could make use of the situation and use the basis of the new housing expansion resulting from the vinex policy.

Because of the fact that the project is commissioned by different stakeholders, which al influence the research, it will be very important to have the expectations and goals clear for each party. As explained in the motivation chapter they all have their own interest and the final product will have to meet all the requirements. The project will need to have a practical relevance to be of use for the design office, a scientific relevance to be able to contribute to the body of knowledge within the field of Urbanism and the project will have to meet the educational goals to make sure the graduation is adding sufficiently to the required package of personal knowledge.

The final product has to be a balanced mix between research and design, applicable in comparable situations. Due to the comparison between four study cases it will be possible to draw conclusions which are not only suitable to on specific location. After having zoomed in on a specific location, which has to be a key project in the eventual perspective, it will be of great value to zoom out again and draw some important general conclusions. The outcome of this generalization provides the knowledge which should fit the needs of all stakeholders in this project.



1.5 Relevance

1.5.1 Scientific relevance

The scientific relevance of this project is based on mainly three topics. The project is a study on which conditions are changing in situations after a large expansions and on how and where to develop in these situations. The policy of the government is guiding new developments towards inner city locations and points towards densification and diversification. This means that key projects of this research will be within existing urban structures. A lot of areas are dealing with changes of the main functions and many business areas have to be redeveloped into more urban and centre functionalities (VROM, 2006). The new policy is also focusing on development which has a strong relation with the public transport infrastructure, in order to protect the environment. One of the main targets of this research is to make use of the basis provided by the new and large housing expansion at the edge of the city. The developments will therefore need to have a relation with household services and facilities. This means that the developments will have to be economically orientated.

These characteristics of the research bring us to three important topics within the body of knowledge: Transport Oriented Development, Change of Function Areas and Economic Development. These are all topics which have been emphasized a lot and the theory behind them will now be explained. Applying these theories in current and actual situations in cities in The Netherlands, as this project will do, will contribute to the developing of these three topics.

1.5.2 Societal relevance

The societal relevance of the study is mainly related to the discussion about the past, present and future Dutch government policy. The changes which are occurring at the moment affect the lives of many and give us a little insight into the future. These changing conditions provide a source for new research, because there is not always an answer to questions that arise in new situations. In this case the effect of a typical large “vinex” expansion on the space in between the expansion and the city centre. Which changes occur in this area and what kind of potential does this new situation have? These kind of questions are strongly related to the research question of this thesis and the answers are of great importance for future developments. So, the societal relevance lies in the fact that we can use these answers to be able to anticipate on the changing conditions and make better designs. The government has set some important goals for future developments which should result in vital and successful cities. One of the main targets is to build 40% of the new houses in existing urban areas and optimize the use of available urban space (VROM, 2006). New developments should also create diverse and vital urban areas. The implementation of these goals is of course very location specific and therefore the government lets municipalities decide how to use the policy exactly. By elaborating this project the new policy will be tested and it will be an example of how it can be implemented. This will form the basis of the societal relevance.

Another topic which will secure the societal relevance is the fact that the research is partially commissioned by the architectural and urban design office De Zwarte Hond in Rotterdam.

Doing this research In cooperation with a design office will force it to keep it practical, realistic and societal relevant. The goal is to combine the scientific and practical knowledge and bring the project to a higher level.

1.5.3 Methodology

The major challenge of this thesis is to reveal the development potential of the area and implement new projects in the existing urban fabric, which is changing because of new forces. The comparative analyses of this paper, based on important criteria and indicators, shows the differences between the four cases and the potential that lies within. The final design project will depend on the outcome of the research in the first half of the graduation year, but it will be a significant part of the master thesis. During the graduation year several methods and techniques will be used to come to the end result. The methodology will comprise the instruments suited for answering the research questions of chapter 3. The most important methods are described in the topics below.

Literature research

The literature research is an important element of the P2 research. The relation to the literature will prove and determine the scientific relevance of the thesis and is therefore very important. It is important to compare relevant literature to the practical analyses and draw conclusions. The used literature at the moment is mainly linked to the review paper about economic development. The literature will also provide an important basis for the project after the P2, during the more design oriented fase.

Mapping

The mapping of the case studies already forms the basis of the research. Sources like Google maps, NieuweKaart and several maps from the mapping room like the V10 Vector map will enable many important analyses and are key elements of a good research.

Site analyses

In this case, site analyses will possibly form an important additional element of the research. Its importance depends partially on the outcome of the research, but it will be helpful to do some on site review in order to keep the project realistic and practical. A site trip with the studio might provide important input for the project and link it more to the situation in real life.

GIS

GIS is a relatively new kind of research. It is based on the comparison between data and maps. There is already a lot of data available to be used in a GIS program. Different kind of maps can be used as a basis for the analyses and numerous kinds of data can be placed on top of them. The data will be visualised and related to places on the map. This program makes it easier to do quick scan or in dept analyses and it might be a very important data source.

Statistics

Already, in this research, statistics have proven to be useful. Data resources are becoming better and more useful very rapidly and provide an increasingly important input for the project. Several municipalities for instance have developed a solid data package which can be used in the analyses. In The Netherlands statistics are relatively well organized and a lot of data is available. Most well known data resource is of course the CBS, the government statistics resource.

Space Syntax

Space Syntax has proven itself very useful already in determining the integration of the road network. It showed clearly that the new housing expansions were very regional oriented and had very few local integration. Also after P2, the technique will be important to decide which changes should be made to the road structure and what effect certain developments will have.

It might also be interesting to compare it with the SpaceMate program which analyses densities and typologies.

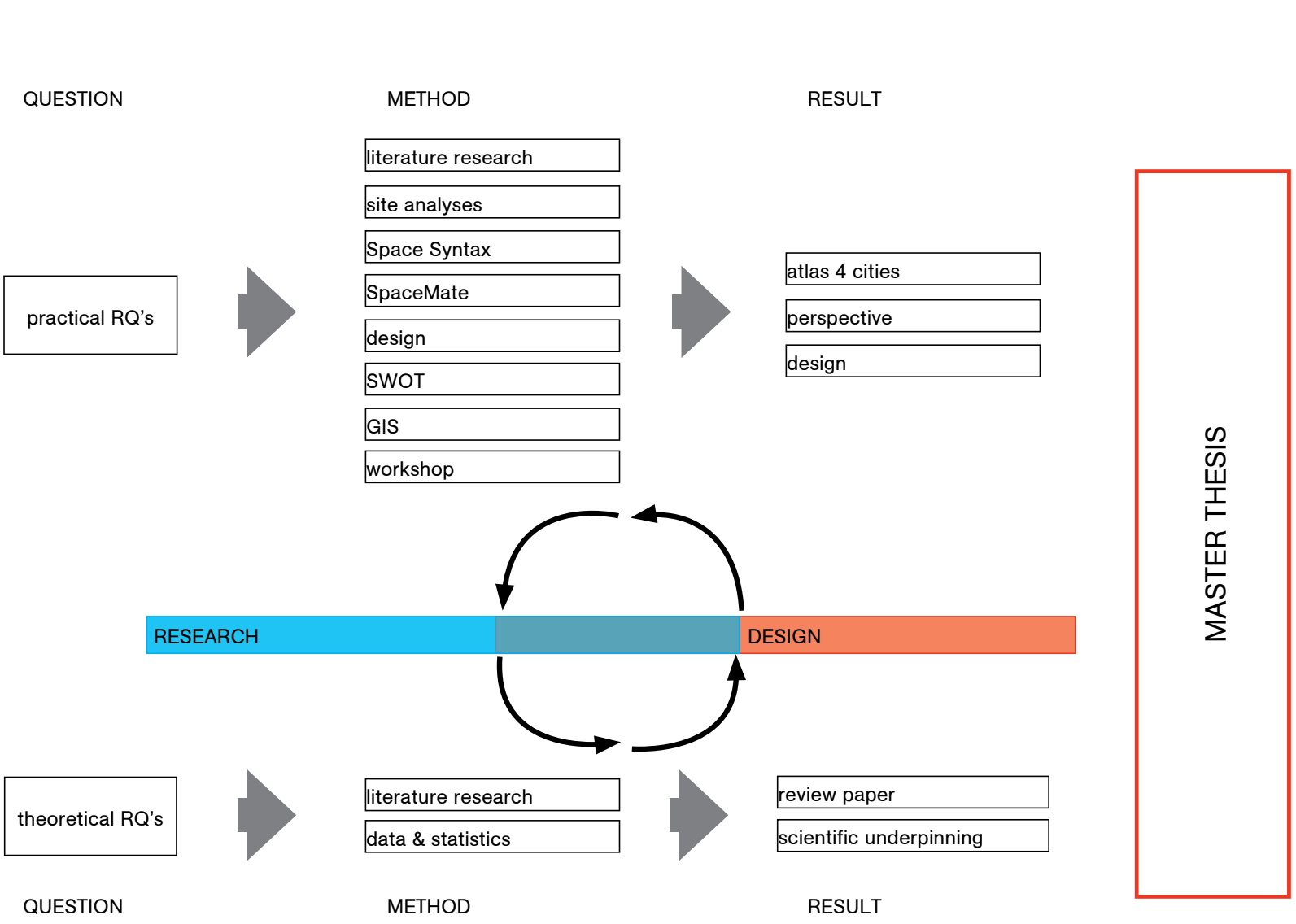
SpaceMate
The SpaceMate program is used to determine the density, typology and program of an area on a relatively low scale. It can be used in advance to decide what an area could look like, but it can also be used to test the design when it would be implemented. It might be very useful to combine it with the Space Syntax technique, to be able to add the integration of the road structure.

SWOT analyses
SWOT analyses are always useful to draw conclusions, helping to make important progress during the research. It helps to look back on the analyses which have been done and to decide what to do next. The SWOT analyses will be supportive during the entire research process.

Design
The design process will start after P2 and will have a strong connection to the analyses which have been done. It helps to zoom in on a location and to test the research which has already been done. It will probably result in taking a step back again and perform new analyses and then start with the design again.

Workshop
A workshop will provide a great input from fellow students and professionals from the field. When combined with a field trip it also provide the needed practical knowledge.

Source: (Google 2010)


QUESTION
METHOD
RESULT
literature research
site analyses
Space Syntax
SpaceMate
design
SWOT
GIS
workshop
practical RQ's
atlas 4 cities
perspective
design
MASTER THESIS
RESEARCH
DESIGN
theoretical RQ's
literature research
data & statistics
review paper
scientific underpinning
QUESTION
METHOD
RESULT

2.

introduction

research

design

conclusion

2.1 Theoretical research

2.1.1 Introduction

"The spatial patterns of cities in developing countries are the product of a long history, reshaped by current policies" (Riguelle et al., 2007). The Netherlands follow a long tradition of 'bundled deconcentration' policies in order to control the vast expansions of expanding cities, mainly after the Second World War. Large housing developments at the edge of Dutch cities, which are now being built, were guided by the fourth policy document extra, also known as the "vinex" policy. Hereijgers and Velzen (2001) state that the, often very large, neighborhoods at the edge of Dutch cities are still very much depending on the existing qualities of the urban core and the axis therefore between the new neighbourhood and the existing city is very important.

Recent policy changes are focusing more on densification, transformation, intensification and centralization of the existing cities in order to preserve the rural land and make cities function more efficiently (VROM, 2006). During the coming decade several large housing development areas at the edge of Dutch cities will be completed and - because of the recent policy changes - development opportunities will be sought more within the existing boundaries of the city and less in expansion possibilities.

Combining the policy changes and the post-vinex situations will provide a new pressure on the area in between the expansion and the existing city core. The new basis of the housing area at the edge of the city can be used to add new facilities to the city and make new development more successful. It is of great importance to know where these new developments and investments should be implemented. In other words: which spatial and economic conditions create a high investment potential for economic development in expanding Dutch cities? Developing within existing city boundaries forces investors and designers to adapt to the structure of the city and find innovative ways of dealing with challenging situations. Why are certain places interesting for investors to develop their new real estate and why are these places seemingly beneficial?

The major challenge of this paper is to reveal the development potential of areas that find themselves in comparable situations as described above and to set out the interest of investors in these situations.

2.1.2 Recent Dutch developments

Despite the 'bundled deconcentration' policies after the Second World War, urbanization has developed rapidly and cities are still expanding. Several of the large 'vinex-expansions' at the edge of Dutch cities, which are now being completed, cause the city to expand with 10% up to even 30% (Boeijenga and Mensink, 2008). These expansions resulted in a lot of changes in the city and caused the gravity point of the urban structure to shift.
Recent policy changes are focusing more on densification and transformation which means developing within the existing boundaries of the city (VROM, 2006). "The effectiveness of the policy documents has been frequently questioned, but it is however likely that the urban sprawl of Dutch cities would have been higher without the compact urban development policies" (Geurs and Wee, 2006).

Due to the recent policy changes developments must be sought largely in the existing part of the city which creates a new pressure on the urban structure. Boeijenga and Mensink (2008) state that

the new expansions are often still depending on the existing cores of centralities in the vicinity. This means that there must be significant movements in between the expansion and the core. Due to this fact, investors will presumably be more economically orientated in these situations and try to make use of the potential which these flows have. So areas in between a recent expansion and an existing city core in The Netherlands will evidently comprise several development goals and opportunities that can be used to efficiently fill in the gaps within the existing structures or to stop the declining of certain problem areas.

2.1.3 Economic development

The definition of economic development can be interpreted in different ways depending on the situation and on the goals of the area of subject. Although, it seems that every economic development goal is related to the increase of employment, mainly in local economies (Helling, 1997). Malizia (1986) makes the distinction between growth theories and development theories. He states that while growth strategies focus more on short term changes, increasing the rate of economic growth and employment, development strategies focus on long term changes and more structural changes of the economy, but also on employment increase. Economic growth seems to be more related to quantity and economic development more to quality changes (Flammang, 1979). In the 'post-vinex' situations of many cities in the Netherlands, areas are dealing with an increase of economic growth potential. New opportunities arise when investment is sought within areas in between centralities with a high interdependence. Recent expansions at the edge of Dutch cities are often largely depending on the existing core of the city (Boeijenga and Mensink, 2008) and the new basis of this expansion often creates beneficial conditions for economic growth. "Economic growth often leads to economic development and vice versa" (Malizia, 1986), so this will also stimulate the economic development of the area. The potential of these areas can be exploited by making use of the spatial infrastructure which is already there or by improving the existing structure. Helling (1997) states that increasing efficiency of spatial patterns would contribute to economic development. But also public infrastructure can contribute largely to the increase of economic development in these areas (Duffy-Deno and Eberts, 1991).

2.1.4 Conditions for development

Spatial and economic conditions which create opportunities for new investment and development are often very location specific and depending on many factors (Flammang, 1979). Nevertheless, a lot of research has been done to be able to define in which situations investors are willing to invest in property and new development. Adair et al. (1999) researched the interest of investors and made a top five of factors which would attract investors. This kind of research can be used to reveal the development potential of specific spots in an area, but it can also function as a guideline for new area development.

Economic conditions

Rental and capital changes seem to be an important indicator for investor interest. Guy et al. (2002) state that "on an urban level, the potential performance of a city's property market is an important element of an investment decision. If rental and capital growth are expected to be strong, then an institution would wish to invest in that city." So, if there are indications for a growing real estate value in a certain area, than this would increase the potential for new investment and development. Another research, done by Adair et al. (1999), defines a list of important factors which will draw investor interest according to the research. They define a

In search for a place to develop...

Source: (Google, 2010)

top 5 of interests:
1.Capital appreciation
2.Rental growth
3.Perceived level of risk
4.Quality of the proposed development
5.Construction costs/land costs
This research also shows that property value is an important factor for investor interest. The results seem quite evident as investors of course will want their property to increase in value. However, the research doesn't answer the question to why rental and capital growth are occurring in certain areas. So, this probably means that there must be other factors that create a spin off effect causing property value to rise. Nevertheless, rising property value is a very relevant indicator for investor interest and thus for development potential.

Spatial conditions
Beneficial economic conditions, such as rental and capital growth, are the result of factors which create a property prosper. So which conditions cause the real estate to increase in value? Guy et al. (2002) state that the "geographical location appears to have been a stronger influence on investment flows than the economic performance of an area", referring to the British Investment Property Databank (1996). This means that good spatial conditions, such as a good accessibility, will stimulate economic development. Next to that, if an area is well connected to a housing area, it will be better able to make use of the potential and the basis that this group of residents has. It is therefore of great importance that the vast expansions of several cities in The Netherlands are well connected to the existing city in order to take advantage of the new basis for facilities in the city. Banister (1995) states that "Businesses and amenities are planned by relating their user requirements to location features." In the case of several areas within Dutch cities, which are well connected to recent expansions, the economic development potential will most likely relate to facilities which have a relation with households, as this is the main target group that lives in the new expansion. The economic development potential will be even higher if the area of subject has two or more transport modes coming together at an interchange point (Banister, 1995).

Public transport
Next to the road structure, as discussed above, also the public transport infrastructure is of great importance for successful economic development. Fact is though, that these transport nodes will have to be highly accessible in order to be able to contribute to the economic prosper of an area (Holmes and Hemert, 2008). "Public infrastructure will contribute to a better accessibility and it may attract new households and firms, which then further contribute to an area´s growth" (Duffy-Deno and Eberts, 1991). During the past decades, public transport has played an increasingly important role in Dutch developments and people are making more use of its benefits. The public transport infrastructure should be one of the key elements of new housing expansions at the edge of Dutch cities, as the government states in their new policy document 'Ruimte'(2006). These new public transport developments will have to be well connected to existing infrastructure in order to secure the connection between the urban core and the housing expansion. Existing transport infrastructure might have to be adapted to the new situation, so being able to make use of the new basis, which large housing expansions have, for new economic developments in the existing city.

Mix of rental and ownership
To know the effect of the mix of rental and ownership in real estate in a certain area, it is important to know the background

of property development in these situations. In The Netherlands, social housing has had a major impact on the socio-economic situation of several neighborhoods (Schutjens et al., 2002). After the Second World War there was large need for housing in several parts of the country. The building of new houses was strongly guided by the government and, at that time, the quantity of housing was more important than the quality (Priemus and Dieleman, 1999). Building houses on a large scale was unavoidable and it provided acceptable and affordable living space for many residents at that time. But when the economy started to pick up in the 80s, these residents were able to afford more expensive and qualitative housing and left the areas with a high percentage of the relatively cheap social housing. The new inhabitants of these areas had a lower social and economic status and the overall average income started to decline (Priemus and Dieleman, 1999). In general one could say that high concentrations of social housing have had a negative impact on the socio-economic status of many neighborhoods in The Netherlands (Kempen and Priemus, 2002). Next to that, it is evident that people are more willing to invest in real estate which is their own property, than in something which is owned by someone else. So, areas with a high percentage of owner occupied housing and private rent will have a higher investment potential than areas with a large amount of social housing, especially when the real estate value is rising (Guy et al., 2002).

Change of function areas

The available space in Dutch cities has to be used to an optimum in order to create higher densities and large expansions at the edge of cities have to be stopped. New developments therefore have to be sought in existing urban space and change-of-function areas might play an important role in maximizing the use of this limited space. (VROM, 2006). It is therefore not surprising that “most of the new additions to the housing stock are being constructed in change-of-function areas” (Korthals Altes, 2007). Korthals Altes and Tambach (2008) define three important themes which determine the potential for new housing and industry development in such areas: “the attractiveness of the site as a location for the introduction of housing, the environmental loading caused by combining industry and housing, and municipal strategies for redevelopment of the industrial estates”. Mixed-use seems to be a keyword in developments within change-of-function areas. New housing has to be added to these areas, which already creates a mix of function, but the government is also eager to create more diverse and vibrant living environments in the existing cities (VROM, 2006), which also implies mixed-use. This strategy might ultimately result in multiple land use areas which covers even more dimensions and types of land use (Louw and Bruinsma, 2006).

2.1.5 Conclusions

The investment potential of a certain areas is often very location specific and it is not always possible to define the characteristics which have to be present in order to secure economic prosper (Flammang, 1979). Nevertheless, knowing the investor interests and the conditions which might stimulate investment, can function as a guideline for future development. The scientific research that has been set out in this paper points out several conditions and characteristics which support economic development and will presumably attract investment.

On the on hand, this paper attempts to define whích spatial and economic characteristics attract the interest of potential investors and on the other hand it has pointed out some of the main conditions which creáte these investor attracting characteristics for investment. Pointing out the current characteristics indicates

Recent developments in the in between area of Utrecht

Source: (Google, 2010)

the interest for new investment at the moment and revealing the conditions that create these characteristics will show the potential which the area has for new development.

Areas in many Dutch cities have the potential to attract more investment and create more economic prosper during the coming decades (VROM, 2006). A lot of declining neighborhoods in several cities in The Netherlands are in a position where they can benefit from their geographic allocation and their space to implement new development. In several areas they find themselves in between a new large housing expansion and the urban core of the city. The traffic flows through this in between space, due to the often strong relation between the new expansion and the existing urban core (Hereijgers and Velzen, 2001), can be used to create economic development, implementing the new government policy. By using change of function areas, changing the mix of rental and ownership and making better connections –as described in this paper- the neighborhoods might be able to turn around the decline and create the important and needed economic prosper."

2.1.6 Recommendations

Having set out the conditions to stimulate economic development in existing urban areas in Dutch cities, this paper can be used as a guideline for new development. These conditions are however very location specific and do not guarantee successful investment. In many situations in several cities in The Netherlands spatial and economic characteristics of an area combined with policy changes are resulting in a pressure on the area in between recent housing expansions and the existing urban core. These areas also often comprise several problem neighbourhoods which are destined for new development. The basis of the new housing area at the edge of the city should be used to generate these new developments and start the regeneration process of the problem areas. As this paper shows, it is of great importance that the area is well connected by the infrastructure and also spatially to key areas in this strategy. Also a balanced mix between social rented housing and owner occupied housing, and optimizing the use of development space contribute to a large extend to stop turn around the decline of the problem areas and make them vital again.

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2.1.7 Successful urban space

“Urban design is essentially about place making, where places are not just a specific place, but all the activities and events which made it possible” (Buchanan, 1988). I think this is a quote which should be kept in mind when one strives to create a successful urban space. It is about the place which is being created, about the activities that take place, the diversity it has and the people who use it (Jacobs, 1969; Montgomery, 1998; Gehl, 1989; Cook 1980).

Urban planners and theorists have been searching for a long time to be able to define what it is that makes urban places successful. The scientific research is trying to get a grip on the characteristics which these places should have to be competitive with the beloved urban places we have in our minds. Jane Jacobs was, by writing her well known book “Death and Life of Great American Cities”, probably one of the first theorists recognizing the value of our beautiful historic urban cores and the quality of street life, as by that time many urban planners had other things in mind with the small scale and fine grained historical areas, which were seen as undesired. More recently, researchers are continuing on the path which Jacobs has set out. There is Lynch (1981) with his theory of good city form, Sherman (1988) with a list of indicators for successful urban places and Punter (1991) with his theory about the sense of place in the city.

Montgomery (1998) has tried to bring all the theory about making a good city together in one paper and concludes with 25 principles which should be taken into account to be able to make an urban place successful. But what do we think of when we have a beautiful urban place in mind? Is it about the buildings which have a certain quality, about the people who use it or about the streets making the connection?

The principles of Montgomery are based on the three main elements of an urban place: Activity, image and form. These elements together decide what the characteristics of a place are and whether it has the desired quality, according to the writer. To achieve a certain urban quality, the place has to have a sufficient level of urbanity. Jacobs (1969) states that urbanity can only be achieved when there is enough diversity and activity. Montgomery (1998) states then that activity is the product of vitality and diversity. So, activity seems to be an important indicator for urbanity according to these sources. Also Cook (1980) and Gehl (1989) tend to prove that successful urban places are based mainly on a diverse street life and activities in and around buildings. When we take the three basic elements of Montgomery (1998) in mind, we could say that image and form are determining whether we have activity or not. By design we can create a certain physical setting and an image, which stimulates activity, but what should the characteristics of these areas be? Jacobs (1961) defines a list of four conditions needed to generate activity: a mixture of primary uses, building intensity, permeability of the build form, a mixture of buildings. These are characteristics which we would find back in our beloved historical urban centers which have proven to be successful and vital during the past decades (Jacobs 1961). Housing prices have rised significantly as the practical research shows further in this booklet.

To start with, successful urban places should have a sufficient density, as it will enable the place to sustain diversity with a relatively large number of people within easy traveling distance (Montgomery, 1998). The practical research within this thesis shows that areas surrounding lively streets have an average number of 120 inhabitants per hectare. A summary by Pont and Haupt (2009) of research by Lozano (1990) and Jacobs (1961) shows a range of 20 to 350 dwellings per hectare or 40 to 700

inhabitants per hectare. Around 150 inhabitants per hectare would, according to these researchers, be enough for an area to have a significant level of urbanity and diversity. 40 inhabitants per hectare would be the absolute minimum to enable an area to sustain basic facilities and some activity. Above 700 inhabitants a form of standardization would be unavoidable according to Lozano and Jacobs, which would be undesirable.

Creating diversity alone would not be enough to create a successful urban place. The place also needs the right design. An urban designer can influence the place largely, but we can not plan everything. We can only create conditions which would support the development of successful urbanity and then hope it will develop in the desired way. Learning from the past, we could derive certain ideological morphologies and typologies which support the development of urbanity. The typology of the classical urban block still seems to have a lot of preference in several scientific reports (Jacobs, 1961; Montgomery, 1998). This kind of typology stimulates density and diversity to a large extend and has proven its flexibility in the past when places have grown in terms of urbanity. Jacobs (1961) and Montgomery (1998) talk about the ideological housing block with 6 layers, with all sorts of program like shops, offices, dwellings, studio's, roof gardens. This is a kind of typology which one would find back in many historical centers of cities in The Netherlands.

The important role which streets play in the urban life is a theme which has become a popular topic again for urban designers. Whereas the street, or rather the road, was seen mainly as a transportation mode during decades after the Second World War, planners started to realize later that the street also plays a very important role in creating a successful urban place.

A lively and successful urban place

Source: (Flickr, 2010)

2.2 Practical research

2.2.1 Introduction

This is the starting point of the practical research, a part which forms a large portion of the graduation project. The practical research follows out of the problem statement in the introduction and the theoretical research in the first part of this chapter. The analyses of the four case studies, later zoomed in on the city of Utrecht, form the major part of the practical research and form the basis of the perspective and the design. The practical and theoretical research are combined to create a solid basis and to be able to function as a guideline for the design. The starting point of the design process does not mean the end of the practical research as they overlapped and were used as a combination.

The four case studies are placed in The Netherlands on the right image. The red housing expansions at the edge of the cities are presented on the same scale as The Netherlands, so that we can see the massive scale of the developments. These images, combined with some demographics, were the starting point of the research and the fascination for these situation. On the following pages in this chapter it will become more clear what the characteristics of the in between spaces are and what the impact can be on the existing cities.

The four study cases of the practical research

Source: (Google maps, 2010)

2.2.2 Introduction Amersfoort

Introduction and history

The city of Amersfoort was first mentioned in the year 1028 and received its city rights in 1259 (Amersfoort, 2010). The main core of the city is still preserved and forms a great historical and cultural quality of Amersfoort. As we can see in the images on the right, the city remained relatively small until the 20th century. It experienced an economic drop back in the beginning of the 19th century and at the end of this century it had only around 10.000 inhabitants (Amersfoort, 2010). Before the Second World War, the city expanded a little around the centre, but the main growth was realized after the war. By then, the city was given the status of 'growth core' (groeikern) by the government, which resulted in a vast expansion. Later on, during the 80s, the city expanded further towards the east due to restrictions in the west. Also the last expansion, Vathorst, is being built at the east edge of the city, causing the geographic centre of the city to move outside of the centre. After the expansion has been realized, the city wants to focus more on the existing city, improving the quality and growing within existing borders (Luchtenveld, 2009)

Figures Amersfoort

inhabitants	143 210
men	70 300
women	72 910
% <15 years old	21
% 15-25 years old	11
% 25-45 years old	31
% 45-65 years old	25
% >65	12
allochthonous	23%
number of cars/household	1,1

Development of Amersfoort

Amersfoort <1850
10.000 inhabitants

Amersfoort 1850-1900
10.000 inhabitants

Amersfoort 1940
50.000 inhabitants

Amersfoort 1980
100.000 inhabitants

Amersfoort 2000
130.000 inhabitants

Amersfoort 2015
160.000 inhabitants

Source: (Kaartenkamer, 2010)

2.2.3 Introduction Amsterdam

Introduction and history Amsterdam

In the year 1275, the city of Amsterdam is mentioned for the first time as a settlement near the Amstel canal and it received its city rights around 1300 (Schaatsbergen, 2006). By then, the region was controlled by the diocese of Utrecht, which played an important role in The Netherlands. During the 16th and 17th century the city expanded rapidly and the economy was flourishing, due to its good geographical location, which allowed for a lot of trade. Amsterdam received its capital status around 1800 and towards 1850 it had about 250.000 inhabitants (Nijs and Beukers, 2002). Despite these facts, the city experienced a drop back of the economy during the 18th century and it was only up until the end of the 19th century, when the industrialization started to develop, that the economy was growing again (Schaatsbergen, 2006). In the 20th century, Amsterdam grew a lot with some massive expansion plans, like the Plan Zuid and the General Extension Plan. The expansions were mainly organized in a concentric way around the centre, mainly towards the south. At the moment, the city is building mainly within existing urban areas, except for the expansion IJburg of course (Nirov, 2010). Due to a large pressure on the space around the city, building on water became the best solution for the city (Claus et al., 2001). In the future, it may be possible to make a better connection to the city of Almere and use the potential of a twin city.

Figures Amsterdam

inhabitants	755.610
men	49
women	51
% <15 years old	16
% 15-25 years old	13
% 25-45 years old	36
% 45-65 years old	25
% >65	11
allochthonous	50
households	416.430
cars/household	0,5

Development of Amsterdam

Amsterdam 1850
250.000 inhabitants

Amsterdam 1900
300.000 inhabitants

Amsterdam 1940
500.000 inhabitants

Amsterdam 1980
680.000 inhabitants

Amsterdam 2015
760.000 inhabitants

Source: (Kaartenkamer, 2010)

2.2.4 Introduction Den Haag

Introduction and history Den Haag

The first time that Den Haag is announced in its history is probably around 1242, when the landgrave of Holland resides a court in the area. After a successful period where trade is flourishing and the city is growing, Den Haag loses its governmental character in the 15th century. At the end of the 16th century the Spanish use the city as a basis and it receives a more residential city status. It becomes the meeting place of the states of Holland, an important governmental body. During the 17th century, influenced by the Golden Age, the city is growing and the trade is successful again. Den Haag grows to around 30.000 inhabitants in the year 1700 and is one of the bigger cities in The Netherlands. The 18th century is a period of stagnation for the city and the city starts to suffer from decline. In the beginning of the 19th century, this stagnation starts to turn, the city is growing again and Den Haag finally receives its city rights in 1806. It also obtains its status of residential city again, which it had lost in during the 18th century. The industrial revolution at the end of the 19th century is resulting in prosperity and growth and the city is expanding towards 200.000 inhabitants. The city continues its growth in the 20th century and, despite the Second World War, Den Haag achieves around 600.000 inhabitants in the ‘60s. As we can see in the image on the right page, the expansion has always taken place mainly towards the east, as the coast makes it impossible to expand towards the west. The city has never reached its maximum number of inhabitants again, due to a movement of people towards areas around the city and at the moment it has around 480.000 inhabitants.

Figures Den Haag

inhabitants	481.860
men	49
women	51
% <15 years old	17
% 15-25 years old	12
% 25-45 years old	33
% 45-65 years old	25
% >65	13
allochthonous	47
households	240.300
cars/household	0,7

Development of Den Haag

Den Haag 1850
70.000 inhabitants

Den Haag 1900
200.000 inhabitants

Den Haag 1940
400.000 inhabitants

Den Haag 1980
500.000 inhabitants

Den Haag 2015
480.000 inhabitants

Source: (Kaartenkamer, 2010)

2.2.5 Introduction Utrecht

Introduction and history

Utrecht is the oldest city of this research. The first outlines of the 'Dom square', the well known church and hart of the city, were built around the year 50 a.d. (Utrecht, 2010). It was the 'Castellum Trajectum', which later grew out to the city of Utrecht (the name 'Utrecht' is derived from 'Trajectum'). The Romans decided that Utrecht was at the northern border of their empire, together with a few other cities and these should become more important (Colenbrander, 2005). It was already then that Utrecht had its strategic position within The Netherlands. The settlement started growing and received its city rights in the year 1122 (Utrecht, 2010). The Romans started building the Dom tower in the middle of the city and later on in the 14th century a new church was built and functioned as a main residence for important members of the Catholic Church, like the bishop. Utrecht has always developed itself in a more or less concentric way, with a clear and well-preserved historic core. The defensive canal is still preserved and can be seen as the border of the centre. During the 19th century, the city starts expanding outside of this defense line, as we can see in the images on the right. Due to the railway barriers in the city and later the highways, it wasn't always easy to find new places for new expansions. Also the expansion of Leidsche Rijn is dealing with this problem, as we already saw in the introduction of this thesis. In the beginning of the 20th century, Utrecht continued growing with expansions around the centre. After the Second World War, Utrecht developed some typical post war areas, which are now known for their problems, being part of list of problem areas within The Netherlands. At the moment there is still a large pressure on the housing market, as a lot of new houses are needed and expansion opportunities are shrinking (Kleef, 2003). Further on in this research, we will see what this means for the city of Utrecht.

Figures Utrecht

inhabitants	299.890
men	48
women	52
% <15 years old	17
% 15-25 years old	17
% 25-45 years old	37
% 45-65 years old	19
% >65	10
allochthonous	31
households	157.300
cars/household	0,8

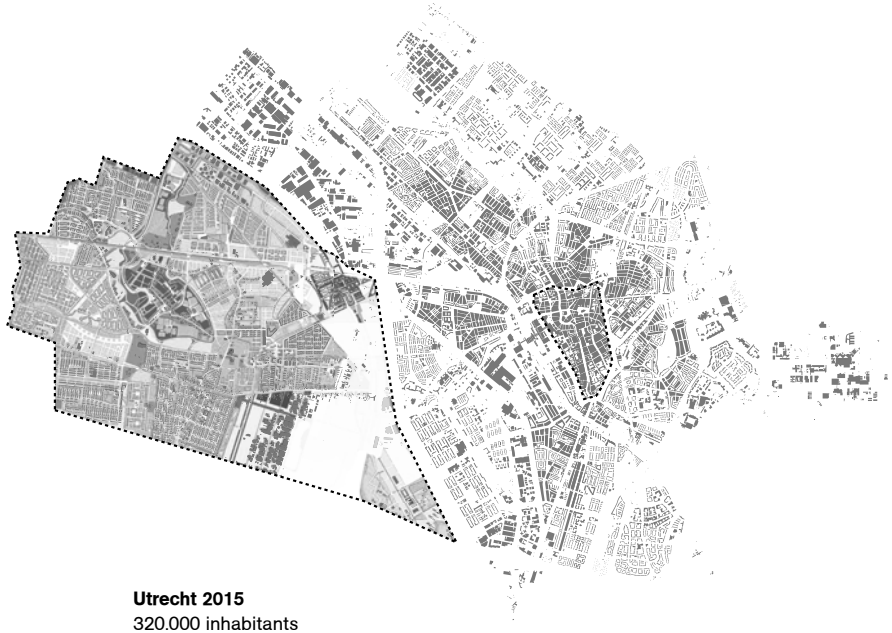
Development of Utrecht

Utrecht 1850
30.000 inhabitants

Utrecht 1900
100.000 inhabitants

Utrecht 1940
150.000 inhabitants

Utrecht 1980
250.000 inhabitants



Utrecht 2015
320.000 inhabitants

Source: (Kaartenkamer, 2010)

2.2.6 Analyses Amersfoort

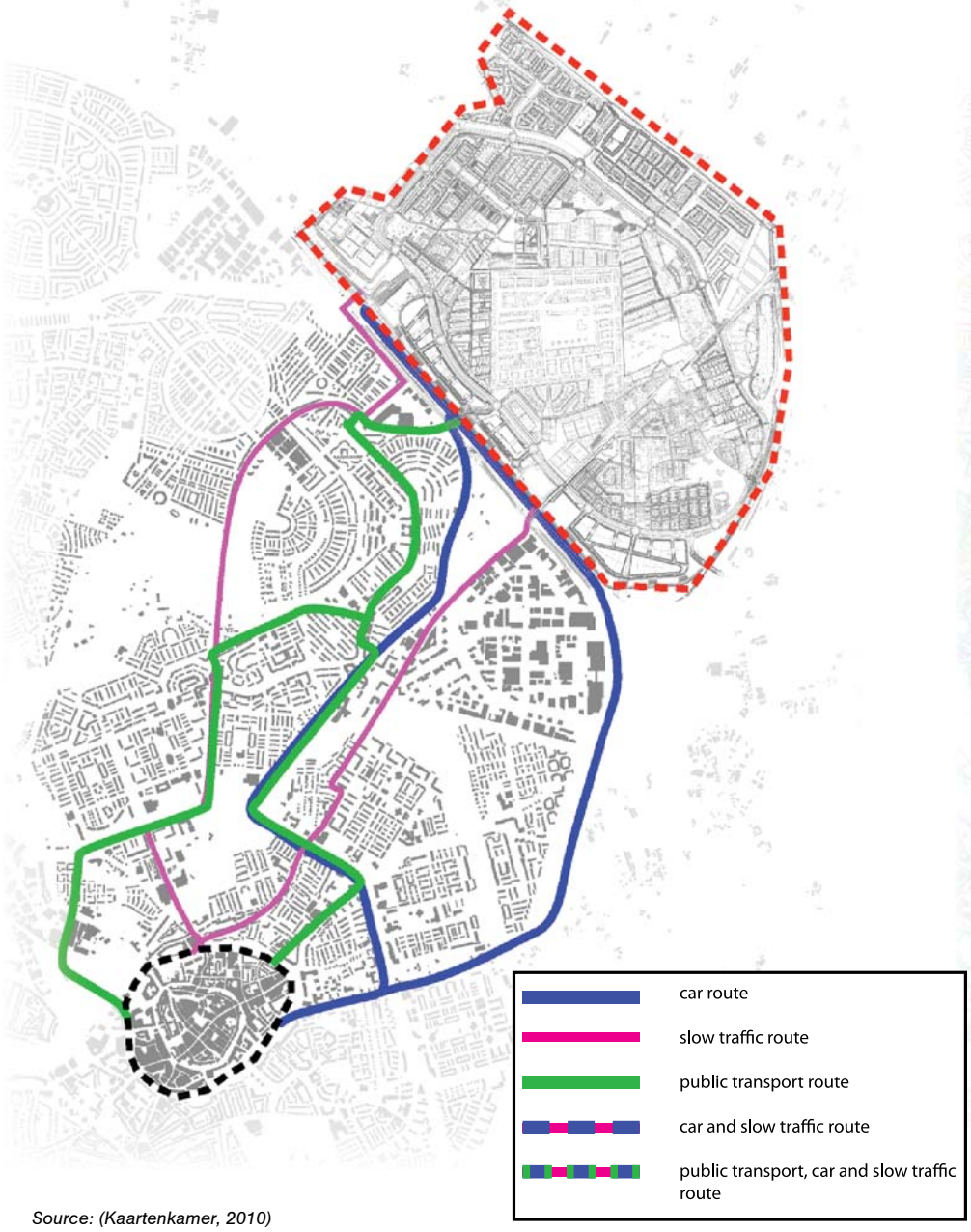
Connection expansion-centre

The step depth of the connecting streets from expansion to centre show clearly that there is no clear and straight continuous route, other than the highway, towards the urban core of Amersfoort. The exits from Vathorst are selected and the Depthmap program has calculated how many steps it will take people to reach the centre. The exits are located around the highway, taking this as a starting point. We can conclude from this analysis that the most clear route is the one via the highway and the ring road. The in-between area of Amersfoort doesn't contain a very clear route which can be used as a backbone for new developments, what would be the goal of this project. Also the distance between the centre and the expansion helps to make it less accessible. This is the result of the way Amersfoort has developed during the past decades, as we saw in the first part of the practical research.

By car, the centre is relatively easy reached -despite the distance- taking the highway and the inner ring road, the right blue line in the analysis. The left blue line will be the most logical route to take if one would cross the in-between area. This is also the route which the municipality suggest as main connection between Vathorst and the centre. The bicycle plan of the municipality shows to main routes, from which the right one would be the most logical and continuous. Nevertheless, one has to take several barriers (a highway, a railway, a waterway, an inner ringroad) before arriving at the centre, so it doesn't seem to be very bicycle friendly designed. By public transport, Vathorst is well connected to the central station of Amersfoort by a railway. Also bus lines have their routes through the housing area, but due to the distance, it would take some time to arrive at the centre of the city.

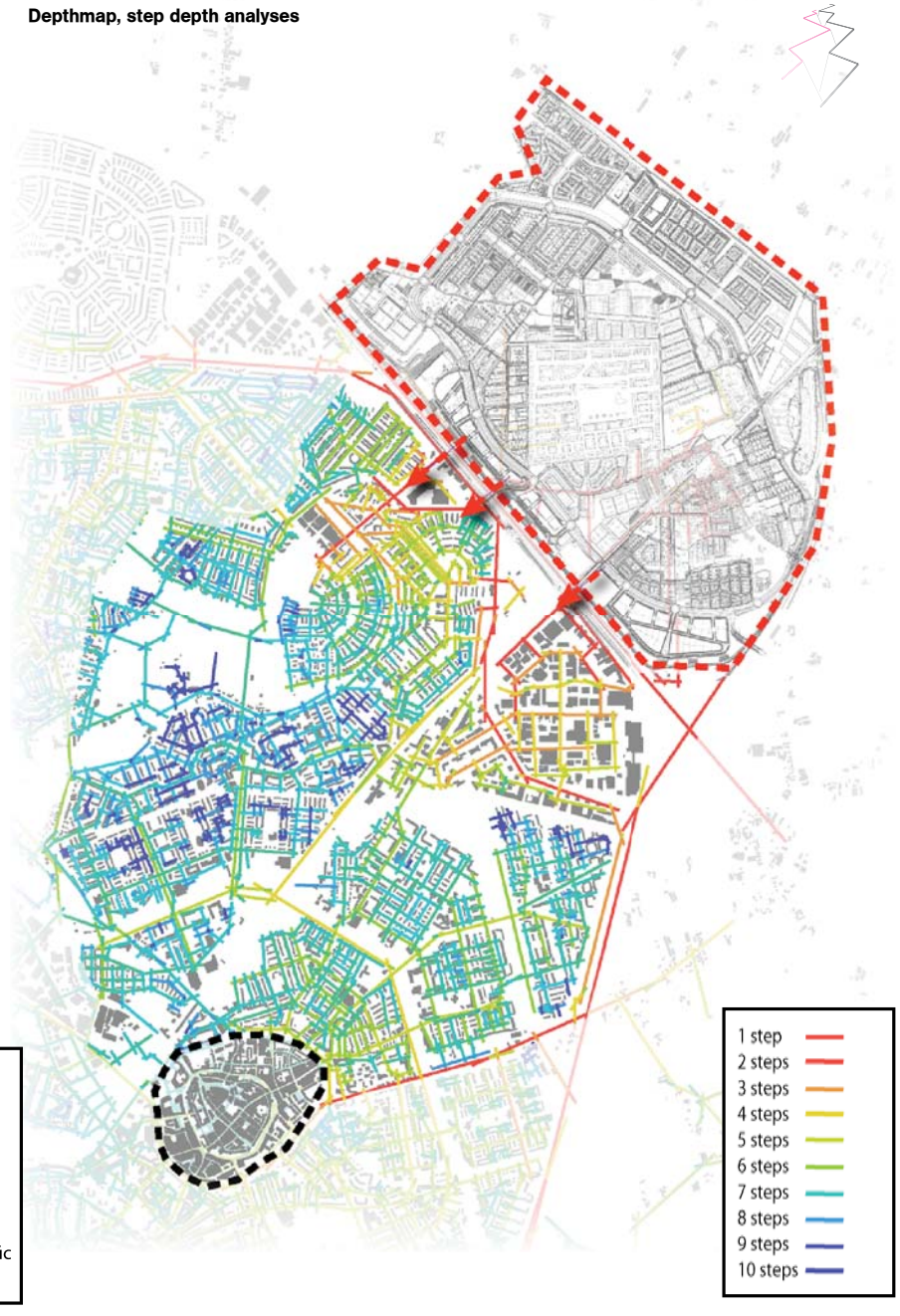
Summarizing, we could state that the potential to use an axis as a backbone for new development, in order to use the support of the expansion, is relatively low in Amersfoort. This is the result of the distance between the housing expansion and the centre, the amount of barriers which have to be overcome and the fact that there are very few clear and continuous routes through the in between area. The main cause of the latter fact is the way in which the in between area is designed. The area exists out of several separate housing expansions dating from the 80s and the 90s which have a very introvert design without any clear and direct connection to the centre.

Routes between expansion and centre



Source: (Kaartenkamer, 2010)

Depthmap, step depth analyses

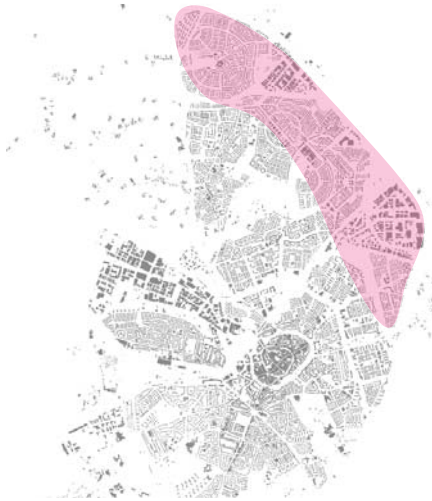


Densities

The density analysis of Amersfoort shows clearly that there the city has a relatively monogamous overall density. Areas around the centre have basically the same number of houses per square kilometer as the edge of the city, except for some low density parts, which have a lot of business. This monogamous density is the result of the development of Amersfoort in the past century and especially from the 80s on. The city was marked as a growth core by the Dutch policy makers and it had to take up a significant amount of new dwellings together with other cities in The Netherlands. The development existed than of course mainly out of housing with a relatively low density and a lot of green. A lot of the typology which is used is comparable to the Vinex typology, in terms of density and green space, but also in terms of structure and vision. This resulted in the fact that Amersfoort has a lot of areas which don't have any urbanity, but more the character of a village. The average density of Amersfoort will lie around 10.000 inhabitants/km2, which is a lot less than the other three cities in this research.

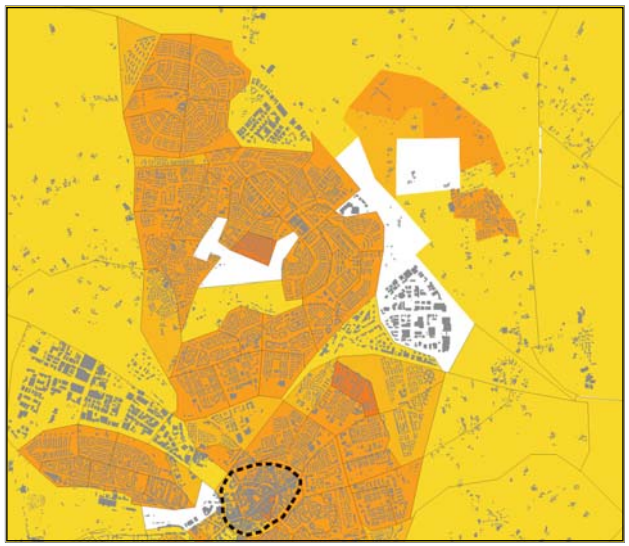
The ratio between new houses being added by Vathorst and the existing housing stock is about 1:5 which is comparable to the ratio of Utrecht and Leidsche Rijn. So, the impact seems to be relatively high and it will create a significant new support for developments in the existing city and the in between area. Fact is though, that the expansion is situated clearly outside the periphery of Amersfoort with a strong highway barrier in between and a large and monotonous housing area. The city has developed mainly towards the east during the past decades which is now resulting in a large distance between the centre and the expansion. This means that the pressure on the in between area will probably be less high than in the situation of Utrecht. It is also harder to define a clear in between area due to the large distance and the development mainly towards the east. Nevertheless, the amount of houses is very large in relation to the existing stock and Vathorst will have a certain impact on the city. It seems though, that the other cities in this research have a higher potential to develop a certain urbanity and increase the density significantly. This is assumable because the other cities have a more clear in between area with less distance towards the centre and because these in between areas seem to have some urbanity already without the monogamous housing areas.

The edge of the city before the expansion



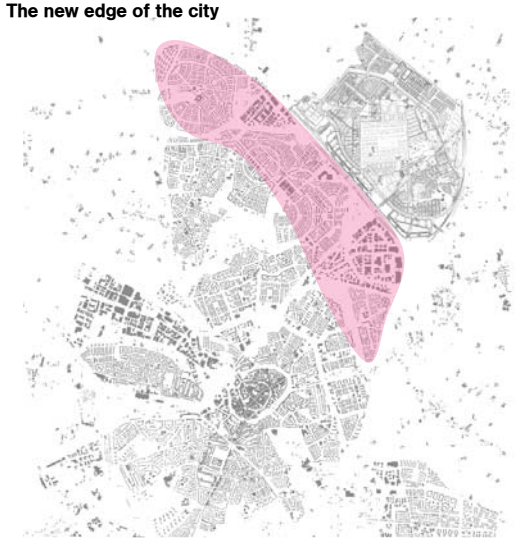
Source: (Kaartenkamer, 2010)

1990
55.000 houses



Source: (Kaartenkamer, 2010; CBS, 2010)

The new edge of the city



Source: (Kaartenkamer, 2010)

2020
66.000 houses

Source: (Kaartenkamer, 2010; CBS, 2010)

inhabitants/km2

- 0
- 1 - 2500
- 2501 - 5000
- 5001 - 10000
- 10001 - 15000
- 15001 - 20000
- 20001 - 25000
- 25001 - 30000

2.2.7 Analyses Amsterdam

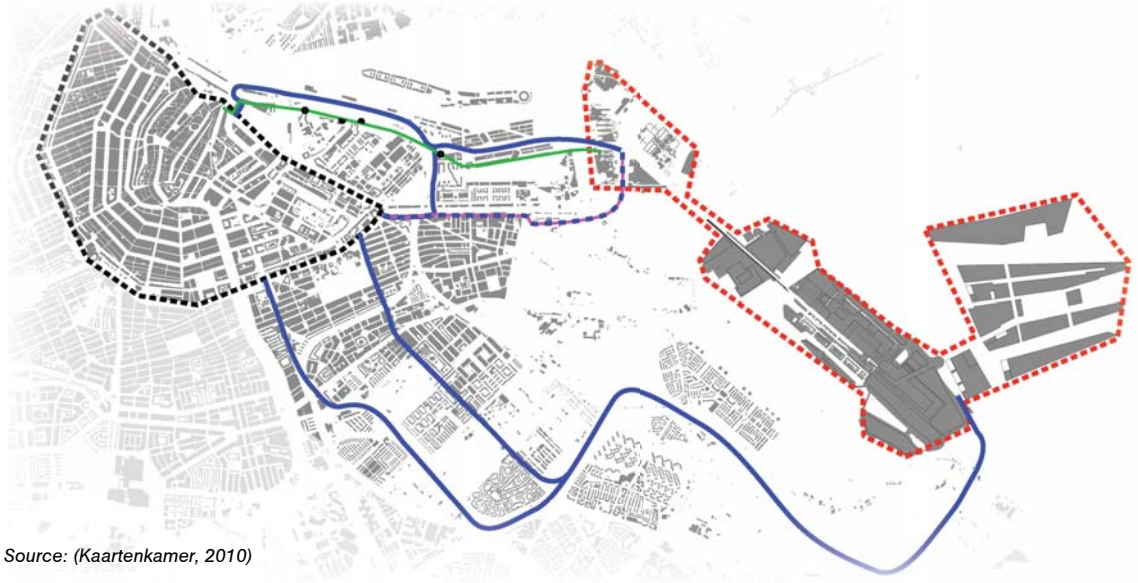
Connection expansion-centre

The expansion IJburg lies in relatively close proximity to the centre of Amsterdam and largely within the urban area of the city. The fact that it has been built in the water has a certain impact on the number of connections which it has to the outer world. What the space syntax analysis, the step depth, clearly shows is that there are two relatively clear entrance routes towards the centre. Furthermore it is well connected to the highway at the east part of the island and thereby to the region. These connections seem to be relatively clear, but they are also the only connections the expansion has to Amsterdam and the region. Based on the step depth analyses from the exit routes of IJburg we could state that there are basically two routes which would have the potential to be used as a backbone for development. The northern one going straight to the central station of Amsterdam and the southern connection towards the southern part of the centre.

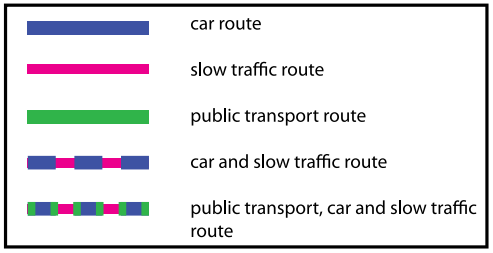
Taking a look at the flows across the connecting network, we can see that there is a clear separation between car, public transport and bicycle routes. As we saw in the analyses of Amersfoort and Vathorst, also IJburg is very well connected by car routes. There are to direct routes from the expansion to the city centre, as the step depth analyses also showed, and two routes via the highway. The housing expansion is furthermore well enclosed by a tram line connecting the hart of IJburg to the central station of Amsterdam. This is a straight and continuous route with a lot of stops and can be seen as a thorough connection, despite the fact that it is the only connection basically towards the centre by public transport. The bicycle network doesn't seem to be very sufficient in terms of connection towards the centre. There is basically only one connection which will take you along a heavy traffic road and around the straight connection to the centre. The problem is that the main traffic connection to Amsterdam leads you through a tunnel which is not accessible to the bicycle. This results in a bicycle route which is not very continuous and straight, next to the fact that there is only one connection.

Summarizing the infrastructure analyses of the in between area of Amsterdam, we can state that there are basically two clear and continuous connections between IJburg and the centre which would have the potential to be used as a backbone for new developments, what would be the aim of this research. The housing expansion is mainly well connected by car and public transport and the least by bicycle. The network shows a clear separation of flows and there is no main connection which combines traffic. The fact which is not shown by these analyses is that IJburg is an island and partially the routes are going under or around the water. This would mean that there is less development opportunity in the in between area, although it has some potential due to the relatively short distance and the straight connections.

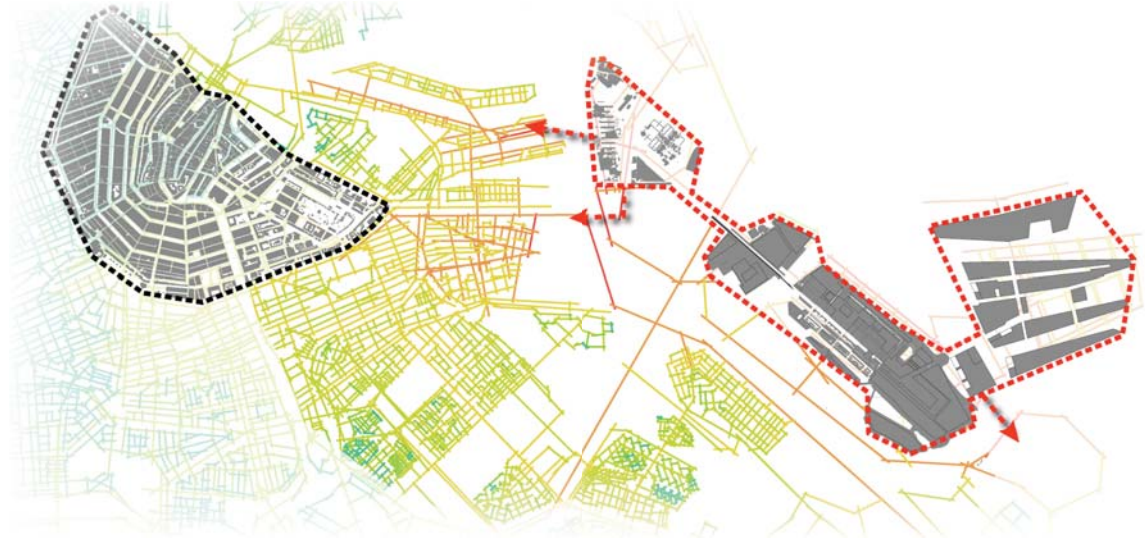
Routes between expansion and centre

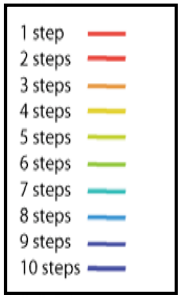


Source: (Kaartenkamer, 2010)



Depthmap, step depth analyses





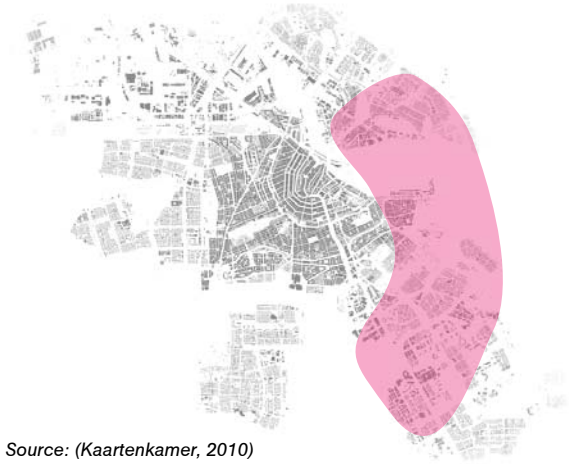
Source: (Kaartenkamer, 2010)

Densities

When we take a look at the density map of Amsterdam we can see a strong concentricity. The higher densities (up to 20.000 inhabitants/km2) are found around the centre with its shape of halve a circle. Amsterdam is the city with the highest densities compared to the other cities in these analyses and it also has the highest number of inhabitants. Especially the pre war areas reach a relatively high density which is more than sufficient to sustain a good level of urbanity (Pont and Haupt, 2009). Later on in this research, we will see what these areas look like and why they have a certain level of urbanity. We can see that the later extensions around the pre war areas, have a lower density. They have been built with a very different typology and have a less dense morphology. These areas have less urbanity and are more housing orientated.

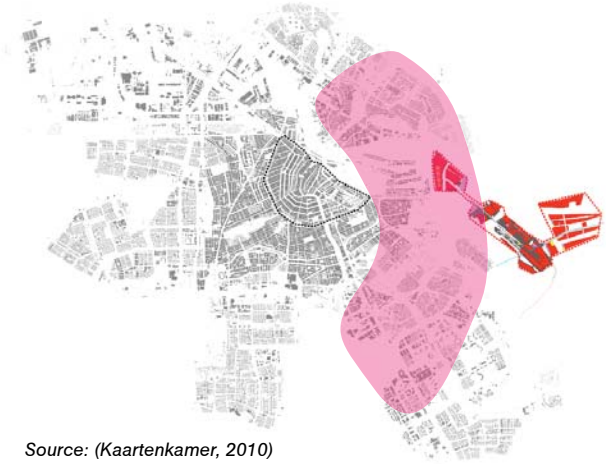
Comparing the amount of new dwellings of IJburg to the existing housing stock we can state the impact of the new expansion on the existing city is limited, certainly when we compare this to the cases of Utrecht and Amersfoort. Nevertheless, IJburg is situated relatively close to the centre and it is quite well connected to the centre as we saw in the latter analysis. So, people are probably mainly depending on the centre of Amsterdam with its facilities and other qualities. The part which was the edge of the city before the expansion remains basically the edge and the new housing area doesn't seem to have a very large impact on this. It is difficult to find a clear in between area due to its shape, but most of all due to its situation in the IJ lake. This means that the opportunities to densify the left over in between area are very limited. Summarizing this analysis we can state that the impact of IJburg, in terms of a shifting gravity point, are very limited and the expansion doesn't result in a clear in between area. So, the opportunities for the elaboration of our research challenges are relatively little which makes Amsterdam less interesting to further zoom in than the other three cities.

The edge of the city before the expansion



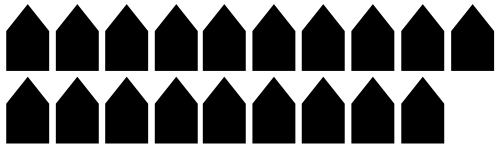
Source: (Kaartenkamer, 2010)

The new edge of the city

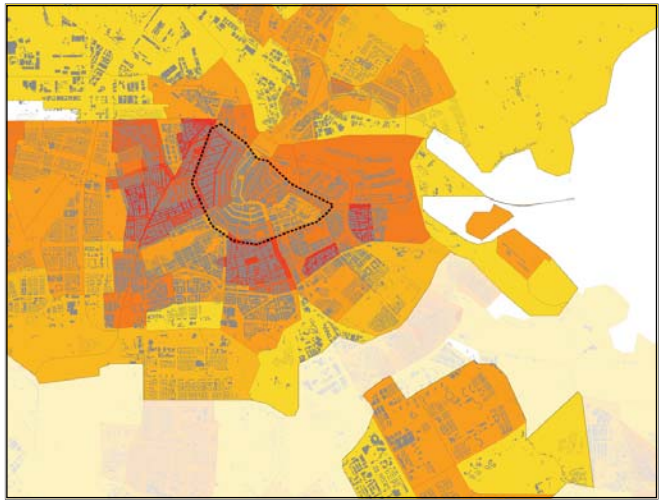


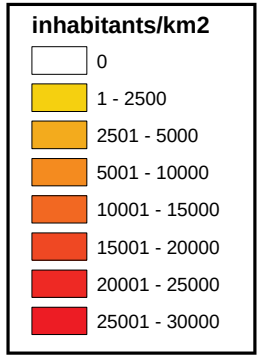
Source: (Kaartenkamer, 2010)

1990
380.000 houses



2020
398.000 houses





Source: (Kaartenkamer, 2010; CBS, 2010)

Source: (Kaartenkamer, 2010; CBS, 2010)

2.2.8 Analyses Den Haag

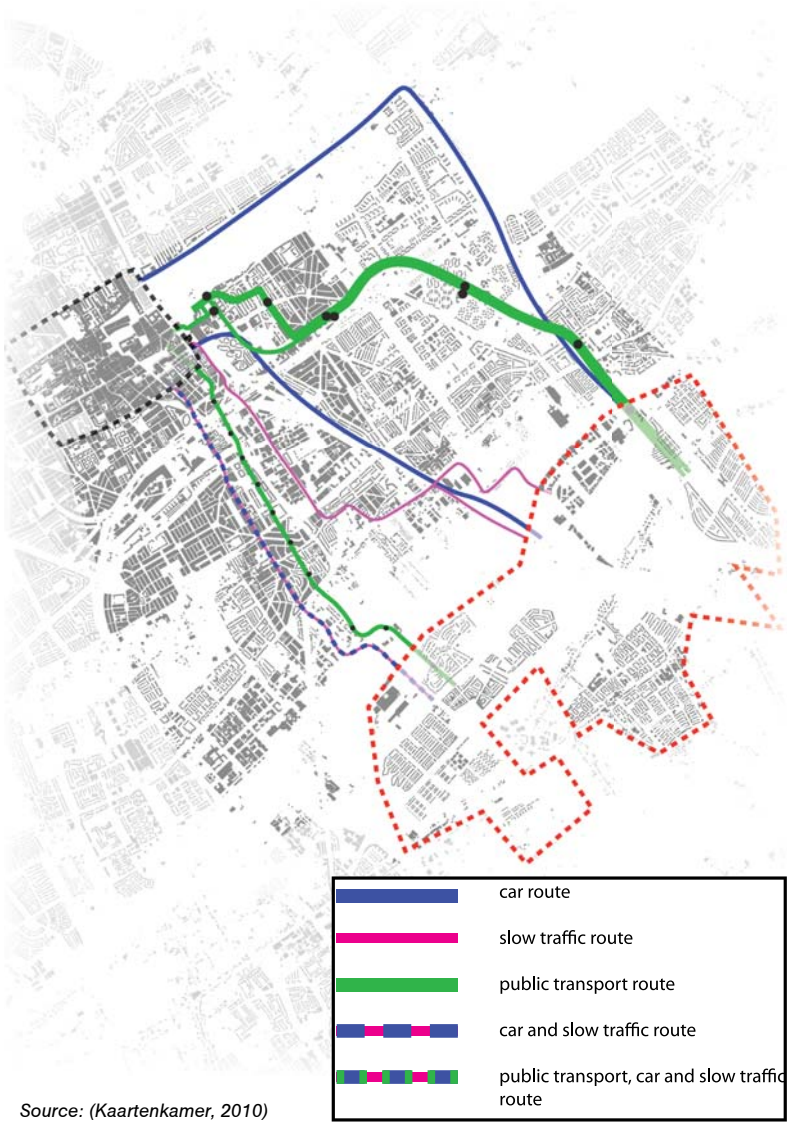
Connection expansion-centre

The connection between the centre of Den Haag and the expansion Ypenburg had to overcome a large infrastructural barrier and a relatively large distance in between. This resulted in the fact that the routing is not very clear and continuous. The Space Syntax analysis shows that the highway makes the clearest and most straightforward connection. The problem is of course that a highway is not very well integrated and therefore it is hard to use this axis as a development backbone, by making use of the support provided by the expansion. The other route which stemmed from the Space Syntax analysis has a better integration and also a relatively well continuity. It is questionable though if the highway barrier is overcome in sufficient way. Despite the large distance between the expansion and the centre and the highway barrier, this axis seems to have some potential for the elaboration of the challenges within this thesis, because it is relatively clear and well integrated.

When we take a look at the traffic flows between Ypenburg and the centre of Den Haag, we can see that there is a relatively clear separation. There is no axis which has a combination of public transport, car traffic and slow traffic. This results in a less clear routing between expansion and centre as people need to remember several routes when they take different transport modes. The expansion is mainly well connected by car and by public transport as the analysis shows. This situation is comparable to the case of Amersfoort, which also has a large distance between expansion and centre, and a main connection by public transport and car. Also Amersfoort doesn't have a clear and continuous connection, as people have to take several strong turns. We can also see this in the step depth analyses, where each strong turn requires a new step. People will always have to take several steps towards the centre, as we can see, which makes the connection less strong.

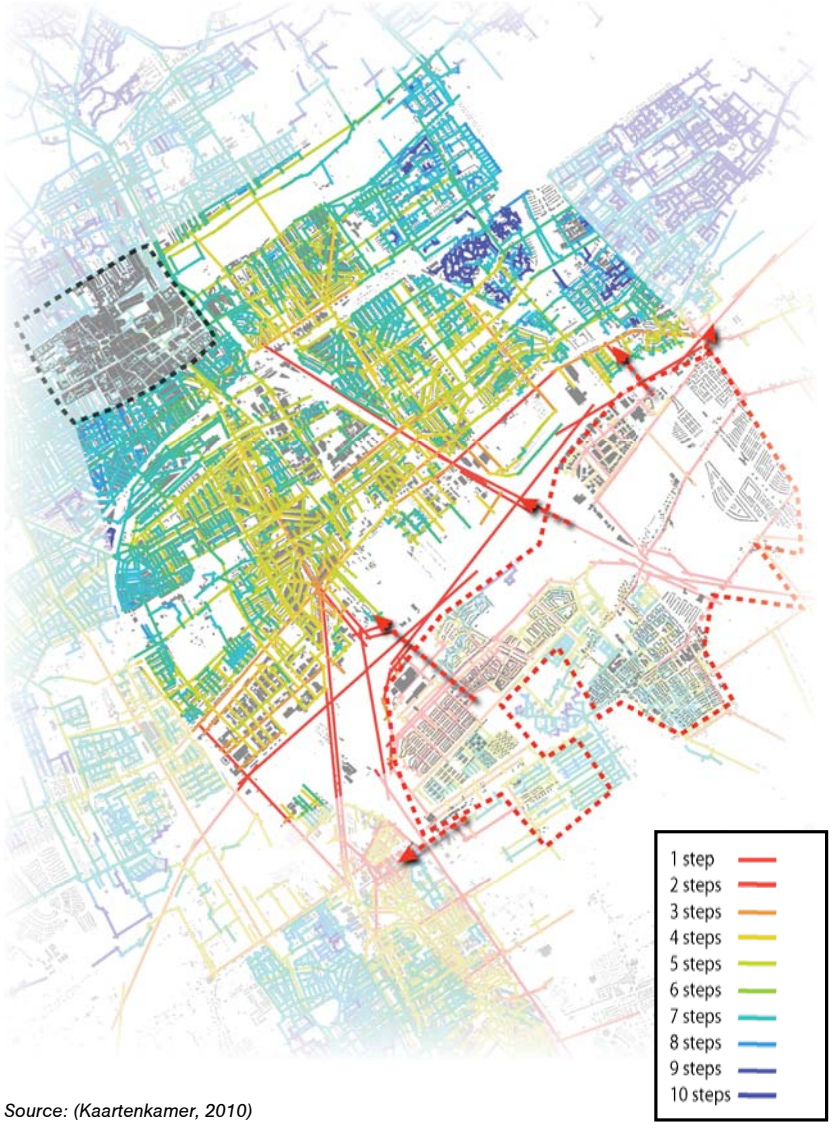
Concluding these analyses, we can state that Den Haag has some potential to elaborate the challenges of this research, although it doesn't have a very strong connection between expansion and centre, due to a large distance, a large barrier and low continuity of the axes. Nevertheless, it has two relatively clear axis between Ypenburg and the centre and one of these is relatively well integrated. The latter one might therefore be interesting to be used as a backbone for development, by using the expansion as a support for developments along the axis.

Routes between expansion and centre



Source: (Kaartenkamer, 2010)

Depthmap, step depth analyses



Source: (Kaartenkamer, 2010)

Densities

The large housing expansion near Den Haag is built in the middle of a network of centralities. Next to the main urban core in the region, the cities of Delft and Rijswijk are also very near and other centralities are also to be found in the vicinity. This was the first conclusion of the quick scan analysis in the introduction part of this thesis. This results in the fact that the edge of Den Haag is not very clear, because the centralities don't have a clear border. The density map shows clearly that the city is not very concentric as concentrations of densities tend to spread through the city and not only around the centre. This also results in a vague border and the housing expansion is built somewhere outside of this border. If we take a look at the morphology which was already there and what has been added, we can conclude that the former gravity point of the city has moved towards the expansion.

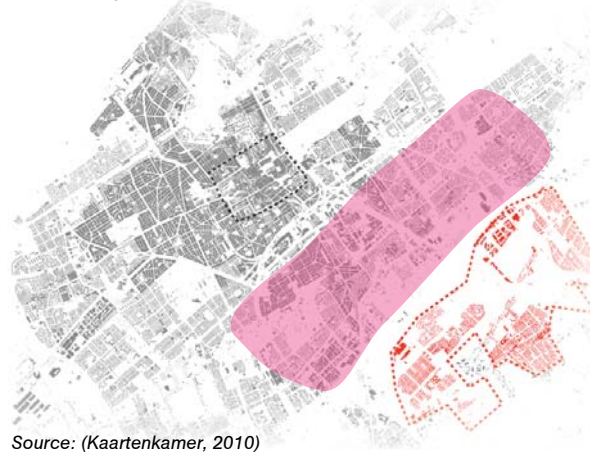
The new housing area is situated outside the edge of Den Haag with a space in between. This results in the fact that the centre of Delft is physically more in the proximity than the centre of Den Haag and people might also go easily to other centralities for their daily needs. This means that the pressure on the existing city, and thereby also on the area in between expansion and centre, will be less than if the housing area would be depending only on Den Haag. The amount of new houses is about 1/12 of the complete housing stock which was already there. This is a relatively large amount of new dwellings, however when we compare this to Utrecht or Amersfoort, we will see a lot more being added to the existing stock.

Summarizing these analyses, we can speak of a shifting gravity point within the city, but the housing area will not have the same impact as the expansions of Amersfoort and Utrecht, in terms of amount of new dwellings and the new morphological situation. Also the fact that the housing expansion is situated in a network of centralities means that the impact will be less high than in other situations where the new expansion is only reliant on one urban core.

The edge of the city before the expansion

Source: (Kaartenkamer, 2010)

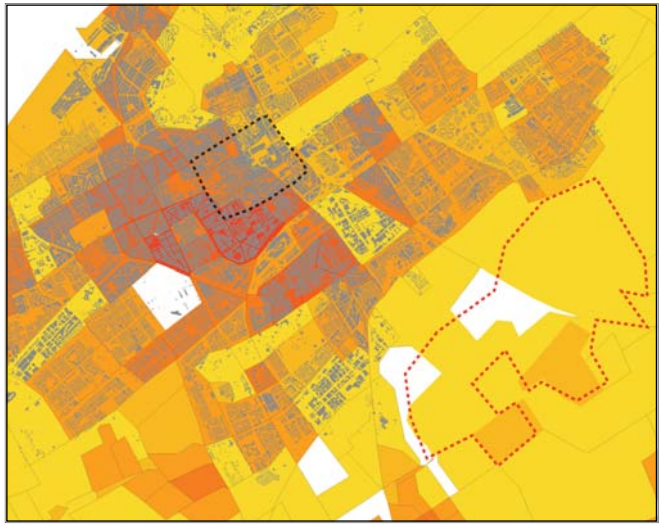
The new edge of the city

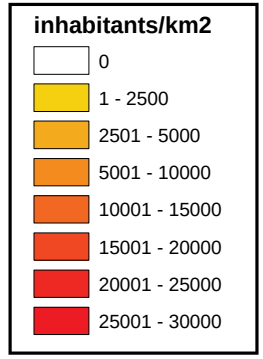


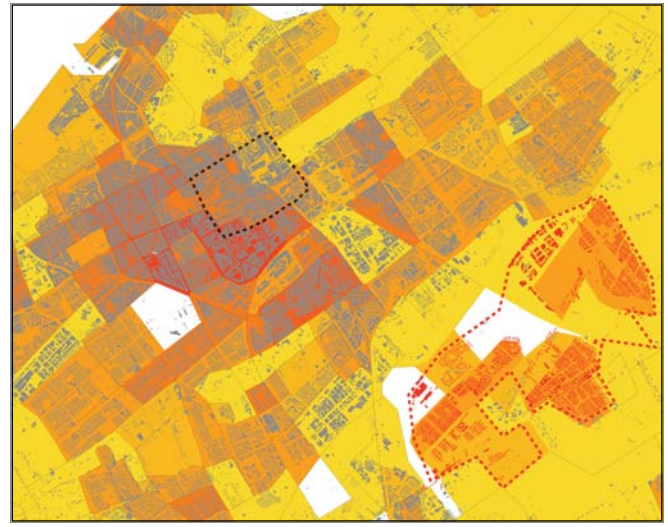
Source: (Kaartenkamer, 2010)

1980
210.000 houses

2020
222.000 houses







Source: (Kaartenkamer, 2010; CBS, 2010)

Source: (Kaartenkamer, 2010; CBS, 2010)

2.2.9 Analyses Utrecht

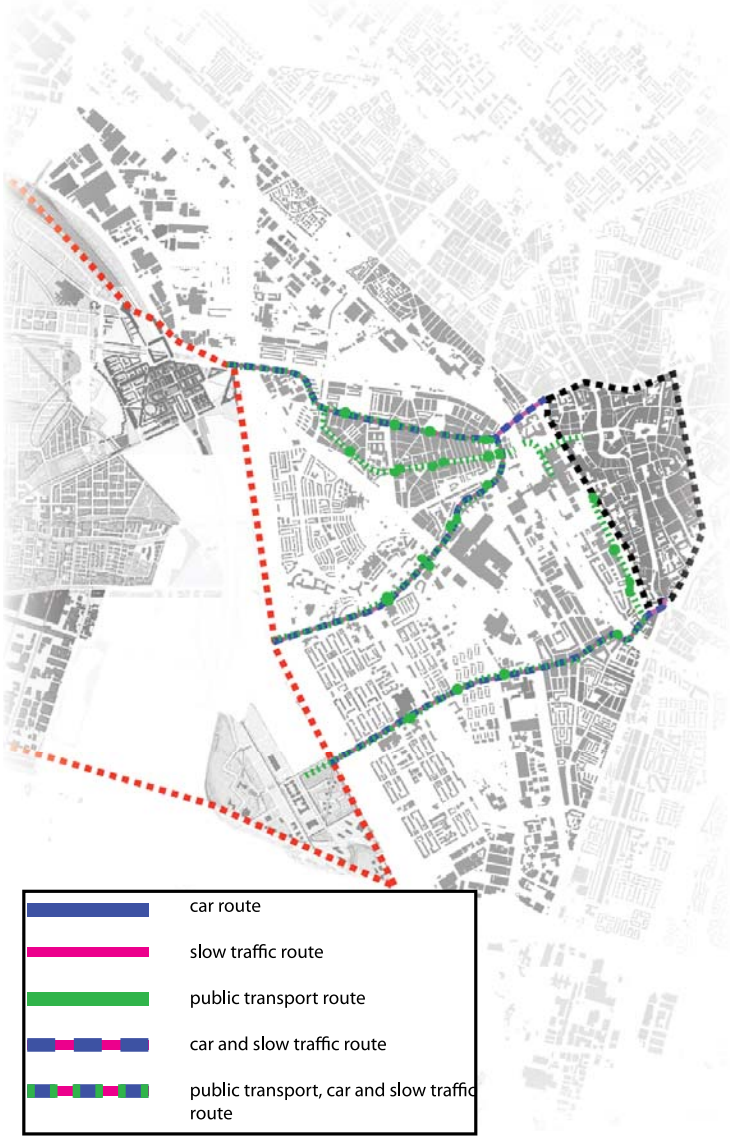
Connection expansion-centre

The stepdepth analysis from the exits from Leidsche Rijn shows clearly that there are three main axes connecting the expansion to the centre. They create a very clear and continuous route through the in between area and the distance is relatively short, compared to the other cities in this research. The in between also seems to be very well connected to the housing expansion as you can reach most of the area within a few steps. Nevertheless, later on in this thesis we will see that two of these axes are not very well integrated and form a barrier instead of a connection between several neighborhoods. What is important to conclude out of this analysis, is that from the expansion we can reach the centre fairly easily, within a few steps across different continuous routes.

Taking a look at the traffic flows we can see that the three main axes all have combined traffic flows, so people can take the same route, either by car, public transport or bicycle. This makes this the routes even more clear, as all flows take the same road. In the other analyses of the study cases we saw that either the distance was very large or the flows were separated, resulting in a week connection between the housing expansion and the centre. Next to the public transport flows which are drawn in the analysis, there is also a railway connection between Leidsche Rijn and Utrecht central station, but due to the small distance people will probably use the connecting road network to come to the centre.

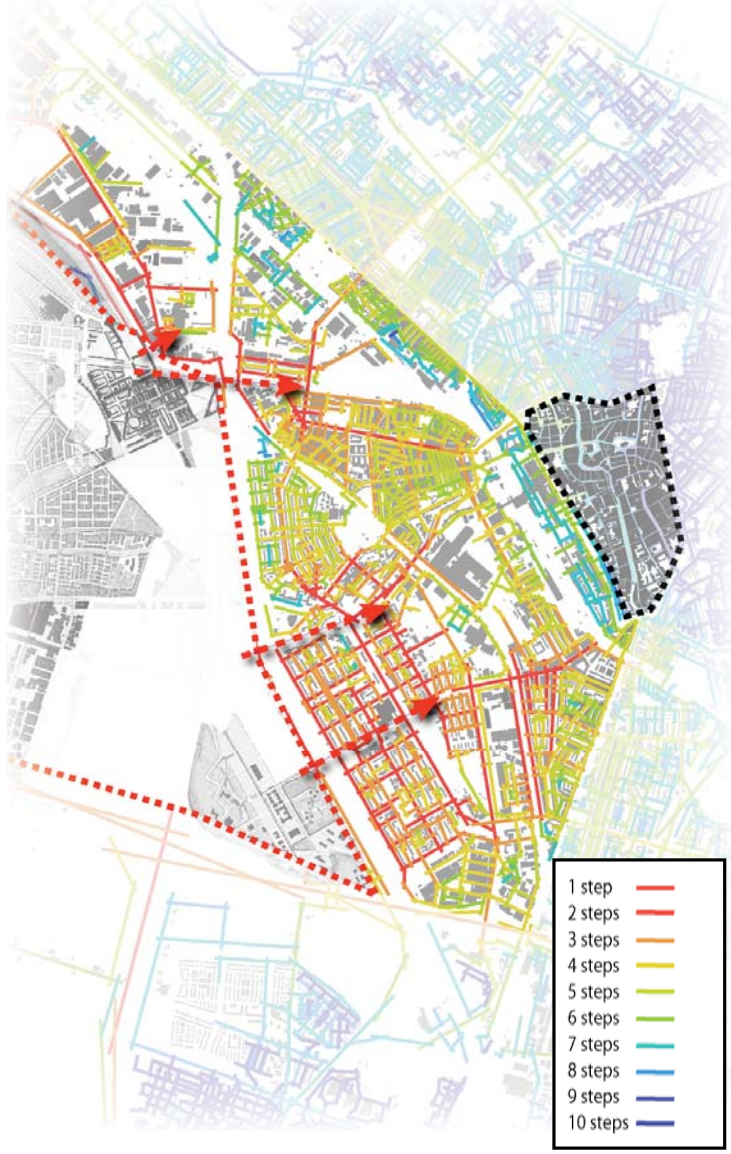
The routes from Leidsche Rijn to the city centre of Utrecht are very clear as these analyses show and this results in a lot of potential for the in between area to use the expansion as a support for development. The northern part of the in between, as shown in the image, doesn't have a very straight connection between expansion and centre due to several barriers, closing of the in between. There is a railway, a waterway and a highway which all pass the northern part, creating a very clear in between area below the northern part of this analysis. With this conclusion, the in between becomes clearly defined and is smaller than the in between of the other cities within this research. This will probably give Utrecht the best change to use the new situation with the expansion as a support for a successful in between area.

Routes between expansion and centre



Source: (Kaartenkamer, 2010)

Depthmap, step depth analyses



Source: (Kaartenkamer, 2010)

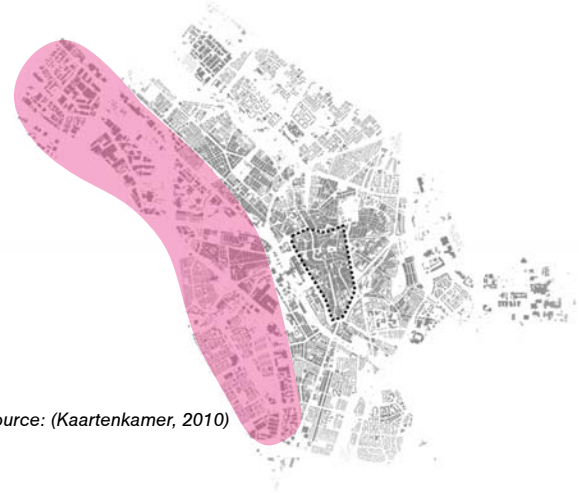
Densities

The density map of Utrecht shows a relatively large differentiation between the districts. The highest densities are to be found outside the centre, mainly in the pre war areas, as we also saw in other cities. These characteristics are probably best comparable to Amsterdam, although Amsterdam has higher densities and less differentiation between areas around the centre. The foreseen average density of Leidsche Rijn lies around 10.000 inhabitants/ km2 (Spangenberg, 1995)which is probably a little above the average of Utrecht. We can see that the in between area has a lot of differentiation, with areas which have only a few inhabitants and areas with more than 15.000 inhabitants/km2 next to them. It is interesting to see that there is such a large difference in density although the city has grown relatively concentric. Later on in this thesis we will see why the in between area has this differentiation and how this was developed.

The scale of the expansion Leidsche Rijn, in terms of geographic size, is very large compared to the existing city as we can see on the map. Although the expansion will be built with a relatively high density, it results in a very clear in between area and a large change of the geographic centre of Utrecht. The amount of houses, which is being added by the expansion, is about 1/5 of the complete housing stock of Utrecht. It is the largest expansion of The Netherlands at the moment and it will probably have the largest shifting gravity point of the four study cases in this research. The centre of Utrecht is the main core of the region and there are not much other centralities on which the expansion could depend on for its daily needs. This will probably result in a greater pressure on the in between space than for example the city of Den Haag, where the expansion is connected to a lot of centralities in the vicinity.

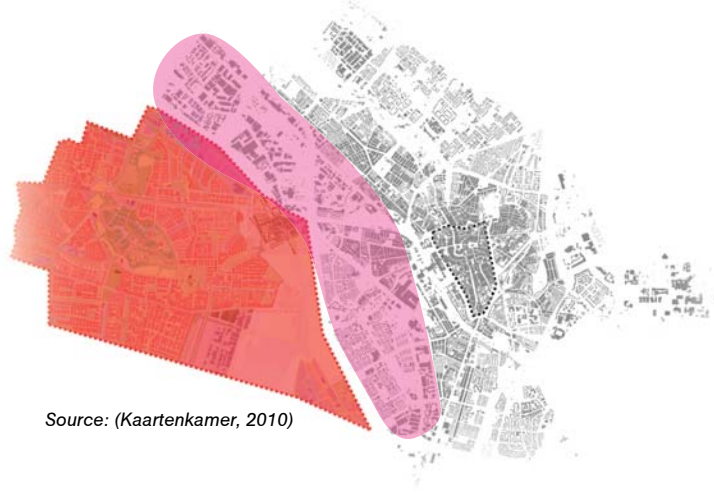
Summarizing this research, we can state the expansion of Leidsche Rijn is causing a large shift in the gravity point of Utrecht, due to the large amount of houses and the new geographic situation. This results in a very clear in between area, which seems to be very interesting to do further research on. Next to this, Utrecht is the main core in the region where Leidsche Rijn depends on, which will probably result in a strong relation between the expansion and the centre. Later on in this thesis we will see if this is indeed the case and in what way Utrecht can benefit from its expansion.

The edge of the city before the expansion



Source: (Kaartenkamer, 2010)

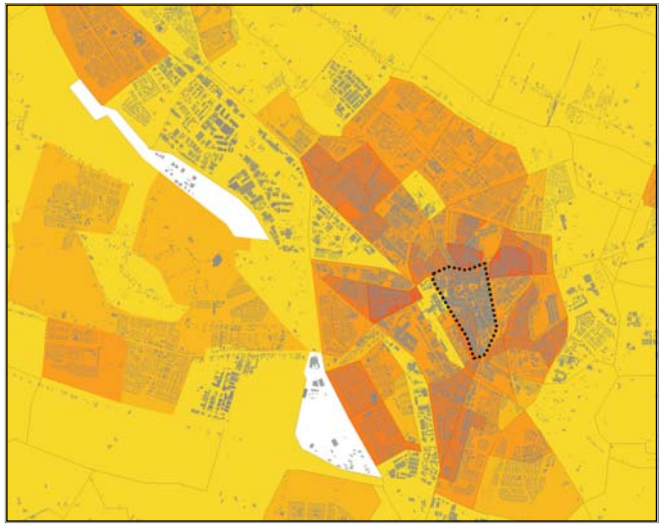
The new edge of the city



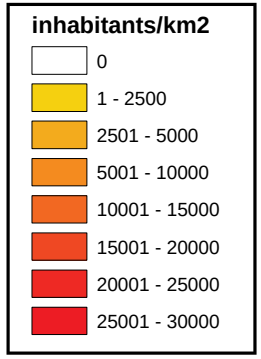
Source: (Kaartenkamer, 2010)

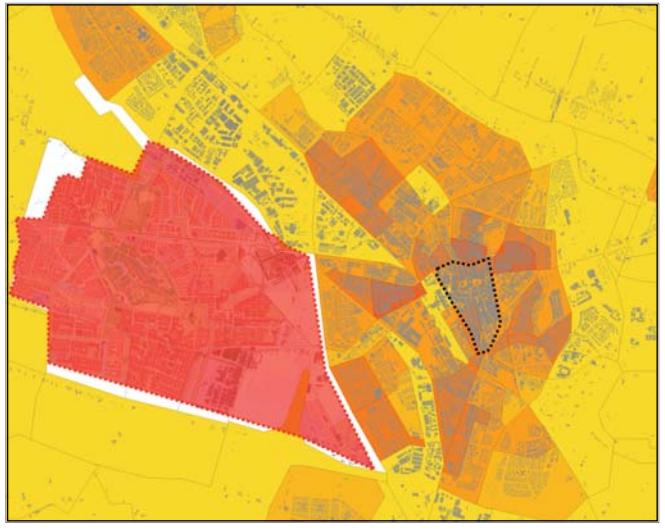
1980
100.000 houses

2020
130.000 houses



Source: (Kaartenkamer, 2010; CBS, 2010)





Source: (Kaartenkamer, 2010; CBS, 2010)

2.2.10 Conclusion study cases

After the analyses done at this point we can state that it is Utrecht which has the most potential to elaborate the aims and goals of this research, as described in the introduction. The first analyses within the problem statement showed that Utrecht and its expansion Leidsche Rijn have a certain typology which is mainly comparable to Amersfoort and Vathorst. As we saw, the expansions were mainly connected to their city of origin and not really part of a network of centralities. This probably means that the expansion is relying largely on one urban core for the daily needs and the connection to this core should be good (Hereijgers and Velzen, 2001). What we also saw in this first analysis is that the expansions are situated on the other side of the highway, which forms a clear barrier (Boon et al., 2003).

Following analyses on the infrastructure connecting the expansions to their urban core showed that many cities seem to be having problems making a clear connection. We saw that there is often either a large distance between the expansion and the centre and the possible routes to take are not very clear. The housing expansions are mainly well connected by car routes and traffic flows are often separated. Utrecht appeared to be an exception with actually a very clear connection, a relatively small and clearly defined in between area and combined traffic flows. The latter means that it should be well connected either by car, public transport and bicycle. One of the key principles within the Vinex policy was to control the growing auto mobility and this it appears that the designers have struggled to create a connection which is not very car dependant (Boeijenga and Mensink, 2008). All the expansions do have a good public transport connection, but the cycle routes seems to stay behind. Concluding we can state that Utrecht has the best infrastructure to elaborate the aims and goals of this research, having the best connection between expansion and centre and the most clear in between area with a relatively short distance from Leidsche Rijn to the city centre.

The first analyses in the introduction showed that Utrecht has the largest housing expansion of the four study cases, either in relation to the existing size of the city and in relation to the other three expansions and it is actually the largest expansion of The Netherlands with almost 30.000 dwellings (Spangenberg, 1995). As we saw in the last analyses, this results in the largest shifting gravity point compared to the other cities. The area which was the former edge of the city, is now the almost exact centre of the urban fabric. Utrecht has developed very much in a concentric way during the past and this seems to be a missing piece in the more or less round shape of the city. This shifting centre means a certain form of urbanization and this is already happening in some areas of the in between of Utrecht, as we will see in further analyses in this thesis. The municipality and the government are also setting the goal to create more dynamic urban environments with higher densities and the municipality has pointed towards this area for their urban goals (Kleef, 2004, VROM, 2006).

At this point in the research, we are able to make a decision between the four study cases. As the analyses showed, Utrecht has the best opportunity for axis developments, in order to use the expansion as a support for development, the largest change of gravity and the most clear in between area due to clear borders and a short distance between the expansion and the centre. This is what makes Utrecht the best case to further zoom in on an in between area and elaborate the research goals and aims and finally to implement the design goals, to show the opportunities of these areas. On the next pages new analyses will zoom in on the in between area of Utrecht and set the goals and aims for the area out of which the final design will be derived.

The canals of Utrecht, a view towards the Dom tower

Source: (Flickr, 2010)

2.2.11 Introduction Utrecht

After making the decision for zooming in on the city of Utrecht, we can project the goals and aims of the problem statement on this in between area and form a strategy to elaborate these topics. For now, these four questions on the right page, form the direction of further analyses. These questions will slowly be transformed into design goals which will be derived out of further analyses and a combination of theory. It will be important to combine the challenges of the more local level to the challenges within the problem statement.

Next to the challenges and problems defined in the problem statement of this thesis, the city is facing other major goals and aims. As we can see on the image on the right and on the next page, Utrecht is a main infrastructural hub, either by car or public transport. This gives Utrecht a good economic position in The Netherlands. The other side of this important characteristic is the barriers which are created by the large infrastructure. Later on in the research we will see which barriers are crossing the in between area and forming another design challenge. Utrecht is also dealing with barriers on a more local scale as we will see and some of them should be transferred into a connector rather.

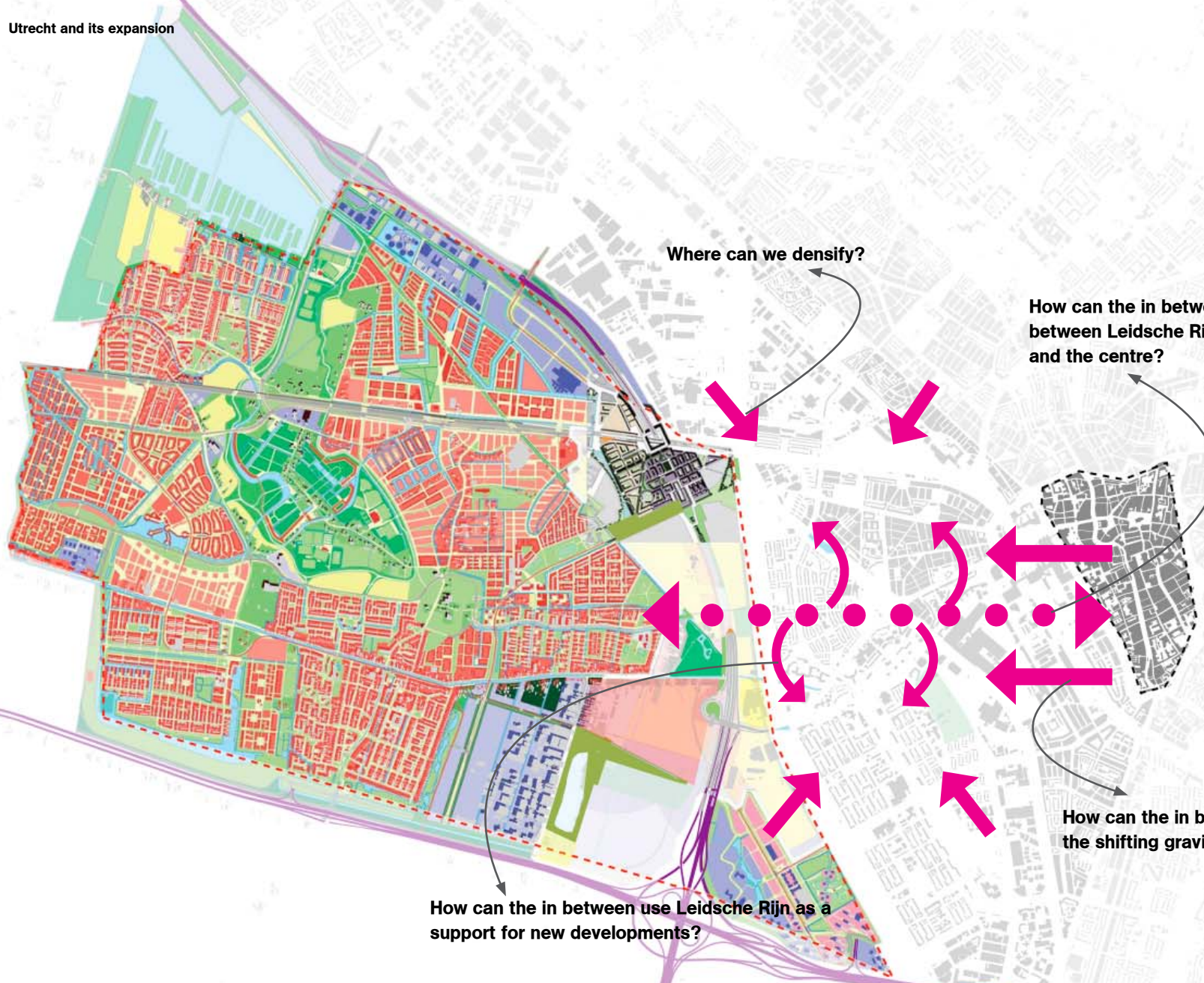
Utrecht functions in the region as the main urban core due to its size, its cultural and historical qualities and the shopping hart of the city (BRU, 2005). Its popularity as a residence results in a large pressure on the housing market and thus also on the in between area. The municipality has calculated that the city needs around 30.000 more houses towards 2030 (Kleef, 2003). This amount is comparable to the size of Leidsche Rijn and it is questionable if the city will meet its goals within 20 years. Nevertheless, the city will have to build a lot and the in between area has a significant capacity as we will see further on in this research. Next to this pressure to build a lot of new dwellings, there is the expansion problem. Due to large qualitative nature areas surrounding Utrecht, it has limited opportunities to expand. This means that the main part of the new developments will have to be realized within existing city borders. This is also in line with the new policy of the government as we saw in the introduction of this thesis.

As we will see in this chapter, the in between area of Utrecht has a lot of potential to become a successful urban place which is the subject of a constant change. The new context due to the vast expansion results in new demands for the area and new pressures. But these demands and pressures also form a lot of potential for the area and make it possible to introduce qualitative and quantitative changes, making it an exiting place to be. What these words mean and what the potential of the area is, will be presented in the perspective and finally in the design chapter with visualizations.

Utrecht within the rail network

Source: (NS, 2010)

Utrecht and its expansion



Source: (Spangenberg, 2005)

Utrecht and the surrounding nature

Source: (Google maps, 2010)

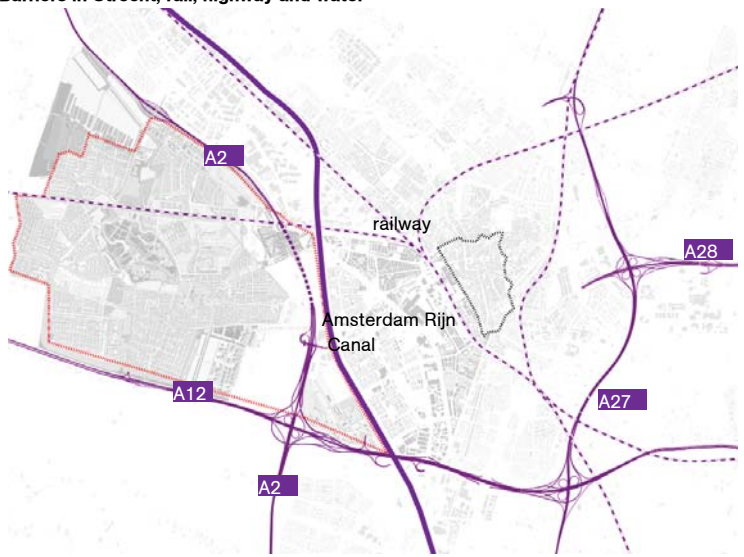
Utrecht within the highway network

Source: (NS, 2010)

Utrecht and the surrounding nature, fort Rijnauwen

Source: (Google images, 2010)

Barriers in Utrecht, rail, highway and water



Source: (Google Maps, 2010)

The canals of Utrecht

Source: (Flickr, 2010)

2.2.12 Utrecht Densities and morphology

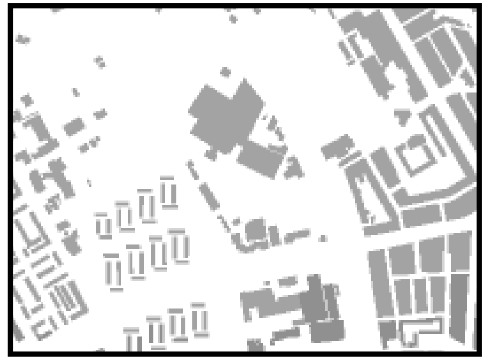
The density and morphology analyses show a large differentiation between the neighborhoods, as the other analyses also showed. The post war area of Kanaleneiland shows relatively high densities up to 15.000 inhabitants/km2. However, the highest densities of the in between of Utrecht are to be found in the pre war area of Lombok, in the northern part of the area. This area has a density up to 30.000 inhabitants/km2. The differentiation in densities means that there are also very low densities to be found in the map on the right. This is the area around the central station, where there is simply not enough space left for housing due to the large infrastructure. The other neighborhood with a very low density is to be found in the middle of the map, where a business area is situated. Due to the separation of functions, which was a criteria for development in post war designs, there are almost no dwellings built within the business buildings. These kinds of extremely low densities result in very little liveliness and urbanity (Jacobs, 1961) and it is therefore questionable if this is a desirable situation in the future as we have to densify our existing urban areas. This seems to be an area with a lot of potential for the implementation of housing in order to stop the urban sprawl and create a successful urban space within the existing city boundaries.

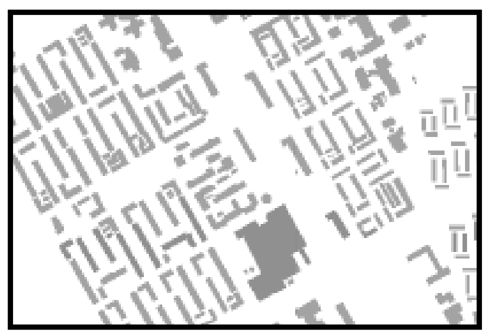
The morphology of the in between shows the same strong differentiation as expected after the density analysis. For a large part, this has to do with the building period of the different neighborhoods, pre war and post war. The post war parts have a lot of green and open space left, which might be suitable for densification and urbanization. The pre war areas already have relatively high densities and show fewer opportunities for development. The latter also have a better score in the Leefbaarometer and higher housing prices, as we will see in the next two analyses. This means that these areas are less in need for new developments, next to the fact that there is not much space left for densification. The typical morphology of the post war social housing areas hasn't proven to be very successful, but it might be possible to turn it around in an area with more quality and less problems. The morphology of the business area with the lowest density of the in between shows a lot of open space and a rough grain. This is very different from the fine grain which the urban fabric of successful urban areas often has. It probably means that this kind of morphology is in need for a change due to the shifting gravity, and has the potential to become more urbanized.

Birdseye views from the in between

Source: (Bing maps, 2010)

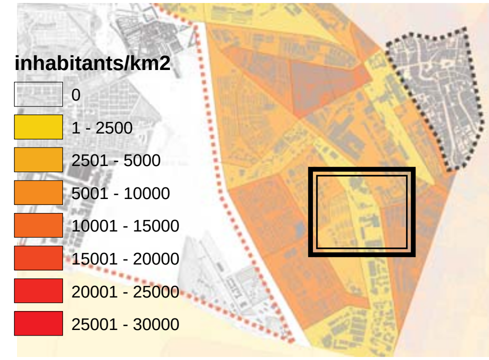
Morphology of the in between

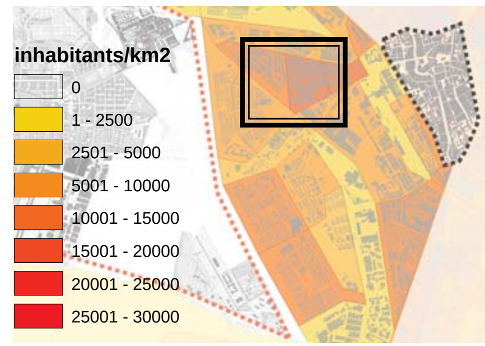


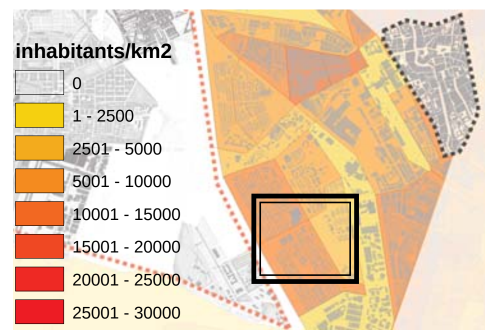


Source: (Kaartenkamer, 2010)

Densities of the in between







Source: (CBS, 2010; Kaartenkamer, 2010)

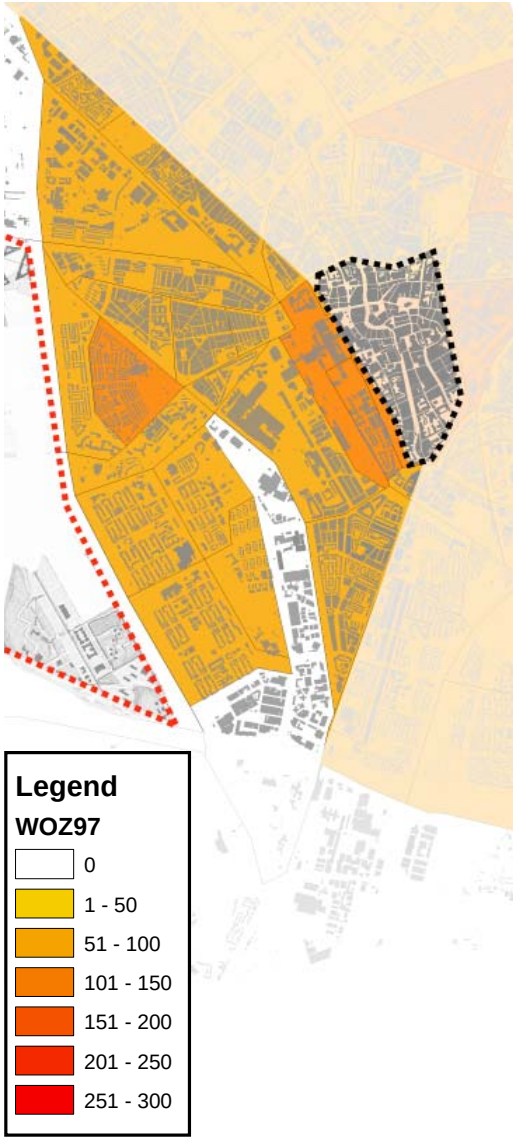
2.2.13 Utrecht housing values

Housing prices (woz-waarden) are an important indicator for the economic condition of an area as they determine largely the interest of investors (Guy et al., 2002; Adair et al., 1999). Of course an investor wants to see his property rise in value over time, so if rental and capital growth are expected to be strong, then the investor will be more eager to invest in real estate. As we saw in the theoretical research part of this thesis, Adair et al. (1999) defines a list of important factors which will draw investor interest and capital appreciation is the most important one. The housing values are often also an indicator of the social and physical condition of an area, as we will also see in the case of Utrecht. A factor which will often bring the housing prices down is the amount of social housing. It is often a cheap form of housing and built in large quantities without paying to much attention to the quality. The negative impact which high concentrations of social housing have on a neighborhood will probably bring the socio-economic status of the area further down (Kempen and Priemus, 2002). Kanaleneiland will be the area in Utrecht, which is most well known for the amount of social housing and the problems which it faces.

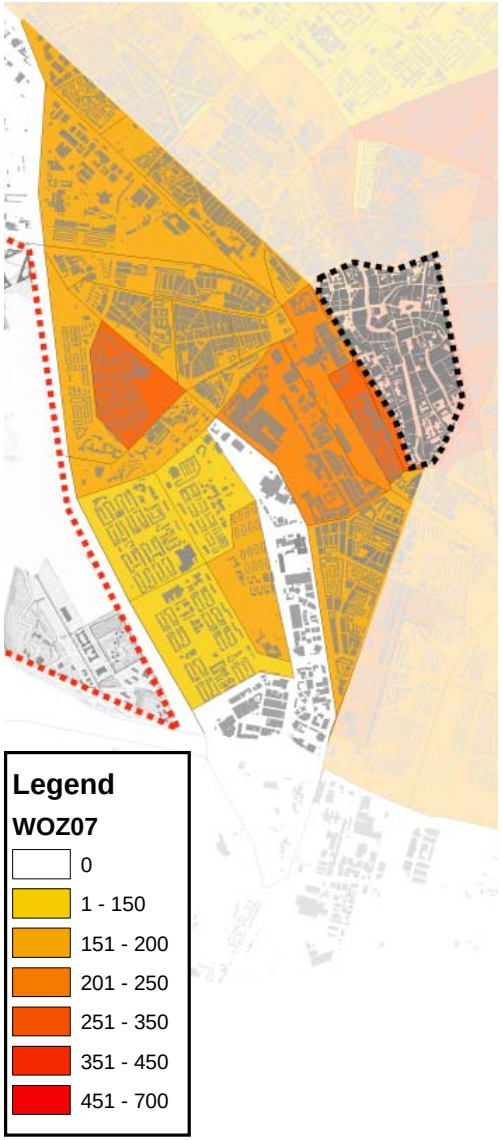
In the housing price analyses of the in between of Utrecht we can see that there are large differences between the different neighbourhoods in the area. It is also very clear that this difference has become much higher within ten years. Especially areas in the proximity of the centre have had a strong growth in housing values during this period and areas more at the edge stayed behind. One of those areas is Kanaleneiland which has even seen a drop back in there housing prices. The cause of this is probably the problems which the area is facing due to the concentration of social housing. There seems to be one area at the edge however, which does have a good performance as housing prices have raised significantly. There is one area which is left white, because there are to few houses to measure a descent value.

Summarizing these analyses we can state that the overall performance of the in between area of Utrecht is relatively well, as housing prices have raised during the past decade. Nevertheless, this is a trend which we also see in other cities and doesn't relate only to the performance of Utrecht. Next to this we can see some areas which stay behind and they might be in need for developed, based on the findings of this analysis.

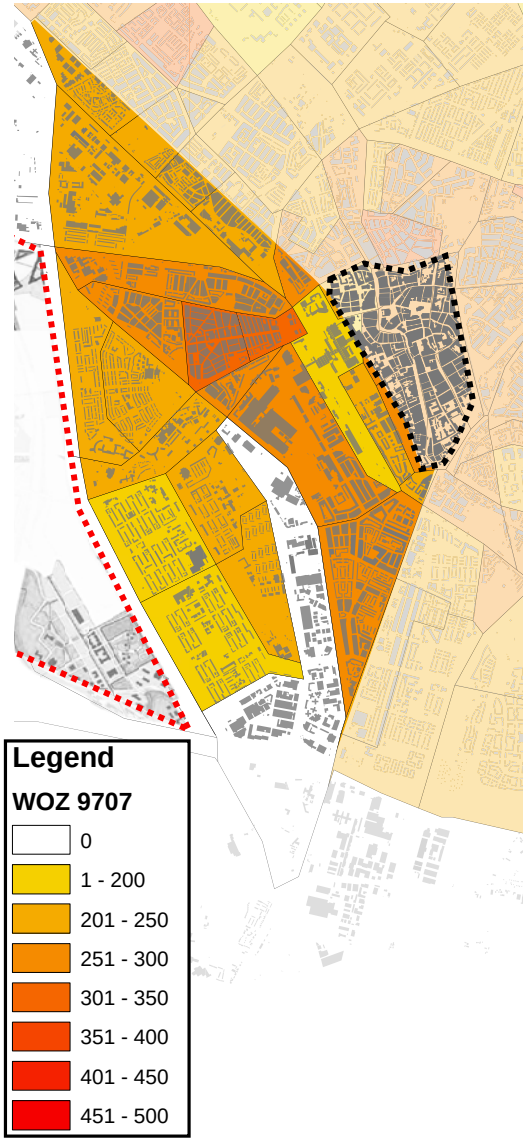
WOZ values 1997 (housing prices) of the in between



WOZ values 2007 (housing prices) of the in between



WOZ values 1997-2007 (housing prices) of the in between



Source: (CBS, 2010; Kaartenkamer, 2010)

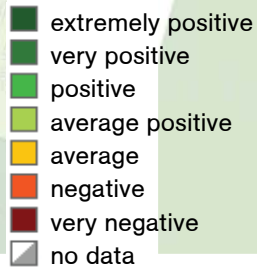
2.2.14 Utrecht Leefbaarometer

The Leefbaarometer (livability measurer) from the ministry of Housing, Spatial Planning and the Environment has been developed in order to measure the state of the neighborhood. According to the Ministry, the instrument gives us information about the livability in all neighborhoods in The Netherlands. It also provides us background information and shows the development of the socio-economic and physical state of the neighborhoods (VROM, 2010). The information given by the Leefbaarometer is used by the government and the municipalities as an input for their policy and to locate certain problem areas. Information about the housing quantity, public space, quality of facilities, residents, social cohesion and security is used to come to a final score for an area. The score reaches from very extremely positive to very negative and makes the division between very small areas. It claims to be able to give a descent and reliable final score on which policymakers can rely their choices. Fact is though, that certain input which is used to come to this score is based on subjective knowledge. For example, it depends on the opinion of the residents if they are satisfied with their neighborhood and if they feel save and comfortable. Nevertheless, due to several measurements which do have a lot of objectivity like crime rates and housing values, the Leefbaarometer will give a reasonably well indication for the condition of the neighborhood. It might not be very exact but can indicate where we can find areas which need our attention, because of a low final score.

If we take a look at the final score of the in between of Utrecht, we will see a significant improvement of several neighborhoods during the past decade, from 1998 to 2008. Nevertheless, there is one area which stays behind and doesn't show any improvement during this period. This will be the area of Kanaleneiland, which has become a famous problem area of The Netherlands and is one of the 'Vogelaarwijken', which exists out of 40 neighborhoods with a lot of problems. Especially the northern part of this area needs a lot of improvement and has the lowest performance of Utrecht. Due to the policy of the government and the minister of housing, communities and integration, a lot of these problematic areas have started a turnaround in the past years. Also Kanaleneiland has started with a lot of initiatives to improve the condition of the neighborhood, either physically, socially and economically. One of those important initiatives is the rebuilding of the area around the center of Kanaleneiland. The plan for this area shows the destruction of large parts of the social housing and the building of new apartment blocks with a better mix of rental and owner occupied. Next to this, a lot of housing blocks will be improved ore rebuild which in the end should create a better score in the Leefbaarometer. All the other areas within this analysis show a significant improvement and don't seem to be in need of similar drastic developments. The analysis does show a large variety in the scores and it seems that the area has a lot of diversity in conditions. Also when we take a look at densities and housing values, and later at urbanity, we will see a lot of difference in the identity of the neighborhoods mutually.

Liveability in Utrecht, 1998

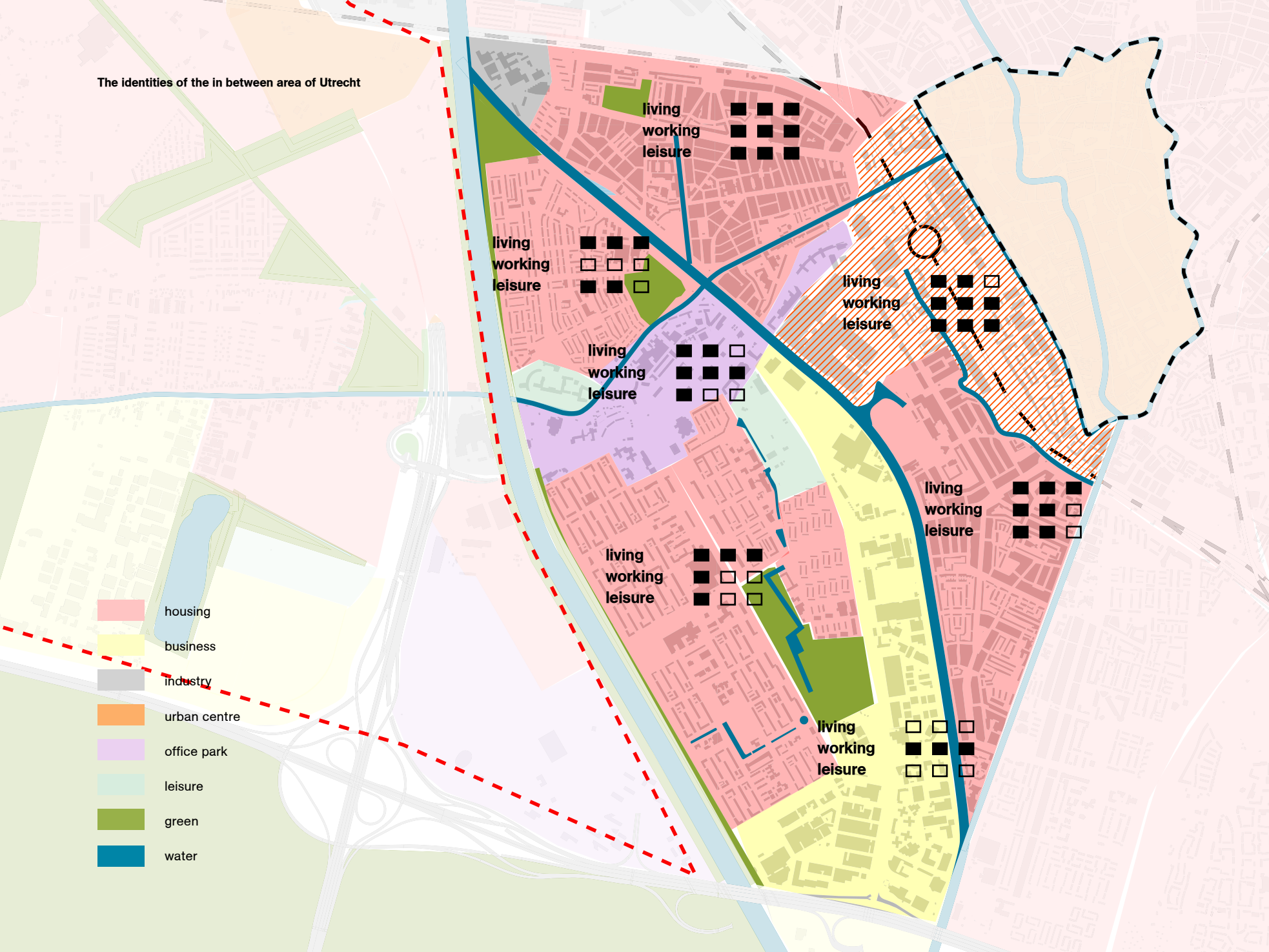
Liveability in Utrecht, 2008



Source: (VROM, 2010; Kaartenkamer, 2010)

2.2.15 The identities of the in between

Taking a look at the main identities in the in between area, we can conclude that it is very diverse with a lot of different densities, typologies and morphologies, but also in terms of program and functions. The older areas, which are closest to the centre, have the most urbanized identity with a strong mix between living, working and leisure. These are also the oldest areas, developed in the beginning of the 20th century (see Appendix I, age of developing). After the second world war the areas more to the southern edge of the in between were built according to different principles. At that time planners and designers were convinced that living and working should be separated which resulted in these mono functional areas. We can see that there is a clear separation between the business area with almost no dwellings (as the density map shows) and the post war social housing area more to the west, with around 10.000 dwellings/km2. The latter area has a density which is sufficient for sustaining a certain diversity and activity according to Pont and Haupt (2009), referring to Jacobs and Lozano, but due to the separation of functions it has very little urbanity (Jacobs, 1961). The large concentration of social housing in the south western part resulted in a well known problem area of the Netherlands called Kanaleneiland (Kempen and Priemus, 2002). In between the business area and Kanaleneiland is a very low density area situated, with an average density of 3500 dwellings/km2, mainly social housing. These kinds of densities are not sufficient to sustain urbanity and there is also little mix between living, working and leisure, similar to the area of Kanaleneiland. The area to the south east of the in between space has a lot of similarities to the northern part, as it is also built in the beginning of the 20th century and also shows a lot of centre characteristics with several places with a certain activity and liveliness. The area which is most near to the centre has a lot of working places and a lot of leisure functions but it also contains a descent amount of housing, as the density maps shows. This mix results in some urbanity, but due to the station area and some important large scale economically important functions, like the Jaarbeurs, it doesn't have much change to create a higher density. These functions take up a lot of space and will have to be replaced if one strives to create a highly urban environment at this area. Nevertheless, it has a relatively good mix and a lot of centre characteristics. Next to this station area, we will find a place which has the characteristics of an office park and follows the middle axis from the highway. This axis has a very large scale, because a lot of traffic uses this route as it is the main entrance to Utrecht from the highway. This results in a barrier which seems to prevent the area from achieving a higher level of urbanity and density, although we can find a certain mix. Further analyses in this research will clarify the potential of this axis to transform into a connector instead of a barrier and integrate the urban fabric around the road. On the next pages, we will take a closer look at the neighborhoods and see what it means whether to have a good mix between living, working and leisure or not. This will also enable us to see the potential of the neighborhood to elaborate the aims and goals of this research and create a certain level of urbanity.


The identities of the in between area of Utrecht
living
working
leisure
living
working
leisure
living
working
leisure
living
working
leisure
living
working
leisure
living
working
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living
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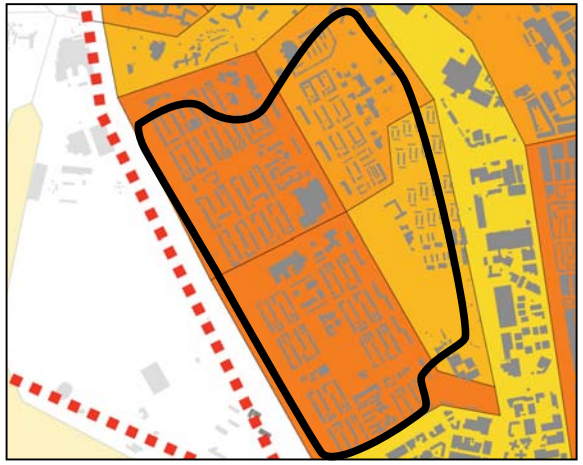
industry
urban centre
office park
leisure
green
water

densities



Source: (CBS, 2010)

liveability

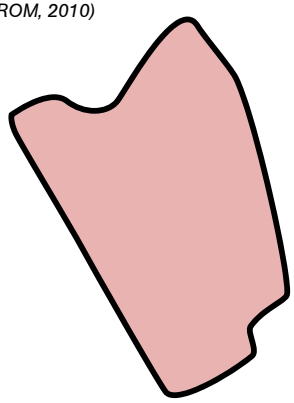
Source: (VROM, 2010)

housing values

Source: (CBS, 2010)

potential for urbanization

potential for densification



living ■ ■ ■
working ■ □ □
recreation ■ □ □

main typology

main image

connecting axis

Source: (Google Maps, 2010)

densities

Source: (CBS, 2010)

liveability

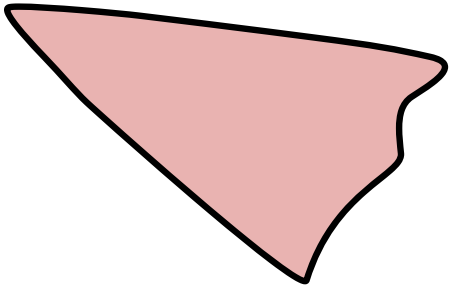
Source: (VROM, 2010)

housing values

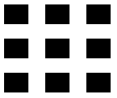
Source: (CBS, 2010)

potential for urbanization

potential for densification



living
working
recreation



main typology

main image

connecting axis

Source: (Google Maps, 2010)

densities

Source: (CBS, 2010)

liveability

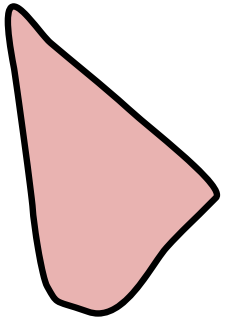
Source: (VROM, 2010)

housing values

Source: (CBS, 2010)

potential for urbanization

potential for densification



living
working
recreation

main typology

Source: (Google Maps, 2010)

main image

connecting axis

densities

Source: (CBS, 2010)

liveability

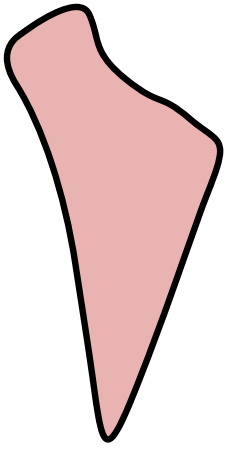
Source: (VROM, 2010)

housing values

Source: (CBS, 2010)

potential for urbanization

potential for densification



living ■ ■ ■
working ■ ■ □
recreation ■ ■ □

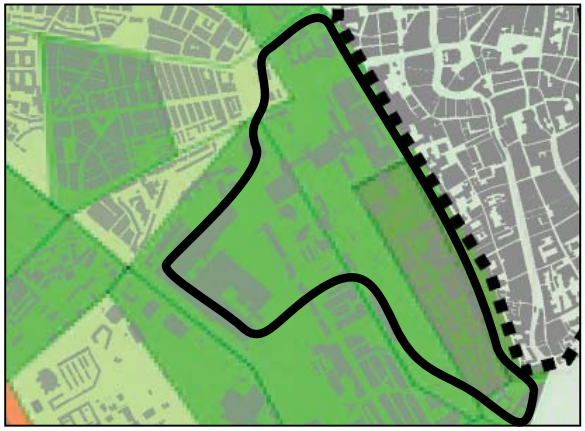
main typology

main image

connecting axis

Source: (Google Maps, 2010)

densities
Source: (CBS, 2010)

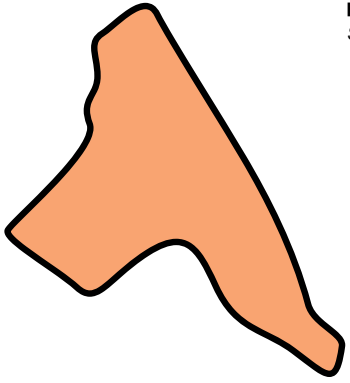


liveability
Source: (VROM, 2010)

housing values
Source: (CBS, 2010)

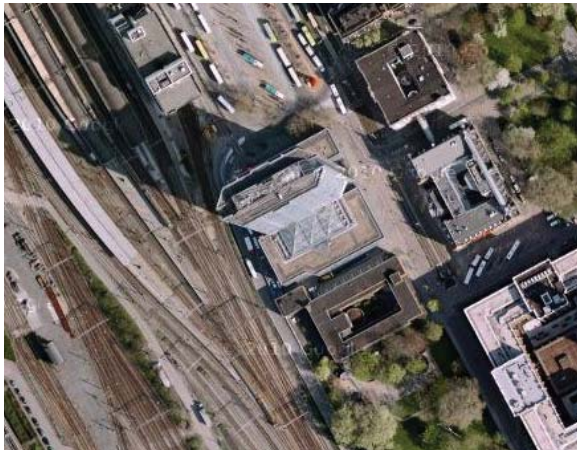
potential for urbanization

potential for densification



living
working
recreation

main typology



main image

connecting axis

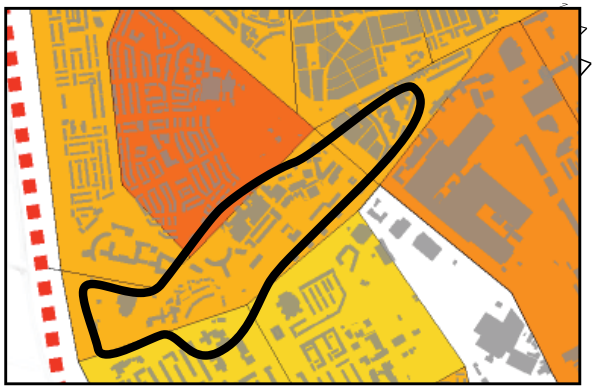
Source: (Google Maps, 2010)

densities

Source: (CBS, 2010)

liveability

Source: (VROM, 2010)

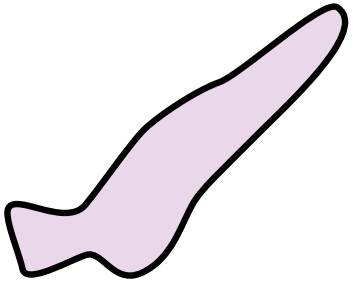


housing values

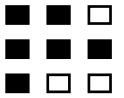
Source: (CBS, 2010)

potential for urbanization

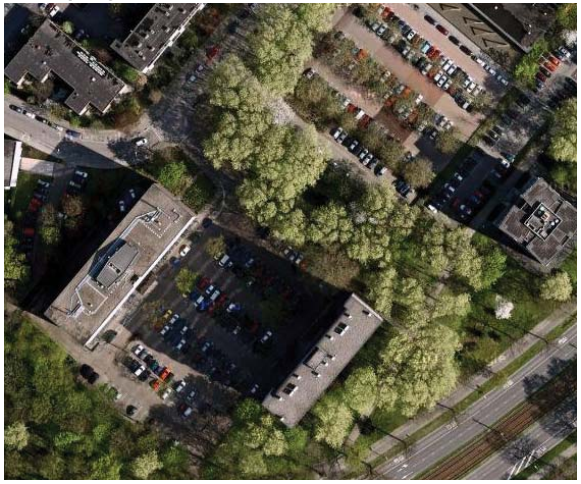
potential for densification



living
working
recreation



main typology



Source: (Google Maps, 2010)

main image

connecting axis

densities

Source: (CBS, 2010)

liveability

Source: (VROM, 2010)

housing values

Source: (CBS, 2010)

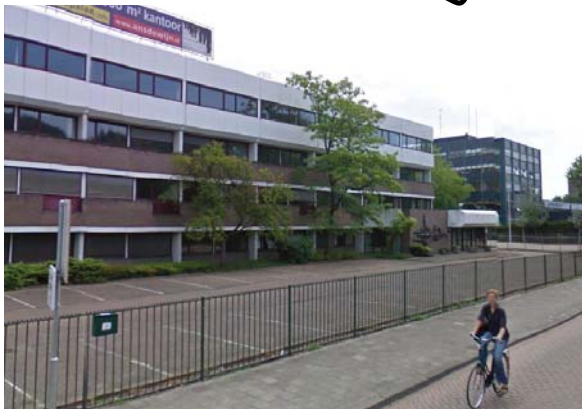
potential for urbanization

potential for densification

living ☐ ☐ ☐
working ■ ■ ■
recreation ☐ ☐ ☐

main typology

main image



connecting axis

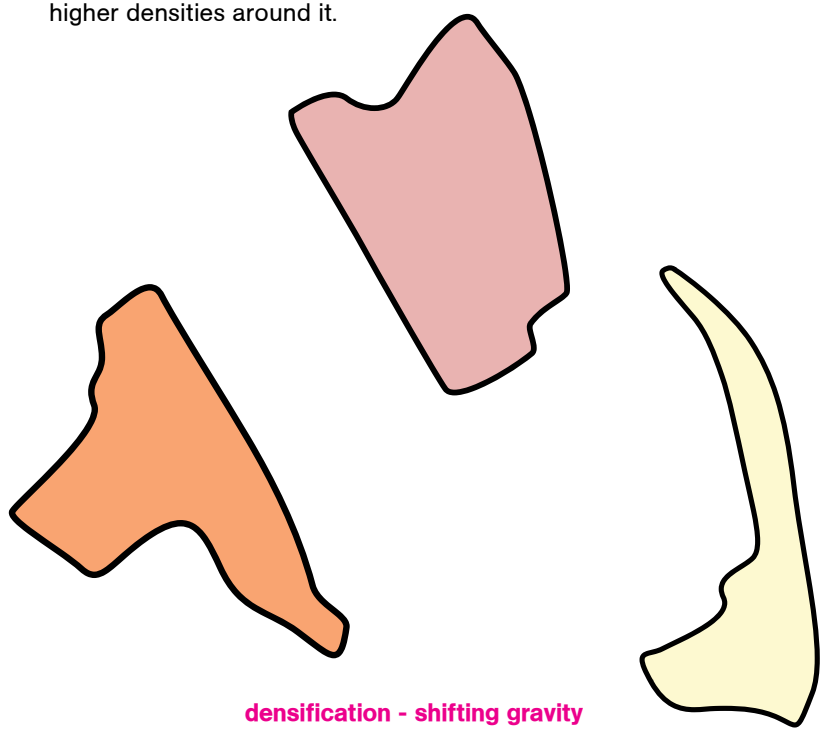
Source: (Google Maps, 2010)

2.2.16 Conclusion

As we saw on the last pages, the in between area has a lot of different identities which often have a strong separation of functions and differ a lot in their level of urbanity. Summarizing this part of the research we can state that there are three areas which have a high potential for achieving a high level of urbanity, although they sometimes seem to lack a successful mix of living, working and recreating.

The analyses of the problem statement showed that the in between areas are in need for densification and they are the subject of the shifting gravity. The text on the right side of this page shows a translation of the shifting gravity and the densification target into urbanization. This is the result of the new context in which the area finds itself, as also the municipality and the government state (Kleef, 2004; VROM, 2006). A certain density of people is a necessity for sustaining activity and urbanity, as we saw in the theoretical research of this thesis. This means that we can translate the goals of dealing with shifting gravity and densification into the development of urbanization. So, two important questions towards the design for the in between would be: where can we densify and where can we develop urbanity?

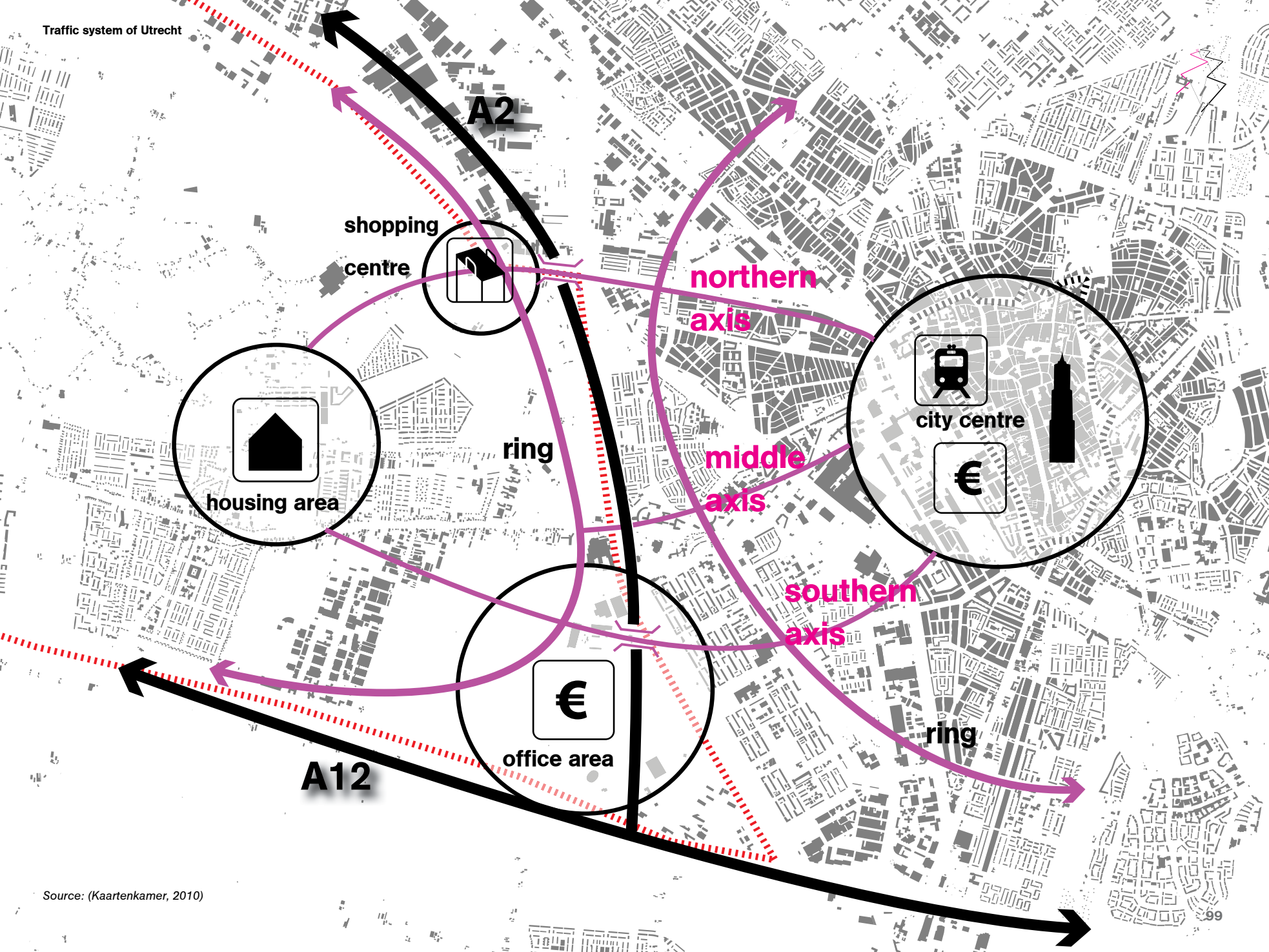
The southern part of the in between is built after the Second World War and has a strong separation in functions. The west part is the social housing area which mainly exists out of dwellings and a concentrated place with functions, the facility centre of the neighborhood. The area around the centre has a lot of problems as we saw in the analyses and a large part of it will be demolished. This gives us the opportunity to create urbanity along the axis as a starting point for further urbanization. The other two areas have a very low density and are in need for the development of new dwellings combined with other functions. The starting point for these developments would be at the axis, so that the axis will be the backbone for urbanization of the in between. As we will see on the next pages, the southern axis would have the highest potential to be transformed in to an urban axis with significantly higher densities around it.



2.2.17 Traffic system of Utrecht

On the right page, the traffic system of Utrecht is simplified in a schematic map. The highway is displayed in black and it is connected to the more local traffic on one place, the middle axis. To the north, the arrow of the highway is pointing towards Amsterdam, to the west towards Den Haag and to the east towards Amersfoort. The northern and southern axes are not directly connected to the highway and can therefore be seen as more local. The middle axis functions as the main entrance for the city centre from the highway. The ring roads of the city and the expansion function on the city scale and they are directly connected to the three axes. The ring road of Leidsche Rijn is being constructed at the moment, but it will function in a similar way as the ring of Utrecht. It functions as a spider web, with a circle around the centre and main axes connecting it to the centre.

At this level, we can define four main actors, which are connected by the axes, as the scheme shows with circles and icons. The most import actor will be the city centre of Utrecht with the main railway station, an important economic area around the station and the historic core of the city. The northern axis will connect the city centre to the centre of Leidsche Rijn, which will be shopping oriented, but it will also contain a mixture of several other recreational functions and housing (Spangenberg, 1995). The northern axis will continue towards the mainly housing orientated areas within the expansion and it will be one of the main routes from the expansion to the centre. The middle axis will function mainly on the regional or national scale, as it connects the centre of Utrecht to two of the busiest highways of the Netherlands (Kleef, 2004). The southern axis connects the city centre to an important economic area, the office park called Papendorp. This office park is part of the plan for Leidsche Rijn and it will be the main location for large scale offices who want to reside in Utrecht (Spangenberg, 1995). The park is situated near two important highways and it will be connected on a local scale by the southern axis. This axis continues towards the housing orientated districts of Leidsche Rijn. The northern and southern axis will be the two main connectors for residents traveling from the expansion to the centre and back, whereas the northern connector will be more leisure oriented and the southern connector will be more working oriented, due to the different actors. On the coming pages we will zoom in more on the three axes and reveal a little about there identities.



Source: (Kaartenkamer, 2010)

northern axis

middle axis

southern axis

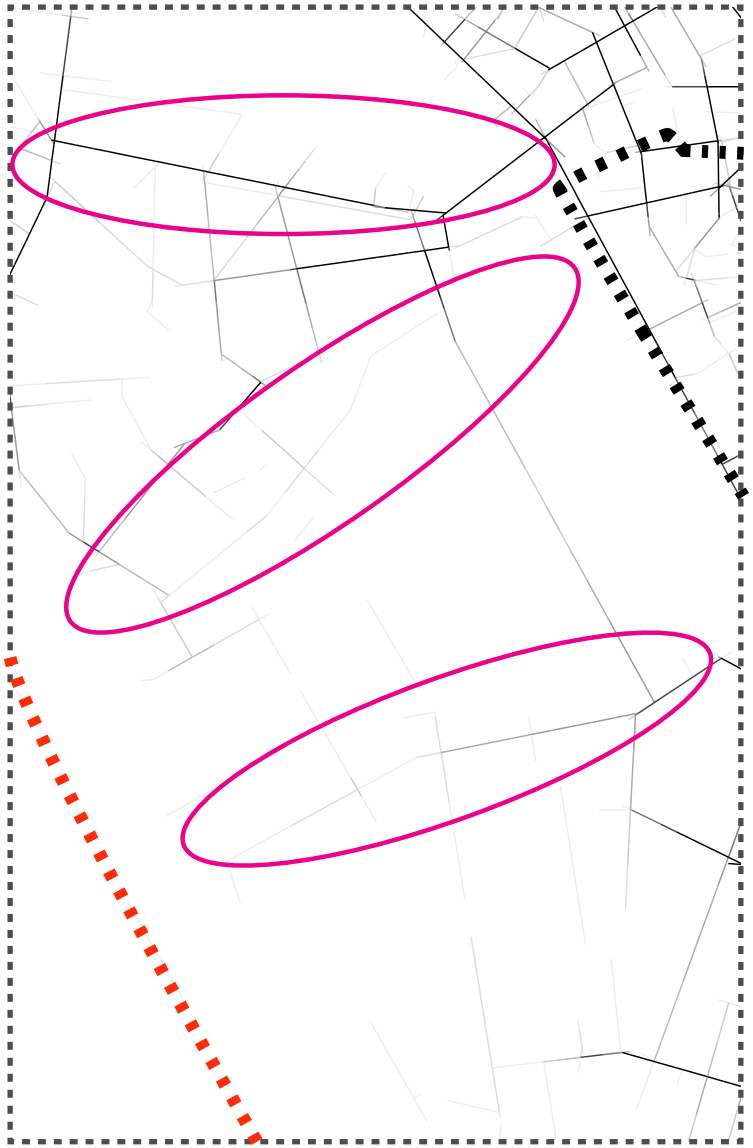
Source: (Google Maps, 2010)

2.2.18 Integration of the axes

As we already saw in the traffic system of Utrecht, the axes are connecting several actors in the city, resulting in different identities for the axes. The integration values are differing a lot from each other and don't seem to match with the scale of the axes. The northern axis is very local, as we saw on the last page, the middle axis is very regional and the southern axis is also very locally oriented. The integration of the axes is shown in the image on the right. This is the topological choice R10 analysis with the Depthmap program, based on Space Syntax theory. This means the topological integration of the street network with a radius of 100 meters, a relatively local scale. A better integrated street often results in a more lively environment as people tend to use the street more often (Hillier and Vaughan, 2007). More segregated areas also tend to attract more burglars, as streets are less lively and there is less social control from the neighborhood (Nes, 2005). This is also in line with the theory of Jacobs (1961), saying that streets should be lively and full of activity to provide 'eyes on the street' and thus social control.

When we take a look at the integration value of our three axes, we can see a clear differentiation. The northern axis, which is the oldest of the three (Renes, 2005), has a relatively high integration value on this local scale. The middle and southern axis, which have been built after the war, have a relatively low integration value. The principles of the post war designs were based on the idea that roads should be designed as connections from point A to B and thus as places to go through and not as places to go to. The southern part of the in between area is designed after the war and followed these principles, based on the CIAM conference, where the famous architect Le Corbusier played an important role. These principles resulted in roads that had little integration and little connections (as we can see in the two step analyses on

integration value of the axes

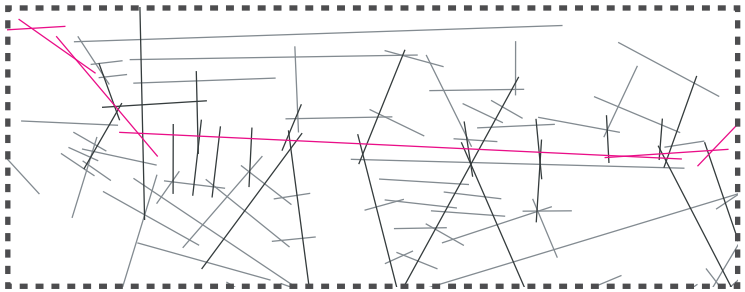


Depthmap, Topological dept analyses, Radius 10

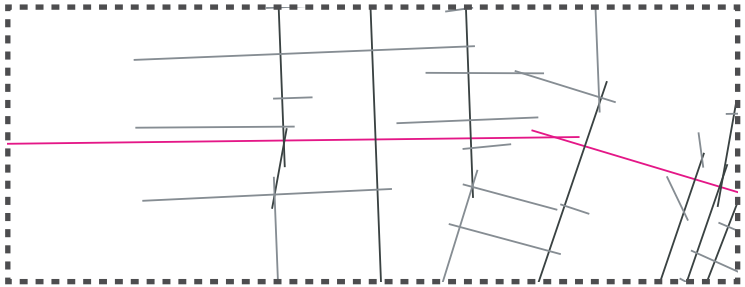
this page). This resulted in quiet neighborhoods where the heavy traffic would go around, but it also resulted in the fact that the street lost on of its primary functions: the place to go to (Jacobs, 1961). This had also to do with other factors, based on the design of the street, which are analyzed in the design chapter of this thesis.

In order to obtain a certain level of efficiency, roads can't have too many connections, as crossings slow down and decrease the capacity of the road. So, we can imagine that regional roads, which need to sustain a high traffic capacity, should have limited connections. When we take a look at the scale of the three axes, we can state that the southern and northern axes have a very local function as they are not connected directly to the national highway. The middle axis will be the primary western entrance for the city centre, when Leidsche Rijn is finished, and it is connected directly from the centre to the highway (BRU, 2005). The traffic model of the municipality (BRU, 2006) shows the same characteristics of these axes. Thus, despite the fact that the southern axis is very local, it has a very regional integration. Taking a look at the traffic intensities of this axis (see Appendix I) we can state that there is no necessity for this regional integration. The traffic intensities are for example much lower than the northern axis, which has a good local integration.

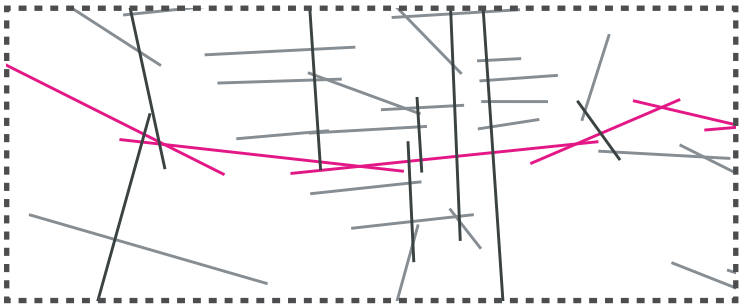
northern axis - 2 step analysis



middle axis - 2 step analysis



southern axis - 2 step analysis



Depthmap, stepdepth analysis

2.2.19 From a road to a street

The design of the southern axis is also very regional, as we can see in the comparison with the outer ring road of Utrecht on this page. The design of the outer ring road sustains traffic intensities, which are more than five times higher than the intensities of the southern axis, as the map in the appendix shows. All these facts give us a basis to say that the southern axis has the potential to be downscaled and integrated. This means that we can and should make new connections, downscale the design and let it function as a street and not as a road. Because, as Montgomery (1998) states: "...the design of a good street is perfectly possible provided that it is first and foremost considered as a street an not as a road." In other words: a place to go to instead of through. Making new connections will improve the catchment of the street. This results in the fact that there are more people 'within easy travelling distance' to the street, which will make it more lively (Montgomery, 1998). Also the fact that there will be more corners and thus more opportunities to develop 'a fine grain economy', will contribute to the liveliness (Jacobs, 1961). These steps will in the end contribute to the urbanity of the in between, as we will see in the following chapters.

southern axis

outer ring road

Source: (Google Maps, 2010)

2.2.20 The potential of the southern axis

The three axes connecting Leidsche Rijn to the centre of Utrecht have a differing identity and quality as we saw in the analyses and pictures in this chapter. The northern axis has a certain urbanity with a lot of activity and a mix of functions along the axis (see appendix). It will connect the centre of Utrecht to the new centre of Leidsche Rijn and will probably remain a relatively busy street with a lot of activity. The two local axes on the north and south have the opportunity to function as a connecter between several areas and between expansion and centre. The middle and more regional axis has less opportunity to function as a connector and will remain a certain barrier for the area, due to heavy traffic from the highway. This axis functions as the main entrance for Utrecht from the highway on the west and this results in high traffic intensities as the intensity analyses of the municipality show in the appendix of this thesis. The southern axis has a very regional design as we can see on the picture from the road, but the context of it is very local actually. This results in relatively low traffic intensities as we can see in the intensity analyses of the municipality. This gives the southern axis the opportunity to scale down to a more local level and connect surrounding areas instead of functioning as a barrier.

The southern axis also has a very low integration value with a low radius of 10 as the Space Syntax analysis shows. Also the two step analysis shows a similar integration and catchment. This axis design is clearly the result of the post war principles, where these main roads were only used as an efficient way of traveling and not as a connector of the urban fabric. The design is comparable to the outer ring road of Utrecht which has an intensity which is five times higher. These findings give us a solid base to downscale the southern axis and let it be a well integrated connector, with the opportunity to develop towards a lively urban street instead of a efficient regional road. This opportunity makes it interesting to elaborate the perspective and design on the area around this axis. As we saw in earlier analyses, the areas around this axis have a good opportunity to create more urbanity which makes it a good combination in the design. The northern part of the in between with its axis already has a lot of urbanity and a sufficient density without many new opportunities. The middle axis has a regional design and doesn't have the opportunity to scale down and integrate, due to heavy traffic which makes it less interesting to elaborate a design.

Southern axis of the in between area

Source: (Google Maps, 2010)

2.2.21 The challenges of the axis

Two of the four challenges from the problem statement were about the connection between city centre and expansion and about the opportunity to use the expansion as a support for development. The southern axis will have the best opportunity to transform into a street which uses the potential of Leidsche Rijn as a support and make the connection in the in between area. This would mean connecting and integrating, because connecting it will allow people to use it as a mode of transportation and integrating the axis will connect the axis to the in between so that the area can benefit of the support. This results in the questions of how the in between can make the connection and how the axis should be integrated. These questions will function as a guideline for the perspective and final design further on in this thesis.

The outcome of the last analyses lets us zoom in further on the in between area and set the goals and aims for the design. Summarizing we saw that the southern axis has the highest potential to transform into a more low scale urban street with a good integration and a well connection; and the southern areas, connected by the southern axis, have the highest potential to realize a lot of new developments, in order to create a high density and successful urban area. These conclusions result in a high potential for the area which will be presented in the final design.

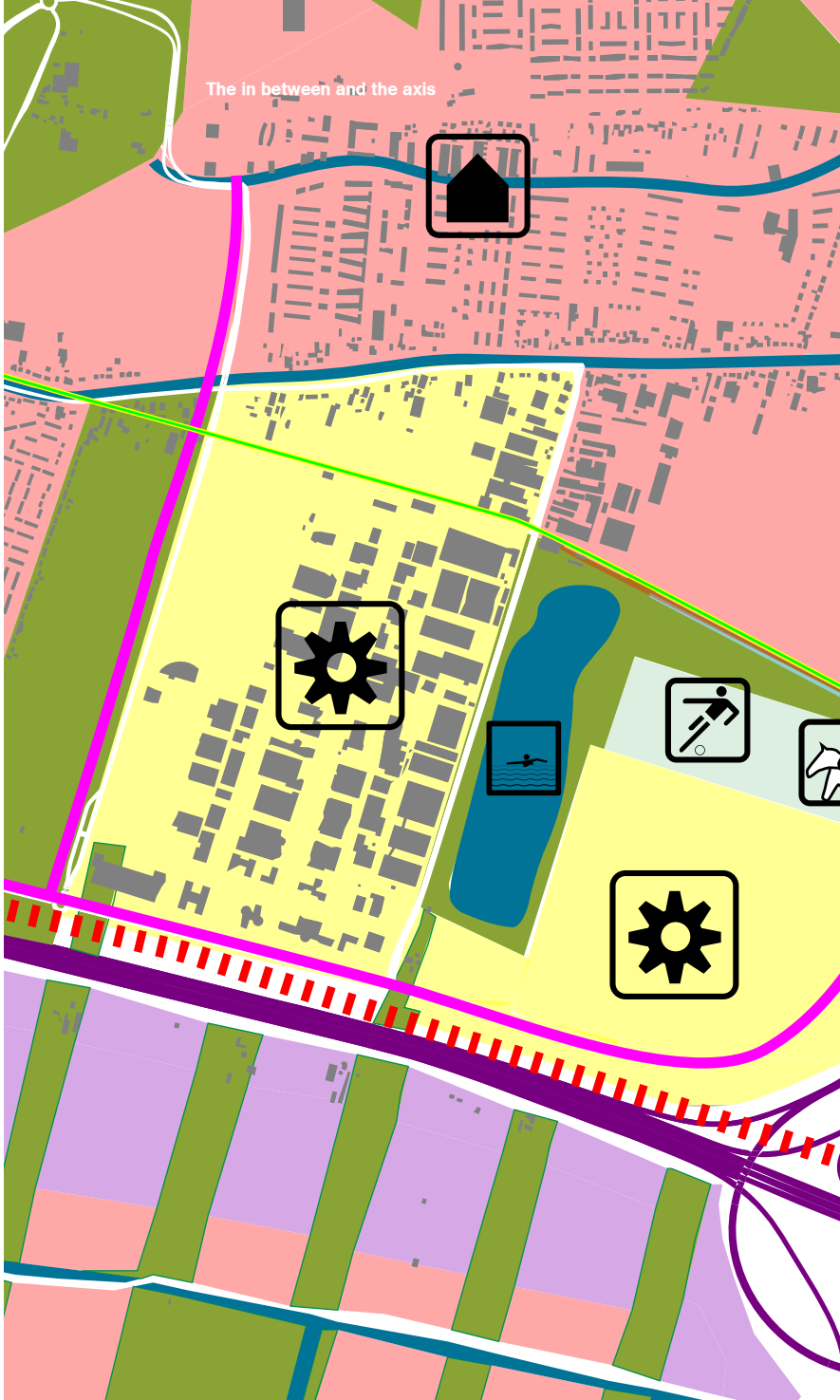
use the axis as a support and make the connection

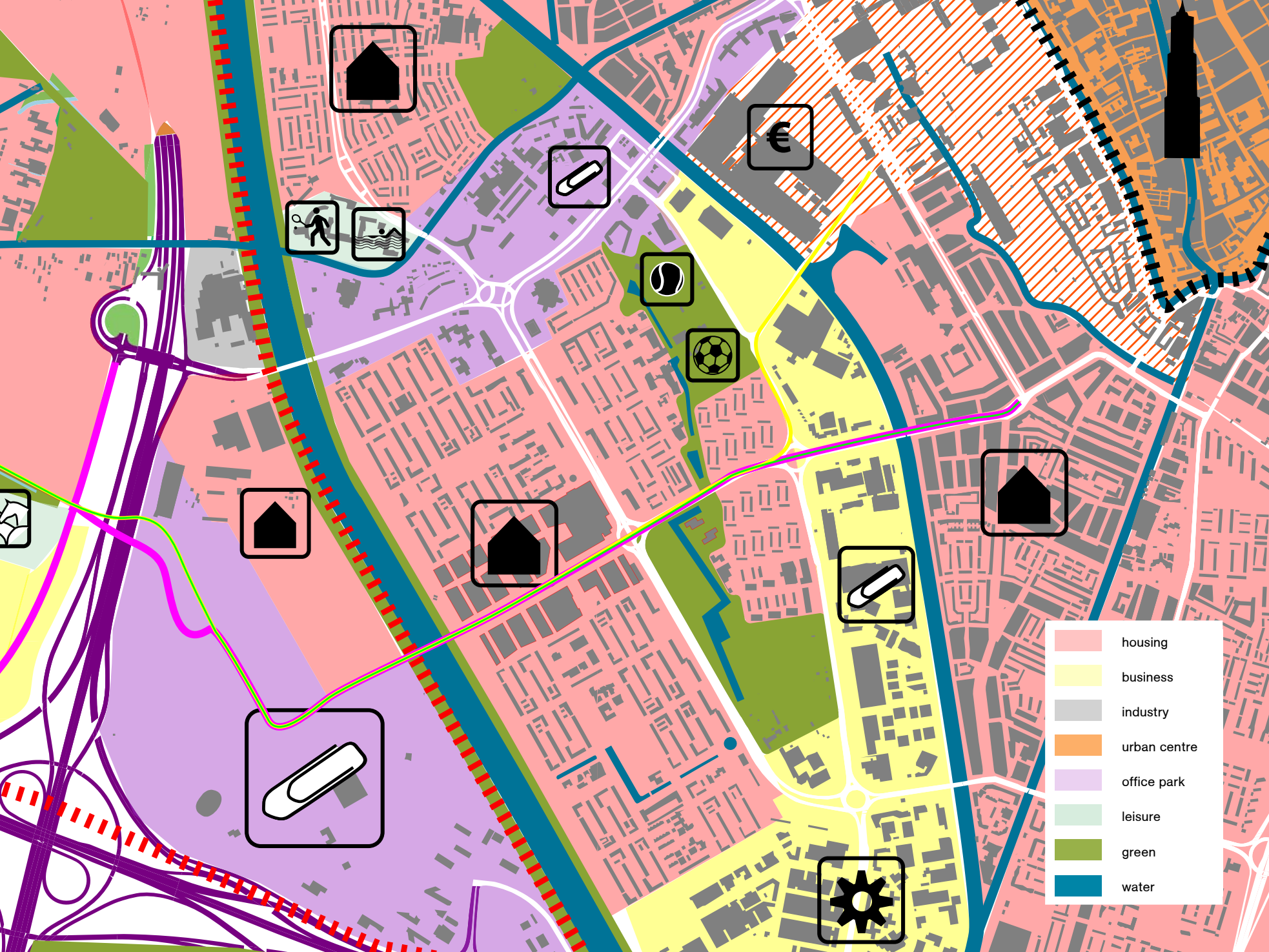
↓

connection and integration of the axes

↓

how can the in-between make the connection?
how should the axes be integrated?




housing
business
industry
urban centre
office park
leisure
green
water

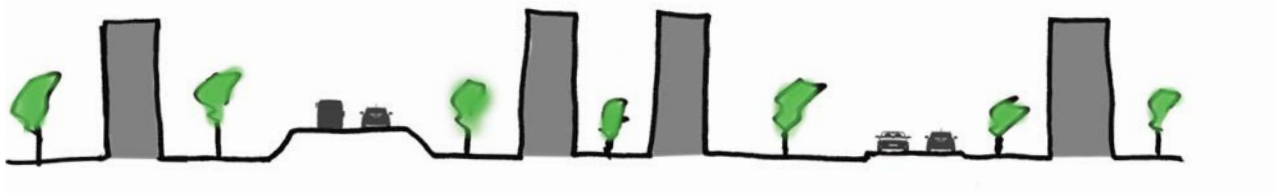
2.2.22 The identity of the southern axis

As we saw in the latter analyses, the southern axis starts at the hart of Leidsche Rijn, crosses the important office area, called Papendorp, and continues towards the centre. As the traffic model of the municipality shows the axis will be one of the two main public transport connections connecting the expansion to the centre (BRU, 2006). Combined with the fact of it crossing the main office area of Utrecht, this will mean commuting flows from expansion to the area and from the office area to the central station. This is also expected by the municipality, as the 'two way flows 2020' map shows in the appendix. Before the axis crosses the office area, it will first pass an housing area, a small business area and some sporting facilities, as the map on the right shows. After it has crossed the ring road of Leidsche Rijn and the highway it reaches Papendorp. This is what can be seen as the starting point of urbanity. The high quality offices and the housing area can result in a sufficient mix between working, living and recreating, resulting in more liveliness, activity and urbanity (Jacobs, 1961). The traffic system of Papendorp is designed as a large roundabout where our axis has two exits, one on the side of Leidsche Rijn and one on the side of the in between. So, we can conclude that the roundabout is the starting point of the area and axis of subject and the edge of the in between. After the route leaves the office area, it will reach the in between area and here we will see what the shifting gravity means. In the design chapter, we will zoom in on this area and show the potential it has.

2.2.23 Conclusion

The main practical research questions that have to be answered are put together on the right page. This means that the focus of the design will lie on the axis and its surroundings. Without surroundings with a sufficient level of urbanity there will be no urban street, as further analyses will show and without a well street design there will not be a lively and active urban environment along the axis. Creating a successful urban environment will be a key element in a successful outcome of this research, because this will be where all the goals and aims come together. To create urbanity we need a certain density, which was one of the goals in the introduction and is a necessity for the city due to a large pressure on the housing market (Kleef, 2003). To create an urban environment the street will have to be integrated, as this will increase the catchment and allows activity to sustain (Yang, 2005). Adapting to the shifting gravity will, from this point of view, result in the development of a higher level of urbanity. Using the expansion as a support for development will increase the level of activity on and around the axis and will contribute to the level of urbanity. These were the four goals from the introduction projected on creating urbanity. Next to the topics of this research, the government and municipality are also setting similar goals and aims and are also focusing on developing urbanity in these areas. The government has set the goals to create more diverse and highly urban living environments within the existing city borders, because this will create a successful places and protect the remaining nature areas in The Netherlands (VROM, 2006). The municipality states that the area on the west of Utrecht has to develop towards a highly urban and dynamic environment with an adaptive character, where changes are needed (Kleef, 2004). These are indicators for the direction in which these areas will develop, often being influenced by a shifting gravity point. Now that we have set the goals and aims, we can continue towards the design.

Current urbanity of the in between area



how can the in-between make the connection?
how should the axes be integrated?

where can we densify?
how and where can we develop urbanity?

Creating more activity and urbanity

3.

introduction

research

design

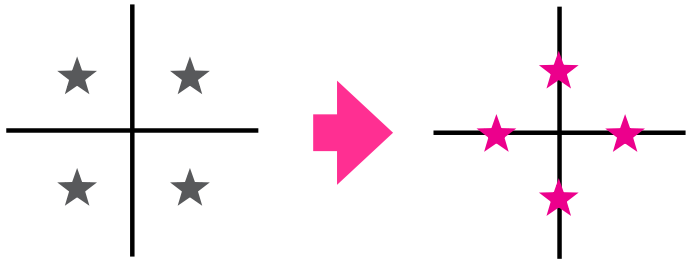
conclusion

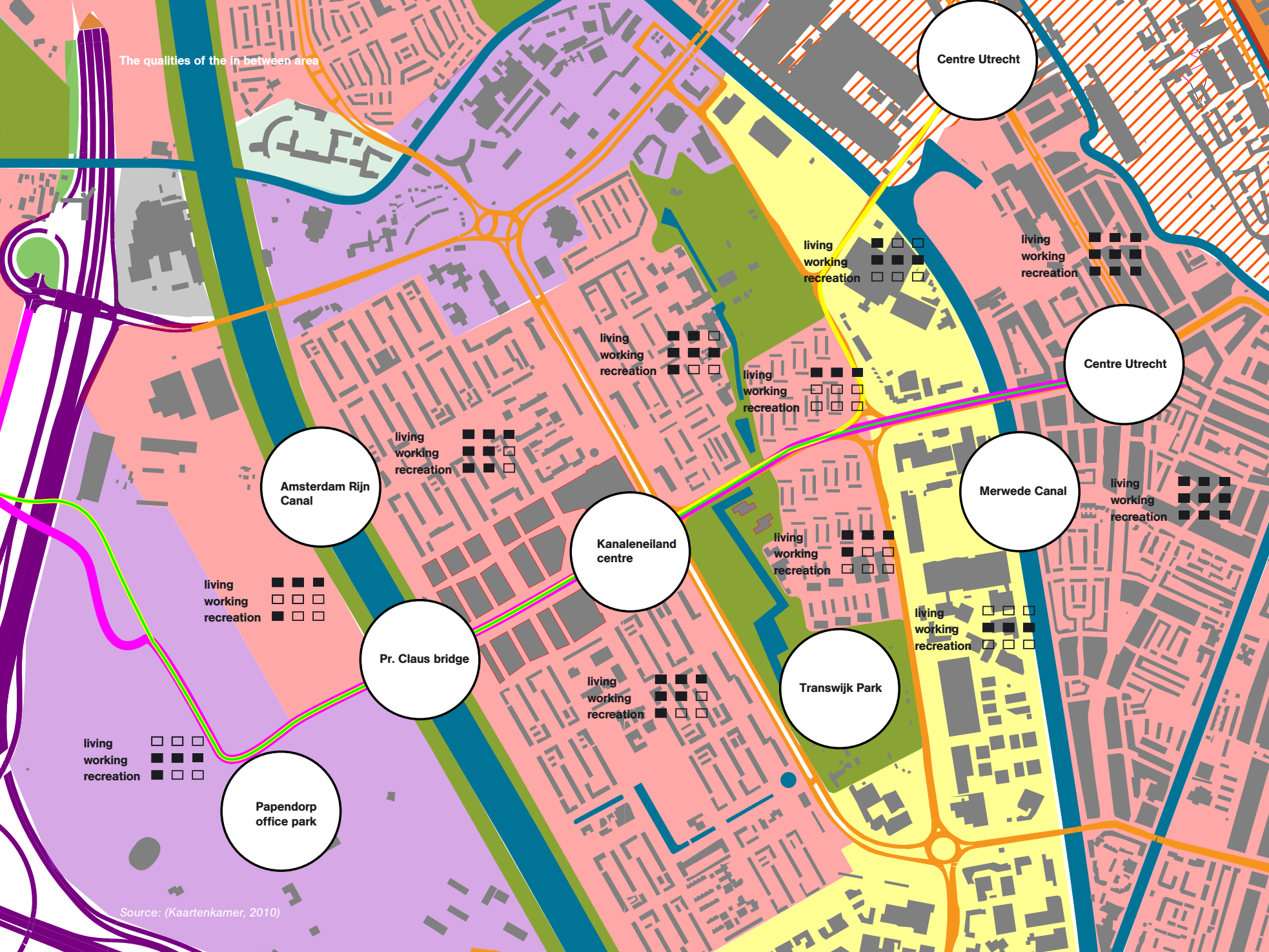
3.1 The perspective

3.1.1 Introduction

The perspective for the in between area of Utrecht is the logic follow up of the analyses in the previous chapter and it is the basis for the design, so therefore it is the beginning of the design chapter. During the research chapter, the aims and goals for the in between area of Utrecht are gradually become more specific and are forming the basis for the perspective. On the right page we will find a summary of important qualities within the area surrounding the southern axis and some important conclusions from the research chapter. This results in an inventory of challenges, problems, qualities and negative conditions.

As we have seen in the last part of the research chapter, the southern axis should be scaled down and the integration of the road should be improved. In this way, the axis can be transformed from a barrier into a connector and a place to go to in stead of through. This means that it can integrate the surrounding districts and create a better mix between living, working and recreating. Thus, the areas around the axis will be the place where it all comes together, the place where urbanity will start to grow, the place which will connect Utrecht to its expansion and the place where people will like to go to. Therefore the axis can be seen as the backbone of this project. Next to the integration of functions, the area also has a lot of potential to integrate its qualities. The new situation, due to the shifting gravity, will result in a new pressure on the area which means that there is an ability to make important changes. The two canals can open up them selves more towards the city and new connections can be made towards other qualitative green or blue areas like the park Transwijk. The increase of urbanity in the area means that there will be less room for green space within the neighborhoods, but it will also result in a higher quality green, due to its scarcity. Another character of the area is the central district of Kanaleneiland. It has a facility centre which is concentrated at the axis. The overall mix of the north part of Kanaleneiland is therefore relatively good, but the problem is that the facilities and the workplaces are strongly separated from the housing districts. This results in little mix and little urbanity. The demolishing of the central district gives us the opportunity to make a new plan for it which will fit within the perspective. This also gives the axis the opportunity to increase the amount of workplaces and recreation along the street. The Prins Claus bridge is a strong landmark of the area and makes the connection between the office area of Papendorp and the central district of Kanaleneiland. This quality can be used as an icon for the areas surrounding the bridge. The proposed plan for Papendorp also has a strong separation in workplaces and housing, so why not create a more lively and urban environment with a better mix of living, working and recreating. This will also enforce the route from Leidsche Rijn towards the in between area and further on towards the centre. These main characteristics of the areas on the map on the right will form the basis of the perspective and on in this chapter we will see the potential of the entire in between on a smaller scale. The next pages first show the outline of the perspective and gradually the design will be given shape and we will zoom in on street level.




The qualities of the in between area
Centre Utrecht
living
working
recreation
Centre Utrecht
Amsterdam Rijn
Canal
Kanaleneiland
centre
Merwede Canal
Pr. Claus bridge
Transwijk Park
Papendorp
office park
Source: (Kaartenkamer, 2010)

3.1.2 Developing a toolbox

In the research chapter, we have set out the aims and goals for the design. The design should answer the question on how we can integrate the axis and how we can sustain urbanity. Integrating the axis will enable the in between area to make the connection between the centre and the expansion. Developing urbanity means that we have to increase density, as we will see on the following pages. Increasing density is also the target of the municipality, because there is a large pressure on the housing market of Utrecht (Kleef, 2003). This means that integrating the axis and developing urbanity will find the answer on the four challenges, which have been stated in the introduction of this thesis. The next questions then soon arise: how can we create urbanity and how can we integrate the axis? In order to find an answer on these questions, a comparison is made between scientific research and empirical research. The empirical research is done on four study cases, which all have a sustainable level of urbanity and a well integrated axis towards an urban core. These axes are: the Overtoom in Amsterdam, Rijswijkseweg in Den Haag, Vleutenseweg in Utrecht and the Amsterdamsestraatweg in Utrecht. This comparison between theory and analyses forms a solid basis in order to be able to answer the research questions. In order to use it as a guideline for the design, we can use the metaphor of a toolbox, where every tool is a condition that is needed to elaborate the design goals.

Jane Jacobs has set four conditions to sustain urbanity (Jacobs, 1961):

1. A mixture of primary uses
2. An intensity of people (density)
3. Permeability of the urban block
4. A mixture of buildings

These were conditions that Jane Jacobs has stated by analyzing cities in mainly the U.S. and Europe. It is therefore interesting to compare them to Dutch examples, as the toolbox does. Next to the theory of Jacobs, there are many other researchers emphasizing the same topic. Their research will also provide an additional basis for the toolbox.

Next to the four conditions of Jacobs that define how to sustain urbanity, we also have an axis which should have certain characteristics in order to be successful. The theory of Space Syntax forms an important guideline for developing the 'axis tools'. Next to this, there is also a lot of literature available about the characteristics of an urban axis. Comparing this to the empirical data, will enable us to develop the tools for the axis. This resulted, next to the conditions for urbanity, in three conditions for a successful urban axis:

5. A sufficient level of integration
6. Continuity of the morphology
7. Definition of the section

All these tools are put together in the toolbox and form the guidelines for the design. On the next pages, the empirical analyses are presented and afterwards put in the toolbox. Every condition, which is found in the theory, has been compared to the conditions that have been found in the study cases. After the empirical analyses, the theory behind the topics is further explained. When the toolbox is complete, we will move on to the design for the in between area of Utrecht.

A mixture of primary uses

The mixture along the overtoom

Source: (Google Images, 2010)

The mixture in the in between

Source: (Google Images, 2010)

Intensity (inhabitants/km2)

Asw

average:
10.400

Overtoom

average:
13.900

Rijswijkseweg

average:
11.200

Vleutenseweg

average:
14.000

Southern axis

average:
7.500

Source: (CBS, 2010)

Permeability, morphology analyses

Asw

Overtoom

Rijswijkseweg

Vleutenseweg

Southern Axis

Mixture of buildings

Very little mixture in the in between

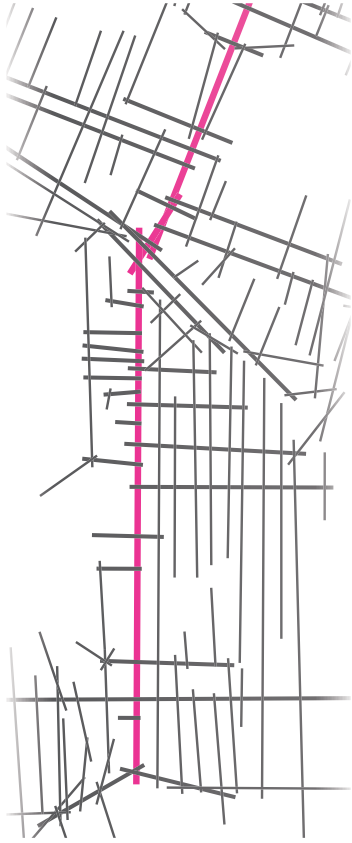
A lot of mixture along the Overtoom

Source: (Google Images, 2010)

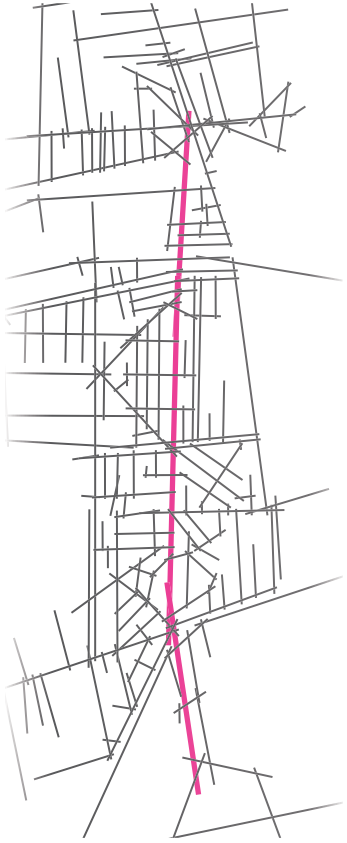
Integration of the axes, stepdepth analyses, 2 steps

Asw

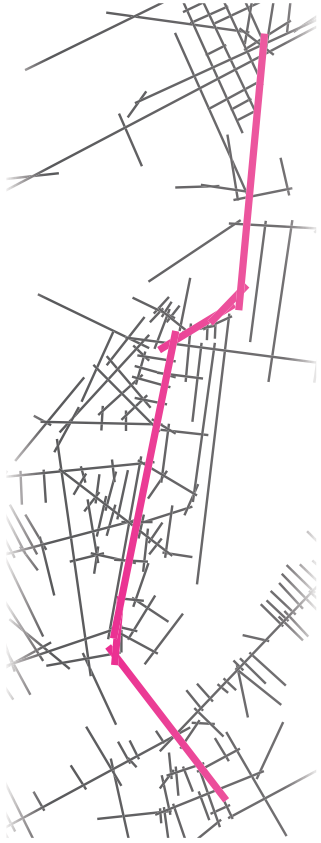
Overtoom



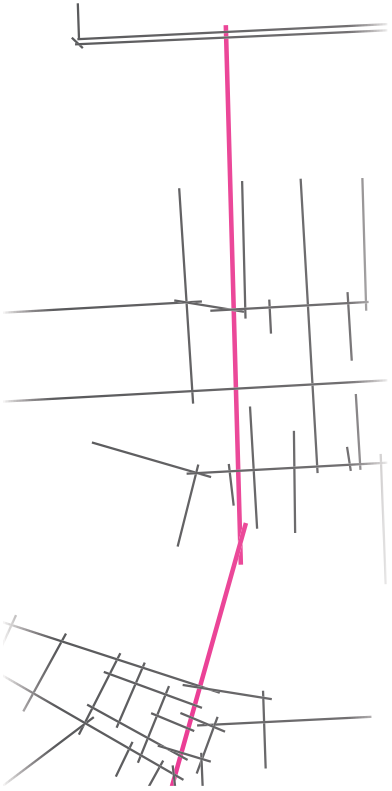
Rijswijkseweg



Vleutenseweg

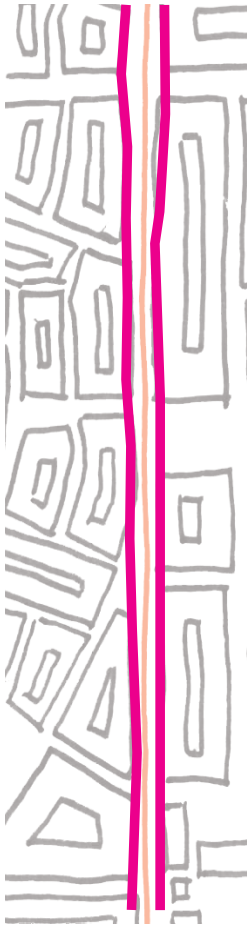


Southern axis

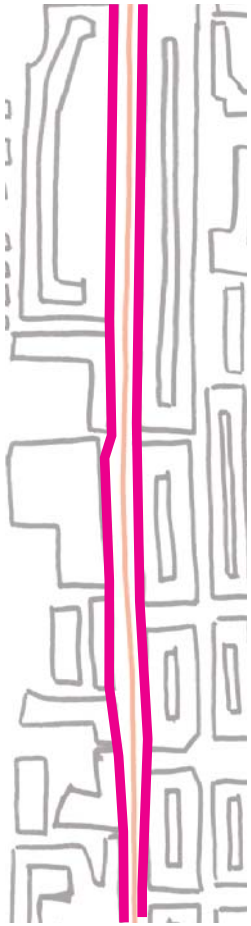


Continuity of the morphology

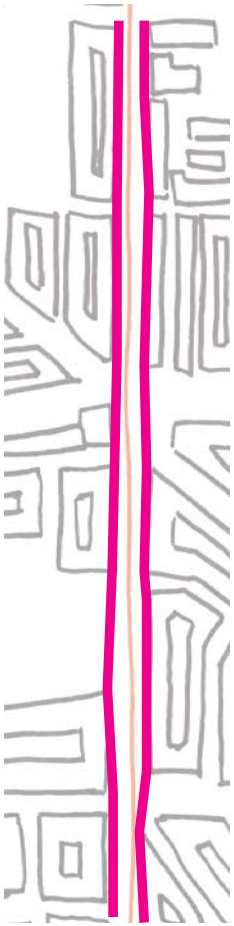
Asw



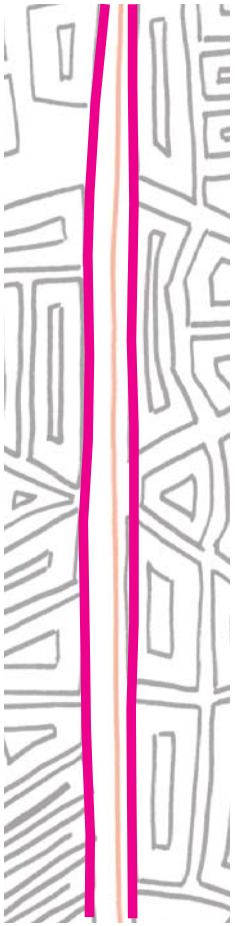
Overtoom



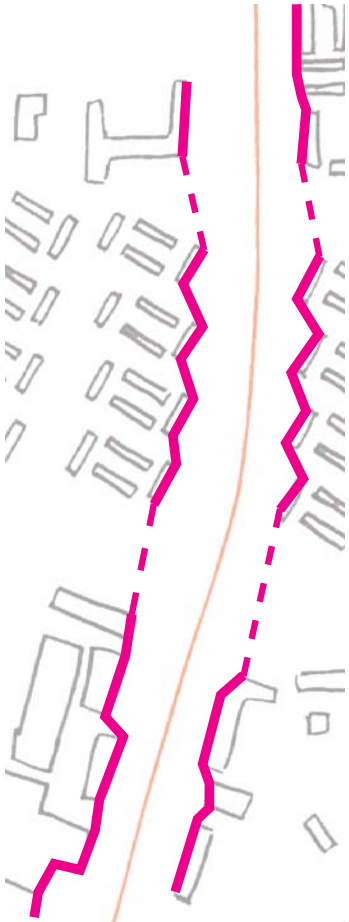
Rijswijkseweg



Vleutenseweg



Southern axis



Distance, definition

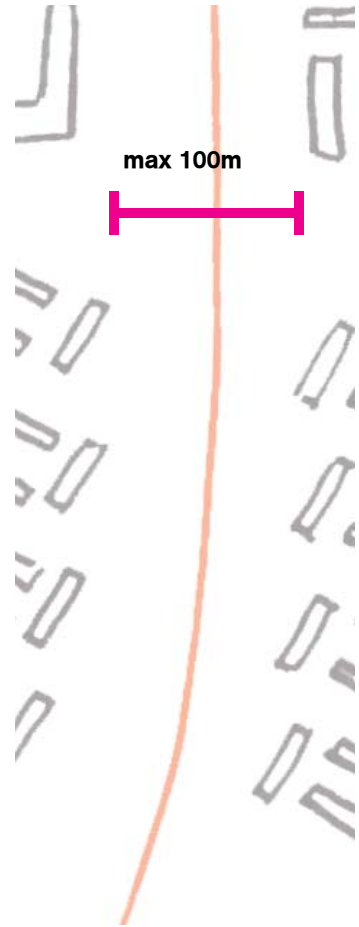
Asw

Overtoom

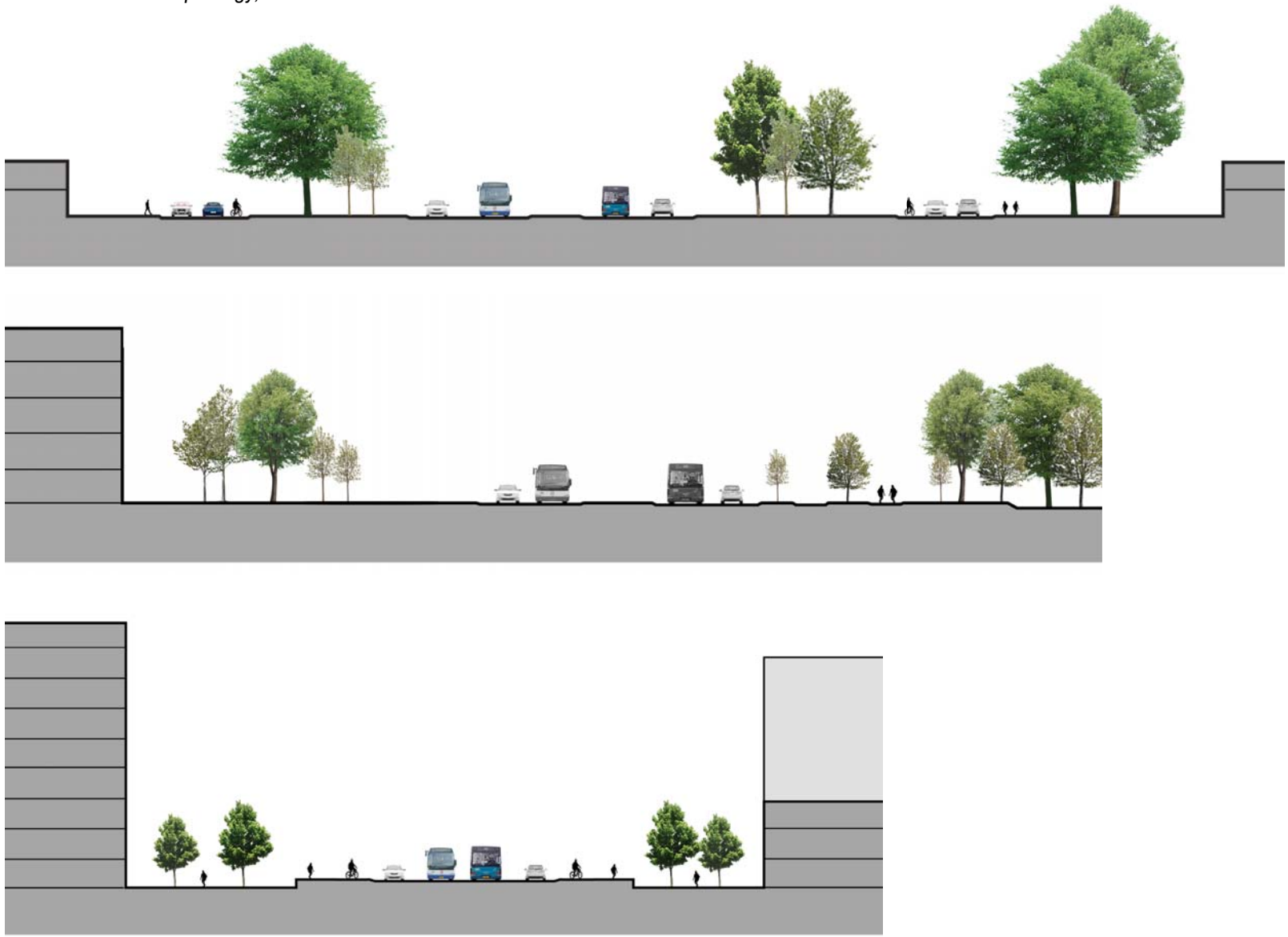
Rijswijkseweg

Vleutenseweg

Leidscheweg



Definition of the morphology, sections of the southern axis

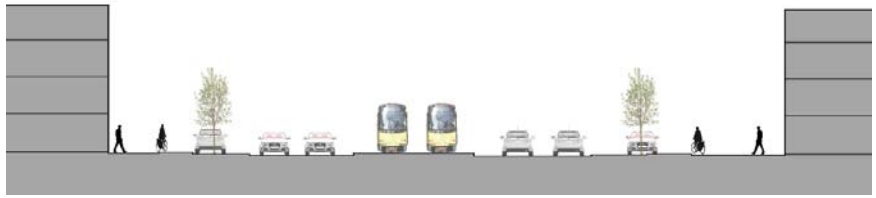


Sections of the urban axes

Asw, Utrecht

Overtoom, Amsterdam

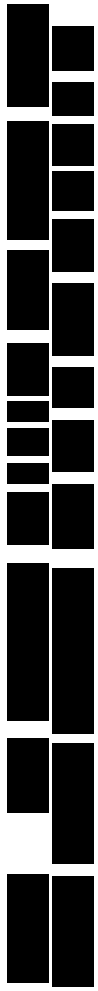
Rijswijkseweg, Den Haag



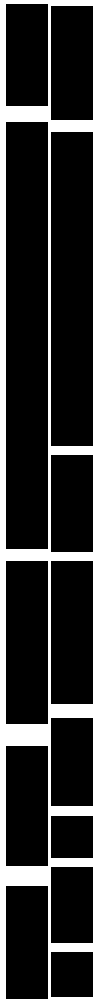
Vleutenseweg, Utrecht

Definition and continuity, frontage along the axis

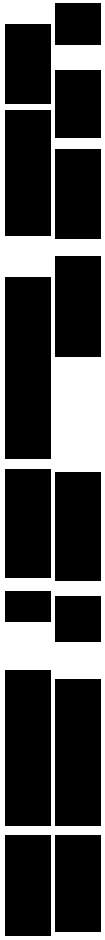
Vleutenseweg



Overtoom



Rijswijkseweg



Asw

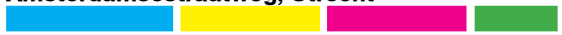
Southern Axis

southern axis

Vleutenseweg, Utrecht (northern axis)

Rijswijkseweg, Den Haag

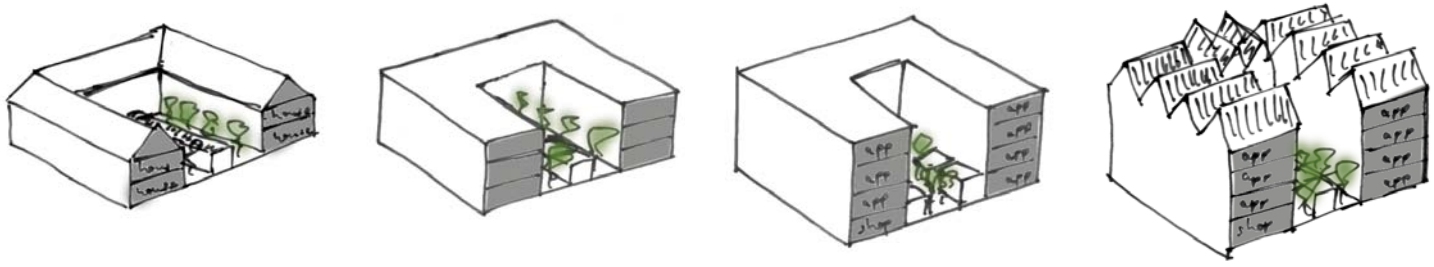
Amsterdamsestraatweg, Utrecht



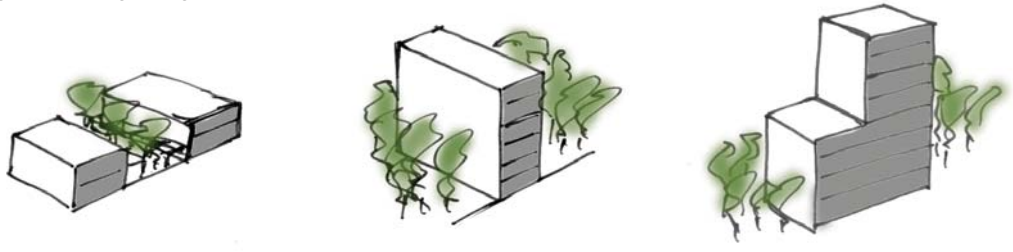
Overtoom, Amsterdam

Mixture of uses, typologies

Typologies of buildings along the urban axes



Typologies of buildings along the southern axes



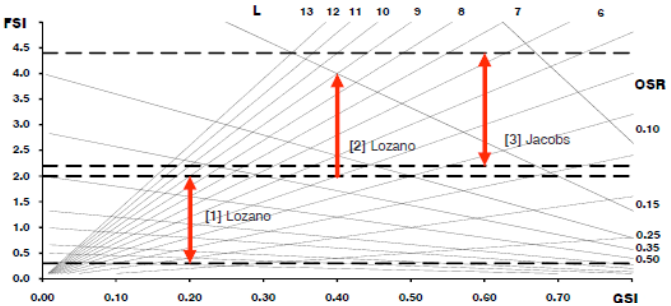
3.1.3 The toolbox

The toolbox is a metaphor for the set of conditions which form the guidelines for the design, based on scientific theory and empirical analyses. After applying the set of tools in this design, we will be able to reflect on the quality of them and after some possible adjustments it will be valuable to generalize them and make it a generic toolbox which is applicable in comparable situations. With this knowledge built up in this thesis we can then zoom in on the other case studies at the beginning and draw a concluding vision for these areas. For now, the toolbox will further refine the goals and aims of the design and function as a guideline. After this short introduction I will explain how the analyses are done, what the conclusions were and how the tool is created.

Intensity

One of the four conditions for urbanity according to Jane Jacobs was a sufficient intensity of people. Also Montgomery (1998) states that “the key to sustaining diversity lies in there being, within easy traveling distance, relatively large numbers of people.” Pont and Haupt (2009) made a summary of density thresholds in order to sustain variety and urbanity. Densities of around 4.000 inhabitants per km2 should be enough for some first facilities in an area. 24.000 up to 70.000 inhabitants per km2 should be sufficient to create and sustain diversity and urbanity in an area. When we take a look at the urban areas around the axis in the comparison, we will find densities lying around an average of 10.000 up to 14.000 inhabitants per km2. This is apparently enough for areas in Dutch cities to create a sustainable level of urbanity. The densities of the in between area vary a lot. There is the business district near the centre where almost no people reside and there is Kanaleneiland in the west where the average lies around 12.000 inhabitants per km2. The average of the areas surrounding the southern axis would be around 7.500, of which we can conclude that it is not sufficient to sustain urbanity with a variety of facilities. So the goal would be to almost double the amount of people living in the in between area in order to create and sustain a certain level of urbanity.

Densities required for sustaining facilities



Source: (Pont, 2010)

Integration

As we saw in the intensity topic, we need a certain density of people living in an area to sustain urbanity. It is then evident that people need to be able to reach the facilities in their area, in order for these facilities to survive. As Montgomery (1998) states: “the key to sustaining diversity lies in there being, within easy traveling distance, relatively large numbers of people.” Thus, when it is easier for people to reach a facility then it is more likely to be used. The integration of a street contributes to a large extend to this reach of densities. As we saw in earlier analyses between the three connecting axis in the research chapter, the southern axis has a relatively low integration value. Also this two step analyses shows a low reach in comparison to the other axes with more urbanity. As analyses with the Depthmap program (based on Space Syntax theory) showed, the integration value of a street will improve if it is better connected to the network of streets within a

city. The low integration value of this axis is a typical result of the post war design principles. Main streets were designed as efficient roads to get people from A to B through an area. A junction was only slowing down the traffic and thus less efficient. This resulted into barriers with little liveliness and activity, comparable to the southern axis. Analyses with Depthmap show that a street has a higher integration value when it has more direct connections to surrounding districts. The integration will even more improve when other strategic connections are made and when the street has an improved continuity. Concluding this analysis, we can state that connecting the southern axis better to the infrastructural network will improve the integration and eventually the level of urbanity as more people are able to easily reach the axis.

Definition

The definition of a street is determined to a large extend by the characteristics of the section and the frontage of buildings it has. When we take a look at the morphology of the in between and compare it to the other urban areas, we can conclude that the difference in frontage is the cause of the space in between the buildings. The building lengths of buildings along the southern axis is comparable to the length of the other urban areas, but the space in between the buildings is a lot larger. This results in a less continuous and clear front which should define the street. Alan B. Jacobs (1993) states that a street needs a certain definition to be successful and it should have a ratio 4:1, street width:building height. This is a conclusion after a thorough analysis of hundreds of 'great streets' in his book When we take a look at the ratio of the urban streets in these analyses we will find ratios varying from 2:1 (Overtoom) to 4:1 (Vleutenseweg, Rijswijkseweg). The ratio of our southern axis varies from 20:1 in the east to 5:1 in the west, the new plan for Kanaleneiland. So, next to the frontage which should be improved by decreasing the space between buildings also the ratio of the section should be improved significantly in order to create a successful street.

Mixture of buildings

All the buildings along the axes which are compared to the southern axis, have a lively mix of ages and types, of heights and widths. According to Jane Jacobs (1961), this is a criteria for urbanity, as people are attracted by the variety and more likely to visit the area. A street will be simply more interesting when it has a lot of variety which meets the eye. Organically grown districts with a lot of history usually already have the variety due to the different building styles from different periods. The southern part of the in between area is mainly built just after WOII and therefore it has very few variety due to different building periods. So, apparently urbanity needs some time to grow in order to create a qualitative mix. An important goal for the design of the in between would thus be to preserve the qualities in the area and add new. Due to the shifting gravity, large companies are moving towards the edge of the city where new large business areas are being developed. This means that they are leaving their buildings behind, which might form an interesting design challenge for architects, to change the function and revitalize the old buildings. Many of these have a good potential of becoming successful residences, as we will see in the design. Thus, the goal would be to find qualities and opportunities and preserve these and build new wherever possible, to create a well mixed area over time.

Mixture of uses

Walking around any of the streets which are compared to the southern axis, one would notice the amount of uses which reside in all the buildings along the street. Historical urban main routes often have these characteristics, as buildings have changed over time as there were new demands due to new uses. This created a

lively mix of uses, one of the four conditions for urbanity according to Jacobs (1961). As we can see in the additional analyses within the appendix, the three axis within the in between area differ a lot in terms of functions along the street. Whereas the northern axis has a lot of functions, creating a lively mix, the middle axis has a monogamous mix of offices and the southern axis has only concentrated functions at certain points. Also the mix between working, living and recreating would be most sufficient for sustaining urbanity in the north part of the in between, along the northern axis. Taking a look at the functions along the street and the amount of people living in the area, gives us a good impression of the mixture of uses in the area. Stating this would mean that the southern part of the in between, along the southern axis, has to create a better mixture of uses, in order to sustain urbanity.

Continuity

The continuity of the axis is to a large extend being determined by the buildings along. The conclusion of the morphology analyses is mainly that there is too much space in between the buildings along the axis, which resulted in little definition. This space in between the buildings also contribute to the level of continuity. Nevertheless, another condition, which probably has a larger impact on the continuity would be the orientation of buildings along the axis. Whereas the urban axes all have a very strong continuity with almost all buildings situated towards the street, the southern axis has very little relation to the buildings surrounding it, because there is very little frontage and buildings are not all orientated towards the street. Also a shifting alignment along the edge doesn't contribute to the continuity. Improving the continuity would also improve the definition of the street, as more buildings will face the street. Thus, orientating the buildings along the axis towards the street is the goal, in order to improve the continuity. When the continuity is improved, it will also improve the connection between start and end of the street and it will be more logical for people to take this route, as it will be easier to navigate with a better definition.

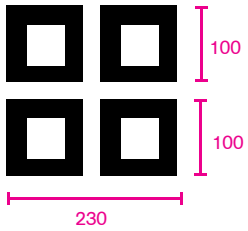
Permeability

The comparison between the morphology of historical and urban areas and the morphology of the in between shows a lot of differences at first sight. Whereas the historical urban morphology is very dense without a lot of space in between the blocks, the in between has a very open structure with a lot of 'air'. This is the result of the post war ideology where buildings needed a sufficient amount of open space around them, according to the designers and planners. When we compare the building length of the blocks along the street we'll find an average of around 100 meters. This is comparable to the desired length according to the urban theory. Montgomery (1998) states that "to be successful, city districts should comprise as many blocks as possible, and these should only rarely exceed 90x90 meters." Taking this as a guideline for the design, this should provide a sufficient permeability of the urban fabric. Permeability is on of the four conditions to create urbanity according to Jane Jacobs (1961). She also states that, when we create shorter blocks and implement more of them, we would increase the number of points with the economic potential of trading. This would then also contribute to mix of uses within a building or a street. Comparing the theory and the analyses of the other urban areas to the morphology of the southern axis, we can see that the building lengths don't differ a lot. It is even so that the average length along the southern axis is shorter than the average from theory and analyses. So we could state that the permeability of the in between area around the axis is relatively good. In the frontage analysis we will see what the difference is between the compared areas around their axis and why the other areas have more urbanity.

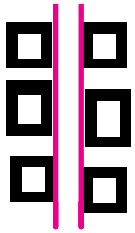
	criteria/condition	analysis	intervention
Area	mixture of uses	densities, identities	create a mix of living, working, recreating
	permeability	morphologies, typologies	guidelines of the morphology
	mixture of buildings	typologies, identities	preserve qualitative buildings and add new
	intensity, density	density maps	increase density of dwellings
Axis	catchment, integration	space syntax and two step analysis	add connections and downscale
	definition, continuity	sections, morphology, continuity	create an more urban section with an active frontage

intensity

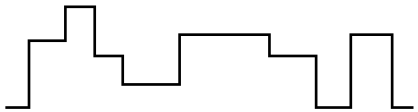
permeability



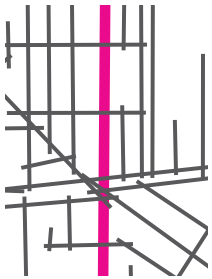
continuity



mixture of buildings

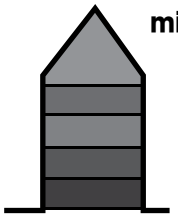


integration



definition

mixture of uses



3.2 The design

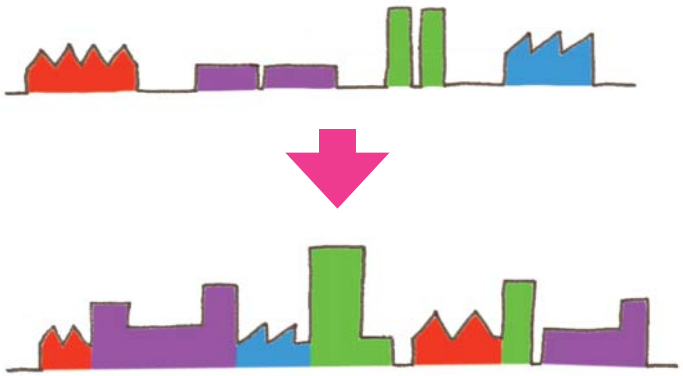
3.2.1 Main interventions

Mixture of uses
Having developed a toolbox based on a comparison between theoretical and practical research, we are now ready to put it into practice and shape the design. The toolbox is ready to be used at different scale levels, starting at the neighborhood scale. The analyses on this scale showed that there is a clear division between the different districts in terms of identity. This means that the interventions have to be different as well and use the toolbox from several starting points. To start with, the integration of the southern axis allows us to connect the districts and make it more one complete in between area in stead of separated districts (see map on the next page) with a separation of functions. As we saw in the analyses, this will prevent the area from reaching a sufficient level of urbanization, which is one of the major goals of this design challenge. So, the mixture of uses starts at the neighborhood level and it will end at the building block level. When we take a look at the mixture of working, living and recreating, we can state that the area of Kanaleneiland needs a better spread of working and recreating; the middle area needs a lot more houses, more recreation and more workplaces; the business area needs a lot more houses and more recreation. The office area at the edge has a planned division of functions, so to develop more urbanity, there has to be a better mix of functions. Implementing these interventions will create a better mixture of uses and it will be a step to more urbanity.

Permeability
The permeability of the urban fabric is something which has to be emphasized on a more local scale, although interventions in the infrastructure network on a higher scale will also improve the permeability, as we will see in the design.

Mixture of buildings
The mixture of buildings is also a tool which can be best used on the very local scale. What we have to keep in mind is, that the urban areas in the analyses have all had a long time to grow and develop their urbanity. A sufficient mix of buildings developed over time and often in an organic way. So it is important, if we want to create this mixture, to preserve as many buildings and qualities as we can. The area of Kanaleneiland has a sufficient density already and it will be more about relatively small interventions on the scale of the building block, to create a qualitative mixture of buildings. The low density housing area has less potential to increase densities by making minor changes. Due to the new context, as a result of the shifting gravity and challenging development goals, there is a large pressure on the area to be developed towards a highly urban and dense environment. This typology is not sufficient anymore and it will have to be replaced over time with a typology which creates a lot more density and a better mixture. The business area has a lot of large scale buildings which will have to find a new place at the edge of the city due to the new pressure on the area. This makes it no longer sufficient to have such large scale business near the centre of the city. Due to the fact that there are new developments at the edge of the city, creating space for this business, there is a growing number of empty buildings in these areas. Some of these buildings have the

Developing a mixture of buildings



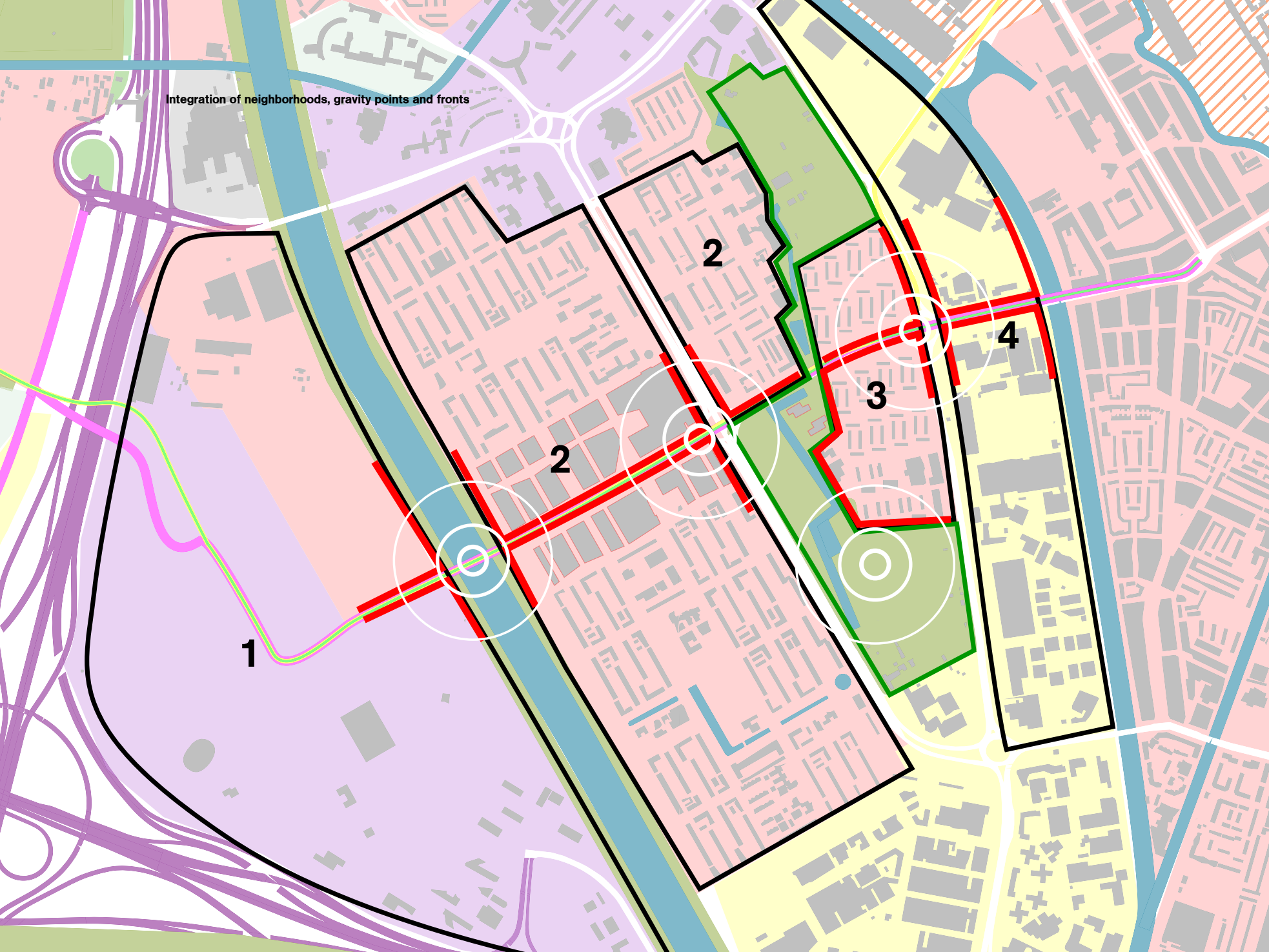
potential to being preserved and having a change of function. We will see on a lower scale what these qualities are. The office area of Papendorp doesn't have this history yet, thus it will be important to keep in mind that a mixture of buildings will contribute to the level of urbanity. At the moment, the office area is being developed in a separated function typology, which will result in little urbanity. So, it will be good to mix the typology of the offices with the typology of a residence area, especially along the axis, creating a more urban street.

Intensity

The density of the area has already a sufficient level at some districts, as we saw in the analyses. The district of Kanaleneiland has a relatively high density already, but it could be even higher, when we compare it to the theory and the analyses. The low density housing area has a very low density and this has to be increased significantly as well as the density of the business area near the centre. The density of Papendorp is still to be defined and should have similar values, in order to create a sufficient level of urbanity. The gravity points of the area, in terms of density, will have to be around the centre of Kanaleneiland and towards the centre around the two nodes of transportation (see map on next page). This division of density will create a balanced gravity point around the axis, so that the axis can be the backbone of the area. At the moment, the density gravity point is mainly around the centre of Kanaleneiland which results in less balance within the in between area.

Integration

On this larger scale we are able to make some strategic interventions in the infrastructure network. In order to let the axis function as the backbone of the in between, it has to be well integrated, as the toolbox shows. Making new connections will be an important intervention in order to downscale and integrate the axis. Making connections on this scale makes it easy to see them in the larger perspective and testing it in Depthmap (Space Syntax theory) will allow us to see the consequences of these interventions. On the next page, all the new connections are showed with a circle and the integration analyses of Depthmap shows the results of the plan (to be added in the final report…). The area of Papendorp will have to be designed, following the principles of integrating the axis, within this toolbox. This will allow the axis to have a clear landing in the area and it can then be used as a backbone for developments. The interventions in Kanaleneiland, area 2, will be mainly about opening up the neighborhood towards the axis. The post war design resulted into some closed of parts which have to be opened up towards the surroundings, in order to integrate the network, making it more lively and urban. The interventions on the very local scale within the neighborhood also results in a better integrated axis, as it will be better connected to the surrounding areas. Area 3 is at the moment lacking any integration to the axis. There are only a few connections towards the road and this isn't sufficient for a good integration, as the Depthmap analyses


Integration of neighborhoods, gravity points and fronts
1
2
2
2
3
4

showed. Making connections towards this area will improve integration and allow activity to take place. The business district has a strong north south orientation and the large scale of the business results in few connections. The developing of a more fine grain needs more connections on the local scale, which will integrate the area better to its surroundings.

Definition and continuity
Improving the definition and continuity of the axis will contribute to a more clear route and a more urban typology. This is an intervention which has to be done on a relatively local scale. On this scale we can define the important fronts, which will improve the definition and continuity. As we can see on the former page, the important fronts are situated along the axis and near the nodes. These are the places where it is important to set the landing of the axis and define the starting point of urbanity. Increasing the urbanity in an area makes separations between nature and concrete stronger as space becomes more scarce. This is why it is important to make a clear border and define the edge between green and grey. Therefore the edge along the park will also be an important guideline of the design.

3.2.2 The master plan
The master plan for the in between area represents the main interventions on a more local scale than described in the previous paragraphs. Using the guidelines of the toolbox, we are ready to implement the necessary interventions in order to elaborate the goals and aims of this graduation project. The master plan will be developed in three steps, in order to set a time span and to generate a spin off effect from step to step. The first step will be the starting point of the development towards an urban in between area with a lively axis. The second step will continue this development and the third step will result in a design where all the goals and aims have been realized and where the questions within this thesis have been answered. The goal is to elaborate the three steps in a time span of 30 years, 10 years for each step, towards 2040. The master plan exists out of three maps, representing the three steps, and visualizations supporting the concept. The maps will show the outline of the design and the visualizations will tell the story on the street level. The street level is the scale where the interventions will have their impact and where urbanization will develop. The visualizations will explain the development of activity and urbanity in the area, by the foreseen interventions. But let's first take a look at the three maps of the master plan.

A birdseye view towards the centre of Utrecht with the proposed interventions

Step 1, main interventions

The first step of the master plan will conceive the basis of the final design and it will set the direction in which the plan will develop. As already stated in previous paragraphs, the southern axis of the in between area will function as the backbone for this development. As the toolbox shows, the axis can only fulfill this function if it is integrated properly and well connected to the surrounding areas. Logically, the first step then would be to downscale and integrate the axis. This means that we can make new connections towards the surrounding areas and downscale the profile of the street. The sections in the next paragraphs will show the new profile of the axis in the sections. By the creation of an urban front along the axis, we are able to develop a more urban profile, which fits in the goals and aims of this project. This new profile will also improve the continuity and definition of the morphology along the axis. The plan for the new centre of Kanaleneiland, in the western part of the in between area, is being constructed at the moment, but it doesn't fit completely within the guidelines of the toolbox. The main changes are: opening up the facility centre and spreading it along the axis, in order to create a better mix of functions and more liveliness along the axis; and second, making new connections to integrate the axis better to the district. Another important intervention within the first step is the replacement of the two very large roundabouts by a more urban intersection. The roundabouts prevent the axis of integrating properly at these important nodes, they don't fit in the rigid structure of the surroundings and need a lot of space, which can now be used as space for development. Next to that, the effectiveness of roundabouts decreases when the difference between traffic flows from each side becomes higher, which will be the case here. These described interventions will form the basis of developing an urban and integrated axis.

Masterplan - step 1

In between area Utrecht

Step 2, main interventions

The interventions within the second step will continue on the path that has been set out by step 1. Now that the basis for an integrated and urban axis is there, the area is ready to continue urbanization and densification and integrate the axis and the districts to a larger extend. Throughout the area, new connections have been made in order to open up the area towards the axis. These connections will be explained in the coming paragraphs. The interventions for the post war area Kanaleneiland are relatively minor and on a more gentle scale than the interventions which have been done around the centre of the area. Using the toolbox as a guidance, this resulted in making new connections, improving morphology, permeability and legibility and replacing insufficient buildings. The buildings that were insufficient didn't have enough mixture and didn't create enough density to develop a sustainable level of urbanity. The replacements and additions that have been done, had the goal to create a clear separation between public and private and to transform unused places into qualitative urban courtyards. Next to these interventions in Kanaleneiland, the other developments were based on adding a next row of urban blocks where possible, hereby increasing the intensity of people and the mixture of buildings. The typology of the urban block is added, because it has the advantage of fitting in the structure, the ability to create high densities and it has a certain flexibility to create a mixture of functions over time, as we saw in the toolbox. The second step makes connections between several qualities in the area. The urban park is one of the main qualities of the in between area and by making the connection between the park and the canal in the east, it will be better integrated with the surrounding neighborhoods and it will open up towards the area. The new row of urban blocks will provide a clear border of the park and gives it more definition. This will decrease the amount of green space within the districts, but it will improve the quality of the park and make it more urban.

Masterplan - step 2

In between area Utrecht

Step 3, main interventions

The third and final step of this master plan will optimize the level of urbanity in the area and it comprises the answers on all the research questions stated in this research. It shows how we should deal with the in between areas, which are the subject of change in the cities within this project. The interventions that are represented by the third step are done in the east part of the in between area. Along the axis, urbanization is spreading and the districts around the street are becoming successful and lively urban places. Next to this, the third step improves the connection between qualities in the area. The potentials of the business area are used to an optimum by preserving the qualitative buildings and adding new to create a sustainable mix of functions and buildings. By extending the urban park towards the east, a new connection between park and canal is been made. Next to this, the park also opens up towards the business area and improves the quality of the district. Urbanization tends to create a strong border between nature and built space, because space becomes scarcer and is used to an optimum. Probably the best example of this process is of course the Central Park in New York, where we will find an extremely clear border between 'green and grey'. This makes it important to preserve and reinforce the green structure in the area and create a better definition. The third row of urban blocks makes it more feasible to make a new connection towards the west of the in between and towards the centre of Kanaleneiland. This will increase the level of integration of the axis. The final step tends to use space to an optimum, which is one of the main goals of the government at the moment (VROM, 2006). This will enable the in between area to develop and sustain a sufficient level of urbanity and to contribute to meeting the building targets of the municipality.

Masterplan - step 3

In between area Utrecht

3.2.3 Key interventions

Infrastructural interventions

The interventions on the infrastructure of the in between area are based on tests with the program Depthmap, which uses the theory of Space Syntax to measure the integration of the infrastructure. It was found that the local integration of the axis improved when new connections were made to the surrounding neighborhoods. This also improved the 2-step depth, which represents the reach of the axis. This means that a greater amount of people live within relatively easy traveling distance, as Montgomery (1998) describes. Thus, improving the integration of the axis will contribute to the level of urbanity on the street. Mainly, the critical interventions have been done along the axis and in the post war social housing areas (Kanaleneiland). Due to the principles of the design for the area, the streets have little integration and many dead ends. As the map shows on the right, two new continuous axes, connecting the north and south of the district, have been constructed by making only a few connections. Furthermore, a lot of new connections along the axis have been made to the direct surroundings and further on into the neighborhoods. This solves the §segregation of the neighborhoods to a large extend and improve the integration of the infrastructure network. As we will see in the conclusion chapter, the overall integration of the southern axis improves a lot when these interventions will be elaborated, which will in the end contribute to a lively and urban axis, full of activity.

The urban park

Preserving, replacing and adding

As we saw in the toolbox, it is essential to create a mixture of buildings, in form, age and type. This means that it takes time to grow this mixture and develop a sustainable level of urbanity. Therefore, we want to preserve the buildings that have a sufficient quality or the potential to become qualitative. The business area is an exclusive opportunity to create a qualitative urban place by preserving, replacing and adding buildings. It contains some factories with a lot of history, which can be transformed into other functions. The pressure, due to the shifting gravity, results into a movement of large-scale companies to the edge of the city. The office area Papendorp will provide a new residence for large-scale offices and the business district at the other side of the highway will provide a place for large-scale business. This means that there will be a lot of development space available where we can densify and develop urbanity. As a reference for what to do with the historical factories and the empty office space, the Westergasfabriek and the IJkantine in Amsterdam are nice examples (see reference paragraph).

The same principles from the toolbox are used to improve the districts with the post war social housings. Also here it is very important to preserve the buildings that have a certain quality and replace the buildings that don't have the potential to sustain this quality. As we can see in the map on the next page, these principles are put into practice by preserving the blocks that form the clear structure of the area and add buildings blocks in order to create a qualitative urban courtyard. The reference page shows two pictures of a buildings block which has been revitalized by improving the façade and changing the function of the plinth. This shows that these blocks have the potential to become qualitative and sustainable buildings with a lively plinth. Another image on the reference page shows what the potential then is of the courtyard that has been created. It can be the place where people meet, create a stronger social bonding and enjoy the life outside in their own quiet courtyard. Following these principles, the entire post war area has been improved in a similar manner.


Infrastructural interventions

Connecting park and canal

As we can see on the map with the same title, the urban park of the in between area has been connected in several ways to the neighborhoods and to the green and blue structure. In the first and second step, the connection has been made towards the canal in the east. By doing so, the park will be better connected to the existing city and to the blue structure. The green axes, which are already present partially in the neighborhoods, have been continued towards the new harbors and further on towards the canal. This also makes the connection from the business area towards the urban park, which will probably make the park more used, as it will be more present. The park is part of a green structure which stems from the Amsterdam Rijn canal and continues towards the office park landscape in the north part of the in between area, along the middle axis. This green structure has been enforced around the axis, in order to make in more present and create a clear separation between built space and green space. Another important green intervention that has been made is the expansion of the park towards the canal. This resolves the segregation between the park and the business area and lets the business area benefit from its green qualities. By downscaling the axis, the park will also be better integrated with the surrounding neighborhoods and it will be easier accessible for the inhabitants, as the regional axis has been transformed into an urban and local street.

The centre of Kanaleneiland

The planned interventions for the centre of Kanaleneiland don't match completely with the principles of the toolbox. At first, the integration of the axis is not improved, as there have not been made new connections to the surrounding neighborhoods. So, the first step would be to add two new connections, which result in two new axes, which continue from the northern part of the district, crossing the axis towards the south. This will improve the integration of the centre with the complete housing area and are therefore of great importance. Also the roundabout has been replaced by a straight junction, because this fits better in the rigid structure of Kanaleneiland, leaves space for development and solves the problem of a barrier, due to the large scale of the roundabout. The next change that has been done is the improvement of the definition and continuity of the morphology along the axis. Buildings have been situated closer to each other along the street and the street profile has been narrowed from 70 meters to around 40 meters. This will improve the continuity and define the street properly, creating a clear urban space along. The final, but probably the most important intervention, which has been done, is opening up the facility centre of the neighborhood. The problem with the proposed design is that it still has a concentration of facilities in basically one building. The goal of this project though, is to situate facilities along the axis and create a lively and urban environment along the entire street. Applying these principles to the design for the centre resulted in opening up the building and split it into four separate ones, hereby creating a new public space, which has a direct relation to the street. This public space actually crosses the street towards the southern part, which makes the connection towards the southern district and integrates the street with the public realm. This intervention also leaves room for facilities to be situated along the axis instead of a concentration in one spot.

The vision for Papendorp

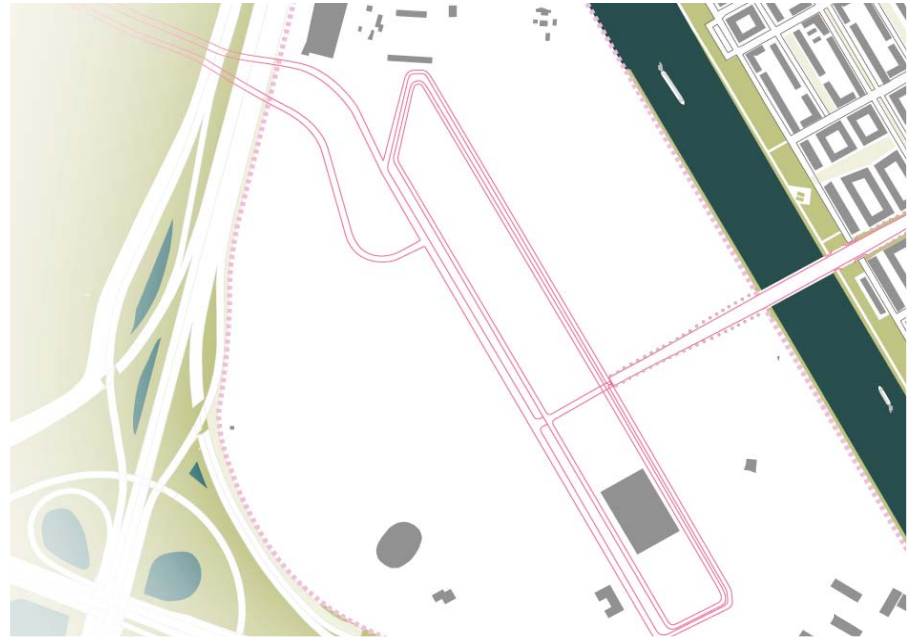
At the moment, the office park at the beginning of Leidsche Rijn has been constructed for about half of the total plan. A housing area has been foreseen along the Amsterdam Rijn canal, near the bridge towards the in between area. This area has the potential to achieve a certain level of urbanity and integrated axis towards

Preserving, replacing and adding

Connecting park and canal

The centre of Kanaleneiland

The vision for Papendorp



the housing areas of Leidsche Rijn. It is situated at an important node of two highways, which connect Utrecht to the north, south, east and west of The Netherlands. Next to this, it will be also very well connected by public transport, as a main bus line connects the area to the railway station of Utrecht, which as we saw in the research chapter, has an important national position. This means that the area has a relatively large-scale character, which leaves room for some larger scale urbanity. Following the principles of the toolbox, we can state some conditions for the district, in order to achieve the desired level of urbanity and create a well-integrated axis. The conditions for the axis are, that it has to be designed as a main route from Leidsche Rijn towards the in between area and further on towards the city centre. Combining all the traffic flows will contribute to the continuity of the connection and it will add to the position of main route. Next to this, the axis should be well integrated with a sufficient amount of connections to the surrounding areas. The morphology along the axis should create definition and continuity, which makes the route clearer. Furthermore, the areas surrounding the axis should have a proper level of urbanity, to support the identity of an urban route towards the centre. This means that there will have to be a sufficient mixture in terms of buildings and functions. At the moment, the design of Papendorp shows a clear separation in office areas and housing areas, but this will not contribute to developing urbanity. Next to the mixture, the morphology of the area should be permeable, which prevents segregation and stimulates small-scale activity. Finally, the density of the office park should meet the demands of the toolbox, which means that the goal would be to create a density of around 10.000 to 15.000 inhabitants/km2. Following these principles and conditions will enable the office area Papendorp to sustain urbanity and create an integrated and lively axis. The reference image on the right shows what the future boulevard of Papendorp could look like along the canal.

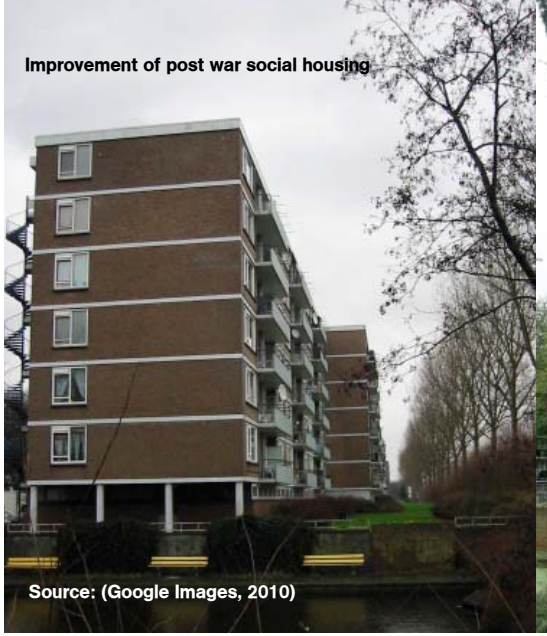
References

The reference images have a direct relation to the key interventions paragraph and further explain what it foreseen by the proposed design. They show what the potential of post war social housing is, what the potential of preserving historical buildings is and what the area of Papendorp could look like when the toolbox is used as a guideline for its design.

Pietsmidkade, Rotterdam

Source: (Google Maps, 2010)


An urban courtyard
Source: (Flickr, 2010)


Improvement of post war social housing
Source: (Google Images, 2010)


The Westergasfabriek, Amsterdam
Source: (Google Images, 2010)


The IJkantine, Amsterdam
Source: (Flickr, 2010)

3.2.4 Visualizations

The three steps

The visualizations on the following pages show the transformation of an area around the in axis. It is about the area within the circle on the map on the right, with a view towards the centre. The image on the bottom shows the current situation at the same place. The first step shows a division between the lively urban front that has been added and the quiet neighborhoods, which it creates behind the front. In this step, nothing has to be demolished and the residents can remain in their houses. The urban front that has been created is the starting point for further urbanization in the area. In the second step we already see a new row of housing blocks, which results in a densification and a mixture of buildings. We can also see that the liveliness on the street starts to increase as more people are living in the vicinity and urbanity is developing. The third step shows the final result, where more shops have opened along the street, and there is even a store that has opened in a side street, because it has enough support from the large amount of people living in the vicinity. Urbanity has been developed, with a lot of activity and liveliness as a result. A place has been conceived where people can enjoy the qualities of urban life and spend time throughout the day because there are a lot of things to see and do.

Overview of the location of the visualizations

Overview of the location of the visualizations

Source: (Google Maps, 2010)

The quiet neighborhood behind the new front

The new lively front, a starting point of urbanization

The southern axis, first step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The southern axis, second step

The southern axis, third step


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ZOETERMEER

4.

introduction

research

design

conclusion

4.1 Introduction

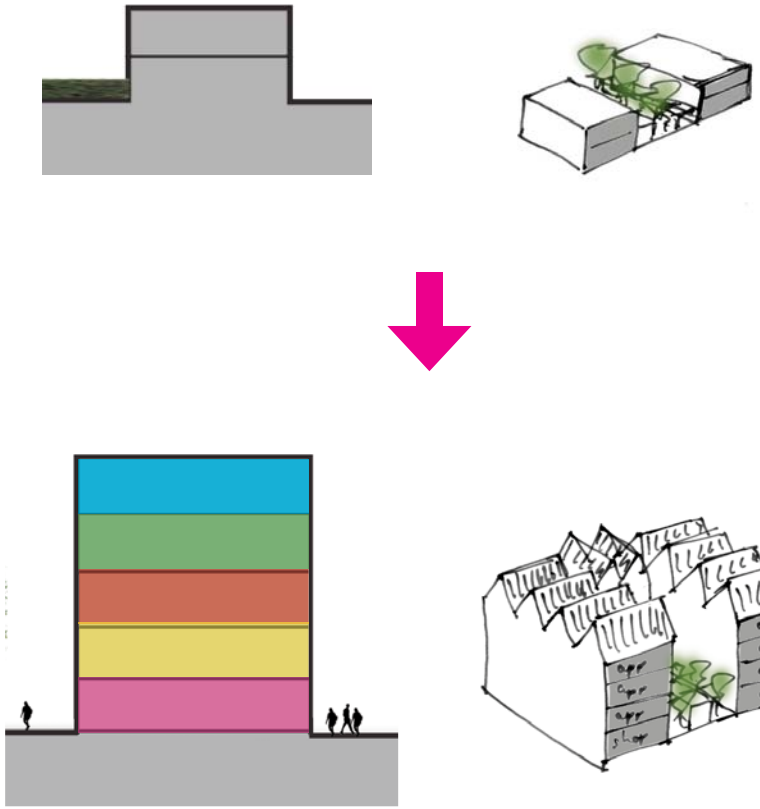
In order to show what the effect is of the proposed interventions it is useful to measure the changes that have been made by the design. In the following paragraphs, this has been done by taking the toolbox again and elaborating the same analyses on the new situation. In this way, it is easy to compare the new situation with the original and see what has changed. After this has been done, we can take a look back and conclude what the effectiveness of the interventions is and whether or not it has been successful.

4.2 The impact of the interventions

4.2.1 Mixture of uses

According to the toolbox, an area should have a mixture of uses in order to sustain activity and urbanity. As described in the main interventions topic of the design chapter, the area should have a better mixture, in terms of program on the larger scale. The post war, social housing areas for example, don't have much mixture and contain mainly dwellings. On the level of the street this results in little activity, due to little small-scale mixture. As the toolbox showed, the compared urban axes all have very different typology of buildings along the street. They all have a strong relation to the street and a mixture of uses within almost every block. The program that has been added in the design has a better mixture, as the images on this page show. The top images resemble the post war, social housing typology with housing as the only use. The bottom images show the principle of the improvement, a better mixture of uses within the urban block. The typology which has been added, has a stronger relation to the street than the current typology, which allows it to sustain diversity in uses. As urbanity will develop over time, more uses can be added to the urban block, depending on the local economy. This will result in the development of a fine grain economy with a lot of street life within the public realm.

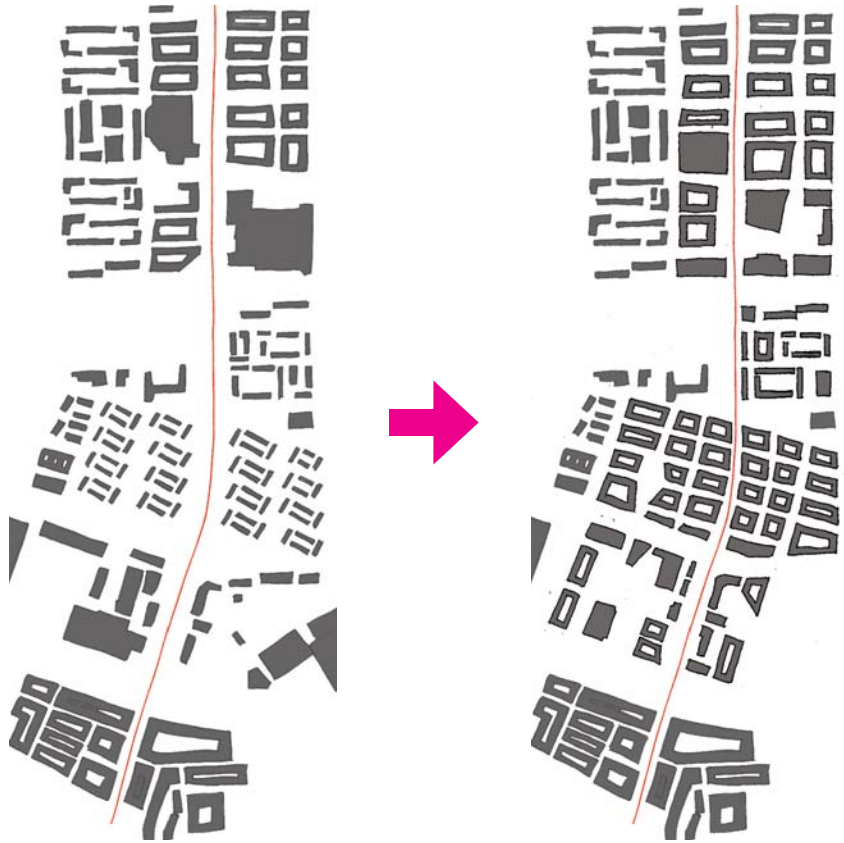
from none to a lot of mixed uses



4.2.2 Permeability

On the right, the morphology analysis within the toolbox is done again with the new situation. This clearly shows the improved permeability of the urban fabric. The structure has become clearer and the relation to the street has been improved. The principles for the permeability have been taken into account in order to determine the measurements of the building blocks. The problem with the morphology of the original situation was more related to the readability of the structure. The buildings had no direct relation to the street and where oriented in a different manner, which resulted into an unclear morphology. The permeability was relatively good, as there were no very long buildings, exceeding the maximum façade length of the toolbox. Taking these measurements into account, the readability of the urban structure has been improved by adding new urban blocks with a stronger relation to the street, as we can see in the images on this page. This resulted in a denser and more rigid morphology, which shows more similarities to the morphology of the study cases.

Towards a better permeability



4.2.3 Mixture of buildings

The interventions are based on preserving, replacing and adding buildings, which means that we should preserve and improve the buildings that have a sufficient quality and replace the buildings that don't. This will result in a better mix of buildings than the current situation has. As we can see in the image on the right, the typology of the buildings has a relatively monotonous character with very little mixture. The building on the picture has been 'copied' for 64 times, so we could say that the area is in need for a little more creativity. The proposed building blocks have a lot more variety as we can see in the image on the right bottom side of this page. This means that there will be more diversity along the street and more variety to meet the eye when walking along the facades. When there is more to see for people, it will be more likely that they will come and visit the area, which will make the public realm more lively. So, next to the variety that develops due to the preserving and adding of buildings, there will also be a variety of buildings within the urban blocks, which will contribute to the development of urbanity.

Little mixture of buildings, the present situation

Source: (Google Maps, 2010)

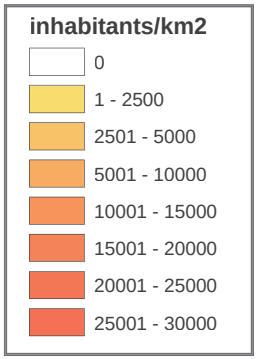
A lot of mixture of buildings within the block, the proposed situation

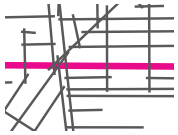
4.2.4 Intensity

The interventions within the final design will result in a lot more people living in the vicinity of the axis. The densities that have been created are comparable to the densities that we found along the urban axes of the study cases. Taking a look at the amount of houses that have been added or replaced (for an overview see the appendix), we can state that the density goals within the toolbox have been realized. The average density of the neighbourhoods where interventions have been done, will lie around 12.000 inhabitants/km2, which will be sufficient to sustain a mixture of functions in the area and urbanity. The original average density lies around 7.500 inhabitants/km2, so we can conclude that the density has increased significantly. A total amount of 9.500 houses have been added and 1.500 houses have been demolished, which means that the total amount of houses increased with 8.000 houses. This is a relatively large part of the total of 30.000 houses, which have to be built towards 2030, according to the plans of the municipality. Thus, we can state that this research shows that the in between area has a relatively large capacity, which should be used to take away the pressure on the housing market of Utrecht and create a successful urban area.

Densities, the current situation

Densities, the proposed situation



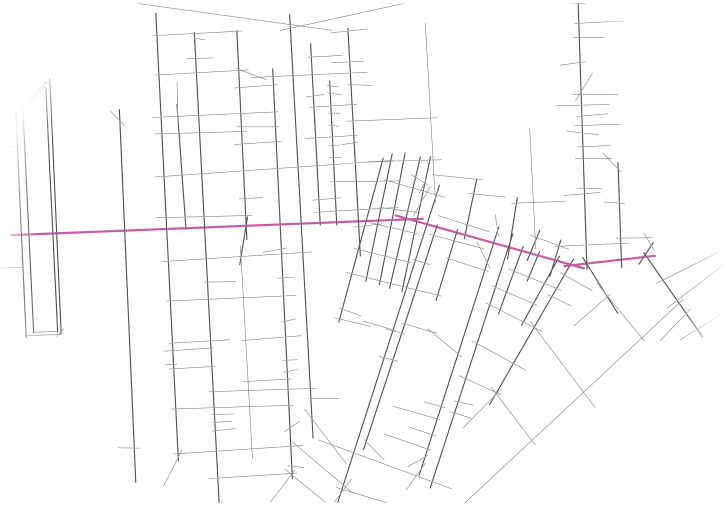


4.2.5 Catchment, integration

As the images on the right side of this page show, the catchment of the axis has been improved significantly, due to new connections throughout the area. The segregation of the neighbourhoods along the street has been improved, as they are now better connected. Improving the catchment of the axis also means that there are now more people living within easy travelling distance of the street, as it is better accessible. This will increase activity, because it is more likely that people will use the axis. In the 2-step analyses on this page, we can also see the difference in scale, due to a significant amount of new connections along the axis. This has transformed the axis from a barrier into a connector for the surrounding districts, because there are a lot more places where people can cross the street. The catchment is now better comparable to the catchment of the axes in the study cases, which all have a fine grain of connections and a relatively large 2-step depth.

2 step depth, the current situation

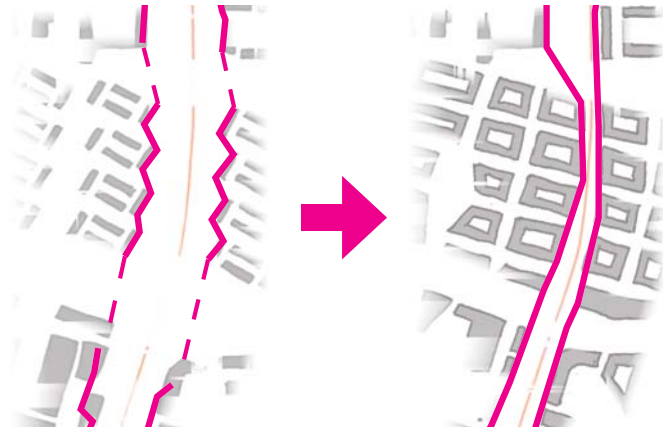
2 step depth, the proposed situation



4.2.6 Continuity

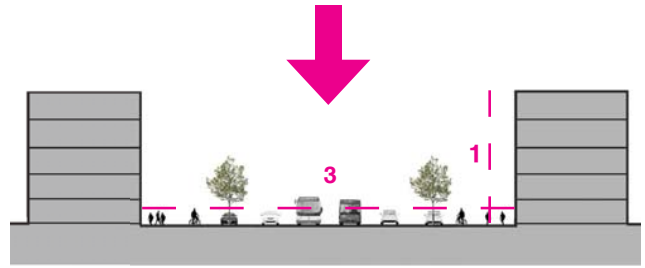
The original continuity of the axis shows little similarities to the axes in the study cases. This is the result of the post war design, where the axis was developed as a regional road with very little integration with the surroundings. This resulted in a morphology that has no direct relation to the street at many places. Many buildings along the axis have not been situated towards the street and sometimes with their front façade in another direction. Also the space in between the buildings was very large which doesn't contribute to the continuity and definition, as we saw in the toolbox results. The buildings that have been added along the axis however, all have a strong relation to the street, as the image on the right explains. This significantly improves the continuity of the morphology along the axis. The front that has been created shows a relatively fluent line, which clearly shows the continuity. This new situation shows a lot more similarities to the urban morphology of the study cases and makes the southern axis a clear route between centre and expansion.

The improved continuity



4.2.7 Definition

As the toolbox shows, the axis needs a certain definition in order to be successful. This will create a more continuous route and it will define the public realm. The original profile was designed with a ratio of 20:1, section width:building height. This means that there is basically no definition of the street. The interventions show a significant improvement towards a ratio of 3:1. The minimal ratio for a clear definition lies around 4:1, so the proposed design should be sufficient to create well defined street. The ratio of the design for the new centre of Kanaleneiland lies around 5:1, but with the interventions that have been done in this area, the definition is improved to 4:1. The axis has hereby a well definition through the entire in between area.



4.3 Main Conclusion

Now that the research has been done, the design has been implemented and the impact of it has been measured, we can take a look back at the research question, which has been stated in the introduction. After the problem statement I had come to the following main question, which has determined the development of the project to a large extend, but has always been adapted during the process: *how can we implement new housing oriented developments within the area in between a large housing expansion and the urban core, in growing Dutch cities, by dealing with a shifting gravity point and making use of the support provided by the housing expansion at the edge of the city?*
The growing Dutch city where all the practical research questions have been answered is the city of Utrecht. It appeared that this city has the largest expansion, the largest shifting gravity point, the most clear in between area and the best opportunities to use the connecting axes as a support for development, which all made Utrecht the best study case to elaborate the final design.

The master plan for the in between area of Utrecht tends to find an answer on the challenges and problems that are found in places where there has been a very large expansion, which resulted in an in between area where densification is a goal for the future, due to limited further expansion opportunities. As the introduction showed, this means that the in between area should make the connection between the centre and the expansion, it should use the expansion as a support for new developments, it should be densified and it should adapt to the shifting gravity point. As the research chapter showed, we can transform these challenges and problems into two sub-research questions:
- How can the axis be integrated in order to make the connection and use the expansion as a support?
- How can the in between area increase density and develop urbanity, in order to meet the targets of the government and municipality, and adapt to the shifting gravity point?

The answer to these questions has been given in the design chapter, where the perspective is shaped and the interventions followed out of the developed guidelines.

The final design for the in between area of Utrecht shows what the potential of these situations is, where an in between area has been developed, due to a very large expansion. By using four study cases, which all have the desired urbanity, I was able to develop a toolbox that shaped the design. This toolbox is based on a comparison between empirical analyses on the study cases and scientific research on this topic. The conclusion was that the area and the axis had to have several conditions, in order to develop a sustainable level of urbanity and use the axis as a backbone for the developments. Comparing these conditions to the original situation of the area resulted in a number of conclusions, which formed the basis for the design. The final design is implemented in three steps, with a time span of 30 years. After these steps, the in between area will have a well-integrated axis, which makes the connection between the centre of Utrecht and the expansion Leidsche Rijn and uses the expansion as a support for development; and the in between area will have developed a sustainable level of urbanity, with successful and lively urban places along its main street. The implementation of this design is the answer on the research question. This is how we should implement new housing oriented developments within the area in between a large housing expansion and the urban core, in growing Dutch cities. This is how we should deal with a shifting gravity point and this is how we should make use of the support, provided by the housing expansion at the edge of the city. The design for the in between area of Utrecht will then be the example of how to answer the research question in similar situations which can be

found in several growing Dutch cities, like Amersfoort, Amsterdam and Den Haag.

4.4 Reflecting on study cases

Reflecting on the other cities

Taking a look back at the four study cases where the research has started with, we will find some similarities to the case of Utrecht. The other cities would also have the potential to find an answer on the challenges and problems that have been stated in the introduction. Fact is though, that Utrecht is the best example to elaborate the final design goals and aims on, because it has the most clear in between area, the largest shifting gravity point, and the best opportunities to use the axes as a backbone for development. Also the fact that there is a large pressure on the housing market supports the development of urbanity in the area. However, developing urbanity in the in between area might be only a suitable goal for Utrecht. Every study case would demand its own aims and goals for its final design. Now, let's take a quick look at the three case studies and imagine what the design would look like for their in between area.

Amersfoort

The city of Amersfoort has the character of a relatively quiet province town, as we saw in the analyses within the research chapter. The analyses on livability and housing prices (see appendix I) don't show very spectacular results. There seem to be relatively few problems, housing prices are a little lower than the other cities, but don't show a lot of extremes. So, it doesn't seem very logical to develop a very high level of urbanity in the in between area of Amersfoort. The municipality states that they want to stop expanding and start improving the existing areas in their city (Luchtenveld, 2009). This will probably result in building within the in between area. This is in line with the policy of the government (VROM, 2006) and this will probably result in a relatively strong densification. As we saw in the infrastructure analyses, the city doesn't have a very strong connection between the centre and the expansion, which could be used as a backbone for development. This means that a first challenge would be to improve the connection between the centre and the expansion and possibly conceive this backbone. Summarizing this imagination of a design assignment, we can state that it would probably be about searching for places to densify the in between area in a subtle way, without disturbing the residential qualities of the in between. Next to this, creating or improving an axis which could serve as a backbone for development would support the design and enable it to use the expansion as a support for development.

Amsterdam

The case of Amsterdam is a very unique one, as the housing expansion has been built in the IJ lake next to the centre. As we saw in the research chapter, this doesn't result in a very clear in between area, which has to be densified. Nevertheless, the distance between the expansion and the centre is relatively short and a few connections are relatively good, in comparison to the other case studies. Therefore, it seems that Amsterdam has a high potential for development along an axis, although it seems that the axes don't have much space left to densify or urbanize, as densities are already high and there is already a lot of urbanization, because of the short distance towards the centre. This means that the design challenge is more likely to be about developing another axis, which would improve the connection between centre and expansion, and expanding urbanity from the centre on. As the livability analysis shows (see Appendix I), the in between area (which isn't very clear) has some problems which might provide an interesting design challenge. Summarizing this, we could imagine a design challenge, which would be about

developing a new connection between the centre of Amsterdam and IJburg that would function as a backbone for development, in order to improve the quality of the problematic areas within the in between. This assignment might demand the development of urbanity, which has a lot of advantages, as we saw in this thesis. If so, than this assignment would show a lot of similarities to the assignment for Utrecht.

Den Haag

As the analyses for Den Haag showed, it has a relatively large expansion, but it is situated within a large distance of the centre and the existing housing stock of the city is already quiet large. The large distance between the centre and the expansion results in an in between area which is not very clearly defined. This will probably mean that the pressure on the in between is less high than on the in between area of Utrecht, due to a smaller shifting gravity point. Nevertheless, the city of Den Haag has two relatively clear axes, which could be used as backbones for development, in a similar way as this has been done for Utrecht. One of these axes though, is a highway, which would demand a different approach. At the moment, another axis has been planned, which uses similar principles and is used as a backbone for the revitalization of the office area Binckhorst. The axis which would be most suitable to elaborate a design assignment on, has a relatively good connection to the centre. As the infrastructure analyses show, the connection is lacking a bit near the expansion. The axis also connects an area with some problems to the centre and the expansion, as the livability analysis show (see Appendix I). Summarizing this, we could imagine a design challenge, which improves the connection of the axis with the highest potential and use this as a backbone, in order to improve the quality of the districts that encounter some problems.

4.5 Recommendations

In this research, the toolbox that has been developed is applied on the case study of Utrecht. This resulted in a design which is only suitable for the in between area of Utrecht. However, we could also take a step back and imagine where we could also use this toolbox, in order to conceive a design that is applicable to other case studies. The characteristics that these areas should have, would have to show similarities to the in between area of Utrecht. It should desirable to create and sustain urbanity with a dense population. But the area should also be in between two areas that have a certain dependency on each other, in order to enable it to use the traffic flows as a support for development. Therefore, the area should also have an axis that can be used as a backbone for this development and for the creation of urbanity. Taking a look then at the three cities in this research, we could state that Amersfoort would probably not be very suitable for using the toolbox as a guideline for the design of the in between area, because it doesn't seem very desirable to develop urbanity and there is not a clear axis which could be used as a backbone. Amsterdam and Den Haag however, would possibly benefit a lot from applying the toolbox on their in between areas. These cities have a relatively clear and continuous axis, which could be used in order to redevelop the districts around it. These cities would probably also have a higher potential for the development of urbanity in the in between area, as densities are higher and the cities are larger. Next to the study cases in this research, we could possible find more examples in The Netherlands and beyond, where there has been a large expansion that is depending on the urban core for its daily needs and where there is an area in between these two actors. Concluding we can state that when there is an area that can identify itself with the two goals of the toolbox, than it will be useful to use it as a guideline for development. This means that it would have to be desirable to have a well-integrated urban axis in

the area, which can function as a backbone, and it would have to be desirable to create and sustain urbanity.

In the near future we will probably have to deal more often with similar research questions and challenges, as pressure on the increases, due to limited expansion opportunities. As the government states as well, we will have to build within existing city borders and stop the large expansions at the edge of our cities (VROM, 2006). This will be the only chance of preserving our left over nature in The Netherlands, but it will also be a unique opportunity to develop more beautiful urban places that have the desired conditions, in order to be sustainable and successful. This research is an example of how we could deal with an area, which has the potential to densify and develop urbanity. By doing so, it has proven that there is a lot more space to build on within the existing city borders, preserving and improving the qualities of the city, which area already there and preserving the qualities of the nature around the city. As urbanists, we have the ability to convince cities to develop with these aims and goals, and improve our existing urban areas.

4.6 Evaluation graduation project

Taking a look back on a year of extensive work on the topic Shifting Gravity, I can state that it is really possible to conceive a project that is above your expectations. The graduation year is a year with a lot of pressure to perform, a lot of uncertainty about if it will meet your expectations, a lot of working hours, a lot of stress about finishing things on time and finally a lot of joy when it all ends up being successful. Working on this project at the architectural and urban design office helped me a lot to structure the process and it gave me a lot of opportunities to reflect on the process with the my colleagues on the office floor. The beginning of the project was relatively uncertain and it wasn't very clear immediately how the process would develop. At the end of the summer of 2009 I had managed to give a direction to the project. I had decided that the project should be about the edge of urban areas and possible about an historical axis that connected it to the centre. Then I noticed that there was a change within the policy of the government. The very large expansions were put to a halt and building within the existing city was the new focus. This resulted in the more or less final outline of the project: it should be about an area, which is in between one of these very large expansions and the existing city. At P2, it became clear that Utrecht was the best case study to do further research on and finally conceive a design for its in between area. Towards P3 I struggled to find the right direction for the continuation of the project. What did this shifting gravity actually mean? And how could I manage to find an answer on the challenges and problems that I had stated at P2? Slowly I came to notice that it was all about integrating the southern axis and developing urbanity in the area around it. It was only after P3 when I took the four case studies with an urban axis, in order to compare them to what the urban theory was writing about this subject. These analyses were of great importance for the development of a basis for the design. Towards P4 then, there was a large time pressure to conceive the design that was based on the findings of these analyses. I managed to develop this design on time and passed the P4; graduation was a fact. Towards P5 there was only a little amount of time to improve the design, complete the booklet and presentation and improve the posters. Although there are always things to improve and I would have done things differently the second time (and other clichés;), I can take a look back on a successful graduation year and I am very satisfied with the final result; it truly exceeded my personal expectations. There is still a lot to learn and explore after this year, but now I can imagine myself working in the field, contributing to find innovative answers on challenging questions and being part of the creative class.

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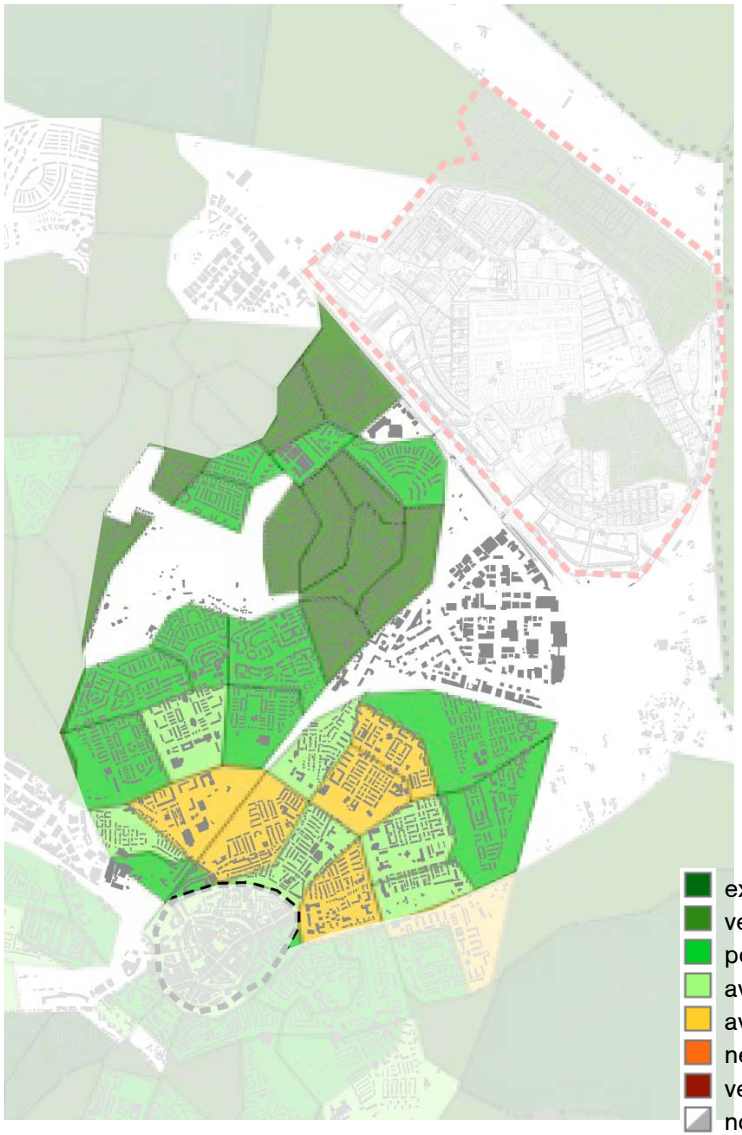
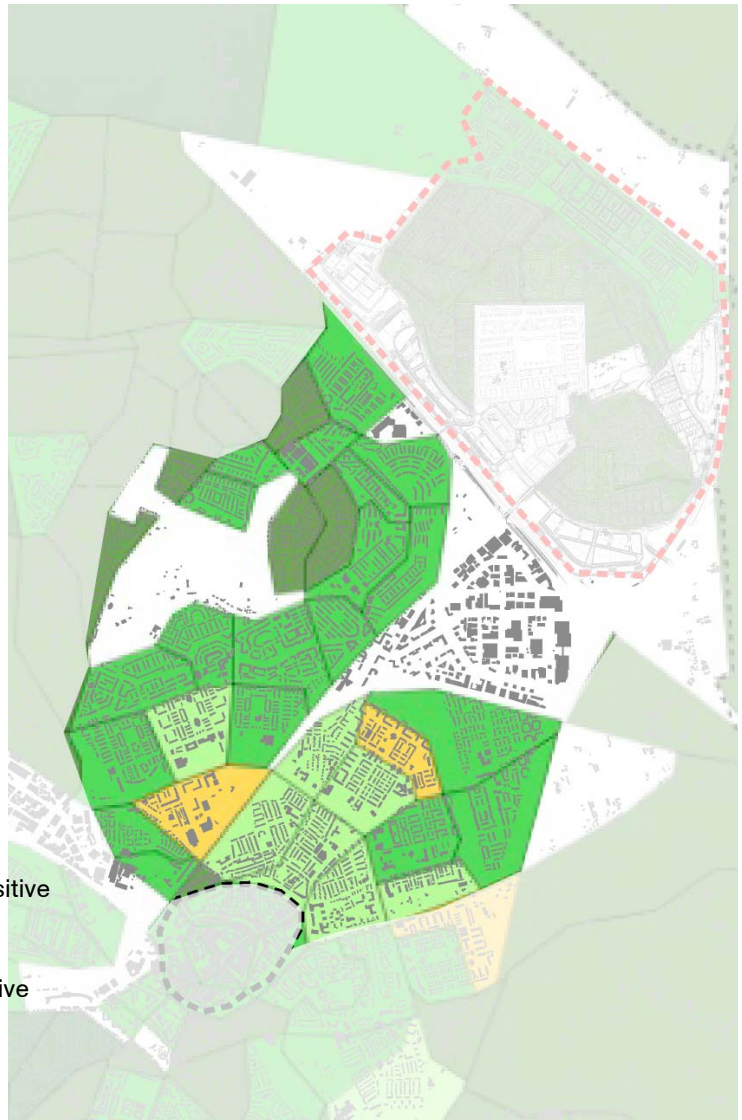
Appendix I additional analyses: Amersfoort, Amsterdam and Den Haag

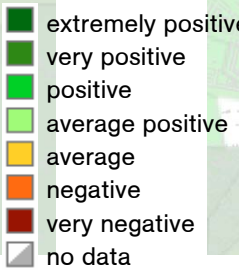
Livability and housing values

Liveability in Amersfoort, 1998



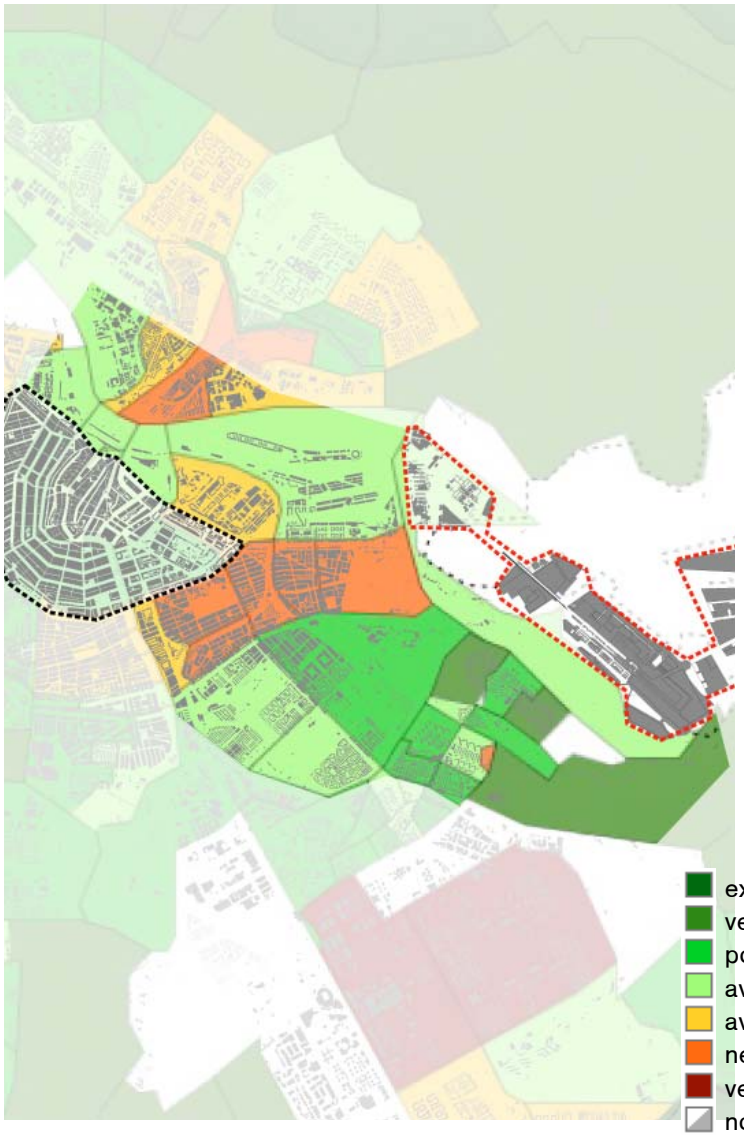
Liveability in Amersfoort, 2008



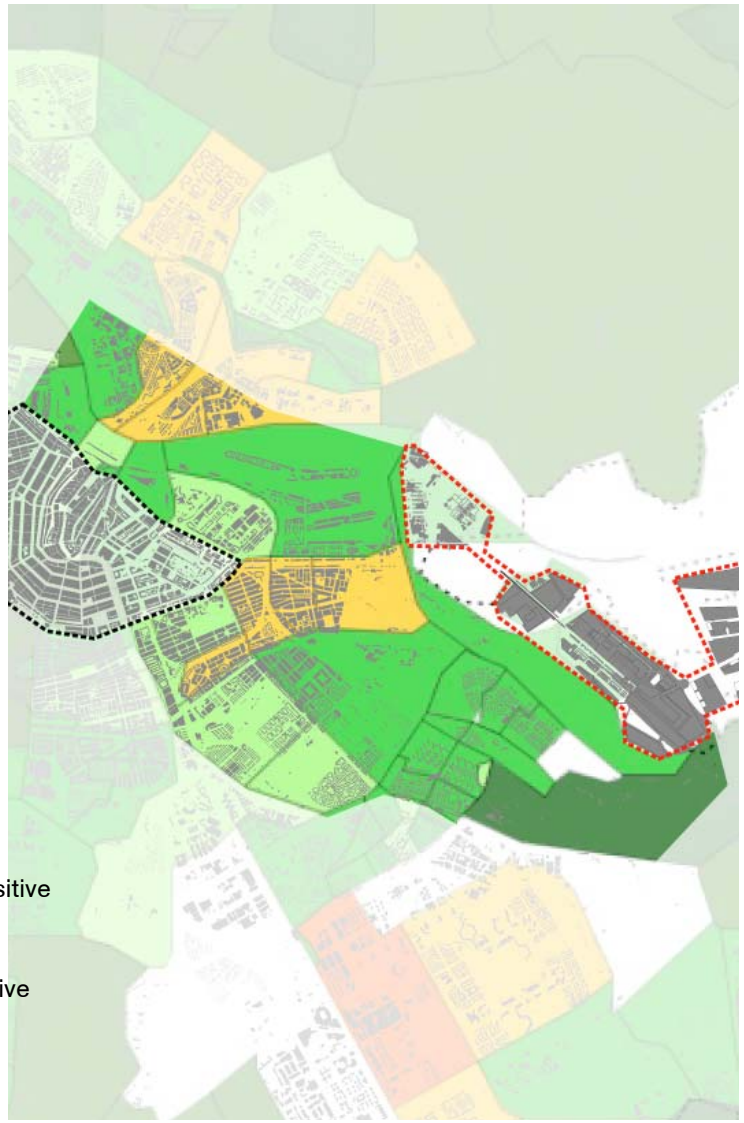


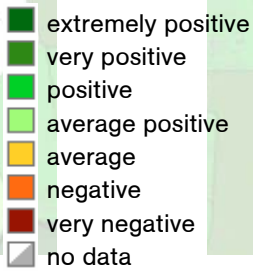
Source: (VROM, 2010; Kaartenkamer, 2010)

Liveability in Amsterdam, 1998



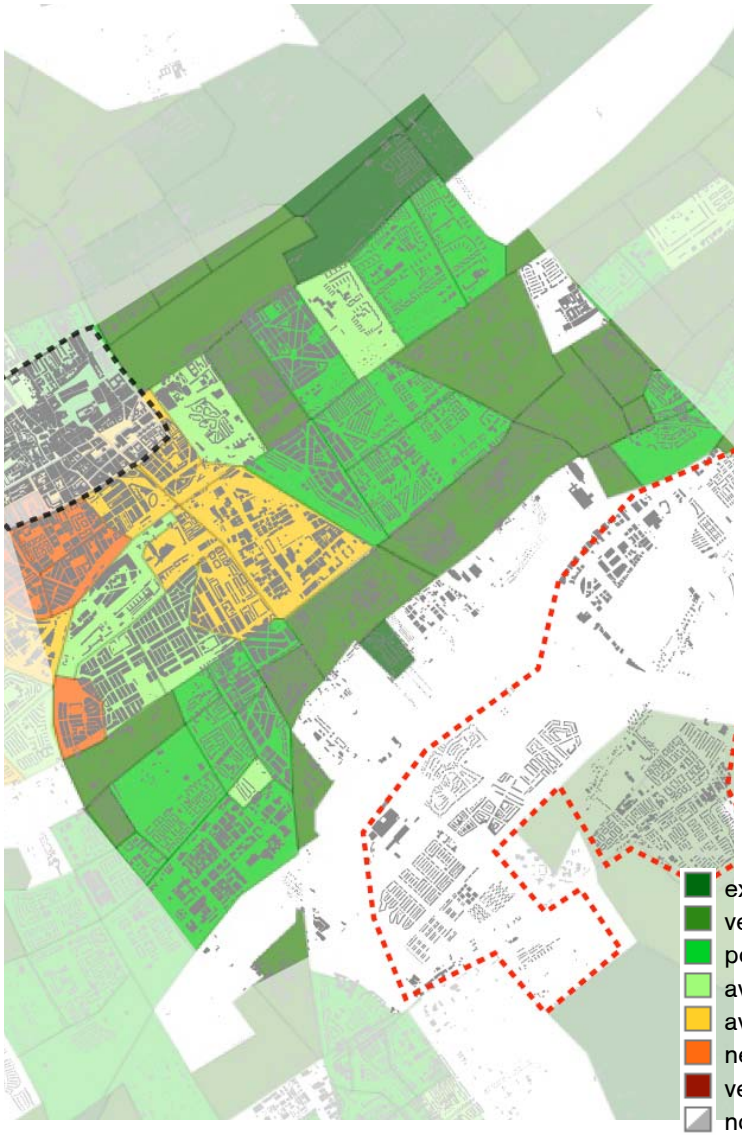
Liveability in Amsterdam, 2008



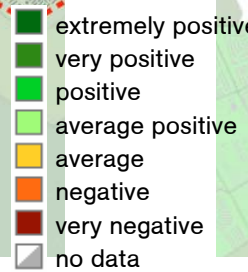


Source: (VROM, 2010; Kaartenkamer, 2010)

Liveability in Den Haag, 1998



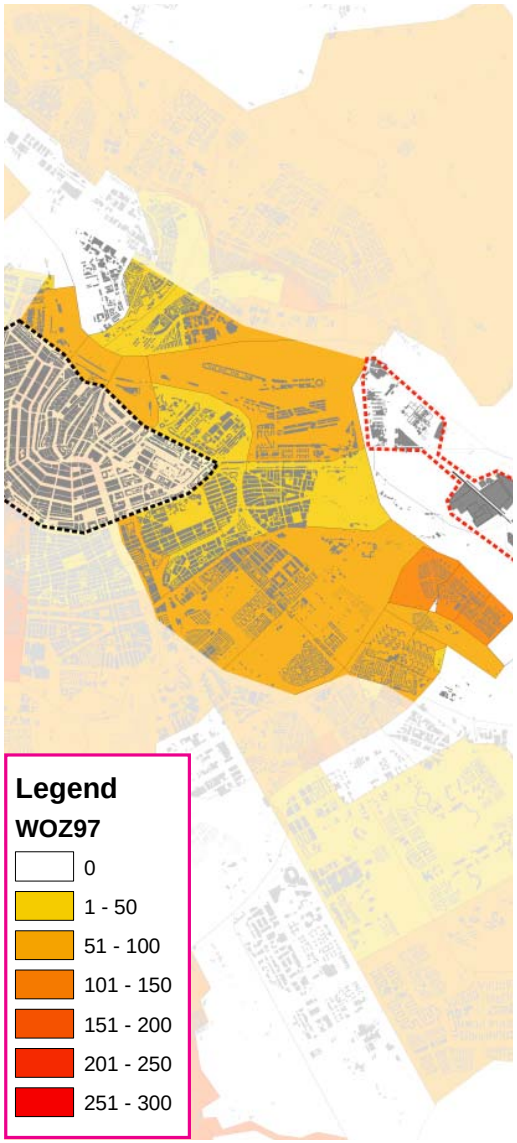
Liveability in Den Haag, 2008



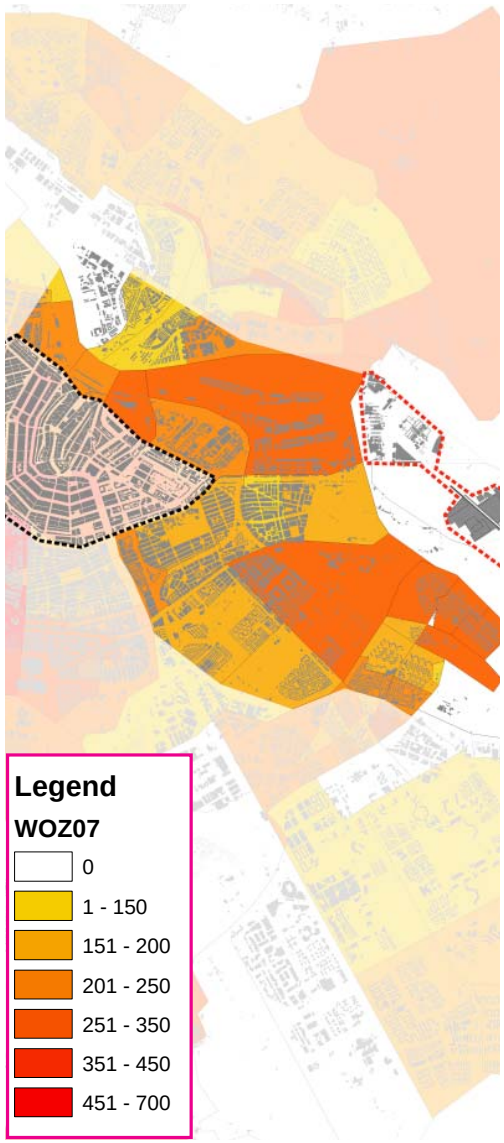
Source: (VROM, 2010; Kaartenkamer, 2010)

housing values Amsterdam

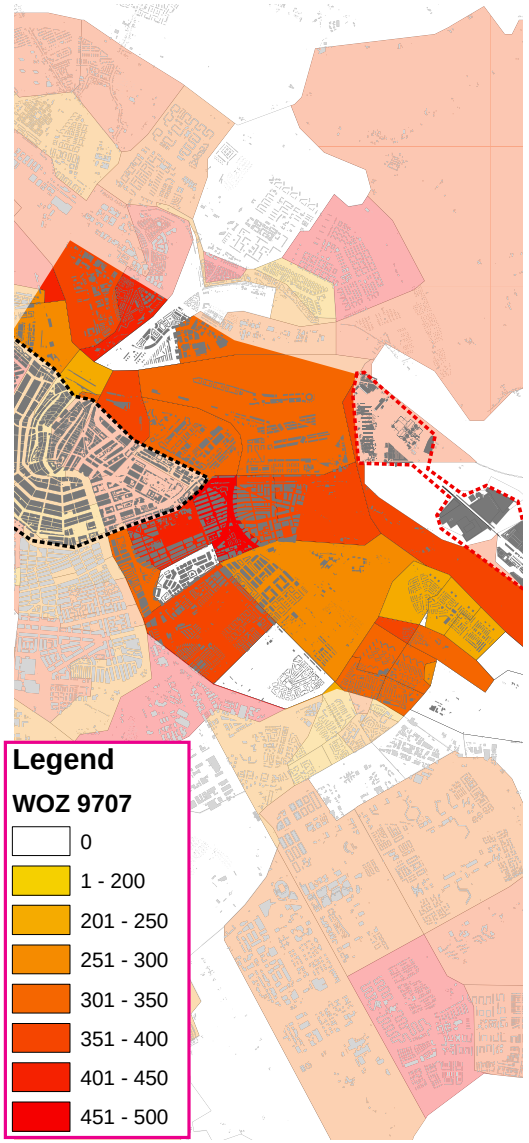
WOZ values 1997 (housing prices) of the in between



WOZ values 2007 (housing prices) of the in between



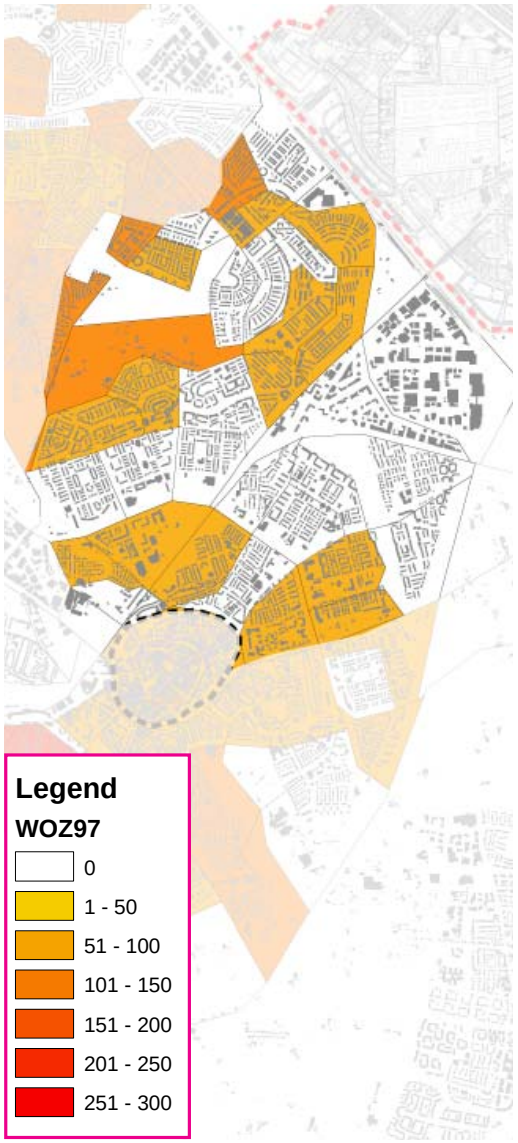
WOZ values 1997-2007 (housing prices) of the in between



Source: (CBS, 2010; Kaartenkamer, 2010)

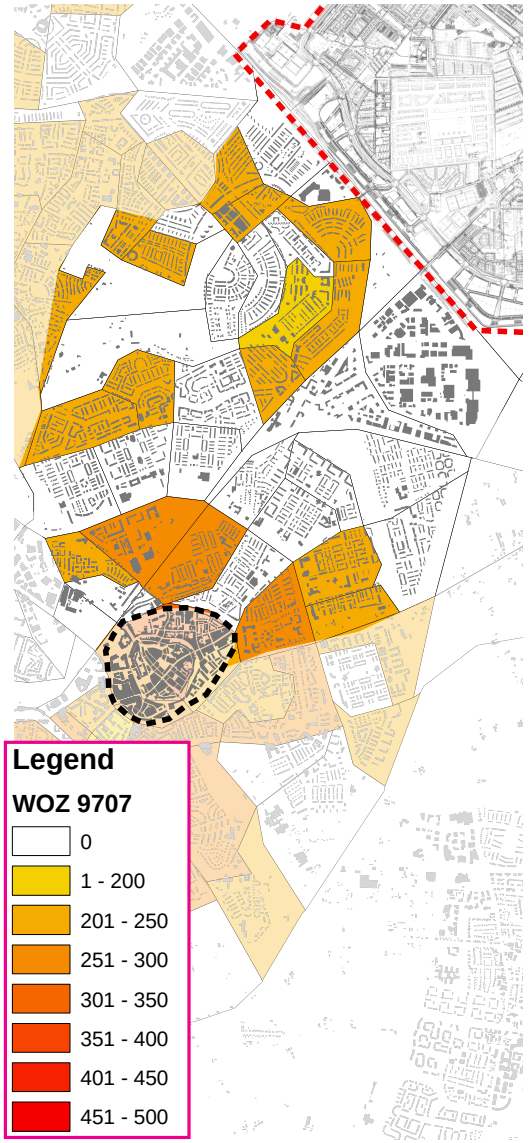
housing values Amersfoort

WOZ values 1997 (housing prices) of the in between



WOZ values 2007 (housing prices) of the in between

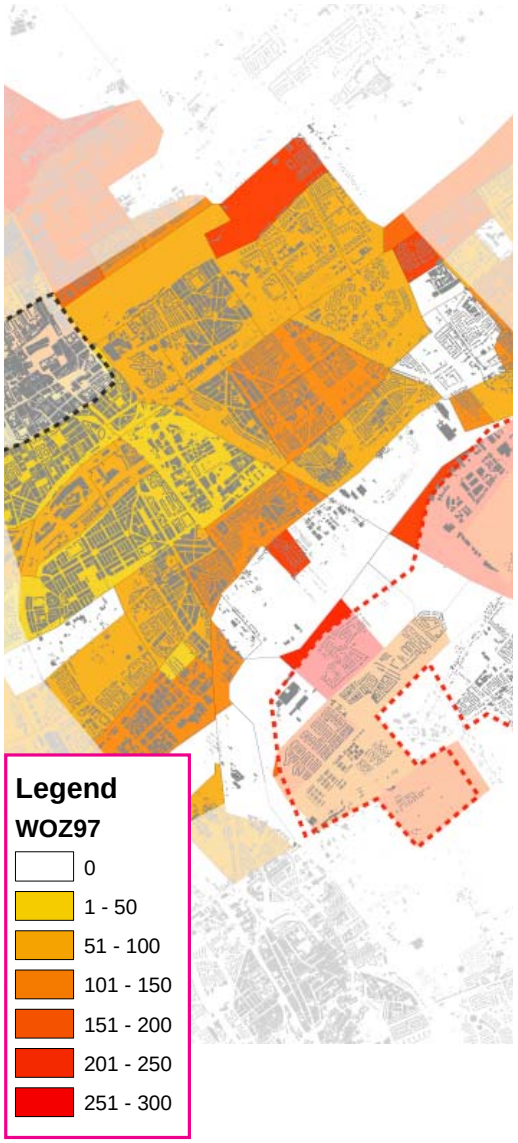
WOZ values 1997-2007 (housing prices) of the in between



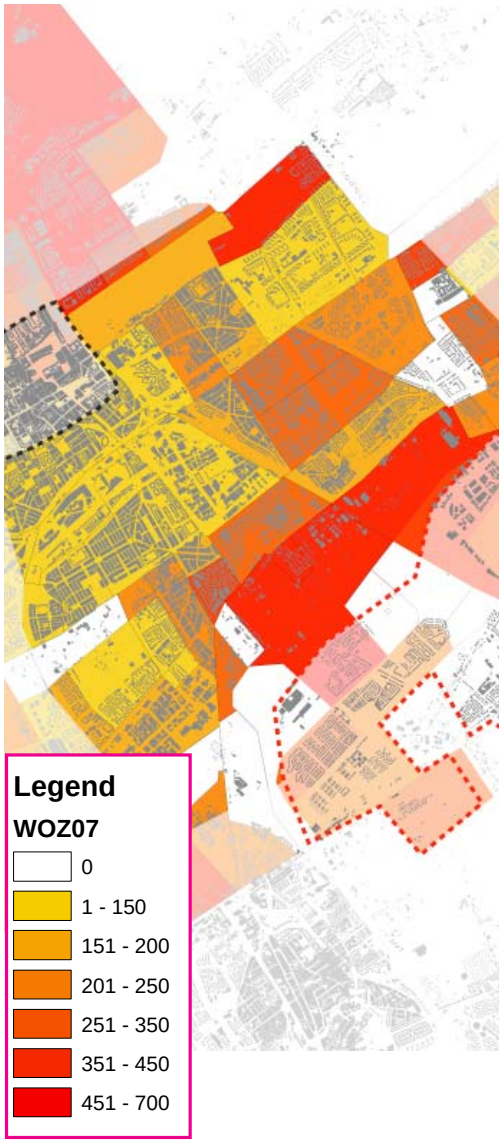
Source: (CBS, 2010; Kaartenkamer, 2010)

housing values Den Haag

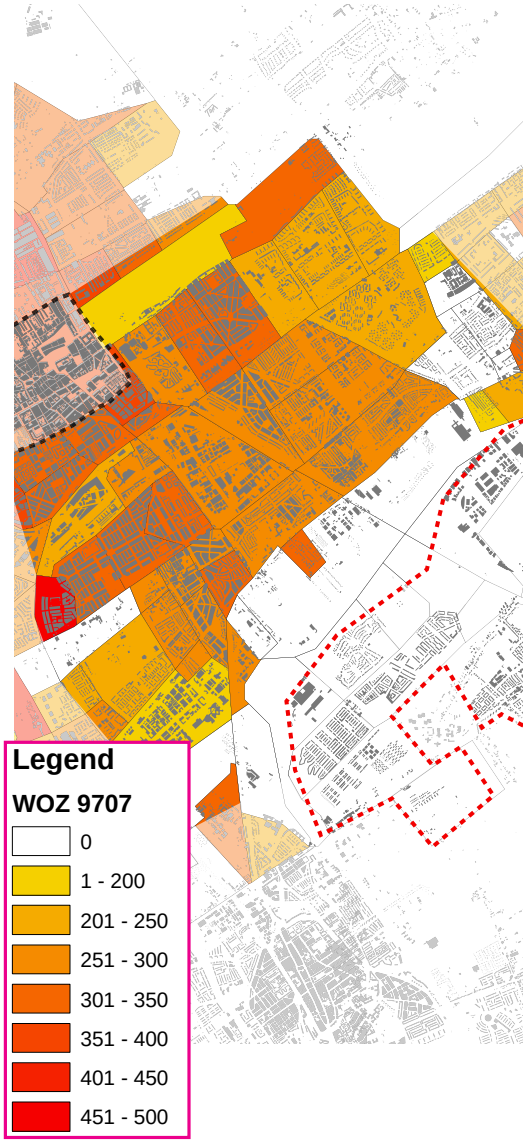
WOZ values 1997 (housing prices) of the in between



WOZ values 2007 (housing prices) of the in between



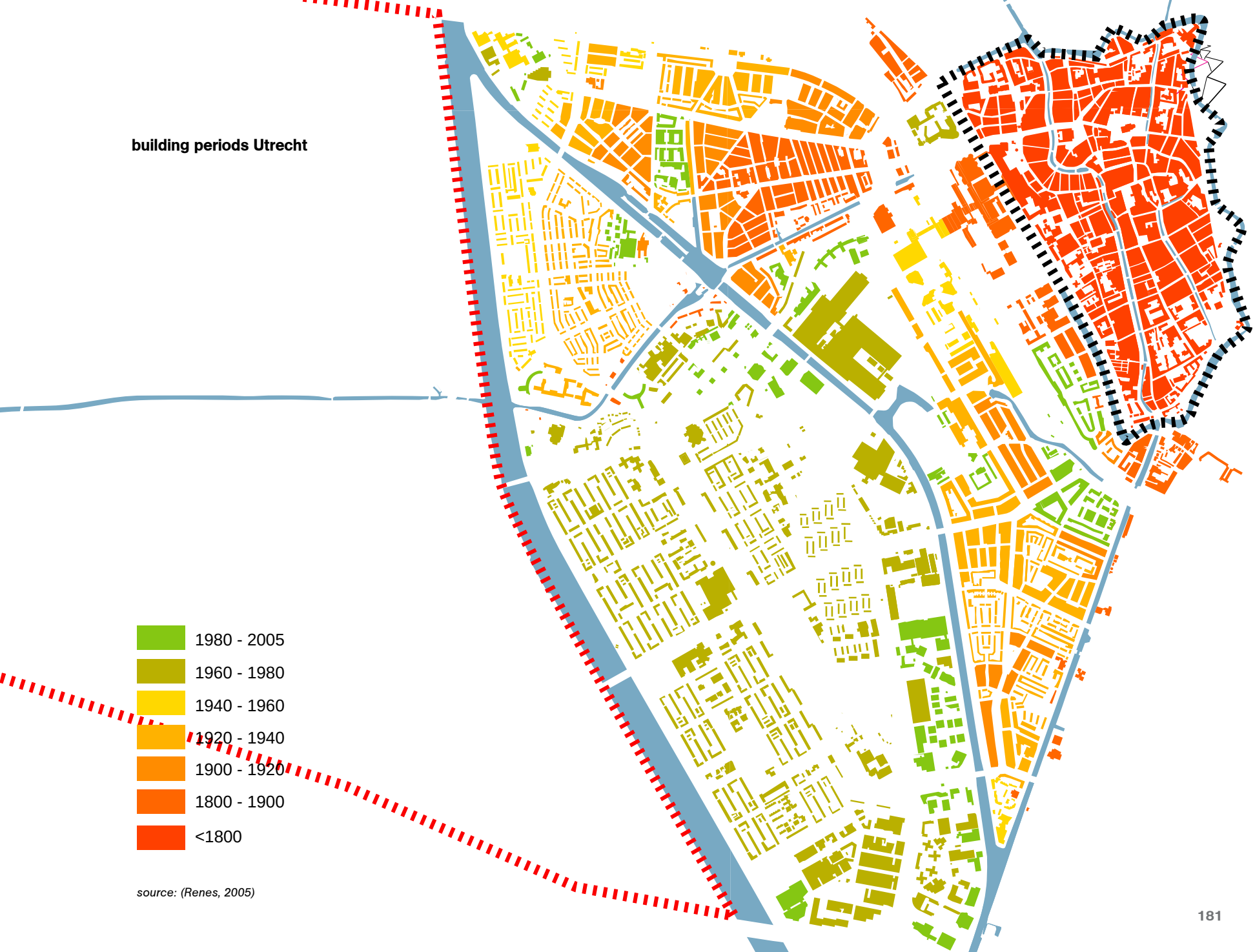
WOZ values 1997-2007 (housing prices) of the in between



Source: (CBS, 2010; Kaartenkamer, 2010)

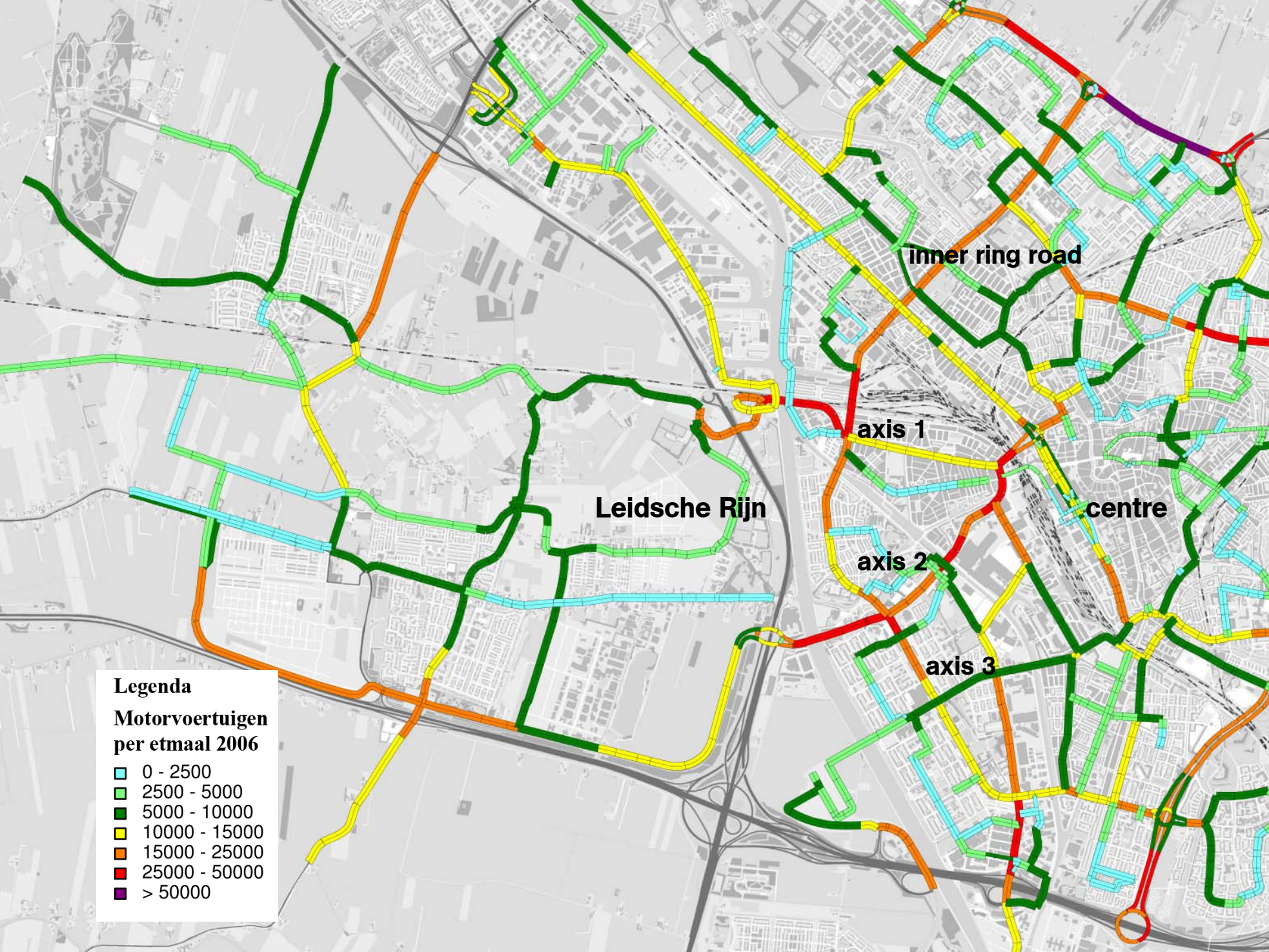
Appendix II additional analyses

building periods in between Utrecht
traffic intensities of infrastructure Utrecht
program along the axes
the design for the centre of Kanaleneiland
traffic flows in Utrecht in 2020


building periods Utrecht
1980 - 2005
1960 - 1980
1940 - 1960
1920 - 1940
1900 - 1920
1800 - 1900
<1800
source: (Renes, 2005)

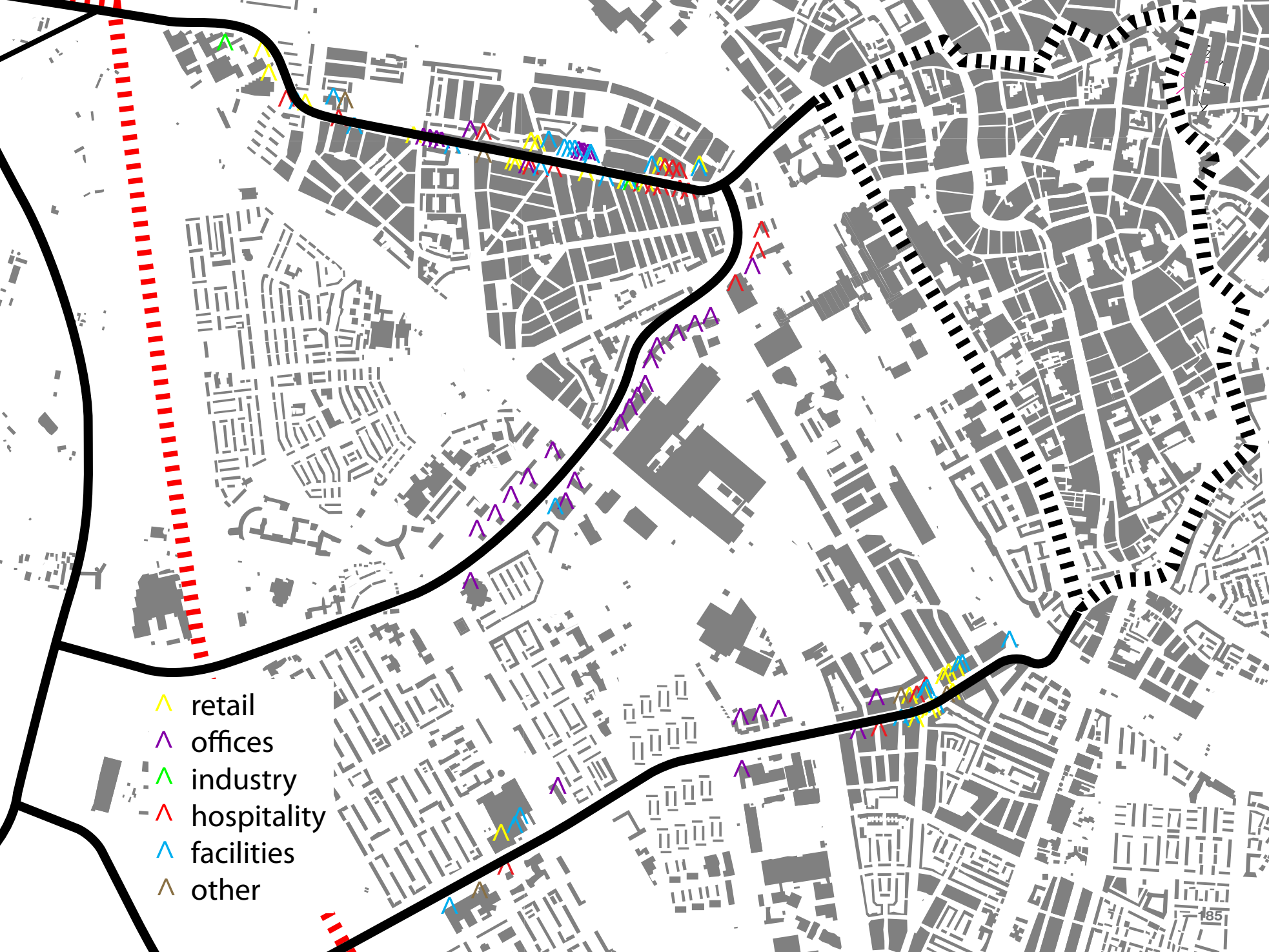
Traffic intensities Utrecht

Source: (BRU, 2006)


inner ring road
axis 1
Leidsche Rijn
centre
axis 2
axis 3
Legenda
Motorvoertuigen per etmaal 2006
0 - 2500
2500 - 5000
5000 - 10000
10000 - 15000
15000 - 25000
25000 - 50000
> 50000

Program along the axes

Source: (Google Maps, 2010)


retail
offices
industry
hospitality
facilities
other

Calculations of the proposed design

area	surface total km2	density current (inh/km2)	current inhabitants	new inhabitants	moved inhabitants	total inhabitants	new density inh/km2
1	0,45	3500	1575	5267	960	5882	13070
2	0,62	100	62	6030	50	6042	9746
3	0,6	13700	8220	1865	1260	8825	14709
4	0,42	7100	2982	1273	460	3795	9035
5	0,68	10800	7344	1745	370	8719	12821

Total	dwellings added	dwellings demolished	dwellings total	New average density
	9626	1550	8076	11876

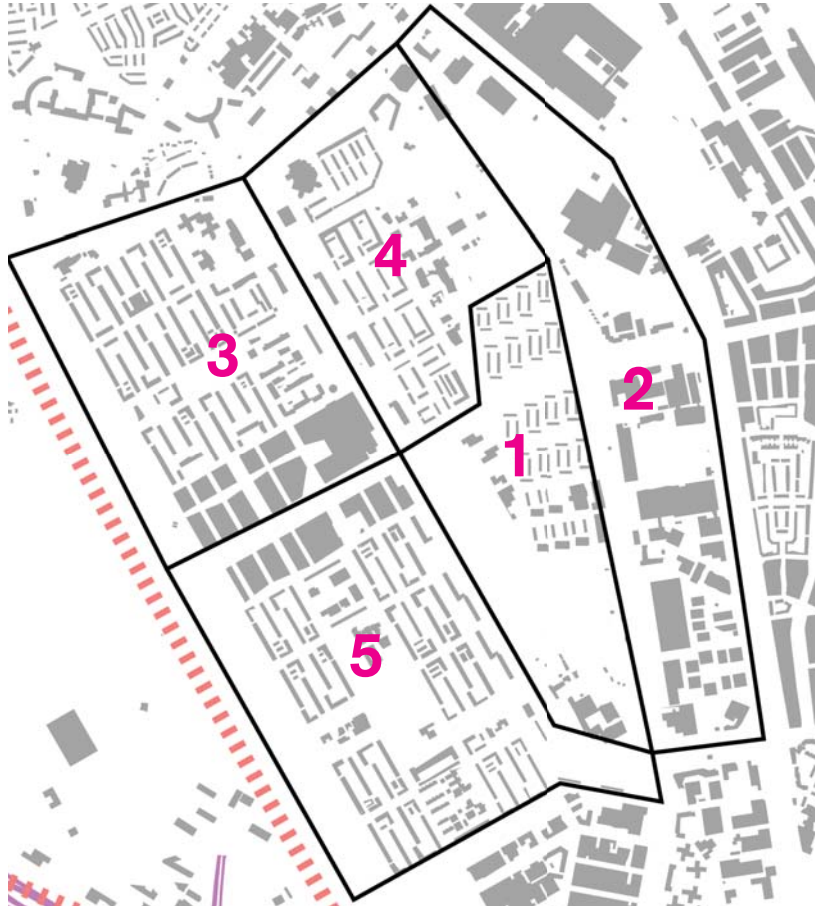
Area 1	m2 housing	new dwellings	new inhabitants
new total	240000	3133	5267
50% starters 60m2	120000	2000	3000
30% upper class 120m2	72000	600	1200
20% lower class 90 m2	48000	533	1067

Area 2	m2 housing	new dwellings	new inhabitants
new total	274800	3588	6030
50% starters 60m2	137400	2290	3435
30% upper class 120m2	82440	687	1374
20% lower class 90 m2	54960	611	1221

Area 3	m2 housing	new dwellings	new inhabitants
new total	85000	1110	1865
50% starters 60m2	42500	708,3333333	1062,5
30% upper class 120m2	25500	212,5	425
20% lower class 90 m2	17000	189	378

Area 4	m2 housing	new dwellings	new inhabitants
new total	58000	757	1273
50% starters 60m2	29000	483,3333333	725
30% upper class 120m2	17400	145	290
20% lower class 90 m2	11600	129	258

Area 5	m2 housing	new dwellings	new inhabitants
new total	79500	1038	1745
50% starters 60m2	39750	662,5	993,75
30% upper class 120m2	23850	198,75	397,5
20% lower class 90 m2	15900	177	353



Design for the centre of Kanaleneiland

Source: (Mecanoo, 2006)

Traffic flows in Utrecht

Source: (BRU, 2010)