Preteen use and perception of public space in Utrecht in 1996, 2016 and into the future

Regenerating urban social structures by building on child-friendly spatial characteristics

İhsan Deniz Kılıçoğlu

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Master Architecture, Urbanism and Building Sciences

İhsan Deniz Kılıçoğlu
Student no.: 1312596

Mentor team
Dr.ir. M.J. van Dorst
Dr. A. van Nes

Committee member: P.A. Koorstra
Faculty of Architecture - Department of Urbanism
Delft University of Technology

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Cover: Children playing in a stream behind their house in Lunetten, Utrecht. Photo by author, 2016.

For Enis, Davut and Martijn,

and all others who remain young forever.

Summary

This thesis explores the possible effects of spatial characteristics on the use and perception public space by pre-teen children. The aim of this thesis was to identify spatial patterns that can be used to create urban public spaces which enhance the ability of children to make (diverse) friends, to explore different urban landscapes, interact with different types of people and situation, and to participate in social life and democratic processes. A short investigation of the general history of children in communal spaces is presented to contextualize the situation of urban children today. This is followed by an evaluation of recurring themes in scientific literature, which shows the diversity of definitions and approaches which are applied today. In order to find possible spatial effects, empirical research was conducted in two neighbourhoods - one urban and one sub-urban- of Utrecht, the Netherlands. A novel mapping method was used. Self-reported neighbourhood maps were drawn by children around the age of 10 during mapping workshops at four primary schools in Utrecht. The validity of the maps was evaluated by comparing them to on-site observations. Statistical analysis indicates that the effects of certain spatial characteristics near a residence are stronger than non-spatial factors such as going to school independently, living in an area where children make up over 20% of the population, of having one or more siblings. Especially the presence of courtyards or large parks is shown to benefit the social life of children in public space. Children who live near a courtyard have one to two neighbourhood more than average, while children who live near a large park have twice the spatial reach as the average child. The results of this thesis may be of interest to municipalities, urban planners and parents in general.

Keywords – Spatial freedom, independent mobility, public space, children, urban youth, citizenship.

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C 1 - Problem definition

Introduction - From the current debate in both scientiffic and popular literature we get a very pessimistic view of urban childhoods. Where children were free to explore the entirity of the city independently throughout most of urban histoy, many today are not allowed to leave the house unaccompanied or only under strict regulation. Increased car traffic in the 20th century is seen as the main culprit (Bouw & Karsten, 2004, Risotto & Giuliani, 2005, p.76, Gill, 2007, p.62). At the same time, residential and educational segregation has lead to the existence of 'many childhoods' in the city. Much has been written on the effects of such technological and societal changes on independent child mobility and social relations, and they will be addressed in indepent sections of this chapter. However, while such changes in transport modes, suburbanisation and parental attitudes have undoubtedly influenced children's use of public space, much less attention has been given in research to small-scale spatial factors, which greatly impact the possibilities for children to play outside in their direct living environments. It is exactly the study of such spatial factors, which does not depend on complex social questions, that could lead to practical sollutions to increase indepent child mobility and social interactions. A recent research found that children who live near a natural area have a larger independent reach (De Vries et al. 2008, p. 81). This thesis seeks to findn such spatial factors ,which influence the ability of children to play outside independently, make (diverse) friends, and participate in a democratic society.

Shrinking childhoods - According current research independent mobility of urban children in the Netherlands has continued to decline in the previous decades (Trommelen, 2009). In a recent publication urban georgapher L. Karsten and architect N. Felder go as far as to state that 'virtually no children go out by them selves any more' (2016, p.175). Hillman et al. (1990, p. 5) found a clear relation between traffic intensity and the number of friends and aquantences. Longer distances between the residence and facilities such as schools also lead to more trips being taken by car (Hillmat et al, 1990, p.41). While during the global recession of 2007-2010 urban living environments grew more popular amongst young households, the most recent data seems to indicate that the number of families leaving the city is increasing again (CBS, 2016). However, contrary to public perception, growing up on the countryside or in a sleepy suburban area does not necissarily entail more spatial freedoms, as increased distances mean that children often depend on their parents for transport (Tillberg Mattsson, 2002, p.443, Karsten & Felder, 2016, p.160). Also, children use public space on the smallest scales, which need not differ between villages or cities. Degrees of urbanisation fail to fully explain the differences in indepent child mobility between developed nations. Hillman et al. show that indepent mobilit of German children is much higher than that of children in England (1990, p.72-73). They point to parental attitudes as a reason for the difference. According to Alparone & Pacilli parental attitudes reflect the strength of community relationships. They show that parents who reside in neighbourhoods with weak community relationships percieve more social danger, which negatively effects the independent mobility of children (2012, p.117). The notion that children are safer and enjoy more freedom growing up in a small village originates from a nostalgic conception of social control in rural communities. This is not necessarily reflected in reality, and a sense of community is not exclusive to rural areas. Some urban parents, however, share this nostalic idea and are afraid to let their children play outside in the urban environment. Where more affluent parents can still provide some freedoms to their children by driving them to friends and clubs, some children of the lower classes remain virtually stuck at home (Karsten & Felder, 2016, p.162). Whether based on fact or fiction, risk aversion has lead many, especially higher income, families to leave the (inner) city, and poorer families to restrict the independent movement of their children. Since the 1990s the introduction of computers and gaming consoles also lead to a further reduction in outside play time (Clements, 2004, p.74). Research also indicates a relation between a decline in outside play time, increased 'screen time' and obesity. (Wen et al, 2009)

Many childhoods - Not just the reach, but also the character of childen's play has changed. According to one research, due to segregation along lifestyles of parents, there are now 'many childhoods' in the city (Bouw & Karsten, 2004). Lia Karsten even went so far as to conclude that children of different socio-economical backgrounds don't play together (Obbink , 2016). In the Netherlands, it is not uncommon for a school to have over 80% children with a migrant background, while other schools in the city are mostly 'white' (Cohen, 2010). Also the social life of children is increasingly segregated along the lifestyles of parents. Where children of higher income families

are usually members of sports, music or arts clubs, childern of lower income parents often are not. As residential segregation rises and social class and ethnic background increasingly align, cities face a future where the urban landscape becomes culturally fragmented. As desegregation of housing and schools is a political taboo, we must ask how else we can influence the abilities of children to make (diverse) friends, to participate in different social activities and to integrate into Dutch urban society.

How can urban public space stimulate children to play outside, make more (diverse) friends, participate in a democratic society, and make contact with different aspects of the urban landscape?

A selection of gloomy headlines concerning the apparent decline of outside play.

C 2 - Research questions

Introduction - The starting point of this thesis was the question which resulted from the problem definition as detailed in the previous chapter: "*How can urban public space stimulate children to play outside, make more (diverse) friends, participate in a democratic society, and make contact with different aspects of the urban landscape?".* To begin to answer this complex question, different sub-questions were formulated relating to the conception, use, perception and sustainability of public space as children's space. These sub-questions are introduced in this chapter.

Sub-questions

Independent child mobility is an important factor of human development, enabling the gradual integration of children into (adult) society. In this way public space functions as a catalyst for citizenship formation. But "*what is public space as children's space?*" To answer this question a literature research was conducted on the historical development of the relationship of children to the urban environment, and on current debates in scientiffic literature relating to children's use of public space.

All the literature used to answer the first research question was written by adults, and much of it revolves around parental attitudes towards the neighbourhood or traffic safety. But what do children themselves think about their environment? "*How do children in urban areas use and perceive public space?*". To answer this question observations were combined with mapping sessions at four primary schools in an urban (Votulast) and suburban (Lunetten) setting in Utrecht, the Netherlands.

When we start to understand how children use and percieve their living environment it becomes possible to look for spatial patterns that influence their play activities: "*(How) do the spatial particularities in neighbourhoods effect the use of public space by children?*" Quantitiave and qualitative analysis is used to find answers to this research question, which are explained in more detail in the following chapter.

As explained in the problem problem definition it is generally understood that individual play patterns have changed significantly over past generations due to shrinking indepent mobility. But how does this change look? How have the play patterns of children within the same neighbourhood changed over time? When their numbers dwindle, there is the risk that once safe and socially active streets become deserted and taken over by groups of adolescent boys, making this public space less attractive for the remaining children and parents. Due to policies of risk aversion many parking garages, staircases, passages, courtyards and raised pedestrian spaces have been fenced-off in recent years. While these measures serve to minimize burglaries, at the same time they form a barrier for social interaction by limiting children's freedom of movement; both into and out of these 'gated communities'. How did the changes in the urban fabric affect the children's perception of their environment? This leads us to the thrid and fourth research questions: "*How have socio-spatial "play patterns" changed in residential neighborhoods as compared with 1996?*", and "*(how) do the spatial particularities of the neighborhoods relate to these changes?*". To answer these question 30 former residents were interviewed, and their data was compared to those of children today.

Finally we come to the design-oriented question "*What design patterns can we distil from these particularities to use in an urban regeneration plan to improve the sustainability of public space as children's space?*". The outcomes of the previous research questions were used propose child-friendly interventions at different scales in two neighbourhoods.

Fig. 2 - Girls playing on the streets of Vogelenbuurt, Utrecht, 2016.

C 3 – Methodology

Introduction – This chapter is meant to clarify the research methodology which was employed for this thesis. The first section gives a short introduction to the scientiffic background to the research. The second section gives an overview of the techniques which were used in answering the different research questions. Sections 3 through 9 describe the techniques in detail.

3.1 Scientiffic background to the research

Little fundamental work from the fields of urban design and architecture has been published on the study of - and planning for - the use of public space by children. Notable exceptions are '*Environmental Planning for Children's Play*' (1970) by Arvid Bengtsson, and '*The Child in the City*' (1979) by Colin Ward. Aldo van Eyck's work '*The Child, the City and the Artist*' - written in 1962 - was only published years after his death, in 2008. While these works form a decent theoretical starting point to answer the first research question, they do not put forth a clear methodology for the study of public space as children's space. Urban geographers have studied the play and social interactions of children, but have not developped - to the knowledge of the author - systematic approaches to mapping and analysing the spatial patterns of these activities. In more recent research GPS-trackers have been used to map the movement of children in their neighbourhood. Not mentioning the clear ethical implications concerning privacy - a concept which children might not yet fully grasp - the results of such studies can easily be called into question, as the invasive nature of the applied technique may itself engender children to moderate (the reach of) their play.

As there were no pre-established methodological frameworks for the study of children within the field of urban design it was necessary to find existing techniques which might give new insights when approached from the context of children. On the facing page are four maps, two of which inspired the author to conduct this research. The maps show how different approaches to spatial research can add to the understanding of social structures.

Giambattista Nolli's map of 1748 map of Rome shows all publicly acessible spaces of the city. It was the first map to include the semi-public domain inside churches as part of the urban fabric. The map next to is was made by the author in 2015 to crudely model the effects of traffic intensities and safe crossing places on the availability and interconnectedness of public spaces for children in the Oude Noorden in Rotterdam. It shows the neighbourhood as an archipelago of child-friendly islands. The validity of the map is doubtful as it was based on deterministic assumtions about the effects of certain characteristics of public space, and not on extended observation of, or interviews with, children. It does show, however, that adding a new dimension to existing methodology can help to illustrate a specific concept.

The 'social space' map by architectural research group Aorta at the bottom left shows an intricate social network that exists around the courtyards of Lunetten, Utrecht (Nio et al, 2011, p.55). The social network of children, however, spans many streets and courtyards; As they form just a fraction of the population they live much more dispersed, and must travel relatively farther for social interactions. The scale of (small) urban blocks thus seems inadequate to study the use of public space by children.

On the bottom right we see an individual neighbourhood map of a child in Rotterdam, published by Karsten & Felder in 2016 - when most of the research for this theses had already been completed. At first glance the map by Karsen & Felder seems comparable to the ones produced for this thesis (see section 6 of this chapter). Differing definitions and methodology, however, make it difficult to compare results directly. Ways in which the methodology used for this thesis may be improved by integrating aspects from the research by Karsen & Felder is adressed in the discussion.

Taken on their own these maps do not fully represent the social relations and use of public spaces by children or adults. However, by combining such socio-spatial mapping techniques with observations and personal cognitive maps we might get to understand more clearly the relations between the design of the urban fabric and perception and use of its public space by children. It was also atempted to say something about the usefullness of certain analysis techniques when researching children's use and perception of public space.

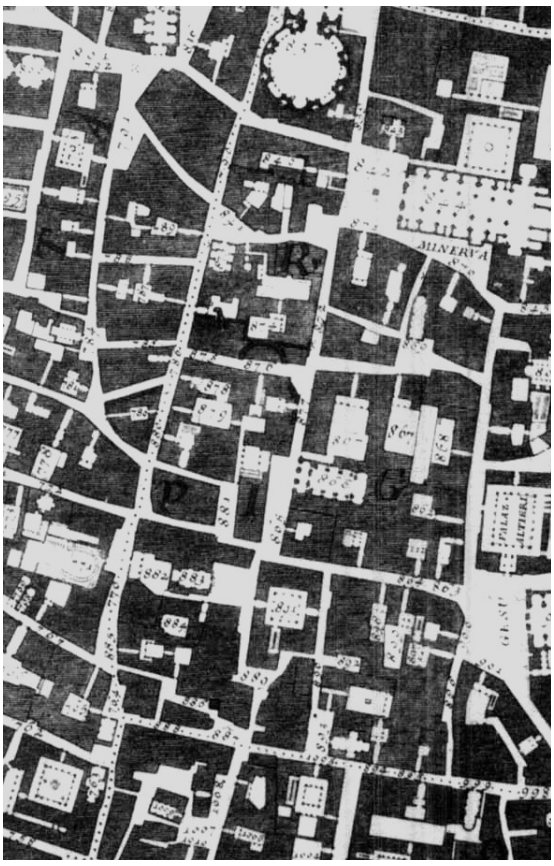


Fig. 3.1 - Map of Rome's public spaces, Giambattista Nolli, 1748

Fig. 3.2 - 'Children's Nolli map' of the Oude Noorden, Rotterdam, with schools indicated in red. Map produced by the author in 2015

Fig. 3.3 - 'Social space' in Lunetten by Architecture Center Aorta, 2011.

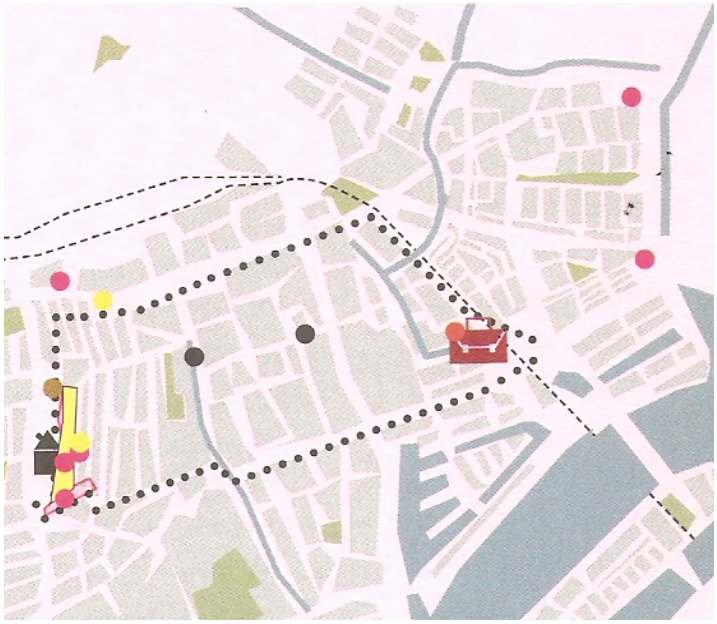


Fig. 3.4 - Personal neighborhood of a child in Rotterdam, L. Karsten & N. Felder, 2016.

3.2 Overview of techniques

This section gives an overview of the different techniques which were used to answer each research question. Some techniques were used to find answers to multiple questions.

To answer the first sub research question "*What is public space as children's space?*" a literature research was conducted on the general history of children in communal spaces, and on six recurring themes within contemporary discourses relating to the use and perception of public space by children.

The second research question "*How do children in Utrecht use and perceive public space?*" was addressed through on-site observations and 'social mapping workshops' at four primary schools. Observation techniques used included 'static snapshot mapping' and mapping the border between public & private (the plinth). The workshops included short discussions and a questionnaire. In order to make a quantitative analysis possible the research subjects were asked about those aspecs which might influence their behaviour in public space - such as their gender, if they had siblings, if they went to school independently and by what mode of transport. The results of the maps were grouped based on these questions to see if there were patterns due to non-spatial factors.

The third research question "*(How) do the spatial particularities in these neighbourhoods effect the use of public space by children?*" was addressed through the comparison of combined workshop maps and data such as traffic intensity, the density of children, and the vicinity of certain spatial configurations such as courtyards, play squares, parks and school yards. More familiar analysis techniques such as a typological, functional and space-syntax analysis were used to further contextualize the results. To see if and how the structure of public spaces in neighbourhoods on a larger scale influne the social 'play patterns' of children, the results of two different neighbourhoods were compared.

For the fourth research question "*How have socio-spatial "play patterns" changed in residential neighbourhoods of Utrecht as compared to 1996?*" interviews with former residents were conducted to produce social maps which could be compared to those of current children as created during the workshops. Because this part of the research relied on the memory of the subjects of a period 20 years ago it functions mostly as an indicator and could not be used to do quantitative statistical analysis. Being adults, however, they could offer a more precise and detailed perspective, due to the relative distance to their childhood and a clearer understanding of the questions and standard mapping techniques (uniformity, clarity for others, hatching, etc). The accuracy of the maps could only be estimated if they were at least superficially comparable to those of current children.

For the fifth research question "*(How) do the spatial particularities of these neighbourhoods relate to these changes?*" possible patterns of change in the two neighbourhoods were compared with typical spatial analysis techniques such as those used for the third research question. Through this comparison it was attemted to make statements about factors that influence the sustainability of public space as children's space.

The final research question "*What design patterns can we distil from these particularities to use in an urban regeneration plan to improve the sustainability of public space as children's space?*" was answered through the creation a set of guidelines and design principles which were used to give examples of small-scale interventions in the urban fabric of the two neighbourhoods. The children of the primary schools were again involved through a workshop, where they were asked to draw their ideal play space.

* Originally it was the plan to test the final design proposals through a feedback workshop with the same children who participated in the analysis and design workshops. As the school year had ended before this stage of the thesis was reached, this conclusion proved unattainable.

What is public space as children's space?

The historical perspective:
- Literature study on the development of the relationship of children to the (urban) environment

Theoretical understanding:
- Literature study on reccuring themes in contemporary discourses on children in public space

How do children in Utrecht use and perceive public space?

On-site observation:
- Mapping play activity on wed. & sun.
- Statistical analysis of observations
- Photographic documentation

Self-reporting by children:
- Social mapping workshops
- Questionnaire
- Statistical analysis of data derived from workshops

(How) do the spatial particularities in these neighborhoods effect the use of public space by children

Spatial analysis:
- Morphological study
- Mapping children's amenities
- Mapping inter-visibility public/private domain
- Space Syntax analysis

Empirical research:
- Statistical analysis of data derived from workshops
- Qualitative analysis of social maps

How have socio-spatial "play patterns" changed in residential neighborhoods of Utrecht as compared with 1996?

Other research:
- Collecting data from municipality

Historical understanding:
- Interviews with former residents resulting in maps.
- Qualitative analyis of these maps in comparison to those of current children.

(How) do the spatial particularities of these neighborhoods relate to these changes?

Other research:
- Literature research on sustainability of public space as a social medium.

Empirical research:
- Qualitative analysis of the relations between changes in use to changes in urban structure.

What design patterns can we distil from these particularities to use in an urban regeneration plan to improve the sustainability of public space as children's space

Planning strategy:
- Collecting patterns and guidelines from previous research questions
- Visualizing patterns and guidelines

Design strategy:
- Design workshops at three primary schools
- Desinging small-scale interventions to illustrate the patterns and guidelines
- Testing design through feedback workshop *

3.3 Data collection

Cartography – There exists no such thing as a perfect map, even of the Netherlands. Most maps are made for car drivers and virtually all are targeted at adults. This means that most standard maps are useless for analysing public space at the scale of the pedestrian. Alleyways and courtyards don't appear on most maps. The base maps that were used during the workshops and interviews conducted for this thesis were made by the author, based on imported data from the Open Street Map (OSM) project. The data was downloaded with Maperitive and imported to vector based graphics software. The OSM data was then edited based on personal knowledge of the author, observations made during site visits and interviews with former residents. To find a clear and neutral presentation format, different visual styles were tested during the pilot interviews. Initially only maps were made of both research locations. After correspondence with teachers it became apparent that not all children in their classes resided within the research area. In order to be able to let as many children as possible participate in the workshops additional maps were made of the neighbourhoods Hoograven, Tolsteeg, Centrum, Wittevrouwen, Tuindorp, Overvecht and Pijlsweerd. This process was very time intensive, as the maps required a higher level of detail than was offered by the OSM data.

Demographics – The municipality of Utrecht operates a website called 'WistUdata', where a host of statistical data is provided on different scales including the 'buurt' level, which is smaller than the neighbourhood. From this source we can find general information about the current demographic characteristics and recent changes of each neighbourhood. Unfortunately the data on WistUdata does not go as far back as 1996, which would have been helpful in answering the third research question. Luckily the municipal office of for data was able to find some statistics from 1995 on the number of of children and the ethnic background of the inhabitants. More detailed demographic information from the Central Bureau of Statistics (CBS) was used to locate streets with a high or low concentration of children. This data was accessed through the interactive map in the digital article 'Statistiek saai?' (Statistics Boring?), published by NRC Handelsblad in 2012. The original datasets for this map are not directly accessible to the public since they are divided to the postcode level, which has just 20 households on average.

Traffic intensity – In 2012 the municipality of Utrecht counted traffic movements on all major roads and bridges. Combined with intensities from the Google Traffic function of Google Maps, this gives a general overview of the intensity of use of most of the through streets. Unfortunately both the municipality and Google Maps do not offer any information on car movements in most residential streets. The topological integration into the street network (see the Space Syntax paragraph of the Desk analysis section) was used as an indicator of traffic intensity for streets without a dataset. The author is not a traffic modeller, and for the purposes of this research a general indication will most likely suffice.

Fig. 3.5 - Cartographic data from OSM in Maperitive.

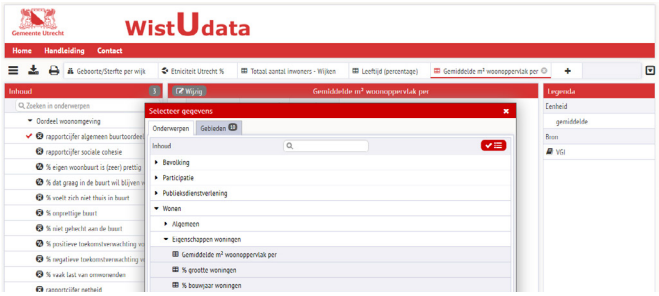


Fig. 3.6 - Municipal statistics portal 'WistUdata'.

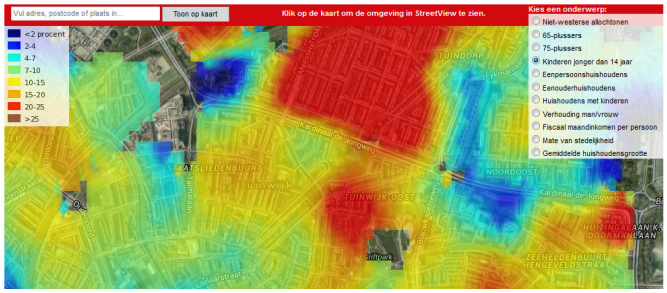


Fig. 3.7 - CBS statistics by NRC Handelsblad.

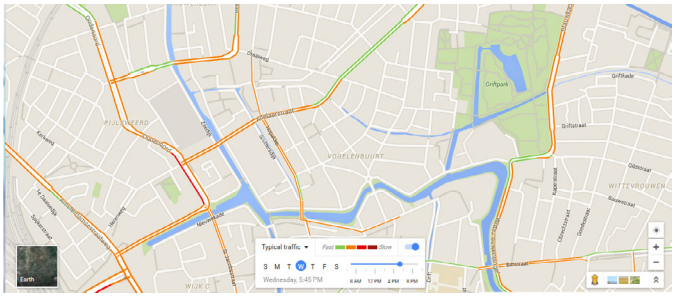


Fig. 3.8 - Traffic information on Google Maps

3. 4 Desk analysis

Building typolog– A building typologies map was created for both neigbourhoods. Although no direct relation between building typology and play patterns of inhabitants is expected, the combination of building typologies with public space typologies might lead to new insights about the effects of different typological combinations on the use of surrounding public space.

Functional analysis – A functional map was created of both areas, focussing on public spaces and facilities that are accessible to children. From this map we can see that in Lunetten the schools are clustered, while other facilities are spread throughout the neighbourhood. In Votulast, the opposite is true; the schools are more spread out, while other facilities are concentrated in the Griftpark. This is due to the history of Votulast as a dense working class neighbourhood. There is much less public space to house facilities than in the post-modern suburb Lunetten. When the Griftpark was redeveloped, it was a logical site to compensate for this lack of functions.

Public space typology – All public spaces were grouped based on on their typology; street, (play) square, park, courtyard, school playground, sports field, shopping centre and supervised (adventure) playgrounds and petting zoos. The resulting map was used to look for relations between public space typologies and spatial play behaviour (see the chapter on results).

Space-syntax analysis - Currently, Space-syntax and other spatial analysis techniques rely on assumptions that pertain to adult behaviour in public space. Children, however, use public space in very different ways. It is not just due to their shorter visual horizon, but also because of their shorter attention span. Where adults take the utilitarian straight path, childen move from one play spot to the next, and might end up somewhere else than where they planned to go. It is hoped that by including this technique in this thesis, it might become possible to make statements about the value of such spatial analysis techniques for child-friendly urban design. To make the technique applicable to children, a slight deviation from the standard practice was used: all roads and lanes that are exclusive to motorised transport were excluded from the map, since children are unable to use them.

Fig. 3.9 - Building typologies

Fig. 3.10 - Public space typologies

Fig. 3.11 - Space-syntax step depth

3. 5 Observation & location documentation

Mapping use of public space - The on-site observations were carried out in May 2016 between 14:30 and 16:30 on Sunday and Wednesday (when Dutch schools are closed in the afternoon). During the 4 days of observations, 495 children were documented in public spaces. Children who were inside supervised parks such as petting zoos and adventure playgrounds were not counted. A distinction was made between boys and girls, supervised and unsupervised. Children deemed above the age of 12 were not counted in the survey.

Photo-documentation – The public spaces of both neighbourhoods were documented through photography. Places where public and (semi-) private meet, such as façades, publicly accessible staircases, alleys and courtyards, were also documented. The visits to document the public space were independent of the visits for the observations of playing children. Still, if the opportunity presented itself, playing children were also photographed, if they permitted it. Most of the photo-documentation took place late in the afternoon, when schools were out. The photo-documentation is used to illustrate specific spaces, themes, patterns, and the thesis in general.

Degrees of privacy – All spaces in both neighbourhoods were classified on a scale ranging from completely private to completely public. The scale progresses from personal private space (1) to communal private space (2), communal semi-private space which closes in the evening (3), open communal semi-private space (4), communal semi-public space (5), enclosed public space (5), 'urban' open public space such as streets (6), and 'natural' open public space such as parks (7).

Mapping the border between public and private space – Simultaneous with photo-documentation the inter-visibility between public and private space was documented. This was done to be able to relate the characteristics of these spaces to possible activities (or lack thereof). It was also used to define spatial characteristics which might influence the permeability of this 'border'.

Fig. 3.12 - Children playing at the Majoor Bosshardt-plantsoen in Tuinwijk, Votulast.

Fig. 3.13 - Children roller skating outside the view of their parents. Griftpark, Votulast.

Fig. 3.14 - Accompanied children playing on a pedestrianized street in Vogelenbuurt, Votulast.

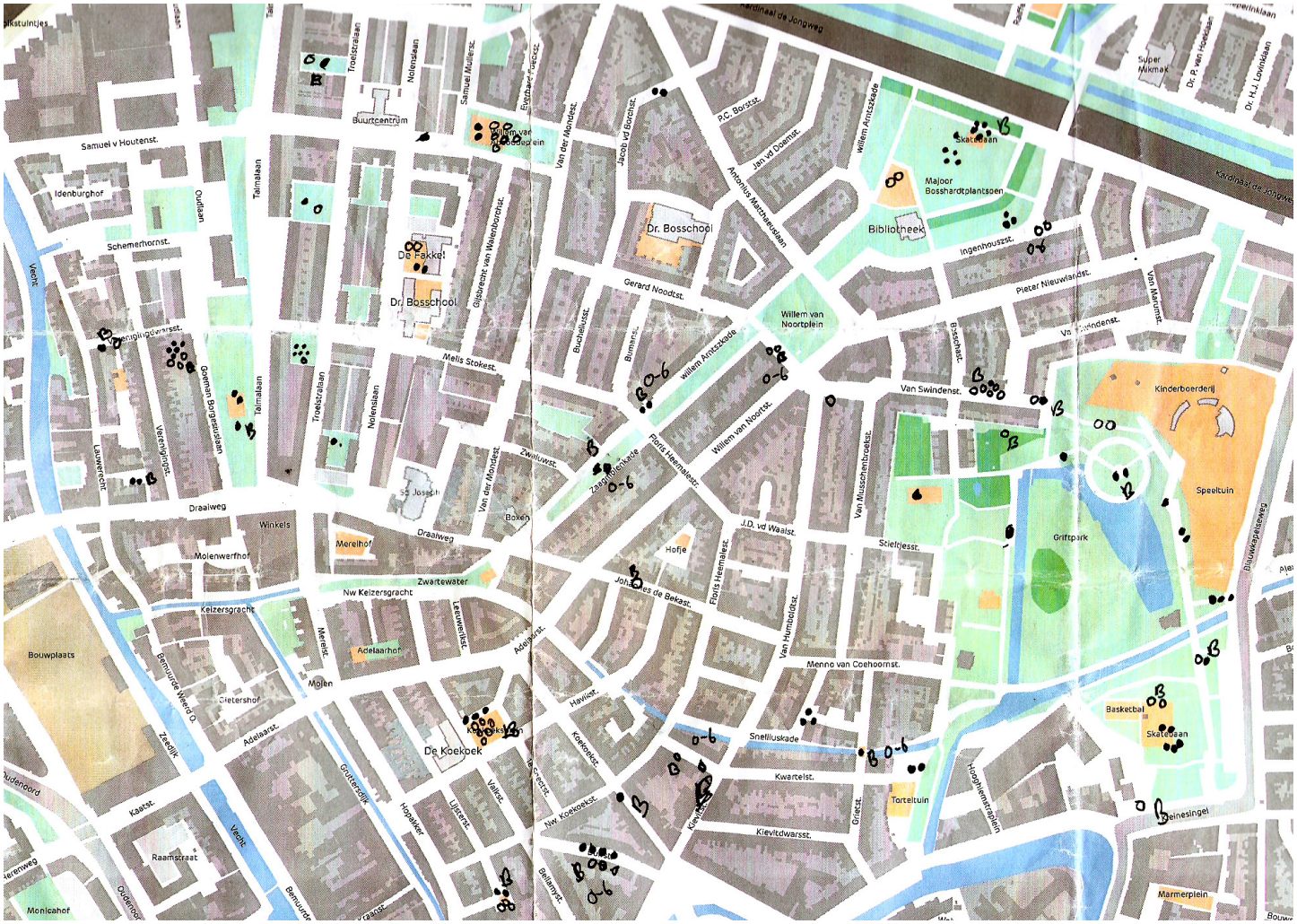


Fig. 3.15 - Example of one round of observations of children in public space in Votulast, Utrecht.

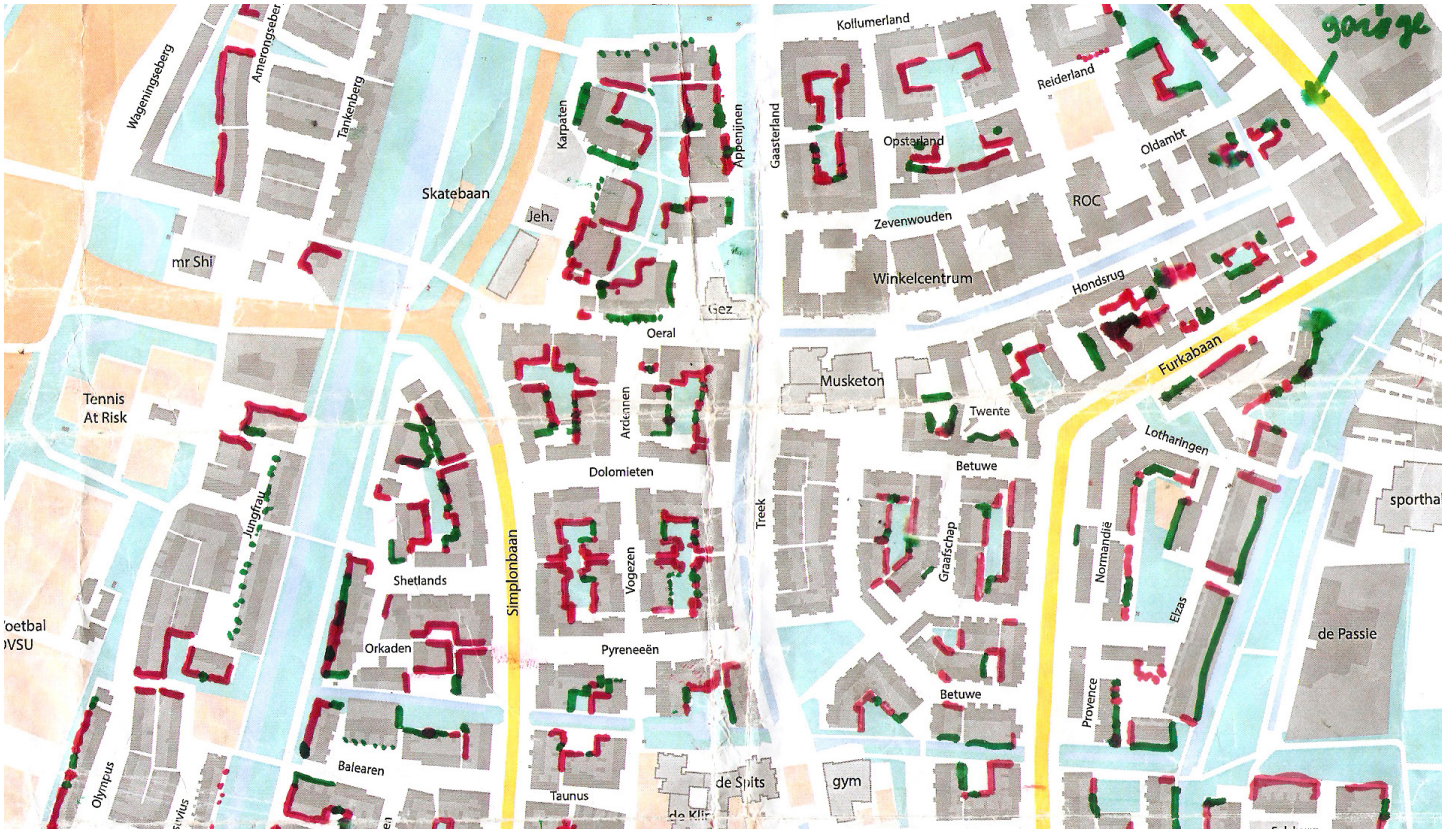


Fig. 3.16 - Part of the documentation of the border between public and private space in Lunetten, Utrecht.

3.6 Social mapping workshops

In order to understand their usage and perception of public space in the two neighbourhoods, children were asked to create a 'social map' of their living environment. In order to reach an adequate sample size for a statistical analysis, four 'social mapping workshops' were held at different primary schools in the last week of May and the first week of June, 2016. All six schools in the two neighbourhoods were approached to participate in the research, but the Baanbreker in Lunetten and the Dr. Bosschool in Votulast did not respond. The mapping workshop consisted of three parts: a short introduction about the practice of Urbanism and the research, followed by a short questionnaire and then the mapping itself. Each student was provided a map of the neighbourhood at the start of the workshop. Additional maps of surrounding neighbourhoods were provided for children living further from the school. Unfortunately, a handful of students still was unable to (fully) participate in the workshops. Satellite photography and an enlarged map were placed on the whiteboard for children who were uncertain of their routes. In order to be able to compare and analyse the outcomes of the workshops, the resulting maps were 'translated' into a uniform digital format. The translation of the maps was conducted with utmost care and effort, but in some cases the maps were not very explicit and required some subjective interpretation. However, this was not done to steer the research; it was unknown to the author at this point in what direction the results would point, or how this would relate to the individual maps. In future research, the legibility of the maps could be improved through individual interviews (for examples see the next chapter on Comparing use and perception of public space by children in 1996 and 2016).

3. 7 In-depth interviews

In order to compare current use and perception to the situation of 1996 former residents, who were around the age of 9 in that year, were asked to make a similar map as the children made in the school workshops. This part of the research was very time intensive, as it was challenging to plan meetings with dozens of individuals within a few weeks. Snowball sampling was used to reach a significant number of respondents (31), but because the data generated by these interviews relied on the 20-year old memories of the subjects, it was not used for quantitative statistic analysis. Instead the spatial patterns of these maps were qualitatively compared to those of current children. Respondents were given a map of their respective neighbourhood, which was similar in scale and appearance to the one given to children. The maps were modified to reflect the situation of 1996, as some areas have been redeveloped in the years between. A typical session would last for about an hour; just as long as the school workshops. Even though the results are based on (selective) memory, it is hoped that by the relative subjective distance to their childhood, as well as the more relaxed setting of the individual sessions when compared to the somewhat chaotic school workshops, the subjects would be able to draw a more or less accurate picture of their pre-teen childhood use and perception of public space. An added benefit was that the adults produced clearer and more precise maps, as they were aware of standard mapping techniques such as demarcation and hatching. The sessions were not recorded, as that would have taken too much time to play back. Notes were made on the backside of the maps or sometimes on the map itself. To compare the results with those of current children, all maps were 'translated' into a similar layered digital format.

3.8 Design workshops

As a follow-up to the mapping workshops, the schools were offered a participative design session focussing on two or three of the areas which the children of that neighbourhood found particularly problematic. The goal was to have such a session at least in one school in each neighbourhood. The results of these sessions will be used to formulate additional patterns and targets for the design phase of this thesis. At the start of the workshop each student will be given the choice between two or three locations. The students will then be supplied with both a plan, an isometric drawing and an eye-level perspective of the chosen location. They are asked to draw their desired end situation, on the drawing which they feel the most comfortable with. If they are finished early, they can be asked to think about how their design would look in one of the other viewpoints. In this way also the second workshop doubles as a topography lesson, as it requires children to think about space in an abstract way.

Fig. 3.17a - Example of a personal map drawn by a participant.

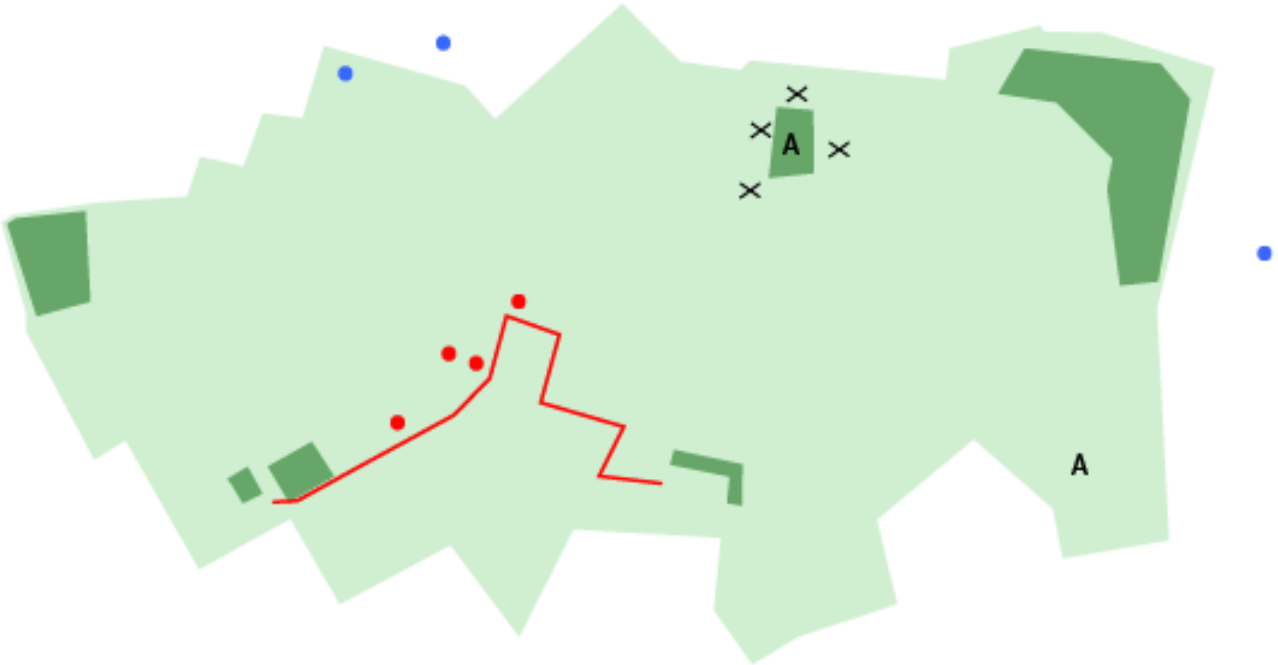


Fig. 3.17b - Digital translation of the same map, created by the author

3. 9 Flowchart

Flowchart - The flowchart below shows the relations between the different techniques that were applied during this thesis. The large box on top describes the research methodology, which is mirrored for both neighbourhoods. The analysis of the current situation, and the comparison with the situation of 1996, were used to draw conclusions for both urban and suburban design patterns and guidelines.

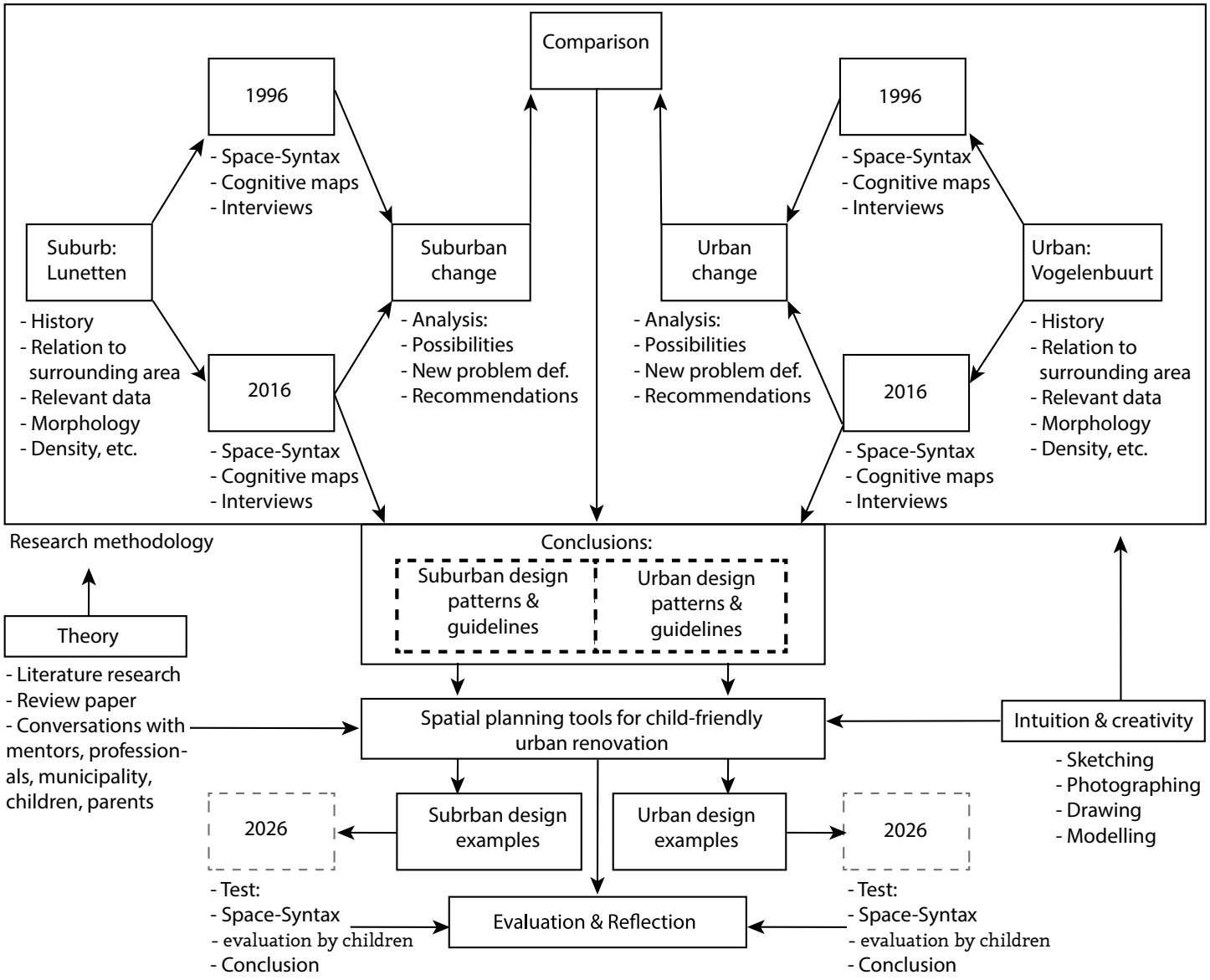


Fig. 3.18 - Flowchart showing the symmetrical approach to compare the two 'opposing' urban design typologies.

C 4 - Literature study

Introduction - This chapter is divided into two sections which explore the question "what is public space as children's space?" from different avenues of approach. To understand how the relationship of children to the urban enviroment changed over time, and to uncover what may have been lost in the process, a brief general history of children in communal space was attempted. The second part of this chapter consists of six thematic explorations of contemporary discourses relating to children and public space.

4.1 - A history of children in communal space

In the introductory book 'Childhood in world history' (2006) Peter Stearns the notion of a childhood outside the family (the relationships between children and friends, neighbours, or the regulation of children's activities in public space) is not defined, and is thus not addressed as such. However, by complementing a general history of childhood with specific examples from both the past and the present, we might begin to understand in what ways children's use of communal or public spaces has changed or remained constant as a result of cultural-spatial developments. This is what has been attempted in the following sections. The overview starts with a global view but narrows down to Western public spaces, in particular those in the Netherlands.

Nomadic and early settled communal spaces

Children and adults are not spatially segregated in nomadic communities. Young children are often physically bound to a (working) parent, and nursing takes place for a longer period. There is less age differentiation between children in hunting and gathering societies; Children of all ages play with each other and with adults that are present, and they are often not involved in economic activities until their teens (Stearns, P.N., 2006, p.9-10). The place of children within such communities is asserted through initiation rituals into economic or cultural activities. It is a misconception that nomadic groups lack communal spaces, as their large tents or temporary structures are shared with the extended family. If they follow a seasonal migration pattern, certain natural spaces such as valleys or pastures - which are shared with other groups - can be seen as a form of communal space as well. These natural environments may also develop religious significance, binding groups through rituals. Coordinated arrival at such places in spring gives clans the opportunity to exchange knowledge, goods and spouses. It is also a period when children are given more freedom, as parents are less busy with keeping the pack together and on the move. Some modern Central Asian communities still celebrate such moments through dance and horseriding games, in which children participate.

Settled hunter-gather communities also typically have communal spaces; The spaces in between and surrounding dwellings, which are used by the entire community. Some of the early larger Neolithic settlements such as Çatalhöyük in central Anatolia, however, had few shared spaces such as streets or squares. Each house had its own productive, ritualistic and storage spaces, and the exchange and consumption of goods also seems to have been concentrated inside the residences (Hodder & Cessford, 2004, p.20-22). As access to the dwellings was through their roof, and there were no streets, this raised space must have been used to move around the settlement. There is evidence that the domestic life also extended to the roofs (Hodder & Cessford, 2004, p.28). If this is the case we could imagine the roofs of the closely packed buildings as a continuous semi-public space, where children could roam freely between stalls and people busy with daily activities. Recent research, however, has thrown doubt on the ammount of social life on the roofs at Çatal Hüyük. Hodder now postulates that communal spaces or rituals would be situated outside the city (2017).

With the invention of agriculture children became an important source of labour for the family, and birth rates went up (Stearns, 2006, 11). A high density of children has been shown to lead to friendships

Fig. 4.1 - A section of Çatal Hüyük by Adela Pokorna (2017), based on work by Hrůza (2014). The city shows no signs of social hierarchy or division of labour, nor are there clear public spaces or defensive structues.

spanning greater age ranges (Berg & Medrich, 1980, p.329, 339), thus while their play time was somewhat limited during the harvest, a settled lifestyle did probably not entail losing contact with younger or older peers within the community. Parents in agricultural settlements could also share responsibilities for child rearing, and thanks to longer life spans, grandparents were increasingly involved as well (Stearns, 2006, p.11, 15).

In her research on children in the traditional farming community of Woldsby, UK, Christensen found that patterns of residence can be read as "graphic representations of interconnectedness of family, kin & generation" (2008, p.74). She shows how the children of the village are part of networks of 'emplaced social relationships' (2008, p.74) The 'inhabitation' of the village is a shared experience, and the meaning of its places is produced though collective engagement, leading to a 'moral landscape' filled with 'emplaced knowledge' (2008, p.76). Children are especially important in the formation and transfer of this local knowledge. Historically, they even played a role in a village's 'law enforcement', through mocking and shaming adults in public for indecent behaviour (Bakker et al, 2006, p.299). According to Berg and Medrich children are the "carriers of life, stories and histories of neighbourhoods" (1980, p.320-321). Roger Hart states that "if children have freedom in space and time [..] they pass on their culture through games, song and dance" (2002, p.136). Children from historical neighbourhoods and villages have been found to have more consistent and detailed spatial knowledge than suburban children (Banerjee & Lynch, 1990, p.177-180). This raises the question if modern neighbourhoods where children can not play outside independently lack potential for the creation of a narrative of emplaced knowledge through oral histories, traditions, and play.

Although young children in agricultural societies were not involved in economic production, they would have ample time to study the activities of adults through imitation play. Blinkert found that when children are left to play by themselves, they "insist they do not play, instead they work" (2004, p.110) Groups of children left to themselves have been known to construct shelters 'mimicking villages' (Norman, 2003, p.28). It seems likely that children in historical settlements would have had similar creative freedoms, at least at times when there was low demand for their labour. Children also participated in community festivals relating to seasonal agricultural activities through games and contests (Stearns, 2006, p.14). Such festivals educated the youth about cultural values and ensured the memorialisation of the calendar.

Children in pre-modern urban public spaces

The agricultural calender persisted in urban classical antiquity, such as in the religious festivals of Athens (Hannah, 2013, p.52, 68). The Panathenanic festival, held every June, involved the herding of fattened cattle from the surrounding pastures for the sacrificial feast on the closing night of the festival. Children played a role in the rituals and plays during the festival, and boys aged 12 to 16 competed in athletic events. Through these festivals in the city's public spaces children were exposed to competitive sports, religious ceremonies, theatre plays, musical performances and Homeric recitations. According to Stearns, such festivals offered the opportunity for the youth to let off steam (2006, p.47). Athenian girls were barred from participating in public sporting events, while Spartans took pride in public displays of strength of their girls (Connoly & Dodge, 1998, p.35). The Panathenanic Games were open to athletic contestants from all of Attica, and in the team competitions different districts would compete against each other, perhaps comparable to the tradition of the Palio, which is still held twice a year in Siena, Italy.

Fig. 4.2 - A section of Olynthus by I. Travlos (1934). The transition from public to private was quite gradual in classical Greek cities. Entrances of shops were on the main streets, while residences were accesible from side streets through semi-private courtyards. Back-alleys connected some homes to each other. Children in such a city may have been able to access different residential and commercial spaces within their own block from a young age.

City districts or 'neighbourhoods' were synonymous with the city's tribes (Saunders, 1976, p.25), which – at least in Attica – also represented political entities in the council (Traill, 1975, p.74). The city used a 10-month calendar representing the tribes of the city, next to the 12-month religious-agricultural calendar. In his book on Laws, Plato imagined his ideal city-state to be divided into twelve districts (Mitchell, 2000, p.7), each of which would have its own religious and agricultural section (Saunders, 1976, p.24). By designing his ideal city around twelve districts, rather than Kleisthenes's ten tribes, Plato thus proposed the harmonisation of urban civic life with the agricultural calendar. In classical Greek cities, urban spaces and events were thus tightly connected to civic, religious and agricultural traditions, allowing children to engage in most aspects of adult public life.

While young people were allowed to play and participate in 'trivial' matters such as athletic games or musical competitions, they were not allowed to enter the agora (Hughes, 2011, p.25), which excluded them from the political and philosophical life of the city. At the trial of Socrates it was argued that the philosopher was corrupting the youth by lecturing to them in the agora, to which Socrates replied that – as claimed by Plato in the Republic – the city itself was the greatest corrupter of the youth (Leibowitz, 2010, p.119). According to Stearns (2006, p.26) Greek, Roman and Chinese civilizations all had concerned notions about childhoods, leading to a desire for obedient children. Both Plato and Aristotle argued for an "early regulation of play" (Stearns, P.N., 2006, p.28).

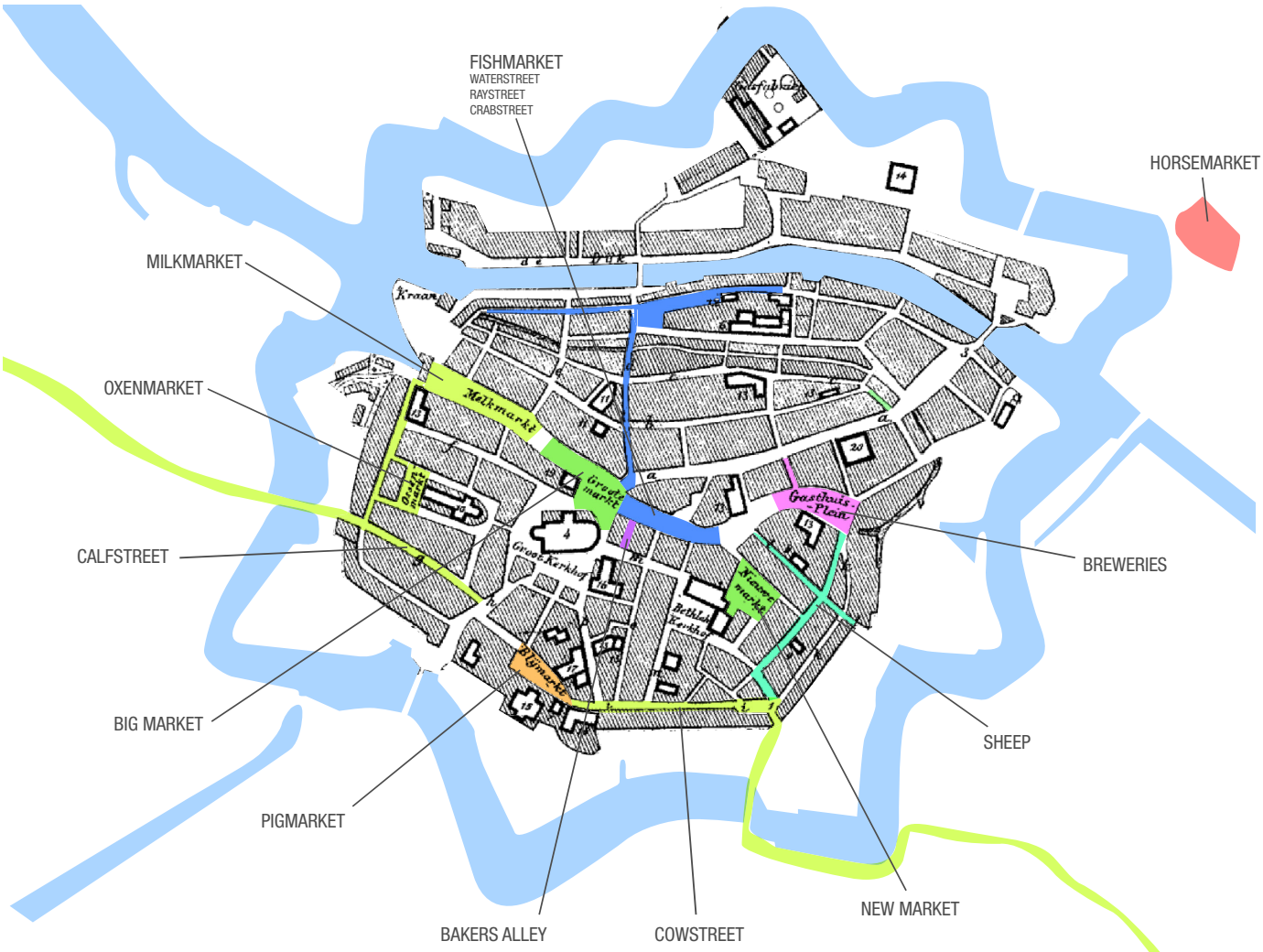


Fig. 4.3 - 'The historic urban food landscape of the trading town Zwolle', the Netherlands. The map shows how dairy and livestock markets were located close to the entry points from farmland to the west and east of the city. The fish market was located in the heart of the old town- where the river 'Aa' used to flow - and streets carrying the names of fish were prominent along the river 'Zwarte Water' in the north. The map does not include other trades, which were often clustererd as well. Map created by the author in 2015. Underlayer: Kuypers Gemeenteatlas 1868.

Fig. 4.4 - 'Childrens Games' Pieter Bruegel the Elder, 1560. On display at the Kunsthistorisches Museum, Vienna.

After the classical period, children still took part in agricultural production or learned a trade though apprenticeship. Many children in pre-modern societies had virtually unrestricted freedom of movement. This freedom was also a necessity to them, as they were an integral part of a domestic workforce, which in turn usually played a part in one of the trades or guilds of the city. These guilds were often spatially clustered. Menial tasks such as buying groceries or small items such as baskets, pots or cloth, thus meant that one had to visit different specialized areas of a city. A typical Dutch trading town had markets for dairy, fish, grain and different types of livestock, and streets specialized in pottery, metalworking, shoe-making, basket-weaving, leathercraft, among others. The produce on sale at the markets would change according to the seasons, or the arrival of trade convoys. In many towns the transhumance of animals or other events relating to the agricultural calender were still celebrated. According to Bengtsson, "the play-stretch [of children in pre-modern cities] was provided by a network of roads which spread all over town and embraced the adult world with its multitude of workshops & markets of different kinds" (Bengtsson, 1970, p.24) Children thus had to navigate not just the maze of streets and alleys, but also the social and cultural landscape of the city, with its different spaces, seasons, classes and occupations.

In 1530 humanist Desiderius Erasmus published a book on civil etiquette for children. The social norms he promoted through his book were those of the city; Not aristocratic or boorish, but bourgeois (Bakker et al, 2006, p.137). The 1560 painting 'Kinderspelen' (Children's games) by Pieter Bruegel the Elder and the 1625 engraving 'Ex nugis seria' by Adriaen van de Venne show that urban children played a great variety of games. It is sometimes argued that Breughel and other Dutch artists were not so much interested in children themselves, rather using them as metaphors for wider society to tell morality tales to an adult audience (Bakker et al, 2006, p.83, 144). However, the images do offer information on the use of public space by children. In the painting 'Kinderspelen' we see children imitating all aspects of adult urban culture; There is a mock baptismal, bridal and church procession, a fake knights jousting duel, a boy is giving a sermon, a girl is playing store, and oth-

ers are collecting firewood for the midsummer 'Sint Jansvuur' festival (Hartman & Lens, 1976, p.23, 32, 57, 74, 90, 103). What Breugel in fact shows us, seemingly following humanist literary tradition, are children practising their citizenship through play. Other games which are featured on the painting make use of the public domain in interesting ways, such as 'Wall Walking', and 'Nalopertje' ('Follow Me'), where one has to copy acrobatic moves and jumps (Hartman & Lens, 1976,p.88, 98). John Locke was influential in spreading the idea that child play had educational values through his 1698 book 'Some Thoughts concerning Education' (Bakker et al, 2006, p.151).

During the 18th century, enlightenment thinkers began arguing against urban culture as had been propagated by the humanists. They valued rather the 'natural' life of the countryside, which had not been perverted by urban civilization (Bakker et al, 2006, p.151). These romantics also idealised childhood, which lead to a gradually increasing valuation of play and education among the general public. However, it took until the 1840s before the idea that 'common children' should work in order to become orderly and duty full began to fade (Bakker et al, 2006, p.195). Increasing numbers of children were partially freed from labour, and the period of youth lengthened.
During a 2009 visit to Fez, Morocco, the author was taken on a tour of the old town by a 10 year old boy, who would be described as a 'faux guide' in the official tourist industry. The trip through the car-free streets and alleys went past different markets, mosques, a tannery and the graveyard overlooking the city. The boy knew his way around town, and arranged access to places which usually remained outside the view of tourists. Spatial freedom and knowledge were crucial for our young guide; To interact with tourists, take on responsibilities, mediate between cultures, learn languages, convey civic pride, and at the same time earn some extra income for his family.

The unrestricted life of children in cities, particularly of boys, was a popular theme in early youth literature of the 19th century, and is still idealised by some today. In 1890 the Dutch writer Multatuli publishes 'Woutertje Pietersen', who is able to reach the edge of the city at age 10 (van Duijn, 2004, p.21-22). A comic from the popular Flemish children's serial Suske en Wiske published on the 50th anniversary of it's run in 1995 by author Paul Geerst illustrates the youth of the comic's late creator Willy Vandersteen in 1920s Antwerp, Belgium. In the comic it is stated that Vandersteen played all throughout the city. Parts of the city that are visited by the protagonists include the school, a market, a square with a statue, the port, the banks of the Schelde River, a construction site, and, in order to get blessings for a 'crusade' against children from another neighbourhood, the local church (Geerts, 1995).

Children in early modern urban public spaces

When work began to be concentrated outside the home due to industrialisation, the lives of children and adults started to diverge (Stearns, 2006, p57). The development of the educational system also segregated children from adult economic activity, which they would otherwise have experienced through land labour, apprenticeships or, increasingly, factory work. Yet, without adequate welfare provisions, many children were still unable to attend school. Cramped living conditions forced many of them unto the street. With such large numbers of children roaming the streets unattended, many cities started to enforce strict social norms in public space (Stearns, 2006, p59-62). 'Unregulated' spaces such as alleys, stoops and yards became seen as inappropriate for children (De Coninck-Smith & Gutman, 2004, p.133). However, many children in poorer neighbourhoods did not have access to the new urban parks that had been constructed during the 19th century, and thus had no choice but to play on the street.

Rapid urbanisation dramatically changed the historical structure of cities, with their specialized trades and markets, which much have had some effect on the way in which children were able to interact with different occupations, or in which they understood their city as part of an agricultural landscape dominated by seasonal changes. In reaction to the estrangement of the individualistic industrial 'Groszstadt', groups of German youths organized themselves as 'Wandervogel' ('Wandering birds'), starting in 1897. Without adult supervision they made excursions exploring natural environments and folk customs of the countryside, and formulated their demands for more autonomy. (Bakker et al, 2006, p.300-301).

The importance of play in the formation of intelligence was put forward by Karl Groos in his 1899 book 'The Play of Humans' (Lefaivre, 2007, p.40). The idea that children needed their own segregated spaces began to take hold. Around the turn of the 20th century movements and associations promoting playgrounds started to emerge in Europe and the United States, partly out of concern for children of poor fam-

ilies or migrants playing in the streets (Hart, 2002, p.137-138). Some even argued that playgrounds should be constructed as "disciplinary physical activity space" (De Coninck-Smith & Gutman, 2004). Dutch pedagogues warned about the dangers of modern urban life; Its cinemas, tobacco and liquor stores, and dancing café's were supposedly detrimental to the morality of children (Bakker et al, 2006, p.253). To take children out of their 'impoverished urban environment' Kindervakantiekolonies ('Child Holiday Colonies'), were set up, with minimal parental influence (Bakker et al, 2006, p.273-275).

However, the idea that children learn through play already had a substantial following, and progenitors of the modern 'adventure playground' were constructed in the United States as early as the 1880s (Hart, 2002, p.145). Furthermore, playing in the street was not rejected by all advocates of child play; Dozens of streets throughout New York City were closed to traffic and turned into 'play streets' between 1914 and 1924. According to the New York Times of 1914 "children must play, and children, if they live in the cities, must play in the streets" (Police Athletic League, n.d., para. 3). Free play in public space was somewhat restricted, however, by the disappearance of alleys and dead-end streets as a result of slum clearance (Van Duijn, 2004, p.22).

As women joined the workforce, schools, kindergartens and youth clubs such as Scouting increasingly substituted for them in childrearing, leading to more 'institutionalized' lives of children (De Coninck-Smith & Gutman, 2004, p.133). Still, this did not affect all children, and newspaper boys and delivery boys were used well into the 20th century (Stearns, 2006, p.96). The idea that child-play needed guidance to have purpose remained prevalent, especially in the United States under influence of John Dewey, while teachers in some European countries began experimenting with self-education through play and discovery, as advocated by Maria Montessori and Peter Petersen (Bakker et al, 2006, p.63-65, 69-71).

Fig. 4.5 - 'Erinnerungen an Brienz', painting by Sebastian Buff, unknown date (before 1880). From Wikimedia Commons. Children in 19th century romantic art were often depicted in natural or village settings.

Fig. 4.6 - Children playing near a dead horse in New York, c. 1905. Photograph by unknown author, from Wikimedia Commons.

Fig. 4.7 - 'The Tambourine', a 1905 painting by Jerome Myers depicting children dancing in a street of New York's lower east side. The Philips Collections.

Fig. 4.8 - The tragic reality of modern city life; parked cars and scooters under the 1951 mural 'Spielende Kinder' (Playing Children) by Hilde Uray in Vienna. Photograph by János Korom, 2010, from Flickr.

Fig. 4.9 - Children wading in a fountain in the center of Vällingby, Stockholm, 1954. Today naked play in such a highly public space would likely draw offence. Photograph by Sune Sundahl, from the Architekturmuseet.

Fig. 4.10 - Playground apparatus in Thetford, England. Metal climbing structures had existed before the second world war, but became ubiquitous in parks throughout the world in the following decades. Some consisted of geometric shapes (such as those by van Eyck), while others were figurative. These 'Space Age' structures are monuments to a period which is otherwise fading from public space. Photograph by Flickr user Sludge G, 2008.

Children in post-war European urban spaces

As supervised playgrounds kept being built in the United States from the 1930s to the 1950s (Hart, 2002, p.139), a re-evaluation of childhood occurred in war-ravaged Europe. In 1943 the first true adventure playground was created in occupied Copenhagen, unsupervised, to shield children from punishment for their "wild play" in public space (Norman, 2003, p.17). In the years following the war European artists found in children the perfect subject matter for their urban drama films and playful paintings (Lefaivre, 2007, p.46). Residents of rebuilding European cities set up temporary "junk playgrounds" in left over spaces (Norman, 2003, p.18-19)(Van Duijn, 2004, p.23). In 1948 the UN adopted the Declaration of the Rights of the Child. However, this had no direct effects on how children used or perceived public space, as freedom of movement and the right to (unsupervised) play were not mentioned in this accord. However, cities themselves started to develop strategies to incorporate play spaces in neighbourhoods.

As playing children became more accepted and catered for in urban public space, their desire to escape the city was somewhat eased. Youth organisations, camps and the 'free youth movement' started to fade (Bakker et al, 2006, p.300, 304). In the Netherlands the 'method Wagner' was used to calculate the adequate size and number of play spaces for different age groups (Karsten, 2009, p.85) Trying to quantify the play of children in such a way could, if taken to the extreme, have lead to segregated, mono-functional (and thus likely abused) play-spaces. To the contrary, the hundreds of playgrounds that were built by urbanist Mulder and architect van Eyck in Amsterdam were fully integrated into the urban landscape (Karsten, 2009, p.86). Many of the smaller playgrounds of Van Eyck were designed in such a way that they did not need supervision (Ligtelijn, 1999, p.81). According to Hertzberger, the playgrounds of his mentor Van Eyck were successful due to their use of simple, colourless 'primary shapes', which left room for the imagination of the children themselves (Hertzberger & Gieskes, 2008, p.219).

Not all new approaches to urban play spaces were as successful. Many of the playgrounds established in the 1950s and 60s used thematic designs or abstract shapes and primary colours, which, according to Hart, left the 'inventiveness' solely with the designers (2002, p.145). In similar wording, Bengtsson laments the playgrounds of the time, which according to him

are "so finished, so arranged that nothing is left to the child's initiative" (1970, p.156). This period also birthed the commercialisation of play spaces in the form of child-oriented amusement parks such as Disneyland. Playgrounds and 'play leadership' were seen as instruments to reduce crime (Norman, 2003, p.22). In a period when motor vehicles were starting to dominate public space, Van Eijck saw his playgrounds as safe spaces for children (Ligtelijn, 1999, p.68).

In 1958 the Technical Assistance Administration of the United Nations convened in Stockholm to address the 'problem of playgrounds' (Bengtsson, 1970, p.7). One of the outcomes of the seminar was the proposition that each neighbourhood requires three distinct layers of playgrounds; Playgrounds within sight of the residence for the smallest children, a 'network of playgrounds' throughout the neighbourhood for young children, and "comprehensive playgrounds" in each 'neighbourhood unit' for older children and adults (Bengtsson, 1970, p.89) A year later, in 1959, the International Council for Children's Play was founded. Participating countries set up their own national bodies, which carried out studies on topics relating to child play, including playgrounds and 'play gardens' (Bladergroen, 1980, p.87).

From the early 60s, however, activists such as Jane Jacobs started to protest the segregation of children from adults, arguing against playgrounds and in favour of lively sidewalks and mixed-use neighbourhoods (Karsten, 2009, p.84). Considerations for children began to influence urban design itself. The most important principle for the development of the modernist high-rise neighbourhood the Bijlmer in Amsterdam, for example, was the idea that children should have free reign to play wherever they want, unrestricted by traffic (Verhagen, Ris & Burrett, 1987, p.25). To achieve this, elevated metro lines and roads were constructed, keeping the ground level unobstructed. These concrete 'walls' blocked sight lines, and created dark, left-over spaces. The exceptionally large dimensions of the housing complexes also made parental oversight nearly impossible. To realise such uncompromising modernist neighbourhoods the gound surface was often flattened and elevated, erasing the historic natural and (agri-)cultural landscape. This may put children who grow up there at a disadvantage as it limits the knowledge they can extract from their environment. Instead of giving children autonomy, modernist urbanism fostered feelings of alienation and isolation.

Fig. 4.11 - Children and artists build a sculpture on the playground ''T Zand' of the Banstraat in Amsterdam to protest its demolition, 1973. In the 1970s activists and artists sought to draw attention to the plight of urban children in innovative, inclusive ways. This particular protest was unsuccessful: the plot now houses an appartment complex. Photograph by Punt, from the Nationaal Archief.

Fig. 4.12 - 'Dead space' in the modernist residential 'child-friendly' suburb the Bijlmer, Amsterdam. Author unknown, from the Bijlmermuseum.

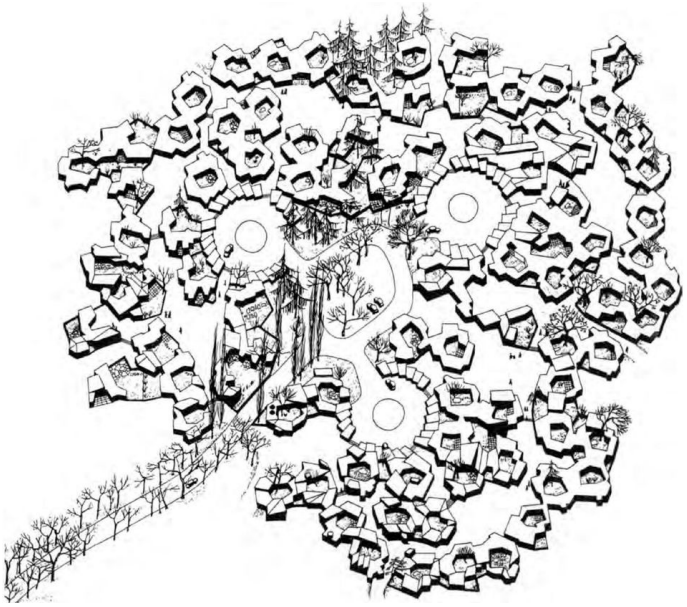


Fig. 4.13 - 'Small-scaled, complex and diverse: the principle of the cauliflauwer neighbourhood'. Illustration by Niek de Boer, 1972.

Fig. 4.14 - Children playing in a publicly accessible courtyard in the '70s neighbourhood' Lunetten in Utrecht, the Netherlands, 2016.

Fig. 4.15 - Children playing on an open school yard of the centrally located school cluster in Luntten, Utrecht, 2016.

Children in (post)modern urban public spaces

From the 1970s onwards budget cuts increasingly left parks and playgrounds without guardians or play supervisors (Hart, 2002, p.141). Many of the playgrounds which had been constructed in the decades before were inadequately maintained, critically modified or completely removed (Ligtelijn, 1999, p.69). At the same time, children's right to the city's public spaces was promoted by the urban ecological movement (De Coninck-Smith & Gutman, 2004, p.138). Researchers and designers began publishing works relating to children's perception and use of public space (Loukaitou-Sideris, 2003, p.132).

From the late 60s, architects from the structuralist movement in the Netherlands had been experimenting with alternative forms of (child-friendly) urban development; Arranged around courtyards, raised pedestrian spaces and woonerfs (dead-end 'living streets'). Protests in the 1970s against the frequent death of children due to accidents with motor vehicles, combined with the oil crisis, marked a turning point for urban design in the Netherlands. Through-traffic in historical neighbourhoods was minimised, alternative modes of transport were stimulated, but the biggest change was in the layout of urban extensions and new-towns, which took the form of modern 'garden cities'. Structuralist suburbs built to 'human scale' (bloemkoolwijken, meaning 'cauliflower neighbourhoods') became ubiquitous throughout the Netherlands. Schools were given a more prominent place in these developments, in some cases as part of the neighbourhood centre (De Boer, 1997, p.25-26). This did not mean, however, that all public space was, from then on, child-friendly.

Due to an increase in homelessness, crime and drug abuse in the 1980s, public space began to be seen "not as an amenity, but as a problem", and was as a result sometimes commercialised or privatised (Loukaitou-Sideris, 2003, p.130)(Karsten, 2009, p.87). When drug users and homeless people were evicted from urban parks and streets during of the 'War on drugs', they took refuge in left over spaces near residential areas; In-between buildings, in bushes, basements, abandoned buildings, and under highways and bridges. These were spaces where children typically played, but which now could contain quite dangerous elements such as needles or drugs. Economic crisis and drug abuse also affected children directly, some of whom as a result became addicted, homeless, or delinquent.

Urban policies based on risk aversion led to the fencing off of back entrances and stairways, turning housing complexes into gated communities. While this might have had some effect on curbing crime or nuisance locally, it also made these traditional play spaces in the direct living environment decreasingly accessible to children. In the United Kingdom, playgrounds themselves became less accessible due to 'child protection policies', which required payment and registration (Norman, 2003, p.23-24). Risk aversion also limited the design possibilities for playgrounds due to norms and standards for ground-surfaces and objects (Van Duijn, 2004, p.38).

As the state retreated from the public domain, schools were increasingly asked to take on social responsibilities. Just like its polar opposite the Bijlmer 30 years before, the post-modern low-rise suburb Leidsche Rijn west of Utrecht was envisioned as a "child-friendly city". The focus, however, had shifted from guaranteeing spatial freedoms to education and social control. The child-friendly city now meant a 'community school', which shared its facilities with the neighbourhood (De Boer, 1997, p.27). Driven by (adult) demands in a newly liberalised market, housing blocks became longer and more uniform. The in-between spaces; The alleys, back-entrances and courtyards - which had been so popular with children - disappeared from the lexicon of Dutch urban planners. The demand for deep private gardens facing south was, from now on, the most influential factor in the layout of new residential neighbourhoods.

From the late 1990s, urban public space in the Netherlands was further 'sterilised' of social problems through a 'zero tolerance' policy towards addicts in public space, which pushed them towards new clinics and housing located farther away from the city centre (Hoffmann & Blokzijl, 2017). As the perception of urban public space started to improve around the turn of the 21th century, families with children started to return to urban neighbourhoods (Karsten, 2009, p.88). The largest increases in families with children are now occurring in highly urbanised areas (Karsten & Felder, 2016, p.12-14). A new generation of children is being raised in the city; It is for and with them that we have to redefine our urban public spaces.

Fig. 4.16 - A designated and 'safe' playground in Leidsche Rijn, the Netherlands, 2006. Photo by Panoramio user Marcelo30NL.

Fig. 4.17 - Undefined space in the 90s suburb Leidsche Rijn, the Netherlands. Photo by Wikimedia user Itsramon.

Summary of the historical perspective

The historical overview shows that there are large differences between nomadic, agrarian and highly urbanised cultures in the way children use their respective shared spaces. Children in nomadic cultures use the same spaces as adults, and are thus exposed to most aspects of adult life on a daily basis. At early age, however, their spatial freedoms are restricted in some cultures through strapping them tightly to an adult, draft animal or cradle. In early agricultural societies children became an important part of the workforce, and their share in the population increased. From modern analogies we postulate that children in historical agricultural settlements played an important role in the development and transfer of emplaced spatial knowledge and traditions; It may well be that many local legends originated as children's tales. The main takeaway for urban designers here is that sustainable local identities can arise from collective engagement by children in shared spaces.

In early cities the surrounding landscapes and the seasonal agricultural calendar continued to play a determining role in the function of many urban public spaces such as streets, squares and ports. As part of the household workforce, which in turn was part of one of the trades of the city, children in the classical and pre-modern period had to navigate large parts of the city's shared spaces. The relationships of these shared spaces to specific religious, civic and agricultural aspects of urban life were relatively direct and uncomplicated, which made it possible for children to participate in these socio-spatial constructions. In less developed cities or agricultural towns we can still recognize such patterns today. In most developed countries, however, cities have grown so large, and industrialised to such an extent, that their squares and streets have lost their function within the historic network of trades, as well as their relation to the surrounding agricultural landscape. While it is impossible to untangle the globalised networks of economic and agricultural production, it is still feasible for urban designers to use – now often conceptually empty – public spaces to re-establish tangible and symbolic connections between the city and its production economy, and the surrounding agricultural and natural landscapes.

The public life of urban children changed dramatically in the early modern cities of Western Europe and the United States. Industrialisation removed production from the domestic environment, new regulations displaced markets to the rim of the city, and formal schooling spatially segregated an increasing number of children from the adult workforce. Urban public spaces began to be seen as ill-suited for child-play, leading even groups of children to explore alternatives outside the city in groups such as the Wandervogel. To accommodate urban children, parts of urban parks in several American and European cities were turned into the first designated urban playgrounds, not to dissimilar in itinerary from some recent examples. The notion of 'eduction through play', however, was still relatively new, and the preference for supervised or guided play remained, for instance through new youth associations such as Scouting. What is interesting here is that the spatially unrestricted and unsegregated urban childhoods which are idealised in current discourses were already being dismantled decades before the spread of motorised transport, which is typically seen as the main culprit in restricting urban children's freedoms. To bring back some of the aspects of the spatially acute pre-modern childhood may thus require more changes than putting restrictions on through-traffic alone, for instance to the way in which we think about segregation of play and work from public space. Easing zoning regulations to allow small non-polluting workshops in residential neighbourhoods, or to allow dwellings to be mixed in with light industry, can bring children back into contact with working environments.

After the second world war the European public – including artists and urban planners – started to re-evaluate the conception of childhood. Playgrounds became ubiquitous throughout public space. The concept of a 'network of playgrounds' was put forth by the technical Assistance Administration of the UN in 1958, but was not universally adopted. Exceptional were the playground designs of Dutch architect Aldo van Eyck, which were integrated into the urban fabric. From the 1960s onward, however, the idea that children should be spatially segregated from adults in playgrounds came under attack from activists like Jane Jacobs. New ideals of unrestricted spatial mobility and integration of children into public space started to influence urban design, but the scale and structure of the postwar modernist neighbourhoods often made parents reluctant to allow children to play outside independently. Without adequate socializing time children in such neighbourhoods are impeded in their endeavour to build shared emplaced knowledge in the way children had been able to in pre-modern cities or agrarian settlements.

Following the oil crisis of 1973 and protests against traffic accidents, Dutch planners and urban designers started to gravitate towards low-rise, high-density development, building on Structuralist experiments of the late 1960s. This radical change towards a more human-scale urbanism was partly the consequence of new intensive participation processes. The resulting labyrinthine fractal-like modern garden cities are ideal for young children to explore, and to build emplaced knowledge through shared experiences. In using existing landscape elements, the connection to the agricultural landscape was somewhat restored to the (sub-)urban environment. Unfortunately these uniquely Dutch neighbourhoods have also proven to be somewhat confusing to adults who are used to neat orthogonal spaces and direct movement. Partly due to a political shift favouring liberalisation of the housing market the complex structuralist design patterns were abandoned in the 1980s, which brought Dutch urban planning more in line with transatlantic zoning policies. In many of the so-called VINEX suburbs of the 1990s the alleys, courtyards and small in-between spaces were not present any more, or were privatized. It remains to be seen if other (semi-)public facilities such as 'community-schools', sports clubs and expansive post-modernist parks can compensate for the lacking building density and network of small-scale play spaces needed to construct embedded spatial knowledge and local legends. For dense historic neighbourhoods, which are again seeing a rise in the number of young inhabitants, the question is how the sparely available play spaces can be connected to form a play network, so that urban children do not become isolated in an adult world.

Fig. 4.18 - Children playing in Pilgrim Street, Newcastle upon Tyne, c.1890. Photograph by unknown author, from the Newcastle Libraries 'Domestic and Family Life Collection'.

4.2 - Children and public space in contemporary discourses.

Denial of agency: 'out of place' in public space

The rights of children are often restricted under the pretence of protecting them from their own 'irrational behaviour'. Modern societies have made sure to protect young people from their 'fantastical' ideas and ideals by excluding them from democratic and economic processes. Kulynych argues that modern definitions of citizenship as defined by Habermas and Rawls exclude children on the basis of linguistic capabilities and moral competence respectively (2001, p.255-256). According to Kulynych "the construction of the identity of the public [...] is built upon the exclusion of children", and children in public space are thus often seen as out of place or 'dangerous' (Kulynych, 2001, p.223,253). The idea of children in public space being dangerous can be understood in two ways: they are seen both as vulnerable, and as villains (Gill, 2007, p.11). According to Davis & Jones, the conceptualisation of children as problems "obscures their problem-solving capabilities" (1996, p.107-108).They state that healthy children are "able to move about their local area with reasonable independence and safety", and are "given shared ownership of public space" (Davis & Jones, 1996, p.108).

Lia Karsten draws attention to the lack of consideration given to children in the discourses of current urban professionals (2009, p.82). If they show interest in children at all, policy-makers tend to focus on early childhood or adolescence, while it is precisely the period in between when children start to explore their environment and slowly become part of the urban fabric (Gill, 2007, p.12). This omission is quite persistent, as it was already noted by Bengtsson (1970, p.192). To involve children in this age range with policy decisions some municipalities have set up children's councils. Such bodies might serve some educational function for a select number of participating children (and aldermen), they do not, however, empower urban children in general. Instead of approaching children as complete individuals, policy makers tend to involve them only on a thematic basis (Elsley, 2004, p.161-162). Spatial experts are usually not involved at all with policies directed at children (Blinkert, 2004, p.100). While the ground surface is the most important element of public space to children, it receives the least attention of designers (Lynch & Lukashok, 1990, p.157) And while streets and paths of brick, gravel or cobblestone may, to adults, be aesthetically pleasing to look at, children rather prefer grass, dirt and smooth surfaces that they can actually use (Lynch & Lukashok, 1990, p.157). The resulting urban public spaces are not intrinsically designed to accommodate for play, which is, save for some residential developments, seen as a mere afterthought.

This adverse outcome reflects the skewed power relations between children and adults, and is proof of the difficulty adults have to see the world from the perspective of a child. "Adults do not intuitively understand the importance of elements of the environment for children", as Churchman states (2003, p.102). Alternatively, children often do not yet fully comprehend expansive public spaces (Van Duijn, 2004, p.42), and are not as well equipped to cope with heavy traffic (Bengtsson, 1970, p.23). Enlargement of spaces and buildings have left fewer in-between places - which are easier to grasp for children - in public space (Hertzberger & Gieskes, 2008, p.251). This is especially the case in highly urbanised areas, which as a result have become the world of adults. The response has often been to 'facilitate' children in such areas in their own segregated, sometimes fenced off, spaces. The rationale behind such policies is often quite sympathetic, such as this statement by Bengtsson: "In our adult system we will have to set aside small reserves in which the children's own law & order is allowed to prevail" (1970, p.158)

According to Hertzberger, however, it are the adults who need to learn how to live in a child's world (Hertzberger & Gieskes, 2008, p.236-237). Jacobs also argued that children should be integrated in daily urban life (Karsten, 2009, p.82, 84). In order to achieve this, Hertzberger proposes the concept of the 'learning city', which sparks curiosity and discovery for all ages, and where there is no clear boundary between children and adults (Hertzberger & Gieskes, 2008, p.235-236). Geocaching and augmented reality games such as Ingress and Pokémon GO have shown that people of all ages and backgrounds can share public space in a highly social, constructive and playful manner. It is up to urban planners and game developers to adapt this new canvas in ways that will empower children and other owners of public space.

By experimenting with new forms of co-creation of public spaces, powers can be delegated to children in an educational, creative and democratic way, giving agency through real experiences. Such a direct approach is more suited to the mindset of children than a children's council, which merely transplants

them into the corrupted world of competitive and bureaucratic adults. The recognition of developmental differences between children and adults need not lead to the domination of one group over the other in public space. The conception of children being 'out of place' in public space should be countered through inclusive design processes and shared ownership and responsibility for people of all ages.

Fig. 4.19 - Children in Amsterdam protesting the lack of play space in 1982. Adults can 'share' agency with children by supporting their initiatives, while remaining in the background themselves. Photograph by Cees de Boer, from the 'Noord-Hollands Archief'.

Fig. 4.20 - Children painting a non-political banner in the 'Taksim commune' in Istanbul, during the 2013 protests to save Gezi Park. Especially during emotionally challenging times adults have the responsibility to ensure the right of children to safe and dignified outside play spaces. Author unknown. Shared by Facebook group 'Diren Gezi Parkı'.

Fig. 4.21 - Grind-prevention on a concrete barrier, 2006. Creating durable grindable surfaces in public space could prove more cost-effective in the long run. Photograph by Wikimedia user Mboverload.

Fig. 4.22 - The legendary skate park 'Burnside' in Portland, Oregon. Like many other parks around the world Burnside was built without a permit. Photograph by Wikimedia user User Cacophony, 2006.

A jungle of rules: curbed freedoms in public space

According to much research, independent mobility of children has decreased sharply, mostly due to the introduction of the auto mobile (Hutenmoser, 1995, p.404)(Karsten & Van Vliet, 2006, p.69-70). Instead of controlling motor vehicles, traffic engineers are often concerned with controlling children (Davis & Jones, 1996, p.107). However, there are many other factors which impact the freedom of movement of children. It can, among other things, be restricted by bullying, territoriality and policing (Day & Wagner, 2010, p.517-519). This can affect children of all ages when they want to use public space to play.

Although it is usually not enforced, most Dutch cities have bans on sidewalk chalking, which have only recently come under scrutiny (Ekdom, 2017). Tim Gill quotes a police officer stating that "chalk graffiti has been a persistent problem" (2007, p.10). In many cities youth curfews exist (Kulynych, 2001, p.260-261), and children are often barred from hanging around or gathering. Cities around the world have introduced restrictions on roller-skating and skateboarding in public space through regulations and the redesign of spaces (Woolley, 2006, p.55-56). According to Van Duijn the skater "uses the city on every scale" (2004, p.46-47), making it likely that this battle against the 'ultimate user' of public space will fail time and again.

Children are attracted to desolate, demolished or wasted spaces because they allow for creative usage and deviation from the rules governing regular public space (Lefaivre, 2007, p.28). Such places can offer children privacy from peers or adults (Berg & Medrich, 1980, p.336,340). As many children have limited space and privacy at home, they often seek to establish their own spaces outdoors (Banerjee & Lynch, 1990, p.175, 184). When they claim ownership of such a space, however, they are usually chased off, and the place is subsequently sterilized (Hertzberger & Gieskes, 2008, p.212)(Banerjee & Lynch, 1990, p.177). Children are generally aware that their presence in such places is not appreciated by all adults. It is for that reason that "they will work day and night, well knowing they may be stopped at any time" (Bengtsson, 1970, p.158). Out of frustration with a lack of adequate playing space, some children have tried renting car parking spaces (Hertzberger & Gieskes, 2008, p.211). Even improvised use of formal play spaces can cause tension with authorities (Elsley, 2004, p.157).

Blinkert states that, to children, the city is a 'jungle of rules' (2004, p.106). Ironically, such restrictions might actually encourage children to get involved in subcultures, antisocial behaviour or crime (Gill, 2007, p.17).

Children who live in areas which are seen as 'problematic' also tend to break up their neighbourhood into 'micro-spaces', to avoid further stigmatisation (van der Burgt, 2008, p.266). This also impacts the spatial freedoms they have within their direct living environment. While public space is usually thought of as communal space, Loukaitou-Sideris notes that, instead of interaction, it can also foster "divisions based on class, race and ethnicity" (2003, p.131). According to Thomson and Phillo, children from the age of 13 experience street space as "classed leisure space" (2004, p.124-125). Play spaces themselves have often become segregated, mono-functional space as well, and have in some cases been commercialised (Hertzberger & Gieskes, 2008, p.227-228). While territorial behaviour in public space can lead to increased segregation and decreased freedom of movement, some researchers note that territoriality can also give children a feeling of belonging. According to ethnographer Childress it is important for teenagers to be able to claim spaces as their own (de Coninck-Smith & Gutman, 2004, p.136).

While social norms in public space are necessary to a certain extent, it is also clear that their strict enforcement often impedes on the ability of children to explore, construct and play in their direct living environment, especially in highly regulated urban areas. Instead of forcing children and teens to conform to adult norms, urban designers and planners could strive to create public space which actually caters to the norms of young people as well. Often-times planners do not even need to allocate spaces for play, as children will choose these themselves. In such cases, all that needs to be done is to empower these young architects, gardeners and urban designers; Perhaps through a safety check, a grant to make a self-styled playground, skate park or 'gang-hut' permanent, a participatory redesign, or in some cases, just to leave the children completely to themselves.

Fig. 4.23 - Prescriptive and restrictive - the red sign indicates many forbiddens - playground at Riverside Park, Noshiro, Japan, 2018. - Photo by Wikimedia user

Fig. 4.24 - 'Rules of play for the play field'. With the help of the Utrecht municipality children in Lunetten put up signs prescribing basic rules they thought of themselves. Such a sign may help to affirm the authority of children over adolescent and adult visitors.

Fig. 4.25 - Construction on four set poles in a residential semi-public courtyard in EVA-Lanxmeer, Culemborg, 2009. Certain areas of public space should be allocted to creative, free play. Photograph by Wikimedia user Lamiot.

Fig. 4.26 - Fenced playground on Sønder Boulevard, Copenhagen, Denmark. Photo by Flickr user Max Katz, 2011.

Fig. 4.27 - Huge tower and slide on a square in the center of Bremen, Germany. A city that wants to become 'child-friendly' needs to consider opportunities for play in all its public spaces. Photo by Wikimedia user Rami Tarawneh, 2006.

Fig. 4.28 - Children playing in front of a row of duplex houses in Votulast, Utrecht, 2016. Details such as stairs and alcoves give children opportunities to play games, hide from bullies, or seek shelter from rain.

Playgrounds or sidewalks; Segregation and integration of children in public space

Many parents, and adults in general, tend think of child-friendly neighbourhoods in terms of playgrounds and parks. To many children, however, parks and playgrounds are rather unattractive when compared to bustling street life (Berg & Medrich, 1980, p.341). According to Van Duijn, children spend only 30 percent of their outside play time at allocated play spaces (2004, p.40). Jane Jacobs claimed that gang violence was primarily a problem of playgrounds and parks (Lefaivre, 2007, p.52), and Hertzberger blames the need for playgrounds on a lack of child-friendlyness of public space in general (Hertzberger & Gieskes, 2008, p.214).

The idea that play should be 'orderly and safe' has led to an increasing uniformity of playgrounds (Loukaitou-Sideris, 2003, p.131). Lefaivre states that most playgrounds "offer a configuration of prescriptive items that only hinder a child's imagination"; The concept of 'playgrounds' should thus be abandoned in favour of play space, which allows children to "deviate from the rules", she argues (2007, p.28). Most playground designs also do not take into account seasonal changes in weather patterns. Playgrounds that offer no shelter from wind or rain typically lose their function during the colder months of the year (Bengtsson, 1970, p.216). Instead, spaces such as streets, fields, slopes, streams and ponds are quickly populated with children when they are snow-covered or frozen up.

While the generic 'swing and slide' playground is forcefully rejected by most researchers, playgrounds which offer more diverse opportunities for play and interaction are still a valued type of public space. Playgrounds are also spaces where children and parents of diverse backgrounds intermingle (Norman, 2003, p.8). The sandbox in particular is a place where children make their first friends, and migrant parents meet their native neighbours (Hertzberger & Gieskes, 2008, p.224). According to Van Duijn the 'formal' playground also functions as a meeting point for children, who can play there while waiting on friends (2004, p.39). The location of a playground influences its accessibility, especially in an uneven topography; Due to the pleasant down-hill access routes, "a play park at the bottom of a valley has a larger catchment area" (Bengtsson, 1970, p.110-111).

Karsten argues for playgrounds to be incorporated in the design of large, centrally located urban squares, which should evoke the image of "totem poles for the neighbourhood" (2009, p.90-91). Similarly, Hertzberger names the playgrounds of his mentor Alco van Eijck in Amsterdam as successful examples that were designed as an integral part of the urban landscape (Hertzberger & Gieskes, 2008, p.214). According to Lefaivre the 770 playgrounds built by van Eijck in Amsterdam are not just exemplary for the way they have been 'inserted' in the urban framework, but also for the participatory process through which they were established, and for the fact that taken together they supposedly formed a city-wide network (2007, p.58-59). This concept, called Polycentric interstitial participatory public space (PIP), creates a "polycentric net of micro urban villages on [top of] the existing city", they argue (Lefaivre, 2007, p.71). While ambitious in its scale, the PIP approach by itself does not ensure that all of public space will become 'children's space', for if the urban fabric does not allow for play in its streets and squares, these 'micro urban villages' will remain isolated. As stated by Bengtsson, the vitality of playgrounds can be enlarged through "convenient connections with an area's favourite 'play-stretches'", such as routes to schools and shops (1970, p.111). To turn this archipelago into a functional play network requires a holistic approach to the design and use of public space itself.

According to opponents of segregated play spaces such as Jacobs, the sidewalk is the quintessential place for children to interact with peers and adults. Because it is close to home the sidewalk allows children to be part of urban life without constant oversight, and gives parents the opportunity to socialize with neighbours (Karsten, 2009,p.84, 89). The street often also plays a role in the social network of a child. Bengtsson states that: "the street has been a unifying factor, giving a sense of belonging and security against children of other streets" (1970, p.21). Within a 'play network' the streets or sidewalks, short-cuts and alleyways are just as important as the designated play spaces. Hertzberger offers pointers on how to enhance the playability of sidewalks; Through details such as canopies, alcoves, offsets, decorations and boulders, "buildings become approachable" (Hertzberger & Gieskes, 2008, p.228).

Playgrounds or play parks can, and often do, have an important role within a neighbourhood, especially for younger children. However, children's need to play can not be satisfied solely at designated play spaces. To children, opportunities for play present themselves already on the way towards the playground. Exploring side-routes, discovering secluded places, and observing or interacting with animals are some of the ways in which children use their environment. Thus, in an ideal situation, designated play spaces are well connected to their surroundings and to each other by 'play stretches', which taken together form a 'play network'.

Fig. 4.29 - A lowly sping rider next to a wheelie bin and parked cars. Resulting from the often banal implementation of planning regulations for play, such tragicomic spaces are a common sight throughout the Netherlands. Photo by Wordpress user Cornutus, 2010.

Fig. 4.30 - A view of the unique shared open back yards of students living in the former social housing blocks at Nolenslaan, Utrecht, which are planned to be demolished. Most yards are only demarcated by a low fence along the back alley and can be entred from adjacent gardens. In the space - which is intermediate between public and private - the students have built a diverse landscape of lounges, tree huts, greenhouses, spice gardens, a hot-tub area and chicken coop. Such environments would be highly stimulating to children.

Spatial freedoms: autonomy in public space

According to a recent publication on children in Amsterdam and Rotterdam the most important rules for playing outside are 'staying within sight' and 'not crossing any roads' (Karsten & Felder, 2016, p.91). If these rules were inflexible, this would mean that children today have virtually no spatial autonomy, and their living environment is restricted to the block where they live. In her article 'The bubble-wrap generation' Malone argues that by restricting movement parents are in fact "adding to a child's anxiety and lack of competence in assessing environmental hazards". According to Malone, independent mobility gives children environmental competence, a sense of purpose, self-worth and efficacy, social competence and resilience (Malone, 2007, p.523). Similarly, Arza Churchman names way-finding, self-esteem, freedom of choice concerning degrees of privacy, expanding horizons though contact with people, activities, resources & stimuli, and dealing with threats and challenges as reasons why children's autonomy matters (Churchman, 2003, p.104).

Hüttenmoser found that children who are accompanied play only 1 to 2 hours outside per day, while children who can play independently spend over 2 hours outside (1995, p.405). Children who were not able to play outside by themselves had less than half as many playmates, were typically underdeveloped in motor and social skills, and their parents had a smaller social network (Hüttenmoser, 1995, p.405-408). Hüttenmoser also argues that attending organized playgroups can not substitute for 4 to 5 hours of independent outside play (1995, p.409). According to Churchman, factors which influence the autonomy of children are the planning of roads for pedestrians or cars, single-use of mixed-use zoning, the distance between residences and the (city) centre, the existence, knowledge of, appropriateness and affordability of services, the availability and accessibility of public transport, perceived safety, attitudes of adults towards children in public space, and social or cultural norms within families (2003, p.104-1005).

It is sometimes argued that children in rural environments or suburbs are more independently mobile. According to Van Duijn the age when children reach full spatial autonomy is higher in large cities such as Amsterdam (2004, p.41). However, children living in villages and suburbs have been found more likely to be driven to school, clubs and friends (Karsten & Felder, 2016, p. 160).

Churchman and Ginsberg found that a majority of children living in homes with entrances on a shared courtyard were able to play outside alone from age 3-4 (Churchman, 2003, p.107-108). In research conducted by Veitch et al, which focussed on parental attitudes towards outside play, all parents living on a cul-de-sac or courtyard indicated that they allowed their children to play outside by themselves, while that was only the case for half of the parents living on a through-street (2006, p.387-388). Bengtsson notes that for residents of high-rises, playing outside requires courage of both children and parents (1970, p.13). Attitudes towards spatial autonomy thus seem to be highly influenced by perceptions of safety of public space in the vicinity of the residence. Parents living on a cul-de-sac or courtyard also reported "community-oriented networks between neighbours" (Veitch et al, 2006, p.388). A feeling of community in turn encourages parents to give children more spatial autonomy (Alparone & Pacilli, 2012, p.112).

Being able to go to school independently is often seen as an important part, or indicator, of a child's freedom of movement. De Boer calls the 'route to school' educational, formative in the development of independence, and important in understanding the place of the school and home within the neighbourhood (1997, p.23). However, the route itself - as a physical connection - is not as important as the experiences that can be had along its path. As Hertzberger puts it: are there shops, markets, monuments, trades, is there commercial activity, a place to swim, etc.? (Hertzberger & Gieskes, 2008, p.213). Research by Rissotto and Tonucci has shown that children who go to school by themselves have "more detailed knowledge about the route to school and the context of the home-to-school itinerary", while children who were brought by car or foot had the least detailed knowledge (2002, p.74). They argue the lack of environmental knowledge is due to the fact that "children who are accompanied are not free to pursue their own interests". (Rissotto & Tonucci, 2002, p.74) Accompanied children are known to travel faster and more direct (Mackett et al, 2007, p.464). Van Duijn states that if distance and time are not in play, one "logically chooses the most beautiful, comfortable, route" (2004, p.45). Because children typically value time and space differently than adults do, it seems reasonable to assume they approach the journey to school or a friend's house differently as well.

According to Christensen, children have to balance their personal *emplaced* knowledge with the con-

stant input of formal - abstract - spatial knowledge by adults (2008, p.78-79). Possibly unaware of the educational value of going to school by yourself, many teachers in the Netherlands expect parents to bring their children to school, as a show of engagement (Karsten & Felder, 2016, p.62). Instead of bringing parents or local institutions into the school, teachers could instead "take education into the neighbourhood" (Malone, 2007,p.524). Christensen gives the example of unguided expeditions through the neighbourhood during geography classes, which teach children about map reading, measurement of distance and direction, and help them connect emplaced and formal spatial knowledge (2008, p.80).

There are also many non-spatial factors which influence the independent mobility of children. Independent mobility of healthy children increases with age; Starting from ones own home, extending to the garden, then the street, the neighbourhood, and finally the entire city (Christensen, 2008, p.77). Typically boys are found to have more spatial independence (Rissotto & Tonucci, 2002, p.75)(Davis & Jones, 1996, p.109), and so are children who own a dog (Veitch et al, 2006, p.388). The amount of independence also changes throughout the year, as children are allowed to roam more freely during the longer summer days (Page et al, 2009, p.7). While such factors cannot be addressed through urban design, it is important to consider them when conducting research on possible determinants of spatial autonomy of children.

Designing urban space to increase children's autonomy is not a straightforward task. Standard approaches aimed at increasing spatial autonomy of adults, such as publishing maps, putting up signage, or increasing public transport, will only have a minimal impact on the mobility of children, as the scale of such measures is usually not suited to the mental world of the latter. Instead, small-scale interventions such as creating back entrances, short-cuts through blocks and car-free streets might have a larger impact on the relative autonomy of urban children. The effects of spatial characteristics on human behaviour are often indirect, complex and thus less evident. Still, it is clear that there are relations between the spatial qualities surrounding a residence and the autonomy which parents are willing to extend to their children. In order to increase spatial autonomy of young people, urban designers and planners need to understand the aspects of public space which influence the aspirations of children, but also those which influence the fears of their parents.

Fig. 4.31 - Children around the age of 3 on their first bike without training wheels at Koekoeksplein, Utrecht, 2016. Learning to ride a bike gives children more spatial autonomy.

Fig. 4.32 - Alley in Lunetten, Utrecht, 2016. Open back alleys, short-cuts and pedestrian passages and bridges are important for the free movement of children in public space.

Fig. 4.33 - A child playing with dogs in Griftpark, Utrecht, 2016. Owning a dog gives children an excuse to be outside regularly, and it can help their emotional development.

Neighbourhoods; Routines and action spaces

Neighbourhood effects are a popular topic in current socio-economic research. Unfortunately, such research is often restricted to statistical, non-spatial, analysis. By focussing on economic and long-term developments of large groups of people, the real-time perspective and spatial demands of children are too easily overlooked. Philips and Shonkoff for example argue that adults and adolescents are more susceptible to neighbourhood effects than children because "they spend more time away from their homes" (2000, p.328, 331). This statement omits the fact that adults and adolescents often do not spend this time away from home within their own neighbourhood, while younger children do so almost exclusively. Furthermore they state that "interactions [of young children] with people [...] outside their immediate families have been relatively limited in scope and usually controlled closely by parents" (Philips and Shonkoff, 2000, p.328). It is evident that, to some researchers, independent interactions with neighbours, friends, store-owners, etc., are of a second order compared to those with parents and teachers. On the other hand there are also researchers that do stress the importance of the neighbourhood as a socialising factor. Niklasson and Sandberg for instance argue that the outdoor environment can be seen as a "reflection of what children should experience, know, and what culture they should comprise" (2010, p.493). This perspective seems to conflict with the notion that neighbourhood effects on the behaviour and development of children are negligible.

Some of the confusion might arise from the many different interpretations of the concept 'neighbourhood'. The official municipal definitions of neighbourhoods used in big data analysis - typical of research on neighbourhood effects - do not necessarily reflect the reality of adult residents, let a lone those of children. Other researchers have used terms such as 'activity space', 'action space', 'action radii' or 'play-stretch' to indicate the area where a child plays outside. These terms are more easily quantifiable than the ambiguous concept of 'neighbourhood'.

Lynch states that the 'orientation on the city' is usually formed "not by wandering, but by going to school or work" (Lynch & Lukashok, 1990, p.170). Karsten defines neighbourhoods as being determined by daily routines, where differing action radii of children lead to different perceptions of what their neighbourhood constitutes (Karsten & Felder, 2016, p.56). Bengtsson also stresses the importance of the routes to schools and shops (1970, p.23).

However, many Dutch children do have the time and freedom to wander, scooter, skate or bike around their own neighbourhood, greatly increasing their action space, but not necessarily impacting their daily routines. While some parents are disinclined to allow their children to wander freely, this wandering can play an important role in structuring fragmented spatial knowledge. According to Lynch, wandering should be made more attractive through concentrated and differentiated urban environments (Lynch & Lukashok, 1990, p.169-170).

The area where a child is allowed to play independently is often much smaller than their neighbourhood or action radius (Karsten & Felder, 2016, p.54). Parents often do not have a well developed understanding of how their children interact with their environment. This makes it hard to evaluate research on the 'action space' of children which relies solely on self-reporting of parents. Parents tend to overestimate the time their children play outside (Karsten & Felder, 2016, p.83), while at the same time underestimating the spatial reach of this play (Elsley, 2004, p.156).

Children see their neighbourhood in terms of friendships and emplaced knowledge, while adults are more likely to think in terms of places and routes. Friendships are often made at or near school, making this an important place in the neighbourhood for both children and parents. For some children the school plays such a large role in the conceptualisation of their neighbourhood that they rarely play with children who live on the same street, but attend a different school (Karsten & Felder, 2016, p.62). When a school is located very far from home, the number of friends in the direct surroundings has been found to diminish, leading some children to develop their neighbourhood around the school, instead of their home (Karsten & Felder, 2016, p.64). In mixed-use neighbourhoods corner-shops also function as 'anchor points' for children, next to schools (Karsten & Felder, 2016, p.56).

In their research on Oakland, CA, Berg and Medrich go as far as to equate the term 'neighbourhood' to the locally regulated 'school attendance areas', which have a maximum walking radius of 15 minutes and should be free of thoroughfares, so that children above kindergarten age are able to go to school independently (1980, p.324).

The diversity of urban landscapes also affect the ways in which children use and perceive their neighbourhood; A flat topography increases play opportunity and range (Berg & Medrich, 1980, p.338), while on the other hand hills are fondly remembered from childhood for the many different activities that can take place there (Lynch & Lukashok, 1990, p.161).

According to Blinkert lack of action space "may curb development [of children] into creative beings"; If the quality of action space is bad, children watch more TV and parents look for organized childcare alternatives (2004, p.103-104, 110). The quality of action space was deemed bad if there was: a speed limit of 50 km/h, a street width of over 6 meter, more than 4 parked cars within 20 meter of the residence, no public space within 100 meter of the residence, noise above 50db, no place for soccer or skating within 200 meter of the residence, no friend within reach, or if the residence was an apartment on the 3rd floor or higher (Blinkert, 2004, p.101). According to Villanueva et al the size of the activity space decreases if there are utilitarian services within 800m of a child's residence or if they live on busy roads (2012, p.263, 269-270). While some of these characteristics extend to the level of a whole neighbourhood, most belong to the scale of urban blocks and streets. Since they are all defined in spatial terms, we might call them spatial effects.

Research has also demonstrated non-spatial effects on the size of the activity space of children. Villanueva et al (2012, p.264, 269) found that activity space increases with age, independence of travel, way-finding skills, having more friends, positive perceptions of safety, living in a neighbourhood with low traffic, and confidence in independent travel. For girls, having confidence of parents and participation in out-of-school activities also increased their activity space, while for boys that was the case if they owned a bike (Villanueva et al, 2012, p.269). These non-spatial dimensions are, however, often partially determined by spatial factors. For instance the confidence of parents in the capabilities of their children to play outside by themselves can be influenced through urban design, for instance by limiting through traffic.

Fig. 4.34 - Brightly coloured markers at a pedestrian crossing on a 'school route' in Lunetten, Utrecht, 2018. Ideally, children should not be required to use any specific path towards school.

Fig. 4.35 - The paddling pool at Koekoeksplein, Utrecht, 2016. During hot summer days a square with flowing water is the place to be.

Fig. 4.36 - The yard of the urban square 'Willem van Abcoudeplein' in Utrecht, 2016. A 'meent' (a traditional Dutch grassy village square) can house many different types of social, play and sports activities.

Outdoor play; The socializing street

A different perspective on the study of children in public space focusses on outdoor play. The term 'play' often excludes organized physical activities such as sports, but includes activities such as moulding, digging, singing, drawing, writing and many others. Outdoor play can be both supervised or unsupervised, which has implications on autonomy and freedom of movement. Outdoor play is not recognized by all parents as a requirement for a good childhood. Some parents have (pre)conceptions about their child not being an 'outdoors child' (Veitch et al, 2006, p.388). It may in fact be due to parental attitudes that some children 'choose' to stay at home. Children who are only allowed to play outside accompanied might find such play opportunities quite restrictive. Seeking autonomy through an internet connection in their room is an easy alternative. The stereotype also exists that 'outdoors children' are mostly from lower SES families, but this does not hold true (Karsten & Felder, 2016, p.84).

Planners and policy-makers often think of play as something frivolous (Hart, 2002, p.136). However, outdoor play has been shown to benefit health and the development of motor, cognitive, social and emotional skills (Schouten, 2005, p.14-23). Berg & Medrich state that for children, the neighbourhood equals their 'social universe' (1980, p.320). According to Bengstsson "furnishing for play is to a large extent furnishing for 'togetherness'" (1970, p.90). Roger Hart even argues that free play in public space is "important for the development of civil society and, hence, democracy" (2002, p.136).

Others focus more on the personal experiences that may be gained through play. Churchman argues that playing has many developmental benefits: it has a role in physical development, offers opportunities for testing and improving abilities, builds autonomy and independence, improves social and language skills, stretches the imagination and creativity, creates experiences of adventure and risk, and functions as an emotional release (2003, p.106). Different types of play all have their part in the development of basic human physical and psychological functions. Functional play is important for developing motor skills, imitation play helps children structure social norms and values, and fantasy play can help them deal with their anxieties (Goorhuis-Brouwer, 2010, p.57-58). The more challenging the outdoor environment is, the more children will be able to learn there. Play environments should thus facilitate "dirt, water, fire and wind experiences" (Niklasson & Sandberg, 2010, p.494).

Due to different natural and cultural factors the demographics of neighbourhoods themselves are prone to change as well. This means that the character and frequency of usage of play spaces also changes continuously (Van Duijn, 2004, p.38). The outdoor environment, including playgrounds and play parks, should be able to cope with such changes. In new residential neighbourhoods the percentage of children often declines when the first generation starts leaving their parental homes. This may have adverse consequences on the possibilities for outdoor play, as the density of children in a neighbourhood greatly influences their social life. According to findings by Berg & Medrich a low density of children leads to more 'formal friendship structures', play in smaller groups, and less spontaneous play activities, while a high density leads to more "casual, less structured friendships, spanning greater age ranges" (1980, p.329, 339). They also found that children in mixed-use inner-city neighbourhoods have many interactions with adults such as store-owners (Berg & Medrich, 1980, p.337).

Some argue that the presence of adults is conductive to child's play. According to Loukaitou-Sideris passive play does not allow for significant interaction between children; Instead children should be stimulated through organized play activities (2003, p.138). Loukaitou-Sideris defines a spectrum of interaction: from co-occupation to interaction, collaboration, and finally sustained relationships. The sustainability of relationships seems to be related to the frequency, duration and quality of interactions. She argues these factors can be influenced by creating "common spaces that children can call their own", "natural and designed elements", and events, games, workshops and field trips with children as co-organizers (Loukaitou-Sideris, 2003, p.140-141).

On the other hand, Hertzberger argues that any regulation of play spaces limits possible experiences (Hertzberger & Gieskes, 2008, p.212). According to Goorhuis-Brouwer, in order to develop cognitive skills, it is important that adults do not interfere too much with child play (2010, p.59). Lynch also stressed the importance of unprogrammed spaces, left over spaces in between buildings, and wastelands, as places for imaginative "free play" (Banerjee & Lynch, 1990, p.175,177). Natural environments also offer similar opportunities. Green spaces offer a great vari-

ety of materials, sensory experiences, discoveries on every scale, and subtle and abrupt changes through time (Van Duijn, 2004, p.43). Playing is "most satisfactory when it allows for the manipulation of the environment" (Lynch & Lukashok, 1990, p.161). According to Martensson, "play experiences rich in content are better made in a limited environment, where children can create their own spaces" (Mårtensson, 2004, p.3).

Bengtsson stresses the importance of having diverse play environments and hiding places for children in the direct vicinity of their residences (1970, p.90, 111). Outdoor play is sometimes limited due to a lack of materials (balls, skates, construction elements) or lack of time; Children can not form groups of friends needed for certain types of play if they only spend a short amount of time outside (Hüttenmoser, 1995, p.410). These limitations may be eased somewhat by locating play spaces close to residences, so that children can spend as much time there as possible, while having the possibility to collect materials from home or from neighbours. Churchman argues that play spaces should be located close to home and to other activities (including those aimed at adults), should be easily accessible, offer sufficient open space and opportunities for different types of play, should have equipment for different activities and elements that can be manipulated, and should include flat surfaces (2003, p.108). These spaces should be safe for children, climatically comfortable and have considerations for adults as well, such as places for oversight of, or privacy from, children. According to Churchman all public space should be designed to accommodate for play, which has implications on building density and typology, the road system and the 'open-space system' (2003, p.108-109).

Aarts et al found positive environmental factors for outdoor play in neighbourhood social cohesion (most age groups), diversity of routes (older children), the presence of electronic devices in the household, and the availability of recreation areas (younger children). Having access to electronic devices enables children to interact with more children from their neighbourhood. For boys under 7 the presence of water was found to be positively related with outdoor play, and for girls aged 7 to 9 living in a green area. Living in a flat or a high-socio economic status neighbourhood were found to have negative effects on outdoor play. (Aarts et al, 2010, p.215)

Fig. 4.37 - Children of different ages posing on a New York sidewalk, 1910. Friendships span greater age ranges when there is a high density of children in public space. Photograph by Bain News Service, from the Library of Congress.

Fig. 4.38 - Girl playing in the semi-public courtyard 'Adelaarhof' in Vogelenbuurt, Utrecht, 2016. By not prunning lower branches trees remain climable.

Fig. 4.39 - Elementary school children in Lunetten, Utrecht, 2016. Like any good public space a school yard needs corners where children can experiment socialising without constant oversight.

Fig. 4.40 - 'Gooiooird' in the Bijlmer, Amsterdam. High-rises leave space for green but negatively affect microclimates, social control and parental attitudes, resulting in reduced outside play activity. Photo by Wikimedia user Hilton Teper.

Living on a higher floor level has been found to decrease the possibility to play with other children, the number of times one leaves the home, the duration of outside play, and the frequency of unaccompanied play (Bengtsson, 1970, p.13). Research conducted by the International Council for Children's Play showed that monotonous high-rise buildings without access to playground facilities lead to passivity and lack of initiative in children (Bladergroen, 1980, p.88-89). For that reason Bladergroen argues that small children should preferably live on the ground floor level, with direct access to outdoor play spaces (1980, p.91). The combination of high-rise buildings and open space also negatively influences the micro-climes of the direct environment, thus restricting opportunities for play near the home. The cast shadow of large buildings on an east-west orientation for example leaves the northern side cold and unpleasant for most of the year, while a north-south axis ensures that both the western and eastern sides are in shade for half of each day of the year (Bengtsson, 1970, p.9). While the possibility of playing in the shade is appreciated during parts of the year, at least the main part of a playground should be sunny (Bengtsson, 1970,p.9).

Niklasson & Sandberg call these possibilities of play 'play affordance'. Their research on the utilised play affordance of elements in public space found that children of all ages were attracted to climbable features, shelters and materials that can be manipulated. Boys and girls aged 6 to 9 also preferred graspable, detached and non-rigid attached objects such as swings. For girls aged 7 to 9 affordance for sociality and attached objects were also important, and for boys aged 6 this was the case for flat surfaces. (Niklasson & Sandberg, 2010, p.491).

Since a lack of physical activity is seen as an important cause of child obesity (de Vries et al, 2010, p.10-11), much research on outside play has focussed on this health aspect. National and local governments have introduced schemes and projects to increase physical activity of children, mostly through organised activities, but in some municipalities also through the (re-) design of parks and streets to accommodate sports and physical play. It is, however, not enough just to invest in the quantity of spaces or programs available to children. De Vries et al found no relation between the availability of playgrounds, recreation facilities and physical activity of children; They found rather that 'quality, appropriateness and safety' are more important factors than the quantity of possible play spots (2007, p.315-316). They show positive associations for physical activity in the frequency of green space, residential density, frequency of terraced houses, availability of sports fields, water elements, safe walking and biking conditions and the frequency of parallel parking spaces (2007, p.314). Physical activity was negatively associated with dog waste, heavy traffic, boarded up houses, frequency of staircase entrance flats, the number of intersections and paved playgrounds (de Vries et al, 2007, p.314). Timperio et al also found no relation between the quantity of features in public space such as lighting, cycling paths or water and physical activity of children (2008, p.516-517). Other research shows children to be more physically active if there are more sports fields, low-rise buildings and collective parking spaces, and if there is more greenery or water (de Vries et al, 2005, p.109). According to the Committee on Environmental Health, incidental physical activity can be influenced through neighbourhood design, for instance by opening the school-yard for use outside school hours (2009, p.1592).

Summary of the contemporary discourses

The denial of agency of children in (urban) public space is problematic on several levels. Because society deems them incompetent children are kept far removed from the planning and design decisions that influence their environment. And because they are not heard by urban professionals aspects of public space which are most important to their play are too often overlooked. According to Jacobs and Hertzberger the solution can not be to facilitate children in their own segregated play spaces, but instead to integrate them fully into the public domain; 'To teach adults to live in a child's world'. Hertzberger's argument for the 'learning city' fits neatly with recent developments in augmented reality and social gaming.

Too much rules and regulations can quell innovation and play. As children have limited ownership and privacy, they sometimes need public space to escape peers or adults into their own realm. Instead of asking children to conform to prescriptive 'play spaces', urban designers could construct public space in such a way that it accommodate the desires and realities of children. Creating spaces where children can take initiatives to set their own rules and create their own games.

For the very young, standardised designated playgrounds can still offer enough challenge to warrant their abundance in suburban neighbourhoods. For slightly older children they also have social functions as places to meet or hang about. According to Hertzberger and Lefaivre playgrounds need to be an integral part of the urban fabric, and play should take place across the city. In order to achieve this goal the city's sidewalks need to be integrated into this play-network, which brings us back to the ideals of Jane Jacobs. Urban children should indeed play in the street and on the sidewalk, but also in natural, agricultural, productive, athletic and playful environments. Spread across public space all kinds of planned and unplanned experiences should be within reach, for all ages.

There is evidence that restricting spatial autonomy of children may be harmful to their development. Unaccompanied children stay outside longer, have more playmates, use more side-routes, and as a result develop more detailed spatial knowledge. Some urban parents feel the need to limit their child's freedom of movement based on negative perceptions of traffic safety or social control. Low and mid-rise developments around semi-private spaces such as courtyards or cul-de-sac seem to be conducive of early autonomy. Designing safe routes to school may incentivize parents to allow their children to go to school by themselves, but even more effective in giving autonomy to children may be the creation of a secondary network of alleys, footpaths and shortcuts, as argued previously in the conclusion of the historical perspective. Interventions and design solutions must be suitable in scale to the mental world of children.

The 'neighbourhood' is an important but contentious concept. Bureaucratic definitions of neighbourhoods usually do not align with individual interpretations of adult residents, let alone those of children – who have yet to connect their fragmented spatial knowledge. Where adults typically see their neighbourhood in terms of routines, children do so in social and emotional terms such as friendship. This seems to be the case for both children in urban and agrarian communities, while the latter usually also have a local network of kinship. For some children much of their social life revolves around school, which then becomes synonymous with their neighbourhood. Parents often do not have a full picture of the spatial reach of their child's outside play. Research indicates different positive and negative effects of spatial characteristics of the urban environment on the size of a child's 'activity space'.

Outdoor play benefits health and stimulates the development of many important skills. The more challenging the environment, the more children will learn from their play. For the development of motor skills, for instance, a child needs to be able to run, jump, roll, climb, hang, swing, fall and kick. The density of young people in a neighbourhood influences the patterns of play and friendship children can develop. Contrary to popular belief, small rural communities may thus not be the best places to raise young children. Children are naturally attracted to unprogrammed 'wild' spaces, which most researchers argue should be plentiful, diverse and located in the vicinity of residences. Research indicates that there are many spatial characteristics that can positively or negatively affect the possibilities for outside play, the duration of this play, and the frequency that this play is unaccompanied. What is most important, however, is not the quantity of play spots, but their quality and appropriateness. In order to allow for play the micro-climates of the urban landscape need to be pleasant year-round; Lot's of sunlight, but shade and shelter from rain and cold as well.

C 5 - Location

Introduction – This chapter introduces two research locations; 'Votulast' and Lunetten, both located in Utrecht, the Netherlands. The primary focus of this thesis is on the spatial factors that influence the ways in which children engage with urban public space. In order to maximize the possibility of finding effects of spatial characteristics, two neighbourhoods of widely different urban structure were selected for the research; one historical central neighbourhood, and a post-modern suburb. To minimize the influence of socio-economic factors, it was important that the population of these neighbourhoods had similar socio-economic backgrounds.

From the data provided by the municipality of Utrecht we find that both Votulast and Lunetten have around 7.5% children between the ages 4 and 11. The total built-up area of the neighbourhoods is very similar, but Votulast has 13% more inhabitants. In both cases single-family homes make up around 40% of the residences and people with a migrant background account for approximately one quarter of the population. The average living space per inhabitant in Lunetten is 10% larger, but the average income is 10% lower. Due to its proximity to the city centre the crime rate of Votulast is 35% higher than in Lunetten (58 crimes per 1000 inhabitants versus 43), while its population is 14% more often highly educated. The biggest differences in the neighbourhoods are due to their urban structure. With 289 dwellings per hectare, Votulast is more than five times as dense as Lunetten, which only has 53 dwellings per hectare. And the density of Votulast is still increasing; in 2016 urban infill of vacant plots and former garages will add over 70 apartments to the already overcrowded Vogelenbuurt. Due to its history as a planned mixed-income neighbourhood, Lunetten has a lower percentage of owner-occupancy than Votulast (34% vs 56%), but this percentage has been increasing due to pressure from social climbers and a recent social housing sell-off. The largest statistical difference is due to the parks surrounding Lunetten; inhabitants have 3.7 times more trees per inhabitant than residents of Votulast.

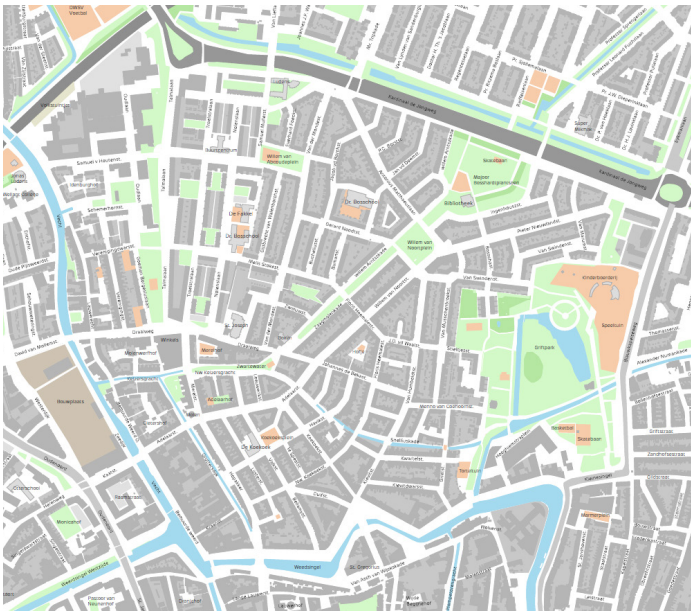


Fig.5.1 - Map of 'Votulast'

Fig.5.2 - Map of Lunetten

Fig.5.3 - Votulast from the air in 1998. Photo Service HUA, Utrechts Archief.

Votulast

Area: 1.1 km² *
Inhabitants: 13082
Density: 289 dwellings/h
4-11 yo: 6.9%
Highly educated: 74%
Migrant background: 24%
Crime / 1000 inh. : 58
Single-family homes: 42%
Living space / inh. : 30m²
Owner-occupied: 56%
Av. household income: 34.8 k
Trees / 1000 ihn. : 187
Sports facilities: 4

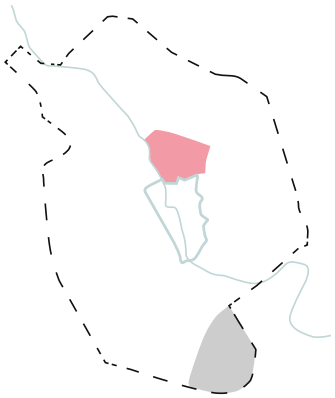
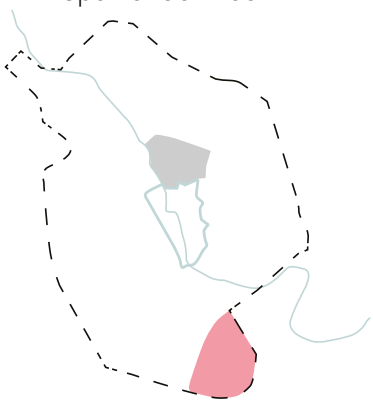


Fig.5.4 - Lunetten from the air in 1998. Photo Service HUA, Utrechts Archief.

Lunetten

Area: 1.8 km² *
Inhabitants: 11530
Density: 53 dwellings/h
4-11 yo: 7.8%
Highly educated: 60%
Migrant background: 26%
Crime / 1000 inh. : 43
Single-family homes: 38%
Living space / inh. : 33m²
Owner-occupied: 34%
Av. household income: 31.5 k
Trees / 1000 ihn. : 687
Sports facilities: 12



* Data collected from municipal website 'WistUdata'

5.1 - Urban Utrecht: 'Votulast'

'Votulast' comprises the residential neighbourhoods Vogelenbuurt, Tuinwijk, Lauwerecht and Staatsliedenbuurt. Except for a part of the Staatsliedenbuurt these neighbourhoods are mostly made up of traditional blocks of pre-war town houses. Some buildings in Lauwerecht date from the 19th century or even older, especially along the 'Bemuurde Weerd' (Walled Mound); the first and only walled 'suburb' of the medieval city. Vogelenbuurt was originally built in the first decade of the 20th century as a working class neighbourhood, while most of Tuinwijk was constructed in the 1920s for the middle classes. In the Staatsliedenbuurt some conservative brick modernist housing blocks and high-rises were built after the second world war. The high-rises were replaced with mostly low-rise housing in recent years. Due to the proximity to the city centre the popular Vogelenbuurt is currently seeing further densification due to the construction of apartment buildings on vacant plots and former garages. To put an end to rat running, through-traffic was minimized in the 1990s. Some streets were closed off from one side and currently most streets in the Vogelenbuurt remain free of car traffic during the day. As part of the recent urban renewal in the Staatsliedenbuurt, the long Troelstralaan was transformed into a cycling street, where cars are 'guests'. The most influential change in the neighbourhood was the opening of the large Griftpark on its eastern side in 1999. Before it had been a brownfield of the municipal gasworks and landfill. The opening of the park increased the attractiveness of the surrounding neighbourhoods. Even though Votulast has seen some demographic changes due to gentrification, the percentage of children has remained more or less stable throughout the past 20 years.

Fig.5.5 - Collage of public spaces in Votulast

Fig.5.6 - Map of Votulast, 2016.

5.2 - Suburban Utrecht: Lunetten

Lunetten is an a-typical residential suburb constructed mostly in the 1970s and 80s, which features many spatial innovations popular of the time; publicly accessible courtyards, woonerfs, raised pedestrian spaces and internal parking solutions. Most housing blocks in Lunetten were initially developed to offer living space for all income groups, although the percentage of owner-occupancy has increased significantly since its construction. In some parts of the neighbourhood much of the social housing is indistinguishable from private sector housing because it was built in the same style, including tiled gable roofs. In the northern and north-eastern part of Lunetten, however, there are large complexes of 'Bebo' residences (apartments on top of two-storey houses) and experimental modular 'carrier-infill' structures. Just as with the smaller urban blocks in other parts of Lunetten, these complexes are built around publicly accessible courtyards. In the 1990s and early 2000s the last additions to the neighbourhood were made in the north-western and north-eastern parts. This was part of the urban densifiaction plan of the unsuccessful national VINEX memorandum, which on a larger scale lead to a dramatic increase in suburbanisation. A string of parks surrounds Lunetten, which help to insulate the neighbourhood from noise and air pollution coming from adjacent motorways and railways. Since 1996 all fire escapes of the apartment complexes in Lunetten have been closed from the outside with metal fences and doors to protect the residences from burglaries. Similarly some of the raised pedestrian streets in Lunetten have been fenced off, turning these complexes into gated communities. In 2015 the bicycle tunnel under the train station was moved north to align it directly to Lunetten's central street. Due to the high number of facilities for children Lunetten has been able to maintain a more or less stable percentage of children in the past two decades.

Fig.5.7 - Collage of public spaces in Lunetten

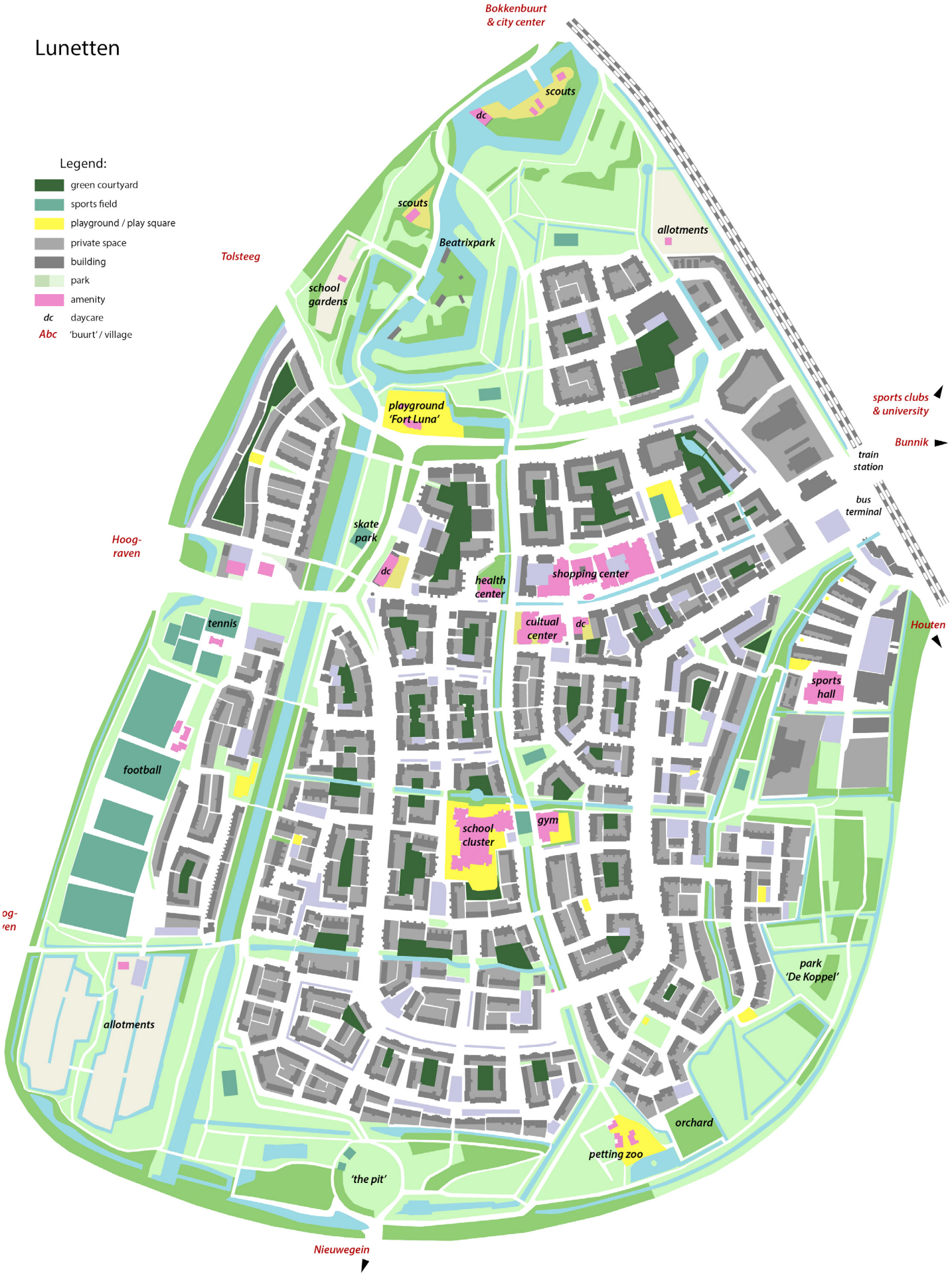


Fig.5.8 - Map of Lunetten, 2016.

C 6 - Results

Introduction - Thic chapter consists of four sections which detail the results of the empirical research of this thesis. The first section describes findings of the on the on-site observations. The second part shows the outcome of the mapping workshops & questionnaire. The influence of spatial characteristics on child play in public space is explored in the third section. The final part of this chapter focusses on the sustainability of public space as children's space. The results of the Space Syntax analyis are not included in this chapter, as they pertain more to the software itself than to the subject matter of this thesis. Observations on the value of Space Syntax for the analysis of public space as children's space may follow in a future paper.

6.1 Observations

Methodology - The on-site observations were carried out in May 2016 between 14:30 and 16:30 on Sunday and Wednesday (when Dutch schools are closed in the afternoon). During the 4 days of observations, 495 children were documented in public spaces. Children who were inside enclosed spaces such as petting zoos, adventure playgrounds or daycares were counted as supervised. A distinction was made between boys and girls, supervised and unsupervised children. Children deemed above the age of 12 were not counted in the survey.

Supervision - 55% of the children using public space were under supervision of an adult. This applied mostly to children under the age of 8. In this case the parent chooses an appropriate playing spot; the fenced 'playground squares' and courtyards seem to be the most popular, followed by urban parks and smaller playgrounds. The other 45% of the children, who were playing in public space unaccompanied, were mostly above the age of 6, but especially inside and around courtyards children even younger can be seen playing unaccompanied.

Public space typology: Street - The most used type of public space by unaccompanied children, both boys and girls is the street. Not all children are actively playing in the street, however. Some of them are on their way to a friend, or returning home from playing in the park. There are almost twice as many boys on the street as girls. Most of the unaccompanied children who play on the street are over the age of 6. However, when there is no courtyard present,

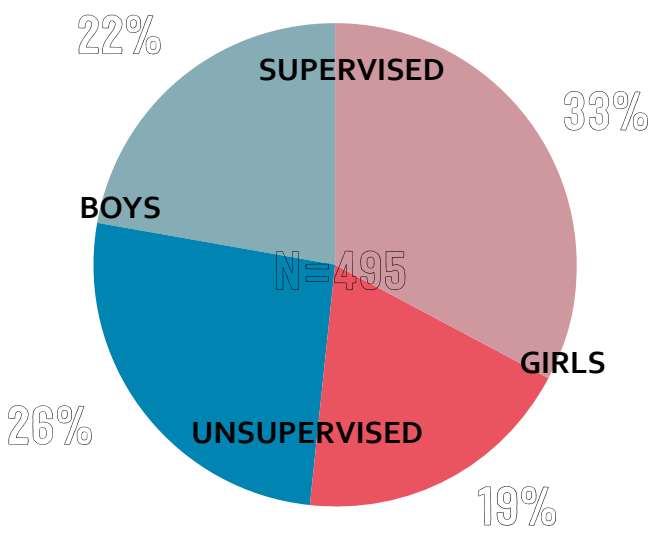


Fig. 6.1 - Sum of all children observed in both neighbourhoods.

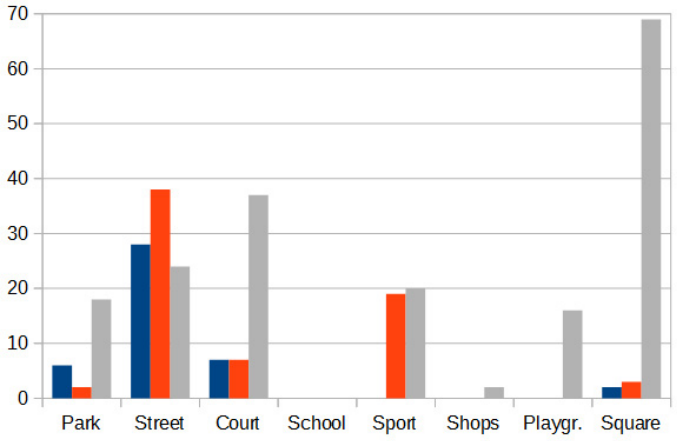


Fig. 6.2 - Children observed at different public space typologies in Votulast.

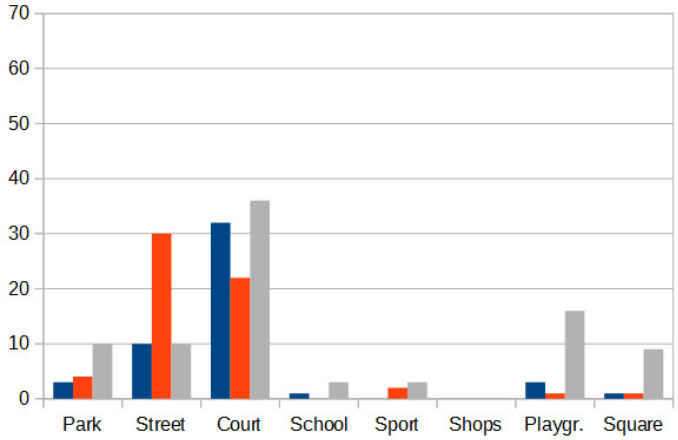


Fig. 6.3 - Children observed at different public space typologies in Lunetten.

Fig. 6.4 - Sum of four rounds of observation of children in public space in Lunetten.

incidentally children who are much younger can be seen riding their tricycles on the sidewalk around the block, while their parents remain inside the garden. This was the case in both neighbourhoods. Not all streets are appropriate for outside play. Most children that were observed on the street were playing on calm residential streets or streets with wide side walks. Playing in the street can be as simple as running, skating or cycling around on the sidewalk or reading a book on the bench in front of your home, but it often involves social activities with other children in the area. Some of the unaccompanied children in the street were playing 'belletje trekken' (ding dong ditch), a slightly mischievous game, while others were playing a sociable game of 'heitje voor een karweitje'. Some of the other activities found on the street included ball games, pretended play, skating, chalking and practising cycling.

Public space typology: Courtyard - The second most used typology is the courtyard. This is true for children of both sexes. For accompanied children it is the most used typology. This is remarkable seeing as the school yard ranks much higher based on the maps generated by the workshops (see the following 'Mapping workshop' section). The reason that the school yards were not as much used during the observations has to do with the temporality of play at school; the school yard is mostly used during and directly after classes. In both neighbourhoods there are squares, parks or courtyards that take on the role of meeting places, which in other neighbourhoods might be taken on by the school yard. Activities that were observed in the courtyards included tree climbing, picnicking, pretended play, ball games, two water fights, tent pitching and chatting with friends on multi-person swings. Courtyards offer more diverse possibilities of play than a street, because they usually have a grass field and trees, and are sometimes connected to a stream. In the case of Lunetten, the courtyards have different characteristics and are interconnected, which makes it interesting for children who are a bit older and want to explore places further from home. Some of the unaccompanied children who were observed inside the courtyards (or in the alleyways opening up to them) were around 3 years of age. The most popular activity of this younger group is riding on their bicycle with side-wheels on the path that encircles the courtyards. Usually their parents are inside the garden and leave the gate open. Young children that were under supervision of adults were mostly running around, playing ball games or using slides, climbing structures or similar contraptions.

Public space typology: Sports field - The third most used typology by unaccompanied children is the sports field. Within the research area this means a grass or concrete pitch or skate park, located in a larger urban park, but there are also a few singular small (fenced) football fields. In the Griftpark (located in the east of 'Votulast'), there is a large skate park which has two areas, one of which is heavily used by younger children. During most busy hours there is some form of supervision through a small stall which also has a first aid kit. Children are sometimes put off by other or older children and adults who use these facilities as well. However, it also creates possibilities to make new friends in the neighbourhood, and the presence of adults might improve safe or fair play. In the parks themselves, most children were accompanied by adults. This might have to do with the social problems associated with urban parks.

Public space typology: 'Play square' - The fourth most used typology is the 'play square'. These are mostly, but not exclusively, used by younger children. During one day of observations, the paddling pool at Koekoeksplein was open and dozens of children were playing on and around the square under supervision of multiple parents. Also during other days of observations these squares were heavily used by parents and young children. Not all children who are present at these locations are being individually supervised, but supervision of a few adults seems to be enough to create a safe environment. The heavy domination of these squares by younger children seems to put off older ones from playing there, at least during the observations.

Public space typology: Small playground - The least used typology is the small playground on the side of the street. Usually it has a combination of standardized playing instruments such as a swing, slide, crazy scrambler and tumble bars. There are not so many of them, and they are mostly used by accompanied children under the age of 5. Because of their location on the street they are more prone to vandalism than protected or secluded playgrounds. However, they always have a bench for young parents or guardians to keep watch, and sometimes they are surrounded by a low fence. When even slightly older unaccompanied children play at these playgrounds, they usually do so in unorthodox ways; climbing on top of the miniature house, running off the slide, leaping from the swing, etc. Many children like the thrill of energetic fast-paced games, and soon they out-grow the possibilities of small playgrounds.

Fig. 6.5 - Sum of four rounds of observation of children in public space in Votulast.

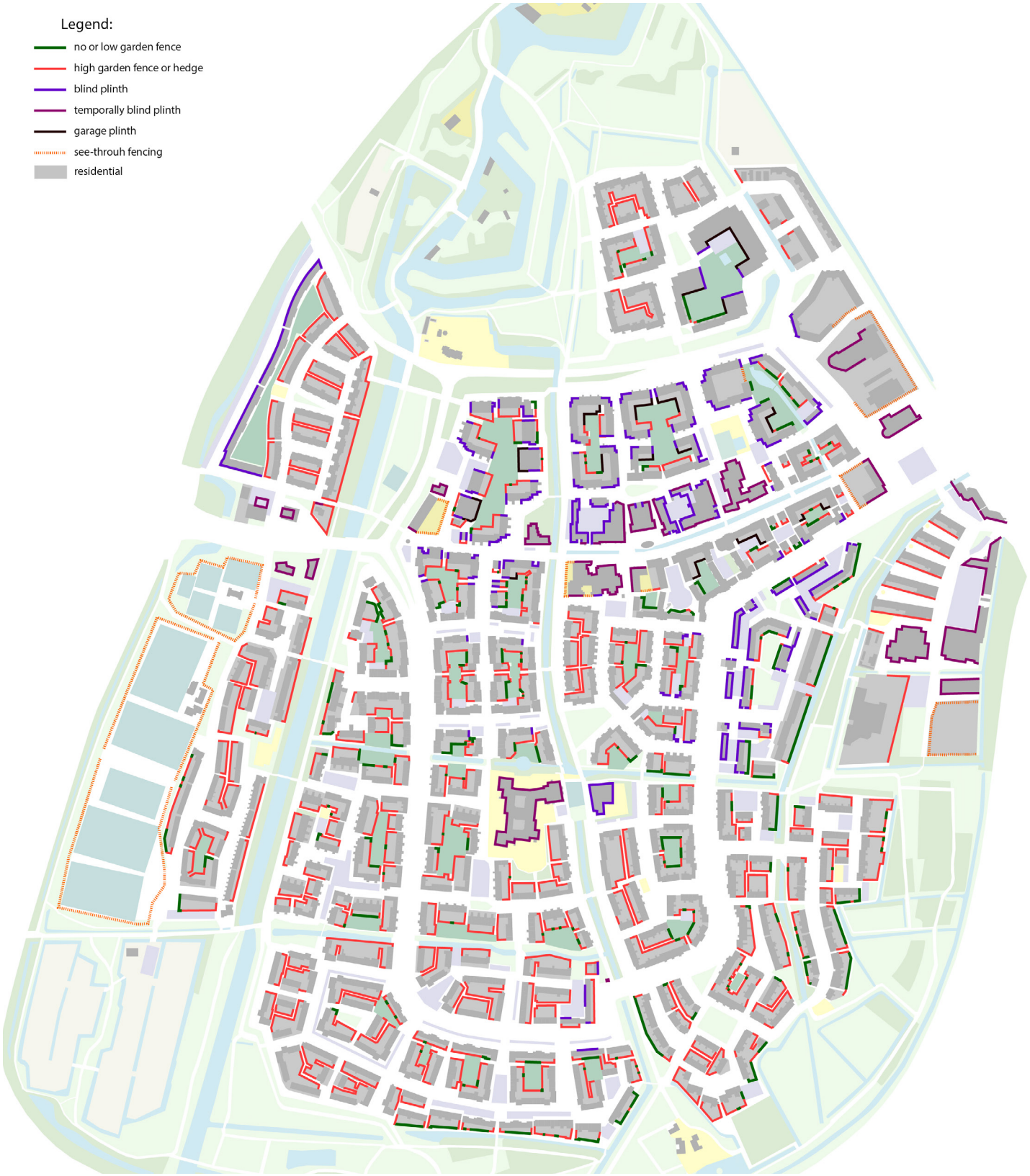
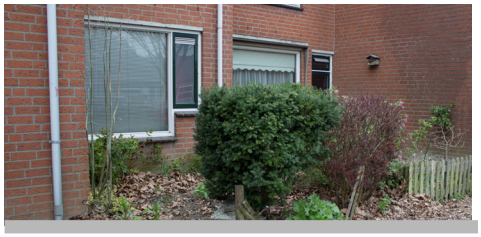


Fig. 6.6 - Map of plinth typologies in Lunetten.

The plinth is one of the most important aspects of the built environment as it functions as the interface between the private and the public domain. Because a childs eye level is relatively low the plinth takes up a large part of its field of view, making it even more imporant to this group.

The border between the public and private domain was mapped in both neighbourhoods in order to find possible effects of different plinth typologies on the use of abutting public spaces by children. The results of Lunetten are detailed in this chapter, as they offer the most insight.

Legend



Residential plinth

Fencing

Open garden

Closed garden

Temporally blind plinths (shops, schools, community center, etc.)

Parking garage

Blind plinth

Fig. 6.7 - Conclusion: Combination of plinth typologies & observed children in Lunetten.

A pattern arises when the observed children are added to the map of the plinth typologies. There seems to be a relation between the permeability of plinths and the use of semi-public courtyards by children. A gradual transition between public and private space may help foster feelings of belonging and safety, as adults remain approachable. For space explorers a permeable plinth may also generate more interesting micro-environments. The size and character of the courtyards - leaning towards public or private - also influences the use of these spaces. Tiny courtyards only have use value for toddlers, while large courtyards are often so public that residents are hesitent to create an open relationship with their gardens.

Fig. 6.8 - The mid-rises in the north of Lunetten (blue) offer less opportunities for social control on their public courtyards, which - as a result - are barely used by children.

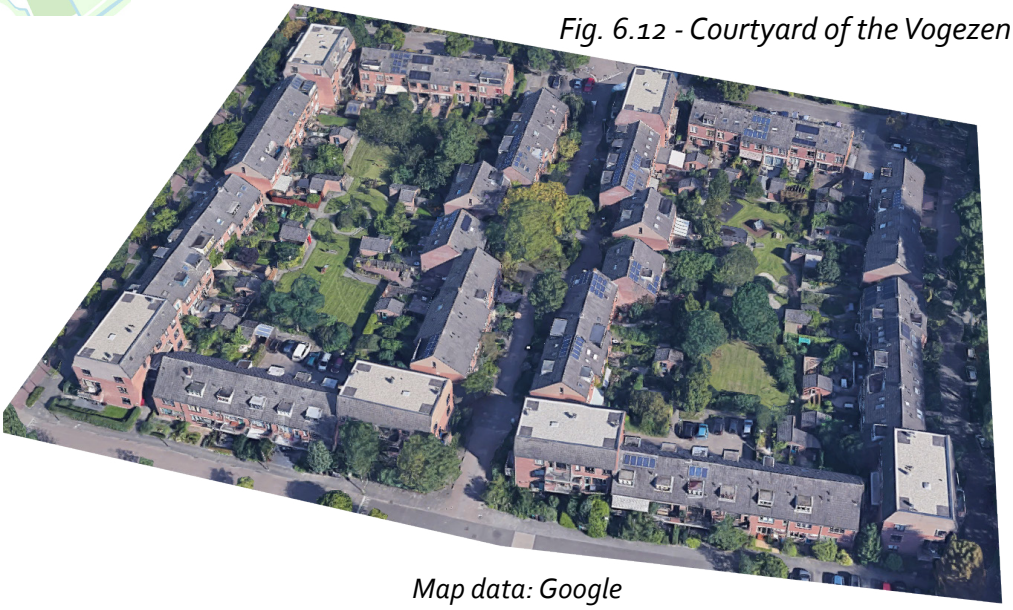
Map data: Google

Fig. 6.9 - Courtyards of Lunetten

Fig. 6.11 - Courtyard of the Balkan-Karpaten

Fig. 6.12 - Courtyard of the Vogezen

Fig. 6.10 - The mixed blocks of central Lunetten (mostly red) have a high social control on their public courtyards, which are popular among children.



Map data: Google

6.2 Mapping workshops

Methodology – In order to understand their usage and perception of public space in the two neighbourhoods, children were asked to create a 'social map' of their living environment. In order to reach an adequate sample size for a statistical analysis, four 'social mapping workshops' were held at different primary schools in the last week of May and the first week of June, 2016. All six schools in the two neighbourhoods were approached to participate in the research, but the Baanbreker in Lunetten and the Dr. Bosschool in Votulast did not respond. The mapping workshop consisted of three parts: a short introduction about the practice of Urbanism and the research, followed by a short questionnaire and then the mapping itself. Each student was provided a map of the neighbourhood at the start of the workshop. Additional maps of surrounding neighbourhoods were provided for children living further from the school. Unfortunately, a handful of students still was unable to (fully) participate in the workshops. Satellite photography and an enlarged map were placed on the whiteboard for children who were uncertain of their routes. In order to be able to compare and analyse the outcomes of the workshops, the resulting maps were 'translated' into a uniform digital format. The translation of the maps was conducted with utmost care and effort, but in some cases the maps were not very explicit and required some subjective interpretation. However, this was not done to steer the research; it was unknown to the author at this point in what direction the results would point, or how this would relate to the individual maps. In future research, the legibility of the maps could be improved through individual interviews (for examples see the next chapter on Comparing use and perception of public space by children in 1996 and 2016).

In the following sections the specific techniques and questions used in the questionnaire and during the mapping sessions are explained in the order that they were addressed to the students, as well as their results.

Questionnaire - The questionnaire was used to define additional reference groups: the subjects were asked to indicate their gender, if they go to school alone and by what mode of transport, if they have siblings and what their age is, and if their parents went to university. Most children did not know the answer to the last question, so it was left out of the last two workshops.

80% of children were allowed to go to school independently. Over 43% of children in the survey always went to school alone, while 37% was sometimes accompanied by a parent. Around 90% of the trips to school were made on foot or by bike, while just 2 percent went exclusively by car. The remaining children sometimes go by bike, and sometimes by car.

The route to school – First the children were asked to indicate their route to school in red, pink or orange. Since the location of the schools was known, it was not necessary to ask for the place of residence. Children who had two households were allowed to draw both routes. The results were used to calculate the lengths of the school routes and to find possible problematic intersections along them.

Around 60% of the children live within 600 meters of school. Typically they have no or just one crossing with a through street on their route to school, but some children indicate they do cycle along such busy streets. 15% lives more than 1200 meters from school. They are among the group that is always or sometimes brought to school by car, and that never goes to school independently.

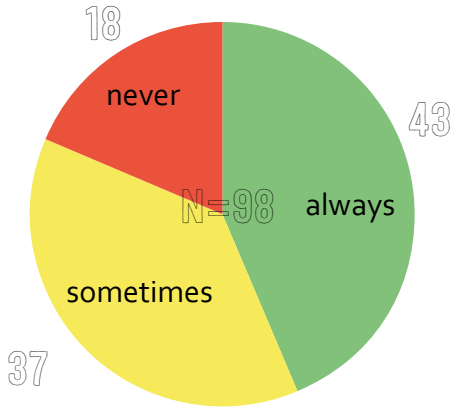


Fig. 6.13 - Goes to school independently.

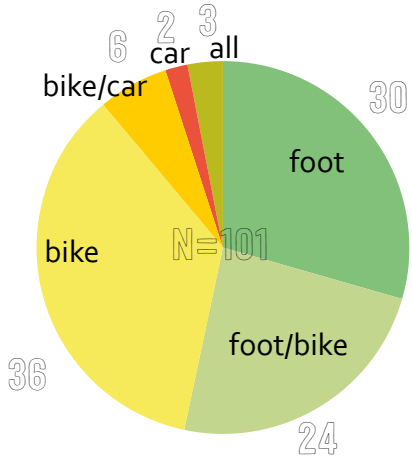


Fig. 6.14 - Means of transport.

Mapping friends – Secondly, the children were asked to mark the homes of their friends from school with a red cross, and the homes of their neighbourhood friends with a blue cross. This part of the workshop is a highly social activity. Sometimes the children did not know exactly where their school friends lived, but they were allowed to help each other. The results relating to the number and dispersion pattern of neighbourhood friends were used to to find possible effects of spatial characteristics (see the next chapter on the Effects of spatial particularities on use and perception of public space in 2016).

The average number of friends in the sample is 10, of which 7 friends from school and 3 from the neighbourhood. The standard deviation is 5.2 and 70% of the measurements fall within one SD, meaning that 70% of children have between 5 and 15 friends. This is not a very surprising result. Girls have 11.25 friends within reach on average, while boys have 8.8. 11 children had less than five friends in total and 13 children had more than 16. The graph of the number of neighbourhood friends does not have a normal curve, but an exponential decay function. 25 students didn't have any neighbourhood friends, or did not know where they lived. The average is 3 and the median just 2, but there are also also a handful of students who have more than 10 neighbourhood friends. Even though the average number of neighbourhood friends is so low, there are plenty of children for whom their neighbourhood friends make up a large part of their total number of friends, and in some cases they are the majority.

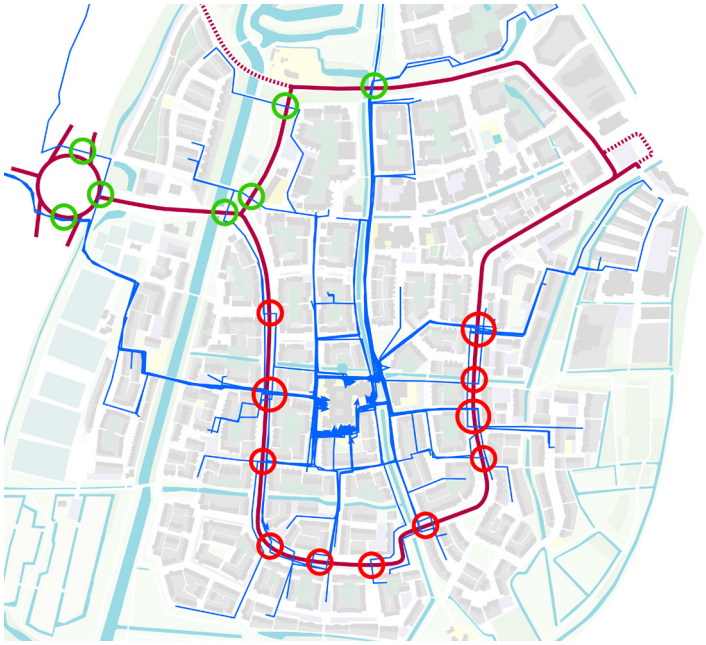


Fig. 6.15 - School routes & major traffic in Lunetten

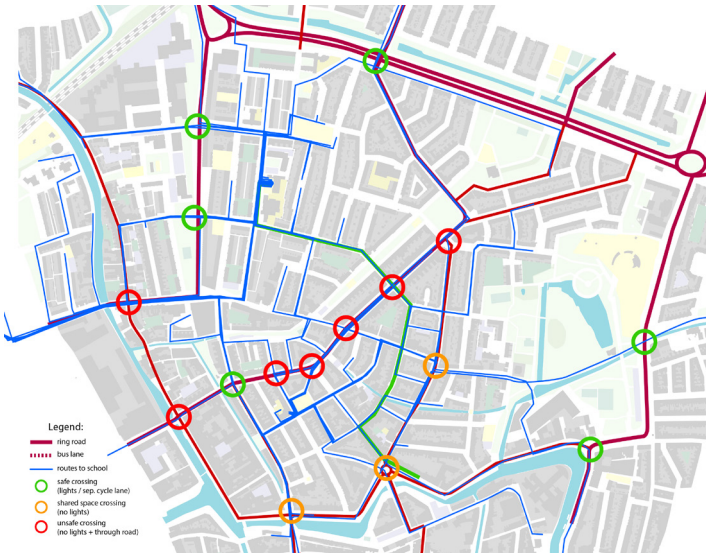


Fig. 6.16 - School routes & major traffic in Votulast

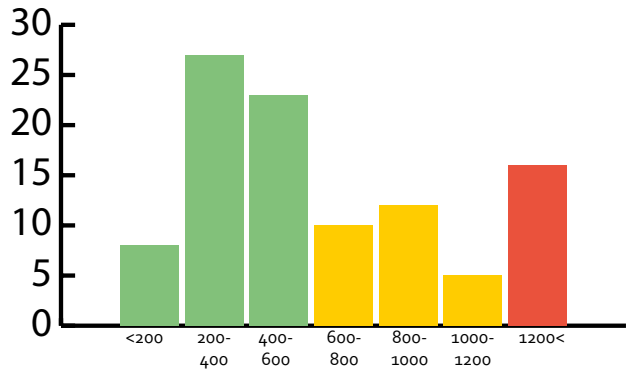


Fig. 6.17 - Distance to school (m).

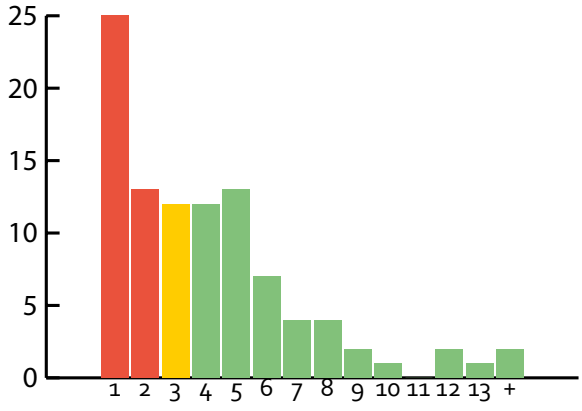


Fig. 6.18 - Number of neighbourhood friends.

Independent reach – Thirdly the students were asked to demarcate the total area where they played outside without supervision with a blue or green marker or pencil. This could be a single area around the house or school, but also multiple zones, for instance if the child in question would play outside at a friends house. Sometimes children were unsure if to draw the areas where they played the most, or the total area, including places where they would venture less frequently. The author guided the students through this step, explaining that it the latter was the desired interpretation. The results of this step were used to calculate the individual reach of each child, as well as to find hard and soft border elements in the public landscape (see the section on borders of the next chapter).

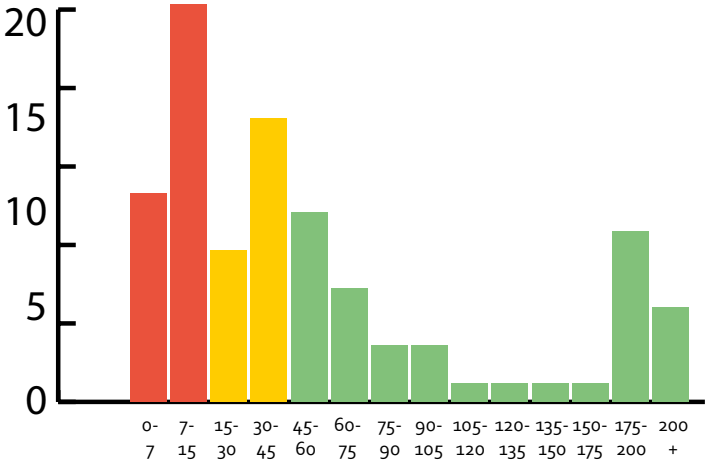


Fig. 6.19 - Independent reach (ha).

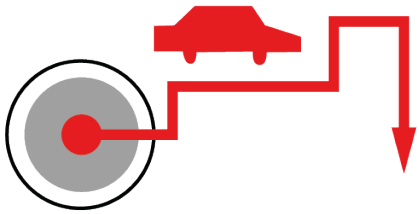


Fig. 6.20 - Children who are always brought to school have 30% less independent mobility on average

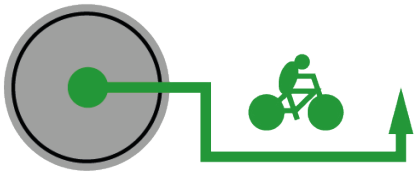


Fig. 6.21 - Children who always go to school by themselves have 7% more independent mobility on average.

When we plot the individual reach of all children we get a graph with three peaks. The central peak seems to have a normal distribution around 40 hectares, with a standard deviation of around 20, but there are also two large groups of outliers; 32 children had an independent reach less than 15 hectares, while 15 children were virtually unrestricted with a reach of more than 175 hectares. The differences in these results might be explained by several factors. The central peak might indicate the spread of the gradual expansion of the reach of the average child around age 9/10, while the children who have a very restricted reach might be limited due to physical factors (see the next chapter), or social/cultural factors, which were not addressed in this research. Some children in the research were slightly older than others. Around the age of 10 children start to experience much less restrictions on travel. Some of the students had reached this point, and indicated they felt comfortable in leaving their neighbourhood with friends to go to a nearby recreation area, sports facility, forest or shopping centre. This could explain the relatively large group of outliers with more than 175 hectares of independent reach. A handful of students did not indicate any places where they played outside. When asked, they replied they didn't really play outside since they did not have any friends, or they were not allowed to because it was deemed unsafe. After the school (-playground) the most included public space typologies within the total independent reach areas are the large (supervised) playgrounds, the urban parks, sports fields and (if present) the shopping centre.

Popular playing spots - The next assignment given to the student was to hatch their favourite playing spots, within the areas demarcated in the previous exercise and with the same colour. The results of this assignment were used to analyse possible relations between public space typologies and popularity of use (see the next chapter), and to make a qualitative comparison between the current use of these spaces to the situation as remembered around 1996 by former residents (see the chapter Comparing use and perception of public space by children in 1996 and 2016)

Typically children use the public spaces which are nearest to their homes the most. This includes the sidewalk, (part of) the street or empty parking spaces, but for some children also a courtyard or play square. An exception is the school playground; even most children who live further away from school in-

Fig. 6.22 - Indicated favourite play spots by children in Votulast

dicate they use it often. A discrepancy between the self-reported popularity of parks and school yards in Votulast and the number of observed unaccompanied children at such places may be due to the timing of the observation visits. To a lesser extent this also applies to (adventure) playgrounds and petting zoos. Children less often venture to these places unaccompanied. When we compare the combined maps of the popular playing spots of both neighbourhoods, we see that the children in Votulast often indicate specific streets as the places where they play the most, while children in Lunetten more often indicate a larger area covering multiple streets and blocks. This could indicate that the suburban 'bloemkoolwijk' typology of Lunetten gives more spatial freedoms and play possibilities to children in their direct living environment compared to the urban pre-war closed block typology of Votulast. In Lunetten there is also less difference between boys and girls in their preference for play spaces.

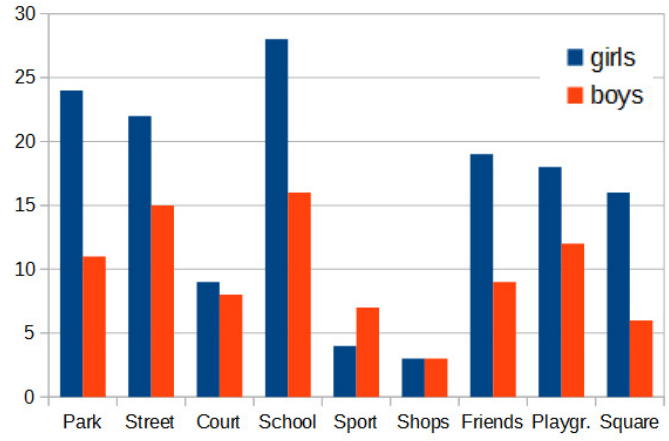


Fig. 6.23 - Indicated favourite play spots in Votulast

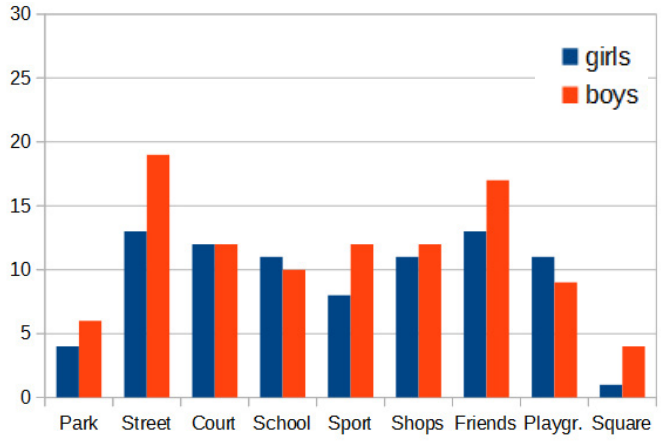


Fig. 6.24 - Indicated favourite play spots in Lunetten

Negative perceptions – The last question of the workshop relates to negative connotations of public space. Children were asked to mark scary or unsafe places, or places they were specifically forbidden to go to, with a black marker or grey pencil. The results were used to locate areas that were deemed problematic by multiple children. In this way it was hoped to find to possible intervention locations (see the chapter on 'Design locations'). Some of the negative connotations are location-specific, and do not relate to the typology of public spaces. These will be addressed in the following paragraph. Negative feelings that could be related to specific user groups associated with different types of public spaces, sometimes at different times of the day, will be addressed in the sections of the next chapter on the Effects of spatial particularities on use and perception of public space. Just as with the positive perceptions described in the previous section, the negative perceptions were used to make a comparison to the situation around 1996.

The results show that similar types of public space are viewed very differently in both neighbourhoods. Many children in Votulast have negative feelings towards the streets in their neighbourhood, while we don't see this problem in Lunetten. In Lunetten there is the fear of child predators in the bushy parts of the urban park. Similarly, children in Votulast fear the dark parts of the Griftpark in the evenings, but for different reasons, having more to do with older teens or addicts.

Verification – As a means to verify the validity of the 'social maps' generated during the school workshops, the digitized maps were compared to the on-site observations described in the first part of this chapter. The correlation of the number of observed children and the popularity of the underlying public space as indicated by the school workshops seems to be high. To increase the validity of this method, it could be repeated and improved in different situations.

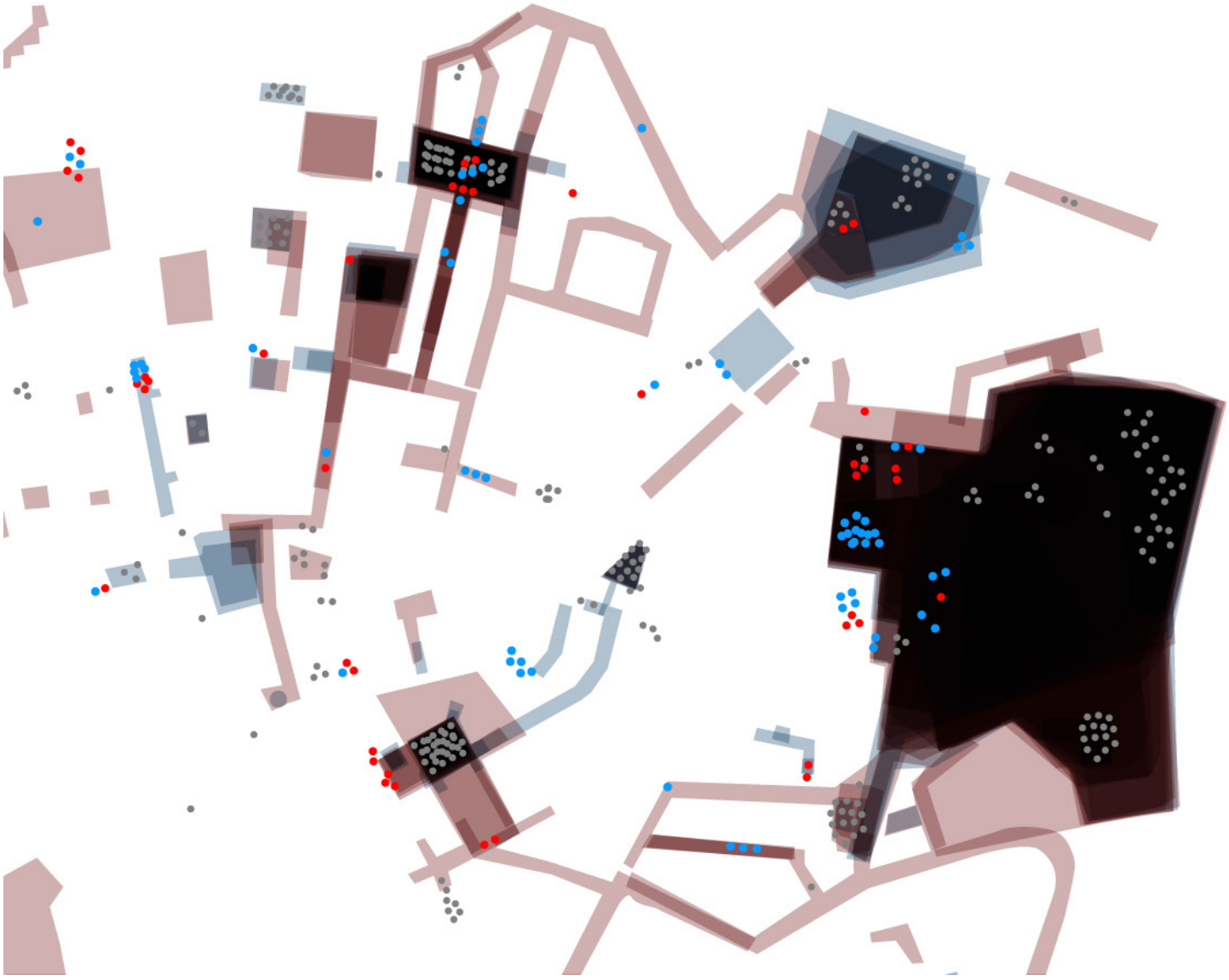


Fig. 6.25 - Verification of self-reported data: Indicated favourite play spots + observed children in Votulast.

Fig. 6.26 - Verification of self-reported data: Indicated favourite play spots + observed children in Lunetten.

6.3 Effects of spatial particularities on use and perception of public space in 2016

Public space typologies

Methodology - To test the added value of certain public space typologies on independent mobility and the number of neighbourhood friends, a statistical analysis was carried out on the social maps. The independent reach and the number of neighbourhood friends of children living near different urban typologies was compared. Children living in the vicinity of multiple public space typologies were included in all relevant groups. To see if the effects public space typologies were significant, a few reference groups were created; children who always go to school independently, children who have 2 or more siblings with a maximum age difference of 5 years, children who have younger or older sibling with a maximum age difference of 5 years, children who live in an area with a low or a high concentration of children, and children who live closer than 400 meters from their school.

Public space typology: Street & Island – Because all children in this research live near a street, it was impossible to measure the effect of this type of public space directly. The streets themselves are difficult to sub-divide in sub-typologies. As an example: there are not enough children within this research living on through roads with narrow sidewalks. One recurring pattern was the 'island'; a set of streets that is not well integrated into the rest of the city. Although in this case there were also not enough examples to base a statistical analysis on, it does seem that children living in a secluded 'island' tend to make more 'neighbourhood friends' than average, who are usually concentrated within this island. On the other hand it is also likely that this form of spatial segregation reduces indecent reach.

While the street is by far the most used type of public space by children in both neighbourhoods, it is also the typology which is perceived the most negatively by children in Votulast. Children in Lunetten don't experience the streets in their neighbourhood to be as problematic. This difference might be due to the widely different street typologies of both neighbourhoods. In the historic areas of Votulast the streets are very narrow, while they are much more spacious in the post-modern suburb Lunetten. The latter also has more diverse public spaces, while most public space in Votulast is made up of streets. Children in Votulast are thus more or less forced to use the street for types of play which might be more suited for a courtyard. There is also much more motorised traffic in centrally located Votulast than in Lunetten, which lies rather segregated from the rest of the city. Strategies to make the streets in Votulast more child-friendly have been in place for decades, mostly directed at stopping rat-running, creating small playgrounds and dead-end streets by closing short sections to car traffic. In some calm residential streets, the current layout with sidewalks could be updated to become level shared space, creating more playing opportunities. The advances in e-ink technology creates the possibility to create dynamic street signs. Certain streets could be closed to car traffic during the day, clearing them for other uses. A few children who lived inside the city centre (outside the official research scope, but they were still encouraged to participate in the workshop) were not allowed to play outside. According to their parents it was not safe enough. There is a slight irony in this, since one of these children lived on the 'Nijntjeplijntje' (Little Miffy square), named after the popular cartoon rabbit created by local graphic artist Dick Bruna. The square is unfortunatly not frequented by children, but by teenagers and alcoholics.

Public space typology: Urban park – Living near a large urban park (n=26) doubles the independent reach to an average of 122 hectares, and nearly triples the median independent reach to over 100 hectares. Children who live near such a park also have 1 more neighbourhood friend on average, and have 2 more as median. Typically these friends are more dispersed, since the park also attracts children who live a bit further away. What is striking is that the effect of this spatial typology seems much stronger than that of going to school independently. Children who always go to school by themselves or with friends only gain 6% independent mobility as compared to the average, and they do not have any extra neighbourhood friends. This outcome is interesting, given that municipalities often emphasise safe 'school routes' as a way to give children more spatial freedom. Instead it might be more fruitful to invest in making urban parks more accessible to children.

From the workshop we found that the large urban park is the public space typology which has the most negative connotations for children in Lunetten, especially for girls. There are also some children in Votulast that have negative feelings towards (parts of) their urban parks, but in slightly lower numbers. According to the girls in Lunetten, child predators are

Neighbourhood friends and independent reach

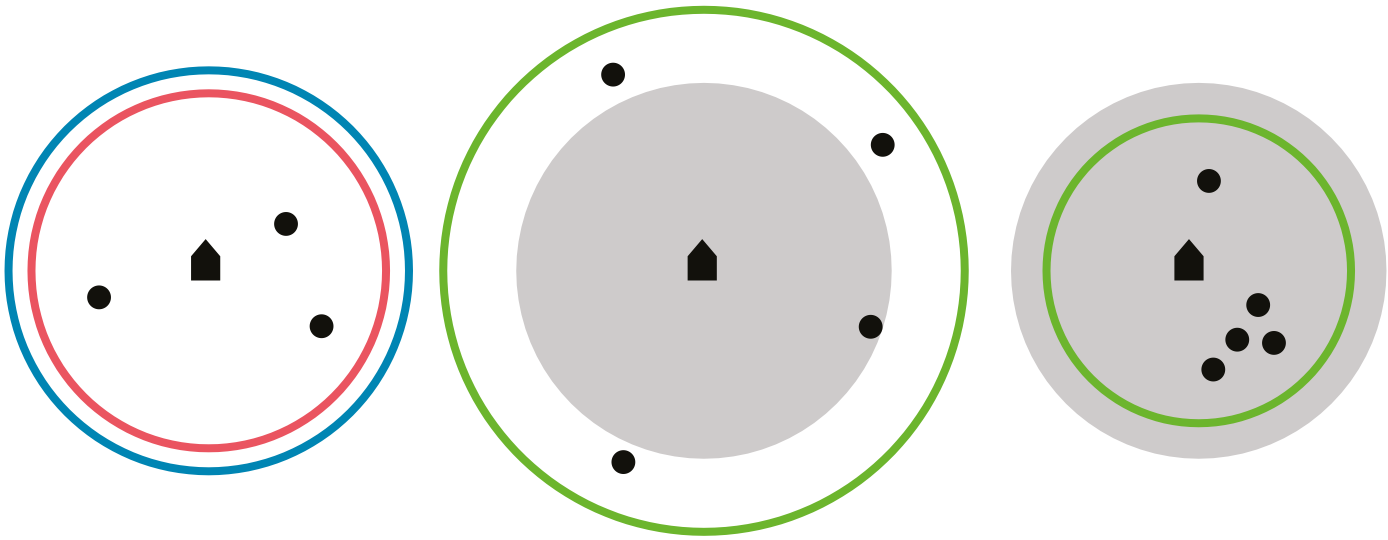


Fig. 6.27 - Independent reach and neighbourhood friends.

Girls (n=55)
Average Area = 56.4 ha (r = 425m)
Median Area = 27.3 ha (r = 295m)
Neighbourhood friends = 3.3

Boys (n=46)
Average Area = 72.1 ha (r = 480 m)
Median Area = 41.1 ha (r = 366m)
Neighbourhood friends = 2.7

Living near a large park (n=26)
Average Area = 122.7 ha (r = 625m)
Median Area = 101.5 ha (r = 570m)
Neighbourhood friends = 4.1

Living near a large park doubles the independent reach and adds one neighbourhood friend on average.

Living near a courtyard (n=28)
Average Area = 57.2 ha (r = 425m)
Median Area = 14.6 ha (r = 215m)
Neighbourhood friends = 4.6

Living near a courtyard reduces independent reach, but adds two neighbourhood friends on average.

Fig. 6.28 - Children in Lunetten not living on a courtyard (red) and neighbourhood friends (blue)

Fig. 6.29 - Children in Lunetten living on courtyard (red) and neighbourhood friends (blue)

lurking in the bushes. Although there is no indication that this is the case, this part of the large park 'De Koppel' is not regularly maintained, as it is meant to emulate a natural environment, making it a densely grown and dark environment. Some children use this area to build huts and treehouses, but apparently a lot of children find it too scary to explore. A possible solution could be to place the kindergarten of one of the elementary schools of Lunetten here, as it is an excellent environment for a forest kindergarten. In this way the children might become more familiar with this area of the park, while increasing oversight at the same time. Children in Votulast more often point to adolescent teens and adults who use the parks in the evening. They are aware of alcohol and drug use; a problem which mostly affects the inner-city and the neighbourhoods surrounding it. To make the park safer for children in the evening, activities such as theatre plays could be organised. A park warden could also be assigned in the summer, and more lighting might improve the feeling of safety in some areas.

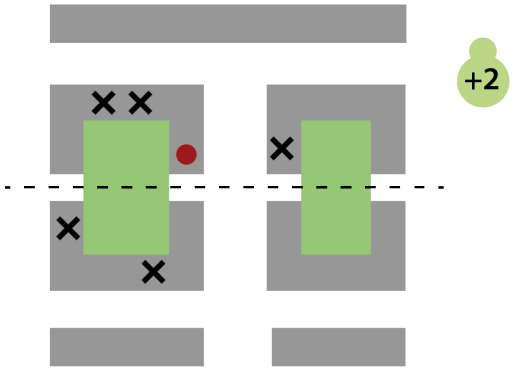
Public space typology: Courtyard – The strongest effects on the number of neighbourhood friends was found through children who live on a courtyard (n=28). On average they have 1.7 more neighbourhood friends than average, and 2 as a median. Again it is striking that the effect of this public space typology seems much stronger than that of a high concentration of other children (over 15% of the population), which does not significantly impact the average number of neighbourhood friends. Having two or three siblings, or at least one younger sibling, also increases the number of neighbourhood friends with just one on average. The neighbourhood friends of children who live on a courtyard are typically highly concentrated, around the courtyard. From this comparison we can see that stimulating the settlement of more families with children in an area is not necessarily the best way to create a more child-friendly environment. There is, however, a negative aspect to living on a courtyard typology; the average independent reach is not affected, but the median is almost halved as compared to all children. The reason for this could be due to the fact that many children who live on a courtyard don't have the need to travel as far to go to a playing spot or to meet friends. Instead we find that some children who do not live on a courtyard go to the friends who do to play outside.

From the mapping workshops we found that a lot of girls in Votulast have a negative perception of the courtyards in their neighbourhood. Only one girl in Lunetten had such negative feelings for a courtyard, even though they are much more numerous in this neighbourhood. A reason for this difference might by that the courtyards in Votulast are not part of the urban network; they are barely visible from the street and much less accessible than those in Lunetten. Usually they close in the evening, while those in Lunetten remain open permanently. Another difference might be found in the way the private gardens relate to the shared (semi-) public courtyard. In the historical and dense urban fabric of Votulast, most courtyards are surrounded by brick walls and tall garden fences. In many courtyard in Lunetten, however, part of the borders of the private gardens have a much more open characteristic, with low fences and plants that allow for direct visual contact between the two realms (see the section on the relation between public and private space).

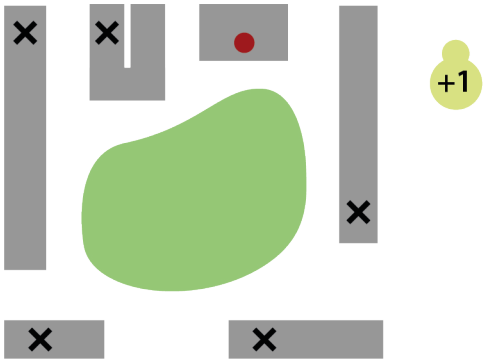
Public space typology: 'Play square' – Living near to a 'play square' (n=26) does not seem to have a significant influence on the number of neighbourhood friends or independent mobility. There was one case where there did seem to be a positive relation: one boy who lived near the Koekoeksplein, but went to a different school, had many neighbourhood friends surrounding the square. The popularity of the Koekoeksplein might be explained by its central location, next to the school de Koekoek. It is the only large public space in the area, so it attracts children from the surrounding streets. The same can be said for the Willem van Abcoude square, but it has a more closed characteristic and the streets surrounding it are a bit more busy.

According to the workshop maps, the play square is the least popular public space typology in general. For girls it is slightly more attractive than the sports facilities or shopping streets/centre. The heavy presence of younger, accompanied children could be the reason that these places are of less interest to older children, especially boys. Even though they are of lesser interest, there are almost no negative associations to the squares.

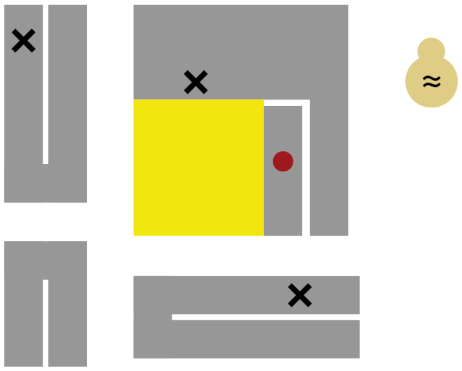
Public space typology: School playground – The only public space typology that has a negative effect on the number of neighbourhood friends is the school (playground). Children who live closer than 400 meters to their school (n=35) were found to have 0.7 less neighbourhood friends on average, and one less as a median, while it did not increase the number



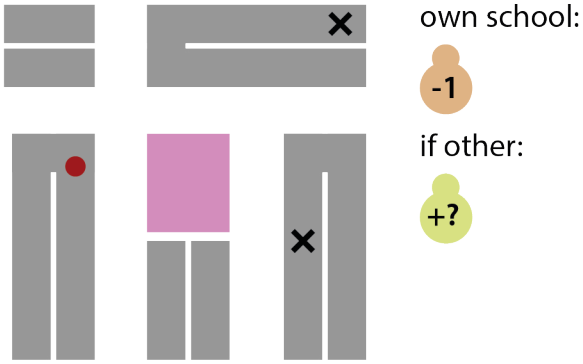
Courtyard:
high concentration



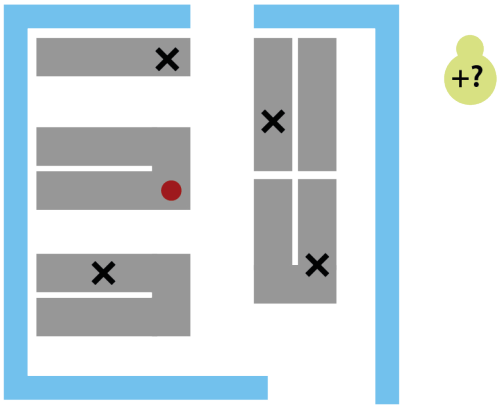
Park:
low/medium concentration



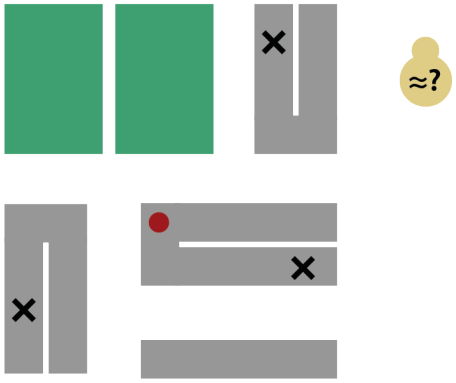
Square:
medium concentration



School:
medium concentration



'Island':
high concentration



Sports fields/club:
low/medium concentration

Fig. 6.30 - Spatial patterns of friendship.

of school friends they have. The reason that children who live close to their school have less neighbourhood friends seems obvious; most of the children in the area also go to the same school. On average they also have 40% less independent mobility. This result puts into question the popular argument that the best living environment for children is as close to school as possible. Instead living a bit further away from the school increases the chances of making neighbourhood friends and also promotes more independent mobility.

According tot the maps generated by the workshops, schools are the second most popular type of public space. Among girls it is even more popular than the street. Girls in Votulast, however, also see problems at the school playgrounds. Interesting here is that this only applies to the playgrounds of the Fakkel and the Dr. Bosschool, and not the Koekoek. As described in the previous section on the 'play square', the Koekoeksplein forms an integral part of the neighbourhood. In contrast, the playground of the Dr. Bosschool is closed to the public, while the one of the Fakkel is public, but surrounded by a rather tall fence. A possibility for the playground of the Fakkel, which will be redesigned in the near future, is to increase its accessibility and to integrate it into the rest of the neighbourhood. The school playgrounds in Lunetten are not seen as very problematic. They are for the most part completely open to the public, although not as integrated into public life as the square next to the Koekoek.

Public space typology: Shopping streets – Shopping centres or streets are, after the play square, the least popular play spot. Most children in Votulast are, however, able to go to shops by themselves. This includes doing errands, buying ice-cream, soft drinks, crisps or French fries. Not all children in Lunetten are able to go to the shopping centre independently: for 40% of them it lies outside their area of independent reach. For many of those who can reach it, it is a popular playing spot. Still, since children have no significant credit of their own, spending much time in the shops might not be very interesting by itself. The shopping centre in Lunetten has some alleyways and an elevated pedestrian street, making the public space a bit more interesting for children to explore.

A lot of boys in Lunetten, however, expressed negative relations towards the shopping centre. This might be due to adolescents and homeless people hanging around the square in front of the shopping centre. Playing on the elevated residential street is also not always appreciated by the tenants. By opening up the social cultural center 'de Musketon' towards the square and the shopping centre, an environment that is more attractive for children and parents might be created. On the square in front of the shopping centre there used to be a large metal climbing art structure. It was removed without creating a new attraction for children, making the trip to the shopping centre less interesting.

Public space typology: Sports field – 30 children indicated a sports field or skate park as one of their favourite playing spots. However, any possible effects of living near such a typology on the number of neighbourhood friends were not measured, since the sports fields themselves are usually part of a larger urban park, for which the effects have already been described earlier on in this chapter.

16 children in Lunetten had negative feelings towards the skate park. When asked for an explanation, some children replied that it is a place where older children often hang out and cause trouble. Also 10 children in Votulast had negative feelings towards their skate park in the Griftpark, which is one of the largest open air skate parks in the Netherlands. A smaller number of children indicated a skate park as one of their favourite playing spots. Typically a skate park is a place where younger children intermingle with teens. Many older skaters are happy to give advice and motivate younger children to use the park, but it is a place which sometimes attracts bullies as well. It also functions as a meeting place for adolescents, especially in the evening. This sometimes causes problems for skaters, as was evident during one of the days of observation, when part of the skate park in Lunetten was covered with glass litter. Because of its suburban location and smaller size, the skate park in Lunetten is not as intensively used as the one in Votulast. The skate park in Lunetten also has a designated youth hang-out space, which attracts non-skaters. A recent suggestion by residents of Lunetten was to create more spaces where older and younger children can interact. {SOURCE} In order for such spaces to succeed, the different modes of use of different age groups should not conflict too much. In the Griftpark the skate park is combined with a basketball court, to attract more positive and active adolescents and adults to this area of the park. This strategy could also be applied in Lunetten, replacing the youth hang-out with a facility that is also functional for younger children and helpful in attracting

more positive user groups. For other types of sport fields, small football pitches in particular, size and quantity matters. Most children don't have negative feelings towards the football pitches, but from the on-site observations it was noted that at some football fields and courts in Votulast, groups of children were waiting for their turn to play. In Lunetten there is an abundance of grass pitches. A caged mini pitch was recently opened along the Talmalaan in Votulast, but there are still one or two places in the neighbourhood that could be transformed into small pitches, to reduce waiting time for the fields in the Griftpark.

Semi-public space typology: Petting zoos, (adventure) playgrounds and scouting – There were not enough children living in the direct vicinity of these types of spaces to base a statistical analysis on. They are, however, one of the most popular playing spots of both boys and girls, and sometimes the independent reach of a child extends far from home along a narrow corridor, just to include such places. In many cases however, children do not go to the petting zoo by themselves. Older children do go to scouting and the adventure playground by themselves or with friends. Five boys disliked the petting zoo specifically. Other types of playgrounds do not have significant negative connotations for the children in this survey.

Semi-public space typology: Graveyards & churches - One interesting result on the maps in Lunetten were the endless crosses denoting negative feelings towards the graveyard and churches. When asked if they really found those places scary, some children acknowledged that their fear was mostly based on an image they had formed in their mind.

Fig. 6.31 - Children playing in a shared semi-private courtard in Lauwerecht, Utrecht, 2016.

Non-spatial effects

Boys and girls – Girls were found to have two more school friends and 0.6 more neighbourhood friends on average than boys. This supports the idea that girls are a bit more social. The average independent reach of boys is 30% larger than that of girls. Similarly, this supports the idea that boys like to explore a bit more, while girls prefer to socialize. However, it remains unclear from this research what the precise reasons for the differences are.

Siblings – Children who have two or more siblings, or at least one younger sibling, have 0.7 more neighbourhood friends on average. This could be explained by the fact that siblings can share each others friends.

Border typologies

Methodology – In order to locate and quantify obstacles limiting the independent mobility of children in (sub-) urban neighbourhoods, the outer edges of the independent reach areas (as indicated during the workshops) were compared to each other and to the underlying urban landscape. The permeability of different border typologies differs due to their nature (be it buildings, water, rail or road), and features such as length, width, traffic intensity and number of crossing points. This makes that certain borders are relative depending on for instance physical distance from the home. For this reason both neighbourhoods were further divided into two groups; the children in Votulast were divided based on if they lived to the north-west of the Willem van Noortstraat, or to the south-east of it. In Lunetten children were divided in a group that lived to the north or west of the schools, and a group that lived to the south or east. The individual translated digital maps of children living in the same area within a neighbourhood were made transparent and superimposed over a base map, to find possible spatial relations.

Absolute borders – Edges which were uniformly shared by most children fall in the category of infrastructure: motorways, railways, broad canals and rivers. Typically these elements have few crossings. In some cases there is a bicycle tunnel or bridge where in theory children could escape the 'neighbourhood island'. In reality the absolute borders are probably often solidified into psychological borders as well. In addition, according to Karsten and Felder, children are very loyal to their neighbourhood. {SOURCE} When they have negative preconceptions of other neighbourhoods they might not want to venture past the absolute borders surrounding their own environment.

When we look at the barriers for children in Lunetten we see that the neighbourhood is very clearly defined by an almost impermeable ring. This ring is formed by the motorways A12 to the south and A27 to the east, the elevated access road Waterlinieweg to the west, and a railway on the northern side. In Votulast the situation is very comparable: absolute barriers almost completely encircle the area. To the north the clear-cut border is defined by the Kardinaal de Jongweg, which is part of the city's inner ring road. On the southern side the city's moat forms the boundary, while on the west it is the river Vecht. Only the Blauwkapelseweg on the eastern side of the Griftpark (at the easternmost edge of Votulast) is, with just two lanes, somewhat permeable to this age group.

Relative borders – Except for the outer edges shared by most children, there were also sharp edges within the neighbourhoods themselves. These borders are shared less often, and sometimes take on a different meaning depending on the relative distance to the home. When we compare these secondary borders between children who live in the western and eastern parts of Lunetten, we find that some of these border sections are shared between the two groups, while others are not. The same applies to the two groups of Votulast. The relative borders relate to secondary infrastructure such as neighbourhood access roads and small canals, but also to patterns of use.

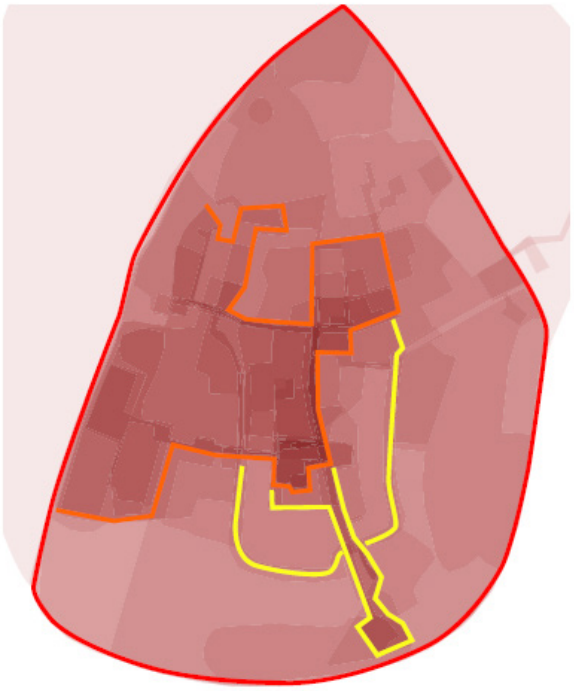


Fig. 6.32 - Apparent borders for children in W.-Lunetten

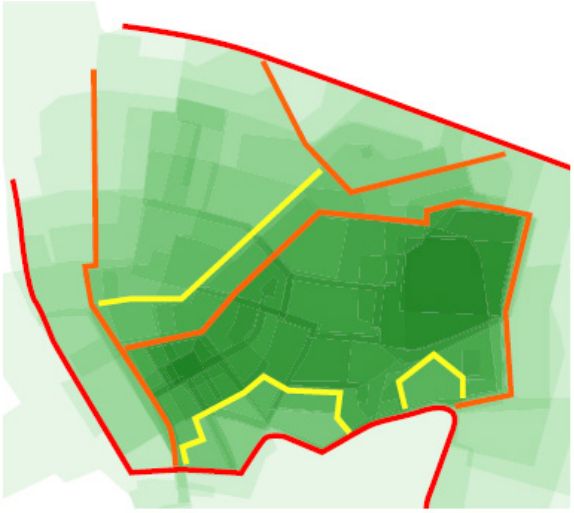


Fig. 6.33 - Apparent borders for children in E.-Votulast

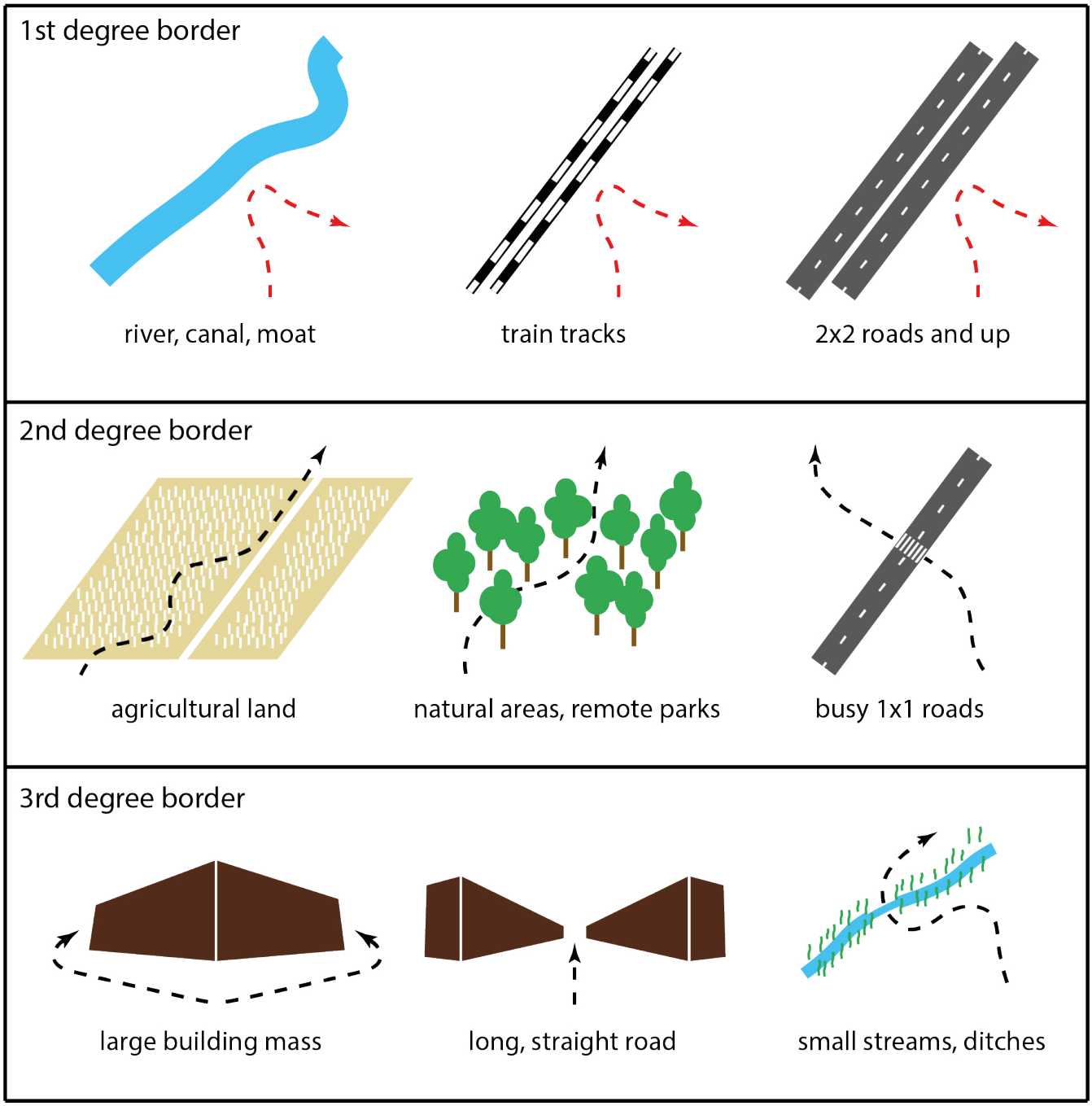


Fig. 6.34 - Schema showing degrees of border typologies.

Long straight streets do not encourage taking side-routes, as we see in the case of children in the west of Lunetten, who do in large numbers venture independently to the petting zoo in the south-east of the neighbourhood, but do not explore any of the adjacent streets. In this case the street itself does not form the barrier, but the elements that delineate it do. Streams or dense building mass give incentive to continue straight-on. This 'repulsive' effect of closed building mass can also be observed in the southern and western parts of Votulast, which have a density comparable to the medieval city centre. There are less streets through these historical housing blocks, while there are a few discreet alleyways. In the northern part of central Lunetten there is also a clear example of an arrangement of housing complexes which has the outward appearance of a closed castle. It is not often included within the independent play areas drawn during the workshop. Barriers can be pushed farther out, or given new meaning, through the presence of functions such as parks, sports facilities or shopping centres. Another factor which seems to create a barrier for the exploration of the urban landscape seems to be discontinuity of the morphology of the urban fabric. In order to clarify these relations, the results were compared to space-syntax maps of the neighbourhoods (see the next section).

6.4 Comparing use and perception of public space by children in 1996 and 2016

Methodology – In order to compare current use and perception to the situation of 1996 former residents, who were around the age of 9 in that year, were asked to make a similar map as the children made in the school workshops. This part of the research was very time intensive, as it was challenging to plan meetings with dozens of individuals within a few weeks. Snowball sampling was used to reach a significant number of respondents (31), but because the data generated by these interviews relied on the 20-year old memories of the subjects, it was not used for quantitative statistic analysis. Instead the spatial patterns of these maps were qualitatively compared to those of current children. Respondents were given a map of their respective neighbourhood, which was similar in scale and appearance to the one given to children. The maps were modified to reflect the situation of 1996, as some areas have been redeveloped in the years between. A typical session would last for about an hour; just as long as the school workshops. Even though the results are based on (selective) memory, it is hoped that by the relative subjective distance to their childhood, as well as the more relaxed setting of the individual sessions when compared to the somewhat chaotic school workshops, the subjects would be able to draw a more or less accurate picture of their pre-teen childhood use and perception of public space. An added benefit was that the adults produced clearer and more precise maps, as they were aware of standard mapping techniques such as demarcation and hatching. The sessions were not recorded, as that would have taken too much time to play back. Notes were made on the backside of the maps or sometimes on the map itself. To compare the results with those of current children, all maps were 'translated' into a similar layered digital format.

Questionnaire – At the start of an individual mapping session, the subject was asked the same questions as are described in the questionnaire section of the chapter Use and perception of public space by children in Lunetten & Votulast in 2016. These questions were, however, not meant for statistical analysis, but to get a more personalized perspective on the maps.

Mapping friends – The subjects were asked to mark the homes of their school and neighbourhood friends, in the period they were between the ages of 7 and 10 years old. The average number of neighbourhood friends of the 31 adults was 3.65, which is slightly higher than the average of current children, but this can not be used in argumentation since selective memory might have distorted this result somewhat. Some friendly connections that were formed at later age might have slipped into the map, and it did occur that a respondent was unsure if a friend went to the same school or not. In such cases notes were often made on the map.

When we look at the dispersal patterns of the neighbourhood friends of the individual adult subjects, we see that these fall in line with the patterns described in the section on making friends in the previous chapter; highly concentrated when the subject lived on a courtyard, medium concentration for those who lived in an 'island', and more dispersed for others. Off course not all results follow this pattern, but the general trend seems too strong to be coincidental.

Independent reach – Next the respondents were asked to demarcate the areas where they played outside without supervision in the relevant period (age 7-10). Some respondents found this task easy to do, while for others it took quite some time.

A compelling result was the marked difference between the independent reach of boys and girls. The adult men in the sample often encircled quite a large area, comparable to current boys and girls, while most adult women indicated they played just in the public spaces directly surrounding the house, covering an area of just a few blocks and possibly part of a park. These results seem to indicate that spatial freedoms of girls have increased during the past 20 years. This goes against the general trend found in literature. It is possible that the differences are due to changes in parental attitudes towards the sexes in the past 20 years. Many girls in the school workshops indicated they were members of a local football club and that they were allowed to go there independently by bike. 20 years ago, girls participated much less in organised sports. The difference might, however, be explained by a more modest attitude by adult women during the mapping session itself. To see if these differences reflect changes in reality, a larger sample and more through investigation of the childhoods of adult women from both neighbourhoods would be required.

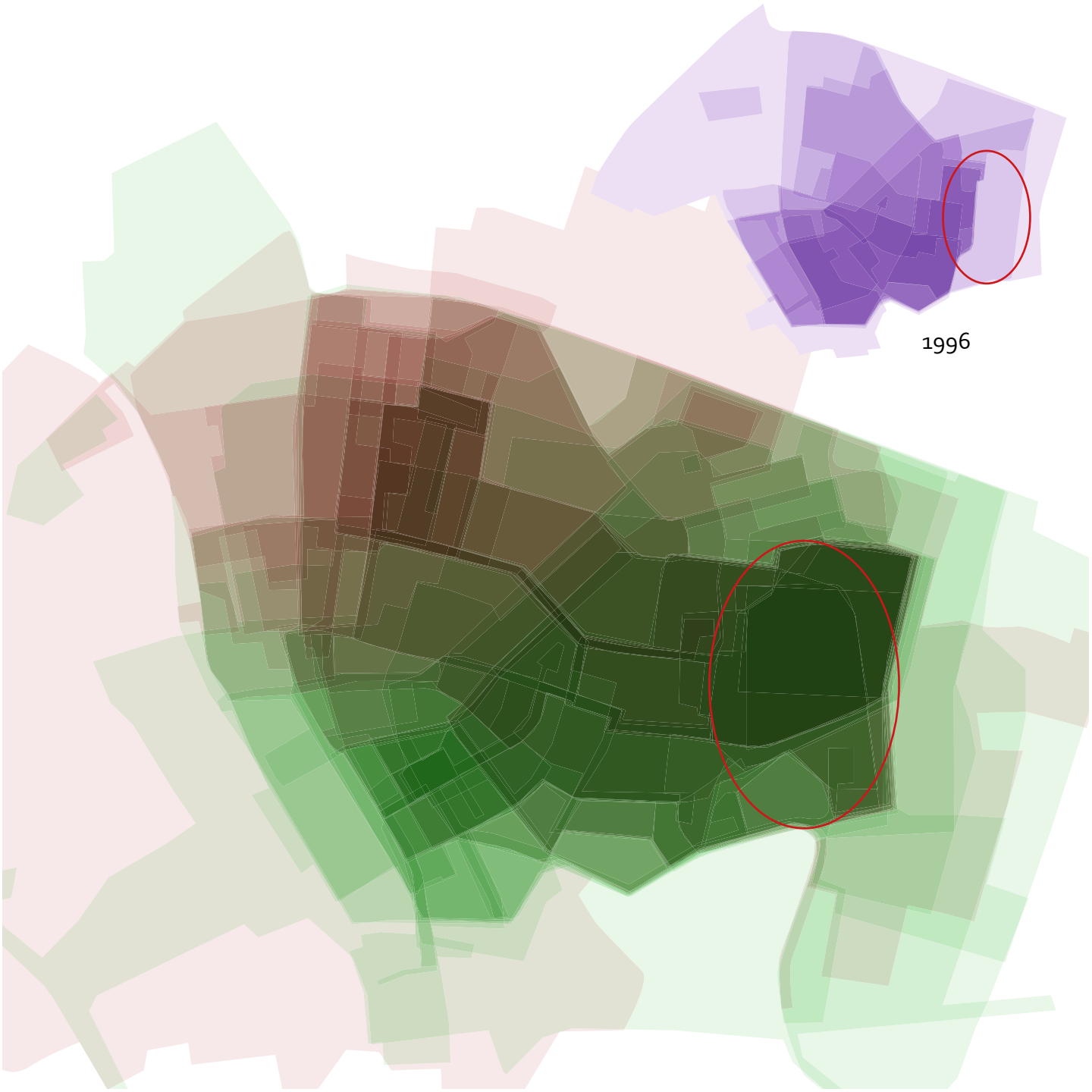


Fig. 6.35 - The combined independent reach map of children in 'Votulast" for 2016 shows that the neighbourhood acts as an 'island' in the city. The inlay shows the situation before the Griftpark was opened.

A significant change in the use of public space since 1996 was found around the Griftpark, in the east of Votulast. Twenty years ago most of the Griftpark was still a brownfield where children would only incidentally be taken to with their parents. For a long time it was a neglected, overgrown and uneven terrain, which was known to be contaminated by a century of industrial use. The western part of the Griftpark, which housed the petting zoo before it moved to its current location on the north-eastern side of the park, formed a clear barrier for the children in 1996, and some even omitted the park in its entirety. This situation has completely changed in 2016. Currently the Griftpark is one of the most popular spaces for children in Votulast, and instead of forming a barrier it functions as a stepping stone towards the exploration of the neighbourhoods that lie beyond it.

Popular playing spots – Next the subject were asked to hatch their favourite playing spots. This was generally an easy task, since it usually fell within the previously drawn independent reach.

When we compare the general trend in the popularity of different play spots between Lunetten and Votulast we find that the directions of change in the two neighbour-hoods seem inconsistent; children in Lunetten today are less likely to indicate they favour playing in a large park as compared with 1996, while the opposite is true for children who live in Votulast. In fact the whole 'centre of gravity' of outside play in Votulast seems to have shifted from the streets in the central part of the Vogelenbuurt towards the direction of the Griftpark. This could be due to both push and pull factors; increased pressure from parked cars in the streets, and a wealth of new play possibilities in the park. Another factor that might have contributed to the growing popularity of the Griftpark is the presence of more diverse user groups. Along the western part of the park there is a concentration of postwar social housing (a-typical for the area). According to the adult men the children who lived in these social housing blocks would sometimes take over the park, making it less attractive to some of the other children. The enlargement of the park might have contributed to a decrease in the possibility for monopolization by a single user group.

In Lunetten the difference is not so clearly defined. Most favourite play spots have not changed much in 20 years. These are still the streets and courtyards close to home, the petting zoo, adventure playground, football fields, skate park and shopping centre. Also some parts of the parks have retained their attractiveness, such as the large bowl-shaped feature called 'de Kuil' (the pit) and its surroundings in the southern part of Lunetten, as well as the eastern parts of the Beatrixpark in the north of the neighbourhood. The biggest change was seen in the appreciation of the school playgrounds. Most adult respondents did not indicate this space (which is publicly accessible) as one of the places where they played outside a lot. For reasons why this could be the case, see the next section negative perceptions. Current children in Lunetten value the school playgrounds very much. In the past 20 years, some improvements have been made to the playgrounds, such as a new energy producing multi-person swing and climbing structures. In 2010 the Dutch law on noise nuisance was amended to exempt schools and daycares in an effort to ensure the rights of children to play outside regardless of complaints from neighbours. This could also have improved the quality of outside play on school playgrounds in general, but it is unknown if there were any complaints by neighbours in 1996. Most of the smaller differences between the maps of the two time periods can be attributed to the sample size of both groups, which is not large enough to cover the entire neighbourhood. However, the combined map of both age groups still leaves some blank spots. As we have concluded from the analysis of border typologies, relatively closed urban blocks can also form an obstacle for children. This might explain why there are relatively few popular playing spots in the more densely built up parts of Lunetten, for example in and around the relatively popular shopping centre. This area has a lot of (experimental) stacked housing and undefined public spaces. The percentage of children in this area is also lower than in the parts with more town-houses, making it less attractive for children, and thus possibly an interesting design case.

Negative perceptions – Finally the subject were asked to mark spaces which they remembered negatively from their childhood. The results were compared to those of current children.

When we look at the differences in negative perceptions between 1996 and 2016 we see a mirror image to the patterns described in the previous section about the popularity of the play spots. In Lunetten adults indicated they found the school playgrounds quite problematic during their childhood (some of them spoke of bullying and physical violence), while current children in general did not share these experiences. The reverse is true for park the Koppel in the

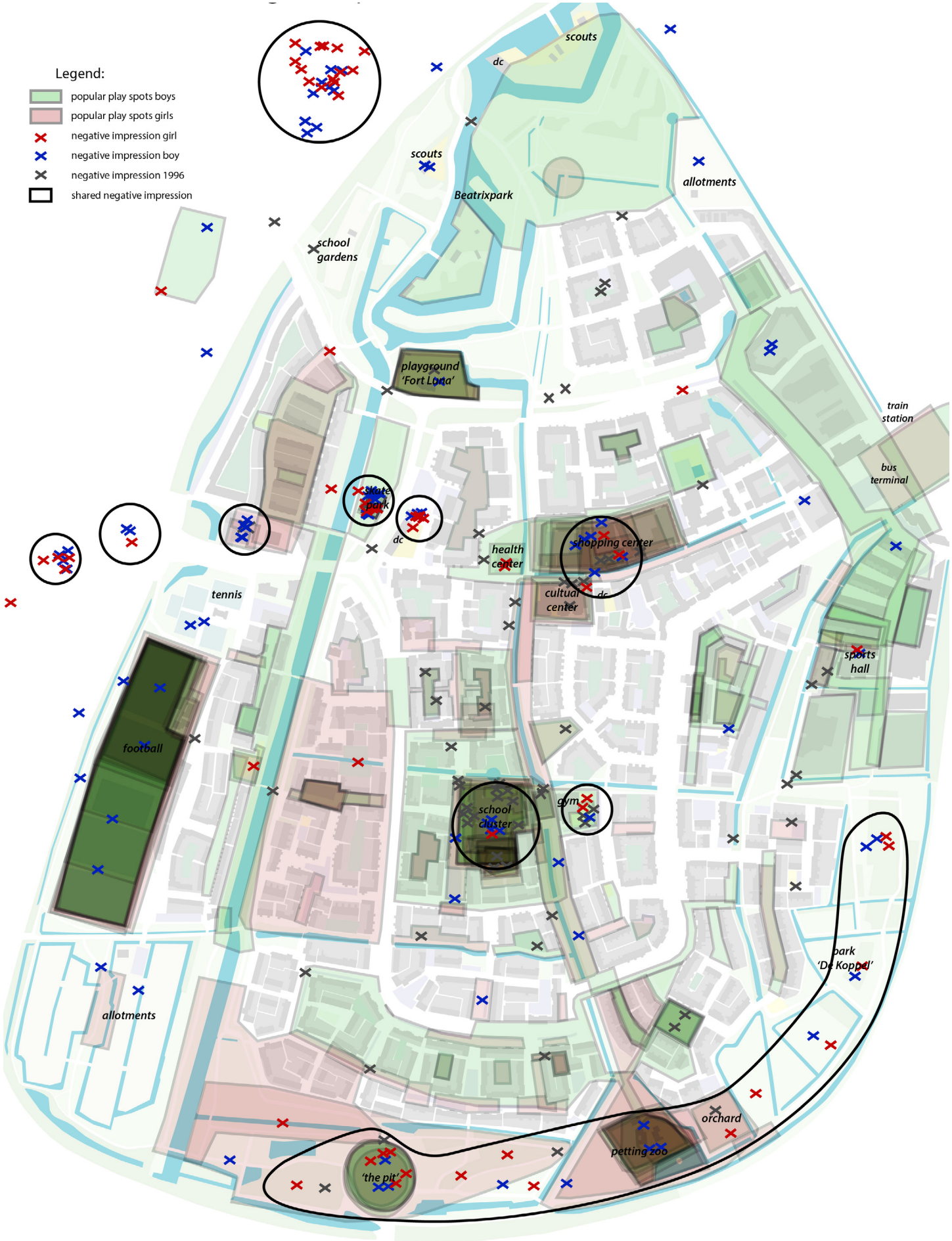


Fig. 6.36 - Map of positive and negative perceptions of children in Lunetten in 1996 and 2016.

south of Lunetten, as was also explained in the previous section. Other areas that seem to have improved are the courtyards and the bicycle tunnel under the Brennerbaan, which connects the northern residential 'island' (de Wadden) to the rest of Lunetten. Some adults who lived within this island had indicated they found the tunnel or paths leading towards it a bit scary in their youth, as there were some cases of muggings. Luckily, these fears seem to have dissipated over time. There are, however, also areas with problems that seem to have persisted, most notably the shopping centre, the skate park and the sports fields outside the school gym. The problems at these locations relate to conflicts with other children, teens and sometimes adults. These locations were added to the list of possible intervention sites to be studied in further detail (see the chapter on design locations).

In Votulast we also see the same patterns return as described in the previous section, but the change becomes more precisely defined. The southern half of the western border of the Griftpark has clearly improved in the last 20 years, but the northern half has not. It is unclear what the precise origin of the negative experiences towards it is. This part of the Griftpark is lined by garden fences and sheds, while in along other parts the houses face towards the public space. In the case of a semi-public courtyard such as in Lunetten, this would not be a problem. However, because the Griftpark is fully public, people who have a backyard facing towards it are less inclined to create an open relation between their private garden and the park. They also have less possibility to appropriate the space. Perhaps as a means to counter this publicity of the large (post-modern) urban park, this section was left untouched as a more reclusive, tree-covered natural environment. This conflicts somewhat with the intensively used football pitch which lies just a dozen yards to the south of it. Perhaps this constellation of the absolute privacy behind the garden fence, and the absolute publicity of the football pitch leaves the space in between a bit undefined. However, it is exactly this overgrown, dark and out-of sight characteristic which makes it interesting to some children, as was noted during the on-site observations. It is one of the few places in Votulast where they can pretend to be in a forest. To see how it can be improved without sacrificing its qualities, it was added to the list of prospective intervention locations. Two other places that have improved since 1996 are the Koekoeksplein and the Troelstralaan. Some adults indicated that when they were younger, they were sometimes not allowed to play at the Koekoeksplein by older children, while later in their childhood they themselves would send younger children away, and use the swings as goals for ball games. This practice seems to have stopped, because we find no negative relations to the square among current children. From the observation we have also seen that the square is currently firmly in the hands of younger children, under protection of their parents. The change along the Troelstralaan can be attributed to the urban renewal in the past years, which has added three new 'pocket parks' to the neighbourhood. It has also brought more mixed housing to the area, where there used to be predominantly stacked social housing. Two spaces of which the perception does not seem to have improved since 1996 are the small courtyard on the Johannes de Bekastraat, and the Majoor Bosshardt-plantsoen in the north-east of Tuinwijk. The Majoor Bosshardt-plantsoen is a very basic traditional park. It does not draw nearly as much visitors as the Griftpark, even when taking its size in to account, but it does house the library and a half-pipe. Because the park, which for the most part is just a grass field, is surrounded by a hague and a street, it does not have much oversight from the houses that look out on it. During one site visit a couple were observed having intercourse in a secluded area of the park, but in sight of children. This area was also included in the list of possible intervention locations. The courtyard on the Johannes de Bekastraat is the only courtyard south-east of the Willem van Noortstraat. From observations is it can be extremely crowded with children and parents. This sometimes leads to conflicts with residents, who have to share this semi-private space (the gate closes in the evening) with people from outside the block. In Lauwerecht, along the Vecht (in the west of Votulast), there are also a few semi-private courtyards, but from observations they do not have this pressure from outside. To see how the relation between public and private can be inproved, the courtyard on the Johannes de Bekastraat is also a candidate for a design intervention.

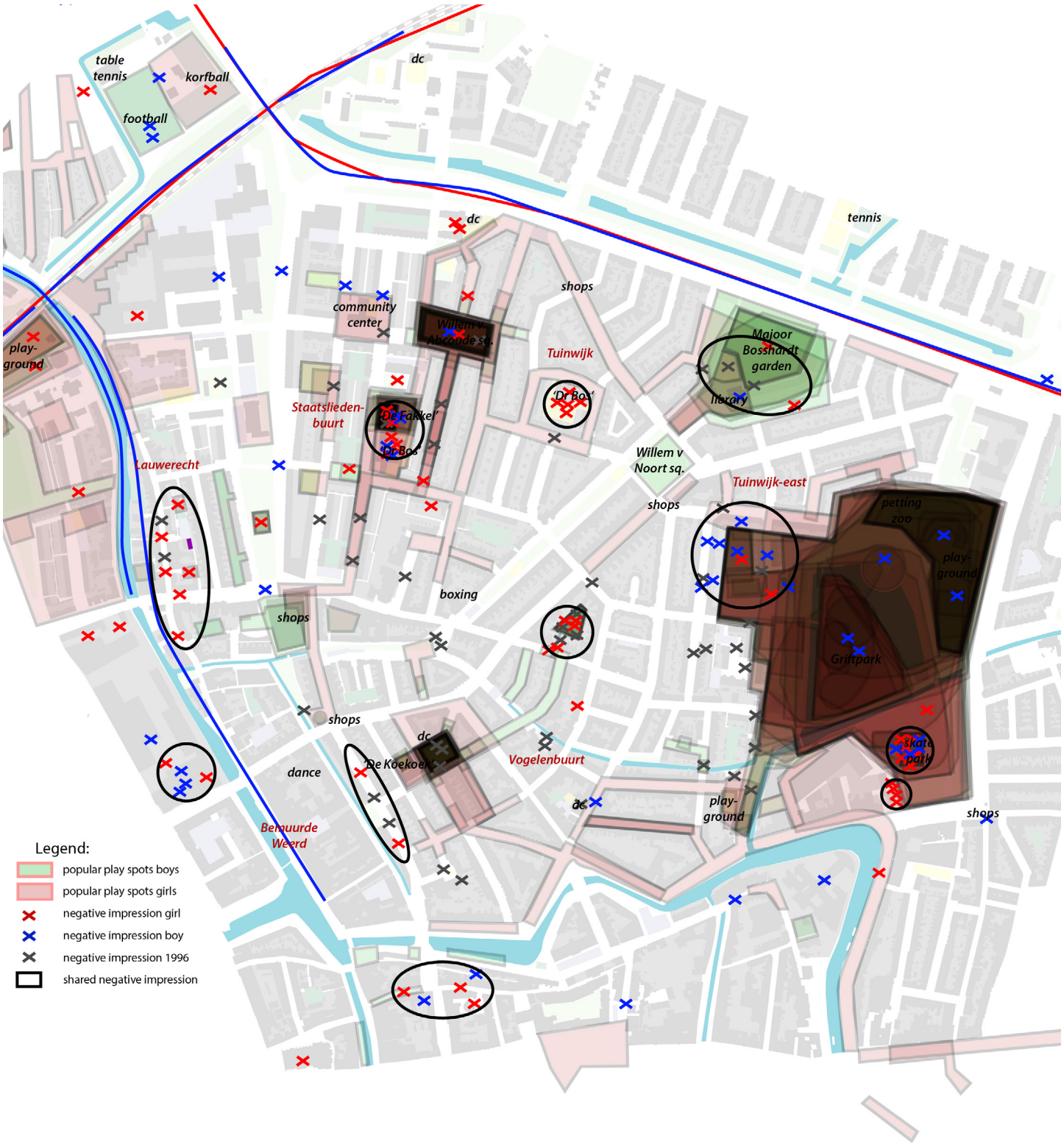


Fig. 6.37 - Map of positive and negative perceptions of children in Votulast in 1996 and 2016.

7 - Design

Introduction - This chapter consists of two parts. The first section describes the results of the design workshop which was conducted at three primary schools, following the initial analysis of the previous mapping workshop. The second section gives an overview of the design proposals put forth by the author.

7.1 - Design workshop

As part of the preparation for the design phase a follow-up workshop was given at three of the four primary schools which participated in the mapping workshop. The fourth school did not respond, as they were busy moving to a new building. First a discussion was held on the results of the mapping workshop, after which the children were asked to design their own ideal play square. For each neighbourhood there were two locations to chose from. Children could decide themselves if they felt more comfortable making a perspective, birds-eye view or plan drawing.

Elements which are desired by children in both neighbourhood include climbing and sliding structures, multi-person swings, football pitches and benches. The drawings of children in Votulast contain many recognizable (standardized) elements, which are less prominent in the drawings of children in Lunetten. Many children in Lunetten included natural environments in their designs, which were mostly missing from the drawings of children in Votulast.

List of ingredients for a play square in Votulast, as imagined by children themselves.

Dodge-ball court
Handball court
Football court
Small fenced pitch

Climbing structure with shelter, slide & sliding pole.
2,5m tall climbing wall
Igloo climbing rack
Rope pyramid
Castle (with slide)
Tree hut (where you can sleep)

Multi-person swing (with roof)
Single person swing
Tower/tree with slide
Transparent slide
Shoe slide
Zip line
Trampolines
Carousel
See-saw
Spring rocker
Tumble bars

Drinking fountain
Fountain with stream
UFO-fountain
Fire pit
Forest

Benches & table
Popcorn stand
Equipment shed
Giant smiley face

Nerf/water pistol arena
Climbing tree to the USA

Bridge across bus lane
Demarcation of play zones

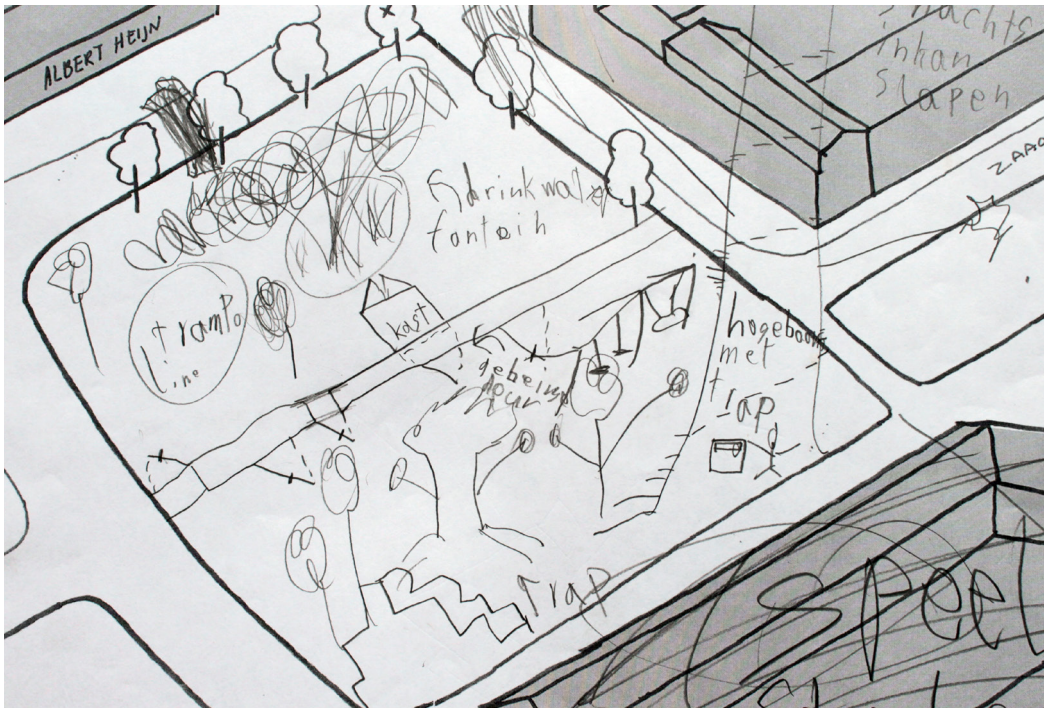


Fig. 7.1 - Birds-eye view drawing by Sylvester of a desired playground on the Willem van Noortplein in Tuinwijk.

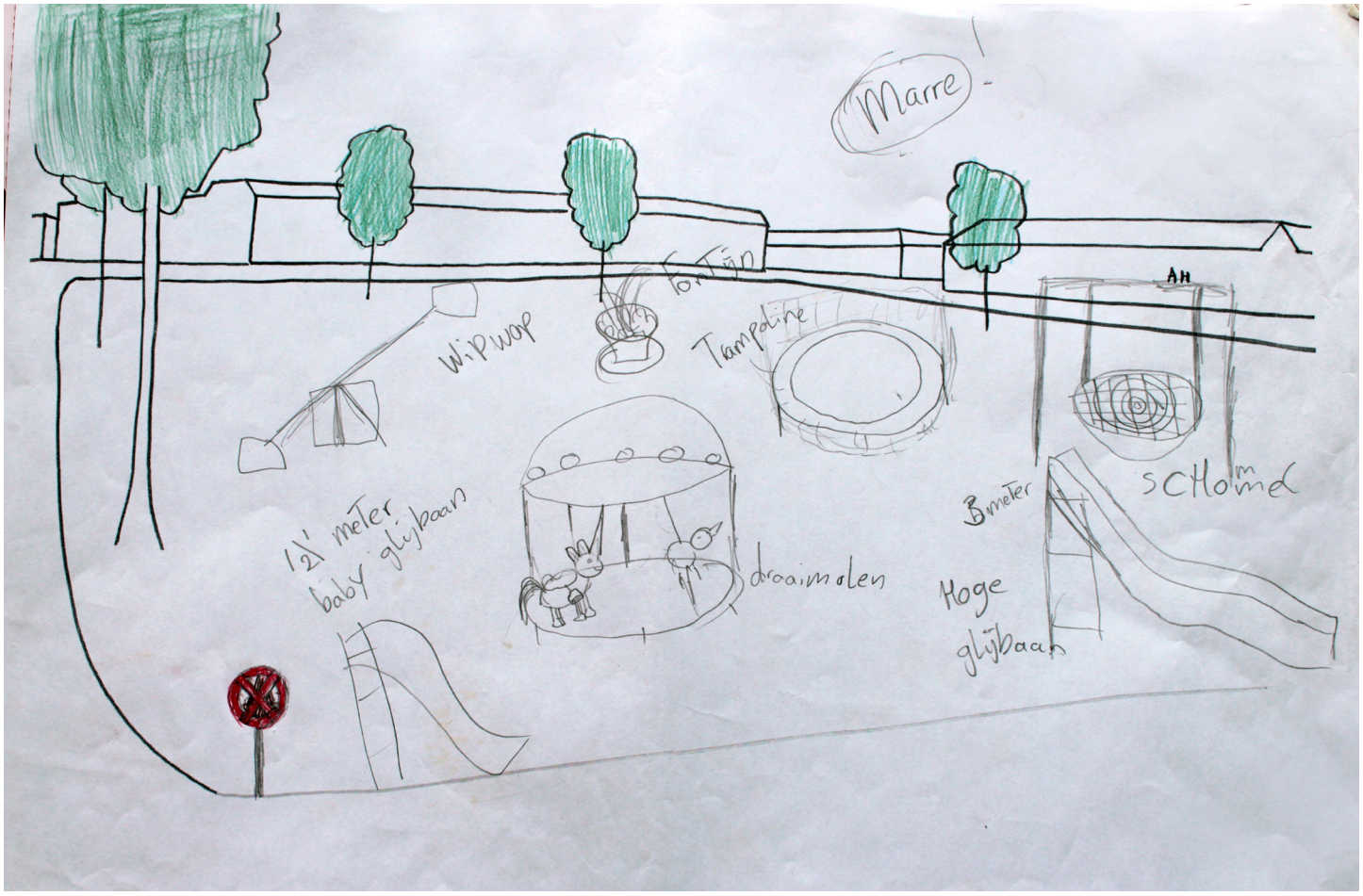


Fig. 7.2 - Perspective drawing by Marre of a desired playground on the Willem van Noortplein in Tuinwijk, Votulast.

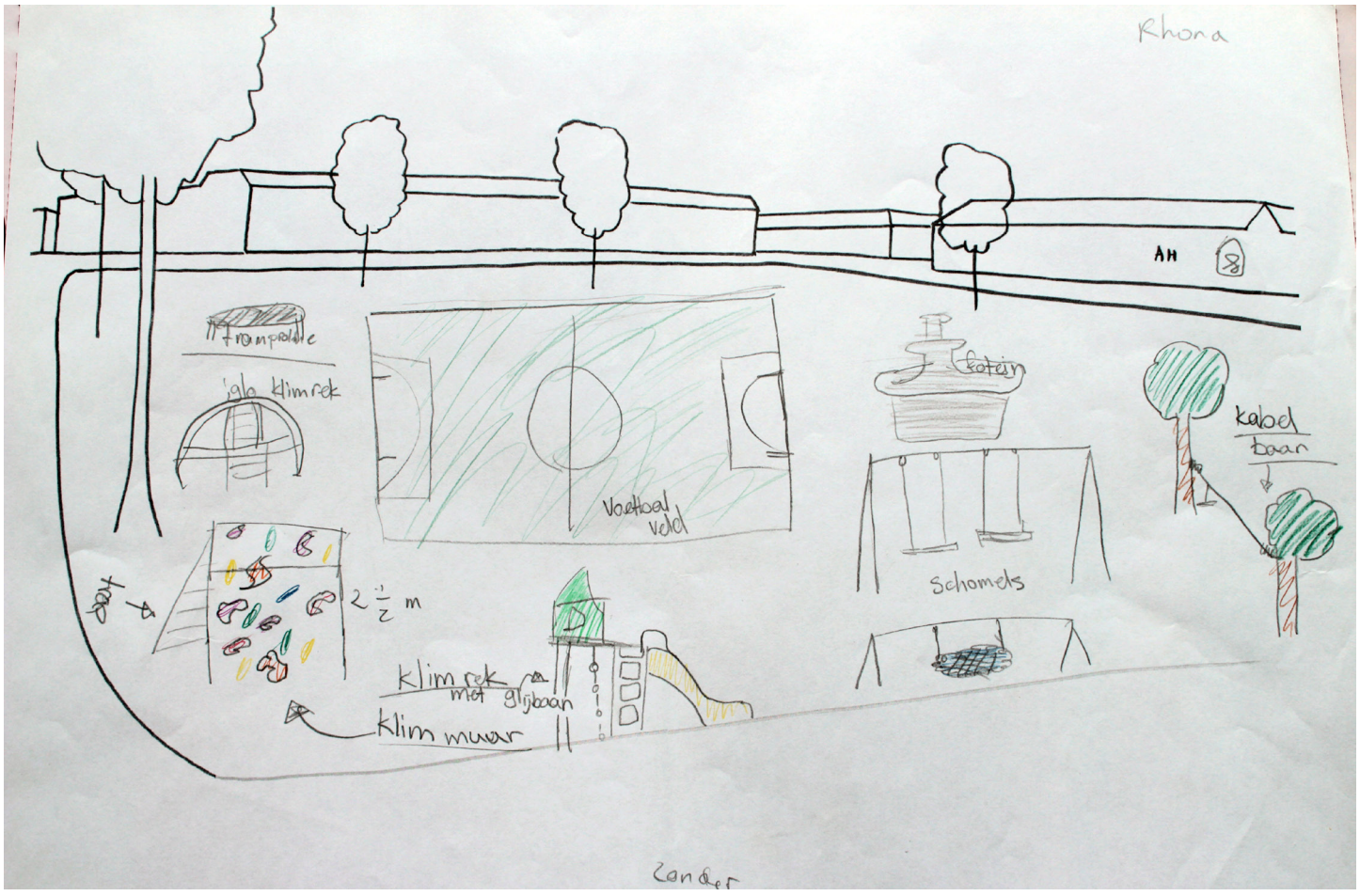


Fig. 7.3 - Perspective drawing by Rhona of a desired playground on the Willem van Noortplein in Tuinwijk, Votulast.

List of ingredients for a play square in Lunetten, as imagined by children themselves.

Football pitch
Small fenced pitch

Climbing wall
Climbing pole
Climbing structure with zip lines, platforms, rope bridges, sliding poles, etc.
Tower with platform
Multi-level tree hut

Multi-person swing (with roof)
Energy producing swing
Colourful slide into greenery
Trampolines
Tumble bars
Tractor tire half dug in

Diverse natural environments with wood blocks, benches, sandbox, hammocks.
Green labyrinth
Bare-feet path
Forest

Waterway with bridges
Pond with fish
Water spouts

Benches & tables
Stretchers / relaxing chairs
Miniature house
Bunkers to hide in
Rain screen (retractable)

Skate park
Video arcade
Swimming pool
Standing boxing bags
Foam-block pit & diving plank
Mini-kart track
Roller-coaster
Free Wi-Fi
Clear boundary of playground

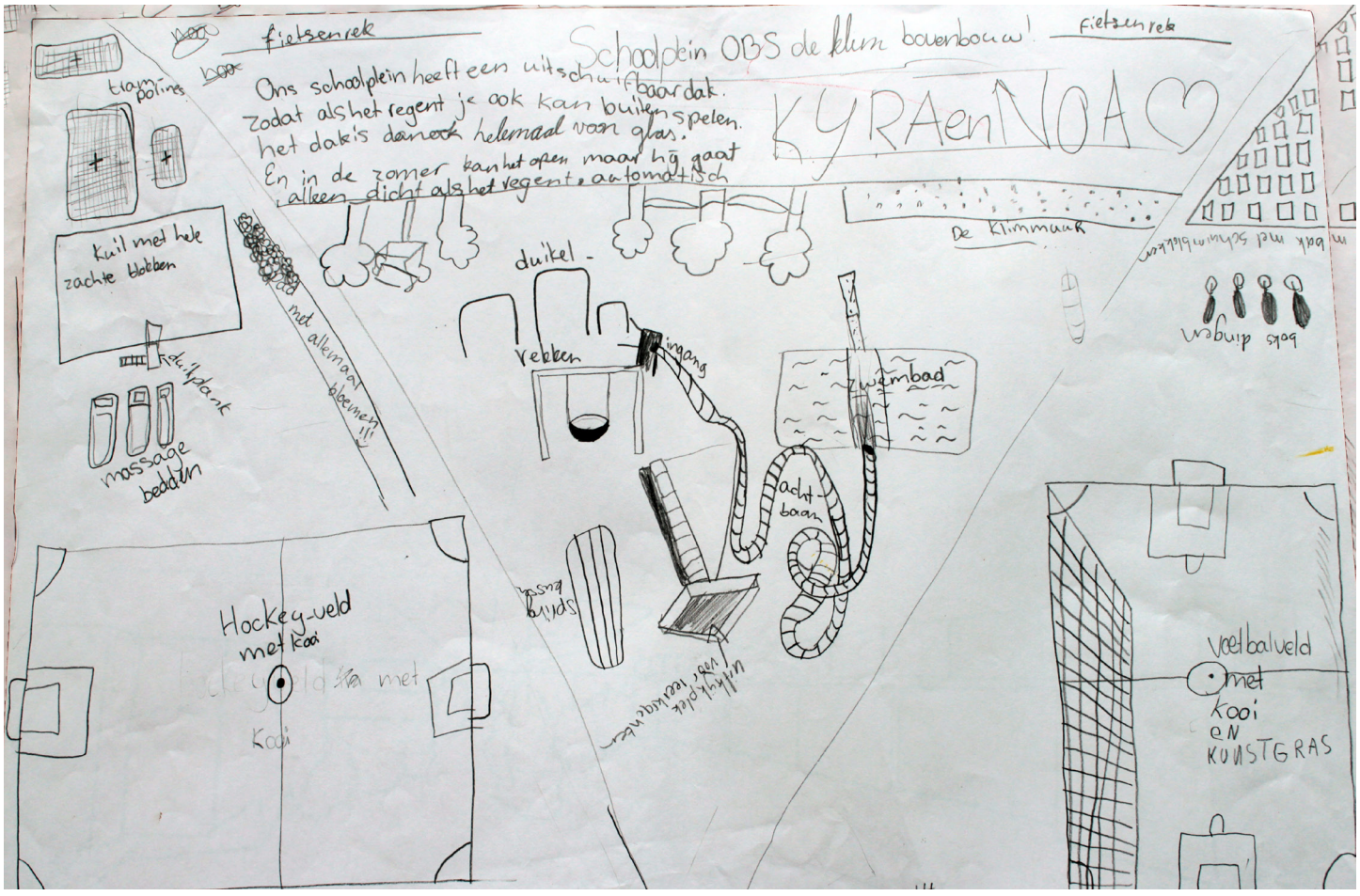


Fig. 7.4 - Plan drawing by Kyra and Noa for the yard of De Klim primary school in Lunetten, Utrecht.

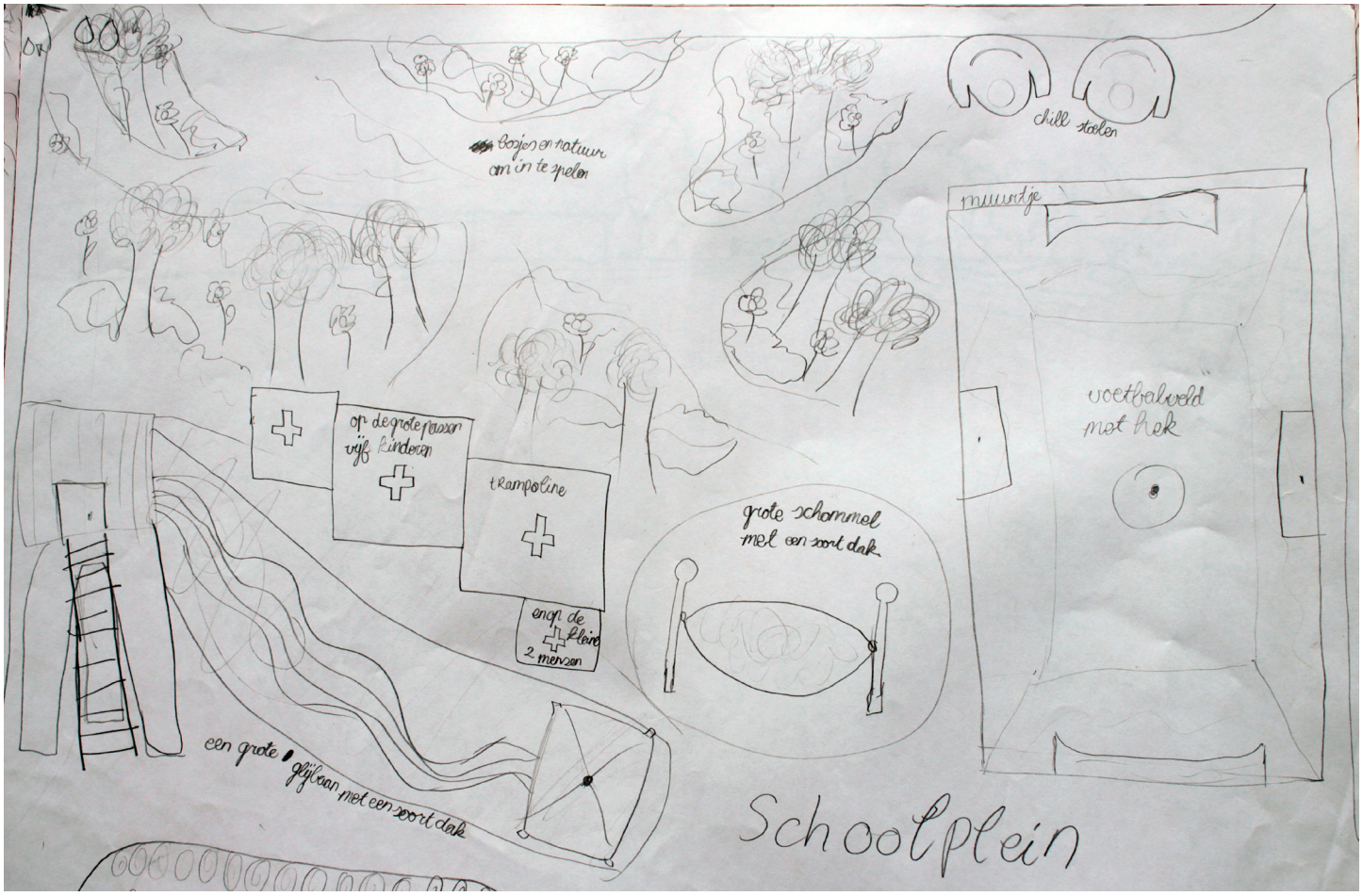


Fig. 7.5 - Plan drawing by Frederiek for the yard of De Klim primary school in Lunetten, Utrecht.

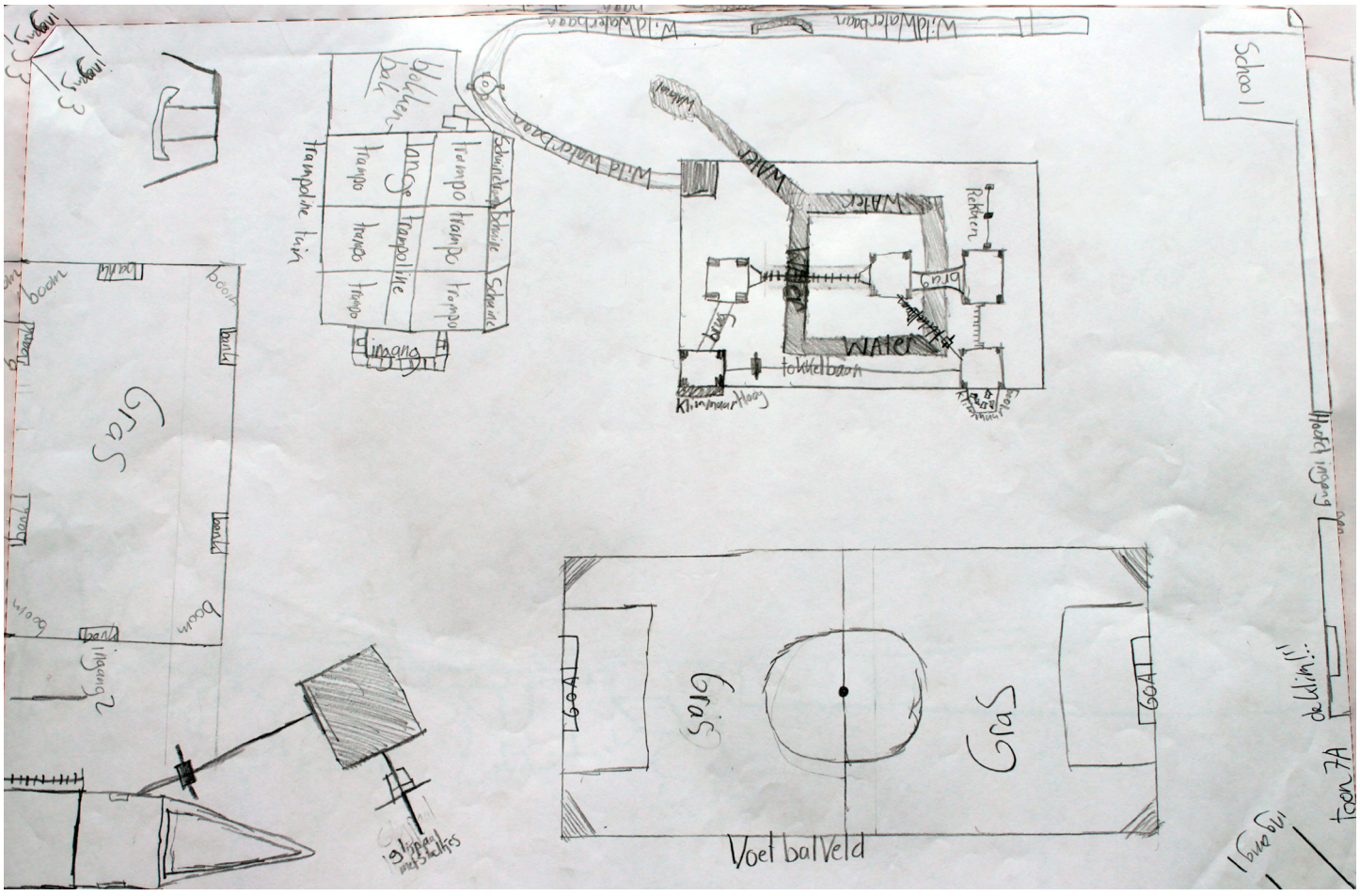


Fig. 7.6 - Plan drawing by Toon for the yard of De Klim primary school in Lunetten, Utrecht.

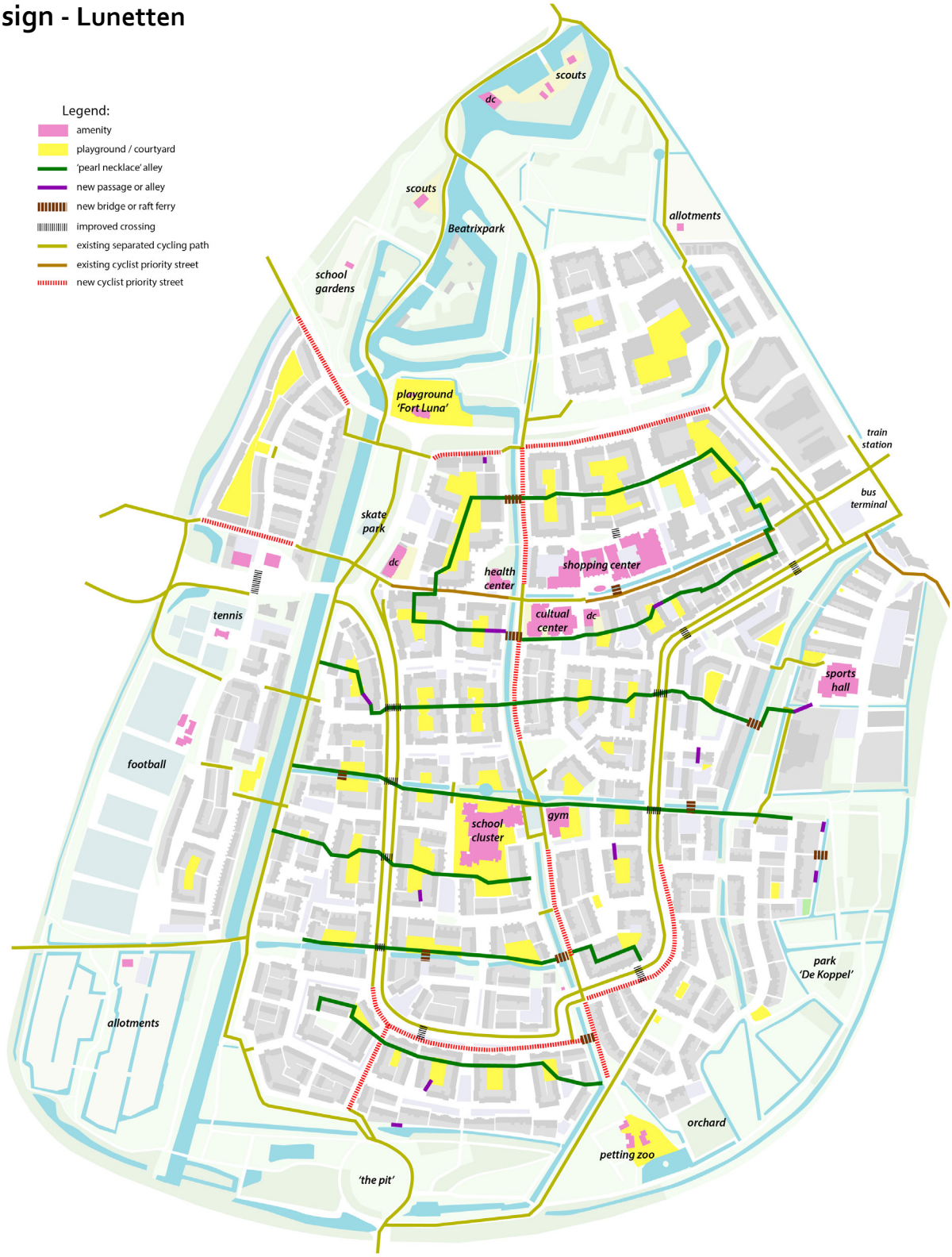


Fig. 7.7 - Plan of proposed interventions in the urban structure of Lunetten.

Interventions in the urban structue

Lunetten already has a quite extensive 'secondary network' of alleys and footpaths connecting its many play spots. However, as this network was not completely fixed during the initial planning of Lunetten, it is not continuous throughout the entire neighbourhood. Some residences in Lunetten have two 'front doors'; one official entrance on the street side for visitors from outside the neighbourhood, and a more personal entrance on the courtyard for children and neighbours. Through a number of interventions the value of this secondary network as a facilitator of play and social life may be safeguarded and improved.

From the Space Syntax analysis it can be concluded that the urban fabric of Lunetten facilitates movement in the north-south axis better than movement

on the east-west axis. To better facilitate movement on the east-west axis it is suggested that the 6 main alleys/pathways connecting most of the courtyards of the neighbourhood be improved, extended and differentiated. It is further suggested that the municipality extend the existing cycling infrastructure by turning interstitial mixed-use roads into cycling priority streets, creating a robust network spanning the entire neighbourhood.

Improvement: While the secondary network clearly exists, there are no pedestrian crossings where it intersects with the ring road. Such crossings could be included in future renovations of the road. Other improvements to the alleys and pathways could include allowing residents to put windows in their side walls, assigning space for wall paintings, and planting vines in front of other blind walls. Residents along each path could chose a name or theme for their "pearl necklace". The use of harmonious elements or materials may give each necklace its own recognizable character. As was described in the theory chapter of this thesis, children are creators of local knowledge & culture. Thus it seems natural to let the children themselves develop a narrative for their own necklace, which may be translated into a physical concept with the help of adult residents or a design professional.

Extension: At certain places the network can easily be extended by opening a gate or passage, while at other places it would require adding a pedestrian bridge or raft ferry. In the case of the northernmost 'pearl necklace' such additions would result in a circular pathway connecting most of the residential courtyards of northern Lunetten. In other cases it would increase the interconnectedness of the pearl necklaces, or improve accessibility of the parks surrounding the neighbourhood.

Differentiation: By minimizing repetition of play-elements along the east-west alleys these 'play stretches' become more interesting to explore. As some of the courtyards are also interconnected on the north-south axis, repetition should also be minimized in this direction. Local children should be involved in deciding what type of play should be facilitated in a specific courtyard. Ideally the design concept for each location would be unique – to create a diverse landscape with many possibilities for play – while at the same time relating in some way to the theme or narrative of the necklace.

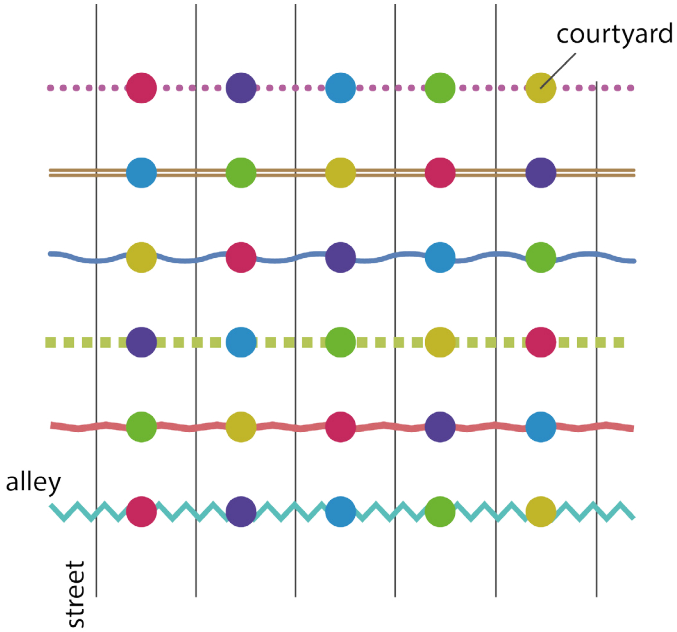


Fig. 7.8 - Concept for the diversification of alleys and courtyards.

Fig. 7.9 - Map showing proposed interventions in the public spaces of Lunetten.

Interventions in public spaces

The secondary structure connecting the courtyards of Lunetten somewhat resembles the 'interstitial play network' which Lefaibvre argues for. The spatial innovations which give shape to this network, however, had not fully matured yet when Lunetten was conceived. Many spaces lack social control due to blind plinths or tall garden fencing. Due to such oversights in design and regulation some of the alleys, courtyards and raised pedestrian spaces fail to achieve their potential as safe and engaging play environments.

Courtyards - The semi-public courtyards surrounded by a mix of town-housing and small apartment blocks in the central part of Lunetten are quite successful. To protect the quality of these spaces for play and social interaction it is important that enough residents maintain some form of inter-visibility or permeability between their private gardens and the semi-public courtyards. While most courtyards are

faced by open gardens from at least two sides, there is still room for improvement. Only in a few cases does a majority of gardens have an open relationship with the courtyard. Some suggestions may be given to the residents on the relation between private and semi-public space the permeability and inter-visibility of garden fencing, hedges or shrubbery.

The smallest courtyards seem to lack any social activity. This may be due to the narrow, enclosed feeling which results from a lack of visual depth, and the uniformity of these spaces and their surrounding sheds. When the distance between facing sheds on a courtyard becomes very small (around 15 m), these sheds start to dominate the landscape. Especially children, who's eye level is much lower, will have their sky decreased. It should be no surprise that tiny rectangular enclosed spaces – without plants or animals – are of no interest to children. The improvement of such spaces requires the joint effort of residents and the municipality. Shared bike parking facilities may relieve the need for private sheds, which in turn leaves more space for open connections between the public and private domain. Residents could be encouraged and supported to create a more enticing play environment in these smaller courtyards, for instance by planting different layers of ground cover, shrubs and trees. The municipality of Utrecht announced in 2018 that it planned to construct a number of 'tiny forests' in the city. The smaller, underused courtyards of Lunetten could likewise be transformed into mini parklets. By using plants as design elements these spaces will change character throughout the year.

The larger courtyards in the north of the neighbourhood (1a,b,c&d) also lack oversight and social activity. The size, shape and character of these courtyards and their surrounding architecture is different in each case, but they also have commonalities; for the most part they are surrounded by stacked appartments and maisonettes – some of which are located on top of parking garages.

The size of courtyards 1a, 1c and 1d allows for the addition of small structures, which may help to improve the level of social activity and oversight. Next to small ground-bound residences for ageing residents of the neighbourhood such structures could also be used to create unique play environments by bridging the ground level of the courtyard with the private gardens on top of the parking garages.
Courtyards 1a, b and c are elongated spaces, and are comprised of two or three distinct yards (fields). Courtyards 1a and 1c have a fairly public character and are also used by residents of neighbouring blocks. Through differentiation and a more clear demarcation these smaller yards – which are about the same size as the courtyards in the central part of Lunetten – may become semi-public spaces, inticing residents to appropriate them as their 'block garden'.

Courtyard 1b is much narrower than the other courtyards in the north of Lunetten. Its simple rectangular shape may allow the addition of a roof spanning the courtyard, turning the block into a small biosphere. This response to climate change has the potential to add a uniquue play environment - also for the colder months of the year - to the urban landscape.

Squares and streets - There are five distinct areas of the urban public space in Lunetten which lack oversight from surrounding buildings during most or all of the day. This includes the space between the school cluster and the gym (1), a play square and spaces surrounding the adjacent high school (2), a parking street under a raised pedestrian street (3), a parklet next to the health centre (4), and the space surrounding a student housing complex (5). Due to blind plinths, tall hedges, overgrowth or a domination by parked cars these places have become devoid of social life. It is suggested that these areas be redesigned separately – including the surrounding blind plinths – to create unique and vibrant spaces which add to the diversity and character of the neighbourhood. Child-friendly spatial characteristics should be taken into account in the re-design of these places.

Parks - The comparison of the maps of former and current children showed that certain parts of the parks surrounding Lunetten have over time become less popular play sports. Two interventions are proposed to increase the attractiveness of these areas to children.

A section of the eastern part of Park de Koppel (I) is a wet, overgrown, shadowy forest. This ecologically valuable area is exceptionally suited for building tree huts. Children could be allowed to construct there using (locally sources) natural materials, thus minimizing the impact on the natural character of the place.

The allotment gardens in the south-west of Lunetten have a lot to offer, but are unknown to many children of the neighbourhood. By integrating the gardens into the surrounding park, more children may be enticed to explore this local food production landscape.

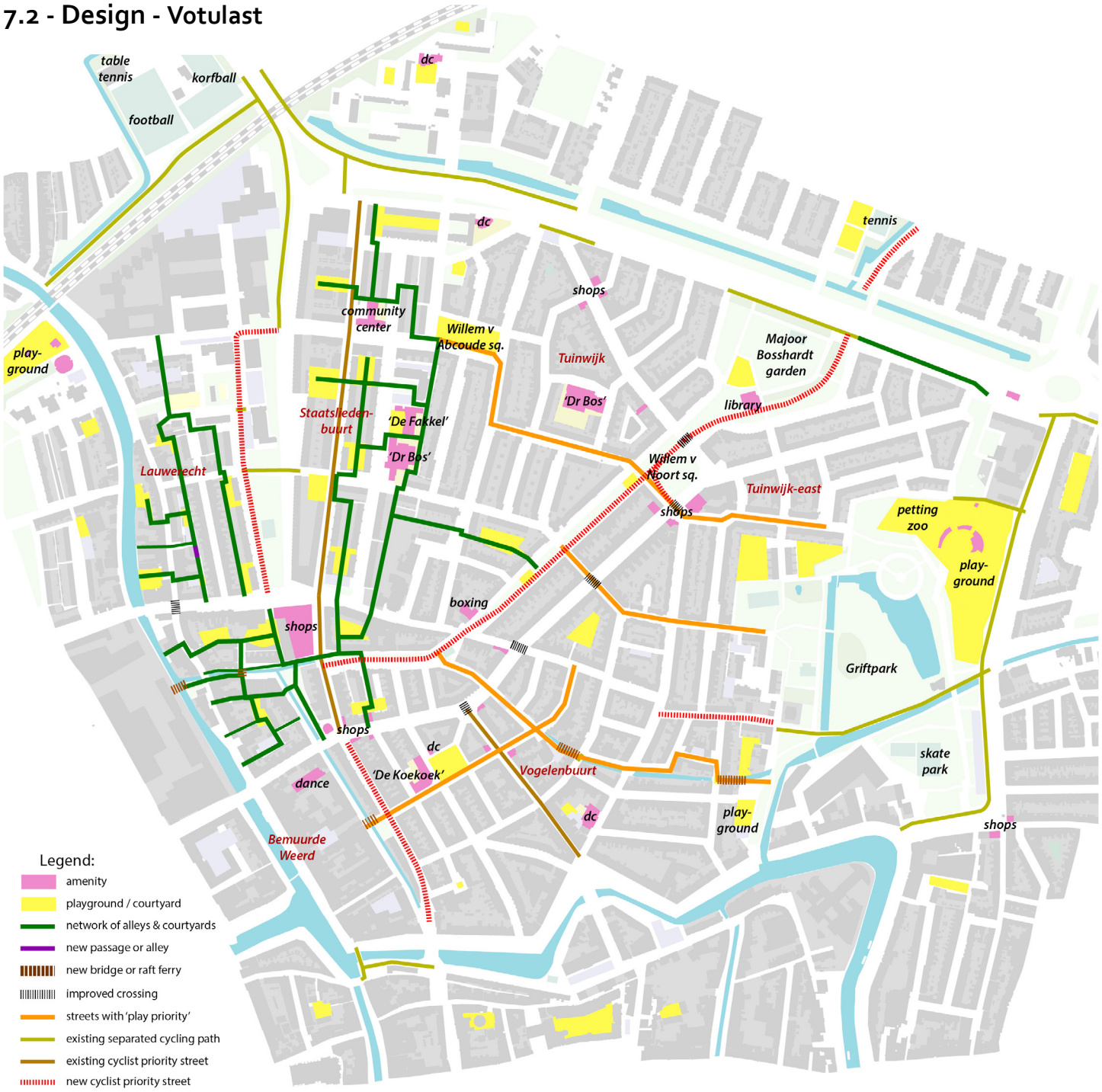


Fig. 7.10 - Plan of proposed interventions in the urban structure of Votulast.

Interventions in the urban structue

The 'secondary network' of alleys and footpaths connecting play spots is less prevalent in Votulast. Only in the most western 'buurt' Lauwerecht exists a network of open courtyards which is somewhat popular among children. Some of these courtyards, however, are currently unappealing car parks. It is suggested that the quality of these spaces be improved by gradually removing parking spaces and creating openings in surrounding blind plinths, placing them back into the social structue of the neighbourhoood.

In the neighbouring Staatsliedenbuurt there are alleys connecting pocket parks and courtyards as well, but many have been fenced off. By opening these passages the secondary network would expand considerably - giving children more autonomy, and allowing them to approach friends and neighbours from the more private back yard.

There is no network of semi-public spaces in the rest of Votulast. Here children have no choise but to play on the street. The play spots of these 'buurten' can be connected by minimizing car traffic in certain streets.

Fig. 7.11 - Map showing proposed interventions in the public spaces of Votulast.

Interventions in public spaces

Courtyards - In addition to the courts of Lauwerecht, it is suggested that the structure of the communal gardens of the housing on Nolenslaan should be maintained in case the buildings themselves are torn down.

Squares and streets - A cluster of three spaces near two schools in the Staatsliedenbuurt (1) has the potential to become a dynamic play landscape, if the central courtyard is opened and its plinth enlivened. The open residential block along the Griftpark (2) only needs a small investment in its play square. The same holds true for the blind plinth of an apartment complex in the north (3). The office park (4) should become more functionally mixed.

Parks - The central axis leading from the Zwarte Water in the west to the Majoor Bosshardt Gardens in the north-east has the potential to become a 'green promenade'. One of its parallel streets may be turned into a cyclist priority street, and its standardized fenced playgrounds may be replaced by a more diverse natural play environment. A playful redesign of the centrally located Willem van Noort square may help children make friends from other buurten.

8 - Conclusion

How can urban public space stimulate children to play outside, make more (diverse) friends, participate in a democratic society, and make contact with different aspects of the urban landscape?

The main research question of this thesis is multi-faceted, and likewise does not have a singular answer. Clues were found in literature as well as in empirical research which make it possible to begin to formulate strategies for the integration of children into a diverse and democratic urban landscape. Some important findings are discussed in the following sections. The scheme on the right condenses notions relating to child play into three socio-spatial scales.

The results of this thesis indicate that spatial characteristics of the environment near residences are more influential on the play of children in public space than non-spatial factors such as going to school by oneself, or living in an area where the percentage of children is larger than 20%. As the sample sizes used in the empirical research for this thesis were sometimes quite small (n=26 or 28), it is too early to draw definitive conclusions on the size of the effects of spatial characteristics on the play of children in public space. A statistical analysis does, however, hint at the existence of such effects. Especially the presence of courtyards or parks near the residence seems beneficial to the social life of children, resulting in one to two additional neighbourhood friends, and a doubling of their spatial reach respectively. Positive effects of such spatial typologies on the outside play of children are also reported by other studies. The data further points to possible correlations between spatial characteristics of the environment near residences and the geographical spread of neighbourhood friends.

By comparing the observed activity of children to the particular underlying spatial characteristics further possible constraints on play in public space were found in the permeability of surrounding plinths (the inter-visibility between public and private space), and in the absolute size of play spaces. Children seem to prefer public spaces where the transition between the public and private domain is gradual, and which are not so small that they lack use or exploration value, or so large that they become anonymous. This means that – if these constraints are shown to hold true in future research – the presence of play spaces in the vicinity of residences in itself does not guarantee child play in those spaces.

According to the popular literature cited in the problem definition the situation of children in modern cities is dire. The results presented in this thesis, however, paint a more nuanced, sometimes even positive picture of urban childhoods. While the self-reported spatial reach of a significant number of participating children was quite limited, the results do not support the notion – as put forth by urban geographer Lia Karsten – that children under the age of 10 today generally do not play outside unaccompanied, and that children of different backgrounds do not play with each other any more.

The self-reported neighbourhood maps of former residents who were approximately 10 years old in 1996 are comparable to those of children of the same age today. While the number of participating former residents was too low for a statistical analysis, the maps do not show signs of a 'shrinking childhood' during the past 20 years in the neighbourhoods Votulast and Lunetten. To the contrary, the spatial reach of children in Votulast seems to have increased due to the opening of a large park on the eastern side of the neighbourhood. These results indicate that the phenomena of the 'shrinking childhood' is not a continuous process, and that it may be halted or even reversed through spatial interventions.

In both urban and suburban settings a majority of children indicates that they play outside without supervision. Nearly half of the children observed by the author in public space were unaccompanied. Children as young as two or three years old were cycling on their bikes with training wheels – outside the view of their parents. Such an early attainment of spatial autonomy is only possible when the border between the private and public domain is permeable, and if parents are willing to extend such freedoms. An open relation between a garden and courtyard gives children the opportunity to play in spaces with different degrees of privacy, and enables them to make decisions about going out or returning home, taking or returning a bike or toy, or to ask a friend to come play outside.

Most of the children who took part in the mapping workshops reported that they have multiple friends from their neighbourhood who attend a different school. As Dutch schools have a higher level of segregation than neighbourhoods themselves, the chance that a neighbourhood friend who attends another school is from a different cultural or socio-economic background is relatively high. As spatial characteris-

Fig. 7.12 - The developmental phases of childhood can be linked to different socio-spatial scales. The intermediate scale of the 'Buurt' is less known in the anglophone world, but corresponds more or less to the reach of 9 and 10-year old urban Dutch children as found in this study. As children grow older the size of their activity space increases, and the character of their play changes. As their spatial reach increases, so should the diversity of the landscape.

tics are shown to influence the opportunities for children to make friends in their neighbourhood, professionals have the opportunity to create places which foster cross-cultural friendships. Urban design may thus contribute to the integration of diverse groups into a democratic urban society by creating a more playful environment.

Finally it should be emphasized that in order for many adults to be able to design spaces with and for children, a shift in thinking has to take place about the place of children in urban public space. That is why this chapter concludes with a short - by no means exhaustive - list of easy to remember bullet points.

'Public space as children's space' is where children:

- are seen as natural
- are respected as full human beings
- are valued for their problem solving capabilities
- are given agency through real experiences
- have the freedom to roam
- have places to hide or seek shelter
- have access to diverse play materials & friends
- can have 'fire, wind, dirt and water' experiences
- can interact with animals in their natural habitat
- can grow and harvest food
- can learn about trades & the economy of the city
- can learn about the relationship city-countryside

9 - Discussion

The conclusions of this thesis put some popular municipal policies to create child-friendly neighbourhoods into question. Instead of using quantitative guidelines for play spaces, maintaining a high percentage of family households and creating 'safe school routes', municipalities may achieve better results through insuring access for children to urban parks, and by stimulating the revitalization and proliferation of small-scale spaces in the vicinity of residences such as courtyards, 'pocket parks' and 'play squares' – interconnected through alleys, pedestrian bridges and passages.

Architects and adult residents often do not recognize spatial characteristics which benefit children. Municipalities should thus create awareness of such qualities, and implement policy guidelines which aim to benefit children. The results of this study and those of others may...

As the population of children in high-density urban neighbourhoods increases, so does the demand for adequate play spaces. In historical neighbourhoods there are typically a lot of fragmentary spaces such as (parking) courtyards, dead-end streets, alleys and passages. As such spaces are of little apparent use to most adults, they have sometimes been closed off, and are frequently left unattended or unmaintained. By ensuring that such spaces remain public, and that there is some inter-visibility between the public and private domain, municipalities can improve the child-friendlyness of these neighbourhoods. The playgrounds of Aldo van Eyck can function as inspiration for how to integrate child play into a dense urban fabric.

On the quality of the mapping workshops

The data generated through the self-reporting mapping workshops seems to be corroborated by on-site observations. There is, however, plenty of room for improvement of this technique. As they had to take place before the summer break the workshops were somewhat hastily prepared. If the approach is to be repeated, it may be improved by the addition of certain aspects which were overlooked.

The omission of queries relating to organized social activities such as spots, scouting or other clubs means that this important part of the social life of children in their neighbourhood remained invisible.

As many of the participating school children did not have knowledge of cartographic norms it proved challenging to instruct them to draw their maps in such a way that they would be legible and comparable to each other for the author. The quality of the data generated by the workshops may improve if the students are given examples or if they are introduced to the concept of a map key beforehand. It is also important ask questions which are not open to interpretation.

When the author asked a group of students to indicate the area where they *dared* to play outside, a teacher countermanded this by asking the students to indicate the area where they were *allowed* to play. Such situations may be averted by communicating the goals of the study more clearly to the teachers of the participating classes.

On the reproducibility and scope of the study

In order to understand if the spatial effects are truly as significant as indicated in this thesis it would be prudent to include in future research areas with similar spatial configurations, but from different cultural contexts. While the two neighbourhoods which were analysed for this thesis are typically Dutch, the small-scale spatial configurations which one can find there are universal. The semi-public courtyards of Utrecht do not radically differ from the smaller squares found in Mediterranean cities, Chinese Hutongs, or by extension even North-American cul-de-sacs. It thus seems feasible to repeat this study in widely different places, which will undoubtedly yield more information on spatial and cultural constraints on child play in public space.

The scope of this thesis was limited to two examples of Dutch urban planning typologies: one mostly pre-second world war urban neighbourhood, and one structuralist '70s' suburb. Within the Netherlands, however, many other typologies exist. Two other typologies which dominate the Dutch urban landscape are the post-war modernist high-rise developments, and the post-modern suburbs of the liberalised market of the 1980s onward. To get a more comprehensive perspective of the public life of urban children it would be vital to include such neighbourhoods in future research.

On the need for child-inclusive urbanism

The author implores the academic community in the fields of urban design, architecture and planning to include child-friendlyness as an integral part of the curricula of bachelors and masters courses, and to re-evaluate existing strategies for research and design of the urban environment on their applicability and added value to children. Spare a few mining towns and prison colonies, children are part of every urban environment. It is only natural that the demands of children receive full attention of the professionals who are in charge of the design of their 'third socializing factor' – the neighbourhood.

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School	siblings	elder s.	younger s.	independ.	transp.	No. of	route to	indep.	total	school	neighb.	concentration	access to	access to	access to	'buurt'	% U14 near
Koekóek	< 8y dif	< 5 yo	< 5 yy	to school?	mode	homes	school (m)	reach (ha)	friends	friends	friends	of friends	large park	courtyard	square		residence
Girls																	
v_M1	2	0	1	no	bike	1	748	40.3	14	7	7	medium	yes	no	no	g	20-25
v_M2	2	0	1	yes	foot	1	580	57.7	9	5	4	high	yes	no	no	g	15-20
v_M3	1	0	1	yes	foot	2	670	82	12	6	6	medium	no	no	yes	g	15-20
v_M4	1	0	1	yes	foot	1	94	106	9	5	4	medium	no	no	yes	v	15-20
v_M5	1	0	1	yes	f/b	1	405	129	13	11	2	medium	yes	no	no	v	15-20
v_M6	2	0	2	yes	bike	1	813	99	19	11	8	high	yes	no	no	g	20-25
v_M7	0	0	0	yes	f/c	2	1351	46.5	13	9	4	high	no	no	no	v	15-20
v_M8	1	0	1	yes	foot	1	77	41.4	10	10	0	-	no	no	yes	v	7 – 10
v_M9	2	1	1	yes	foot	1	87	11.5	9	6	3	medium	no	no	yes	v	10-15
v_M10	3	1	2	yes	bike	2	1249	242	17	6	11	low	yes	no	no	p/w	2 – 4
v_M11	0	0	0	no	b/c	1	1410	23.8	16	11	5	high	no	no	yes	p	2 – 4
v_M12	1	0	1	yes	foot	1	631	44	18	15	3	medium	no	no	yes	t	15-20
v_M13	1	0	1	no	bike	1	563	?	7	6	1	-	no	yes	no	l	7 – 10
v_M14	1	1	0	no	f/b	2	1459	38.7	12	5	7	low / medium	no	no	yes	v/c	10-15
v_M15	2	1	1	no	f/b	1	317	10.3	14	11	3	low	no	no	no	v	7 – 10
v_M16	1	1	0	yes	f/b	1	886	24.5	4	2	2	high	no	no	yes	p	10-15
v_M17	2	0	2	?	f/b	1	374	13.4	2	2	0	-	no	no	no	v	7 – 10
Boys																	
v_J1	2	0	2	yes	f/b	1	551	38.2	5	4	5	low	yes	no	no	g	15-20
v_J2	0	0	0	no	foot	1	225	37.6	2	5	2	medium	no	no	no	v	10-15
v_J3	0	0	0	yes	f/b	1	366	5.6	0	3	0	-	no	no	no	c	2 – 4
v_J4	1	1	0	yes	foot	1	128	55	1	4	1	-	no	no	no	v	7 – 10
v_J5	1	1	0	no	foot	1	529	200.7	0	3	0	-	no	no	no	l	10-15
v_J6	0	0	0	yes	bike	1	335	0.7	1	0	1	-	no	no	no	c	2 – 4
v_J7	1	0	1	no	foot	1	160	18	3	4	3	high	no	no	yes	v	10-15
v_J8	1	1	0	no	bike	1	836	54.6	2	4	2	low	no	no	no	c	7 – 10
v_J9	2	0	2	no	foot	1	164	8.6	0	7	0	-	no	no	no	v	4 – 7
v_J10	1	1	0	yes	foot	1	272	13.9	0	7	0	-	no	yes	no	v	7 – 10
v_J11	0	0	1	no	car	1	2238	52.6	4	1	4	medium	yes	no	yes	oo	10-15
v_J12	0	0	0	no	b/c	1	2825	?	3	5	3	medium	no	no	yes	td	7 – 10

School	siblings	elder s.	younger s.	independ.	transp.	No. of	route to	indep.	total	school	neighb.	concentration	access to	access to	access to	'buurt'	% U14 near
Fakkel	< 8y dif	< 5 yo	< 5 yy	to school?	mode	homes	school (m)	reach (ha)	friends	friends	friends	of friends	large park	courtyard	square		residence
Girls																	
v_M19	2	0	2	yes	foot	1	238	56.2	13	9	4	low	no	no	no	t	15-20
v_M20	0	0	0	yes	bike	1	1218	49.2	8	8	0	-	yes	no	no	c	10-15
v_M21	2	0	2	yes	b/c	1	273	58.4	8	8	0	-	no	no	yes	t	15-20
v_M22	1	1	0	no	foot	1	281	68.9	10	10	0	-	no	no	yes	t	15-20
v_M23	2	1	1	yes	foot	1	261	19.3	16	15	1	-	no	no	yes	s	15-20
v_M24	1	1	0	yes	foot	1	561	36.7	3	3	0	-	no	no	no	l	7 – 10
v_M25	0	0	0	yes	foot	1	349	7.2	10	9	1	-	no	no	no	t	15-20
v_M26	0	0	0	yes	foot	1	317	6.3	8	8	0	-	no	no	yes	t	15-20
v_M27	2	2	0	yes	bike	1	936	104	17	12	5	medium	yes	no	no	v	10-15
v_M28	0	0	2	yes	bike	1	978	30.1	27	14	13	medium	no	no	no	v	10-15
v_M29	1	0	1	yes	f/b	1	298	16	2	0	2	medium	no	no	yes	t	15-20
v_M30	0	0	0	yes	bike	1	1044	14.7	8	3	5	high	no	yes	no	p	10-15
v_M31	1	0	1	no	car	1	1955	4	3	0	3	medium	no	no	yes	on	15-20
v_M32	2	0	2	yes	bike	1	840	9	6	6	0	-	no	no	no	p	15-20
v_M33	1	0	1	no	f/b	2	771.5	?	10	9	1	-	no	no	yes	on	10-15
v_M34	1	1	0	no	bike	1	1347	6.1	8	8	0	-	no	no	no	p	7 – 10
v_M35	1	1	0	yes	bike	1	1285	93.2	4	3	1	-	no	no	yes	p	10-15
Boys																	
v_J13	2	0	2	yes	bike	1	807	73.3	5	4	1	-	no	no	no	p	10-15
v_J14	1	1	0	yes	bike	1	1001	74.4	9	7	2	low	yes	no	no	t	15-20
v_J15	2	0	2	yes	f/b	1	286	42.1	4	4	0	-	no	no	no	s	10-15
v_J16	1	1	0	yes	foot	1	108	15.2	11	3	8	medium	no	yes	yes	t	15-20
v_J17	1	1	0	yes	foot	1	363	8.3	10	4	6	high	no	yes	no	l	7 – 10
v_J18	1	0	1	yes	b/c	1	302	52.9	6	6	0	-	no	no	yes	t	15-20
v_J19	1	1	0	no	b/c	1	1272	11.7	10	4	6	medium	no	no	yes	p	7 – 10
v_J20	1	1	0	yes	bike	2	1301.5	30.3	14	14	0	-	no	no	yes	o	10-15

School	siblings	elder s.	younger s.	independ.	transp.	No. of	route to	indep.	total	school	neighb.	concentration	access to	access to	access to	'buurt'	% U14 near
Spits	< 8y dif	< 5 yo	< 5 yy	to school?	mode	homes	school (m)	reach (ha)	friends	friends	friends	of friends	large park	courtyard	square		residence
Girls																	
M1	1	1	0	no	foot	1	288	14.5	21	12	9	high	no	yes	no	l-n	15-20
M2	1	1	0	yes	f/b/c	1	393	175.1	19	17	2	low	no	yes	no	l-n	10-15
M3	0	0	0	yes	bike	1	497	19.8	11	7	4	medium	yes	no	no	l-z	10-15
M4	0	0	0	yes	foot	1	226	30.1	15	10	5	high	no	yes	no	l-w	15-20
M5	1	0	1	yes	foot	1	321	14.2	10	8	2	high	no	yes	no	l-w	15-20
M6	2	2	0	no	foot	1	408	4.1	19	13	6	high	no	yes	no	l-n	15-20
M7	1	0	1	yes	f/b	1	517	12.8	24	9	15	high	no	yes	no	l-z	10-15
M8	0	0	0	yes	bike	1	716	5.7	15	13	2	low	no	no	no	l-w	15-20
M9	1	1	0	no	f/b	1	460	3.9	7	5	2	high	no	yes	no	l-z	7 – 10
M10	1	0	1	yes	f/b	1	467	6.3	8	8	0	-	no	no	no	l-o	15-20
M11	1	1	0	yes	bike	1	1002	180.9	17	15	2	medium	yes	no	yes	l-w	10-15
M12	1	1	0	yes	f/b	1	452	7.9	12	11	1	-	no	yes	no	l-z	7 – 10
Boys																	
J1	3	1	2	yes	bike	1	678	87.6	21	14	7	high	yes	yes	no	l-n	10-15
J2	0	0	0	yes	f/b/c	1	432	66.2	15	13	2	high	no	yes	no	l-n	10-15
J3	1	0	1	yes	f/b	2	579	48	7	0	7	high	yes	yes	no	l-z	15-20
J4	2	1	1	yes	foot	1	519	11.1	5	4	1	-	no	yes	no	l-w	15-20
J5	0	0	0	?	f/b	1	389	39	11	10	1	-	no	no	no	l-o	15-20
J6	0	0	0	yes	f/b	1	678	34.5	9	6	3	high	yes	yes	no	l-n	10-15
J7	1	1	0	yes	foot	1	456	68	13	10	3	low	no	no	no	l-z	10-15
J8	1	1	0	yes	bike	1	925	180	9	8	1	-	yes	no	no	l-o	25-30
J9	1	1	0	no	bike	1	1201	180	6	6	0	-	yes	no	no	l-o	7 – 10
J10	0	0	0	yes	f/b	1	560	180	7	7	0	-	yes	no	no	l-w	10-15
J11	0	0	0	yes	foot	1	327	299	12	12	0	-	no	no	no	l-o	15-20
J12	0	0	0	yes	f/b	1	561	28.8	6	6	0	-	no	no	no	l-n	7 – 10
J13	1	0	1	yes	f/b/c	1	909	12.6	12	8	4	high	no	no	no	l-o	25-30
J14	1	0	1	yes	b/c	1	743	180	9	5	4	low	yes	yes	no	l-z	10-15

Klim	< 8y dif	< 5 yo	< 5 yy	to school?	mode	homes	school (m)	reach (ha)	friends	friends	friends	of friends	large park	courtyard	square		residence
Girls																	
M13	2	1	1	yes	bike	1	370	180.9	22	10	12	medium	yes	yes	no	l-w	10-15
M14	1	0	1	yes	bike	1	1690	301	12	9	3	low	yes	no	no	h	20-25
M15	0	0	0	yes	f/b	1	514	172.2	10	8	2	high	no	yes	no	l-o	10-15
M16	1	0	1	yes	bike	1	363	7.8	6	6	0	-	no	yes	no	l-o	15-20
M17	1	0	1	yes	f/b	1	689	182.6	4	4	0	-	yes	no	no	l-z	7 – 10
M18	2	1	1	yes	foot	1	353	6.3	6	6	0	-	no	no	no	l-z	15-20
M19	0	0	0	yes	bike	1	1269	6.4	5	5	0	-	no	no	no	h	20-25
M20	1	0	1	yes	foot	1	154	9	9	4	5	medium	no	yes	yes	l-c	15-20
M21	1	0	1	?	bike	1	2460	?	8	5	3	medium	no	no	yes	h	20-25
Boys																	
J16	1	0	1	yes	bike	1	413	31.6	16	5	11	high	no	yes	no	l-c	15-20
J17	1	1	0	yes	bike	1	1058	323	17	13	4	low	yes	yes	no	l-n	7 – 10
J18	1	0	1	yes	bike	2	587	31.1	7	3	4	high	yes	no	yes	l-o	10-15
J19	1	0	1	yes	f/b	1	239	87	7	5	2	low	no	no	no	l-z	10-15
J20	1	1	0	yes	bike	1	2117	145.2	12	9	3	low	no	no	no	h	4 – 7
J21	1	1	0	yes	bike	1	860	61.6	13	12	1	-	no	no	no	l-w	15-20
J22	0	0	0	yes	bike	1	794	11.1	9	7	2	low	no	yes	no	l-n	10-15
J23	1	0	1	yes	foot	1	233	?	5	1	4	high	no	yes	no	l-c	15-20
J24	1	0	1	yes	bike	1	945	9.5	14	10	4	medium	yes	no	no	l-o	25-30
J25	1	0	1	yes	bike	1	828	184.3	8	5	3	low	yes	no	no	l-w	15-20
J26	1	0	1	yes	f/b	1	501	10.4	9	5	4	high	no	yes	yes	l-o	10-15
J27	1	1	0	yes	bike	1	498	?	9	4	5	medium	no	yes	yes	l-o	10-15

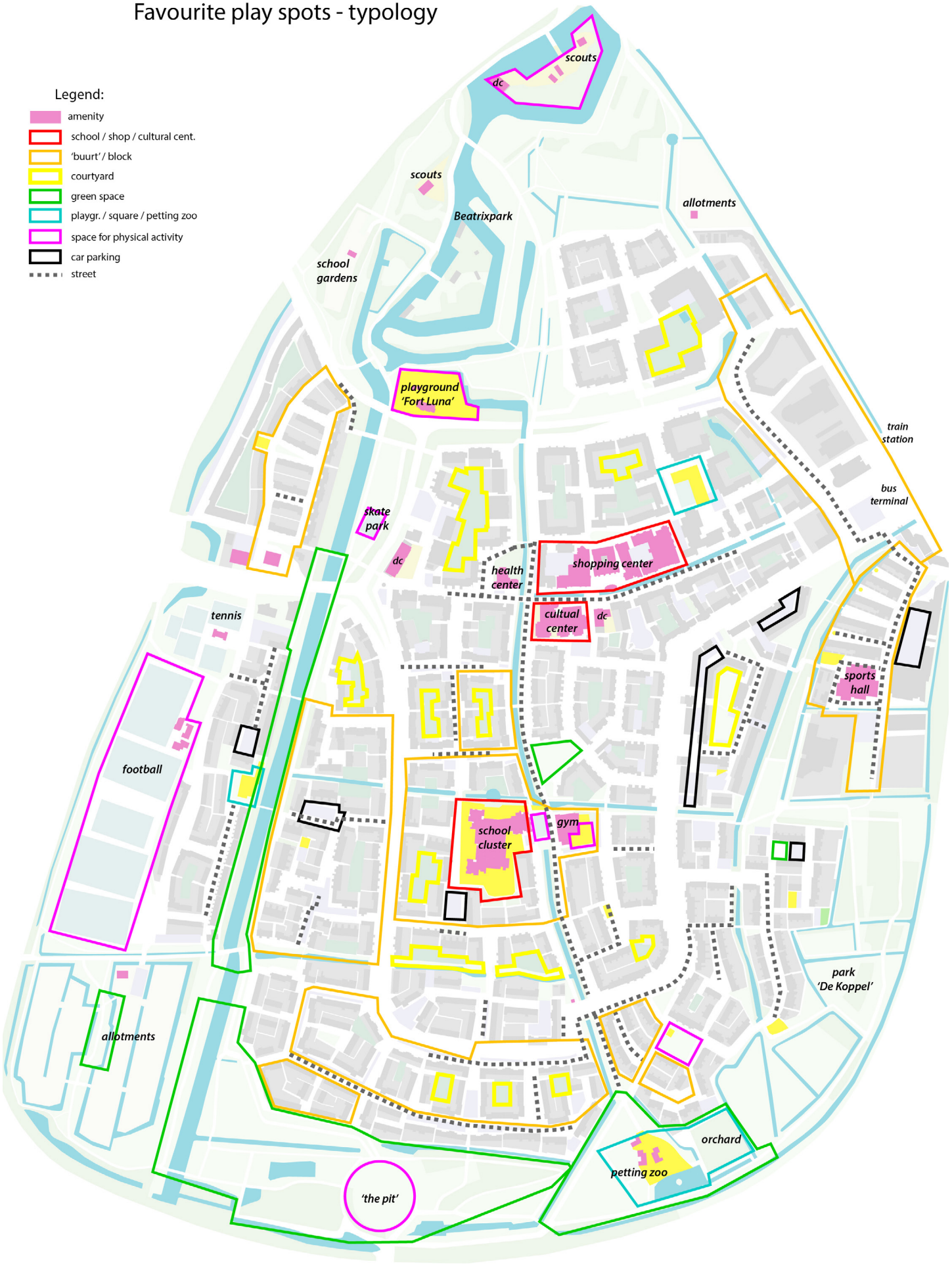
Appendix -

Maps

Plinth typology

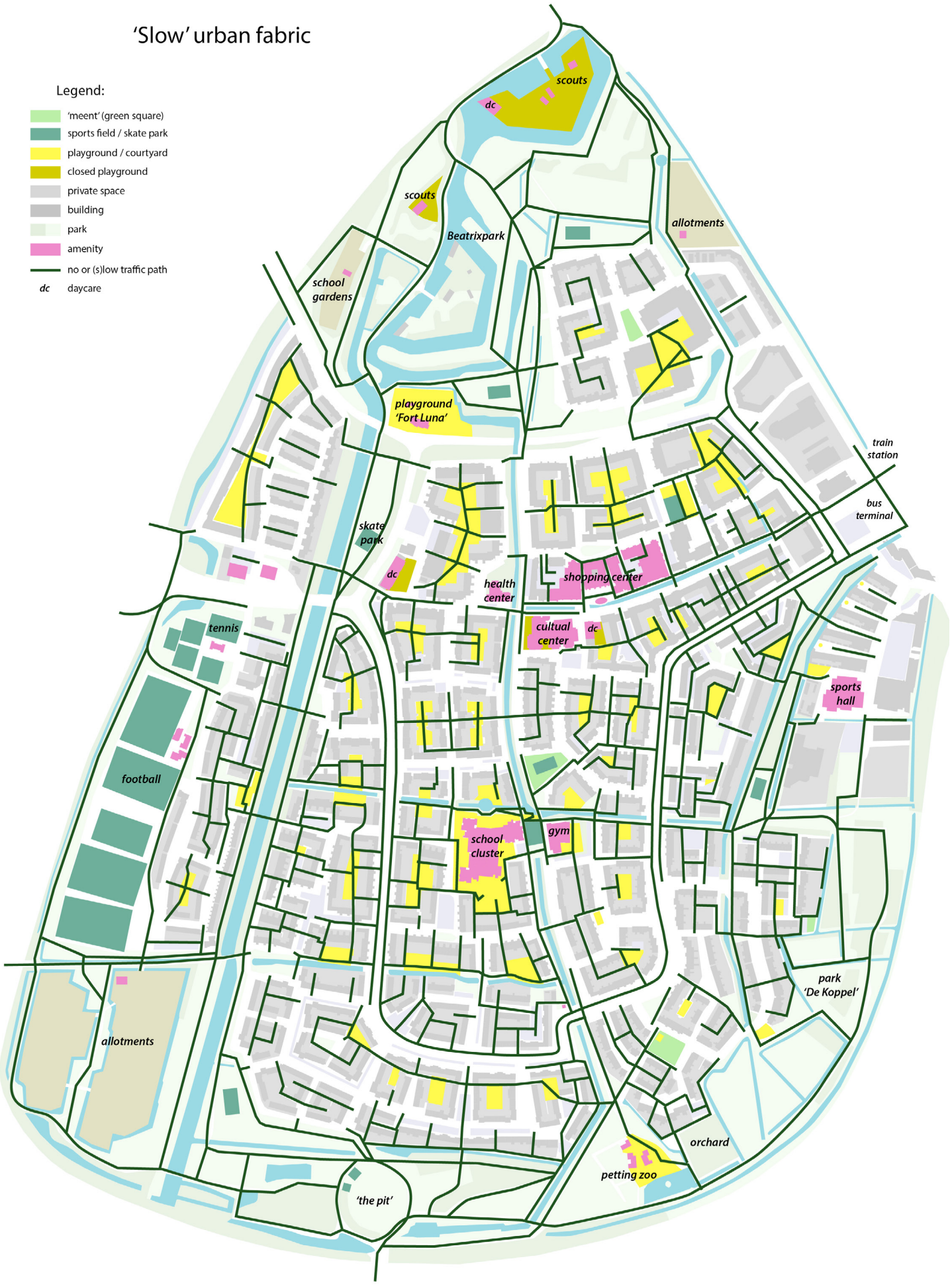

Legend:
courtyards:
with oversight, unaccompanied children
with oversight, accompanied children
with oversight, lacking children
lacking oversight, with children
lacking oversight, children
parking lot, lacking children
closed / outside research area
public space lacking oversight
unaccompanied apparent girl
unaccompanied apparent boy
accompanied child
no or low garden fence
high garden fence or hedge
blind plinth
temporally blind plinth
garage plinth
see-throuh fencing

Favourite play spots - typology



Favourite play spots - typology

‘Slow’ urban fabric



‘Slow’ urban fabric