Research Project

The UK's pursuit of more liveable streets: Have home zones been as successful as woonerven in creating liveable streets?

Matthew Chisnall

Oxford Brookes University

May 2021

Abstract

Currently, there is a growing concern for the environment, community, public health and safety in suburban areas. Addressing these concerns will help to create more liveable streets decreasing the current dominance of cars. As a comparison, a country that has excelled in this area and one which other counties look upon for inspiration, for their urban design and planning approaches is the Netherlands. A successful and widely implemented concept has been woonerven, or 'living streets'. Having been able to address the aforementioned concerns it has helped to transform their suburban streetscape to improve its liveability.

There has already been a lot or research undertaken in both the Netherlands and the UK to look at their respective concepts and how they have been able to deal with the challenges faced. This project will aim to look at the UK's concept (home zones) and its success of improving liveability by comparing it to the woonerf concept.

I will investigate this by using case study analysis to apply the four core design principles found in Dutch woonerven to identify their use in home zones. My second method will compare data collected in both a woonerf in The Hague and a home zone in Charlbury to assess the liveability of the streets through questionnaires to residents.

Overall, home zones have not been able to achieve the same level of liveability as seen on the streets of woonerven. This is as a direct result of poor legislation to support the concept in the UK planning system, this created a number of home zones which either adopted all of the necessary deign principles or very few of them. The knock-on effects created by this meant the streets were not able to achieve the main aim they were designed for; in turn, this led to a poor level of engagement by residents of their street..

List of tables

Table 1 – Home Zone Woonerf Policy Comparison

Table 2 – Liveability Characteristics

Table 3 – Framework

Table 4 – Case Study Analysis Table

Table 5 – Design Analysis Clark Street

Table 6 – Design Analysis Morice Town

Table 7 – Design Analysis Northmoor

Table 8 – Questionnaire

List of figures

Figure 1 – Conventional UK Street

Figure 2 – Home Zone Street

Figure 3 – Woonerf Sign

Figure 4 – Example Of A Woonerf

Figure 5 – Map Of Clark Street

Figure 6 – Cross Section Of Clark Street

Figure 7 – Cross Section Of Clark Street

Figure 8 – Map Of Morice Town

Figure 9 – Entrance To Morrice Town

Figure 10 – Cross Section Of Morrice Town

Figure 11 – Map Of Northmoor

Figure 12 – Entrance To Northmoor

Figure 13 – Cross Section Of Northmoor

Figure 14 – Entrance To Home Zone (Charlbury)

Figure 15 – Entrance To Woonerf (The Hague)

Figure 16 – Physical Barriers Cross Section (Charlbury)

Figure 17 – Physical Barriers Cross Section (The Hague)

Figure 18 – Shared Space Cross Section (Charlbury)

Figure 19 – Shared Space Cross Section (The Hague)

Figure 20 – Green Space (Charlbury)

Figure 21 – Bin (Charlbury)

Figure 22- Cycle Storage (The Hague)

Figure 23 – Plant Pots (The Hague)

Figure 24 – Map Of The Hague woonerf

Table of Contents

Chapter 1 **6**

1.1 – Introduction 6

1.2 - Aims and Objectives: 7

Chapter 2 - Literature Review **8**

2.1 - What are home zones and woonerven? 8

2.2 - What is liveability? 9

2.3 - Why are shared streets important? 11

2.4 - What are the design principles of a successful shared street? 11

2.5 - Framework: 13

Chapter 3 – Methodology **14**

3.1 - Introduction: 14

3.2 - Case Study Analysis: 14

3.3 - Case Studies and Case Study Selection: 14

3.4 - Primary Data Collection: 15

3.5 - Questionnaire: 15

3.6 - Ethics: 15

Chapter 4 - Case Study Analysis **15**

4.1 - Introduction: 15

4.2 -Case study 1 – Clark Street, Tower Hamlets, England 16

4.3 - Case Study 2 – Morice Town, Plymouth, England 18

4.4 - Case Study 3 – Northmoor, Manchester, England 20

Chapter 5 - Analysis of Survey Results **22**

5.1 - Introduction: 22

5.2 - Design Analysis: 22

5.3 - Questionnaire responses 26

Chapter 6 – Conclusions **30**

6.1 - Introduction: 30

6.2 - Key Findings: 30

6.3 - Reflections: 31

6.4 - Recommendations: 31

Appendices **32**

Bibliography **33**

Chapter 1

1.1 – Introduction

Streets form the largest percentage of public open space however, they are also one of the most underutilised spaces. As residents are a part of the street they live on “and where most of our children are reared and where most housewives and old people spend their lives, they are the most important part of our urban environment” (Appleyard, 1980). Currently, they are only seen as a pathway linking different destinations to one another and providing a route for a variety of different modes of transport. As said by Levitas, streets have become “links rather than a locus” (Levitas, 1986) and that they are “increasingly” designed more towards the car and mobility rather than providing a setting for social cohesion and interaction (Biddulph, 2003). This has been going on for a decade now and at some point will need to change.

The areas in front of people’s houses were historically where children played, or people met and talked, however, these seemingly normal past experiences are now limited; currently being dominated by parking (Appleyard, 1980). With ever more emphasis being placed on our environment, community and health these should be the fundamental reasons for the transformation of our streets into an integrated space for all members of the community to utilise.

To facilitate this transformation of streets, a new urban design and planning concept was introduced in the Netherlands during the 1970s, starting in Delft; the concept being woonerven. The exact translation means “residential areas”, it can be defined in English as “a road that is designed with special features to reduce the amount of traffic using it, or to make the traffic go slower” (Cambridge, 2020). However, this definition and translation can be interpreted differently. While having a variety of meanings, woonerven are also referred to as ‘living streets’. In a paper about liveable streets, Donald Appleyard stated that “The design philosophy of the woonerf is to create a kind of gestalt message that the street belongs to the residents” (Appleyard, 1980).

The important parts of the design philosophy included designing safe shared streets in which children can play without the risk of danger from cars. This was done by integrating all aspects of the street to create one uninterrupted street space; one space shared by all and accommodates many uses. The approach in the UK around the 1960s was to segregate streets. This then changed with home zones and woonerven. Woonerven designed streets to have a sense of place whereas the home zone’s main aim was to slow traffic and reduce traffic accidents (Paja, 2015). There has been more popularity around shared streets due to the success of woonerven and were becoming more common in parts of Europe (Appleyard, 2006). In light of the current pandemic, there has been a call to provide more open space where people can spend time outside. Many areas have now opened up streets to “socially responsible recreation” allowing people to use more of the streets than ever before(Vanderbilt , 2020). Having streets that can accommodate a variety of different uses helps make it more appealing to its community and ultimately helps to make it more liveable.

This project aims to directly compare the home zone strategy in the UK to its Dutch counterpart by assessing its impact on liveability within the UK streetscape. This is an area in which the woonerven have excelled and helps to bring together residents on their streets. This comparison allows us to have a better idea of improvements needed in terms of design and policy to make them more common in the UK planning system. There has not been any research into how home zones compare to other counties in their design and experience to understand how to improve them. My research aims to investigate if home zones have successfully improved the liveability of UK streets by comparing this to data collected in the Netherlands.

1.2 - Aims and Objectives:

Aim: Have home zones been as successful as the woonerf system in creating more liveable streets?

Objectives:

Objective 1: To identify the different design characteristics used to create a better user experience.

Objective 2: To develop a framework that identifies the factors which contribute to making a street more liveable.

Objective 3: To apply the framework to cases studies identified to evaluate different home zone strategies and their design features.

Objective 4: To identify what factors of home zones in the UK help to make streets more or less liveable.

Chapter 2 - Literature Review

2.1 - What are home zones and woonerven?

To explain what a home zone is, we first have to look at woonerven (singular woonerf). The concept of a woonerf was first introduced in the Netherlands in 1967 by Professor De Boer (Biddulph, 2003). Around the same time as another report had been commissioned by the Ministry for Transport (UK) about Traffic in Towns (Buchanan, 1963) as a way of improving urban mobility. This initial report by UK government helped to understand the balance between traffic management and the need to reduce noise, pollution, visual intrusion and the impact traffic had on pedestrians and residents (British Road Federation,1964). This inspired De Boer to use urban design to impact traffic through the use of traffic management. The initial concept of the shared street space was first implemented in Delft in the 1970s. Not long after, New Highways Regulations made woonerven official through their first mention of it in 1976 (Kwiatkowski, 1985). In figure one and two you can clearly see the difference between the radical street concept the whole identity changing.

Conventional street in the UK

Fig. 1 (Source: News Shopper)

Street with characteristics of a home zone

Fig. 2 (Source: re:Streets)

Around the same time, the UK realised the issue of children safety on the streets and opted for a more radical approach almost opposite to De Boer. They focused on segregating traffic and fining people for using street to play, specifically children. This approach was introduced in the 1960s through a new design guide Cars In Housing. Experts believed it was the way forward for streets in residential areas, but it created an even bigger divide in the modes of transport. Cutting off an area of public space was massive for the community as “the carriageway was often more popular for pedestrians and for children's play” (Beth & Pharoah, 1998). This negatively impacted the residents who utilised this street space, as they were not able to use them for any outdoor activities, social gatherings or even to just talk. This approach was unsuccessful and didn’t achieve liveable streets.

The first change in UK came through local authorities creating their design guides, with some stating that mews courts and cul-de-sacs could be used as shared street spaces. These streets were only selected because they were deemed suitable to be considered as shared street spaces due to existing features, unlike the woonerven which had specific design features which helped to make them shared streets. Around the same time ‘VINEX’ was launched in the Netherlands in 1991 and it was a Fourth Memorandum on Extra Spatial Planning. This was an influential in boosting the presence of woonerven. Almost overnight

there were far more woonerven being constructed with absolute priority given to pedestrians and planning children(Lörzing, 2006).

Even though the home zone is based upon the woonerf, there are still some differences in their implementation within national and local policy. The table below illustrates how legislation and guidance help to define the construction of woonerven but no such system is in place in the UK. Generally, most of the schemes in the UK range in their level of design; some are retro fitted streets where as others have been built specifically into streets which are more radical design style (Gill, 2006).Table 1 shows the main differences in policy between the two concepts.

	Home Zone	**Woonerf**
Legal Status	Not explicitly defined in law: legislation enables local authorities to create home zones	Explicitly defined in law
Design Requirements	No statutory guidance	Statutory guidance
Shared Surface Use	Not universal	Required by law
Legal Pedestrian Right of Way	No	Yes

Table. 1 (Source: Gill, 2006)

In UK, the Department for Transport defines the term home zone as, “residential streets in which the road space is shared between drivers of motor vehicles and other road users, with the wider needs of residents (including people who walk and cycle, and children) in mind” (DfT, 2005). Both concepts are designed in a way which allows for informal use of the road surface to play, or exercise and to identify this hierarchical strategy. By transforming the street, you start to change its characteristics not just for the main aims of the projects (making the street safer) but also other areas including promoting social gathering, or outdoor activities e.g. gardening. All this starts to change the street’s identity, transforming it into a more liveable one. As of 2021, the success of the woonerf strategy could be seen and it had been applied to nearly 7,000 streets across the Netherlands (Hamilton-Bailey, 2001). There is not an exact figure for the number of home zones in the UK due to there being no central data base; estimations are that there are around 80-100 completed schemes (Gill, 2006).

2.2 - What is liveability?

When it comes to the ‘liveability’ of streets it was challenging to find a definition that helped to give the word meaning. The Cambridge dictionary defines liveability as “the degree to which a place is suitable, or good for living in” (Cambridge, 2020). This reiterates my first point as “there seems to be no agreement as to what liveability means; it is a compendium of value statements about the needs, desires, and aspirations of people cutting across a vast area, be they social, political, or economic.” (Conteh et al., 2016). As the streets cannot be designed to suit one need, they have to be designed instead to prioritise certain needs over others and focus on what is in the best interests for all its users. This means using physical characteristics and better governance to combat issues and helps them become liveable.

When the UK’s Traffic in Towns report (1964) was issued, it chose protecting pedestrian’s safety through segregation of mobility; however, this didn’t account for their experiences. In

particular, the needs of the residents of the streets had been completely overlooked as the liveability of their streets had been sacrificed. Ultimately the response to this report was that the streets were stolen from their communities in search of safety. As a result, streets became dangerous, noisy, polluted and impersonal for the residents who lived there (Appleyeard, 1980). As cars had right of way, they could travel at higher speeds, whilst limited traffic calming resulted in more danger for pedestrians. I my opinion this, doesn't represent the values of liveable streets as the people who are primarily going to use them are the residents. Instead, we should be working to create "a residential area where the design of the spaces between homes provides shared space for all users, including motor vehicles and other road users, with the wider needs of residents, including pedestrians, children and cyclists, being fully accommodated" (Biddulph, 2003).

When creating liveable residential streets, certain characteristics enable a more human-centred environment. The design characteristics of the street should stem from the human experience they will obtain on the street. A liveable street includes many different aspects as it has to incorporate multiple different modes and needs of its users, including social, economic, environmental and public health to create better streets. In a journal about assessing the liveability of residential streets, Ahmed, (2019) identifies eight characteristics essential in improving human experience to create liveable residential street, including:

Safety and security	Streets are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists, and transit users of all ages and abilities.
Street life	The basic measure of the success of street life are the pedestrians in the street, their volume, diversity, and activities.
Social interaction	Relationships that arise from interaction between pedestrians and neighbours that increases a sense of trust, responsibility and friendship overtime.
Transportation	Different means that allow easy and safe moving from place to another, including road networks, traffic, congestion and mobility.
Accessibility and proximity	Easy access to all facilities including: job, healthcare, education, shopping, recreation, and entertainment, whether by transit, vehicle, bicycle, or on foot
Economic viability	liveable streets that apply traffic management techniques and serve mixed uses, can increase land and property values, and attract more businesses and users.
Physical environment attributes	Landscape, vegetation, low air and noise pollution, improved physical attributes (paving, furniture, maintenance, etc.) create more comfort and users' satisfaction.
Public health	Direct relationship between built environment and public health of residents in liveable streets that encourage walking and decrease pollution.

Table. 2 (Source: Ahmed, 2019)

2.3 - Why are shared streets important?

I believe shared streets are the next stage in evolution for residential streets in the UK. Their application in many other European cities, as well as cities in the US and Asia have seen success. Specifically, the Netherlands woonerven have been able to achieve a much higher quality of life and safety for pedestrians. Kraay et al (1982, p. 39) found that 70% of people would be happy to live in a woonerf area, with 16% not having an opinion and only 14% of people didn't like the idea. The same study also identified that the characteristics of woonerven made them more popular amongst their users (families, elderly people and mothers whose children often play out of doors) compared with residents living in normal suburbs (Kraay et al., 1982, p. 39). The success of woonerven hasn't only been attributed to their high-quality play areas, quiet and cosy environment and greenery but also in their contributions to safety (Kraay, 1978). Specifically, two-thirds of children who use the street to play in found it to be safer than conventional segregated streets (Neeskens and Kropman, 1984).

In the Netherlands, there has been a decline in overall traffic related deaths (1970s to 2014) with minimal fluctuation since then. In 2018, there were 678 deaths, with 54 pedestrians and 42 cyclists (CBS, 2019). Compared to UK with 1,784 traffic related deaths in 2018, 456 pedestrian related deaths (48 children) and 99 cyclists. Considering UK has over three times the population of the Netherlands, it has twice as many fatal cycling accidents with far fewer people in UK cycling. As for pedestrian accidents, UK has nearly eight times the fatal pedestrian accidents as the Netherlands. This reiterates Appleyard's view on current streets being dangerous resulting in communities being driven off their streets (Appleyeard, 1980).

2.4 - What are the design principles of a successful shared street?

There is a huge difference in design standards and policy between woonerven and home zones. Many design characteristics help to differentiate themselves from typical streets, whilst achieving better liveability through the woonerf concept. As the concept entails creating shared streets space for all, it must function first as a residence, a playground and a meeting area defined by key characteristics; visible entrances, physical barriers, shared and paved spaces, as well as landscaping and street furniture (Joseph, 2007). All of these feature are the necessary design characteristics needed for a true shared street.

The use of signs at all of the entrances to a woonerf are required. They inform drivers that they have now entered a sharded street space and critically they no longer have priority in these streets, helping to increase the safety of children and residents. Often, they depict children playing and a house. On the sign the car is usually the smaller of all the icons giving the perception that they now have to give way and reduces the level of their importance (Figure 3). A common practice in the UK to slow traffic in residential neighbourhoods has been to simply introduce speed restrictions through signs. In fact, "high-speed driving on residential streets is usually due to the prevailing street layout, width, and pavement type, so assigned speed limits are ineffective" (Joseph, 2007).

The system used in woonerven works through a restrictive approach, by introducing physical barriers in the road which force drivers to change their course, slow speeds and generally be more aware and can intimidate them into declining their speed (Joseph, 2007). Certain features of the woonerf could be tight curves so drivers cannot see down the length of the road forcing them to slow their speed and physical obstacles such as planting boxes, trees etc. The characteristic and most commonly seen feature is the difference in road colour and surface informing drivers that they have now entered a different street. By providing residential or public space, it aligns with Appleyard's views on what a street is about as it allows members of the community to have a place in which they can converse without

having to arrange to meet away from their home (Appleyeard, 1980). The design of these streets helps to create the feeling of a “Yard” and having the necessary features such as trees, benches and a small front garden helps to further reinforce this view (Jonquiere 1978; Hass-Klau 1990). Through using greenery and street features, people feel the street belongs to them and are more inclined to use it for the designed purpose, i.e., recreational and social.

Woonerf sign

Figure. 3 (Source: Toronto Star)

Example of a woonerf

Figure. 4 (Source: Sustainable Design)

2.5 - Framework:

From the literature review, I have formed a framework to structure for the rest of my project. This draws upon seven of the liveable characteristics and the four design characteristics necessary for liveable streets and will be a core component of my analysis of case studies and primary data driven questionnaires.

Characteristics	Questions
Safety and security 	• Does the street have a sign designating the area as a home zone? • Does the street rise to pavement levels at intersections to indicate the pedestrian right of way? • Are street lights used? • Is the street narrow?
Street life 	• Does the street have play equipment for young children? • Do children have the opportunity to play in the street?
Social interaction 	• Are there any benches or street furniture? • Does the street have a quite atmosphere allowing people to talk?
Transportation 	• Are there any vehicle parking spaces? • Does the road promote one way access? • Are there alley ways or cut throughs?
Accessibility and proximity 	• Does the street encourage pedestrian movement?
Physical environment attributes 	• Are there any physical barriers in the road such as hedges or verges? • Does the road have any bends or curves in it? • Are there any bushes or shrubs on the street? • What material is the surface of the street made from? • Is the street all the same level? • Are there any trees that line the street?
Public health 	• Is there any cycle storage? • Is there any public space?

Table. 3

Chapter 3 – Methodology

3.1 - Introduction:

To investigate my question, I will be collecting data using both primary and secondary methods. The primary date collection will involve questionnaires carried out in a home zone (UK) and woonerf (Netherlands) so I can compare and contrast the liveability by assessing the actual perspective of the residents. The second method uses case study analysis to delve into UK home zones and compare them to the design characteristics necessary for a liveable home zone. The assessment of both primary and secondary data collection uses information extracted from literature used to form the framework for the data collection.

3.2 - Case Study Analysis:

Using case study analysis allows me to evaluate multiple examples of UK home zone designs to see if they have adopted the appropriate design characteristics. Looking in depth into specific case studies allows me to use the extracted design principles in my literature to see how common they are in home zones. These case studies will be explored through images and documents about the history of the development process and how they were designed through consultation with local communities. The observations will be listed in a design matrix based upon the four key design characteristics found through my literature.

3.3 - Case Studies and Case Study Selection:

I have selected three case studies to look at in England; these are located in different regions and also vary in size from a single to multiple streets.

Case Study	Rationale
Clark Street, London, England	Clark street is in London and is located in the heart in the borough of Tower Hamlets. This area is very urban and extremely dense, enabling me to see if they have used density to their advantage by turning areas which might have been used for parking into features on the street.
Morice Town, Plymouth, England	The area of Morice Town was one of the original UK home zones and one of the twelve pilot schemes to attempt to copy the “woonerf” concept like-for-like. The area also consists of multiple streets using the home zone concept
Northmoor, Manchester, England	Northmoor in Manchester is located in the north of England. Being the only location in the north allowed me to review how the concept has been applied compared to a similar “woonerf” street standard.

Table. 4

3.4 - Primary Data Collection:

I will use primary data collection to compare and contrast the liveability in a home zone and a woonerf. The primary data collection is comprised of two aspects; a questionnaire to residents about their opinions of liveability on their street. To assess the liveability of an area you need to understand how the physical build environment features affect the quality of the human experience (Harvey, 2015). The second being the design analysis through photos collected at both sites to analyse the use of design characteristics of both streets. The basis of the questionnaire is formed from the framework and literature. Using this method allows me to compare the liveability of a home zone in UK to a woonerf in Netherlands. The use of questionaries allows me to break down the responses into percentages enabling comparison through qualitive data, allowing me to capture the nuances of the human experience (Harvey, 2015). To conducted my questionnaire I consulted with actual residents in both countries, asking them if they would be willing to participate in my university research project.

3.5 - Questionnaire:

This comprises of twenty questions concerning their street and their opinions towards certain aspects shown in table ? of Appendix 1. The questionnaire was formed from the 8 characteristics for identifying liveability(Ahmed, 2020) this will measure the liveability from the residents perspective. I have only chosen to use 8 of these characteristics excluding economic viability as these areas I will be looking at are purely residential with no commercial elements.

3.6 - Ethics:

All of the methods used in my research project were in line with current university guidelines ensuring participants were willing to partake in my project, with all date being anonymous and not personal related. This also include the compliance with both university and government guidelines on COVID-19 and social distancing rules.

Chapter 4 - Case Study Analysis

4.1 - Introduction:

The following section investigates how home zones apply the four design characteristics from my framework and identified in my literature review. I will start by analysing three UK case studies to understand if the design characteristics were used in home zones.

4.2 -Case study 1 – Clark Street, Tower Hamlets, England

Figure. 5(Source: Digi Maps)

Figure. 6 (Source: Google Maps)

1.1 - Introduction

Clark Street is located in East London in the borough of Tower Hamlets. It has many different architectural styles from post war housing to expensive multi story high rise buildings in Canary Wharf.

1.2 - Funding

Parts of Tower Hamlets are in need of regeneration and investment to make it more appealing as much of the area suffers high levels of depravation. The three districts of Bethnal Green, White Chapel and Shadwell are all included in the single regeneration budget called (SRB) ‘connecting communities. This included the provision for 6 home zones across three districts for financial years of 2000/01 to 2003/4, Clark Street receiving £130,000 worth of funding to complete the project (Jones, 2001).

1.3 – Community Engagement

The project conducted design workshop by using leaflets and running adverts in the local paper to engage the community in this process. Due to the lack of funding, they did not have time for a consultation prior to the workshop so people were not familiar with the concept/meaning of a home zone. This proved to be an issue at the start; however, by the end an implementable masterplan was developed with the residents. This was good to see how the council and developers used the community to help design the best development for the area.

1.4 - Design

The street had already been selected for the project due to its location, low traffic volume, strong community, local facilities and it being an achievable scheme. From the workshops, masterplan developments included: fencing along the ground floor of flats to prevent anti-social behaviour in the stairwells, a one-way system along the street, curb build outs at crossings, as well as echelon parking.

1.5 – Design Analysis

Figure. 7 (Source: Google Maps)

Characteristics	Visible Entrances	Physical Barriers	Shared and Paved Space	Landscaping and Street Furniture
Included	✓	✓		
Explanation	The street does have the blue signs at the entrances designating the area as a home zone. The road also rises to the pavement height to inform driver they are entering onto a different kind of street.	The street is quite narrow in general and has chicanes with bollards to slow drivers. The road also curves in two places which helps to slow drivers down.	Looking at the road it is still segregated with a road surface for vehicles, as well as a pavement for pedestrians. The road surface itself is still asphalt the only change in texture is at the entrance when the road rises to meet the pavement.	There are a few trees along the pavement but no planters on the street where residents could do their own landscaping. Like the Morice Town home zone, benches were not included as they could promote loitering. However, no physical objects limit residents from sitting and talking. There are street lights which should provide ample lighting for security.

Table. 5

4.3 - Case Study 2 – Morice Town, Plymouth, England

Figure. 8 (Source: Digi Maps)

Figure. 9 (Source: Google Maps)

2.1 - Introduction

Morice Town in Plymouth was accepted as a pilot scheme by the local council to develop the area into a home zone. There is a mixture of housing tenure and types, with some of the properties having gardens, which make it a good place to start developing a home zone. A total of three schemes were put forward and in 1999, Morice Town was chosen. Like Clark street the area is quite deprived, it is located behind a ship building yard with some of the highest rates of crime in the area.

2.2- Funding

This was a large project as you can see from figure 8, there are many roads which make up this home zone. In total the project required £1m to achieve its desired aesthetic. The project secured £320,000 from the city council's local transport plan, as well as a further £240,000 from the single regeneration budget (Jones, 2001). There was also a bid made to the Lottery New Opportunities Fund (NOF) for £300,000 with the rest of the money from private sources. However, the project was not able to secure its funding from the NOF; in the end the project raised £850,000(Jones, 2001).

2.3- Community Engagement

The project started with initial consultations, by explaining to local residents what the concept of home zones were and how this new concept would be implemented on their streets. The meetings were successful in understanding what residents wanted and concerns they had with existing elements such as high traffic volumes traveling at unsafe speeds for pedestrians. In May 2000, the project moved to the bidding phase to appoint a developer. They worked together with the residents to further develop the masterplan, delivering on the residents' requirements (Jones, 2001). This was designed and implemented over a 3-year period, with significant community input.

2.4 – Design

A biggest issue to be addressed was the need for more on-street parking. The project was not able to secure enough funding for the elevation change (when the street sits at the same height as the pavement per a typical 'woonerf'). Instead, echelon parking was used to give the impression of this, as well as making parking more efficient.

2.5 – Design Analysis

Figure. 10 (Source: Adrian Trim)

Characteristics	Visible Entrances	Physical Barriers	Shared and Paved Space	Landscaping and Street Furniture
Included	✓	✓	✓	✓
Explanation	The entrance has signs informing people they are entering a home zone. The entrance also has a raised crossing at the entrances to slow traffic speeds.	The street includes slight chicanes around planters to slow drivers down, the road itself doesn't curve or bend.	The street is at one continuous level having no distinction between the pavement and street. The street has a brick texture which is different from a typical asphalt road. The road is one way to limit the traffic volume and has echelon parking on either side of the street.	Along the street there are large planting areas possibly managed by residents. There are verges opposite one side of houses and street lighting is included. There is no play equipment for children, or benches (anti-social behaviour restrictions). The planting areas in front of the parking spaces could be used for seating if residents wanted to talk to one another (unlike Clark Street).

Table. 6

4.4 - Case Study 3 – Northmoor, Manchester, England

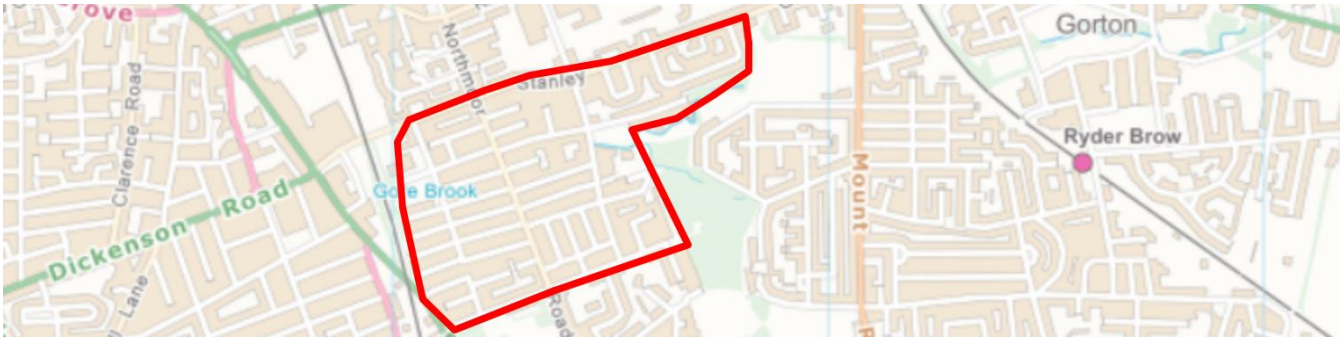


Figure. 11 (Source: Digi Maps)

Figure. 12 (Source: Public Space)

3.1 – Introduction

The transformation began in 1997 of a number of roads in Northmoor into a home zone, within an area containing 1,400 houses (Engineers, 2013). The area was chosen due to its good public transport links and low vehicle ownership, decreasing the need for parking spaces.

3.2 – Funding

The project cost was £750,000 for consulting, design and construction fees, with funding secured for £100,000 from the DTLR Highway funds with the remaining £650,000 from the city council's regeneration fund (Engineers, 2013).

3.3 – Community Engagement

Planners worked with the community to remodel the streets allowing them to become a natural extension to the interior of their homes. An initial consultation took place with the team utilising a local empty house to display plans and drawings for the scheme. Members of the design team would also walk around the development area speaking with residents, allowing them to ask questions. The most important takeaway the designers got was providing the area with a new identity and allowing more pedestrian use through lower traffic speeds(Engineers, 2013).

3.4 – Design

To provide the resident's request for a new identity, the main elements from the woonerf concept were implemented supported by resident input. The main aim of the project was to allow pedestrians and cyclists to have full access to the streets, with traffic calming measures implemented to achieve this (Engineers, 2013). The developers also changed the street's identity by breaking up the repetitive terraced housing look with a linear court yard approach.

3.5 – Design Analysis

Figure. 13 (Source: Public Space)

Characteristics	Visible Entrances	Physical Barriers	Shared and Paved Space	Landscaping and Street Furniture
Included	✓	✓	✓	✓
Explanation	The street has a clear entrance with a home zone sign. The street does not have a raised entrance section, however it does have a chicane to force drivers to change direction and slow down.	The street makes use of echelon parking as a way of creating a chicane in the straight road, slowing traffic. Sections of the street are also very narrow further preventing speeding.	The streets have a brick surface, separating itself from conventional asphalt streets. There is a consist height across the street, with the carriageway and pavement fully integrated.	There are a number of trees which line the streets, along with small bushes and shrubs. The entrances are landscaped with vegetation making the street feel “greener”. There are minimal areas for outside seating use and a lack of furniture might restrict social interaction between residents. Changes also included improvements in overall street lighting.

Table. 7

Chapter 5 - Analysis of Survey Results

5.1 - Introduction:

This section analyses the residents human experience and design of the street in a home zone in Charlbury, England and a woonerf in The Haag Netherlands.

5.2 - Design Analysis:

This section analyses the difference between the two home zones I visited. I will be comparing certain design characteristics based on my framework to understand the extent to which the necessary design characteristics needed for a liveable street have been implemented in Charlbury by using a woonerf in The Hague as a model.

Visible Entrances:

Charlbury, Oxfordshire

Figure. 14 (Source: Google Maps)

The Hague, Netherlands

Figure. 15

From figure 14 Charlbury has signs at the entrances to the street indicating to drivers, cyclists and pedestrians they are about to enter a different street type. There were also signs at the exits of the street to inform drivers and more importantly children, the streets outside of this area do not have the same designation.

The Hague also has signs at both entrances and exits to the street. Figure 15 shows that the entrances and exits to the woonerf in The Hague utilises a raised pedestrian crossing creating a speedhump. This is something which is not seen at the entrances and exits to the home zone in Charlbury

Physical Barriers:

Charlbury, Oxfordshire

Figure. 16 (Source: Google Maps)

The Hague, Netherlands

Figure. 17

Charlbury home zone has physical barriers in the road to try and make it narrower. These features seen in figure 16, show a speed hump running across the road, with a brick paving and also bollards and trees to restrict half the road and divert/slow traffic. It also has many visible bends which obscuring visibility.

These features were common all along the woonerf, creating many chicanes and narrowing of the street throughout including bends in the road, cycle parking, vehicle parking and vegetation planting. This was not the case for the Charlbury home zone as the physical barriers only narrowed the street in certain sections, rather than all the way along, increasing the potential for faster driving.

Shared and Paved Spaces:

Charlbury, Oxfordshire

Figure. 18 (Source: Google Maps)

The Hague, Netherlands

Figure. 19

The street surface in Charlbury is predominantly asphalt, there are some parts which have bricks to indicate parking spaces, a transition to a new area and to indicate physical barriers. Due to the dispersed nature of the area, some parts of the street are very wide as seen in figure 18, this provides a large space for parking, or outdoor activities e.g. football. Most of the street has segregated pavement and carriageways, with only some areas having a constant level. On the other hand, the woonerf figure 19 has a brick surface. The street has a single pavement and carriageway allowing for a better flow of pedestrians through the area. The street does not have sections which are as large or wide as the ones seen in Charlbury.

Landscaping and Street Furniture:

Charlbury, Oxfordshire

Figure. 20 (Source: Google Maps)

Figure. 21 (Source: Google Maps)

The Hague, Netherlands

Figure. 22

Figure. 23

In Charlbury, there are a lot of green features such as verges and small open grass areas as seen in figures 20- 21. One of these spaces is large providing an area for children to play and residents can gather in. The street also features bins which is important in helping to keep the street tidy. There was a lack of community planting area e.g. vegetation which would provide more greenery and offer an opportunity for residents to become more involved with those aspects. There was a lack of seating and street furniture even in the green spaces.

As the woonerf is located in a denser area there is not the opportunity to create these green spaces. As a result, there was a lot more community involvement in planning and maintaining their own vegetation along the street which helps to give the area a less urban feel. The street did not have any bins along the street, however it did have cycle storage which was not seen in the home zone.

5.3 - Questionnaire responses

Demographic:

Charlbury, England

Male: 13%

Female: 87%

18-35

31%

36-49

31%

50+

38%

Den Haag, Netherlands

Male: 55%

Female: 38%

Other: 7%

18-35

14%

36-49

41%

50+

45%

Safety and Security:

I found that residents in Charlbury were split about how cars behaved on their street and whether they were respectful; 50% of residents believe that cars respected they had entered an unconventional street. This is very different in Den Haag with 79% of residents saying that they felt cars would often change their driving style when entering onto the street. In Charlbury, 100% residents said they felt safe walking down the street regardless of day or night. This was higher than in Den Haag, with 90% saying they felt safe on the street however, only 87% of residents felt safe walking down the street at night as some people felt that there could be more street lighting (Questionnaire, 2021).

The largest and most concerning area for residents in Charlbury were if they feel safe letting their children use the street to play in. Only 13% of residents felt safe with this, compared with 87% in Den Haag. When I was conducting my surveys in Den Haag, I observed many children playing in the street. Residents in both areas shared similar perceptions of crime and anti-social behaviour on the street, with 79% of people in The Hague saying they believed that there was little to none and 87% of people in Charlbury of similar view.

Street Life:

Generally, the environment seemed more welcoming in The Hague compared to Charlbury, mostly due to vehicles. In The Hague, 73% of respondents said the street prioritised pedestrians over other forms of mobility, whereas only 56% of people in Charlbury had the same opinion. This view in Charlbury could have been due to the traffic volume as 43% of residents felt there was still too much traffic passing through their street.

Whilst in The Hague, 31% of residents felt the same, many of the residents who felt this way said this because of their location on the street. Referring to figure 24 the blue area is a one way system, while the red allows traffic flow in both directions. Many of the residents who live in houses in the red area felt that their part of the street would become quieter if it were to become one way and they would send their children into the one-way system to play (Questionnaire, 2021). Both areas felt like the noise from traffic was acceptable, with 97% of residents agreeing in The Hague and 89% in Charlbury. In Charlbury, I was surprised that only 56% of residents felt like the street belonged to them and their community, this is compared to 96% in The Hague. I believe a lot of these factors in Charlbury contributed to few residents wanting to use the street as a public space. Only 25% of residents used it for any sort out outdoor activities, whereas 75% of residents in The Hague said they use it and it is a useful space as they live in flats and didn't have gardens. (Questionnaire, 2021).

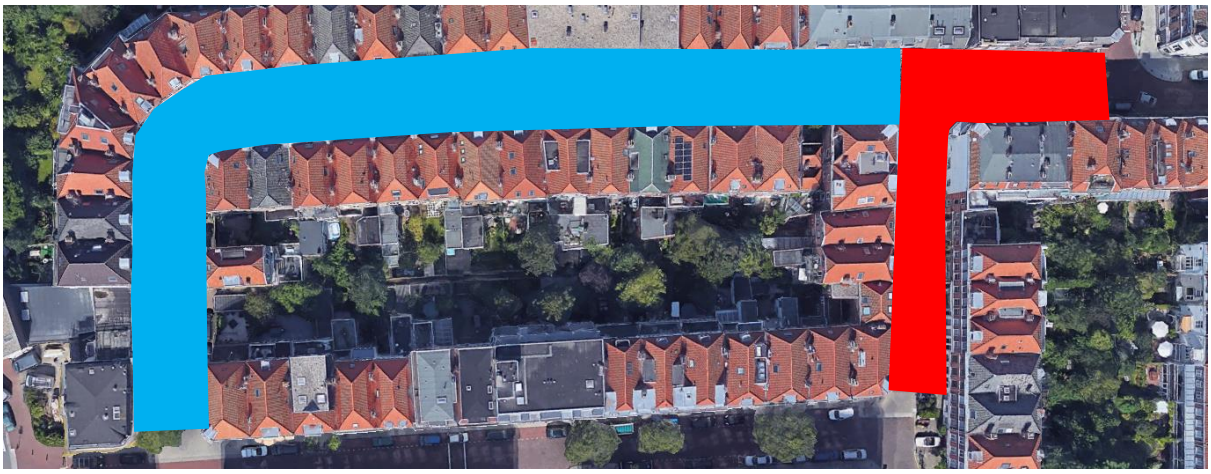


Figure. 24 (Source: Google Earth)

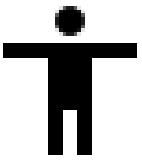
Social Interaction:

With many of the residents viewing the street as busy in terms of traffic volume, this might account for the lack of social interaction between residents. Only 31% of residents used the street for social interaction in Charlbury compared to 80% in The Hague. The number of activities the street is used for was also a lot broader in The Hague with many children using the street for, ball sports, badminton, skateboarding, physical exercise and one resident said he has dinner on the street. The home zone in Charlbury has few activities, with residents only engaging in cycling, walking dogs and using the green space for picnics. The woonerf seemed to have a greater sense of community with residents meeting up once a month to all clean their street, as well as garden to maintain the plants. A lot of residents also mentioned the large street parties they have where the whole street gets blocked off for the day for social gatherings such as King's day celebrations.

Transportation:

An important part of developing a successful home zone is including enough parking as people still rely on their car for work or business. In Charlbury, only 31% of residents felt there was enough parking compared to 46% of residents in the woonerf. In this sense, the home zone has not been able to successfully meet the liveable characteristic as the woonerf in the Hague which is a relatively dense area with many respondents saying there wasn't enough parking but there isn't much you can do about it as we live in a city (Questionnaire, 2021).

Accessibility and Proximity:



Not many of the residents of the home zone in Charlbury felt like pedestrians choosing to walk, as only 44% of residents felt this way. This is compared to 80% in The Hague, as many people described the street as a "forest"(Questionnaire, 2021). As the street is more inviting, many people choose to walk down it compared to adjacent ones.

Physical Environment Attributes:

In the woonerf, 86% of the residents felt like the physical barriers on the street were very effective at slowing down vehicles, in particular the narrow sections (Questionnaire, 2021). In Charlbury, 50% felt the physical barriers were effective, however, many thought this could be improved as curved roads didn't do much to slow cars, suggesting obstacles would be more effective (Questionnaire, 2021). This was something which I identified in my design analysis. Regarding vegetation levels, 100% of residents I spoke to in the woonerf liked and was satisfied with the level of plants and trees. In Charlbury, 75% were satisfied with the amount and the other 25% said there could be a lot more.

Health:

In terms of providing a public space on the door step, 40% of residents in the woonerf found they used the street more during the pandemic. Only 25% of residents in Charlbury felt they had used the area more. Many residents in the woonerf who lived in apartments praised the street as it was a public space they hadn't appreciated before.

Chapter 6 – Conclusions

6.1 - Introduction:

Through the analysis and reviews of my case studies, plus the preparation and responses of my questionnaires, I have been able to understand how successful home zones have been. I will breakdown my key findings in the next section, by linking the design characteristics used and the impact which they have had on liveability from the views of the residents of both Charlbury and The Hague.

6.2 - Key Findings:

The aim of my research project was to understand if home zones have been as successful as woonerven in producing liveable streets. From my data collected in Charlbury and The Hague I analysed serval different variable against the supported case studies and through my questionnaire.

Through initial research undertaken in my literature review, there were some clear differences between how woonerven and home zones had addressed the various issues they wanted to solve. Home zones had a much narrower goal of aiming to achieve safer and quiet streets in terms of quality of traffic and volume. Whereas woonerven wanted to create a whole new identity for the place and redefine the street space. This was seen through the lack of legislation and statutory guidance in the UK and if they had been official supported within the planning system home zone concepts would have been better supported.

The effect this had on the design of the home zones was large and can be seen in both my case study analysis and design analysis of Charlbury. Some streets had full refits and look drastically different from how they did before the home zone renovations, while others simply had minimal elements of what a woonerf looks like; a similar situation to that identified by Gill (2006)

This was evident when reviewing pictures of home zones against the four design characteristics. Some home zone areas had adopted very few of these elements, which made them look different from other home zones and a woonerven. From this, I can see now how influential the trickle-down effect of not having centralised legislation and design guides to create these types of streets is. As woonerven have strict design guides for them to be given the woonerf status, all of them embed a consistent approach, making each one almost identical, with the same, or similar features.

When looking specifically into measuring liveability from the perspective of the residents, this was a similar story. As there was a lack of quality design features in Charlbury, this led to an overall sense of pool liveability from the residents. Characteristics such as poor physical barriers and traffic calming caused few residents to engage with the street. This left residents underwhelmed and many believe more design characteristics could be implemented to solve these issues. Compared to The Hague reference site, this had all of the four key design characteristics which resulted in improved liveability for residents.

Overall, there seemed to be a better community spirit in The Hague compared to Charlbury, which I believe was a direct result of poor home zone planning and implementation of key design features. The main issue which home zones have to face is the lack of consistency between developments, this comes from a lack of planning guidance and centralised legislation. Many of the developments included some of the essential four design principles but not all, it seemed like all of the home zones lie on this line where one end is a replica of

the woonerf design concept while the other end represents a conventional UK street as Gill (2006). This has been one of the biggest shortfalls of this strategy and should be addressed.

To conclude, I found that home zones have not been able to achieve the same level of liveability as woonerven. They are a huge step forward compared to conventional streets but considerable improvements would be required to help elevate their level of success. The trickle-down effect from the lack of central legislation I consider limits their success, as they lack proper implemented and consistent design features such as those identified by Ahmed (2019). These include features such as physical barriers and traffic calming measures, helping to keep residents feeling safe to use the street for it intended purposes and meeting the observations laid out by Appleyard (1980).

6.3 - Reflections:

The whole project was influenced by the current coronavirus pandemic, causing limitations on the data collection I could undertake. However, I was still able to conduct my research in a safe, professional and mature manor and used my skills to work around any problems and issues I encountered.

Questionnaire sites were selected based on the best areas which I could travel to. This meant results were not representative of other home zones outside of my location, so I could not draw broader conclusions. Under normal circumstances, I would have explored additional sites which may have given me more insight into different opinions of their residents. Having to deal with social distancing and face masks made undertaking questionnaires difficult when trying to communicate with residents especially in the Netherlands as it was difficult to communicate about technical terms, as English is a second language there and I don’t speak Dutch.

6.4 - Recommendations:

There is significant opportunity to undertake further research into this this concept of urban design which will help address some of the challenges I faced in my reflections. As this project only evaluated a handful of home zones, there are still hundreds of reference sites to research and determine what characteristics have helped make them successful and what areas of the street they were able to make more liveable.

If any new challenges arise, the reference countries could be widened to look at others that may have adopted their own idea of the woonerf concept such as Germany, Sweden, Norway and Israel. I would suggest beginning to look at these counties to see how they have been able to work around any similar issues home zones are facing and come up with possible solutions.

Finally, possible studies could delve deeper into the idea around the use of home zones in a post covid world to help tackle issues raised by the pandemic, particularly with the potential for a sustained move to a greater amount of homeworking and reductions in commuting implying a greater demand for liveability.

Appendices

Appendix 1 - Questionnaire:

Question	Rationale
What is your age? 18-35 36-50 50+	By asking this it will allow me to understand if residents of different ages have different opinions
What is your gender?	By asking this question I will be able to look at how different genders feel about their street
Do you feel cars are more respectful when they enter this street?	This will allow me to understand if drivers understand the hierarchy shown through the sign
Do you feel the street prioritises pedestrian movement over other forms of transport?	This will show if drivers respect the hierarchy
Do you feel safe when walking down this street?	This question will ask the residents if they believe the street is safe or not for pedestrians
What about walking down the street at night?	Asking this will understand if parents feel safe enough to let their children use the street as intended
Do you feel safe letting your children play in the street?	This will allow me to understand if resident use the street for any sort of purpose
Do you use the street for any outdoor actives?	This refers to street life and what sort of actives residents use the streets for
What kind of activities would you or your children use the street for?	Understanding this will tell me if home zones or woonerven have been more successful in getting people outside during covid 19
Have you used the streets more as an outdoor space during the COVID-19 pandemic?	This asks if the physical barriers have affected liveability through slower vehicle speeds
Do you think using the use of the curved roads and chicanes are effective in slowing down the speed of cars?	By understanding this it will inform me of the types of social interaction which do or do not occur on the street
Do you use the street for social interaction or to gather with other people?	Does the street furniture help you to better interact with people or residents
Do you feel the street is quieter than other residential streets?	This will help me understand if the physical barriers and signs have been successful in slowing vehicles thus decreasing the noise from them
Is there less traffic on this street compared to others?	This will inform me that the area has been successful in decreasing the amounts of traffic passing through the area
Do you feel there is enough on-street parking?	This relates to safety and security and if residents feel safe and their property is safer
Do you feel there is less crime on this street?	By understanding this it will inform me that the street is more appealing for pedestrians passing by as they feel safer
Do you feel more pedestrians use this street compared to conventional ones?	This will reiterate the feeling of a ‘Yard’ which is one of the visions for a home zone
Does the use of vegetation and trees help to make the street more appealing?	This will ultimately tell me if the home zones have been successful in their aim of creating safer and more liveable streets
Do you feel the street belongs more to the pedestrians and residents compared to motorists?	

Table .8

Bibliography

- Appleyard, B. and Cox, L. (2006) 'At home in the zone', *Planning,* 72(9).

- Appleyard, D. (1980) 'Livable streets: protected neighborhoods?', *The ANNALS of the American Academy of Political and Social Science,* 451(1), pp. 106-117.

- Atlas, P. (2016) *Woonerf street construction* Woonerf Policy Atlas: Policy Atlas. Available at: http://policyatlas.org/wiki/Woonerf_street_construction (Accessed: 09/3/2021 2021).

- Beth, L. and Pharoah, T. (1988) *Adapting residential roads for safety and amenity.*
- Biddulph, M. (2003) 'Towards successful home zones in the UK', *Journal of Urban Design,* 8(3), pp. 217-241.

- Buchanan, C. 1963. Traffic in towns : a study of the long term problems of traffic in urban areas. London: H.M.S.O.

- CBS (2019) 'Traffic death toll up by 11 percent in 2018'.

- Chisnall, M. 2021. The UK's pursuit of more liveable streets. Oxford Brookes University.

- Clayden, A., Mckoy, K. and Wild, A. (2006) 'Improving residential liveability in the UK: Home zones and alternative approaches', *Journal of Urban Design,* 11(1), pp. 55-71.

- Conteh, F. M. and Oktay, D. (2016) 'Measuring liveability by exploring urban qualities of kissy street, Freetown, Sierra Leone', *Open House International*.

- Curl, A., Thompson, C. W. and Aspinall, P. (2015) 'The effectiveness of 'shared space'residential street interventions on self-reported activity levels and quality of life for older people', *Landscape and urban planning,* 139, pp. 117-125.

- Department for Transport, C. a. L. G. (2007) *Manual for streets.* Thomas Telford Limited. DfT 2005.

- Dictionary, C. 2020. Cambridge Advanced Learner's Dictionary & Thesaurus. 2020.

- Elsawy, A. A., Ayad, H. M. and Saadallah, D. (2019) 'Assessing livability of residential streets–case study: el-Attarin, Alexandria, Egypt', *Alexandria Engineering Journal,* 58(2), pp. 745-755.

- ENGINEERS, I. o. H. I. (2013) *Home Zone Design Guidelines*. Available at: https://www.motorcycleguidelines.org.uk/wp-content/uploads/2013/08/Home-Zone-Design-Guideline.pdf (Accessed: 5/05/2021 2021).

- Gill, T. (2006) 'Home zones in the UK: history, policy and impact on children and youth', *Children Youth and Environments,* 16(1), pp. 90-103.

- Harvey, C. and Aultman-Hall, L. (2016) 'Measuring urban streetscapes for livability: A review of approaches', *The Professional Geographer,* 68(1), pp. 149-158.

- Jones, P. 'A TALE OF TWO HOME ZONES'. *PROCEEDINGS OF THE AET EUROPEAN TRANSPORT CONFERENCE, HELD 10-12 SEPTEMBER, 2001, HOMERTON COLLEGE, CAMBRIDGE, UK-CD-ROM*.

- Kraay, J. H. (1986) 'Woonerven and other experiments in the Netherlands', *Built Environment (1978-)*, pp. 20-29.

- Kraay, J. H., MPM and Wegman, F. (1982) 'De verkeersonveiligheid in woonwijken: een overzicht van de problemen en mogelijke oplossingen'.

- Kwiatkowski, D. (1985) 'Streetscape in the 'Woonerf'', *Landscape Design,* 157, pp. 34-37.

- Levitas, G. (1986) 'Anthropology and sociology of streets', *On streets. MIT Press, Cambridge, MA*, pp. 225-239.

- Lörzing, H. (2006) 'Reinventing suburbia in the Netherlands', *Built Environment (1978-)*, pp. 298-310.

- Neeskens, J. A. J. and Kropman, J. A. 1984. Bewonersonderzoek beleving openbare ruimte. Instituut voor Toegepaste Sociologie ITS.

- Paja, E. (2015) *Evolvements of the Woonerf concept and design in urban planning*: @issuu. Available at: https://issuu.com/elvispaja/docs/elvis_paja__def_-_evolvements_of_th (Accessed: 15/05/2021 2021).

- Streets, R. (2008) *Case Studies*. HomeZones. Re:Streets: Re:Streets. Available at: https://www.restreets.org/case-studies/home-zones (Accessed: 09/03/2021 2021).

- Transport, D. f. (2019) *Reported road casualties in Great Britain 2018 annual report*.

- Vanderbilt, T. (2020) *The Pandemic Shows What Cars Have Done to Cities*: @theatlantic.
- Available at: https://www.theatlantic.com/ideas/archive/2020/04/pandemic-shows-what-cities-have-surrendered-cars/610423/ (Accessed: 15/05/2021 2021).

- https://www.newsshopper.co.uk/news/10416214.catford-all-night-raves-on-residential-street-drive-neighbours-crazy/

- http://ucdesustainability.blogspot.com/2011/07/wonderful-world-of-woonerfs.html

- https://www.thestar.com/news/gta/2010/01/20/how_streets_look_good_naked.html

- https://www.google.co.uk/maps

- https://digimap.edina.ac.uk/

- https://neighbourhoods.typepad.com/neighbourhoods/2004/03/home_zones_and_.html

- https://www.publicspace.org/works/-/project/b029-northmoor-homezone

- https://www.google.co.uk/intl/en_uk/earth/