UNIVERSITAT POLITÈCNICA DE VALÈNCIA

ETS INGENIERÍA DE CAMINOS, CANALES Y PUERTOS

TRABAJO DE FIN DE GRADO

Redesigning public urban space according to criteria of liveability. Türkenstraβe (Munich) as case study.

Presentado por

Eguidazu Casamitjana, Sergio

Para la obtención del

Grado en Ingeniería Civil

Curso: 2019/2020

Fecha: 15 de agosto de 2020

Tutor UPV: Tomás Ruiz Sánchez

Cotutora (TUMünchen): Julia Kinigadner

Acknowledgments

I would like to express my gratitude to everybody involved in the composition of my thesis. First of all, I would like to thank my supervisor in the Technical University of Munich, M.Sc. Julia Kinigadner, and her colleagues from the Chair of Urban Structure and Transport Planning, whose expertise and supervision has contributed to a more accurate scope of the thesis.

I would like to extend my gratitude to Priya Pawar and Dominic Waddell. Their contribution of reading over the thesis has definitely helped enrich the document with a more sensible and clear order of ideas.

This thesis is also the result of years of education at the Polytechnical University of València, cultivating knowledge and building up a more critical way of thinking. I especially would like to extend my gratitude to Professor Tomás Ruiz Sánchez, for accepting the role of supervisor of the thesis in my home university and kindly supplying me with any information I requested.

To my fellow colleagues from the organisation Alacant en Bici, I also extend my gratitude. They have made me aware of the importance of rethinking how cities are shaped. Their commitment and persistence have inspired me to pursue a better understanding about the topic of cities and urban design.

Above all, I must express my deepest appreciation to my beloved family, whose endless love and trust I feel every day. To my father, Félix, whose persistence, confidence, and belief in me has helped me accomplish several milestones in my life, this thesis being the most recent one. To my mother, Pepa, whose encouragement and belief in education has inspired me to seek out new knowledge and to utilise and benefit from many academical opportunities. To my brother, César, for always being by my side, for sharing many life experiences with me, for helping my parents in darker moments and for looking after them whenever I was not there. And lastly, to you, Amama. I know wherever you are, you would be very proud of my performance.

Abstract

During the last century urban changes in many cities have predominantly focused on mobility as the primary function of streets, neglecting the importance of streets as a space for socialisation, stay and recreation. New urban developments and redesign trends are influenced by criteria of health, space and energy efficiency, integration of nature, and environmental sustainability. These guidelines raise awareness about the importance of the quality of urban spaces, not exclusively in terms of mobility functions, but also in terms of how to trigger more active social life on streets. The thesis aims to contribute to the process of redesigning public spaces from a pedestrian and bicycle-friendly perspective by suggesting a method for assessing the liveability potential of a street under investigation. Considering aspects such as land use, mix of uses, mobility functions, accessibility, or stationary activities, the method is an aid for decision-makers to identify weaknesses and opportunities in any urban space. Türkenstraβe, in the city of Munich, is considered as a case study for the application of the method, final output of which is a street design according to the framework of the method.

Resum

Durant l'últim segle, els redissenys urbans s'han centrat predominantment en la mobilitat com a funció principal dels carrers, descuidant la importància d'aquestes com a espais de socialització, estada i esbarjo. Els nous desenvolupaments urbans i tendències de redisseny estan generalment influenciats per criteris de salut, eficàcia espacial i energètica, integració de la natura i sostenibilitat mediambiental. Aquestes pautes incrementen la sensibilitat al voltant del disseny i la qualitat dels espais urbans. Pretenen no només atendre les funcions de mobilitat, sinó també desencadenar una vida social més activa en els carrers a través d'un millor disseny. El present treball fi de grau té com a objectiu contribuir al procés de redisseny dels espais públics des d'una perspectiva amable per a vianants i ciclistes a suggerir un mètode que avalue el potencial d'habitabilitat de qualsevol carrer. Considerant aspectes com ara usos del sòl, patrons de mobilitat, accessibilitat o activitats estacionàries, el mètode suggerit és una ajuda per identificar debilitats i oportunitats en qualsevol espai urbà. Türkenstraβe, a la ciutat de Munic, es considera com a cas d'estudi per a l'aplicació del mètode, el resultat final del qual és un redisseny de l'espai urbà.

Resumen

Durante el último siglo, los rediseños urbanos se han centrado predominantemente en la movilidad como función principal de las calles, descuidando la importancia de estas como espacios de socialización, estancia y recreo. Los nuevos desarrollos urbanos y tendencias de rediseño están generalmente influenciados por criterios de salud, eficiencia espacial y energética, integración de la naturaleza y sostenibilidad medioambiental. Estas pautas incrementan la sensibilidad en torno al diseño y calidad de los espacios urbanos. Pretenden no solo atender las funciones de movilidad, sino también desencadenar una vida social más activa en las calles a través de un mejor diseño. El presente trabajo fin de grado tiene como objetivo contribuir al proceso de rediseño de los espacios públicos desde una perspectiva amable para viandantes y ciclistas al sugerir un método que evalué el potencial de habitabilidad de cualquier calle. Considerando aspectos como usos del suelo, patrones de movilidad, accesibilidad o actividades estacionarias, el método sugerido es una ayuda para identificar debilidades y oportunidades en cualquier espacio urbano. Türkenstraβe, en la ciudad de Múnich, se considera como caso de estudio para la aplicación del método, cuyo resultado final es un rediseño del espacio urbano.

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1. Introduction

In 2007 cities inhabitants already exceeded the population in the countryside. In 2030 the population expected in cities will rise to 60% of the total (5 billion people) (Nations, 2019). With this framework, cities offer the public space where people gather. The street transforms into the common, shared space where everything happens: frenetic movement, goods and people exchange, social interaction or recreation.

The streets, as the public place where all social activities take place, emerge as a factor that contributes to the solution of many of the existing imbalances and challenges for current cities. For many decades streets have been broadly regarded just as mere communication arteries. However, the functions of a great street go beyond the simple purpose of vehicular and pedestrian traffic

"It is a mistake to judge a city's public realm based on the primary purpose of each of its components. Public parks are not just outdoor recreational facilities; public squares are more than places for social interaction; public streets are not mere travel corridors" (Garvin, 2016). All the mentioned overlooked functions of public spaces can have an important potential in the charm or liveability of a street. However, whereas parks or plazas are recognisable spots for recreation**, what is the function of a street?**

Streets are meant to bridge distances from one point to another, yet they house in-between many other relevant activities that decisively contribute to the liveliness of a city. Streets may provide benches for pedestrians to sit; Streets also may serve as a shelter from the extreme weather (sun, wind or precipitation) and also act as the field where multiple activities and interactions among people might take place.

This dissertation aims to understand the conditions that characterise liveable streets. Concepts worked here will mostly refer to streets, as the most widespread urban space, yet these conditions can also refer to other urban spaces: plazas, parks, alleys, promenades, etc. Furthermore, the underlying purpose of this thesis is to raise awareness and reflection about what our current streets are used for, and how underutilised their potentials might be.

Throughout the study a varied range of aspects will be covered. After addressing the definition of public space and public life, the chapter 3 offers a brief review through the history of streets, emphasising the different tendences in street design until today. Thereafter, chapter 3 reflects the state of the art about benefits and conditions for urban liveability. The principal output of this study is presented in Chapter 6, it consists of a

procedure for assessing liveable conditions of a street, indicated for early stages of a redesign process. Finally, the chapter 7 mentions some strategies for street redesign in order to trigger public life, following recommendations from guidelines. The chapter 8 shows, as a case study, the Türkenstraβe in the city of Munich (Germany), that is assessed applying the concepts covered in chapters 6 and 7. The study ends with a conclusion, in which the strengths and limitations of the proposed method are emphasised. Furthermore, the conclusions highlight the main aspects of liveability obtained after conducting the research.

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2. Public urban space and public life

A public space refers to an area or place that is open and accessible to all peoples, regardless of gender, race, ethnicity, age or socio-economic level (UNESCO, 2017). Due to the vast diversity in the nature of public spaces, it is not feasible to cover all of them within the scope of the present study. Streets, avenues, boulevards, plazas, parks, gardens, roads, alleys, but also public buildings or transport infrastructures such as underground passages, platforms… are examples of public urban spaces, but not necessarily places with a thriving public life.

Jan Gehl and Birgitte Svarre define in *How to study public life?* (2013) **public space** as "*streets, alleys, buildings, squares, bollards:* ***everything that can be considered part of the built environment***". Public urban space encloses and shapes the public zone and interconnect the city and consequentially its occupants. They fill the gaps between buildings and are the framework for public life.

The definition of **public life** is very broad and comprises all the tremendously **complex interactions** that take place, both **in the private and public sphere**, but which can be **observed from the public space**. Of course, people standing on a crosswalk, tourists enjoying a tea in a café or a person walking the dog are all examples of the public life.

A city-dweller mowing the lawn in the yard; a neighbour smoking on the balcony; teenagers in a basement whose loud music can be noticed by passers-by; or a showcase of a store. All the aforementioned activities, that take place in the private sphere, are part of the public life, since their effects are noticeable from the public urban space, regardless of them being positive or not. The activities interact with people walking, sitting, playing, observing on streets, hence they also become part of the public life.

As imagined, grasping all possible interactions that configure public life is a tough task and requires time, patience and a lot of observation and accuracy. That is indeed the magic of street life, the diverse and unexpected intricate network of actions, spurs and interconnections that take place in such limited space. For comprehending the network of interactions in public spaces, **not just an artistic, rational or engineering education is required**, but **also a human and psychological vision**. The use of public space has usually a lot more to do with insights and feelings passers-by have than with rational decisions. Understanding and application of human psychology is essential for estimating what makes public spaces comfortable and what deters users from visiting them.

3. Streets, a hint of each epoch

The way cities have been shaped during so many centuries explains how city life has flourished, or not. **City planning has a direct correlation with liveability**. As shown in figure 1, urban policies such as concentration of activities or dispersion; segregation or mix of uses; promotion of walkability and cyclability or car ownership, among others, directly influence the liveability of city spaces. All those urbanistic policies and many more related to housing costs, public space management or tourism policies directly influence the activity and prosperity of the public realm.

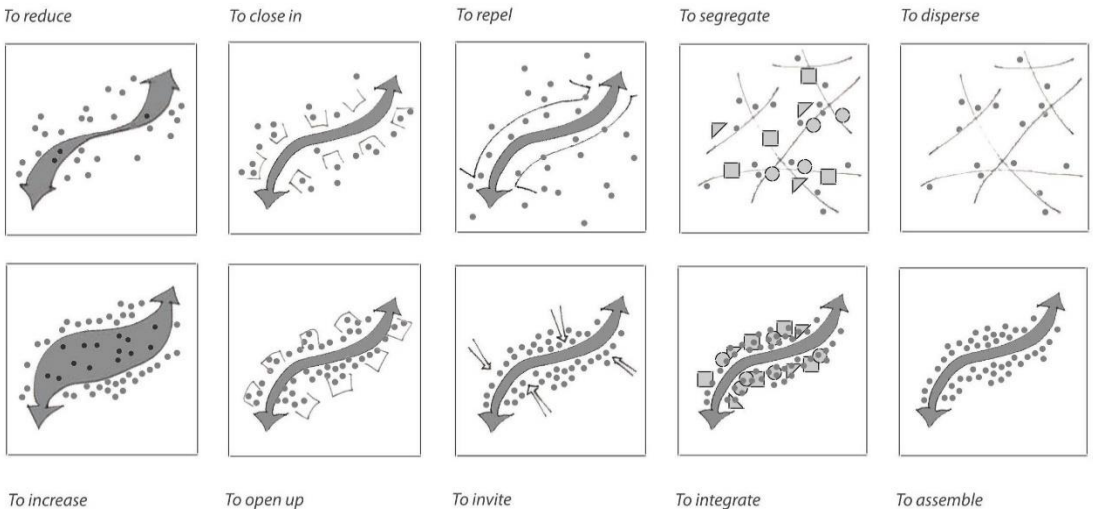


Figure 1; Planning principles: to assemble or disperse. Source: Jan Gehl, Life Between Buildings (1971), 6th edition, The Danish Architectural Press, 2010. Further developed: Gehl Architects — Urban Quality Consultants, 2009.

Walking was until the 19th century the predominant mean of transport and cities were shaped accordingly. Cities by that time featured organic, mixed-use city growth within walking distances without the need for mechanical transports.

With the industrialisation and the rapid city growth, new collective modes of transport arose during the 19th and 20th century. The evolution is shown in figure 2, starting from horsecars and turning into combustion engine buses and cable cars with the electrification of the collective means of transport in 1900, what made them extend over many European cities (Oyón J. L., 1999). This brand-new setting shortened distances and put much more pressure on the streets: different speeds and dimensions had to live together, which was not always an easy task. Along with the public transport prosperity, a new actor appeared. In 1885 Karl Benz manufactured the Benz Patent-Motorwagen. This

milestone is regarded as the birth of the automobile, which changed unstoppably the way cities were shaped.

Figure 2; Omnibus, Horsecar and Tram. Source: "The History of Public Transportation". Retrieved from: https://infographic-journal.com/the-history-of-public-transportation/

During the 19th and 20th century the rural flight, along with the densification and lack of minimum sanitary conditions in cities put urban areas under an important pressure. New currents of thought emerged suggesting radical changes in the way cities were shaped.

The Modernism, supported by the development of the automobile, suggested **a radical break with the traditional city**. The solution, "*the functional city*", aimed to bring light and health to dirty, dark industrial cities. **Le Corbusier**, its main exponent, aimed to "*clean and purge*" the city, bringing "*a calm and powerful architecture*" (Le Corbusier, 1929). He defended a planned urban grid development with remarkable zoning and homogeneous stand-alone high-rise buildings, surrounded by vast green areas and huge segregated transport networks (highways). The most accurate example of a modernist city is Brasilia, capital of Brazil, as seen in figure 3, started from scratch following the ideals of Le Corbusier.

Figure 3; Perspective of the Eixo monumental, arterial road of Brasilia. It features the shape of a plane and all land uses are totally segregated and connected by a vast network of highways. Author: Webysther. Source: Wikipedia. Retrieved from: https://commons.wikimedia.org/wiki/File:Webysther_20180212132345_-_Esplanada.jpg

In the 1960s, when car-oriented developments already influenced the majority of urban developments, new concerns about street life and public space quality arose in America and Europe. They advocated for the recovery of the characteristics of the traditional human-scale city: density, mixed functions and quality of streets and plazas. Their vision was not just in terms of design, but also in terms of psychological and social behaviour of people on streets.

William H. Whyte (*The Social Life of Small Urban Spaces, 1980*), his disciple, **Jane Jacobs** (*The Death and Life of the American Cities, 1961);* **Christopher Alexander**, **Donald Appleyard** or **Clare Cooper Marcus** *(People Places, 1997)* were the maximum American exponents whereas the psychologist **Ingrid Gehl** and his husband **Jan Gehl** stood out in Europe with *Life between buildings* (1971).

In the 1980s and 1990s, the concern about the planet and its sustainability grew sharply. The **Oil Crisis** outbreak in 1973, green movements against nuclear power or the **Brundtland Report**[1] in 1987 were relevant milestones for raising awareness of the environmental issues and putting the environmental defence definitely in the political agenda. The externalities of an economy based on fossil fuel were put into discussion. Public life-public space studies benefitted from the new trends.

3.1. Our current cities

Nowadays most of the cities already recognise the importance of liveability and street vibrancy for attracting new residents, jobs and opportunities. The Modernism distanced activities in public spaces and impoverished the quality of street life. Liveability and health have been put at the centre of priority in many local governments such as Copenhagen, New York, Barcelona or Paris with the implementation of strategies such as **superblocks** in Barcelona or **the city of 15 minutes**[2] in Paris. The idea is clear: space for pedestrians and sustainable modes must be reclaimed and gained by reallocating the space from motorised private traffic.

3.1.1. European cities

Most European cities still preserve their **compact**, bustling **quarters**. Nonetheless, they have also been influenced by the arrival of the car: European cities have sprawled during the last 50 years. Suburbia has grown in extension with medium-density and low-density developments, bringing problems of accessibility to public transport and traffic congestion. However, the **structure of European cities** still presents a **great opportunity** for making them more **liveable, inclusive and sustainable**. The density of European cities,

[1] *Our Common Future* is the original title of the so-called *Brundtland Report*. Brundtland was a Norwegian Prime Minister and the Chair of the World Commission on Environment and Development (WCED), in charge of its composition.

[2] The city of 15 minutes has been developed by the professor Carlos Moreno at the Sorbonne in Paris. It refers to a city which contains all the facilities a citizen might need (work, home, education or healthcare) within a radius of 15 minutes walking (Whittle, 2020). The has become very popular after the outbreak of the COVID-19 pandemic in 2020.

diversity of buildings and attractive public transport allow changes in street design with higher benefits in triggering liveability and social life.

3.1.2. North American cities

The aspirations of modernist ideas and the consumerism society are epitomised by many car-oriented North American cities i.e. Detroit, Los Angeles or Atlanta. From the 1920's onwards, thanks to cheap oil prices, the **powerful American automobile industry** persuaded governments and society through huge advertisement campaigns and political pressure to buy cars. Thanks to the automobile, living in the countryside and working in the city was possible. American suburbia was born, and **the car became essential for most American citizens**. As a matter of fact, Northern American cities were rapidly adapted to them: cities de-urbanised, land uses were clearly segregated by zoning laws, and urban highways were built, sometimes bulldozing blocks of buildings and creating barriers within neighbourhoods with important consequences in the quality of urban spaces. **Streets turned into roads**. Moving cars flowingly was now the priority and pedestrians were an obstacle to it. The North American automobile industry even created the term ***Jaywalking*** (see 3.1.5. Jaywalking) as shameful and dangerous behaviour.

The North American model for cities is **highly costly** in terms of energy and land-use efficiency and municipal costs. It also **impoverishes street vibrancy**: the lack of housing density, retail shops, and huge distances, result in barely any street activity in car-centred developments. Pedestrians are seldom spotted, there is not enough density to have a minimum pedestrian mass that could afford setting up retail businesses: retail shops are substituted in favour of shopping malls, just accessible by car**. Walking** and **cycling** became monotonous and **non-competitive**. Besides, public transport is normally poor in terms of coverage, capacity, frequency, commercial speed, and hence modal split.

3.1.2.1. Jaywalking

"Jay (silly person) + walk: cross or walk in the street or road unlawfully or without regard for approaching traffic[3]".

For centuries crossing the street as a pedestrian was simple, just by doing it. Streets were for people walking, children playing, streetcars or pushcart vendors. There was no need for crosswalks or traffic lights. Right after the arrival of motorised traffic, vehicles had to avoid pedestrians. Streets were bustling, yet cars were still a minority. *"But under the new model, streets became a place for cars — and as a pedestrian, it's your fault if you get hit"* (Norton, 2011).

[3] Definition provided by Lexico (powered by Oxford)

Figure 4: Left: Manhattan's Hester Street, on the Lower East Side, in 1914. (Maurice Branger/Roger Viollet/Getty Images). Right: In 1925 Midtown Manhattan, pedestrians compete for space with increasing automobile traffic. (Edwin Levick/Getty Images). Retrieved from: Vox.com

In the 1920s motorised traffic took over the streets and pedestrians faced increasing death rates. Figure 4 serves as a comparison between both contexts. After initial blame on car drivers, the automobile lobby responded persuading American local governments to change the Municipal Traffic Ordinances: *"The crucial thing it said was that pedestrians would cross only at crosswalks, and only at right angles […]. Essentially, this is the traffic law that we're still living with today*" (Norton, 2011). The **law changes were propagated by a strong advertisement campaign from the car industry trying to ridicule pedestrian behaviours** (see figure 5). Pedestrians who were hit by a car after crossing the streets were labelled as clumsy and jay (silly).

Figure 5; Government safety posters ridicule jaywalking in the 1920s and '30s. Source: National Safety Council/ Library of the Council. Retrieved from: https://www.vox.com/2015/1/15/7551873/jaywalking-history

3.1.3. Chinese high-density sprawl:

China decided a radical makeover of its urban planning. From former compact, mixed-use, cycling cities, Chinese cities morphed into a car-oriented model of zoning with multi-storey buildings located in superblocks, surrounded by high-capacity roads. This layout, which is distant from a human-scaled city (as represented in figure 6), reduces walkability and cyclability. Superblocks are barely permeable and the perimetral roads are hostile places for pedestrians and cyclists. **"***The result is relatively low densities in*

neighbourhoods with virtually no street or community life – in short, not the kind of urban area one would call liveable" (Swilling, 2016). China has realised its mistake and is adopting new strategies to revert it, states Swilling.

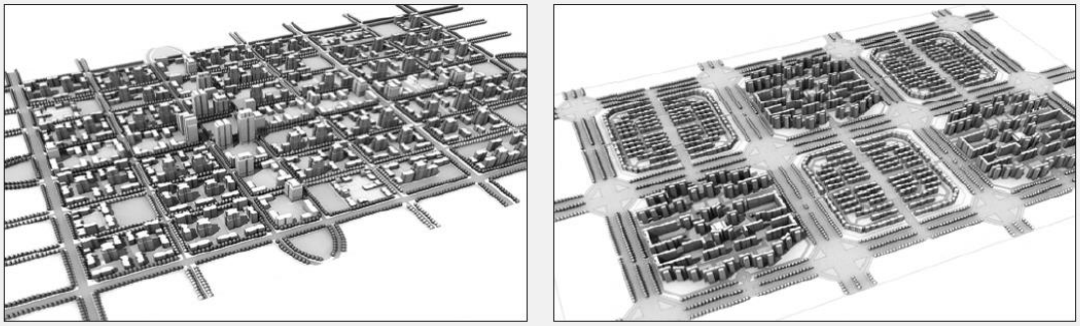


Figure 6; Small blocks vs Superblocks (Chinese model). Source: Figure 7-2. Book: Can a City be Sustainable? (p.99)

3.1.4. Cities in developing countries, the low-income sprawl:

Countries in Asia, Africa or South America are facing the so-called low-income sprawl: slums, favelas, barrios or illegal housing that emerge in the outskirts of many cities (Nairobi, Rio de Janeiro or Medellín), distant from transport networks and urban services that emphasize social divisions within the population. On the other hand, Indian sprawl features a massive city-dwellers concentration in the urban core (Swilling, 2016).

Concerning public life the low-income urban settlements are **rather active in terms of public life** but under a lot of human pressure. The outstanding population density and the lack of municipal facilities or private properties make the urban public space the only place available for recreation. Children playing, the elderly chatting and keeping a watchful eye on them or street vendors selling products are a common vignette on the streets of developing cities. Nonetheless, this contrasts with a lack of minimum safety for citizens, especially women, and an increasing motorisation: all sorts of polluting vehicles (motorbikes, mopeds, rickshaws or private collective buses) drive back and forth in narrow, overcrowded streets.

4. The street, the block, the neighbourhood, the city

4.1. What is a liveable street?

> *"Livability means being able to take your kids to school, go to work, see a doctor, drop by the grocery or post office, go out to dinner and a movie, and play with your kids at the park – all without having to get in your car*".
>
> *Ray LaHood, U.S. DOT, Secretary of Transportation*

Figure 7; Left: Junction in Oxford Street, London, one of the busiest streets in the Globe. (Source: Daily Mail). Right: Les Rambles of Barcelona, always a blooming public life destination. Retrieved from: https://www.saba.es/en/parking-la-rambla-barcelona

A **liveable space** can be described as **somewhere you want to stay or walk through**, no matter if you are a resident or just a passer-by. You find it, either way, welcoming because it gives you pleasant sensorial experiences or you come across something there that makes you feel better: relaxation, entertainment, knowledge, socialisation or isolation (a sample of possible liveable spaces is shown in figure 7).

On a liveable street, you feel comfortable: it is neither too hot nor too cold or windy; it is roomy enough to carry out all your activities and move around without feeling the stress of the crowd around; the level of noise is acceptable, in the ideal case even pleasant; and you feel safe on it: you do not expect dangers due to traffic accidents or pickpockets.

Jan Gehl compiled for educational use in the Royal Danish Academy *The 12 quality criteria concerning pedestrian landscape*, which any lively street ought to fulfil (see picture 8). They were divided into protection, comfort and enjoyment. Finally published in *Cities for people* (2010), the conclusion shown is that **aesthetics is not the fundamental asset a street needs to have**, but it is **more the utilities and functions** it offers instead.

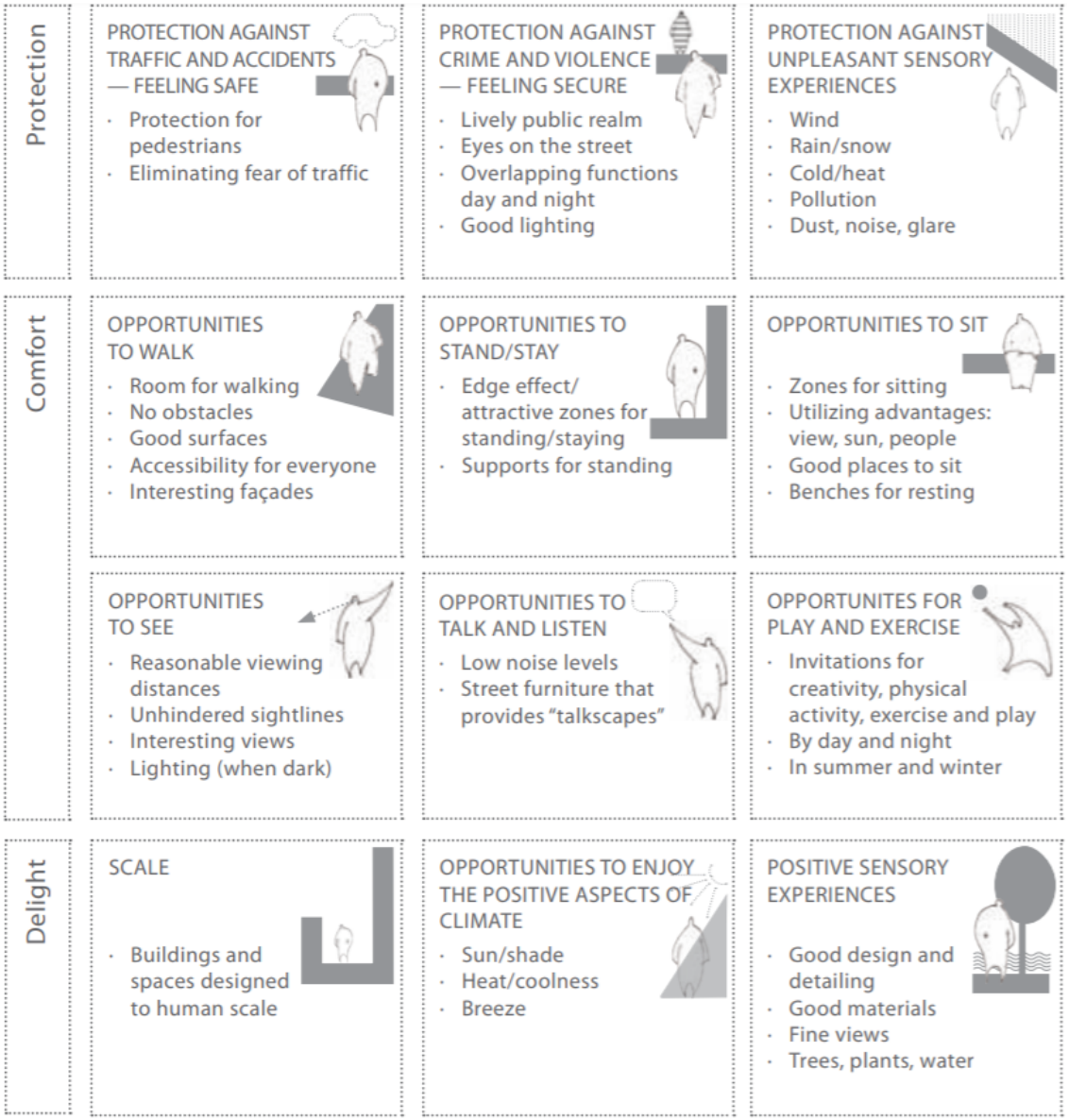


Figure 8; 12 quality criteria concerning the pedestrian landscape. Source: Gehl, J. Gemzøe, Kirknæs, Søndergaard, "New City Life," The Danish Architectural Press, 2006. Adapted and published in *Cities for people* (2010).

4.2. Why do we want them?

4.2.1. Community building

As stated by Aristotle in the 4th Century, we, humans, are social animals, a *zoon politikon*. We are instinctively prone to live in communities, where cooperation is the cornerstone. Cities are the result of the necessity of community, the structure that provides us with a framework to be together and develop multiple interactions. Liveable streets are the outcome of the wish of socialisation along with the realisation of social activities in synergy. On liveable streets needs are fulfilled: humans see other people, talk, criticise, gossip, associate, demonstrate, play, sit, walk, wander around etc. And foremost: **liveable**

streets unite neighbourhoods (foster multiple social activities), **roads divide them** (focus on mobility as the only function on streets).

4.2.2. Pleasure and relaxation

People naturally avoid main noisy streets, windy alleys, or unsafe walkways. On the contrary, pedestrians are more likely to choose pedestrian streets, far from the noise of cars and where the crowds of people make them feel more accompanied; or vegetated paths with sunlight and good climate conditions, from which streets offer a more inspiring sensorial experience. Humans crave for pleasant sensations. They enhance mental stability, **reduce anxiety and cognitive disorders**.

4.2.3. Opportunities and entertainment

The activities that take place on liveable streets are a source of interest for many people. Liveable streets gather different people with multiple interests and purposes. It is the main virtue that sustain liveable streets: its diversity. We choose these streets because we are aware about the potential of diverse activities that might take place on them: markets, parades, demonstrations, exhibitions, shops, street performances, gatherings, or simply a lot of people. **People attract people:** *"man is man's greatest joy"* (Gehl, Cities for people, 2010).

4.3. Why do we need them?

> "*A sustainable city is a vibrant human settlement that provides ample opportunities, in harmony with the natural environment, to create dignified lives for all citizens*".
>
> Can a City be Sustainable? The Worldwatch Institute. 2016

4.3.1. Equity:

Liveable public space makes us equal. We, as residents, feel included within them, regardless of our income, social standing, origin, race or age. We all share the same space and have the **same right to use it**. A liveable street is also equal and inclusive regarding its accessibility. It is a reachable destination for inhabitants who do not own a car and for overlooked groups: they welcome the elderly, children, handicapped citizens and consider the gender perspective.

4.3.2. Sustainability:

The current use of earth resources does not guarantee the prosperity of future generations. The conditions for ensuring liveable streets go along with the framework for making cities sustainable: promotion of walkability and cyclability, reduction of distances and car

dependency, reduction of noise and air pollution and retrieval of nature in cities (trees, permeable surfaces or reintroduction of species).

4.3.3. Prosperity:

Liveable streets are the cradle for prosperity. Prosperity for residents and passers-by, biodiversity, businesspeople and small entrepreneurs. Thriving streets nurture the setup of new businesses which, by large, find enough customers that can make them flourish. Liveable spaces are, therefore, a **factor of economic and social development**.

4.3.4. Efficiency:

A liveable city exploits space much better. In a inviting street people tend to walk and cycle more and public transport is normally convenient and efficient whereas private cars can be left behind. The approach for space utilisation turns more people-centered (see figure 9). It tends to address the issue of **how many people can use the same space** as compared to the approach of how many vehicles can make use of that space, used in car-oriented philosophies.

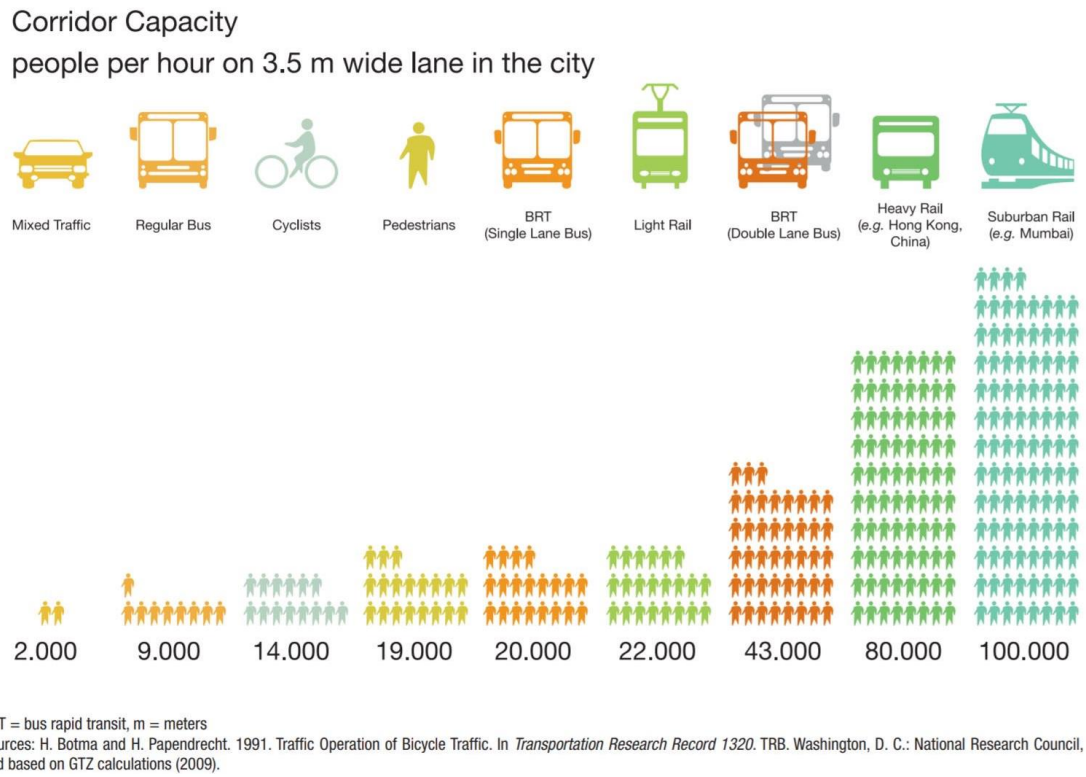


Figure 9; Capacity per mode. Source: see Figure. Retrieved from: Twitter (SLOCAT Partnership)

The **land consumption** of this compact model is notably **lower** than extensive car-oriented planning while accommodating the same number of inhabitants and allowing other supplementary activities. More compact cities allow more farmland and avoid nature bulldozing. It is also efficient in terms of municipal costs, since the required investment for

transport infrastructure, sewage pipes, street lighting, waste collection and gas conductions, inter alia, is expected to be lower (see Figure 10).

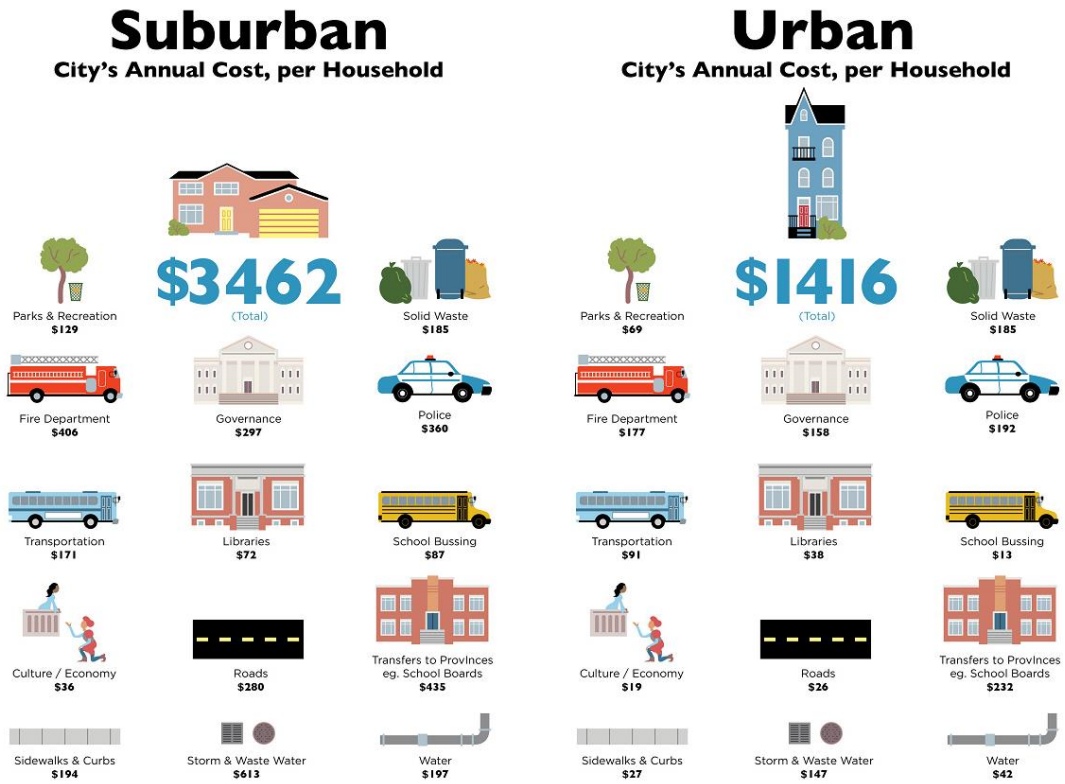


Figure 10; Public services for suburban development cost more than double the services for urban areas in Halifax, Nova Scotia (figures are in Canadian dollars). Image: Sustainable Prosperity. Retrieved from: Streetsblog USA

4.3.5. Health:

The promotion of human-scale cities goes back to the topic of health. Current cities are a hub of sedentary lifestyle, congestion, noise, and air pollution. It directly affects the health of its inhabitants.

Noise is behind clinical pictures of anxiety, nervousness, sleep disorders or cardiac diseases. Air pollution is already a main global health risk. 9 out of 10 urban citizens breath polluted air (Nations, 2019). It causes and worsens respiratory and cardiovascular diseases. Recent studies show air pollution can potentially reduce people's life-expectancy by up to three years and cause 8.8 million deaths a year (Davis, 2020). Plus, our dependence on passive mobility and our sedentary lifestyle cannot help but aggravate the onset of these diseases.

A more **active mobility** with closer destinations is likely to have positive consequences in terms of physical activity. Cardiac diseases and obesity rates are likely to be reduced, as well as deaths caused by sedentary lifestyle. Car accidents and the costs for the

healthcare system would decrease. But what is more, more active mobility would imply a likely increase in happiness in citizens. Physical exercise decisively contributes to the release of endorphins and serotonin, hormones closely related to the levels of happiness. Therefore, **active mobility correlates with happier citizens**.

4.4. What makes a street liveable?

Figure 11. Left: Neuhauser Straße, Munich (Source: muenchen.de). Right: Calle Preciados, Madrid, on a sunny day. Source: ESpecial Life

A liveable street needs activity and diversity. All researchers share the same starting point. It needs different people with different purposes. The diversity of activities is what makes streets so appealing. All following conditions are not exclusive, but rather cumulative. They are all necessary conditions for liveability, none of them is to be neglected.

1. Cross-use streets. The need for mixed primary uses
2. Connectivity and accessibility. The need for small blocks
3. Heterogeneity. The need for aged buildings
4. Density. The need for concentration
5. Safety: the eyes on the streets.
6. Social fabric
7. Integration of nature
8. Less and calm traffic
9. The size of the city matters

Jane Jacobs introduces **four conditions for liveability** in her masterpiece *The Death and Life of Great American Cities* (1961). As Jacobs states in part two (the conditions for city diversity) all four criteria must be fulfilled for developing a holistic potential of every neighbourhood, without exception. The **inability to meet any of these conditions inhibits the potential for a street to become liveable**.

4.4.1. Cross-use streets. The need for mixed primary uses

"*The district, and indeed as many of its internal parts as possible, must serve more than one primary function: preferably more than two. These must* ***insure the presence of people*** *who go outdoors on* ***different schedules*** *and are in the place for different purposes, but who are able to use many facilities in common*" (Jacobs, 1961). Jacobs defines primary uses as the activities which are anchorages (factories, offices, dwellings and some recreational and educational activities). Secondary diversity appears correspondingly for serving people attracted by primary uses. Secondary diversity can even become a primary use if it flourishes to the extent that it becomes a new pole of attraction. All in all, the balanced flow of people guarantees street safety (eyes on the streets), diversity in businesses and economic prosperity: businesses can prosper, they have customer throughout the entire day.

4.4.2. Connectivity and accessibility. The need for small blocks

"*Most blocks must be short, that is, streets and opportunities to turn corners must be frequent. […] (They) are valuable because of the fabric of intricate cross-use that they permit among the users of a city neighborhood*" (Jacobs, 1961). **Great connectivity** of the streets for walking allows greater route choices, makes **walking a more diverse** experience and, thus, more **attractive** and **efficient**. It redistributes pedestrian flows more uniformly.

Alexander Garvin completes this definition adding the importance of the accessibility. A good public realm must be "*open to anybody, that is, overwhelmingly* ***identifiable, accessible, and easy to use***", he states.

4.4.3. Heterogeneity. The need for aged buildings

"The district must mingle buildings that vary in age and condition, including a good proportion of old ones so that they vary in the economic yield they must produce" (Jacobs, 1961). Jacobs focuses in this chapter on the **costs for businesses** of building brand-new facilities and the money they save with old amortised buildings. Furthermore, Jacobs sees in this the variety she craves. She strongly refused homogeneity, standardised forms are dull and reduce street attractivity. "*Differences and not duplications*" give identity and hence charm to neighbourhoods. "*Monotony is the enemy*", Jacobs related. Jan Gehl and his theory of active edges back this argument.

4.4.4. Density. The need for concentration

"The district must have a sufficiently dense concentration of people, for whatever purposes they may be there. This includes people there because of residence" (Jacobs,

1961). Jacobs strongly criticised low-density developments. They do not allow the concentration of people, no business is feasible and the landscape they provide is monotonous and lacking charm, she states.

4.4.5. Safety: the eyes on the streets.

In addition to these conditions, Jacobs pointed out other vital factors for the liveliness of a street, such as safety. Residents watching from their balconies, shop assistants observing from their storefronts or workers on the streets are the most efficient surveillance. **The flow of people makes the streets safer**. *"First, there must be a clear demarcation between what is public space and what is private space. […] Secondly, there must be eyes upon the street, eyes belonging to those we might call the natural proprietors of the street. […] And third, the sidewalk must have users on it fairly continuously, both to add to the number of effective eyes on the street and to induce the people in buildings along the street to watch the sidewalks in sufficient numbers"* (Jacobs, 1961). Furthermore, the term safety also implies strategies of street lighting and traffic calming.

4.4.6. Social fabric

The public space is the framework that allows the **building of a feeling of community** by promoting social gatherings and random casual contacts. It builds up a social network necessary for a liveable neighbourhood and mends the social gap that private space aggravates. *"The sum of such casual, public contact at a local level – some of it fortuitous, most of it associated with errands, all of it metered by the person concerned and not thrust upon him by anyone – is a feeling for the public identity of people, a web of public respect and trust, and a resource in time of personal or neighborhood need. The absence of this trust is a disaster to a city street"* (Jacobs, 1961).

Also important is the existence of what Jacobs calls "public characters": storekeepers or barkeepers, who get in touch with many people and whose contribution to building neighbourhood network is vital. They play an important role in sharing concerns among residents or giving a first impression to foreigners about the identity of the neighbourhood.

Figure 12; Bryan Park, an oasis amid the bustling New York. Source: lovingnewyork.es

4.4.7. Integration of nature

Green infrastructure also plays a prominent role on liveability. Even in cities, the need for people to connect with nature excels as a basic human desire. Streets in which nature is integrated are more welcoming and pleasant than hard, paved streets. The benefits of it are varied. They provide a **better sensorial experience**: the range of colours from trees, bushes and flowers in winter and autumn can spur a delightful experience; the smells they release can be inspiring or even disruptive for allergic people, and the sounds of birds twittering add attraction to streets. Moreover, trees act as a noise barrier, reducing noise pollution from traffic and other activities. They also help clean the air by not only producing oxygen, but also act as particulate filters to capture dust and other aerosol particles floating in the air.

Plus, they guarantee **mild microclimate conditions** within the vicinity of integration. They have an important thermoregulatory function by diminishing the undesirable urban heat island effect. They provide shadow in hot sunny days and warmth in autumn. Green infrastructure, especially native species, also has an important role in promoting **urban biodiversity and resilience**: they help reduce stormwater effects and improve air quality.

4.4.8. Less and calm traffic

Donald Appleyard made an important contribution to the topic in *Livable streets* (1981). He conducted a study on how traffic influenced the public realm: how it affected the likelihood of meetings and the use of public space. He studied three streets in San Francisco, where the only difference was the number of vehicles running (2 000 veh/day, 8 000 veh/day and 16 000 veh/day).

The conclusions followed the expected trend (see figure 13): **light traffic promoted more social interactions,** these were more diverse and occurred in more places than just in front of buildings: even children played football on the asphalt. There existed a feeling of community. They had on average more friends (3) and acquaintances (6.3) from their same street by living in a light traffic street than in a heavy traffic street (just 0.9 friends and 3.1 acquaintances).

In this last case, social meetings barely took place in front of buildings and far from the asphalt. Interactions were reserved to neighbours who shared the same building. Meetings with city-dwellers from the other side of the street occurred seldom. There was no sense of community, the street was just seen as a car corridor. Just each apartment was

regarded as their home territory, detached from the street, something foreign to what there was almost no belonging.

Plus, Appleyard asked the participants to draw their streets. Residents of the heavy traffic street drew fewer details than the ones in the light traffic street. These last ones knew their streets much better since they could feel them and experience them more in-depth.

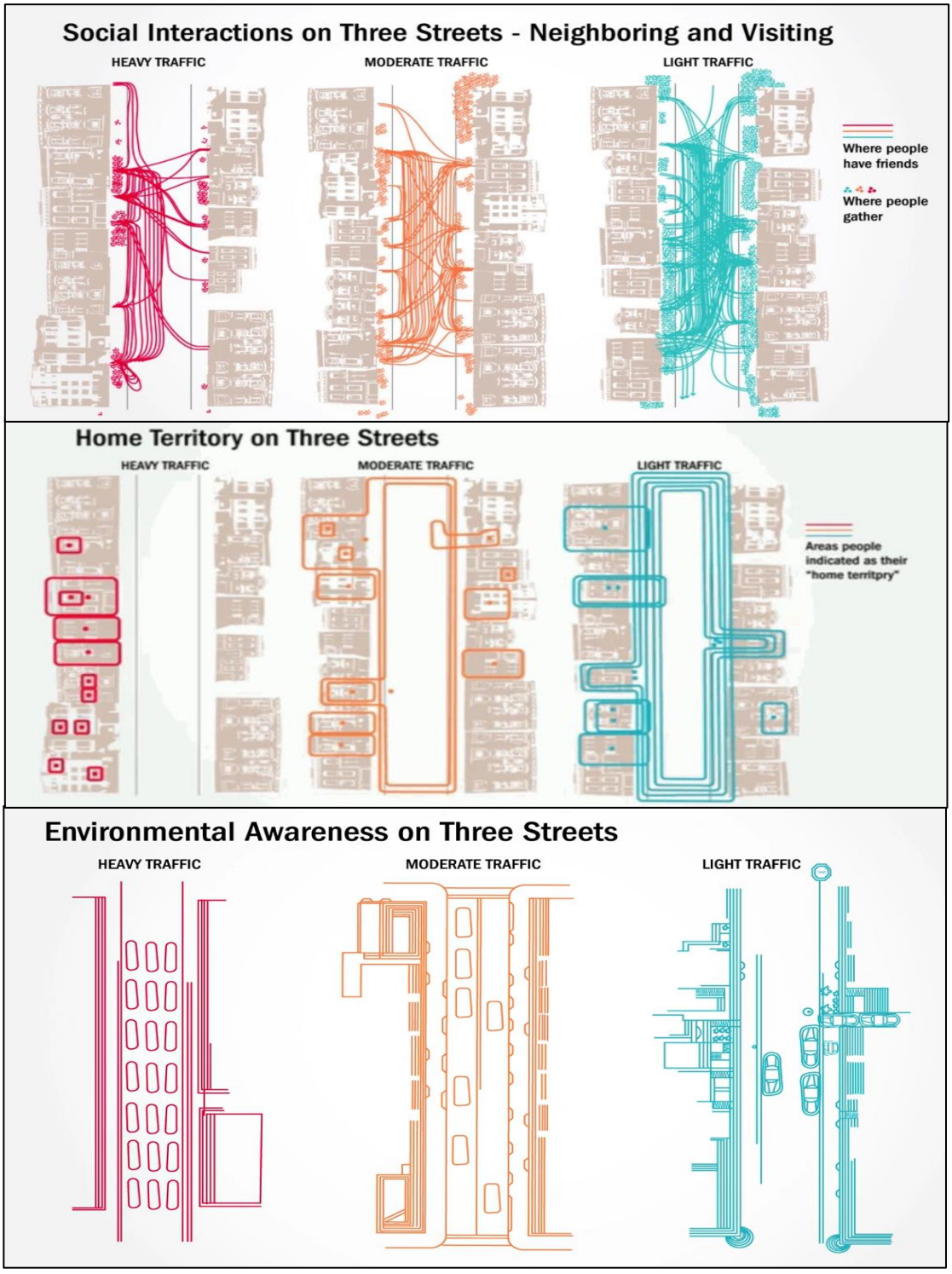


Figure 13; Conclusions of Appleyard studies. Source: Revisiting Donald Appleyard's Livable Streets. STREETFILMS on Vimeo

4.4.9. The size of the city matters

Jacobs also argued that the size of a city directly influences its attractiveness. Following the Central Place Theory of Walter Christaller[4], Jacobs points out that **greater cities allow a broader variety of activities to bloom**: they offer more choices in terms of cultural events (museums, concerts, exhibitions), educational opportunities (libraries, universities…) and more variety of small businesses. The concentration of people allows specific retail shops to be run i.e. "delicatessens, Viennese bakeries, foreign groceries, art movies, and so on". The factor that allows it is the concentration of people, each of them with different style and preferences. In small cities, this would not be plausible, that is why greater cities are considered more attractive.

4.5. The role of the street redesign in liveability

After knowing the conditions for cultivating public life, the following question emerges: **to what extent the streets redesign can contribute to an active public life?** As stated, there are several factors for attractivity and charm that go beyond the design of the public space. The architecture surrounding the public sphere (with its disposition –isolated or embracing the street–; density, compatibility of uses, façade aesthetics, retail shops at street level or not) plays also a vital role, yet it is more permanent and reluctant to changes than the refurbishment of the street layout.

Thus, **land-use policies** are the **first stone for liveability conditions**. They determine the heights and volumes of buildings, their relationship with the street, their possible uses, and how accessible they are to public transport. Given these conditions, the street layout is a key factor in optimising all the opportunities that land planning provides. Thus, it is important to highlight that, **regardless of the street redesign, street life cannot thrive if the land-use simply does not provide the conditions for it** (density, mix of uses or accessibility).

[4] The German geographer Walter Christaller issued in 1933 the Central Place Theory. A Central Place was the point where goods and services were offered. He argued there were different operating ranges depending on the service or good the company was supplying. The more exclusive a product was, the more catchment area it needed to be profitable. Thus, great cities, that possess a greater population, have smaller catchment area because more people concentrate in smaller space, reason why they gathered more diversity in terms of businesses, which with fewer population would go bankrupt.

5. General parameters for assessing street liveability

Assessing street liveability is closely related to observation and behaviour analysis than with mere cold figures and statistics. Gehl and Svarre propose in *How to Study Public Life?* (2016) a variety of questions to be systematically asked: **How many?** (number of people); **Who?** (profile of user/analysis of diversity); **Where?** (distribution of people within the space); **What?** (activities taking place) and, finally, **How long?** (measuring staying times in public spaces or walking times).

Thereafter, they suggest a toolset[5] for answering those questions: **Counting**; **Mapping**; **Tracing** (draw lines registering the movements of people); **Tracking** (follow selected people and register their behaviour); **Looking for traces** (pieces of evidence of human activity i.e. desire paths); **Photographing**; **Keeping a diary** (note down every remarkable observation) and **Test walks** (analyse walking and waiting times or points of conflict).

The method suggested in this thesis, which can be consulted in Appendix 1, aims to provide an easy and complete procedure to evaluate at early stages potentials for a street to be redesigned, both considering the street layout and also the nature of activities that take place in the vicinity of the street in question. Some indicators are meant to be filled out with objective data and some others with maps, sketches, or comments. The method does not provide a framework of acceptable or unacceptable results, since it is hard to establish them, bearing in mind the huge variety of streets and features associated with them. It rather serves as an indicator of weaknesses, strengths, and points of conflict by self-evaluating the results.

This procedure is fostered by the recommendations of the mentioned book (*How to Study Public Life)*, as well as by some other publications from Gehl Architects. For the selection of parameters *Global Street Design Guide* has also been used as a source of information.

An analysis of public life is inevitably subjected to both objective and subjective insights, as well as quantitative and qualitative indicators. That dichotomy is also reflected in the checklist. Nonetheless, all selected **parameters** aim to be **simple** to determine **and are representative for decision-making processes.**

[5] This method is meant to be carried out with conditions that allow an explosion of social life: sunny day, not windy conditions, and mild temperatures.

Figure 14; Checklist workflow suggested for assessing street liveability (Source: Own elaboration). Pictures under Creative commons license.

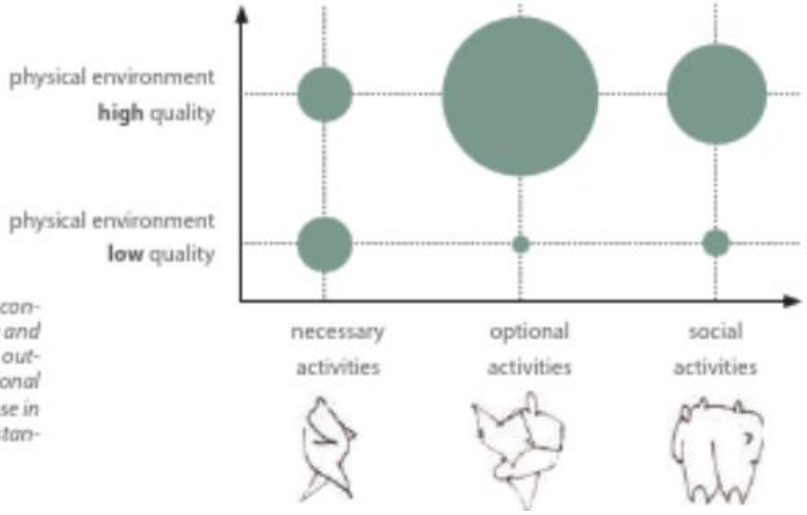
The process, as illustrated in figure 14, is divided into three steps. The **first step** is conducted to **analyse the potentials of any street**. It considers the mix of uses, density and attractivity of the surroundings of the study area.

If the results of the first step reflect ideal conditions for triggering liveability, the **second step** goes deeper into the **analysis of the street layout**. It evaluates if the street design matches the potentials of the area for liveability by analysing mobility, accessibility, comfort, and the use of public spaces.

That second step lays the foundations for the proposal of the street makeover. The **third step** serves as an early rough **comparison of the proposed redesign with the current status**. This third step aims to be an analysis prior to its construction. The third step includes objective indicators and does not contain any sort of on-site parameters, impossible to assess before its construction. It is therefore highly recommendable to assess street life after the redesign construction is being carried out. Nevertheless, the analysis is beyond the scope of the current study.

6. Designing liveable streets. Solutions

The strategies for an urban makeover must fully understand how people make use of streets. When stakeholders are very varied then so are their preferences, sensitivities, and concerns. Gehl (2010) states there are three different street activities: **necessary activities**, carried out under almost all conditions (going to work, school or delivering goods); **optional activities,** with recreational purposes (walk down a promenade or sit on a bench) and **social activities** (play, talk or greet). The two former types of activity are just carried out wherever conditions are tempting and inviting, in which quality is a requirement, see figure 15. A street that embraces and efficiently meets all the needs is a liveable street.



Graphic representation of the connection between outdoor quality and outdoor activities. An increase in outdoor quality gives a boost to optional activities in particular. The increase in activity level then invites a substantial increase in social activities.

Figure 15; Cities for People (p.21), Jan Gehl, Island Press

6.1. Mobility: Shift in the pyramid of priorities

Mikael Colville-Andersen (2018) talks about the arrogance of space when he refers to how the automobile has taken up most of the urban space, even though it moves fewer people, less efficiently and with much greater externalities. **Studies of liveability** invert the current pyramid of transport priorities, by **yielding space to modes** that are not just **more energy-efficient**, but also to the ones that **interact more efficiently with the public life.** Pedestrians and cyclists while walking and riding interact constantly with their surroundings, they experience the streets with all their senses. Those modes, by nature, allow close eye contact with citizens, greetings, pauses to have a conversation, all in all, more participation in public life. Automobile, with its enclosed habitat, fast pace, and undesired externalities; appears to be a disruptive element of public life. Cars hardly allow any minimum interaction of the users with the street life and even affects negatively the quality of interactions of the remaining population (see figure 13).

The street design has to be inclusive an accommodate all possible modes of transport. Yet space constrains always makes the design a compromise among the interests of each mode of transport. Considering the hierarchy in modes represented in figure 16, the solutions for creating liveable urban spaces should be based in the following principles:

Figure 16; Prioritizing People in Street Designs (Source: Global Street Design Guide, NACTO).

6.1.1. Design as the most efficient way of traffic calming:

Car accidents represent an important issue to be eradicated in cities. The consequences of crashes in urban areas are usually closely related to the speed of vehicles in urban areas, as illustrated in table 1. **The street design must ensure a car speed compatible with street life in terms of noise and safety**.

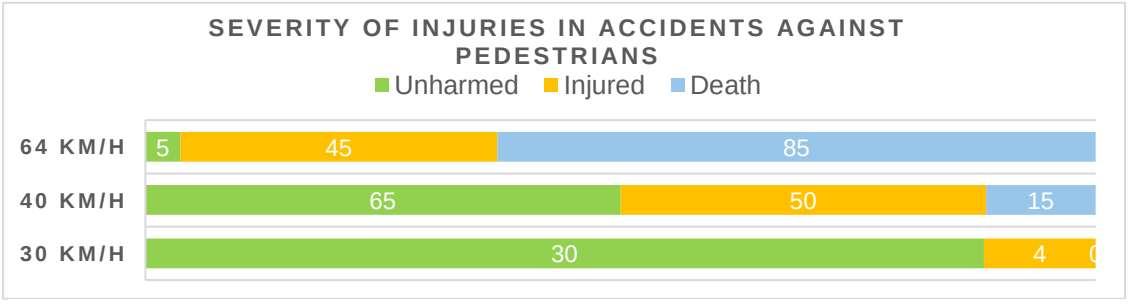


Table 2; Severity of injuries in accidents against pedestrians. Own elaboration. Source: Final Report DDT HS 809, 1999. Retrieved from: DGT.es

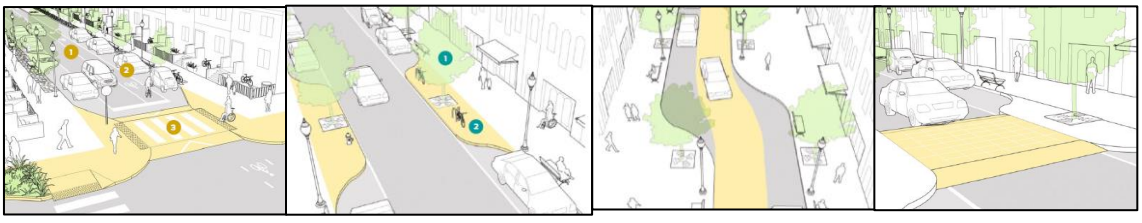


Figure 17; Elements for traffic calming. Respectively, curb extensions, pinchpoints, chicanes and speed tables. Source: Urban Street Design Guide (2013), NACTO

Studies show that actions for traffic calming simply based on signage have a limited effect (Vanderbilt, 2007). Thus, street layout modifications emerge as the proper solution, see figure 17. The strategies range from lane widths reductions (effects of such a strategy are represented in figure 18), chicanes, curb extensions at intersections and crosswalks, radar signs or vertical speed reduction elements (speed humps, tables, or cushions). Also establishing loops, cul-de-sacs or other street divertors is an effective manner of reducing through traffic on secondary streets. Furthermore, studies show drivers are more aware and careful when they encounter unexpected elements such as pedestrians or when they do not have a clear priority or signage. Following these conclusions **shared streets** emerge. It consists of a concept of single platform where all elements interact. Since priorities and reserved spaces are not clear, different agents have to yield the right of way and communicate themselves. The result is a much more aware driving and more sense of safety, yet such a design could create confusion.

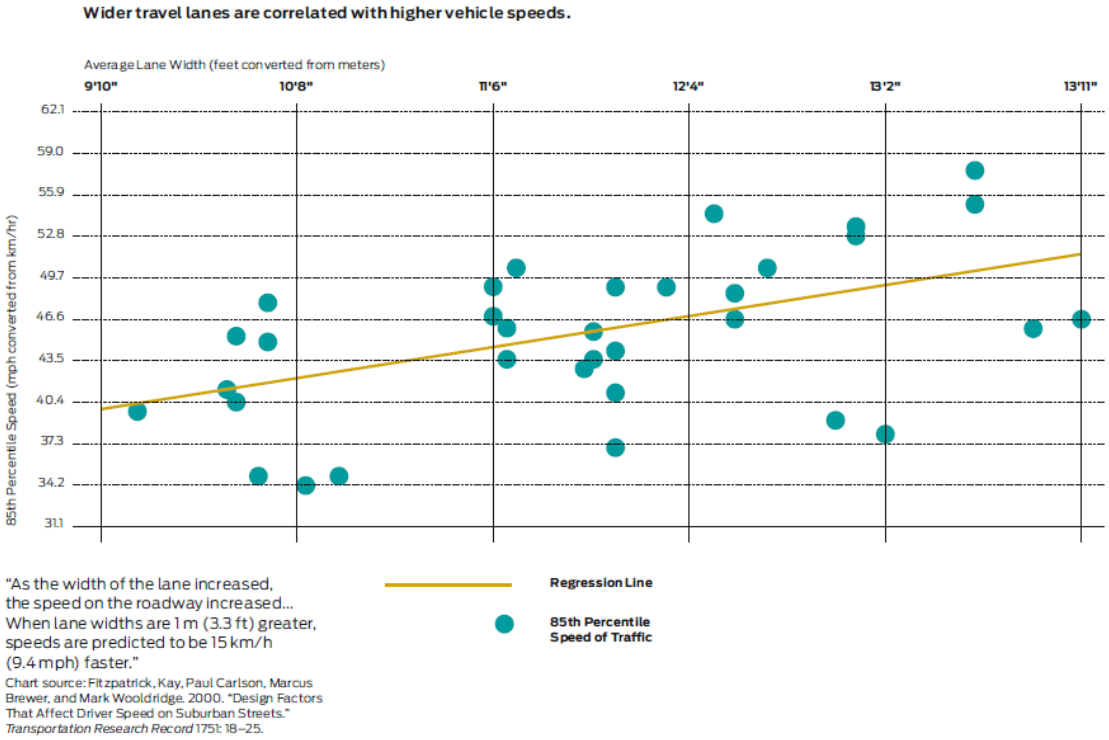


Figure 18; Lane widths and travel speeds correlation. Source: Urban Street Design Guide (2013), NACTO

6.1.2. Sidewalks

Pedestrians are the cornerstone of a liveable street. They have to be granted with a comfortable, inclusive and pleasant space. Sidewalks normally comprise of a through zone (dedicated to the flow of people) and two supplementary zones (both next to the curbs and the façades), where normally stationary activities take place. It is important to understand this difference when allocating street furniture and other elements. The through zone must be a barrier-free path, whereas the supplementary zones are where benches, tables, bus shelters, lampposts, plants and trees, parking meters or hydrants should be allocated. An important aspect to consider is the width of the sidewalks, it

always depends on the pedestrian flow and the particular width of each street. However, as a general approximation, a value of **2.4 meters** is established as the **minimum recommendable width for the clear path**, being 1.8 m the absolute minimum (NACTO). Supplementary activities on streets need additional widths and should never take up space from the clear path. In addition, the following suggestions are to be considered when designing liveable streets:

- **Crossings** should always be **at-grade,** allocated **every 80-100 meters**. After 200 meters or more than 3-minute detour, pedestrians are prone to cross along unsafe routes (NACTO G. D., 2016). An intersection should have crossings connecting every sidewalk: **maximum pedestrian connectivity.** Moreover, crossings, in order to be safe, have to be as **short and as direct** as possible. **Sidewalk extensions** (bulbs-out), **radii narrowing,** and **median refugees** increase visibility and reduce speed and hazard, as represented in figure 19. Lastly, crossings have to be universally accessible through pedestrian ramps and detectable surfaces.

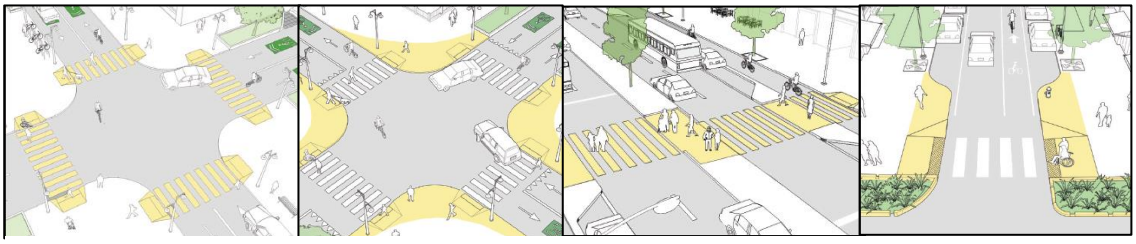


Figure 19; Different design techniques. Respectively: intersection design with 4 crossings; radii tightening; pedestrian refugees and bulbs-out, sidewalk extensions (Source: Global Street Design Guide, NACTO).

- On streets **with a high volume of traffic** and speed a **buffer zone** between circulating cars and pedestrians should be established (e.g. with green infrastructure, parked cars or a buffer area).

6.1.3. Cyclists

A **liveable street** should provide a **coherent, direct, safe and comfortable cycling infrastructure for all types of users** (J. Ploeger, 2007). The needs, expertise, and safety perception are very different among the potential users. On quiet streets, where

Figure 20; Left: vertical and horizontal signage of a Fahrradstraβe in Munich (Source:Green City Experience). Right: signage in a Fietsstraat in the Netherlands (Source: Hart van Enschede)

car traffic flow and speeds are low, a coexistence between motor vehicles and bicycles is feasible and can be guaranteed through traffic calming strategies. In cycle streets (Fahrradstraβe in Germany or Fietsstraat in the Netherlands) bicycles and motor vehicles share the same infrastructure, yet bicycles are given priority.

In main streets, though, segregated cycle lanes allow more vulnerable social groups to feel the required safety to ride a bicycle. Segregated infrastructure, with special consideration to the **design of intersections and points of conflict**, turns out to be essential. The following aspects are to be considered when designing cycle facilities:

- **Avoid conflicts with pedestrians**. Segregate cyclists by curbs, green infrastructure or street furniture. Avoid designing bicycle facilities by removing space from pedestrians.
- **Avoid conflicts with vehicular traffic** through buffer zones and especially at intersections through corner islands, advanced stop boxes for bicycles or cycle signals that give them priority before the car traffic light turns red.
- Promote strategies that increase **bicycle permeability and convenience** e.g. through contraflow cycle streets or traffic diverters. Guarantee safe and accessible bicycle parking facilities.
- **Protected cycle lanes** are preferable in **main streets** over sharrows[6] or lanes amid the traffic e.g. between vehicular traffic and parked cars. Minimum recommended dimensions of **unidirectional bike lanes** are **1.5 m** wide and **bidirectional bike lanes 2.5 metres** wide.

6.1.4. Public transportation

For the purpose of reducing the private car usage, public transport must be given a boost and priority on the streets. The strategies aim always to improve reliability by ensuring a competitive commercial speed and providing accurate real-time information to the user:

- **Specific platforms:** bus lanes allow buses to run without being stuck in traffic jams. Plus, priority at junctions with specific traffic signals for buses enhances commercial speed of public transportation. Bus lane design should deter car

[6] *Shared Lane Markings (SLMs), or "sharrows," are road markings used to indicate a shared lane environment for bicycles and automobiles. Among other benefits shared lane markings reinforce the legitimacy of bicycle traffic on the street, recommend proper bicyclist positioning, and may be configured to offer directional and wayfinding guidance. The shared lane marking is a pavement marking with a variety of uses to support a complete bikeway network; it is not a facility type and should not be considered a substitute for bike lanes, cycle tracks, or other separation treatments where these types of facilities are otherwise warranted or space permits* (NACTO, Urban Bikeway Design Guide, 2011).

trespass by using separation elements. In broad avenues bus and tram lanes are sometimes allocated along the median.

- **User experience:** transit users should be provided with a suitable waiting infrastructure i.e. bus shelters that protect them against inclement conditions and accurate dynamic information systems with up-to-date waiting times, along with direct and easy access to transit infrastructures for every person. All infrastructures associated with public transport should be allocated in the curb zone, never presenting an obstacle to the pedestrian flow.
- Buses should **not exit the lane** when approaching a **bus stop** unless a long waiting time is expected or disturbance with other bus lines may occur. Steering back to the circulation is cumbersome and slows down the speed of public transport. In-lane stops give buses the highest priority.

Figure 21; Left: contraflow bus lanes increase convenience of public transport [Photo of València (Spain) by German Caballero]. Right: Pull-Out Stops are just recommended in specific cases such as in timing points, with likely waiting times. Otherwise, buses lose time trying to steer back to the circulation [Photo in Alicante (Spain) by P. Rubio].

6.1.5. Delivery, municipal and essential services

Delivery and municipal services are an essential part of the economy and the social welfare. Shops, businesses, and activities that take place on streets require constant supply of goods. Nowadays also home delivery services have intensified and increase the demand for more efficient regulations for delivery vehicles. Their rapidness and efficiency are basic for the feasibility of the sector. Therefore, it is important to bear in mind how they can operate in the public sphere. Delivery services also have to make efforts to adapt to new street designs and environmental concerns. The challenges and strategies for delivery services in the streets are the following:

- **Essential vehicles** (ambulances, fire brigades or waste collection) must have access at any time to any street, pedestrianised areas included. **Delivery services** have to be given access e.g. by implementing specific timetables to access to those streets and distribute their products (early morning and late evening, for instance).

- **Loading zones** should be extended throughout a city according to the demand. Prioritise rotation in loading areas over car park lanes in public spaces.
- **Promote cycle logistics** and a **green fleet of delivery vehicles**. Freight vehicles have greater dimensions than normal vehicles, are noisier and can have outstanding carbon emissions. Therefore, cleaner distribution systems are highly recommendable and contribute towards the liveability standards of streets.
- Consider emergency vehicles and other authorised **heavy vehicles** when estimating the **curve radii** and the street layout. Ensure visibility and safety for more vulnerable mobility elements: pedestrians and cyclists.

6.1.6. Individual motorised vehicles and sharing systems

The space devoted to private motorised traffic accounts for a major part of the urban space. Every car occupies between 10 and 12 m^2 of the public space and stays parked for 92% of its time (MacArthur, 2018). Rethinking those spaces is a necessity for liveable spaces. The restrictions and limitations in motorised circulation have to be thoroughly implemented, considering the access to essential users (handicapped and residents).

Figure 22; Different sharing systems in the city of Madrid. All electric vehicles. Several sources.

A more sensible car space usage ought to be promoted, by **seeking more efficient and shared vehicle fleet** (electric car sharing, e-scooter sharing or bike sharing), see some examples in figure 22. Some studies suggest every single car from a car-sharing system removes five to fifteen cars off the streets and induces a behavioural shift of users to a more multi-modal sustainable mobility, it complements the use of public transport and cycling and walking (Archer, 2017).

6.2. Focus on other functions of the street

Fostering liveable spaces also stands for identifying potential social and stationary uses that former designs have overlooked i.e. benches for people to enjoy an ice cream in front of an ice cream parlour; widened sidewalks in front of a municipal office or a take-away restaurant, where people have to queue up**;** fountains in hot locations or

where people normally go jogging or a support for cyclists to wait at a traffic light at a junction.

Redesigning also means **understanding the behaviour of people on streets and providing solutions to the specific needs**. How to solve the demands of people is not generally an easy task. The new design has to accommodate the needs of users, or else the design can end up failing. For example, a bench should be oriented towards interesting views and must be comfortable for the user (shaded if temperatures are high, with back, with more than one seat so that a couple or a group of people can sit and chat together…). All these details make a great difference in the attractivity for users and hence in its eventual utility.

6.3. Sensorial experience in streets. Green infrastructure, sunlight, wind, rain.

In the chapter 4.4.7. "Integration of nature" the features of green infrastructure have been detailed and justifies how it plays a key role in the design of liveable spaces. For the inclusion of vegetation some important aspects have to be considered:

- **Trees behave as gigantic air filters**. Reports show trees have a notable return on investment in dense cities that suffer from high air and noise pollution rates (Plumer, 2016). Allocate trees specially in urban spaces where density, air pollution and noise are high or where those levels should be strongly reduced i.e. main road arteries or close to schools and hospitals.
- **Study climate conditions** and designate better locations for trees according to the regions. Consider the shadow they project and the sunlight throughout the day. For instance, in hot regions trees are recommended to shadow the sidewalks which are mostly affected by the solar radiation. Thus, **heat island effect** can be tackled more effectively.
- **Adapt vegetation to the region**. Consider installing native plants and adaptative spices which are more resilient to the climatic conditions of the area, require less maintenance and provide richer ecosystems.
- Consider **possible undesirable effects** on inhabitants due to the selection of species i.e. avoid species that exacerbate severe **allergies** to population or whose blooms and foliage creates debris on the streets and/or leads to **high maintenance costs**.
- Foresee the possible growth of the vegetation when designing tree pits.

7. Implementation strategies and scope of the method

7.1. Background

Shaping streets is normally a long and flexible process that implies many steps and the participation of numerous stakeholders (usual workflow is presented in figure 23). It usually implies a **cost and resource-consuming process**, along with a slow administrative bureaucracy and an active citizens' participation that enriches but prolongs the process. Any scheme aiming a general improvement in liveability should seek more plausible ways of implementing the previously stated measures yet considering the involvement of citizenship. The method suggested in the thesis aims to accelerate the early stages of street redesign by giving powerful and visible tools to easily identify points of improvements and facilitate the communication with stakeholders.

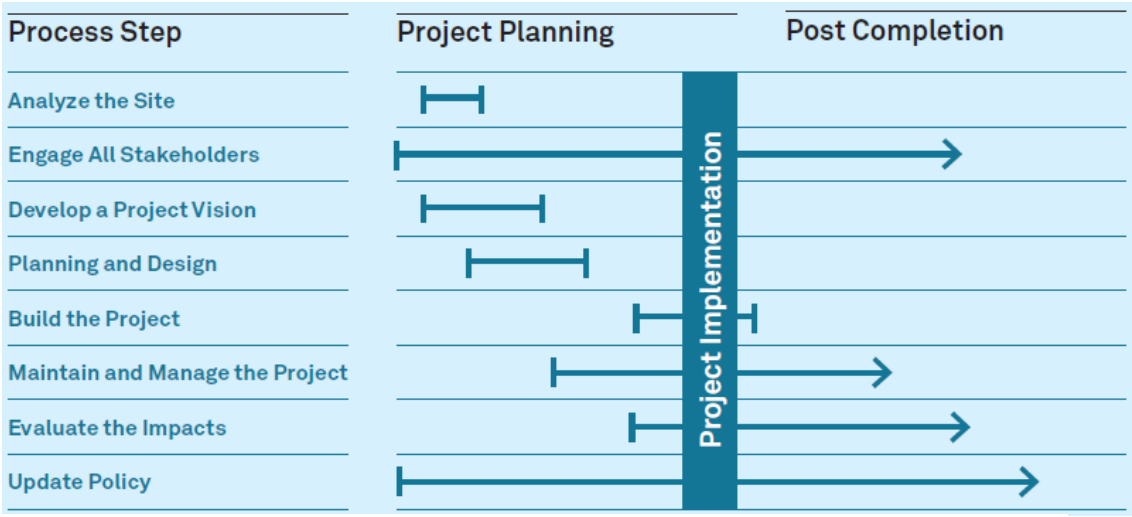


Figure 23; A typical process for shaping streets, yet it may vary in each context. Source: Global Street Design Guide, p. 21. Global Designing Cities Initiative. 2016).

7.2. Early stages:

The necessity of urban makeover can both come from citizens' claims (bottom-up process) or from the self-initiative from the municipality that identifies specific issues (top-down process). Recently, new strategies for a more participative, quick, and efficient process have sprung up. They are explained in the following sections:

7.2.1. Participatory processes

After the commitment of the municipality the question to address is the extent of the public participation. They are normally considered for great projects and general schemes. Citizens' involvement **enriches the project**, brings new approaches and builds up a sense of influence that the citizens have on the way a city is shaped.

Participatory processes also normally **extend the duration of the overall processes** and represent a **challenge** in terms of **communication and decision-making**. The preparation and proceeding of this process becomes, thus, essential.

7.2.2. Street activities

A very sensitive way of increasing public awareness about public space is opening streets to people, that is, make people **realise the underutilised spaces of a street** by showing them the potential options that a makeover can provide. Street openings (with traffic closures) are a perfect chance. The operational hours can be flexibly implemented, for instance every weekend or in traffic off-peak hours. The varied usage of streets allow community building and, moreover, **facilitate further urban changes**, since population is less reluctant to change their mobility patters after knowing the benefits of the urban redesigns. The possible activities being held are very broad, ranging from ciclovias (bike corridors); street markets; play streets or simply open streets (some possible activities are shown in figure 24).

Figure 24; Left: Ciclovia in Alicante running alongside the maritime front (Spain). Author: Antonio Zarco. Center: Open street in Charlotte (USA) (Source: Open Streets 704). Right: Plaça de l'Ajuntament (Townhall), València (Spain), turned into a street market every first Sunday of the month (Source: Levante-EMV).

7.3. Interim solutions

The tactical urbanism provides an efficient temporary solution for a street redesign. **Interim solutions** allow, with provisional objects, to stablish **better liveable conditions swiftly and efficiently**, without having to wait for the final long-term redesign (examples are shown in figure 25). Those provisional objects are horizontal and vertical signage along with solid elements such as planters and flexible bollards to delimit new spaces. Additionally, benches, parklets, tables and chairs can complete the reclaimed space. The concept also gives a perfect **opportunity to assess the viability of any urbanistic change**: if it does not work or does not accomplish the goals, it can be easily modified. On the other hand, they allow citizens to visualize beforehand the potential of a final redesign. Citizens can earlier see the benefits of the redesign plans.

The **low cost of resources and its high goal-fulfilment** also stand out as important benefits of these urban strategies. Nonetheless, interim design changes must be implemented thoughtfully, otherwise residents could regard them as improvised, low-quality urban places. Furthermore, the temporariness of these spaces also make such initiatives more vulnerable to dismantling. A change of plan or political initiative can easily revert such urban designs, in comparison with a fixed urban makeover.

Figure 25; Left: Calle Galileo, Madrid. It shows the weaknesses of interim designs: it was reverted after change in mayor (Source: Ciclosfera). Right: sidewalk widening tasks by means of painting and planters, València (Spain) (Source: Las Provincias).

7.4. Final designs

The result of the previous process are hopefully the works of the final redesign, that showcase a definitive layout with permanent objects and long duration. The preparatory phases allow designs to be more accurate and adjusted to the use of streets people do or might do. The result is, therefore, more likely to be accepted and beloved by residents and to receive less opposition.

7.5. Scope of the general parameters for assessing liveability

The combination of parameters showcased in chapter 5 are meant to be used by the decision-maker in the early stages of the process, from a top-down perspective. The **tools provided in the method help to analyse strengths and weaknesses** of a study area by considering all included parameters, which attempt to give a **holistic vision of the quality of life of a specific urban area**.

The output of the method is a valuable information for decision-makers in terms of the opportunities and vulnerabilities of a specific space to be redesigned. The decision-makers can identify if an urban structure and land use can trigger congregation of people and activities (required conditions for liveability). He or she can also get a radiography of the uses of public spaces and how they could be distributed. With that information, weaknesses and opportunities for the redesign can be identified. It is, all in all, a **tool for**

taking action, since it helps to identify if the street design matches with the potential development of the area in terms of liveability.

Street redesigns imply changes in people's patterns, what by nature create reluctance in parts of the population. Communication beforehand and during the processes of any urban redesign is strongly recommendable to raise awareness and diminish opposition. The method suggested in this thesis can accordingly serve as a **powerful communication tool for government agencies** in order to **share conclusions** with stakeholders and to **raise awareness** of detected necessary improvements. The procedure can provide the decision-makers with visual and powerful information for participatory processes and help facilitate the reach of agreements.

7.6. Potentials and limitations of the method

The suggested procedure aims to cover the early stages of the participatory process. In particular, and following the figure 24, it aims to cover the stages *Analyze the site* and *Develop a project vision*. The decision-makers can transmit the problematics and even suggest early solutions to stakeholders, both for interim solutions (by means of tactical urbanism) and final street redesigns. Nonetheless, for the final project the contribution and opinions of all stakeholders are still needed to be taken into consideration. The method is indicated to be **used for internal processes of feasibility of a street redesign project as well as for communication purposes.** The final purpose of the procedure is to trigger action.

The main limitation of the method is its restricted use. It just may apply to specific stages of developments (*Analyze the site* and *Develop a project vision)*. Furthermore, this method might allow the decision-makers to identify priorities in a specific area in terms of street design. Nonetheless, **the method lacks comparability and prioritisation**. If two or more locations are analysed and show the need for a redesign, the method does not provide the tools for weighting and prioritising interventions. For comparing different alternatives and ranking them, further analysis, such as a Multicriteria Analysis (MCA) or participatory processes should be carried out.

It is also to highlight that due to the huge range of particularities in streets, **the method might have to be adapted to the features of each case study** e.g. include other parameters of accessibility (cycling, by car) or modifying the sorting of retail shops according to the specifications of the study area.

8. Case study: Türkenstraβe

8.1. Project background

As an application of the reported state of the art, the thesis aims to assess a section of a street in the city of Munich, Germany, and suggest a possible layout for its redesign. The area under investigation is part of **Türkenstraβe**, in the district of Maxvorstadt, and comprises **the area between Theresienstraβe and Schellingstraβe**.

Türkenstraβe is located within the district of Maxvorstadt, in particular in the centric area of Universität, delimiting in its south with the old town (Altstadt). The district gathers many characteristics stated in the previous point 4.4. *What makes a street liveable?*: the neighbourhood features **mixed-used buildings** and one of the highest population densities within the municipality of Munich: more than 10 000 citizens/km^2. It has an abundance of student facilities, offices, housing, cafés, retail shops and a very high accessibility to public transport. However, the cross-sections of many streets, including Türkenstraβe, still present an unfair distribution of space. They feature **over-dimensioned car lanes and narrow sidewalks, with reference to the existing pedestrian flow** (see chapter 8.2.2.1). The public space is not inviting to stay and mostly facilitates mobility purposes. There is also a **lack of green infrastructure;** this aggravates the impression of roughness and deters the public from staying.

In order to redesign Türkenstraβe, an early analysis is conducted following the checklist of chapter 5 *General parameters for assessing street liveability*. From these results, a new design is suggested, following the recommendations described in chapter 6 *Designing liveable streets. Solutions*. As stated in chapter 7, the solution is essentially a draft that helps the decision-maker transmit the observations to stakeholders.

8.2. Analysis

8.2.1. STEP 1. Urban conditions for liveability?

8.2.1.1. Businesses

	Observations
Number of storefronts per 100 meters	Shops in the west side: 23 Shops in the east side: 18 Length of the stretch: 240 meters Average: 17 shops /100 meters **Area of bustling commercial activity**
Percentage of vacant retail fronts	3 vacant shops identified, one opening up soon. **7,31%** vacant retail shops. **Low value, strong commercial attractivity.**
Classification of stores 1. *Health* 2. *Grocery stores* 3. *Fashion* 4. *Restaurants & Cafés* 5. *Cultural* 6. *Household goods* 7. *Others*	**-> *(West side)* + *(East side)* = Total** 1.- Health -> 0 + 1 = **1** 2.- Grocery stores -> 1 + 2 = **3** 3.- Fashion -> 4 + 2 = **6** 4.- Restaurants & Cafés -> 8 + 6 = **14** 5.- Cultural -> 2 + 1 = **3** 6.- Household goods -> 2 + 2 = **4** 7.- Others -> **3** = Offices + stationer's + to-bacconist **High diversity of retail shops.**
Number of jobs within the area (radius of 250 meters)	7750 employees (estimation)[7]

[7] Obtained from data provided by the Chair of Urban Structure and Transport Planning at TUM (2020).

Retail rents and land value	15 500 € (Schellingstraβe)[8]

8.2.1.2. Housing and urban structure

	Observations
Number of residents (radius of 250 meters)[9]	3 850 residents
Block size	150x230 & 200x230, Block size **more extensive** than average block size in the city of Munich, but still acceptable for pedestrian connectivity.
Width of the street	17 meters
Percentage of lined-up buildings (no stand-alone)	100%
Percentage of active edges (substract walls, fences or other dull elements)	  West side: 223 – 20 = 203 m East side: 237 – 28 = 209 m **% Active edges = 90 %** **Very high value.**

Conclusions: high population density, remarkable mix of uses and active edges**. Very positive conditions for active street life.**

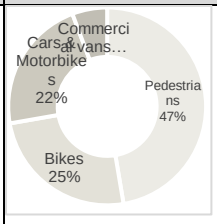
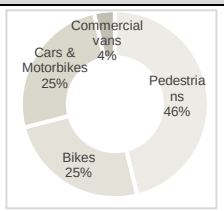
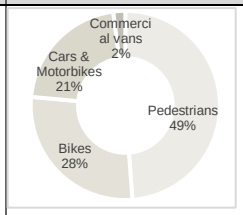
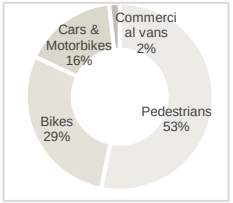
8.2.2. STEP 2. Current street design for liveability?

8.2.2.1. Mobility

LOCATION	***Türkenstraβe (Munich, Germany)***			
DAY	*WEEKDAY*		*FRIDAY*	*SATURDAY*
APROX. TIME OF THE DAY	*12 PM*	*5 PM*	*8 PM*	*12 PM*

[8] Maxvorstadt, as well as the closest districts (Lehel or Schwabing) have doubled their prices recently. Schellingstraβe doubled its price from 8 300 €/m^2 in 2014 to **15 500 €/m^2** in 2018, just four years later (Aigner, 2020).

[9] Number of residents within the area (250 meters radius): Simplifying, we consider a homogenous density of 11 960 residents/km^2 (Wikipedia,2019). That results in a population in the surroundings of $\mathbf{3\,850}\ \boldsymbol{residents} = \boldsymbol{Density} \times \boldsymbol{area} = \mathbf{11960} \times (\boldsymbol{\pi} \times \mathbf{0,25^2} + \mathbf{0,25} \times \mathbf{2} \times \mathbf{0,25}\ (\boldsymbol{lenght\ of\ the\ stretch}))$

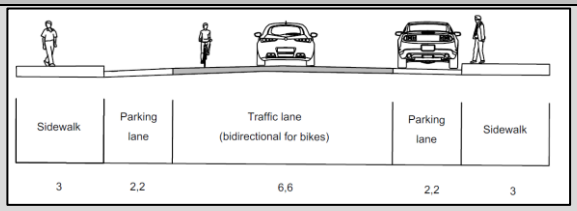
EXACT DAY & INTERVAL OF HOURS	*Wed, 8th July 11:52 – 12:07*	*Tuesday, 7th July 16:50 – 17:05*	*Fri, 7th August 19:37 – 19: 52*	*Sat, 25th July 12:43 – 12:58*
WEATHER	*Sunny, 23 ºC*	*Sunny, 21 ºC*	*Partly cloudy, 27 ºC*	*Partly cloudy, 25 ºC*
Pedestrians	116	156	143	175
Bicycles	60 *(26 of them in contraflow)*	82 *(38 of them in contraflow)*	77 (34 of them in contraflow)	90 *(40 of them in contraflow)*
Passenger cars	50	79	54	48
Motorbikes	4	7	7	5
Public transports *(Only taxis)*	1	3	2	1
Commercial vehicles	14	12	6	6
Modal split				
Others/ Observations	1 e-scooter	2 e-scooters	4 e-scooters	5 e-scooters

8.2.2.2. Accessibility

	Observations
Accessibility by public transport (stops within 10-minute isochrone on foot)	U-Bahn station*: Universität*. 2 U-Bahn lines: U-3, U-6 Tram stations: *Pinakotheken* and *Schellingstraβe*. 3 Tram lines: 27, 28 & N27 (night) 5 daytime bus lines: 58, 68, 100, 153, 154 3 nighttime bus lines: N40, N41, N45 **High accessibility by public transport**

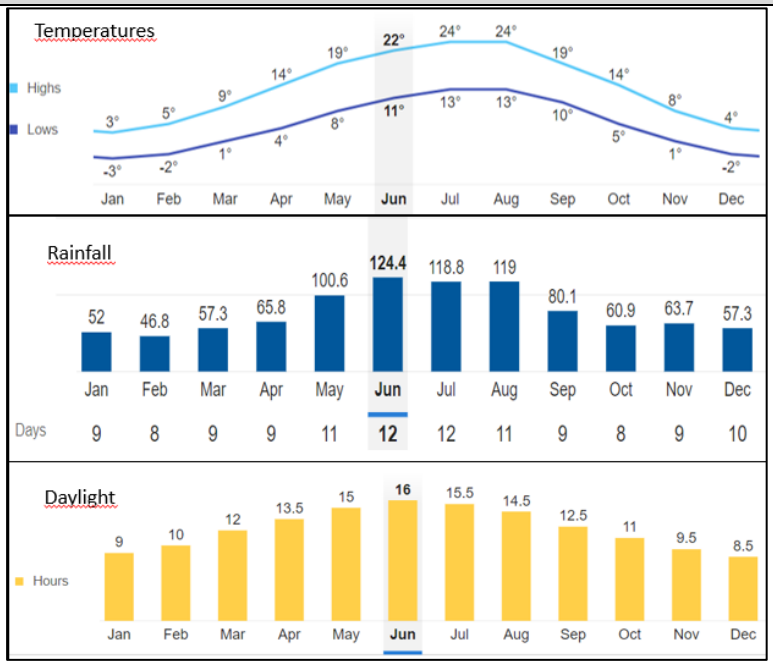
Barrier-free sidewalk and crosswalks?	 Direct, accessible, and signalised crosswalks in the junctions with Theresienstraβe and Schellingstraβe. **All possible directions covered in maximum two steps.** Sidewalks' width reduced by chairs, tables, stands, bikes, e-scooters, motorbikes, parking meters and traffic signs till barely 1,5 meters at many places. **Likely pedestrian bottlenecks and insufficient width identified.**
Identified desire lines?	Scattered flow of pedestrians between both sidewalks has been observed**. Interesting** would be the implementation of a **mid-block crossing.**
Barrier- free public transport infrastructures?	 Accessible bus stop in Theresienstraβe (see left photo). Unaccessible bus stops in Schellingstraβe (see central photo). Currently **under renovation with accessible parameters.**

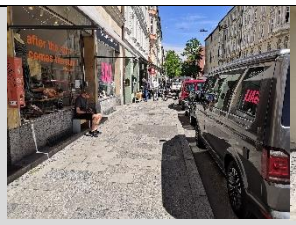
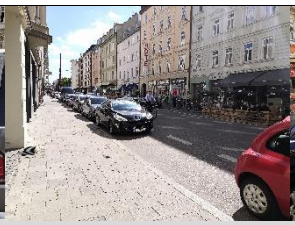
8.2.2.3. Space distribution

	Current extension (m2)	%
Cross section	 The illustration overlooks present elements that reduce sidewalks' width, such as signs, bicycles or chairs (dimensions in meters).	-
Pedestrian area (through area, mobility)	1332 m^2 **Theoretical value**, empirically lower: **affected by obstacles and elements on street**: signs, parked bicycles, e-scooters or motorbikes	31,5 %
Pedestrian area (spaces for stationary activities)	121 m^2	2,9 %
Rolling asphalt (common use)	1953 m^2	46,3 %
Public transport infrastructure	No public transport within the analysed stretch.	-
Cycling infrastructure	Zone 30, coexistence among all vehicular traffic. No specific cycling infrastructure.	-

Car parking surfaces	760 m^2	18,0 %
Cycling parking facilities	44 m^2 Just specific surfaces for parking bicycles have been considered.	1,0 %
Loading areas	0 m^2	0,0 %
Green area	13 m^2	0,3 %
Total	**4223 m^2**	**100 %**

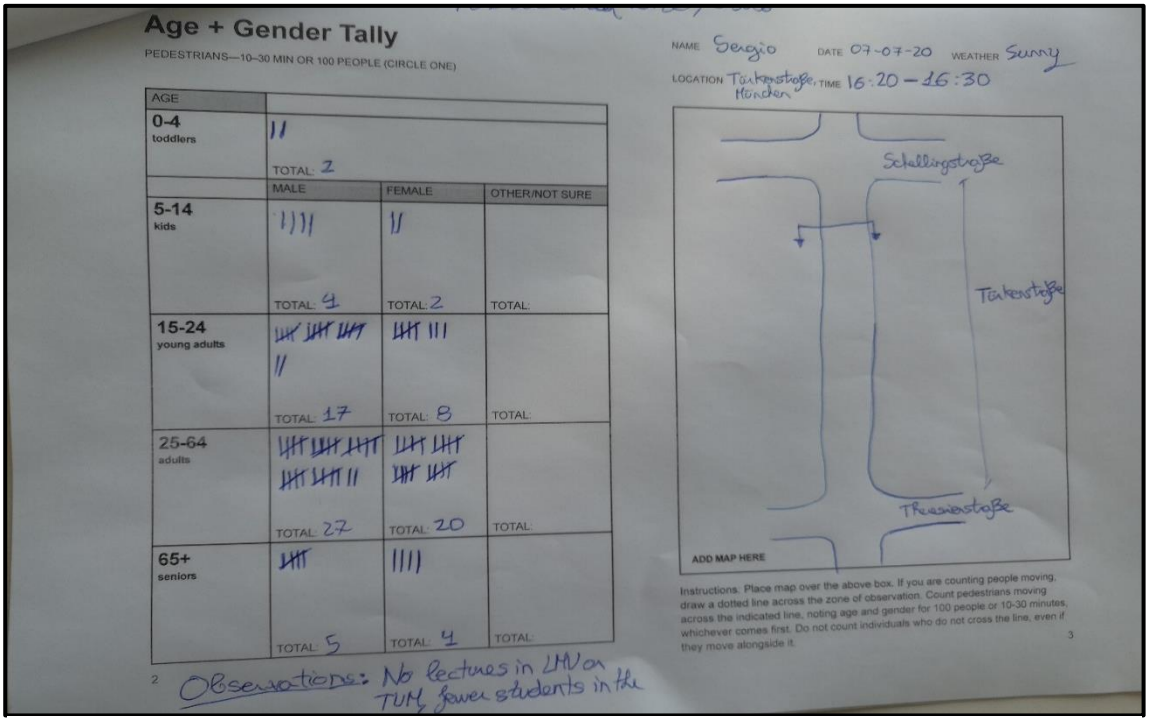
8.2.2.4. Behaviour, confort & security

	Observations
Pedestrian distribution by age and gender	Age + Gender Tally suggested by Gehl Architects. See 8.2.2.4.1.
Purpose of stationary activities	Stationary activity mapping suggested by Gehl Architects. See 8.2.2.4.2.
Speed limit	30 ZONE -> **30km/h**
Percentage of cars speeding	 Not empirically determined. Observations: The **overdimensioned car lane** invites to **speed**. **Bicycles and usual double-parked cars** invite to **slow down**. Average observation of speed limits.
Climate conditions	

Average percentage of street with shade	   **14:10, western side** **16:20, eastern side** **17:07, eastern side** Analysis carried out in July. In the morning east side is partially shaded and goes west progressively. In the evening, the process is repeated in the opposite way, from east to west. From 17:00 on all the street is shaded thanks to the buildings. Before that time, western part is first shadowed and goes east progressively.
Average level of noise	No possibility of accurate measures. Qualitatively, **a rather tranquil street**. Usual rumour of pedestrians, low and discontinued flow of cars.
Street lighting during nighttime	 Central public lighting plus common additional lighting from storefronts. Acceptable lighting.
Intended & unintended elements for seating	  **Lack of public benches identified.** Besides private sitting (cafés and restaurants) very few elements for seating. No public benches, just few private benches in storefronts spotted.

8.2.2.4.1. Pedestrian distribution by age and gender

Note: observations affected by the cancellation of lectures from the TUM and LMU. In normal circumstances a greater flow of students would have probably been registered.



Age + Gender Tally

PEDESTRIANS—10–30 MIN OR 100 PEOPLE (CIRCLE ONE)

NAME Sergio DATE 07-07-20 WEATHER Sunny

LOCATION Türkenstraße, München TIME 16:20 – 16:30

AGE	MALE	FEMALE	OTHER/NOT SURE
0-4 toddlers	TOTAL: 2		
5-14 kids	TOTAL: 4	TOTAL: 2	TOTAL:
15-24 young adults	TOTAL: 17	TOTAL: 8	TOTAL:
25-64 adults	TOTAL: 27	TOTAL: 20	TOTAL:
65+ seniors	TOTAL: 5	TOTAL: 4	TOTAL:

Observations: No lectures in LMU or TUM, fewer students in the

Schellingstraße

Türkenstraße

Theresienstraße

ADD MAP HERE

Instructions. Place map over the above box. If you are counting people moving, draw a dotted line across the zone of observation. Count pedestrians moving across the indicated line, noting age and gender for 100 people or 10-30 minutes, whichever comes first. Do not count individuals who do not cross the line, even if they move alongside it.

Figure 26; Analysis of Age + Gender Tally following the procedure of Gehl Architects. Source: own preparation.

8.2.2.4.2. Purpose of stationary activities

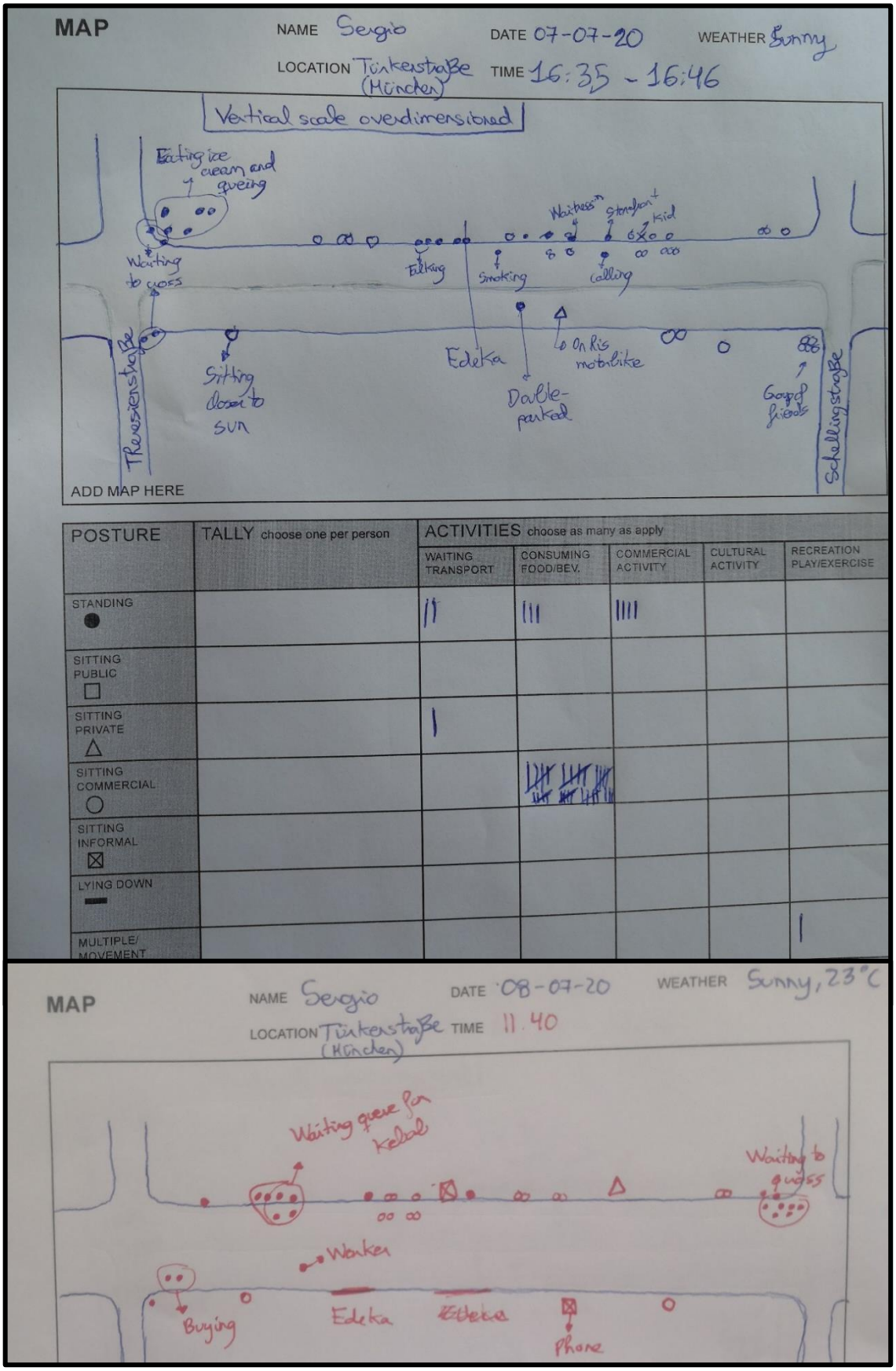


Figure 27; Analysis of stationary activities following Gehl Architects' procedure. Source: own preparation.

Notes: two observations carried out at different times of the day. Stationary activities are mainly related to consuming food and beverages in cafés and restaurants. That most likely comes down to the lack of public sitting. Queues are also spotted in front of take-away restaurants during rush hour. Concentrations of people are also pinpointed at junctions, see figure 28.

Figure 28; Left: commercial sitting in front of a café. Right: people queuing up in front of an ice cream parlour. Source: photos taken by the author.

Conclusion: the promotion of more pedestrian space and equipment for formal sitting and stationary activities is highly recommendable. More green infrastructure, public benches and broadened sidewalks are desirable. More street permeability seems also to be demanded.

8.2.3. STEP 3: Street redesign. Better liveability?

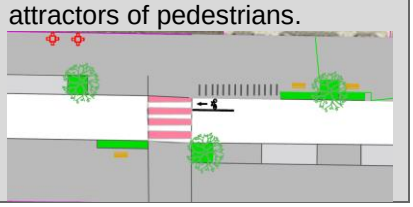
The values represented in the following tables are obtained from the redesign proposal, the layout representation of which can be consulted in chapter 8.3. *Definitive proposal*.

8.2.3.1. Space distribution

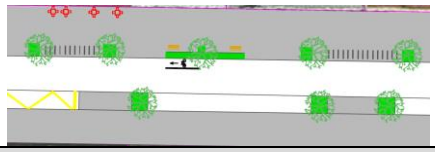
	Current extension (m^2)	%	Extension in proposal (m^2)	%	Balance
Pedestrian area (through area, mobility)	1317 m^2	31,7	2251 m^2	54,1	**+ 71 %**
Pedestrian area (spaces for stationary activities)	121 m^2	2,9	187 m^2	4,5	**+ 55 %**
Rolling asphalt (common use)	1917 m^2	46,1	1153 m^2	27,7	**- 40 %**
Public transport infrastructure	0 m^2	0,0	0 m^2	-	**0 %**
Cycling infrastructure	0 m^2	0,0	0 m^2	-	**0 %**
Car parking surfaces	745 m^2	18	226 m^2	5,4	**- 70%**
Cycling parking facilities	44 m^2	1,1	73 m^2	1,8	**+ 65 %**
Loading areas	0 m^2	0,0	80 m^2	1,9	**∞**
Green area	13 m^2	0,3	187 m^2	4,5	**+ 1338 %**

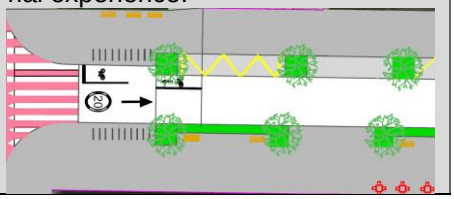
Total	4157 m^2	100	4157 m^2	100	-

8.2.3.2. Accessibility

	Observations	
	CURRENTLY	**PROPOSAL**
Barrier-free sidewalk and crosswalks?	Likely pedestrian bottlenecks and insufficient width identified (1.5 m).	Widened sidewalks till 4.2 – 5.5m. **Through area of minimum 2.5 – 3m**
Barrier- free public transport infrastructures?	Currently under renovation with accessible parameters.	No action needed
Identified desire lines?	Interesting would be the implementation of a mid-block crossing	**New mid-block crossing implemented**, connecting supermarkets on both sides as main attractors of pedestrians. 

8.2.3.3. Behaviour, confort & security

	Observations	
	CURRENTLY	**PROPOSAL**
Speed limit	Zone 30 – 30 km/h	**Traffic calming strategies** ensure the observance of the speed limit**:** at-grade sidewalk, reduced lane width to 4.5 m (bidirectional for bikes) and more crossings.
Average percentage of street with shade	Sun shining in both sides depending on the daytime.	Planting of trees alongside both sides as main shadow providers in summer. 
Street lighting during nighttime	Central public lighting plus common additional lighting from storefronts. Acceptable lighting	**No important changes needed**. Aesthetic changes suggested by means of lampposts.
Average level of noise	Qualitatively, **a rather tranquil street**.	Less traffic flow expected (less noise). More pedestrian flow and interactions expected (more noise).

Intended & unintended elements for seating	Lack of public benches identified.	New benches alongside the street, close to green spaces to provide better climate conditions and sensorial experience. 

8.3. Definitive proposal

The assessment identifies important lacks mostly related to pedestrian space, sitting equipment and green infrastructure. The evaluation highlights the unfair street distribution. Pedestrians, although being the most usual mode of transportation in the study area (around 45-50% of modal split), have available a scarce 32 %, which is notably reduced by varied elements located on sidewalks (stands, chairs or signs), that also complicate the normal flow and experience of passers-by on the street. That unfair distribution leads also to usual queuing that can obstacle the proper flow of people. All in all, **the sidewalk extension has been identified as insufficient to accommodate the current pedestrian flow**, see mentioned common obstacles in figure 29.

Figure 29; Daily common situations. Left: people queuing on the sidewalk for buying a Kebab at 12 PM. Right: obstacles a passer-by comes across while walking through Türkenstraβe. Source: photos taken by the author.

The thesis proposes a redistribution of public space to give more priority for active mobility. The 17-meter section is **redesigned as a shared street**, where asphalt and sidewalk are at the same level, favouring accessibility, and permeability. The allocated street uses are recognised by means of different paving, and the use of separating elements such as bushes or cycle racks.

The design yields more space for walking (+70%) and sitting, while maintaining attractivity for cyclists (cycle racks are also incremented). The widened space is mostly gained

after eliminating one parking lane and cutting down on the width of the car lane from 7 meters to 4.5 meters. The reduction of lane width promotes traffic calming, reduces car attractivity but still allows residents, essential vehicles and delivery services to access the street and is compatible with the existing contra-flow cycle lane. Plus, for facilitating the labour of delivery services, three new loading areas have also been marked.

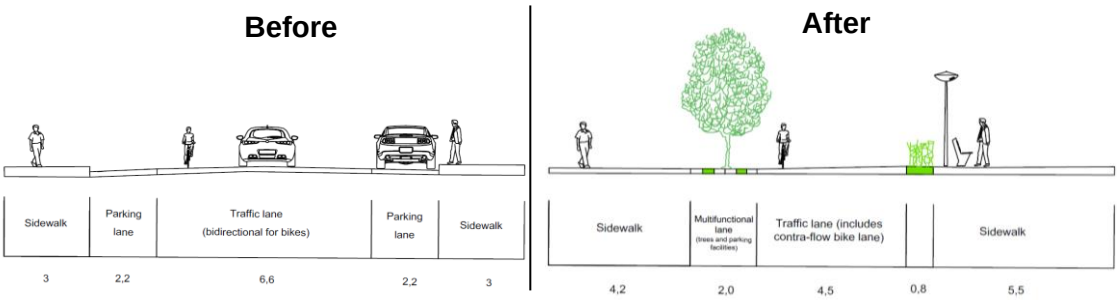


Figure 30; Current and suggested cross-section. Dimensions in meters. Source: own preparation.

In an attempt to promote higher opportunities for socialisation and a recreational use of the streets, benches are installed alongside the street and green infrastructure is tactically included to enhance the sensorial experience of street users by means of trees and bushes. Lastly, street lighting has been substituted for lampposts to improve the general aesthetics.

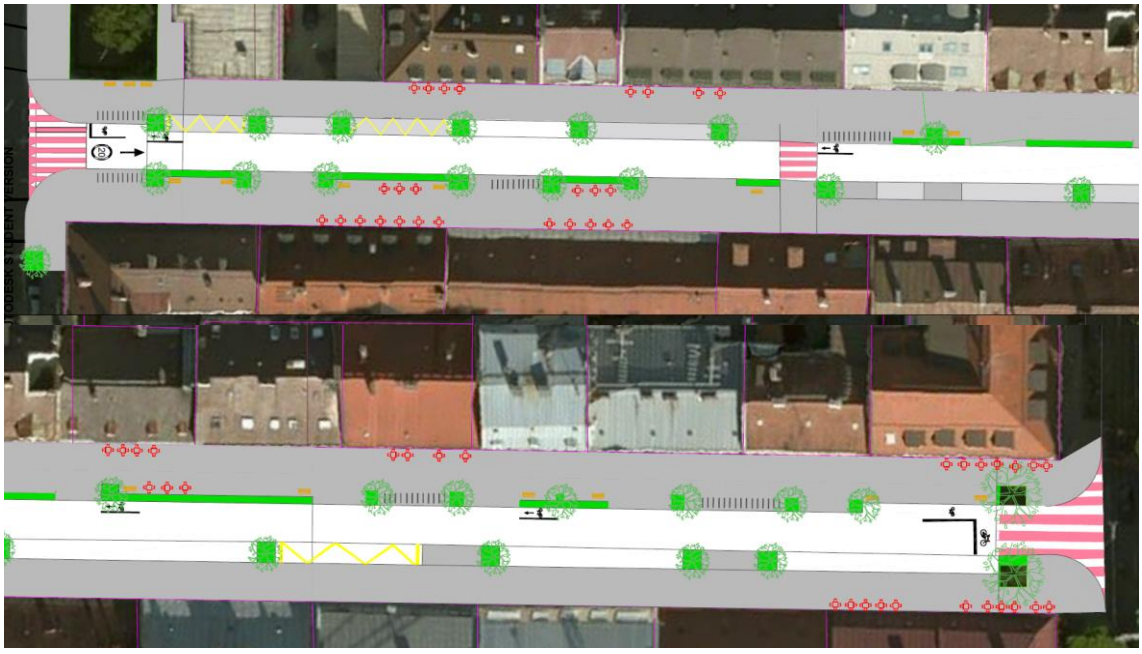


Figure 31; Suggested final layout of Türkenstrasse. Source: own preparation.

9. Conclusions

Beyond the global issues in cities, such as air pollution, socio-economic inequalities and the climate emergency, the awareness of the importance of regaining space for people in cities is continuously gaining support as a means of enhancing socialisation, the sense of community, environmental sustainability and equity. As Gehl states in Cities for people (2010): **"*first we shape the cities, then they shape us*"**. The redesign of cities, streets, and public spaces based on criteria of liveability is already on the agenda for many government agencies.

The goal of this bachelor's thesis was to **understand the conditions that trigger active public spaces** and **how street redesign might foster more liveable spaces.** After the research, establishing a normalised method for assessing the existing conditions was sought.

A liveable street focuses on its utility and the functions that can take place on it, rather than the aesthetics. A liveable street is an active, charming, and welcoming environment that facilitates all possible functions of a street, which go beyond mobility purposes. **Liveable streets feature inviting environments for pedestrians and cyclists, with active edges, green infrastructure, and an optimisation of street space.** Furthermore, the presence of motorised vehicles is reduced by means of traffic calming measures, car park regulations or access restrictions.

The thesis presents a method to encourage strategies and actions for street redesigns. The method features different parameters, quantitative and qualitative, the output of which can be valuable information for decision-makers. The main feature of the method is its ease of execution, along with a powerful communicative capacity. The method is suitable for facilitating early assessments, participatory processes, and stakeholders' interventions.

Nonetheless, after putting it into practice with the case study of Türkenstraβe, some limitations have been encountered: **the method lacks the capacity of prioritisation and comparability**. In order to compare and prioritise interventions, further analysis, such as Multicriteria Analysis (MCA), should be carried out. The enormous complexity of cities in general, and streets in particular, is also a problem we faced when aiming to standardise the method. Due to the diversity, the suggested method might have to be adapted to the particularities of each study area with further or modified parameters, as needed.

Appendix 1: Three-step model: Parameters for assessing street liveability

STEP 1. Urban conditions for liveability?

a) Businesses

	Observations
Number of storefronts per 100 meters	
Percentage of vacant retail fronts	
Classification of stores *1. Health* *2. Grocery stores* *3. Fashion* *4. Restaurants & Cafés* *5. Cultural* *6. Household goods* *7. Others*	
Number of jobs within the area (radius of 250 meters)	
Retail rents and land value	

b) Housing & Urban structure

	Observations
Number of residents (radius of 250 meters)	
Block size	
Width of the street	
Percentage of lined-up buildings (no stand-alone)	
Percentage of active edges (subtract walls, fences and other dull elements)	

STEP 2. Current street design for liveability?

a) Mobility

LOCATION				
APROX. TIME OF THE DAY	*WEEKDAY*		*FRIDAY*	*SATURDAY*
EXACT DAY & INTERVAL OF HOURS	*~ 12 PM*	*~ 5 PM*	*~ 8 PM*	*~ 12 PM*
WEATHER				

Pedestrians				
Bicycles				
Passenger cars				
Motorbikes				
Public transports (taxis, trams, buses…)				
Commercial vehicles				
Modal split				
Others/ Observations				

b) Accessibility

	Observations
Accessibility by public transport (stops within 10-minute isochrone on foot)	
Barrier-free sidewalk and crosswalks?	
Barrier-free public transport infrastructures?	
Identified desire lines?	

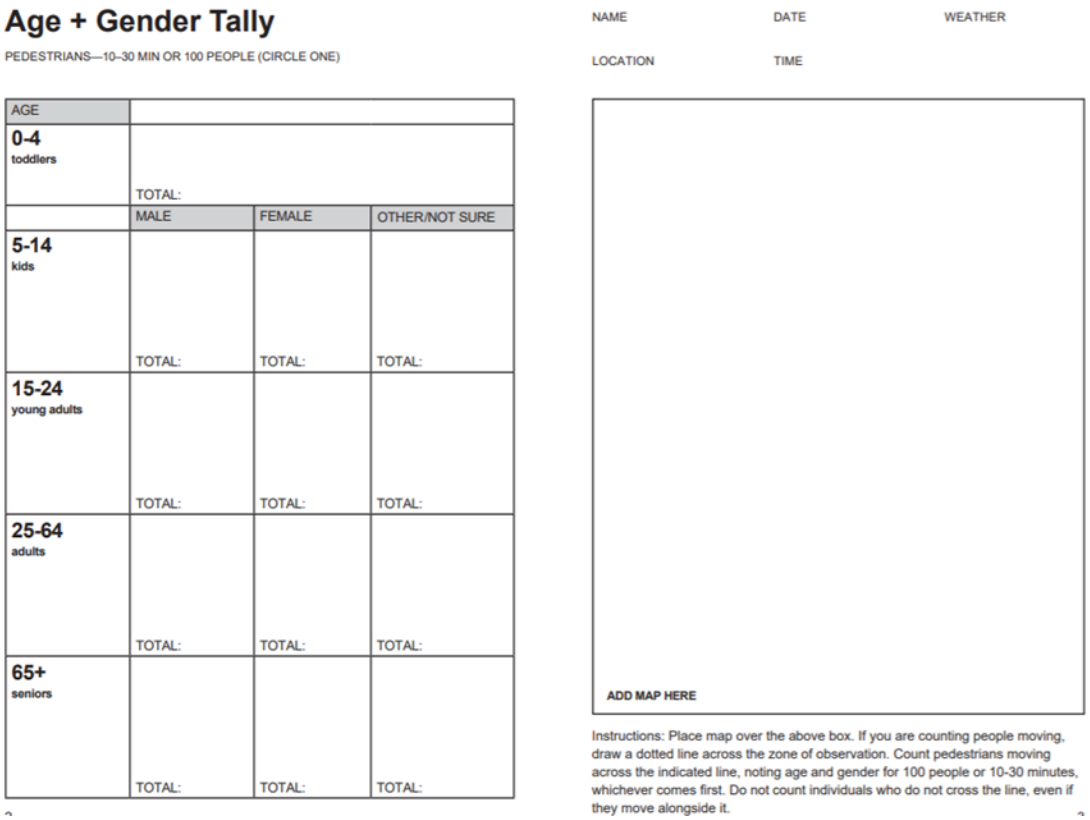
c) Space distribution

	Current extension (m2)	**%**
Pedestrian area (through area, mobility)		
Pedestrian area (spaces for stationary activities)		
Rolling asphalt (common use)		
Public transport infrastructure		
Cycling infrastructure		
Car parking surfaces		
Cycling parking facilities		
Loading areas		
Green area		
Total		**100**

d) Behaviour, comfort & security

	Observations
Pedestrian distribution by age and gender	Age + Gender Tally suggested by Gehl Architects. See i.
Purpose of stationary activities	Stationary activity mapping suggested by Gehl Architects. See ii.
Speed limit	
Percentage of cars speeding	
Climate conditions	
Average percentage of street with shade	
Street lighting during nighttime	
Average level of noise	
Intended & unintended elements for seating	

i. Pedestrian distribution by age and gender



Age + Gender Tally

PEDESTRIANS—10–30 MIN OR 100 PEOPLE (CIRCLE ONE)

AGE			
0-4 toddlers	TOTAL:		
	MALE	FEMALE	OTHER/NOT SURE
5-14 kids	TOTAL:	TOTAL:	TOTAL:
15-24 young adults	TOTAL:	TOTAL:	TOTAL:
25-64 adults	TOTAL:	TOTAL:	TOTAL:
65+ seniors	TOTAL:	TOTAL:	TOTAL:

NAME DATE WEATHER

LOCATION TIME

ADD MAP HERE

Instructions: Place map over the above box. If you are counting people moving, draw a dotted line across the zone of observation. Count pedestrians moving across the indicated line, noting age and gender for 100 people or 10-30 minutes, whichever comes first. Do not count individuals who do not cross the line, even if they move alongside it.

ii. Purpose of stationary activities

MAP NAME DATE WEATHER

LOCATION TIME

POSTURE	TALLY choose one per person	ACTIVITIES choose as many as apply				
		WAITING TRANSPORT	CONSUMING FOOD/BEV.	COMMERCIAL ACTIVITY	CULTURAL ACTIVITY	RECREATION PLAY/EXERCISE
STANDING ●						
SITTING PUBLIC □						
SITTING PRIVATE △						
SITTING COMMERCIAL ○						
SITTING INFORMAL ⊠						
LYING DOWN ▬						
MULTIPLE/ MOVEMENT ✕						

STEP 3: Street redesign. Better liveability?

a) Space distribution

	Current extension (m^2)	%	Extension in proposal (m^2)	%	Balance
Pedestrian area (through area, mobility)					
Pedestrian area (spaces for stationary activities)					
Rolling asphalt (common use)					
Public transport infrastructure					
Cycling infrastructure					

Car parking surfaces					
Cycling parking facilities					
Loading areas					
Green area					
Total		100		100	

b) Accessibility

	Observations	
	CURRENTLY	**PROPOSAL**
Barrier-free sidewalk and crosswalks?		
Barrier- free public transport infrastructures?		
Identified desire lines?		

c) Behaviour, comfort & security

	Observations	
	CURRENTLY	**PROPOSAL**
Speed limit		
Average percentage of street with shade		
Street lighting during nighttime		
Average level of noise		
Intended & unintended elements for seating		

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Declaration

I, Sergio Eguidazu Casamitjana, hereby declare that this submission is my own work and to the best of my knowledge it contains no materials previously published or written by another person, or substantial proportions of materials which have been award of any other degree or diploma at TUM/UPV or any other educational institution, except where due acknowledgement is made in the thesis.

I also declare that the intellectual content of this thesis is the product of my own work, except to the extent that assistance from others in the project's design and conception in style, presentation and linguistic expression is acknowledged.

València. 20th October 2020.

Sergio Eguidazu Casamitjana