# The social-environmental sustainable city

A research driven by the opportunities within the integration of social and environmental urban development. By Boris Duijst, April 2020



## The social-environmental sustainable city



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### Abstract

This research focuses on clarifying relations between environmental sustainability challenges in urban areas and social sustainability. Urban areas are prone to change and are currently undergoing rapid development because of population inflow and climate change. To manage and mitigate these challenges the physical structure and functioning of urban areas requires altering. The developments within this urban fabric of urban areas affect the social structures and functioning of neighbourhoods, this research aims to clarify which relations, opportunities and risks exist between development related to environmental sustainability and social sustainability. This aim involves decreasing and managing negative relations and optimising opportunities and positive relations. The research identifies multiple connections, indicators and conditions that define a high social sustainable standard. Most important conditions that were found contain spatial and organizational requirements such as flexibility, mixed-use, incremental planning, shared economy, community based and inclusive development. If these conditions are maintained and applied correctly when implementing environmental sustainability interventions, high social sustainability can be realised. This is of course influenced by spatial context and existing social conditions. Which according to a survey test-case conducted in Amsterdam Nieuw-West are often connected to creating willingness and sense of urgency with locals. Overall, opportunities are present to simoultaniously improve social sustainability and environmental sustainability by targeted and adjusted implementation of spatial interventions and strategies.

### Preface

Sustainable urban development is an important, yet ambiguous topic. Especially when two subtopics of sustainable development play an important role, as is the case in this research. However, this fact has simultaneously been partly responsible for sparking my interest into the topic. Ambiguity makes it extra intriguing to dive into a research subject because more than only the conclusion has to be determined, the core research is therefore in essence also very much focussed on finding a workable definitions of the subject itself: sustainable urban development. This approach enabled the research to incorporate a larger explorative base that covers the development of the term sustainability in relation to urban development through time. This relation is especially interesting in regard to history, awareness and perceiving. I am aware there might be an element of a naive pursuit for a perfect world present in this research, there is however little to argue against aiming for this.

Special interest, in general, is an important factor within this research. Because, in essence, this research is partly an accumulation of topics related to urban development, sustainability and other societal developments I found interesting during my studies or found interesting in general. The research is therefore also very relevant and typical for current times and conclusions and findings tie in with broader societal development. The research presented here tries to unravel two vast topics of sustainable urban development. This is not an easy task to fulfil, especially because many different views on the topic exist. Tackling and managing a topic like this is about making choices, defining and argumentation. If a clear perimeter has been set out, a topic related to sustainable urban planning can be researched. Naturally, this matter has been an important part of this research. Despite the fact that all made choices have been well elaborated, I am aware that not everyone will agree with them. This is however perfectly fine and only contributes to the important scientific debate surrounding the planning of sustainable urban areas. Hopefully, the research provides a cohesive and complete overview of the relationship between

environmental sustainability and social sustainability in the urban area. The goal of this research is to find the opportunities in integrating these two topics, not only based on scientific relevance, but also on practical use, to motivate the reader of this paper and instigate actions. A underlying sub-goal of this paper is therefore also to indicate importance, clarify importance and stimulate actions. The base hypothesis therefore has a positive nature; opportunities exist to make cities socially sustainable.

Boris Duijst.



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### 1:Introduction

"The future of our present lies in the past, but the future of our future lies in the present" (1969, John McHale)

**1.1 The issue** The world is rapidly evolving, thereby pressuring and questioning our current way of living. It is a general accepted statement that substantial changes in society are necessary to deal with this pressure and create a future which will be just as pleasant, or better, to live in as today. The term sustainability stands at the core of this statement. This term has gained popularity in recent decades, which has caused the term to be continuously covered in ambiguity. A not so recent definition of the term was formulated within the "our common future" (Brundtland) report by the UN in 1987 but still holds up surprisingly well today though. The Brundtland report frames sustainable development as "development that meets the needs of present generations without comprising the ability of future generations to meet their own needs". Concretely, this implies that current developments regarding climate change, population growth, energy production and usage, pollution and inequality manifest themselves as problematic. These problematic developments are not geographically equally distributed but are magnified in certain hotspots where they become clustered and mutually amplify and attract each other; cities.

The city is the current greenhouse of sustainable issues and therefore a focal point of the consequences of unsustainable human development. Tensions in general are high in cities on an environmental, social and economic scale. These tensions are set to rise since the opportunities cities offer are set to attract millions of people worldwide. According to the UN 68% of the world population will live in cities by the year 2050, as of today (2019) this number is 55% of the world population (UN, 2018). In developed western countries this urbanisation rate is relatively lower. Within the Netherlands for example, prognoses indicate a 15% population increase in the four largest Dutch cities by 2030, three guarters of the overall population growth will take place in these cities (CBS, 2016). This is remarkable, especially since the Netherlands is already a highly urbanised country. Making cities more sustainable for the sake of the increasing number of residents and to minimise its increasing effect on unsustainable developments seems a logical goal on itself. However, paradoxically, cities are not the necessarily "the problem" that needs solving, they are also the solution. Experts agree that urban environments offer great opportunities to

tackle sustainable issues regarding climate change adaptation and mitigation, spatial pressure, energy usage, pollution and transport by sustainable development. Cities offer great opportunities for countering negative sustainable developments because obtaining high sustainability standards regarding all mentioned developments cannot be executed as effectively without high-density areas, as multiple researches indicate (Kenworthy and Newman 1999, 2015, Bettencourt 2013, Rode et al 2014, Salat 2009, Rood and Hanemaaijer 2017, Hausleitner, 2012 Hillier and Sahbaz, 2008 Jacobs, 1961. Swilling, 2016). This statement forms a part of the base for this research.

Thus, cities seem to be the solution for a sustainable society. In order to actually realise this, some (of the mentioned) important spatial urban environmental-sustainability issues still have to be dealt with beforehand. This implies large interventions in the spatial context and functioning of urban areas. The success of these spatial interventions is depended on a multitude of existing social and spatial factors, too many to research adequately in one paper. However, one important, determining and overarching issue in the pursuit of sustainability in a dense urban environment is often overlooked: social sustainability. Social sustainability, albeit of high importance, is arguably an even more ambiguous term than "normal" sustainability is. A simplified description of what social sustainability encompasses is: "a process for creating sustainable successful places that promote wellbeing, by understanding what people need from the places they live and work. Social sustainability combines design of the physical realm with design of the social world – infrastructure to support social and cultural life, social amenities, systems for citizen engagement, and space for people and places to evolve." (WACOSS, social life). Within this definition the phrase "sustainable" encompasses environmental sustainability the and word "successful" encompasses positive socio-economic activity. This definition is of course smothered in "ideal world" assumptions, actual feasibility of exactly obtaining such a definition in reality is therefore arguable. However, the definition as it stands is clear. Further elaboration and explanation of the term will take place in this research though.

The aspect of social sustainability is so

important because, put briefly, social sustainability eventually determines if an area is pleasant to live in, it is a decisive factor. This means that a neighbourhood can be environmentally sustainable form a theoretical point of view, (this includes energy, transport or climate adaptation), but could be dysfunctional in practice because its inhabitants do not perceive it as a socially pleasant living environment (Van de Griendt, 2018). This statement will be elaborated upon further in the paragraph below by using an example. The aim of this research is to create insights into how interventions for urban environmental-sustainability, issues in the spatial realm affect and interact with this important aspect of social sustainability. The goal is to find barriers and opportunities in the integration of social sustainability with environmental sustainability issues in a spatially dense urban environment. Integration in this research means optimising opportunities to integrate and preventing or decreasing threads (tradeoffs) and mismatches between social sustainability and urban environmental-sustainability issues. The central research-question is therefore; What opportunities and dangers do urban developments regarding urgent environmental issues provide for improving social sustainability in those areas? Note that a specific neighbourhood is chosen (Osdorp square Amsterdam Nieuw West). This neighbourhood is chosen because it represents a high-density urban area that is currently facing various urban issues regarding sustainability.

1.2 Relevance | The scientific and social relevance of this research can be further explained by an example within the Netherlands that is often used. This is the comparison of the modernist Bauhaus (light, air and efficient use of space) Bijlmer area build in the sixties and the historic 16th century canal centre area, both in Amsterdam. Both areas are defining for their time and don't have a lot in common from an architectural perspective. Also from the modern sustainable point of view they differ substantially. When it comes to sustainable aspects regarding green and mobility the Bijlmer area scores higher than the canal area for example. From the real estate perspective the Bijlmer will score substantially higher in various certificate systems such as BREAAM and GPR-score (van de Griendt, 2018). The Bijlmer area is simply superior to the canal area sustainability wise.

So in every (theoretical) aspect the Bijlmer area is more sustainable than the historic canal area

in the centre of Amsterdam and yet, the Bijlmer is currently being partly demolished and redeveloped while the canal area is currently thriving as never before (also with sustainable initiatives). This indicates that an area with very high theoretical sustainability according to modern standards does not essentially mean anything for the long-term sustainability of an area. The critical point determining the actual sustainability of the Bijlmer is in this case is that of social sustainability. Somehow society feels less connected to the Bijlmer area, resulting in an unwillingness to transform the Bijlmer area to modern needs in contrary to the canal area of the city (van de Griendt, 2018). On the social sustainability scale, the Bijlmer area, therefore scores lower, when following previous reasoning. This example also indicates that sustainable aspects in urban design have potential negative effects on experienced social sustainability within an area. Applying similar sustainable solutions as in the Bijlmer to other areas could therefore come with some dangers and could prove unsuccessful in the long term. This illustrates that it is of high importance to gain insights into the effects of urban sustainable solutions in city design on the levels of social sustainability in an area. This example and reasoning are of course a little blunt but do very clearly illustrates the essence of this research. No matter the measured or theoretical sustainability of an area, if people do not feel happy living there, sustainable potential will never be fulfilled.

An important addition to this example is of course that this is merely an example to make a point. Especially in this example there were other factors at play that caused social troubles in the Bijlmer neighbourhoods, these factors were mostly connected to immigration of specific social groups due to international political and social developments. Generalising from a single example is not scientifically correct and will therefore also not be done. The example simply serves as an explanation and argumentation for the hypotheses that will be further researched in this paper.

**1.3 Sub-questions, hypotheses and outline**|This research is mainly explorative and is set out to establish causal connections between environmental-sustainability related spatial interventions and social sustainability in urban areas. These "if/then" connections will be determined by conducting a literature research and interviews with academics



and experts in the field and can be considered as preliminary hypotheses. These hypotheses will subsequently be tested by a case study with survey. The survey will target locals within the Osdorp square area in Amsterdam. To clarify, he hypotheses at the base of this research have been introduced in the introduction and relevance-paragraphs. They state that opportunities to improve relations between developments related to environmental sustainability and social sustainability exist. The other underlying hypothesis derives from the Bijlmer example and states that social sustainability is a divining overarching influence on an area, partly overruling environmental sustainability when it comes to the long-term success of a spatially defined urban area.

The correctness of these hypotheses will be proved at the end of this research, and will contribute to the answering of the research-question. To formulate a complete and definitive answer to the main research-question some sub questions will have to be answered first throughout the research:

- What exactly is social sustainability and which elements define it?
- What are currently the most urgent developments related to urban sustainability issues?
- What opportunities do these developments offer for improving social sustainability?
- What dangers do these developments offer for social sustainability?
- What process is required to realise social sustainable areas?
- Can the found solutions realistically be implemented and governed?

The research will firstly focus on a literature research to explore the meaning of social sustainability and the most urgent sustainability issues within current urban areas, this will be done in the second chapter by introducing al relevant current theories and findings. The third chapter will focus on the used methods and operationalisation within the research. The fourth chapter will present the results and findings by empirical research based on expert interviews with academics and stakeholders in practice accompanied by a survey/case study with locals. The last chapter will present a conclusion and answer on the researchquestion together with a reflection.

### 2: Theoretical framework

**2.1 Perspectives on social sustainability through time** When the term social sustainability is placed within the historical perspective of city design and planning it has only recently been specifically defined. Yet, a modern retrospective analysis of historical theories and publications regarding city design and planning enables identification of design and planning elements that would be regarded as social sustainability nowadays. An overview of these elements from historical publications together with modern takes on the term is presented below. The aim of this chapter is to give clear insights into the development, associated elements, considerations, and finally, a definition of the term social sustainability.

2.1.1 Sitte One of the oldest prescriptions for creating a city "fit for the future", also from a social perspective, was made by Camillo Sitte in 1889. Sittes views are especially relevant for social inclusive development and well functioning public spaces. Sitte was an architect who criticised "the modern way" cities were planned, drawing his inspiration from the centres of old Italian cities. Sitte claimed that modern planning was influenced to much by bureaucrats and traffic experts while it should be influenced by "the people", artists and old city centres. In his book "city planning according to artistic principles" (1889) Sitte demonstrates multiple principles of historic city centres that should be implemented in modern cities. Public space is crucial in the social and economic functioning of a city according to Sitte. It should be shaped and inspired by practice and not by theories deriving from drawing boards. Sitte detested grid layouts and rectangular squares as it forces inhabitants to move and live according to city shapes instead of the other way around, this was un-natural and therefore unhealthy. The city should be shaped according to its inhabitants in order to create an urban environment in which people could socially thrive. After all, old city centres still function relatively well nowadays. Thus, Sitte's ideas were not associated with any kind of sustainability at the time but still remain relevant today. There exists a core of social sustainability, expressed through physical city design, within his ideas when exposing them in modern context. Social functioning and inclusiveness of public spaces are important factors for designing modern urban areas. It is an out-dated but also interesting perspective that indicates how historic publications can be relevant today.

2.1.2 Howard | Ebenezer Howard, one of the most influential city designers in history, has proven to become increasingly relevant in the present search for sustainable city design, also in regard to the social aspect. His "Garden city" targeted the appalling conditions in industrialised, polluted and overpopulated cities of the 20th century. Howard proposed a radical new idea in which inhabitants of these cities would be moved to smaller towns in the countryside, connected by public transport to the larger cities. Howard's goal was to combine the best that both the city and countryside had to offer, hence: The Garden City. The Garden City would offer comfortable and healthy living conditions for the hardworking middle-class by merging the economic and infrastructural features of a large city with the space and nature of the countryside. Within these garden cities, that were circular shaped, the community formed the base of city society. Therefore public spaces, buildings and parks were abundant. Additionally, the residents of the towns would own the ground within the city themselves, profiting from the expected rise in land-worth and stimulating wealth. Self-sufficiency was also important within this garden city, with local farms producing the food for the city and the local sewer system being used for fertilization of the farmlands (Hall, 2014). The idea of the garden city is over 100 years old but in the context of todays (social) sustainable urban development still relevant. The described elements bare resemblance with current city design concepts regarding the element of nature within cities, inclusive public space, transit-oriented development, community building, connectedness, self-sufficiency and even economic circularity.

**2.1.3 Le Corbusier** Another heavyweight within city design, planning and architecture was Le Corbusier, known for his radical "radiant city" plans from 1931. According to Le Corbusier "man was an orderly creature" and together with "the machine age" this demanded a completely new way of building our cities. Le Corbusier even noted that without implementation of his ideas the city in current form would become obsolete since it had become a filthy, overcrowded and dangerous environment in which residents had become subordinate to work and machine. The city had further seemingly caused a disassociation with nature and each other and caused a transport crisis. According to Le Corbusier a new type of city should;

connect people with healthy nature, create individual freedom, stimulate self-development, contain fresh air and protect against city dangers such as crime and traffic. His idea consisted of a city in nature. Large apartment buildings on poles with hundreds of apartments would be placed in a park-like landscape, also the roads would be disconnected from the and offer direct connecting to parking garages underneath each apartment building. Also public transport would connect the area with the city centre. Next to that, every apartment building would function as a small village community in itself and house all the basic city facilities under its roof such as roof-parks, shops and leisure. The park landscape surrounding the apartment buildings would act as places to meet, connect and recreate in a green, save and inviting environment. Notice that within Le Corbusiers plans very physical interventions were planned to connect people with each other and nature by forcing a community style of living and creating high quality public spaces. Also infrastructure was placed in such a way that it did not affect the connectedness between public spaces and various communities. Interestingly, modernist neighbourhoods, such as the Bijlmer are partly inspired by le Corbusier's ideas.

2.1.4 Whyte William Whyte has conducted extensive research on the social functioning of cities and has been highly influential. Whyte has published multiple books and articles focused on urban sprawl and the revitalisation of centre areas. Whyte's work takes people and public spaces as the core of a cities functioning and criticises the conventional planning and design of the 60' 70' and 80', especially in his 1980 book "the social life of small urban places". It is this book where the famous quote "It is difficult to design a space that will not attract people. What is remarkable is how often this has been accomplished". The quote effectively summarises what Whyte's most important perspectives are. Life on the streets contributes greatly to the life of individuals and society as a whole, designing the spaces of these streets should be a bottom-up process and not top-down, it is all about understanding what people do and need beforehand according to Whyte. When this is achieved a space fit for the future, that invites interactions and stimulates social inclusiveness will be created. It is evident that Whyte is considered as a founder of the modern interpretation of "placemaking" and coexistent initiatives. His work also resembles many

similarities with Jane Jacobs views of well-functioning streets.

2.1.5 Jacobs & Tjallingii Jane Jacobs and Sybrand Tjallingii (2002) have other interesting views on social sustainability. Jacobs dedicated her life against characterless sprawling suburbs, construction of large-scale highways and to the protection of local neighbourhood communities within cities. The construction of these highways would tear apart the social construct within neighbourhoods, causing them to decay. Jacobs plead for a diverse decentralised neighbourhood with a mixture of shops, offices and residences. This mixture would create a socioeconomic construct that would support itself and would create a lively and safe environment because the streets would be full of activity (Hall, 2014). This mixture of work and living in a compact form to create a sustainable and resilient socioeconomic situation is an often-used strategy in modern day city building, indicating how relevant Jacobs ideas from the early sixties were. Tjallingii developed the idea of layers, landscapes, patterns and flows within cities. Physical and economical flows within cities are fundamental for a sustainable situation. Various layers in cities would fulfil different function in this idea, such as a network layer, flow layer and occupation layer. Natural forms and shape are important within these layers. Nature and green within cities, such as parks, municipal gardens, green patches and trees, are all important to modern city design in general. Greenery, or nature, has proven to have a multitude of positive effects on highly urbanised areas. This accounts for the individual as well as a larger sustainable level. These positive effects are often translated by the term ecosystem services. Andersson et al (2014) indicate that commonly observed links between city-nature and personal well-being are recreation and health.

**2.1.6 Gehl** Jan Gehl's ideas and concepts on how public space should be formed have been highly influential and relevant for over 30 years. In the sixth English version of the book "life between buildings" (2011) Gehl continues stressing the importance of areas between buildings and structures in an urban area. This is where social interaction takes place and where a large part of city's identities is experienced. Determined urban design plays a large role in these experiences. Correct urban design makes a place more liveable in multiple ways and therefore more

sustainable from a social perspective. Public space is therefore important to create social sustainability.

Gehl explains three main types of activities that take place within the public space; necessary activities, which consist out of walking to work, going shopping or waiting for transport. These activities are barely influenced by design of public space since actions are predetermined and necessary. The second activity is the optional activity, which consists of taking a stroll and enjoying the sunshine in the park for example. Certain activities are less forced and less predetermined, options are still somewhat open. These kinds of activities are very much dependent on design and spatial context therefore. The last type of activity is the social activity, which consist of having a conversation, going for a drink and children playing outside. These types of activities can be planned but often occur naturally. In this case social activities often evolve out of a necessary or optional activity. They are therefore also heavily dependent on, and enabled by, urban design and context. It is the social activity that influences the experience of a city the most. Whenever a place enables these kinds of unforced natural meetings and interactions, various social connections will evolve, which leads to a more connected, local, inclusive and lively neighbourhood. In different words; proper design of public spaces will create an environment in which people feel at home and save, which is a base for creating a social sustainable urban area.

In practice an urban area that takes care of this could implement various spatial strategies to achieve an environment as described above. Every strategy however focuses on achieving an "inviting" environment that enables necessary and optional activities as end results. If these activities are stimulated, social activities will naturally follow. Besides that, four crucial elements of a well-designed city will be achieved simultaneously according to the cities for people publication (Gehl, 2010), these elements are; liveliness, sustainability, safety and health. Notice that according to the definition in this research all these elements could be regarded as a specific part of sustainability since they all contribute to an areas sustainable on the long term. Spatial features that enable a certain area are highly context dependent and could vary from placement of benches to the spatial allocation of public buildings. But also focusing on the human scale and taking care of traffic flows can contribute to a city that suits the people.

**2.1.7 Bramley et al** In a 2006 article published by the Bartlett School of planning in London (2006, Bramley et al) the concept of social sustainability is researched in the context of urban form, especially the density of an urban area. Before this relationship is further analysed an attempt to identify the exact definition of "social sustainability" is conducted. They underline the difficulty of this task and therefore focus on certain elements and overlapping concepts that are often associated with social sustainability. According to Bramley et al (2006) these concepts are defining and indicative for the definition of social sustainability. They are as follows;

- Social capital: the ability and opportunity of "social organisations such as networks, norms and trust that facilitate co-ordination, and co-operation for mutual benefit (Putnam, 1993: 35).

- Social cohesion: this encompasses various aspects and values such as "the need for a shared sense of morality and common purpose, aspects of social control and social order, the threat to social solidarity of income and wealth inequalities between people, groups and places; the level of social interaction within communities or families; and a sense of belonging to place" (Forrest and Kearns, 2001: 2128).

- Social exclusion; This concept is described as "a process that deprives individuals and families, groups and neighbours of the resources required for participation in the social, economic and political activity of society as a whole. This process is primarily a consequence of poverty and low income, but other factors such as discrimination, low educational attainment and depleted living environments also underpin it. Through this process people are cut off for a significant period in their lives from institutions and services, social networks and development opportunities that the great majority of a society enjoys." (Pierson, 2002)

Bramley et al (2006) add to these recurring concepts, two notions that seem interwoven in the values social sustainability is based on. These notions are "fairness in the apportionment of resources in society" which is based on equity and "sustainability of community" which is based on the ability of a community to be self-sufficient in healthy functioning on the long term. Conclusively, a social sustainable environment should stimulate mentioned concepts, albeit by correct governing, regulations and projects or by spatial form. The research continues by placing the found concepts and values associated with social sustainability in a spatial context to determine the effect of spatial and urban form on social sustainability. A large quantity of social and spatial indicators was abstracted from these concepts and values and tested in various neighbourhoods in the UK. The research concluded that "More dense (compact) urban forms, and their associated housing types, tend to be associated with somewhat worse outcomes in relation to dissatisfaction with home and neighbourhood, social interaction, safety, environmental quality, and indications of potential mobility" in contrast to this, dense urban environments tend to have a positive effect on other elements; "access to services is generally better in denser urban forms, while collective engagement is more neutral." Bramley et al do emphasize that the found correlation is very small and causality is not proved by this research, drawing strong conclusions from this research is therefore questionable. The research does however shed some lights on how social sustainability is considered by various scholars in a spatial context.

2.2 Defining views on social sustainability in **practice** Clearly, the aspect of social sustainability has an important role, yet it is difficult to grasp, let alone measure. In contrast to "hard" sustainable spatial interventions regarding energy or mobility, interventions regarding social sustainability are harder to define spatially and are "softer" by nature. This indicates a large importance for governmental and organisational realm. Appointing an exact definition to social sustainability is therefore a precarious exercise. Creating social sustainability is described in various ways, such as "...formal and informal processes, systems, structures and relationships that create healthy and liveable communities that are equitable, diverse, democratic and provide good quality of life" (WACOSS, western Australia council on social services) or as "a process for creating sustainable successful places that promote wellbeing by understanding what people need from the places they work and live. Social sustainability combines design of the physical realm with design of the social world - infrastructure to support social and cultural life, social amenities, systems for citizen engagement,

and space for people and places to evolve" (Social Life, London based consultancy and innovation enterprise). Various foundations, companies and developers are integrating these notions of sustainability in their enterprises. Creating high quality equity, cohesion, diversity and quality of life are often heard goals when pursuing social sustainability, and are considered as crucial when obtaining social sustainability (Amartya Sen 2000). These goals provide great insights into the more practical dimensions of the term but also require certain governmental and spatial bases to be in place. Examples of this are cultural infrastructure, social amenities, systems for citizen engagement and room for people and places to involve. In modern context there are various views on what is important to consider when pursuing good social sustainability.

**2.2.1 Schwartz & Knoops** Adding to described elements there are currently various societal movements that contribute to the realm of social sustainability. Michiel Schwartz and Riemer Knoop provide an overview of these movements in their sustainist lexicon (2016). According to their research 7 societal movements are currently influencing design, meaning and interaction with the urban environment. These movements define what people need from urban spaces and are therefore important to social sustainability. These movements are:

#### - Placemaking

This movement is characterised by bottom up citizenled initiatives that lead to meaningful, and not only functional, spaces. So, by making inhabitants designers of their own environment in an engaging process spaces are transformed into "places".

#### - Connectedness

The sustainist perspective on sustainable relationships between people, nature and other objects. Marked by the idea that everyone and everything is connected as a system, the meaning of an object is determined by how we relate to it. Within this thinking, cities are interfaces that enable us to connect to heritage and nature and others.

#### - Localism

This movement is described by the following quote; "without rejecting the globalized context in which we find ourselves, people and communities are seeking a new sense of local identity and meaning, today we are both local and world residents, we live locally while we are internationally connected 24/7." Within this movement locally sourced, community enhancing and environmental responsibility are important.

#### - Commons

This movement is best described by the sharing economy wherein community members are becoming the stewards. Examples are the local community park but also online sharing platforms and open access digital commons. There is a focus on responsibility and governance in relationship to the natural environment and communal places.

#### - Circularity

Focuses on going beyond the linear approach of "produce - use - dispose". And instead use a cyclical and restorative approach. It views our complete society as an ecologic-system, thus it should be designed as one. As a system of flows and circles regarding social structures demographics, economics and energy.

#### - Proportionality

Described by the notion that the success of an area is not defined by its size. Grassroots, small-scale an slow- movements are all hip. The human scale takes a central role here, the design and solutions for the environment should be proportional for the individual but also networked and distributed as they are shared with other local communities.

#### - Co-design

A term to capture how design practices are transforming as users and citizens increasingly become involved and connected during the process. Co-designing stands for a collaborative process in which professionals and non-professionals design on the basis of open exchange of knowledge and skills, collaboration and community are important in this process.

Exact spatial consequences are difficult to pinpoint, however a lot of these factors are influenced by, or take place in, public spaces of a city. It is therefore important that public spaces enable and stimulate described societal movements and initiatives. Pursuing and enabling these societal movements by design in public spaces improves social sustainability in neighbourhoods according to Knoops and Schwartz.

The actual Influence of these developments is yet to be defined. However, many of the developments are connected and find their way together into society in various ways. This indicates that at least their perceiving in society is positive, and thereby arguably influential. For example, within recent urban planning in the Netherlands citizen involvement has become increasingly part of planning procedures, this also accounts for placemaking initiatives concerning connectedness, proportionality, localism and codesign. (Pers. Comm. K. Sol, S. Pouwels, F. Van der Zee). The most important consequence of this for social sustainability in a neighbourhood is arguably an improvement in the level of resemblance between what people want and what is actually realised. Most described movements focus on improving the connection between people and their environment through some kind of initiative or procedure, tuning the environment to their true needs is the goal. This is exactly the purpose is of recent planning procedures, despite the lack of view on clear consequenses.

2.2.2 DP-group Research bureau DSP-group has exercised an exploratory research (De sociaal duurzame stad, 2010) on the meaning of social sustainability and the spatial implications of this on urban environments. The research refers to an older definition of the term social sustainability derived from the 2005 Bristol accord on social sustainable communities (Bristol accord, 2005) which reads "Sustainable communities are places where people want to live and work, now and in the future. They meet the diverse needs of existing and future residents, are sensitive to their environment, and contribute to a high quality of life. They are safe and inclusive, well planned, built and run, and offer equality of opportunity and good services for all" The DSP research contributes to this definition by emphasising that this definition should be applicable on various scales, from small neighbourhoods to regional scale.

Within these definitions the concepts of involvement, connectivity health, wealth, safety and social exclusion are most important. When these concepts are translated into a spatial context they manifest themselves in the form of adequate accessibility (especially to facilities), flexible temporal facilities, aesthetically pleasing and diverse public space, and space for cultural and civilian initiatives. (De social duurzame stad, 2010). Other interesting remarks on this definition are that the planning, building and governing of a neighbourhood are considered as one continues indicator of social sustainability. This underlines that the "hard" spatial side of social sustainability is very much interwoven with a "soft" governing side of it and cannot be seen separately. The spatial side is important within this research, however without addressing the soft governmental side an adequate research cannot be conducted. The research continuous by stating that in general social sustainability calls for areas that consist of facilities, public spaces and semi-public spaces in which people can relate, connect and attribute. In other words; places should have a meaning (read; place making), familiarity and diversity also play a role in this. Areas should also be flexible, so they can easily evolve along with changes and developments society is experiencing (De social duurzame stad, 2010).

Adding to these findings, the municipality of Amsterdam has communicated 5 notions, or requirements, deemed necessary for creating a social sustainable environment. Firstly, identification and identity are important. Buildings and public spaces should transmit a certain familiarity and identity. This causes social identification and connection to a place as well as physical orientation when navigating. This requirement also causes aesthetic and social-cultural attachment to a location. Secondly, ownership is important. Ownership enables residents to make their own environment and connect and attach even more to an environment. It also offers opportunities for communities to actively cooperate and create together, thereby improving social connectivity, identification and a feeling of environmental responsibility. Thirdly, the notion of flexibility is required. Already touched upon, this requirement enables the build-environment to evolve with society and even accommodate new social developments, thereby creating connectivity and enabling inclusive societies. From a spatial perspective flexibility is applicable on public space, larger urban structures and buildings. Accessibility is a fourth requirement. This requirement consists of a physical and social side. Firstly, facilities should be located and spread in such a way that they are easily reachable for all inhabitants in an area. Additionally, from a social perspective, usage by all inhabitants should be accepted and it should be affordable (transport plays an important role in this notion). Last important requirements are diversity and mixture of functions. Mix of functions makes for a dynamic street characteristics, which has a positive effect on social interaction and feeling of safety (Note that this requirement relates to Jane Jacobs visions on social sustainable streets). Mixture of functions creates longer periods of liveliness on streets and also enables residents and entrepreneurs to discover and create a local identity. This mix also increases opportunities for exchange of knowledge and flexible use of space.

2.2.3 Inicio Market parties specialise in sustainable social developments and consultancy, and offer insights into practical application. One of these parties is the Rotterdam based bureau of Inicio. The urban development bureau Inicio specialises on the processes and regenerative approaches of creating a social sustainable neighbourhood, their expertise is therefore more on the soft side of social sustainability. Their practical empirical research and projects have let to the following description of what a social sustainable process is; "a social sustainable approach is a continuous process that everyone can participate in with the goal to strengthen relations between people" (Inicio). Within their approach three concepts are regarded as general targets; flexibility, openness and continuity. Flexibility accounts for the ability of the plans deriving from the process to grow and develop with society as needs and desires change. Openness stands for the accessibility and clarity of the process and plans; this is important for an accommodative process that involves all groups in society. Continuity accounts for the self-sufficiency of the results and projects forthcoming from the process. A Community should be able to continue and develop the results of a process without further guidance. Inicio emphasises the importance of involving all target groups as well as all stakeholders, it is important that all stakeholders are willing and on the same page if successful longterm integration of plans is the goal. Like-mindedness and inclusiveness are regarded as beneficial for the process, increase the chances of an effective outcome and stand at the core of social sustainability itself. For example, the multitude of stakeholders include local governments, investors, designers, residents, local entrepreneurs etc. Inicio's expertise underlines the importance and interwoven relation of the "soft" base and processes with the resulting subsequent hard spatial interventions to improve social sustainability.

2.2.4 The compact city | The "compact city"

perspective (compacte stad beleid in dutch) is another practical example of socially and environmentally development, albeit implemented sustainable from a governmental perspective. For example, the perspective of compact city building has influenced Dutch city building and planning for at least the past 4 decades. According to Dutch governance, historically, the perspective is based on the notion of environmental conservation and efficient mobility. Recently the aspect of economy has been added. Mainly because economies in urban areas prove extra potent and viable, thereby stimulating employment (Hajer, M., PBL, 2011). The policy caused urban sprawl to be minimised in the Netherlands, stimulated sustainable transport (cycling) and consolidated a strong economy (Hajer, M., PBL, 2011). Compact cities are also regarded as better for social integration and human development. Internationally the compact city perspective and its sustainable advantages are widely agreed upon but there is also criticism. The variety of criticism is vast but not all relevant. What is relevant is the conclusion deriving from all this criticism. A renowned research by Neuman at al (2005) concluded in regard to compact city building that "conceiving the city in terms of form is neither necessary nor sufficient to achieve the goals ascribed to the compact city. Instead, conceiving the city in terms of process holds more promise in attaining the elusive goal of a sustainable city." (Neuman et al, 2005). This is an important side note to the spatial realm of sustainable city building, which is applicable to all mentioned views and perspectives in this paper. At the same time, it also adds extra importance to the mentioned "soft" side of the issue of (social) sustainability in cities. However other research still fully underline the positives, Burton (2000), in regard to the compact city, states: "likely benefits include improved public transport, reduced social segregation and better access to facilities, while the main problems are likely to be reduced living space and a lack of affordable housing. Research on aspects of density show that the cities that support social equity the most appear to be those that have a large proportion of high-density housing (Burton, 2000)." This information makes clear that the discussion on the compact city is still on-going and a variety of positives and negatives exist.

**2.2.5** *Interpretation* What does this information concretely mean for this research and what can be

concluded? These questions need brief answering before continuing the research. Firstly, from a historic context it seems that some themes keep recurring through time and find their way to modern times as well, this demonstrates what indicators for (social) sustainability are important en persistent through time. From a historic perspectives this seems to be (use of) attractive public space (Sitte, Jacobs, Le Corbusier, Whyte, Gehl) transport and space-use related to transport (Le Corbusier, Howard, Jacobs, Tjallingii), (community) living, self organisation and responsibility (Howard, Le Corbusier, Whyte, Jacobs, Bramley et al) and green (Le Corbusier, Howard, Tjalingii, Anderson), certain topics will therefore also be the focus in the expert interviews, as well as the to-be-defined urgent sustainability issues. Bramley at all also offer views connected to "feeling of connectedness", which is enabled be listed indicators.

Modern examples of social sustainability applied in city design offer a similar perspective on what issues are defining and reoccurring within sustainable city design. The WACOSS definition of what social sustainable development is ought to be is based on, or related to indicators such as described above. Urban developments described by Schwartz and Knoops contribute to different types of self-organisation but also inclusive development (process). This is also what the term "placemaking" is about. DP group frames social sustainability in terms as aesthetically pleasing, accessible, diversity and flexibility. This can however only be realised with a correct process. Something the municipality of Amsterdam and Inicio both agree to. On the contrary, the compact city model is a more orientated spatially strategy to create social sustainability. The spatial interventions mainly agree to important indicators from the historic perspective, density seems to take a more important role now. This is due to the large challenge regarding population growth cities are facing. The recent critiques on the compact city model outline the importance of process in creating a (social) sustainable city, and the relative lack of this element in the current compact city model. The modern examples of social sustainable cities point mainly towards indicators such as; flexibility, inclusive processes, diverse public space, accessibility, safety, aesthetics, transport and self organisation/ responsibility.

The most important lesson to take from these practical examples is that a social sustainable city is not only a product of spatial design anymore. Historically the focus of a social sustainable city has always been on the spatial end result, however, over time the "the social sustainable city" has evolved into a "goal" that can only be reached by combining "hard" spatial interventions with the "soft" organisational side, or process, that takes place beforehand. In other words; a social sustainable city is not only about the end product anymore, it can only be realised through a proper process. The process enables cities to be spatially better suited to desires, creates inclusiveness, responsibility, a collective community feeling, awareness and willingness. Process and organisation will therefore also take an important role in this research.

2.3 Urgent urban sustainability issues | The following paragraphs aim to identify which developments regarding sustainability will be most influential on the urban design, fabric and general functioning of the urban environment in the near future. Through literature analysis and interviews with experts the following five themes (developments) where identified as most influential for urban areas form environmental perspective. Simultaneously an the following paragraphs will elaborate why these developments are important and influential while also distinguishing possible spatial and social connections and consequences.

2.3.1 Densification As mentioned in the introduction, cities are often prone to the extremes of social, cultural and environmental developments because of their high-density nature. This puts urban areas at the forefront of new challenges. The density issue within cities is set to become more important within coming years. This issue is a simple question of supply and demand in the spatial realm. Urbanisation levels are rising because increasing amounts of people move to urban areas, where limited space is available. Naturally the consequence of this is either an increase in density or urban sprawl into the landscape. The second consequence of urban sprawl is what urban areas have been experiencing continuously over previous decades but is under pressure. Especially in wealthy urbanised areas the open landscape is scarce because it is simply not available anymore or because its natural qualities are highly valued and therefore preserved. Besides this, basic urban agglomeration effects tend to stimulate densification of the existing urban area more than sprawl, as history has shown

(Fang & Yu, 2017). This causes modern city expansion to often not encompass "greenfield" development (developing new un-build areas around the city) anymore, it rather focuses on increasing housing and work by "filling up" and maximising spaces within city borders densification of the urban environment is therefore a relatively general development cities worldwide are going through nowadays. A continuation of this development is anticipated in the coming decades and is even set to intensify, this is due an expected increase in migration to cities and legislation that stimulates urban densification (UN, 2018) (CBS, 2016). Within the Netherlands an increase of urban densification, stimulated by national and local governments, has been observed over the last two decades in almost all large cities (Claassens & Koomen, 2017, PBL, 2012).

The effects of densification on the urban environment have been widely discussed by various scholars recently. In general, urban areas of highdensity are vulnerable for generic negative urban effects such as inequality, crime and air pollution. Various scholars argue that densification has a direct causal connection with the degradation of sustainability and liveability in cities. Within the 2019 RUDIFUN document the main problems caused by density are identified as congestion, noise and air pollution, heath island effects, flooding, (mental) health issues, social exclusion, crime and extreme real estate prizes (Coppola et al 2014, Breheny 1992, Leidelmeijer et al 2014, Heusinkveld et al 2014, Peen et al 2010). It has to be added that these elements are highly context dependent and are not a given when implementing high-density. Despite context dependency these elements have to be managed and taken into consideration though.

Urban densification seems an exercise of fine margins because a city with too much density could cause a multitude of negative environmental consequences. However, observed practical implication of urban densification does seem to indicate that the positives outweigh the negatives. This is accentuated by various influential international parties such as UNEP (2011, 2013), the European Commission (2014, 2016), and OECD (2012). Additionally, the Dutch government recently published a document advocating for high-density mixed-use city development (RUDIFUN, 2019). The document points out various scientific publications that emphasise positive effects of high-density for a cities functioning.

Stating that increasing density positively influences a large number of elements such as need for mobility, energy usage, productivity, circular economy, smallscale businesses, material usage, crime, vitality and conservation of nature.

The social aspect specifically is also influenced by densification. Social equity is for example improves as density increases according to Burton (2000). Also equal access to services and facilities is better in highdensity areas (Burton, 2000 and Houghton & Hunter 1994). Furtermore, increased social interaction and natural meetings take place in densely populated areas, this is partly due to the decreased use of cars and high number of functions and facilities (Plater-Zyberk, 2001). Neighbourhoods that enable social interaction and "face to face" communication have a greater chance of containing a "sense of community" than neighbourhoods that do not facilitate this (Nasar & Julian, 1995). Also from an aesthetic point literature suggest that people connect more to high-density areas (Nelessen, 1994 and Diamond & Noonan, 1996). Negative consequences for social sustainability are naturally also at play. Scholars argue that highdensity areas cause dissociation from society and withdrawing from contact. As a result, less close communities and social bonds exist (Bridge, 2002). This is partly due to overstimulation of stimulus and a feeling on anonymity in these areas.

adaptation | Climate 2.3.2 Climate adaptation recently developed into a "hot" topic within city design and is set to continue this upwards trend of importance. The notion is based on the changing climate, which is expected to become more extreme because of atmospheric pollution caused by human activities. Summarised, the climatic changes will cause more extremes in weather patterns, this means a decrease of precipitation in current dry areas and an increase of (sudden) precipitation events in wet regions, temperatures will also develop more extreme peaks, especially the higher temperature values. Cities in temperate climates will experience more extremes on all sides of the spectrum; more droughts, extreme heat and sudden extreme downpours (KNMI, 2015). Most cities are located in temperate climates.

Cities are designed according to the climate they are located in. They are adapted with their climatic surroundings, so inhabitants experience a comfortable living environment. When a climate develops more extremes, a city could lose its ability

to climatically coop, thus losing the ability to provide a pleasant living environment. In relation to previously described consequences of climate change this often results in an inability to provide (drinking) water to inhabitants, extreme heath islands in urban areas and increased occurrence of flash floods. These negative consequences mostly occur because cities consist of large amounts of paved areas and sewage systems. Paved areas prevent water from infiltrating the ground naturally and guide water to a limited amount of specific catchment areas and sewage systems that discharge the water. Paved surfaces also decrease the retention time of precipitation, causing massive surges in discharge. In the event of an extreme downpour the discharge capacity of the catchments and sewages is often not able to coop, resulting in flooding of certain (urban) areas. Paved areas are also prone to absorbing heat, causing their temperature to rise, subsequently they disperse this heath to the surrounding air again, causing a local rise in temperature. This so called "urban heat island" effect is often strengthened by the presence structures that block the natural cooling flow and discharge of air. In average, the temperature in urban areas is 3 degrees Celsius warmer than surrounding rural areas. An increase in extreme temperatures intensifies this effect (KNMI). Availability of water is obviously also affected by these climatic effects. An increase in droughts forces cities to reconsider their water storage capacity and source of water, this often results in expensive investments in water managements systems.

To prevent described consequences cities are naturally forced to take spatial and legislative actions. These interventions are often of an adaptive nature, meaning that they solely account for solving the problems that result from climatic extremes. Mitigating interventions, which are directed at solving the source of the problem, are seldom implemented in the spatial environment. This is because mitigating climate change is less effective when changing patterns have developed and occur. Simply said, mitigation is irrelevant because it is too late. Additionally, mitigation interventions are often implemented through legislation and are only effective on a large national or international scale. So, most implemented interventions are adaptive, mainly to manage and ease the consequence of climate changes rather than decreasing the climatologic effects of climate change itself.

In practice these solutions manifest themselves

in a large variety of spatial interventions. To decrease the chances of flooding as a result of sudden downpours cities are actively encouraging their citizens to limit paved surfaces in private gardens and instead use grass, open soil and vegetation in general. This allows water to infiltrate into the ground instead of heading straight into the sewage system. (Holdijk, 2017). Additionally, multiple cities in the Netherlands offer subsidies to stimulate the implementation of green roofs on privately owned buildings (i.e. municipality of Amsterdam). Green roofs absorb water and thereby increase the retention time of precipitation and decrease sudden discharges, this provides sewage systems with a larger time window to process the water. In public areas, cities have multiple options. Popular solutions are the implementation of permeable green patches, half open pavements, wall or roof vegetation, disconnection of sewage systems, appointed lower overflow areas and wadi's. Recent laws in the Netherlands also force property owners to contain and infiltrate water on owned ground, direct discharge by connection to public sewage is not allowed (Waterwet, Dutch gov., 2018). In the Netherlands these interventions are part of an integrative national plan to implement climate adaptive measures as described in the 'Nationale Klimaatadaptatiestrategie: Uitvoeringsprogramma 2018-2019' issued by the Ministry of Infrastructure and Water Management for example. This indicates the urgency and effectiveness of these solutions. Heath island effects have proven to be effectively decreased by open bodies of water, vegetation and effective use of building materials. Vegetation and water have a cooling effect on the direct environment and provide shade while material-use of buildings affects the heath that is absorbed and radiated by the build-environment. Interventions to prevent heath island effects generally receive relatively little attention in legislation documents compared to other adaptive measures.

Described interventions of these environmental sustainability measures have various consequences for social sustainability in cities as literature shows. First of all, green areas, which are stimulated by climate adaptation have an overall positive effect on wellbeing, health and social interaction of an area (Brown, 2005). They also prove great opportunities to improve biodiversity in an urban area (per. Comm Verheijen). More green spaces are also associated with pride and therefore connectedness and involvement with the wellbeing of the general neighbourhood (Bramley et al, 2006). Parks also increase the availability of flexible use of space, which is important to ensure that an area can be flexibly adapted to the needs of inhabitants (pers. comm. K. Sol). Also, short-time spatial interventions, such as festivals, workshops and sporting events can easily be realised in green areas, which increases connectivity and cohesion of neighbourhood. Other climate adaptive interventions such as green roofs offer opportunities for communities to cooperate. There are examples of initiatives such as vegetable gardens or community roof-gardens that actively bring together a large variety of citizens, this increases cohesion and social interaction. These initiatives could either be self-organisation or led by a certain party. Interventions related to water catchment areas also prove opportunities to create added value for a neighbourhood, water catchment areas can for example act as water parks were children could play and others could meet.

**2.3.3 Mobility** Mobility in urban areas is always under pressure, it allows an urban area to exist, develop and thrive but simultaneously causes a multitude of negative effects to its direct environment. Considering the prognoses of rising urban population these negative effects are evidently predicted to increase if "business as usual" is continued. Negative effects of mobility on the (build) environment are congestion, exclusion, price inequality, noise pollution, air pollution and danger of injury. Jacobs emphasised social factors within these effects by proving the disrupting effects large roads have on communities, connectedness and social wellbeing (Jacobs, 1963).

Most sustainable challenges regarding urban mobility are based on the simple notion that more people require to be transported but less (or no) environmental damage should be the consequence. The challenge resembles to be a highly difficult exercise considering current developments that suggest that the environmental consequences of urban mobility are intensifying in the majority of urban areas. Simply increasing the amount of space reserved for mobility is often not possible in urban areas because of a lack of space and will become even more problematic in the future since the urban areas are predicted to develop a higher density.

The contradicting goal of achieving a higher level of sustainability, by decreasing negative

effects, and increasing mobility overall is a spatial challenge that currently receives substantial attention in urban design. There are various spatial and governing strategies currently implemented that offer opportunities to achieve this goal. Important to underline in regard to this matter is the distinction between mobility and accessibility. These two definitions are inherently intertwined which makes it difficult to distinguish them. There is however, a slight yet important difference, which is highly relevant in recent city building. In her paper, Handy (2002) described mobility generally as the opportunity to move while accessibility is described as the ease with which a location can be reached. The potential of interaction on a certain location is also used as a possible definition of accessibility. The choice, or option to choose mode of transport as well as location is also important within this definition. This also accounts for the term mobility since it is considered as the opportunity to move. In her paper (2002), Handy emphasises the tendency to focus on improving mobility within transport strategies, especially in the Unites States. In practice this results in a focus on more roads, or other capacity improving measures. In this strategy, improving mobility itself is seen as a goal. The strategy is only limited applicable in urban environments because of spatial pressure, as earlier described. Handy therefore continues by stating that accessibility focused transport strategies offer great opportunities (Handy, 2002) especially in cities. Accessibility improving measures are directed at altering land use (mixed-use development), transit orientated development, fill-in development, mainstreet development and street connectedness. It appears that this strategy considers mobility merely as a mean that serves the context (destination) and so, the context is altered instead of mobility itself. Accessibility-focused strategies, together with new technologies and smart-solutions offer opportunities to accommodate more people in their transport needs without increasing the negative external effects of transport. They instead focus on changing the urban environment to spread the destination and origins of passengers and focus on creating more connectivity within regions (which directly effects social sustainability). As a result, accessibility has increasingly received more attention in city building and transport strategies recently. However, when accessibility strategies are implemented, they are often still integrated with mobility enhancing

strategies as well nowadays. This is actually most effective to accommodate the largest amount of people in their transport needs, as Handy accentuates in her paper (2002). Future strategies could however lean more towards accessibility enhancement as methods and opportunities progress.

In terms of social sustainability, accessibility focused strategies offer a multitude of opportunities. These strategies cause for a spatial distribution of destinations that is more equal, so more mixed-use, which creates livelier neighbourhoods with better accessibility and therefore equal opportunities. Focus on sustainable means of transport such as bicycles or public transport also creates a fairer situation in regard to exclusion. A car-based transport system is substantially more expensive for its users, and therefore less reachable for a large group, than a system based on public Transport and bicycles. Transport can be regarded as a human right (Logan et al, 2018) because access offers opportunities to develop, so accessibility is of high importance. A transport system based on cars can also have an exclusive and negative effect on social interaction (TCRP, 1998). It is also described by various scholars that large roads in cities, which accompany a car-based system, could have a bordering effect on neighbourhoods, preventing economic and social development of areas. This is because areas are cut off or do not allow for traveling through by commuters.

**2.3.4 Energy** The issue regarding energy in urban areas is less spatial than previously described sustainability issues. The spatial consequence of this issue is less defined to the borders of the city, they are more present in adjacent, spacious areas. These are the areas where energy is mostly generated and is especially true when renewable energy sources are realised, which is expected to happen more frequent in future decades. Renewable energy is stimulated and embraced in most regions nowadays and since cities demand the largest amounts of energy this pressurises the landscape. Open landscapes are highly valued, especially in urbanised areas, they provide in flora, fauna, agriculture and recreation. Placing windmills and constructing large-scale solar fields in surrounding landscapes causes these qualities to decrease, which is obviously undesired.

Of course, there are opportunities to place described renewable energy sources elsewhere at less hindering locations such as the open sea. Yet, effort is also put into finding possibilities to implement renewable energy sources into the urban landscape. Most spatial solutions directed at producing renewable energy within an urban environment focus on the so-called "roofscape" of an urban area. In earlier paragraph the potential for water retention on roofs was addressed, additionally roofs also offer opportunities to place solar panels, or even wind turbines. Of course, the scope implementation is dependent on factors such as structural strength, angle, public hindrance, position relative to other structures and willingness. Modern techniques also offer opportunities to implement solar panels in tiles or windows, thereby decreasing observed presence and invalidating certain withholding factors. Wind energy is less-easily implemented in urban context because of sound pollution and large visibility, although innovations have decreased noise pollution.

Implementing new renewable energy sources into the urban landscape has a less noticeable consequence on electricity related infrastructure. Decentralised, local, or even off-grid electricity systems are required to coop with a dispersed and intermittent energy transmission. Existing energy systems are constructed to transport energy from a centralised and predictable source, which is the exact opposite of what a decentralised renewable energy grid would mean. If the ambition is to adapt an existing large-scale energy network to decentralised renewable sources two general strategies are possible: Interchangeable and harmonised use of sources or smart-grid implementation. Important to add is that these strategies do not account for an offgrid approach, wherein the energy network would be separated into smaller networks. The UN states that interchangeable use of renewable sources is useful; "To tackle intermittency, several renewable energy sources should be combined to overcome sourcespecific shortages, such as solar at night, or wind during doldrums. Solutions can also come from waste and heat recovery technologies that can be used to bridge supply gaps." (UNHabitat, 2012). Smart grids also help to counter intermittency in supply by "helping to balance variable power generation and end-user needs. These grids are also more efficient in transmission and distribution, thus reducing energy loss. Machine shifts can be automated to run during hours of the day when there is enough power to meet demand" (UNHabitat, 2012). The UN adds to these solutions that, while they are promising, they are also reliant on reducing energy consumption as a whole.

Awareness and more efficient technology, together with active governments as "regulators and drivers of change" stand at the core of this.

Besides spatial and governmental challenges related to urban energy demand, a social communitybased challenge also presents itself. Renewable urban energy sources provide opportunities for households to also produce energy individually or in a collective, off-grid or connected. In a 2016 study (Kampman et al) it was concluded that in 2050 83% per cent of European households could contribute to renewable energy production. And that "About half of all EU households, around 113 million, may produce energy, either individually or through a collective." These collectives, or off-grid communities account for roughly 37% of this amount according to Kampman et al (2016). Communities driven by of-the-grid-energynetworks could arguably offer opportunities to improve connectedness, integration and awareness within society, especially in urban areas that are currently experiencing issues regarding these topics. The Dutch government is currently surveying existing (micro) offgrid initiatives to base larger future initiatives on. The study concludes that: "Smart Integrated Decentralised Energy (SIDE) systems contribute to the resilience, flexibility and circularity of the Dutch national power system infrastructure" and enables bottom-up initiatives in society that improve self-sufficiency in communities (Metabolic, 2018)

Looking purely at the social sustainability aspect, the impact does not seem great although there are few opportunities. Especially the organisational aspect of decentralised renewable energy systems offers opportunities for communities to connect and self-organise. This links to described social movements such as localism and proportionality. Most importantly, it allows inhabitants to take responsibility within their own environment, thereby improving connection to it and adapting it to local needs and beliefs, this enhances the meaning of an area to its inhabitants.

**2.3.5** *Circularity* The concept of circularity is intertwined with the urban challenges presented in paragraphs before and mainly has an economic connotation to it. Multiple definitions to describe the concept of circularity exist, mostly because the concept is applied in a large variety of researches. According to the Ellen MacArthur foundation, a leading institute in research and awareness regarding circularity, circularity is based on the notion that

resources, materials and energy flows within a system and is never lost, only reused. Its inspiration is taken from ecosystem loops and system thinking, in which natural systems are always circular while humans have adapted linear systems in which resources, materials and energy are not reused and merely end up as waste. Most circularity definitions focus on the three R approach; reduce, reuse and recycle. While elements and theories such as closed cycles, Renewable energy, Systems thinking form the base for reasoning. This circular way of thinking demands a different approach to the economy and also functioning as a city, which has spatial (and functional) implications on the urban environment. Implementing actual circular interventions is generally met with resistance and hesitation.

Circular economy, or circularity as a goal in cities is dependent on a couple of factors. The Ellen MacArthur foundation has set up a program, based on three principles, to guide cities to achieve the goal in circularity. Firstly, waste and pollution should be designed-out by trying not to create waste in the first place or integrate recycle possibilities. Also utilisation of unused space provides opportunities to improve efficiency in living, working and mobility and the integration of renewable energy. The second principle focuses on keeping products in use longer, but also smarter. Car or bike sharing are examples of this, the Macarthur foundation emphasises that this could bring communities closer to each other. As a third principle, regeneration of natural systems is proposed. This achieved improvement is soil, water and air quality. Thereby not only helping residents but also flora and fauna. Deeper understanding of the meaning of city planning and design within the context of circularity shows that the majority of previous urgent urban challenges presented in this chapter find their way into circular principles. The Ellen MacArthur foundation presents cities with circular planning principles in their core as places with greater proximity "between where people live, work and play" and where "Valuable land previously dedicated to roads and car parks is freed up for green spaces, commerce, offices, houses, and recreation" (MacArthur foundation, 2017). Additionally, instead of creating waste, cities should be adapted to "a new distributed system of resource management, nutrient flows, and reverse logistics" that will make "the return, sorting, and reuse of products possible." City design, so on a smaller scale, itself follows the principles

laid-out in circular planning. So the design should be nature inspired, which means "Infrastructure, vehicles, buildings, and products are designed to be a combination of durable, adaptable, modular, and easy to maintain and repurpose." (MacArthur foundation, 2017)

Concrete spatial and social effects of circular city development are diverse, but also concrete and clearly distinguishable. Common examples are hubs for shared vehicles, separate waste disposal units, climate adaptive measures and flexible shared workspaces for start-ups. A test case in the municipality of Amsterdam focused on creating a sharing economy by an online platform and concluded with the knowledge that "Several of these activities have also led to closer connections forming between residents", indicating the positive social impact of pursuing circular goals. (MacArthur foundation & Municipality of Amsterdam, 2018)

**2.3.6 Summarising table and conclusion** | The figure underneath gives a summarised overview of the information provides in this chapter. The figure shows the current issue, solutions and possible effects on urban areas and social sustainability.

The information provided on the next page forms the core knowledge of solutions and the spatial consequences urban environmental developments have. The relations will form the focus point of further information gathering through interviews and the forthcoming test case, with the focus especially on the relationship with social sustainability. In other words, the summarising table acts as a guide for further research. However, the information above consists of the exploratory literature research and therefore requires further confirmation, which is also the aim of the remaining research. This research has a practical focus to establish the coherence between theory and practice. Further new-found information will of course also be elaborated, if relevant.





**3.1 Strategy** This research will be valued in a qualitative and exploratory context. Research will be based on literature research with an empiric research based on interviews and a practical research (a case study by survey). Literature research is used for the historic and practical research to determine what social sustainability means within urban planning and what indicators exist. Literature research will also be used to identify what urgent environmental issues urban areas are facing. Interviews with expert will form the base to structure and exactly determine the relationship between these two elements, after which a survey will test and verify the found relations in practice.

A largely qualitative strategy is chosen in the initial phase of the research because it offers possibilities to research context dependent values, experiences and relations within the real world of urban design. The ambiguous and context dependent nature of the term sustainability is better definable with an qualitative method. Such aspects are difficult to define in numbers and consist of complex social structures, making a quantitative method less suited for the initial research (Bryman, 2015). Although, quantitative sources and visualisations are useful and will be used for analysis. The research will make use of literature, expert views and a case study in the Netherlands to identify the relationship between social and environmental sustainability.

The research will target urban design from the realistic perspective of the Marco.Broekman urbanism and design bureau in Amsterdam. This strategy is chosen because it gives a practical "real world" view of the situation and this causes eventual findings to be more concrete, realistic and consistent to what creators of urban design experience. Using qualitative analysis and interviews within cases offers opportunities to go in-depth and answer not only "what is?" but also "why is?" This holistic approach will provide insights into relationships of different spatial element and underlying processes. Using cases also enables the researcher to use a multitude of data collection methods, enhancing validity (Denscombe, 2003). It is however important to be aware of your own viewpoints, values and assumptions as a researcher, since these aspects have consequences on qualitative research. Inwards reflection and informing interviewed parties is therefore important. In this way, the interviewees will be aware of the research context, procedures and goal of the interview. The eventual applicability of the interview outcomes

### 3. Methodology

depends on which level of generalisation is possible (Denscombe, 2003).

3.2 Research methods An usefull method to analyze and order the preliminary results deriving from this research is a multi-Criteria analysis (MCA) followed by a single test case study. This method is often used in researches used for decision-making processes based on a multitude of criteria. The great advantage of a MCA is that it establishes indicators and enables comparing of values based on a large variety of criteria such as monetary units, time, effort, experience or social values i.e. This is especially useful for a research conducted in this paper since it aims to determine and value various elements of social sustainability. These elements are mainly connected to qualitative research techniques, while an MCA could be regarded as a quantitative method. Within this research quantifiable units such as money and time will no be used, creating a MCA based on qualitative measures such as experiences, relations and values. Note that this research does not aim to create an advice out of the found elements and indicators, it focuses on creating insight into what criteria are important and influential and how they affect each other. Within this research the focus will be especially on determining important elements and their interaction with each other. A complete MCA analysis will therefore not be conducted, it merely acts as a base to establish important indicators. Literature research and expert interviews will form the base for this, after which the found data will be tested in a case study by specific analysis and confronting local residents.

The test case chosen in this research is the Osdorpplein area in Amsterdam Nieuw-West. This area is one of the most diverse areas populationwise in the Netherlands, with a large variety in ethnicities but also age. The neighbourhood has been experiencing social problems and has been the focus of various improvement programs. On top of the interesting social, the spatial structure of the neighbourhood is also relevant. Constructed in the 1950's and 60', the area consists of a large variety of flats, apartment buildings and row housing. There are large connected green structures present besides various types of large infrastructure. The area therefore contains elements relevant to both social sustainability and urban environmental sustainability issues. The test case aims to reflect on the findings and hypotheses formed by literature interviews and expert interviews. This is executed by a questionnaire

containing simplified questions regarding the findings. The survey is cross-sectional. Meaning it intends to measure the situation regarding a certain topic at one particular moment in time. When a survey measures a transition or longer development over time, a longitudinal survey is more fitting (Lueng, 2001). However, this is not the case in this research. Local inhabitants of the Osdorpplein area are asked to fill in the questionnaire. Eventually, their response will provide insights into the correctness of the findings and indicates how results should be interpreted.

The survey is designed as follows: A total of 28 questions are answered by the respondents. The first 17 questions are scale-indication questions. The respondent can indicate to what extend they agree or disagree with the statement presented in the question. These types of questions are useful because they offer great insights into certain views, it enables respondents to precisely voice their opinion on a certain subject. The last nine questions have a classic multiple-choice structure, in which respondents can choose between three options. However, to make sure that all relevant information is still gathered, every closed question contains an extra "other" box in which respondents can voice their opinion if it does not match with the options at all. The structure of these questions is therefore more "open". The overall survey is cross-sectional, which is a valued method for surveys describing one moment in time instead of development over time (Leung, 2001). Cross-sectional surveys collect data to create insights into a population of interest at one point in time. Cross-sectional surveys are described as snapshots in time of the populations about which data is gathered (Lavrakas, 2008). This survey focuses on the current situation and does not describe transitions or developments through time, which would favour longitudinal survey methods (Leung, 2001).

Combining the literature research, expert interviews and a survey, naturally leads to a form of "mixed methods" research. Classic researches based on mixed methods combine quantitative research methods with qualitative research methods and have been popular is social studies for a while. Certain studies execute a qualitative or explorative research before testing the results through a quantitative type of research (Erzberger & Kelle, 2003). This research arguably uses a similar strategy. The largely qualitative research method of the MCA id used as an outline to determine indicators, they will however not be quantified numerically. The indicators for **24**  social sustainability will be determined, the literature research and expert interviews will consequently determine the relation with environmental sustainability developments in urban areas. The findings deriving from this qualitative research will be tested in a survey (a quantitative methods). These results will be interpreted in a qualitative manner. Summarised this creates the following research structure; qualitative research leads to a survey, which contains quantitative data, this data will be interpreted from a qualitative view again.

**3.3 Datacollection and operationalization** Qualitative research methods are used to collect and order data, the main method consisted of conducting in-depth semi structured interviews with relevant specialists and involved parties. This will be accompanied be in-depth literature research. The interviews have an open semi structured nature that aims to use the provided answers as guidance for the next question. This inherently means that differences in questions occur within interviews, this slightly influences the general course of every specific interview. In general, this is regarded as a strength within this research (Clifford, French, & Valentine, 2010). However, to remain relevant and on-target as much as possible a list of goals to be obtained from the interview was set up beforehand. These goals formed the main guidance and axiom in every interview to ensure comparability.

Semi structured interviews were the preferred method to collect information because they offer relevant information for a research of explorative nature (Yin, 2009). Testing a hypothesis is not necessarily compatible with an explorative research, this does not discount the use of semi-structured. Interviews also allow for targeted questioning of specific topics but simultaneously remain flexible enough to be adaptable, this enables the questioning to be reactive on the answers of the interview subject. Flexible and unstandardised questioning is advised by Baarda et al (2009), this allows for adjustments and better research overall, the topic list therefore also fluid per interview. On top of that, the subjects responds are also unforced and in own words because of the informal tone of a semi structured interview (Clifford, French, & Valentine, 2010). 12 different subjects were interviewed, some of them more than once, all experts in the field of sustainable urban development. The interviewed subjects, with function, are listed on the next page.



#### 3.3.1 List of interview subjects

Bart Claassen	Senior urban planner and designer at marco.broekman, an urbanism bureau specialised in sustainable development.
Bas van de Griendt	Founder and owner of Stratego advise, a consultancy bureau specialised in a sustainable build environment.
Diana Krabbendam	Director at "The Beach" development bureau for sustainist and inclusive design and development.
Floris Van der Zee	Head designer and partner at Marco.Broekman,an urbanism bureau specialised in sustainable development.
Katusha Sol	Sociologist and co-founder of "placemakers", an urban development bureau specialised in inclusiveness
Sander Meijerink	Professor at Radboud university in urban planning and climate adaptive measurements .
Sander Lenferink	Senior lector in urban planning and mobility at Radboud university.
Michiel Schwartz	Founder of the sustainist design movement, advisor, lector and co-founder of "the beach" for creative innovation.
Sophie Pauwels	Technical innovation expert and o-owner of Inicio, a bureau specialised in sustainable inclusive urban development.
Ben Hendriks	Project manager at the municipality of Amsterdam, specialised in sustainable development.
John Dagevos	General director at Telos research institute, specialised in developing and monitoring sustainable processes.
Wout van der Heijden	Advisor, innovator and founder of Kickstad, specialised in inclusive sustainable urban development.

**3.3.2** Interview goals Awareness regarding the shortcomings of the chosen data collection methods is important. In the case of semi-structured interviews these shortcomings lay within the interviewer and the interviewee. There is a danger of subjectivity in every interview, which can cause biased questions. This can lead to unrepresentative answers. The Interviewee could also be biased on certain topics, or could give socially acceptable responds, causing the same lack of representable reactions (Yin, 2009). There is also a danger within the selection of interviewees, since a wrong selection could provide a skewed view on reality, diversification of interview subjects is therefore important.

To ensure above-mentioned positives and prevent negatives the following interview structure (topic list) was set up. This interview was conducted with 12 important players in the field of research, that interviews goals was to be in-depth and highly informative. Time wise, most interviews are therefore of a duration between 30 and 60 minutes. As a result a lot of information was collected, which causes the selection of actual relevant information highly important. The main goals of the interview questions regarding ambitioned information are presented underneath.

Expert interviews will be conducted to establish;

- 1. What is social sustainability?
- o What is the issue?
- o Social and scientific relevance?
- o Personal beliefs and observation?

The aim of this question is to create a base to expand the rest of the interview upon. Knowledge and views of the interview subject are determined which effects following questions.

- Why is social sustainability so important?
- o Connection with professional background?
- o Spatial examples?
- o practical implementation?

This information is important to acquire because it connects the abstract meaning of social sustainability within reality and provides insight into practical implementation.

- What are the most important urban issues regarding environmental-sustainability?

- Determine clear argumentation for frame work (mobility, densification, climate adapta tion, health, energy)
- o Determine where opportunities and dangers exit.
- o Determine personal view on general sustaina bility issues.

This question is all about connection previously acquired knowledge with information deriving from the interview subject, it also tests earlier made assumptions. The core of the research-question is also directly addressed by this question.

- What opportunities exist between creating social sustainability and identified ur ban issues?
- o What are current lessons from practice.
- o What deserves special attention in regard to the future.
- o Who plays what role?

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This question tries to tie-up previously collected information by direct questioning, this question can be regarded as a conclusion to the interview and is therefore highly depend on provided answers. Important to emphasise in regard to described goals is that additional goals could occur during and interview because the interview subjects provides some unforeseen relevant information. As a consequence the course of the interviews differ substantially. The interview outcomes will be verified by conducting a survey with residents in the neighbourhood of Amsterdam Osdorp.

**3.4 Research philosophy** Research philosophy is about three main topics and accessory questions; ontology (what form of reality exists and what is can there be known about it?), epistemology (what is the relationship between the researcher and what can be known?) and methodology (How do I find whatever I believe can be known?) (Guba & Lincoln, 1994). These questions enable four main forms of research philosophy, within a qualitative research such as this one, constructivism offers the best view (Guba & Lincoln, 1994).

More specifically, the research philosophy is based on two important research approaches regarding ontology and epistemology. Epistemology focuses on what knowledge actually is and how it should be gathered. Within these epistemological related questions there are two general philosophies; positivism and interpretivism. The positivist approach is based on the reasoning that the social world can be researched, determined and understood according to the same rules and principles as natural sciences. Contrary to positivism, the interpretivist approach does not advocate this. This approach is based on the reasoning that subjects are not objects and therefore cannot be researched and understood in this way (Bryman, 2012). Ontology focuses on the relation of (social) subjects with reality. Within this philosophical domain two approaches also exist; realism and relativism (constructivism). According to the realist view realty is not influenced by social beings, it simply is what it is, and this is similar for every being. The relativist view goes against this by stating that everyone constructs their own version of reality, also the researcher. Thus, reality is not a single given, it differs for everyone and cannot be regarded as one general reality (Bryman, 2012)

This

research is of a social nature and focuses on the interaction of subjects with their environment, this is not necessarily a cause for qualitative research. However, the research philosophy in this paper can largely be placed within the interpretive and relativist (constructivist) approaches, this especially accounts for the interviews and test case within this study. The test case tests the correctness the preliminary outcomes of the literature research and expert interviews by conducting surveys with locals within a practical example. The MCA analysis is in essence naturally more based on an ontology of realism. This is only partly the case in this study since the MCA is both based on literature reviews, which is realism based, and on expert interviews, which are very much influenced by relativism (constructivism). Relationships between social sustainable elements within our living environment are highly depended on how it is experienced by people (subjects). It is also context dependent from a social and spatial perspective, results can therefore not be adequately described according to natural science principles and one given reality. Also mixed methods comply with described research philosophy. Such methods are applicable to researches using quantitative methods to analyse qualitative data.

**3.5 Validity and reliability** The level of real-world representation within the research determines validity in general. If a research is correct in

this respect, another researcher should come to similar representations when a comparable research is conducted. Yin (2011) refers to validity "correctness of a description, conclusion, as explanation, interpretation or other sort of account", these descriptions, interpretations etc. should give a fair and just representation of the complexity and scope of the findings and results. Within this research validity is guaranteed by using multiple methods of data collection (literature and empirical). Multiple interviewees from different backgrounds were also interviewed to guarantee a varied and valid research. Also, an actual application of the findings, which acts as a reflective test, is conducted in the form of a single case study. This preferred method of multiple research options within strategy is referred to as triangulation.

Complete repeatability of research results is determined by the reliability of a research. (Bryman, 2015), this demands specific conditions and context. Especially a context and case dependent study could encounter difficulties with repeatability. This is because interviews rely on people that could change their mind at a later stage, making them inconsistent and subjective (Denscombe, 2003). It is therefore of high importance that the researcher precisely documents all steps, decisions, adjustments and procedures. This enables others to follow the exact same path and find the same conclusion, if this is the case, a research is of good reliability. Important side note to this is that the case study has to be the same or very similar. In general it can be argued that reliability is highly depended on transparency of the research.

This study chose a single case study to conclude. It is possible to generalise from a single test case if done analytically according to Yin (2012). Analytic generalisation within an post-positivistic perspective therefore forms the scientific-philosophic base of this research. The test case acts as an analysis for the preliminary results and hypothesis derived from interviews and literature research. Thus, it can be considered as a verification of the explorative part of this research and the preliminary results.

**3.6 Internship** The internship, which added important information and experiences for the fruition of the final product, took place during the starting phase of this research. At the urban design bureau of marco. broekman spatial challenges and issues are tackled with a design by research method. An open process

characterises this method, because the end-goal of the assignment is often unclear at first hand. It is based on the three core terms to necessary for every spatial project; a plan, a research and a strategy. The research form develops while progressing by using different explorative methods such as data collection and analysis, scenario development, interactive workshops and collaborations with other parties. Such activities eventually lead to a strategic research plan, which gives direction to the type of solution that is ambitioned. These kind of processes often require testing by design, because this is the only way to determine the quality of proposed solutions. Not a single project is exactly the same of course but these tests consequently add knowledge for further projects. Research by design takes place on various scale levels and involves a large variety of stakeholders, which makes it a relevant and complete method.

Being involved for eight months in projects concerning our spatial environment and sustainability that use this method of research has been massively helpful in creating a relevant research-question and designing a research that adequately answers this question. In other words, an environment such as marco.broekman is inspirational and educational. Because of the large variety of research projects and the large scope of research methods a great amount of literature and information is covered. All of which could be of added value for the research, it helps determining which issues are currently at play in practice and enables correct filtering of information. The process-like projects also clarify how different stakeholders are involved in a process that aims to create a better environment to live in. This makes it possible to view a research not only from a theoretical perspective, but also from a practical perspective. The research-questions related to mismatches between theory and practice are often most urgent and relevant.

Finally, on a more general note, the activities at marco.broekman contributed to practical and visual skills which are relevant for the completion of the research. Gathering information, interpreting information, communicating information and finally visualising this information is an important part of the work at marco.broekman. Naturally, these skills are highly useful when composing a research.

**3.7 Conceptual model** The conceptual model on the next page provides a simplified overview of the 28

relationships of the main concepts at play in this research. Environmental sustainability challenges (described in ch.2) create spatial consequences and interventions for the urban environments, which on their turn affect the overall long-term sustainability of an urban area. The same accounts for social sustainability. As described in the introduction this influence is arguably regarded as more defining ultimately or "overarching" compared to the influence of spatial sustainability. Environmental and social sustainability (both defined by indicators) share relationships and opportunities for integration of solutions, which result in "hard" and "soft" interventions. When integrated and applied correctly, long-term social and environmental sustainability is the result. lack of, or faulty integration could lead to an unsustainable situation in the long-term.



**3.8 research design model** This model shows the steps of which this research is made up of. The figure also includes all the sub results and outcomes. The actual outcomes will be presented during the research by text and figures.



#### mixed methods



### 4. ANALYSIS OF EXPERT INTERVIEWS

4.1 Goal|The previous chapters explored the definition of the term "social sustainability" and introduced the most urgent sustainability issues urban regions are facing in the near future. The question remains what these developments imply for social sustainability. How do they connect? Where are the dangers and opportunities of these developments in relation to social sustainability? Answering this will provide preliminary answers to the main-question of this research. (What opportunities and dangers do urban developments regarding urgent environmental issues provide for improving social sustainability in those areas?) This question will be researched by briefly describing the relationship before highlighting opportunities and barriers. Afterwards advisory strategies to improve or prevent presented findings will be discussed. All information in this segment derives from the various expert interviews, together with the results deriving from the literature this will form the base for the conclusion and test case.

The sub-questions that construct the main question will also be researched by this exercise. The subquestions are;

- What exactly is social sustainability and which elements define it?
- What are currently the most urgent developments related urban sustainability issues?
- What opportunities do these developments offer for improving social sustainability?
- What dangers do these developments offer for social sustainability?
- What process is required to realise social sust ainable areas?
- Can the found solutions realistically be imple mented and governed?

First three sub-questions have been addressed in the theoretical framework, nevertheless, additional interesting insides into the conception and general understanding of the term social sustainability is provided by briefly addressing the interviewees responds to the question about the meaning of the term. The results will focus mainly on the last 5 sub questions, the sixth is especially addressed by the last paragraph, which will focus on the case study.

The result will also contain an in-depth analysis of the area of Amsterdam Nieuw-West (Osdorpplein surroundings), which will act as a test case for gathered and presented information. The test case can be regarded as an example for practical implementation of the findings and will also indicate **30**  what spatial interventions as a consequence are feasible in practical surroundings. The case study will be conducted by using an inquiry with responds form local community members.

The paragraphs underneath will focus on fields of opportunity regarding the integration of environmental sustainability developments with indicators for social sustainability in urban areas. (flexibility, inclusive processes, diverse public space, accessibility, safety, aesthetics, transport and self organisation/responsibility, attractive public space, transport and space use related to transport, community living, self organisation and green). Any additional indicators identified by the interviews will obviously also be explained and integrated.

The paragraph structure has been deducted from the information provided by the expert interviews. This information was provided by questions that were based on literature research, which can be found in the theoretical framework. The paragraphs were set up according to found information: spatial flexibility, densification, inclusive community based development, shared economy/community, energy, eyes on the street development and transport. Bare in mind that these fields overlap, for the sake of structuring, different information was assigned to all paragraphs, however information of one field could be relevant for other fields too.

**4.2 The meaning of social sustainability** Firstly, the interview subjects responses to the meaning of (social) sustainability will be presented. This information provides a baseline for understanding the views of various players in the field of sustainable urban development.

The interview subject's response was largely similar, or comparable. Floris van der Zee, head designer at Marco.Broekman. refers to the definition of sustainability development in the Bruntland report (1987) which emphasises the need to alter current activities of society in order to provide future societies to experience a similar high quality of life and fulfil their needs. Van der Zee continues by stating that sustainability is currently often framed together with flexibility and adaptability in design and structure. Of course, this is important but not the only side of the definition:

"It's also durability, sustainability is also time. If something is sustainable through time investments are very much allowed. Urban places with good design and measures, stone buildings that can resist the test of time are sustainable. It is important that these places leave a form of culture that invokes respect and remains readable. I don't believe that technological development alone (in regard to flexible and demountable development) will be the solution for all our sustainability issues" (pers. comm. Van der Zee)

Sander Meijerink (professor at Radboud university) approaches sustainability from the viewpoint of his professional background; climate adaptation. Naturally sustainability has an obvious meaning in this context:

"Spatial adaptation is about altering space for the consequences of climate change. It is for example about the question: how do we design space in such a way that it prevents the forming of heath-islands as a result of temperature rise?" (pers.comm. Meijerink)

Meijerink emphasises that he struggles with the usage of this "sustainability" definition. Building an environment fit for the future surely is a form of sustainability but the term sustainability is not only about adaptation;

"A sustainably build environment is an environment that is arranged and designed to function adequately on the long term, so if certain factors change, it should still function. So in that sense it (climate adaptation) is sustainable, but I have always had the urge to associate sustainability with the mitigation issue..." (pers comm. Meijerink)

Sander Lenferink, sustainable mobility and planning expert at the Radboud University finds it difficult to formulate an exact definition of the term sustainability because of the ambiguous nature of the term. In his professional background however, the term is mainly focused on optimising efficiency;

"In my professional background...it is a very ambiguous term that is put on everything. At this moment climate change is obviously very relevant, so than we talk about temperature rise, CO2 emissions and similar. But in principle, sustainable mobility, or mobility in general, could be seen as making efficient use of resources and means to make an efficient system, which is circular or has good support. It should sustain itself. And if I connect this to mobility specifically, it means that sufficient amounts of passengers are required or that the fabrication adds usage of vehicles is as sustainable as possible." (pers. Comm. Lenferink)

Bart Claassen, Senior urban designer at marco. broekman, illustrated various elements connected to sustainability is his profession, hereby emphasising the vastness and ambiguity of the term. Nevertheless meaning of the phrase can be well defined according to context. In the context of urban design sustainability often finds it way through physical interventions regarding climate adaption, this is because cities brake with natural climatic systems and flows which causes imbalance. Sustainability is therefore a search to restore balance in our self-made or influenced environments.

"A city actually breaks with the circular system of waterflows, the balance is disrupted (....) cities have a surplus of water but also often a shortage of water, if you manage to balance this system you loose both problems. The solution is very much finding out how nature works and to imitate this in an urban environment, you fix the balance" (pers. Comm. Claassen)

Lastly, Van der Heijden (Kickstad) emphasises the importance that society has within social sustainability, the organisational capabilities of locals are vital for success, as is illustrated by the following quote

"I find an example of social sustainability is forming a kind of community together to think about sustainability and measures to achieve this. So more the organisational side you could say. The result of social sustainability should be, for me, that people live extremely pleasant at the place they live, work pleasantly where they work and visit pleasantly where they visit. Simply a pleasant environment. Eventually there are lots of sustainability aspects related to this happy living...."(pers. Comm. Van der Heijden)

Van der Heijden adds to this that defining what people mean by a pleasant areas is difficult:

"It is some kind of latent need. People can easily say; in area 1 I don't like this and in area 2 I do like that when I'm there. Why this is, is difficult to vocalise and the background of it is even more difficult to vocalise." (pers. Comm. Van der Heijden) **4.3 flexibility** The following paragraphs state the insights given by the interview subjects in regard to most urgent environmental issues for urban areas. To enhance interventions related to environmental sustainability in the urban area simultaneously with social sustainability of an area, one aspect kept returning. This is the aspect is spatial flexibility. Flexibility in spatial design offers a great amount of opportunities to improve implementation of interventions on the long term and simultaneously connect local inhabitants to their environment. Katusha Sol (Placemakers) even states that the base for social sustainability to a large respect is flexibility.

"So placemaking or social sustainability to a large extend is, the way I notice it, also just flexibility of a space to be adapted to what the local demand is at that moment (...) consequently you work with this in design, so leave some space in the development, and space in general to let people co-decide and think with you. " (pers. Comm. Sol)

Michiel Schwartz (sustainist design guide) agrees to this (leavings places to fill in) and simultaneously points out the difference between co-creation and placemaking;

"Yeah, but literally keeping it open. That you keep something open in design. Because you know, the moment people start taking that spot, they're going to do something. And so, it is not that designers and non-designers are going to co-design together, it's that a designer leaves room for residents to fill in that area the way they want. That is not the same as cocreating with designers what needs to happen in a location." (pers. Com. Schwartz)

According to Sol place making does not only encompass the actual space, the organization behind the use of the flexibility is also important for success.

"Offering a diversity of functions is not only a matter of physical space, its also programmatic. So, with only a piece of ground you wont get there, you need involvement, volunteers and various day activities to Involve the people in the neighbourhood, with diversity, students and scholars. So, a program is naturally as important." (pers. comm. Sol)

What will happen if this is executed correctly is the following according to Sol;

" The idea is that it invokes more ownership. At the moment something is designed for you, and not with you, there is a risk that it does not completely align with your real needs. Because of this you feel less connected and will visit it less often. If you would visit more often more natural meeting takes place, this gives quality to public space on different levels, user, attractiveness, and functional." (per. Comm. Sol)

"...we often work in public spaces of cities and there obviously live a lot of different people with different needs and stakes. It is important because in these areas you just have to deal with each other. Our viewpoint when starting is that these different people should meet each other, this increases cohesion and bonds the neighbourhood. "(per. Comm. Sol)

These ideas are already making their way into large urban (re)development programs, it could still be improved but it indicates the increasing awareness around the issue.

"...it is becoming a little bit more organic, in urban plans it was decided that there will be open space, so 10 per cent is flexible. I think this is partly inspired by place making initiatives; you don't know what exactly will be there (....) In this case you can facilitate this with the open space." (per. Comm. Sol)

The quotation above illustrates how important it is to leave some flexibility within an urban design. Flexibility can also be based on changes in demand and needs deriving from environmental urban issues, which underlines the relevance of flexibility. Van der Zee adds that flexibility is an important factor in regard to social sustainability of cities but does add that this flexibility is not necessarily something purely spatial.

"I think space, in terms of use, should be made flexible but not in terms of dimensions"

"I think that the true power of a growing city is within a clear definition and bordering of space to develop, replace buildings, redesign urban space and clarify private from public...it is an important task for urban designers to define these profiles." (pers. Comm. Van der Zee)

Van der Zee explains that this has been happening in urban areas and has proven to be successful, also from a heritage perspective. This enables people to connect with their environment. Spatial inventions should take consideration of this to ensure awareness of history, this creates connection between inhabitants and environment.

"This is another form of sustainability over time, for example, old city walls and defences are still recognisable in city plans but are used as park or ring road. The space still exists but is given a new interpretation over the years." (pers. Comm. Van der Zee)

Diana Krabbendam, co-founder of "The Beach" in Amsterdam also points out that flexibility in areas provides opportunities for development and improving social sustainability. Krabbendam adds that the process of using flexibility is often a tedious one, only when other stakes are at play development is made possible quickly. An example of this was an illegal tented camp for undocumented referees that forced the local government (Amsterdam) to find another use for the area. Krabbendam stresses that the structural planning in a neighbourhood restricts social development of an area and that flexible use of land is a logical consequence of human nature. Facilitating this would enable better development in cities in regard to many urban issues (pers. Comm. Krabbendam)

Also according to Sophie Pauwels (Inicio) flexibility is crucial for sustainable social development on the long term, paradoxically, flexibility seems to ensure continuity.

"flexibility is the capability of an environment to adjust to changing needs and desires in the future. This is exactly what enables continuity in the long term. When something isn't flexible it could be forced to stop, so it isn't continues." (pers. Comm. Pauwels)

Pauwels adds that flexibility is often used with other terms, recently sustainable development has been put under the label of resilience. Which in essence is also a form of adaptive capacity, flexibility or combined endurance. Pauwels stresses that flexibility is not only a spatial factor important for solving environmental sustainability issues in urban areas. It is also an organisational factor. When developing a neighbourhood, cooperation with the inhabitants is important. Keeping this process flexible increases the chances for a successful outcome.

John Dagevos also underlines the importance

of being aware about our changing environment and worldview, incremental and adaptive planning is crucial to manage this.

"In that way flexibility and incremental planning are of course of importance because you realise yourself that the world is changing around you. We have the tendency to materialize everything in stone or creating it for a very long time"(.....)"With this you don't really create a flexible system. What you actually want is to be able to adapt to changing views on the environment and interventions, which will be there in years." (pers. Comm. John Dagevos)

Van der Heijden adds to this that adjustable, flexible and incremental planning are better suited to modern and sustainable urban planning, this is often not the case nowadays.

"We are very accustomed to big master plans, big blueprints, long-term plan development. Matching financial structure is also very common with landexploitation plans running for years. You often find out after a year that you have to adjust the land exploitation. And the idea that it does not fit in with your master plan. So.....You will have to start thinking if you really want to develop an interesting area. On the one hand how you can be much more flexible with your plan structure and your financial arrangements, and on the other with your spatial planning instruments." (pers.comm. Van der Heijden)

"you really have a challenge of how to be more flexible with your final goal, how to have a good strategy for temporariness, but also how to have a good strategy for plan development, because how do you deal with innovations?" (pers.comm. Van der Heijden)

**4.4 Relations between environmental and social sustainability** Within the literate research five urgent issues in regard to the environment is urban areas have been introduced; density, climate adaptation, mobility, energy and circularity. The interview respondents pointed out that various connections between social sustainability and urgent environmental issues exist. With certain urgent issues the relation is more apparent than with others, especially the relation to density, climate adaptation and mobility are clearly definable. The following paragraph offers an overview of some the relationships described by the respondents. The relation between density and social

sustainability as Floris van der Zee indicates is:

"I think that the densification issue, which is about dealing with high-density in the Dutch situation, really offers some opportunities for sustainable development, for different sides of it. I think social sustainability plays a big role, I'm convinced of that. Indeed I think it's interesting to approach it from that perspective to see how projects can be started that focus on creating and developing participation so that future residents can think about the functioning of a city. In essence they are of course no urban planners and designers. It's interesting to hear ideas, desires and other stuff. Some people may do more, but I think you can't leave it completely up to them. I don't think you can leave local residents up to making their own piece of city." (pers. comm. Van der Zee)

High-density also has a positive effect on the implementation opportunities of public transport. This is a simple matter of supply and demand. In a densely populated area, which also contains multiple destinations, there is a market for profitable public transport. Mixed-use development is a good option to create a neighbourhood that also contains destinations. In previous paragraphs the potential positive effects of public transport on social sustainability have been described. High-density has therefore indirectly, through the means of public transport, a positive effect on social sustainability.

"Well, high-density means more potential passengers....this ties in well with public transport because it means you can run your public transport lines more efficiently. Mixed-use helps as well because this causes counter movements during rush hours. In case of a working neighbourhood and a living neighbourhood the traffic streams always go the same direction" (pers. comm Sander Lenferink)

Also Van der Heijden highlights that densification could by positive for social sustainability if implemented correctly. If implemented otherwise the effects could be adverse;

"Densification on its own is not positive, it could also work negatively. Its all about the way you densify an area. If you live in a tower with small floors everywhere nobody will meet each other because you just have 6 apartments per floor and a lift core. Very anonymous, you get in a lift, get to the parking garage, get into 34 your car an away you are. While the whole city lives in one building, so this could get very anonymous. But you could perfectly target it as a design challenge to decrease this anonymity and increase interaction. This will cause density to suddenly have a positive effect."

Diana Krabbendam expresses her worries in relation to densification of the urban area, she especially worries about the awareness towards nature of local residents.

"I'm not against densification, this is what cities do. But I find it beautiful that that you can easily enter the spacious landscape form the dese urban area, for example the gardens in Amsterdam west. Amsterdam has a beautiful intruding green structure" (pers. comm. Diana Krabbendam)

"densification; sure. But it should not go at a cost of green space which will enables you to make that connection to nature. If you can't make the connection with nature, people will lose their understanding of how sustainability works." (pers. comm. Diana Krabbendam"

**4.5 Inclusive community based development** | When spatial interventions are realised the process beforehand largely determines the success of the intervention. This process, which has been described as the "soft side" of social sustainability, is not automatically a cause for successful interventions in the urban landscape. The process of involving locals with development is crucial for finding a solution. It determines to what extent the intervention corresponds to the desires of inhabitants. However, even if an intervention is successful, it will be less appreciated by local inhabitants if they were not involved in the process. Inclusive processes therefore also form acceptance, sense of being listened to and public opinion. Pauwels underlines this;

"They (inhabitants) felt unheard while the result would eventually be probably the same as what the municipality came up with first" (pers. comm. Pauwels)

This suggests that involving locals with a social sustainable approach is a smart choice no matter complexity or scale of an intervention because it strengthens the network between different people and the neighbourhood. Pauwels, who specialises in practical urban sustainable development, adds to this by stating that a social sustainable approach has various goals:

"...how to come up with a concluding document that clarifies what people support, what are shared ambitions and what ambitions are not shared, there are all kinds of interests. (pers. comm. Pauwels)

"That could be about interaction between people and relations, how many? how often? And how close are these relations? It could be about shared identity, which could have its effect on a neighbourhood or town through a feeling of pride, these things are connected. It could be about the self-organising capacity of a community..." (pers. comm. Pauwels)

She adds that this is largely achieved by following three basic principles that lead to an inclusive development process.

"Flexibility, openness and continuity. If you want to start of a social sustainable process, those are the things to take into account."....."everyone should participate, the question is where is the openness? Well, everyone should participate in their own way...." (pers. comm. Pauwels)

"equality is also super important. This is difficult to accept for some, some say; I'm here on behalf of my organisation or club and have a lot of people behind me so my voice is more important (......) However. We can use these people behind as a network, we try to set up a working group with these people to shape the process." (pers. comm. Pauwels)

Additionally, it is also highly important to realise a project is not finished or successful when the process is over. Success is continuous, this means that inhabitants have to be self sufficient to a degree and keep an intervention relevant. This also ties in with the fact that inhabitants often own a large part of the land in neighbourhoods and need to be able to influence their own property too, Pauwels points out:

"50% of a neighbourhood is private and the other half is public space. So if a municipality makes an area climate adaptive they still have another halve to do. So you want this other halve (the inhabitants) to go along with your plan, but how? Well to involve them in the process, this creates understanding, knowledge and insights. This causes and stimulates people to go along with the plans. ...awareness is surely also a goal of a process." (pers. comm. Pauwels)

The aspect of awareness is introduced here, in this case awareness means that people are willing to change their own property too, for optimal effect and development on the long term. Katusha Sol adds that the process could also create a feeling of mutual understanding and unity, which is important to create neighbourhoods in which appropriate decisions can be taken;

"this (a process) accounts also for cohesion for example, in the sportheldenbuurt they all say that they have very good contacts with each other because they have a mutual pioneering feeling. These are important elements to work with if you're starting with a new neighbourhood." (pers. com. Sol)

Before such understanding, mutual agreement and cohesion is achieved the process is a "struggle" according to Sol, this struggle is however a crucial part of successful process.

It's difficult for many to imagine there are others, with other desires, with whom you also have to share space and that not only your plans can be realised. This is important, eventually all go through this, it's a bit of a struggle to eventually achieve this diversity in a space and interaction between different kinds of people" (pers. com. Sol)

"...eventually the realisation arrives; yes I have dog but not everyone likes dogs. Eventually I live in a city with people that are different, I live here as well and find it important I live pleasantly and therefore don't want conflicts. That's where you need to go through and eventually the area will be inviting to you" (pers. com. Sol)

The right process before a spatial intervention creates opportunity for people to understand each other and connect, which is good for a social sustainable base while making a neighbourhood more sustainable. Van der Zee indicates that this is already happening. On top of that, understanding, and the chance that an intervention is appropriated and suited to its environment increases by this. "I think that the developments in society caused that we now have a pretty mature society where a lot of people can stand up for themselves and form groups or set up a project individually, this enables them to show more commitment to their environment. This offers opportunities for people who are attracted to doing something for their neighbourhood and concretely say things about climate adaptation through sustainable themes. And that enables local residents to work together on their environment as neighbours. This causes implementation of sustainable improvements by working together, and so that also creates a better social cohesion in the district." ( Pers comm. Van der Zee)

"But at the same time you have to add that it also does not apply to everyone, so it can also be an exclusion mechanism. Because people go with money or with time, or think; where is this about. Are not attracted to actively do something as well." (Pers comm. Van der Zee)

Van der Heijden agrees with Van der Zee and states that many people are willing and capable of making change. He however argues that local governments can, and should take a role in this wherever is needed. It is a matter of only facilitating or also taking an instigating role.

"But there are also people who say, I'd really like to do it myself and everything in between. As a government, I think(.....) you have to facilitate all those target groups. Because if you say, well, I'll take this one target group and I'm going to help them and I'll leave the rest aside for a while, it won't work. For example, the municipality of The Hague, which has an approach in which they say; we are going to do certain neighbourhoods because there is no other initiative yet, so we are going to take the initiative as the municipality. Some neighbourhoods have taken a full initiative themselves, we'll keep our hands off that. We're not going to take over, but we're going to help where it's needed." (pers. comm. Van der Heijden)

Lastly, community based development can also be based on small spatial interventions intended to drive people into awareness, creating connection and instigate feeling of responsibility. Pauwels adds the following to the question if neighbourhoods should be designed in such a way that they bring out the best **36**  in people.

"...or awareness and change of behaviour. So, if there are no bins anywhere you will throw your trash on the street, but if there are bins in sight everywhere, with a nice noticeable colour for example you can steer away from this. This will maybe also cause people to act more towards one and other. I think that you are than truly building social sustainability, also in a social way by stimulating people to call each other out by providing facilities." (pers. comm. Pauwels)

4.6 Shared economy A substantial amount of spatial interventions related to urgent environmental sustainability issues offer opportunities for shared economy systems. The shared economy offers a base for people to interact, share and meet, which could improve the social fabric and cohesion of an area. Climate adaptive measures, new forms of urban mobility and even energy measures (which also includes circular initiatives) create platforms to improve socials sustainability and environmental sustainability simultaneously in urban areas. When it comes to mobility, sustainable forms of transportation, such as bicycling and public transport create opportunities to open up more space for pedestrians, green, flexible use and other local initiatives. Additionally, developments in smart mobility, mobility as a service (MAAS) and car sharing programs reduce the need for parking areas, these areas can consequently be used differently for the benefit of urban issues.

"....Shared cars, yes, but also for a specific group of people. So when contemplating new modern neighbourhoods with low parking norms you could leave some places for shared cars." (pers. comm. Lenferink)

Shared cars and other solutions related to smart mobility and MAAS (Mobility as a service, stands for "a mobility distribution model that delivers users transport needs through a single interface of a service provider. It combines different transport modes to offer a tailored mobility package, like a monthly mobile phone contract" Heitanen, 2014) have still not proven themselves to be implementable on a large scale underlines lenferink, he points out his doubts;

"(why the doubts?) Because....people are stuck in their habits and like to be in control. The public support and potential market have been limited for MAAS until now. For example; I'm reasonably young, highly educated and have a variable travel pattern. I should be the target group but still I'm not tempted to use MAAS because I have a bike and go to the station, it is close by. I see no need to change this" pers. comm. Lenferink)

However, Lenferink points out that theoretically, if current trends continue, there will be less cars in general. Partly because of MAAS developments. Certain societal groups, such as youth and elderly people are more flexible or less dependent on transport, which makes them suitable for MAAS.

"If you look at it closely there could be less cars, families can go from 2 to 1 car. Youth doesn't need a car and elderly also don't. Than you have approximately half of the current cars." pers. comm. Lenferink)

MAAS interventions, public transport and cycling enhance the change of meeting, enable new space to be used and reduce the need for dividing and segregating roads. This makes mobility a rosaceous urban environmental issue for improving social and environmental sustainability simultaneously. (pers. comm. Lenferink) Newly open space, such as former roads or parking lots, could for example be used for climate adaptive measures. These measures offer opportunities for communities to cooperate and strengthen cohesion. For example they could be completed by a neighbourhood vegetable garden or children's playground.

On a regulatory base, climate adaption offers opportunities too. Water-containment law forces people to store and absorb water on own ground. Often this requires a neighbourhood-wide plan and cooperation between inhabitants to some extent. Many roofs also offer possibilities for climate adaptive measures. In practice these measures often exist out of community enhancing solutions such as roof gardens that grow locally sold vegetables. Local communities such as a schools or elderly homes (or a combination of booth) often maintain these types of roof gardens. Such Platforms bring together different people and create a sense of local awareness.

Bart Claassen emphasizes the importance of the sharing community. Pointing out that the foundation for sustainable communities comes from shared values and a notion of connection to each other and environment. Claassen continues by stating that his view and definition of social sustainable environments partly complies with cohousing basics. Co-housing resembles various basics of shared economies and communities. Research has also shown that co-housing communities generate sustainable and resilient communities and environments, from both a spatial and organisational perspective (Urban Vesbro, 2000). Co-housing offers solutions to limit resource use by sharing electrical facilities, spaces and cars while simultaneously connecting the local community. Bart Claassen, when asked about characteristics of projects on sustainable city building, states that;

"this (co-housing) means that various facilities are shared, also on neighbourhood level. In Austria and Germany there is a reasonably large neighbourhood fully based on this. Actually all blocks have extra wide staircases that increase interaction, also the windows are extra big so people can see each other. But there are also places that go so far that the actual apartment only consist of a bedroom and the rest is shared, this might be interesting!" (pers. comm. Claassen)

Described developments all offer great opportunities for urgent environmental sustainability to be connected to (improved) social sustainability. Mobility-wise, the need for polluting vehicles can be substantially reduced by sharing, while simultaneously stimulating people to interact and meet. Energy wise, shared mobility systems offer opportunities to reduce usage and comply with off-grid local energy systems powered by renewable sources. The energy of vehicles can be used to store or drain energy. This is accessible and therefore very useful, with a local of-grid energy system. Additionally co-housing communities, are highly suited for shared mobility or local renewable energy systems, since their spatial features and social values adhere to the specific requirements of the shared economy. The same accounts for specific local climate adaptive measures directed at water and heat management, which simultaneously bring together various members and institutes of the community. Such interventions are best implemented in areas of higher density as John Dagevos explains;

"A new community relation will materialise than, I find that interesting. And this is a lot easier in areas with high-density because you can find an economic base there to enable things like this (shared community)." (pers. comm. Dagevos) 4.7 Energy Ben Hendriks, project manager at the municipality of Amsterdam elaborated on the opportunities the energy transition brings to people in the city. Residents in the lower societal classes, struggling with employment and integration, are especially suited to profiting from the energy transition. The municipality of Amsterdam is currently setting up projects to connect these residents with job opportunities deriving from the energy transition. Within the urban area of Amsterdam investments into renewable energy sources implanted in the spatial fabric of the city are currently on-going. (pers. comm. Ben Hendriks). Spatial and technical alterations to the urban energy require simple man-hours for realisation. Schooling programs, set up by the municipality and other stakeholders, specifically target these struggling societal groups by re-educating and training them to become specialists and mechanics. These programs aim to simultaneously improve the energy transition and social wellbeing under the tag of "climate justice". A good example of how urgent environmental sustainability issues combine with social sustainability in urban areas. (pers. comm. Ben Hendriks).

"...A lot of job opportunity is created by climate problems, think of placing solar panels for example. However, there are to little workers available and educated for this, we are now looking into ways to create this. As it seems, even the young generation that is currently being educated is not enough workforce, we need to target re-education, new inflow and people stuck in social welfare too. This is what we're busy with now" (pers. comm. Ben Hendriks).

In lower social classes energy related costs often cause problems. Diana Krabbendam (pers. comm.) pointed out that sustainable and renewable energy developments offer opportunities to decrease these problematic costs for lower social classes while educating and connecting them during the process. Projects have shown that people do not realise how energy-costs can be decreased and create a sustainable situation. When awareness is created, people become very involved with the issue though. The following quotes explain the course of such and project in the neighbourhood of Osdorp and underline the positive effects on social sustainability in an area.

"So they wondered, what does that mean in such a district? For local energy use, but also distribution and energy production can be expected in areas like this. **38** 

It came out of those conversations with people from the neighbourhood, so discussions about poverty, we have no money, very high energy bills. It was also very quickly about how to be more independent. Because if there's one thing here in the neighbourhood, it's that people do not believe in institutions." (pers. comm. Krabbendam)

Notice that also the desire for more independence and being self-sufficient is important for these respondents, which enables further opportunities for social sustainability. Krabbendam continuous by stating the following;

"But what really came forward, is that people said they may have missed the boat, we might have no work, we have no good education but we think the future of our children is very important. We want our children to learn about sustainability, energy. That was a nice to know." (pers. comm. Krabbendam)

Multiple factors come together in such a project. Firstly, it is repeatedly shown that involving locals benefits the quality and "level of accordance to desires" of sustainable developments. Secondly, development of sustainable energy takes place, fast-tracked by social need. Thirdly, awareness, and therefore connection with environment and neighbourhood are created. And lastly, better opportunities for further development and improved employment of future generations is realised, thereby improving the potential economic en social position of this generation. Floris van der zee connects the opportunities around energy to spatial structure of an area, especially through mixed-use. Arguing that by smart mixed-use an energy exchange can take place between residences and offices, an area needs to be designed according to this.

"For sure, I think there is a lot to gain by living a working close to each other. There is some kind of exchange, at night people need energy at home and during the day they need energy at companies. If these are close to each other an exchange system can take place or the demand moves during the day. You can design according to this, you could use rest warmth again if the distance between things isn't too great, it offers a spatial opportunity." (pers. comm. Van der Zee)

When it comes to producing renewable energy in an urban area there is a limit to the production capacity

too. The relation between build environment and energy production capacity a high-density area is important to consider. Bas van de Griendt explains;

"Above 5 stories a building can no longer fulfill its own energy demand on building scale. And with highdensity this can also not be solved on a local scale...." (pers. comm. Van de Griendt)

Setting goals in term of density and energy will therefore have consequences on adjacent areas, passing on demand and spatial implication. When creating high-density areas with self-sufficiency goals, the question therefore remains which level of effect is deemed acceptable. This will differ per case, the main point regarding "passing on" is being aware about the inevitability of it. Finding the balance with urban energy depends on fine margins, which are highly context dependent.

"Yes, this (high-density) is very important. You see it going wrong in a lot of places, its something in need of extra attention. Energy wise, there are a couple factors. It is especially about the energy generation, above five floors it becomes impossible to be selfsufficient in energy needs, and with very high-density you are also not able to solve this (sustainably) in the area" (pers. comm. Van de Griendt)

"This means you have to pass on energy production elsewhere. This is a very important point." (pers. comm. Van de Griendt)

Earlier it was argued that of-grid energy systems based on local renewable energy production could benefit social sustainability in an area by creating collective values and cooperation. However, as Van de Griendt point out, within dense urban environment this could prove to be problematic. Design of urban areas should therefore take this into consideration when allocating space. Passing-on demand could result in less sustainable situation.

#### 4.8 Eyes on the street, create an active and attractive

**street live** Public spaces are important is an urban area with high standards for social sustainability, this cannot only be achieved by surrounding buildings, this is an crucial design challenge according to Schwarts:

"The builders and planners and many architects will say, the built city is the actual city. But I don't want to

believe that. Because if you say; I feel at home in this city, you know that's very real. That's also something that you take with you, something that's not just in the building. It's between the buildings." (pers. comm. Schwartz)

So mixed-use and spatial interaction is important when creating social sustainable places with lively, save and attractive public spaces and street views, However van der Heijden illustrates that mixed-use is not necessarily an absolute solution. It is a good starting point though:

"If you really want to make an interesting area then you have to look at the interaction between those functions. And the interaction between the functions; built and public space. Because also an anonymous building and anonymous public space do not function together. You also have to look at the interaction between them." (pers. comm. Van der Heijden)

An important concept for attractive public space is the concept of mixed-use, which is based on spatial mixture of programming. Programming in urban context indicates usage. A neighbourhood that has a mixed-use setup therefore contains buildings for working and living (and other public facilities). In recent developments mixed-use has been further refined by implementing it on building level. This often translates in buildings that have offices, shops and workspaces on the first (and second) floor and residences on higher floors. Mixed-use development is a welcome effect often associated with densification, it however simultaneously stimulates more lively street views and public space, which positively affects liveability in an area. The connection between the different uses in such an area is crucial in achieving this. This requires special attention in programming strategies, which will cause a certain interaction between places and improve social sustainability

"In masterplans and zoning schemes you could easily fit all these functions as living and working. But this doesn't mean you will create an interesting area. An interesting area will only be created if you can steer it, so what the programming of these functions will do and if they fit together and have interaction. "(pers. comm. Van der Heijden)

So mixed-use and spatial interaction is important when creating social sustainable places with lively, save and attractive public spaces and street views. However van der Heijden illustrates that mixed-use is not necessarily an absolute solution. It is a good starting point though, which is illustrated by this example;

"The occupants of the office upstairs don't benefit from the plinth filling. Now we have been able to turn that around together with the developer, together with the tenants, to a concept that is more coherent, which gives a much more interesting buildings, a much more interesting look towards the surroundings. So mixed-use is not necessarily a solution, but mixed-use is the start of a discussion about the solution." (pers. comm. Van der Heijden)

Within city building the concept of mixed-use is often associated with compact city models, efficient (public) transport, high-density and the famous eyes on the street concept by Jane Jacobs. This concept by Jacobs accords with statements by Pauwels:

"More green, public space which is pleasant to stay in and invites to meet and consequently strengthens relations between people, much more than a place full of cars (...)This leads us to theories such as Jane Jacobs, eyes on the street. Access and accessibility, lighting, there are a bunch of factors." (pers. comm. Pauwels)

In relation to social sustainability multiple connections exist, which was further emphasized by responds from various interview subjects. First of all, mixed-use is often implemented with an activity, or liveliness, objective of a certain number of hours. This objective is set to assure the amount of time that activity takes place on the public spaces of the street. During the day activity will be ensured by working and shopping, while during the night and morning residents fill the street with live. The reasoning behind this goal is closely related to Jane Jacobs' eyes on the street values. These values are based on the notions that inhabitants experience a friendlier and saver neighbourhoods with which they can identify better when street live and sight is active. Various interview subjects adhere to mixed-use development as the following quotes depict.

(Is mixed-use an indicator?) "Yes, the mix and the level at which people can reach each other, literally and figuratively" (pers. comm. Krabbendam) 40

"If you create a mixed zone where "it all" has to take place, then you need a lot more attention for meeting and facilitating. So, for example, maybe make places where no transport comes through. Make many green spaces. I believe in small streets and squares, some kind of tissue, a place for terraces etc." (pers. comm. Van der Zee)

But it also creates dangers for urban societies as Van der Zee indicates when asked if mixed-use development has a positive or negative effect on social sustainability:

"Yes, I think it's exciting, because it's a bit a matter of finding a balance of the type of residents or users in the area. Indeed you see, some of the projects we're working on are more businesses-areas, which then evolve to slowly become mixed areas. And that there are all kinds of festivals and activities .... Not everyone wants to live there but certain groups of people find it just very interesting to live there and to meet each other in a bustling area. Having a beer or drinking coffee together, sharing ideas with each other and working on that environment." (pers. comm. Van der Zee)

This statement proposes an interesting insight. It is possible that mixed-use areas with many activities attract a specific type of people that are more open and connective by nature. This would mean that the spatial design itself is just one part of creating greater social sustainability in an area and not the sole responsible factor. The other factor would be the type of people that are attracted to living in the area. This would mean that certain types of people would not socially benefit form mixed-use development. These statements are however purely speculative and the actual size of the effect is unclear.

**4.9 Schematic figure** | The figure underneath gives a schematic overview of the insights and connections described in the previous paragraphs. It illustrates the connection of described environmental sustainability issues with social sustainability indicators and the found areas of opportunity, which can be regarded as indicators of social sustainability by design and process. The areas of opportunity are divided in a "hard side" which indicates the spatial side of the opportunities and a "soft side" which indicates the organisational side of opportunities.(second column).

The last column depict the precise spatial and organisational/pragmatic consequences or features that a specific field of opportunity brings to an area and community. Some of these features consequently influence each other (positively and negatively) or go hand in hand. It becomes clear that opportunities for co-benefits exist and trade-offs, that require management, are present.



**4.10 Preliminary hypotheses and expectations** [The analysis and forthcoming figure led to the following summary of the most important findings. They can be regarded as the preliminary hypotheses, the expectations deriving from these hypotheses will be tested in the survey. Paragraph 5.2 will explain how the survey questions test these expectations.

Issues regarding increased density offer opportunities to implement flexible spaces, buildings and public space, save inviting public spaces and mixeduse areas, which improves social-spatial suitability. Safeguarding spatial connection and meaning is important when realising this. Interventions related to increased density offer opportunities to involve locals through participation in the decision making process. This will cause more fitting and sustainable solutions. It is expected that a test case will underline the desire for places that are better fit to local needs, which advocates for interventions and consequences related to increased density. The exact realisation is however an exercise of fine margin and depends on local circumstances. It could also prove that experienced social issues are the main reason for people to want changes made in the spatial realm of their neighbourhoods.

Climate adaptive measures offer opportunities to; be implemented into flexible used space, create inviting save green spaces for leisure activities that stimulate social cohesion, offer opportunities to invite people into the decision making process by participation and allow neighbourhoods to take responsibility for climate adaptation and the overall environment. It is expected that the prospect of having more useful, save green areas, is met with enthusiasm in any test case. The same accounts for any activities held on those areas. The possibility to involve local initiatives with these areas is also expected to be popular. It is however also expected that the concept of "climate adaptation' is experienced as somewhat vague and abstract which could prevent people from connecting to it.

New mobility offers opportunities to; free up space to be used flexible, allow spatial structures that stimulate mixed-use and attractive spaces, stimulate new shared modes of transport and decrease pollution. These interventions are good for social interaction, safety, cohesion, integration of locals in participation processes and shared responsibility for local transport modes. New mobility is expected to be desired, mainly because motor traffic will decrease. A prospect of saver streets and less pollution will **42**  appeal to people. The spatial consequences related to new mobility are expected to be viewed as abstract, but still as generally positive. New forms of shared mobility such as shared cars and bikes will probably encounter resistance at first. More public transport is expected to be appreciated.

Renewable energy allows; for off-grid energy systems that require cooperation and participation from locals, shared economy through local off-grid systems and energy exchange systems and locals to take action and responsibility in the energy system and consumption. It is expected that no major negative feelings towards renewable energy will be present in any test case, as long as no inconvenience is caused. Self organisation and participation related to local off-grid energy systems will probably encounter more resistance and will only appeal to a small idealistic number of people. And finally, circular solutions tie in with multiple solutions deriving from social and spatial sustainability.

The causal table also briefly states the consequences for people and space in urban areas. Why these consequences are important is explained below:

- Accordance to desire: a neighbourhood that fits the locals' desires creates feeling of attachment and willingness to improve it.
- Natural meeting: improves social cohesion and contact between locals,
- Spatial coherence and interaction, suited programming.
- Self organisation: creates a feeling of unity in a neighbourhood, which improves cohesion
- Awareness: stimulates willingness to actively improve a neighbourhood
- Connection: improves care for environment and society.
- Nature; creates biodiversity, awareness regarding preservation and appreciation
- Continuity; improves the feeling of connection and attachment to an area

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- Cohesion: causes locals to respect and take care of each other.
- Eyes on the street; creates a save, vibrant and inviting street view.
- Shared utilities; stimulates interaction and improves connection to each other and the local environment.
- Incremental planning; better suited areas on human scale.
- Meaning, places that have use and appeal.

This research has mainly focused on finding relations between environmental and social sustainability, with the goals to capitalise on opportunities that environmental developments provides for social sustainability. However, throughout the research and interviews, some potential threads continuously returned as well. Most distinct are listed below with further explanation.

#### Threats

- Over- and under representation.

The importance of including locals in development has been made clear. Inclusive development strategies could however cause over or under representation of certain groups. This could result is skewed information and faulty interventions.

#### - Exclusion.

Similarly to the risk above, certain groups could be, or feel, excluded in a process despite best efforts. This is inherent to a demographic strategy. Other types of neighbourhoods are therefore always required to adhere to others desires.

#### - Passing-on

Briefly touched upon earlier, the issue of "passing on" certainly has to be taken into account. Sustainable development could create a desired situation locally, but cause tensions and unsustainable situations elsewhere. When implementing sustainable solutions it is important to determine if "the pros outweigh the cons". "Passing-on" aggravates in high-density areas.

#### - Willingness

Sustainable city planning and design can best be achieved by actively involving local residents. To achieve this willingness to cooperate is required from locals though. Most examples indicate this willingness is present, to a certain extend at least. When willingness to cooperate is lacking or only present with a small number of locals, realisation of inclusive development processes could prove difficult.

#### - Distrust

Locals in certain neighbourhoods often feel unheard by local governments, which results in feelings of distrust towards cooperation with, and solutions from governments. This frustrates the potential for inclusive development and correct interventions. - Characterless and sterile environments Realising sustainable environmental interventions and improving social sustainability is often compatible. Yet, sustainable environments still create social unsustainable situations, this is mainly due to environments being sterile, fake and characterless. This research offers multiple ways to prevent this, but prevention beforehand should remain a priority.

#### Negative urban effects

High-density urban areas are prone to issues caused by large amounts of people living close together. These issues can be tackled but do require recognition and strategy. Problems that often occur are air-pollution, heath island effects, flooding, (mental) health issues, social exclusion, crime and extreme real estate prises.

#### Perfect world

-

While executing this research multiple sources pointed out the danger of the "perfect world" view. Aiming for the perfect situation is never wrong but in reality often not achievable. A realistic view is needed in order to make outcomes relevant. In practice this means that some spatial interventions might prove great potential but are not realistic.

#### Spatial connection(safety)

An important side to many spatial interventions is interaction with surrounding environment, both existing and new. An sustainable spatial intervention could prove satisfying on its own but could have an adverse effect on surroundings. A spatial connection is required for optimal result. Interventions should therefore have true 'meaning' to its surroundings. **5.1 Case study introduction** [The case study in this project exists out of a survey conducted in the area of Osdorpplein in Amsterdam Nieuw-West. To achieve a representative image of the situation a minimum of 50 residents with an average age close to the mean is targeted. The surveys main goal is to test if the preliminary hypotheses of this research match with the personal views and desires of residents of a certain urban area. The research can be regarded as a verification of the outcomes this far (or the debunking of certain outcomes). Additionally, the research explores further opportunities for the integration of social sustainable development in urban areas.

The chosen neighbourhood for the survey is the Osdorp-square area in Amsterdam Nieuw-West (see figure 5.1). This particular neighbourhood was chosen because of multiple reasons. First of all, the neighbourhood was constructed according to popular urban design and planning principles of the 50' and 60'. These principles correspond largely to the ideas described by Ebenezer Howard, which were explained in the theoretical framework. These ideas are arguably "sustainable" for the mind-set of the time, and still contain elements of modern views on spatial and urban sustainability. These areas, as well as the Osdorp square area, are characterized by repeating apartment blocks and row housing, mixed with large flats, intertwined with green areas and larger parks. Living, working and shopping areas are visibly separated and a clear zoning plan is applied. In more recent times, this area has been prone to social problems (unemployment, crime, building vacancy and general impoverishment) and is one of the areas that receive most attention when it comes to human development. These problems are largely due to meta-demographic developments regarding inflow of minority groups, gentrification and neglect. Some other causes will be pointed out afterwards but most are highly context depended and are therefore not to main focus of this research. The main focus of this research is on finding opportunities to improve these issues. The area is currently undergoing a large-scale spatial transformation, with multiple new housing projects scattered around and in the area, this transformation is partly intended to improve the social situation in the area. Also, social projects in the area are actively pursuing the goal to improve the situation (pers. comm. Krabbendam). These four factors, the spatial design, social problems, spatial transformation and social improvement initiatives make the place a fitting area for a survey. The area 44

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can therefore be regarded as typical or even extreme.

It is expected to find results in this neighbourhood that largely correspond to the findings deriving from the literature research and expert interviews. An important side note to this is that most inhabitants from the neighbourhood are expected to show more affiliation to the social side of the issue than to the spatial side. This is expected because inhabitants are directly confronted to social problems, while environmental sustainability is less concrete and therefore abstract. Interventions that show direct progress regarding social problems in the area are expected to meet consent. It could however prove to be problematic to mobilise people for inclusive development projects and neighbourhood initiatives because social problems withhold them from this and they simply do not see the point. This could also be further strengthened by reserved feelings towards cooperating with local governments.

The results of the survey will be regarded as a verification of the preliminary results. This is strategy is chosen to understand how the hypotheses deriving from literature research and expert interviews coexist with locals views and to filter out mismatches with "theoretical" conclusions. Of course, it is important to keep in mind the low generalisation level of a single test case. It is however not the goal to generalise from this single case, the goal is merely to test possible reactions and the opportunities for implementation.





figure 5.1 Amsterdam Nieuw-West with the highlighted Osdorp square area

**5.2 Survey questions** The exact questioning in the survey is visible at paragraph 4.3 within the survey result diagrams. The survey questions were targeted to test the expectations derived from the hypotheses made in paragraph 4.10. This paragraph will explain which survey questions belong to which expectations and what it concretely aims to clarify.

At the first 17 questions respondents could indicate on a scale from 1 to 5 to what extent they agree or disagree with a statement. This answering method allows for scaled reactions and even neutral answers. The first seven questions of the survey mainly target the connection with, and feelings towards the local area in general. The questions aim to clarify if a respondent is happy with the situation in general and what role they contribute to themselves in relation to their direct living environment and responsibility. These questions also provide direct information on the physical preferences and experiences of locals. Question eight, nine and ten directly relate to the existing relationships of fellow neighbourhood residents and the desire to change these current relationships. It provides insides into the need for more local initiatives and thereby also flexible land use. Willingness to cooperate with initiatives is also tested. Questions eleven and twelve directly target the "accordance to desires" in the respondents' area and consequently if they feel efforts to improve this are being made. Questions thirteen, fourteen and fifteen aim to test the view of locals towards new forms of mobility (also shared modes). It provides info over the current experiences on transport in the area and willingness to change the current state of it. Question sixteen is a direct question aimed at testing willingness to cooperate and interact with fellow neighbourhood residents and view on possible climate adaptive measures. Question seventeen clarifies if locals value high density, mixed use streets.

The last 10 questions are multiple choice with an option to add further information. They have a closed nature but allow for extra information to be added at the "other" text block. Safety is regarded as a defining issue in the area and is therefore questioned at eighteen A and B. Answers will provide insights into what areas are valued and spatially/socially relevant. questions nineteen, twenty and twenty-one what spatial and social features are valued and why. Simultaneously it will become clear if the current area meets these features (accordance to desires). Question twenty-two sheds additional light on the current transport situation and desires. Question **46**  twenty three clarifies the desire for facilities, which relates to mixed-use, liveliness and transport. Question twenty-four builds on this by further questioning liveliness, related to spatial form and social activity in the public space. Questions twenty-five and twentysix ask locals about their view on, and need for, sustainable spatial interventions (spatial and social). They provide insights into awareness, willingness and priorities regarding sustainability. Question twentyseven and twenty-eight act as concluding questions with a broader character. Twenty-seven directly targets the entire aspect of social sustainability while twenty-eight concludes with testing overall opinion on the general development of the area, considering all involved elements.

**5.3 Survey results** The survey-questions depicted in this paragraph were eventually conducted with input of 51 respondents. The average age of the respondents was 52 years, this is roughly comparable to the mean age of the area which is approximately 45 (OIS Amsterdam). Prerequisite to participate with the survey was a maximal travel time to Osdorp square area of 10 minutes by bike (or approximately 2 km). The survey aimed to reach a diverse mix of respondents, conform to the demographic and racial situation in the area. Exact data of this situation is lacking due to privacy constrictions but general consensus is that an high level of diversity was obtained. The results of the survey are depicted on the next pages



Average age: 52,08

Number of respondents: 51



completely agree

9. I would like to do more together with my fellow neighbourhood

compltelyt disagree



2. I find my neighbourhood beautiful









8. I have plenty of interaction with my fellow neigbourhood



10. I would like more neighbourhood initiatives and events



47

Average age: 52,08

Number of respondents: 51



13. I would like a street with more bikes and less cars



15. Sharing a car with my neighbours seems nice





12.I feel being listened to in order to improve the neighbourhood



14. I find public transport nice to travel with



16.Maintaining a vegetable garden with my neighbours





Average age: 52,08

Number of respondents: 51





Average age: 52,08

Number of respondents: 51



**5.4 Survey results interpretation** *(5.4.1 General)* The presented results largely verify the preliminary results from the expert interviews and literature research, before elaborating on the results connected to specific urgent urban issues some general notes can be placed regarding the overall survey.

First of all, in general the residents of the area surrounding the Osdorp square area are concerned with and committed to the neighbourhood. A minority (10-20%) of respondents were not committed to their neighbourhood at all and simply did not care. This was consequently obviously visible in all responds throughout the survey. As a result, the graph-bars 50 are cumulated at either left, right or both edges of the answer-scale. These questions can be regarded as 'dividing', because residents either completely adhere or not to a certain statement without a clear middle way. Residents clearly disagree to the issues related to these questions, these issues are often connected to topics regarding interaction and general feelings towards fellow neighbourhood residents. The amount of 'dividing' questions is relatively small though. In contrary, there are also 'uniting' questions that seem to centre the results. Issues regarding "uniting" questions are types of issues that the residents largely agree up on. The 'uniting' questions often relate to topics regarding personal aesthetic, spatial and social preferences. The amount of clearly 'uniting' questions is also not large.

Another interesting note to the survey are the additions indicated by some respondents, these additions where often directed at indicating a general agreement or disagreement to a question. In other words; some respondents saw no reason in answering a question or choosing an option because they thought the questions topic was completely irrelevant. As a result they either added an extra note in the 'other' box they did not fill in the particular question. Similarly, some respondents found multiple answers to an answer equally relevant or important, hence choosing more than one answer. Because of this some questions contain a slightly deviating number of responds.

**5.4.2 Density** Answers regarding the broader topics of density and spatial design indicate that in general people are largely satisfied with the current design and use of the neighbourhood, nevertheless some alterations are welcome as it seems. Most residents indicate that they do not find their neighbourhood particularly beautiful or ugly. They do indicate the importance of their neighbourhoods appearance though. These questions imply that improving spatial appearance of the area would be appreciated. Most welcome alterations mainly focus on the subjects of creating a more inviting, saver public space with attention for green and parks. Also, a "larger" number of people is not regarded as exclusively negative, with the majority of people indicating a lively, bustling environment with many people as positive. Safety is also derived from this for most respondents. Interestingly, people regard the park areas in the neighbourhood as the places they feel the least save. This demonstrates that it is important to ensure park areas are used, relevant and vibrant. Parks are regarded as positive and desired but create an unsafe feeling when not used correctly. The end of this paragraph provides a practical example of how correct use could be achieved.

It's the environment in the area that people indicate as the main reason to move, specific houses or fellow residents are regarded as less important. This underlines the importance of inviting public spaces and green areas even more. Also, most residents are content with the proximity and accessibility of facilities. This result could be slightly skewed however, because the survey was mainly conducted in and around the shopping area on Osdorp square. Where facilities are present. However, this finding also argues there is limited need to drastically increase mixed-use areas to spread and improve accessibility to facilities.

Spatially people do not seem to desire a completely different environment, most respondents indicate to not want to give up their current living environment (about 50%, and mostly elderly people that have lived in the area for a long time). The other half evenly chooses for either living in the city centre or a newly build spacious neighbourhood (especially people with children). Interestingly, multiple respondents indicated that they would prefer to live in the countryside because it is less busy and they enjoy nature, this is lacking in their current area. According to most respondents the foremost reason for leaving the Osdorp square area would be the environment (around 50%), followed by "the people" with around 35%. Both results indicate that green areas and space are highly valued (The green areas in and around the Osdorp square area are often not highly valued because of safety) In general, the secondary effects of increased density are interpreted as generally positive but open and green areas are too. Increasing density can therefore not go at the cost of green and should actually improve it as much as possible. This ties in with earlier comments regarding density, green and climate adaptation.

Conclusively, people do not mind more density if this makes streets busier with people and thus, saver. Green is however appreciated a lot, with many people indicating they enjoy nature and space. In this particular neighbourhood, which has plenty of green spaces and park, these places are also regarded as unsafe. This is partly due to youth hanging around but also because there is little spatial connection with other areas and therefore no social control. This unsafe feeling was especially indicated by elderly locals. Green areas should be an integrated part of the fabric and design. In this way, green will be of added value to its surroundings and spatial connection will be realised. In addition, green should also facilitate various groups of local people. Practical interventions to realise the goals mentioned above could be; the creation of a community hall in the park were local initiatives take place, making sure that busy walking or biking routes to important locations run trough the park or to create places to socialise suited for children and elderly.

**5.4.3 Flexibility** Flexible use has been identified as one of the opportunities for increased social sustainability through spatial interventions. The survey specifically targeted the locals' views on interventions associated with flexible spatial use. Direct questioning on the term "flexible space use" was considered but proved unclear and confusing for most respondents.

Firstly, questions regarding activities with fellow locals received mixed reactions, on average there seems to be no explicit negative nor positive feeling towards the topic. This is highlighted by question nine and ten, which indicates the standpoint towards undertaking activities with neighbours and towards neighbourhood activities and festivals. The answers are however also slightly contradicting. Question nine indicates that a majority of respondents do not have the desire to undertake activities with neighbours while question ten depicts willingness towards more neighbourhood activities and events. The discrepancy between these answers could be explained by the need for self initiated actions, which is implied by question nine, or actions that do not require self-organisation, which is the case at question ten. Combined, these two questions seem to imply that locals are open for activities as long as not much organisational action is required from themselves. Additionally, elderly people seemed more willing to initiate activities themselves, without need for organisation by another party.

Questions eleven, sixteen and seventeen also provide insights into the views of locals towards flexible space use. Question eleven tests the level of "accordance to desires". The survey indicates that the majority is not pleased with this in the Osdorp square area. Flexible space use, as explored in earlier paragraphs, offers opportunities to improve this. Question sixteen determines the view of respondents towards sharing and maintaining a vegetable garden with neighbours. A majority (mainly elderly), albeit small, has a positive view toward this, although the general view can be regarded as neutral. However, considering that half of the respondents have a positive attitude on maintaining a vegetable garden, implementation is more then viable. Interestingly, when the desire for a vegetable garden is specified in question 26, other sustainable interventions are deemed as more important. On itself the idea is valued but no urgent desire seems to exist. Question seventeen provides insights into the view towards a lively and divers streets, a goal flexible space use can help to achieve. Respondents indicate that this is an 52

important topic that is highly valued. Respondents indicate they find this important because it provides a good mix of amenities and creates a safe atmosphere. Moreover, people enjoy the colloquial and cheerful feeling such a diverse and lively environment offers. Question 21 also suggests general positive attitudes towards flexible space since parks and green are compatible with flexibility.

5.4.4 Shared economy Shared economy has repeatedly returned as a development direction full of opportunities to create and accommodate spatial and social sustainability. The shared economy can manifest itself in "hard" spatial solutions and "soft" organisational solutions, the survey focused on multiple direct and indirect consequences of the implementation of shared economy and community.

The shared economy/community is obviously connected to interaction with neighbours, the feelings towards this are measured in multiple questions. Question eight, nine and ten specifically. The data deriving from these questions hint at a positive attitude towards increased interaction, as long as there is no need to actively organise interaction, facilitated interaction is preferred. Respondents also indicated that general interaction with neighbours was already high according to their standards (although not between different age groups), desire for increased interaction is therefore not present, unless it is organised.

Transport offers opportunities to implement shared economy/community through solutions such as public transport, shared cars and shared bikes. Public transport has already proven to be an important and valued factor in urban areas. Respondents indicate this as well; locals broadly value public transport around the Osdorp square area, and a considerable amount would even appreciate an increase in public transport system. However, a very direct example of the shared economy, car sharing, is not appreciated by the respondents, as the results to question fifteen show. A large majority does not like the idea of sharing a car with fellow neighbourhood residents. The idea of sharing a "private" mode of transport with others, or the need to make a reservation for car-usage is not considered attractive. However, a large number of respondents were not aware of the concept of car sharing and required explanation to answer the questions. This could evoke confusion or need for broader explanation, which could alter the answer. Respondents that did not require explanation on the

matter also seemed to have a more positive view on the matter of car sharing, these were mainly younger respondents.

Energy is another area suited to the sharing economy/community. This especially accounts for off-grid energy systems based on renewable sources. Question 26 focuses on what kind of sustainable solutions are preferred by locals. All three options were regarded as positive but renewable energy systems proved to be most popular. Therefore, opportunities exist to implement shared economy and self-organisation through renewable off-grid energy networks. In practise this would mean the implementation of community solar panels, geothermal heath systems or adopting a wind turbine in the countryside and setting up a community energy company.

**5.4.5** Inclusive community based development As became clear in the research, the "soft side" of sustainable development is inherent to spatial sustainability. Inclusive processes make fitting and sustainable spaces but also create interaction and social integration during and after the process. Inclusive community based development therefore forms a base for integrating environmental and social sustainability.

Multiple questions in the survey focus on exploring the view of local residents towards inclusive community based development. First of all, and this has been touched upon in earlier paragraphs, there is no clear negative feeling towards interaction with fellow neighbourhood inhabitants. This enables opportunities to instigate inclusive community based development processes when it is organised by a higher authority. The most explicit question on this subject is number twelve, albeit widespread, the respondents on average do not feel heard by authorities regarding improvements in the neighbourhood. By multiple respondents this was not considered as a problem as they do not care about the state of the neighbourhood (often younger respondents), the majority of respondents however indicated that they find cooperating with authorities frustrating and feel that their ideas seldom lead to actual interventions. This feeling was also present with the social development bureau "the beach" albeit on a different, smaller scale.

The dissatisfaction with not being heard by authorities is given extra importance by the outcomes of question eleven, which indicates that the majority of people are not content with the current state of the neighbourhood. It seems that the solution to improve this is present and obvious; implement or improve inclusive community based development to align is with their desires.

More questions provide insights into inclusive community based development. Question three and five indicate the locals care about their neighbourhood and also feel personally responsible for this. Locals value their environment greatly, they want it to be aesthetically pleasing and feel responsible for the wellbeing of their fellow neighbourhood locals (question 4). All results are quite clear and hint at a solid base for willingness and incentive to improve the area inclusively and together. Other answers do however indicate that there is no clear desire or need to increase contact or cooperation with other locals or local governments. Creating purposeful interaction based on well-explained and inclusively developed ideas therefore seems to be a way to enable this. Willingness and incentive to improve the neighbourhood are present within locals and should be capitalised upon, interaction is no desire but can be achieved in the process leading to achieving this goal. Creating described additional positive effects. In practise authorities could for example work together and expand on know-how, projects and connections from "the beach" to reach people effectively.

#### 5.4.6 Eyes on the street, safe and inclusive streets

Jane Jacobs "eyes on the street" concepts positively affect the social sustainability in a neighbourhood by spatial interventions that bare resemblances with current urban developments. Targeting these concepts therefore offers opportunities for improving environmental and social sustainability in an area. Additional consequences of implementing this concept were tested in some questions.

One of the foremost side effects of implementing "eyes on the streets" principles is safety, this effect cannot be discarded, especially on the Osdorp square area. Most respondent indicated that safety is the most problematic social issue in the neighbourhood currently. Improving safety by certain principles would therefore be highly valued. Questions 18A and B researched feelings regarding safety in the area, respondents were offered spatially defined areas to indicate were they felt safe or unsafe. This obviously limited their response possibilities; yet it also caused some insightful additions as respondents (mostly elderly or people with small children) indicated they did not feel safe in any of the proposed areas and felt generally unsafe. Other respondents, in contrary, stated that they did not care about safety because they are not affected by it (mostly younger locals). Overall the results to question seven do indicate that the majority feel relatively save in the neighbourhood, albeit with spread results. However, as question 27 indicates, when a few options are presented, the respondents mainly choose for improved safety over neighbourhood activities and an inviting environment. It could however be argued that an inviting environment encompasses a safe environment, a correlation between these two answer options is therefore present. Thus safety remains important.

"Eyes on the streets" principles call for mixed-use environments. A spatial fabric that offers environmental and social solutions as explained in previous chapters. Locals of the Osdorp square area seem positive towards a mixed environment as question 17 clearly depicts, the majority indicates they value a lively and diverse street. Question 24 provides the same view, most locals enjoy the liveliness of an area and do not feel it is to busy at the moment. A mixed environment would create an urban area with more people on the street during a longer period of the day. Mixed-use for the sake of improved accessibility of facilities is not a required goal since most respondents indicate this is currently not an issue as is visible at question 14. Such a spatial fabric would also evoke more natural meetings in the area, thereby improving the cohesion between fellow neighbourhood residents. This can be considered as an additional positive effects, or need for interaction expressed in certain questions (eight, nine, ten). One last small, albeit positive effect of mixed-use and "eyes on the street" principles is the decreased need for car traffic and increased cause for walking and cycling, questions 13 en 22 express this is welcomed by locals.

**5.4.7 Energy and transport** The terms energy and transport have both manifested themselves as important and full of opportunities regarding social and environmental sustainability. Both urban factors can be used to realise more interaction between locals by different solutions related to shared economy/ community. This has already been elaborated. From a spatial and environmental perspective opportunities are also present, considering the outcomes from the survey.

Firstly, sustainable transport such as electric vehicles, bicycles and public transport are preferred by the greater share of respondents. Questions 22, 26, 13 and 14 all provide insights into the respondents' point of view. Question 22 offers a clear perspective on preferred modes of transport; the car is not preferred while bicycles and public transport are considerably more popular. Locals would like their future neighbourhood to be designed more according to these preferences. Question 26 shows that a considerable amount of locals would enjoy seeing more sustainable electric modes of transport in the area, provided that these modes are affordable to use. The results to question 14 indicate that more than 75% of respondents have a positive attitude towards increased use of bicycles and decreased use of cars in the streets around Osdorp square. Public transport can also count on local support, around 80 % of the respondents experience their usage of public transport as positive. Most indicate that the current public transport system matches their desires as question 14 clearly depicts. Also the need for new car mobility such as shared cars seems low, this aligns with the results from other questions that point towards a need for more bicycle and public transport usage.

Energy has not been questioned abundantly in the survey, mainly because its is intertwined with other subtopics questioned in the interview such as inclusive community based development. When energy is considered separately only questions 25 and 26 directly tell something. Question 25 tests if locals are involved with sustainability. As the results show the majority of respondents (60+%) is involved and do what they can within their capabilities. A small group is very much involved with sustainability and 7% of the respondents say do not care about sustainability at all. The contention of the locals seems a solid base to implement renewable energy upon. Question 26 provides three options for sustainable interventions to choose from, the preferred option is to implement locally generated renewable energy. This option is chosen over sustainable electric transport and a community vegetable garden. The results mark to what extent locals value renewable energy.

A practical example of interventions regarding energy and transport could be to use local renewable energy to power sustainable modes of transport such as electric bicycles and cars. Or increase the presence of electric sustainable transport. 5.4.8 Final remarks The conclusions taken from these interpretations can be summarized as follows; people care about their neighbourhood, spatially and socially, and are mostly united. Willingness to improve the area from a personal point of view is present, however, improvements through means of cooperation meets more resistance. Local governments taking leading role here seems crucial, especially since people feel unheard and experience aspects of their neighbourhood as "un-fit". Terms as safety, liveliness, green and sustainability seem key terms in improvement processes. General views towards spatial, sustainable interventions to address these key terms such as flexible space, mixed-use and sustainable transport are positive. Only certain shared economy elements are clearly not desired. The challenge is to implement desired elements for the right goal and in the right manner. For example, in this neighbourhood, a base for improving safety in parks by spatial interventions and social initiatives seems present, if communicated and organised correctly.

On the spatial side, some concrete statements can also be made in the connection between the social and spatial side of the neighbourhood. Surroundings clearly matter to people, parks and nature are appreciated, as multiple questions indicate. At the same time, a neighbourhood with plenty of activity and facilities is appreciated. This indicates that a proper mix of the two is what people desire. The connection between all this is crucial, without spatial connection, no added value is created. A park area with no spatial connection has less use and will easily be experienced as unsafe. The question remains if the area of Osdorp-square is sustainable? Are people satisfied with the level of social and spatial sustainability? This question cannot be answered precisely, the questions do however suggest that people are very much in the middle when it comes to being satisfied with the area. Is seems people are spatially more satisfied than socially. Satisfaction is mostly derived from good public transport, plenty of facilities and the presence of green while dissatisfaction mainly derives from unsafe feelings in multiple areas. Interestingly, the issue often seems to be that valued spatial features are not optimized, people often indicate they value a spatial feature, but that it could be considerably better. Some examples; people value the amount of present green but indicate they would like more of it and often feel unsafe, the large amount of facilities is appreciated but they are not diverse enough, and lastly, people are content

with public transport and mobility but would like to see more bikes. This matches with the data indicating people feel unheard by local governments and the feeling that their neighbourhood does not meet desires. The solution is very much within adequately and inclusively "activating" areas and features. Some examples to realise this have been stated in the previous paragraphs. Lastly it seems that age partly determines what is experienced as problematic. Younger people experience issues with traffic safety, sustainability and the lack of green while older people experience crowdedness, social interaction and general safety as main issues. **6.1 Reflective survey conclusion** What do the survey results mean for the preliminary results of the literature research and expert interviews? Important to mention first is that this survey served as a single test-case and will not be generalised. The implications from the survey on the preliminary results are therefore to be interpreted as "areas or topics that promise potential possibilities or problems" and not as exact statements/conclusions.

However, the test-case survey provides some interesting insights into the question; "how can improving the environmental sustainability of an area be used to improve social sustainability?" Simultaneously, there are potential threats in practice, also this is shown by the test-case. When it comes to wellbeing and awareness in general, locals are very much involved with their neighbourhood, they recognise problems regarding the environmental and social situation in their neighbourhood. They vocally indicate the desire for change regarding certain issues. The issues attracting most attention are connected to; safety, impoverishment, segregation, green and housing. Environmental sustainability is an issue people recognise but remains abstract and indirect. Direct (social) issues prove more relatable and notable for locals, improving these issues could therefore potentially count on support from locals. A good example of such a relatable social issue is safety, which many respondents connect to locations where groups of youth hang around at night and are involved with drug dealing. People indicated that these locations are often near shopping areas that are deserted at night. Creating mixed-use areas could solve this social problem and also address multiple urgent environmental sustainability issues at the same time, as argued before. Another example is the desire for green, which many respondents indicate. This could be implemented to increase climate adaptive measures (environmental) and to create inviting safe public spaces for people to connect (social). A last example is the desire for increased bicycle and public transport use (and decreased use of cars), this also promises a solid base for implementing change.

The largest danger for actual realisation of spatial interventions seems to be willingness to improve collectively through inclusive processes. Locals indicate they feel largely unheard by local governments and also express little trust in improvement regarding this issue. This negatively influences the need and willingness to cooperate. Additionally, desire for more cooperation and 56

### 6. Conclusions

increased interaction with fellow neighbourhood members is not clearly expressed. This is arguably caused by the social problems that are currently present in the area and the disbelieve that these problems can be changed. This poses a serious threat for actual implantation. Especially since this research has shown that inclusiveness and cooperation are important factors in creating spatial solutions that are environmentally and social sustainable on the long term.

6.2 Survey recommendations | What lessons are learned from this test-case and how can they theoretically be used in a strategy to further improve social sustainability while improving environmental sustainability? Creating willingness with locals to work together on creating a social sustainable area is the key to also realise environmental sustainability. Core social problems from an area should be taken as a goal to improve, creating environmental sustainability is a positive additional effect to this. Locals care about the spatial and environmental state of a neighbourhood but seem to experience social problems as more urgent. An effective strategy therefore could be to tackle environmental sustainability from the social site as this is perceived as less abstract and understandable. Interestingly this recommendation corresponds with the hypothesis presented in the introduction; there is a great underlying importance of social sustainability on the overall sustainability and liveability of an urban area. The test-case seems to verify that an urban area is indeed difficult to develop sustainably if people feel disconnected from it, social sustainability stands at the core of environmental sustainability, especially from the perspective of locals. Or phrased differently; if a social sustainable base is absent, fitting overall sustainability is difficult to achieve. Also, environmental sustainability can be obtained through targeting social sustainability. These two sub-conclusions should be taken into account while creating as strategy to realise the statements from the preliminary results.

**6.3 Answers to the research-questions** Answers to the main research-question and sub-questions will be presented in a brief manner. Underlying and additional elaboration is described in other paragraphs (5.4.8, 6.2, 6.4.1, 6.4.2) of this research paper.

-What exactly is social sustainability and which elements define it?

The following definition comes closest to a complete and satisfying definition (social sustainability is described as a process here) "a process for creating sustainable successful places that promote wellbeing, by understanding what people need from the places they live and work. Social sustainability combines design of the physical realm with design of the social world - infrastructure to support social and cultural life, social amenities, systems for citizen engagement, and space for people and places to evolve." In other words. Adding value and meaning to locations. Historical and practical research indicates important elements that define this; flexibility, inclusive development, density, shared economy, mixeduse, functional green, responsibility, public spaces, safety, awareness and human scale. The concept of "sustainability" within urban planning and design has been changing through time continuously

- What are currently the most urgent developments related to urban sustainability issues?

According to literature research the most urgent developments related to environmental issues are; densification, climate adaptation, energy, mobility, and circular developments.

- What opportunities do these developments offer for improving social sustainability?

Paragraph 4.9 provides an overview of opportunities, which can be regarded as a concrete list of answers to this question.

- What dangers do these developments offer for social sustainability?

Concrete dangers to social sustainability are connected to the following: Over- and underrepresentation, exclusion, passing on, distrust, willingness, characterless and sterile environments, negative urban effects, perfect world, lack of spatial connection (mening).

- What processes is required to realise social sustainable areas?

Inclusive development is required to target all relevant groups in society. Inclusive development enhances the change that spatial interventions are in accordance to desires, while also still improving environmental sustainability. It also offers opportunities to connect locals and increase cohesion, thereby improving social sustainability before spatial implementation has actually been realised. Crucially, flexibility in space use and incremental planning should be taken into account. Core focus of the processes should be on creating value and meaning, also during the process.

-Can the found opportunities realistically be implemented and governed?

The survey indicates that in general locals have a positive view towards spatial interventions related to urgent environmental issues. This research however argues the process to create this is just as important as the eventual intervention. To achieve such a process, willingness and cooperation between locals and governing bodies is required. This could prove problematic. Solutions focused on social issues seem to be more concrete for locals and therefore easier to understand, they add more meaning to interventions. Communication, openness and correct framing of issues is important.

-What opportunities and dangers do urban developments regarding urgent environmental issues provide for improving social sustainability in those areas?

Urban developments related to environmental issues have a clear connection to social sustainability. The clearest spatial connections are visible between climate adaption, density and mobility, while they influence each other too. Opportunities do however not only exist within the spatial realm; the organisational realm proves to be just as important. Both realms together form means to achieve the end goal; environmental and social sustainable cities. There are dangers too, also connected to spatial and organizational sides (see paragraph 3.9). Many are covered within the opportunities, but attention is required. The survey indicates that reality offers other problems. Although not generalisable, these problems are to be expected in other locations (5.4, 6.1). More elaborate explanation is stated in the next paragraphs.

6.4 General recommendations and advice 6.4.1 General conclusions The most important spatial conclusions are as follows; context is very determining in understanding where opportunities to improve social and environmental sustainability exist. Context differs per area and cannot be generalised. However, some base rules (conclusions) have come forward from this research and are applicable regardless of context; A spatial feature or area should have meaning. People relate to areas that are given a purpose, are used and add something to their surroundings. These surroundings can exist out of people or out of spatial features. If no social or spatial connection or relation exists, an area will not be appreciated. People will dissociate with it and eventually will experience the area as unpleasant (resulting in other kinds of problems). An example of this are the parks near Osdorp square, that have little social control, causing unsafe feelings. A neighbourhood should be considered as one system of integrated social and spatial connections; every connection is of added value. If a feature does not add value, it damages the functioning system. (Building a large parking lot in a residential area will for example not benefit the area because it will create nuisance and an unattractive environment). Environmental interventions should therefore have a meaning and have to be understood by the people. Preferably from a social and environmental perspective. If an intervention is of added value to people it can be regarded as successful. This could be realised by the interventions' looks, goal, use or deeper meaning, as long as it adds something for the people and/or environment. For example; creating a vegetable garden adds meaning by use (gardening vegetables), goal (bringing people together, making a space attractive and lively) and deeper meaning (eating local food, educating urban people).

Realising such interventions takes time. Instant success from a social perspective is unlikely. Trial and error are likely. The process leading to interventions is therefore crucial. Incremental and flexible development strategies enable this. What is important to understand is that the determining factor of "meaning" can be created through such a process. A process can even cause social cohesion that is not directly connected to the actual intervention. A process that does not aim to be inclusive will decrease the chances of an intervention being understood, giving it less meaning eventually. Explaining the need or purpose for an intervention increases understanding. Creating a "sustainable city" from the social and environmental perspective is therefore not only a matter of creating an spatial 58

environment that stimulates sustainability (which is often the case in historic examples). The process of creating this environment is just as important for complete sustainability. Form and process are therefore mutually depended on each other.

Creating space that can be used flexible is also a good strategy to give 'meaning' to a place, since the need for a certain "meaning" is prone to change overtime. History has proven that spatial structures unable to change often become absolute, loosing meaning. For example; a playground could originally have real added value to a neighbourhood, but as demographics change it could loose added value and actually be of negative influence to an area by neglect and loitering.

Furthermore, it seems that factors regarding safety, green (nature areas), connection and facilities are most valued, at least in the test-case neighbourhood of Osdorp-square. Some of these factors slightly contradict; Locals value green immensely but often feel unsafe in parks because lacking social control. This could be solved by more spatial connection and meaning in park areas. Another contradiction; locals feel unheard by local governments and feel that their neighbourhood does not reflect their desires while simultaneously indicating no extra desire for more interaction. The local government should therefore take the role as facilitator and make it as easy as possible for all people to participate and initiate. Especially when neighbourhoods indicate little interest in cooperation or interaction. When local initiatives already exist the local government should stimulate this. Solutions and chances exist, key is focusing on what speaks to people, as well as explaining proposed interventions.

6.4.2 **Recommended** research This research has focused on exploring what relationships are distinguishable and how they work. This led to insights regarding opportunities to improve environmental sustainability while also improving social sustainability. Surveys have tested the general view, willingness and opinion of locals towards found opportunities and related developments.

Further research can build on expanding this testing, especially with more concrete test-cases. The current test-case only enables the forming of context dependent views and assumptions. A stronger, generalisable scientific foundation could be accomplished if more tests were executed in areas with different content. These tests could focus on

specific areas of opportunity classified in this research.

Additional knowledge about flexible and incremental planning and design could prove to be useful. Flexibility has proven better adjusted to uncertainties of the future. Flexible space use can adjust to changing desires and sustainable needs, socially and environmentally. Sufficient practical and process knowledge is however lacking and should be gathered. The same accounts for incremental planning processes, which increases the chances of an environment being adequately adjusted to local desires. Furthermore, extra knowledge regarding spatial relationships and correct involvement of stakeholder is required. Stakeholders can contribute greatly to relations between spaces. For example between; type of programming (companies, shops), inhabitants (local residents) and public space (local government).

Other research could focus on the stimulation of willingness to cooperate. This research has shown that better inclusive development processes can improve the functioning of developments derived from environmental sustainability. The research does however also show that cooperation of locals could prove to be difficult. These inclusive developments would simultaneously improve social cohesion and connection during the process. The survey has shown that locals have a positive view towards these developments but not per se towards increased contact and cooperation with fellow locals and local governments. This is however crucial for success. Future studies could especially focus on creating and enabling this willingness in local population, especially in urban areas where the social functioning and trust in governing bodies is damaged. Creating further knowledge about ways to communicate what problems could be solved, how they could be framed and explained could prove to be valuable.

An obvious final recommendation would be to focus on financial and political feasibility. Many proposed solutions require financial and political backing to be realised. Ideas and goals can prove auspicious but are never actually achieved in reality because of these factors. Special strategies are required to cope with such issues, especially because it is a highly content dependent matter.

**6.5 Policy advice** This research has not been set up with the specific goal to provide policy advice. It is created to explore opportunities and dangers on which policy can be based. Some clear, albeit general,

policy directions can be taken from this research however. Keep in mind that further specification is required though. The following advice is merely meant to inspire.

Firstly, it is important to gather understanding of the current situation in the neighbourhood, spatially and socially. This clarifies what areas should be targeted and which problems are at play. This inventory of problems should be made into one linked system that creates an overview of how spatial problems affect social problems and vice versa. Such an inventory enables the creation of an integral plan with end-goals and underlying reasoning. This plan should also contain a context review and research on the effects of adjacent areas (passing-on).

Secondly, the level of required flexibility and incremental development strategies are important to take into account within a spatial plan. A great challenge lays within finding the balance between a coherent fixed master plan and flexible/incremental planning within this plan. The idea of grand master plans that plan and distinct every space for the foreseeable future has proven to be out-dated. A level of flexibility is required. Future needs are simply not predictable, it also increases the chance of places remaining "meaningful". Incremental planning adds to this partly, it enables planning step by step adjusted to local developments and is overall better suited to desires and needs of the time.

The plan regarding incorporating locals into the development process is crucial for successful implementation of spatial and social interventions. It should be a mean to create the plan but also a goal of the plan. It is highly important to obtain a clear understanding of the needs and problems at play. Creating a fitting strategy to target and involve locals should form one of the bases on which the integral plan is based.

**6.6 Reflection** A large research like this one is a complex process that requires adequate time management and planning that will be influenced by inevitable unforeseen setbacks or issues. Being aware of these elements is important when starting the research process. Inevitable problems in this research process were mainly connected to time planning and combining an internship with writing a thesis. It was often difficult to align the feedback and ideas from the university with that of the internship. This caused some delay during the initial phase of the research with a lot of information going back and forth in order to determine the right scope, framework and definitions. This proved to be an inefficient way to make progress. It caused the research to be in development while interviews with experts already started. The interview strategy was based on initial literature research and operationalisation. In later stages information derived from this initial research was refined, specified or expanded. If the earliest interviews would have been conducted in a later stage some concepts and questions would have therefore been formulated differently. More emphasis would have been on indicators for social sustainability for example. Luckily, a sufficient amount of relevant information was still retrievable from those interviews. Interviews conducted in a later stage were of course better adapted and refined. Planning the interviews in general also proved to be a challenge occasionally, this was due to delays that caused interviews to be conducted during and after summertime.

Another unforeseen issue during the research process was a change in research perspective. This issue was not necessarily a negative influence on the quality of the research but did require restructuring and therefore extra time. As the initial research started the "soft" process and organisational side of the main research topic was not regarded as highly important. Focus was purely on the spatial side. When research progressed, various sources, literature and interview subjects, pointed out the importance and relevance of this element. It could therefore not be discarded and took a central role in the further research. This was initially guite unexpected and required alterations to sub questions and general research. These alterations also manifested themselves in the chosen research methods. A mixed-method strategy was eventually opted for. Three forms of research formed the base of this: a literature research, expert interviews and a survey as test-case. These methods have proven to be valuable additions to the research. Mainly because this structure made it possible to formulate hypothesis out of theory and conduct explorative qualitative research which could consequentially be tested and verified by a quantitative survey. The various research methods together form a strong chain of verification, from theory to practice. The theory forming the base of the research took history as a starting point. This starting point was chosen in order to establish a proper understanding of what (social) sustainability means and how it developed in the context of urban planning and design. Description of modernday implementation and interpretation completed 60

the understanding of the terms' development. The gathered knowledge formed a strong base for the next part of the research; the expert interviews.

Other methodical difficulties were related to the research nature, which is explorative and qualitative. There are known dangers in a research like this, which were naturally also present is this research. The research was used to gain insights and understanding about opinions, developments, motivations and connections regarding sustainable urban areas. There is an inevitable subjectivity in such a research, this can influence the outcome, especially considering the relatively small number of interview respondents (12). The number of respondents is too little to completely filter out skewed opinions on certain topics. This does not necessarily mean such skewed results are present in this research, a complete absence can however not be guaranteed. This level of uncertainty has however been taken into account and decreased by adding an extra layer into the research in the form of a test-case survey. This test-case verifies the preliminary outcomes somewhat, and filters out any results that not add up, the number of respondents to the survey (51) is sufficient enough to achieve this.

From a personal perspective planning seemed to be the most problematic element. This was however expected and taken into account while conducting this research. The expectations surrounding the combination of writing a thesis and doing an internship also required adjustments during the research process. Reality proved that integrating research and internship (while also working on other projects within the internship) was challenging but also very educational. In general the research provided information that was personally not foreseen, this is positive. This made the conclusions extra interesting, the overall research relevant and made reconsiderations of earlier ideas necessary. Word of thanks Writing this thesis has been a massively instructive experience for me. It provided me with a lot of important experience that will be useful in future projects and my professional career. This thesis enabled me to combine all knowledge and insights acquired during my studies. (The bachelor program Future Planet studies with a major in urban planning and a minor in urban architectural history and the master program of environment and society studies with the track local environmental change) Within this thesis all information I found particularly interesting and informative during my career as a student comes together to form new meaningful additions to the vast subject of sustainable urban development, which made it especially pleasant to work on this research.

This research would not have been realised without the help and insights provided by all interesting people, experts and companies involved. My thank goes out to all these parties I met during the completion of the project. Some require special words of thanks. First of all I need to thank the office of marco.broekman. and all the lovely colleagues working there. They provided me with a professional and welcoming working environment. Within the office there was both room to work on projects in a professional team and to work on my own project. The office environment at marco.broekman has been greatly inspirational during the fruition of this project. The skills learned during my eight months at the office helped me with understanding what my thesis should be about and what information is needed to realise this. I also acquired important skills for the rest of professional career during my stay there. Special thanks also go out to my two thesis supervisors who guided my through the process. Daan Boezeman has played an important role in finding the right framework for my thesis and setting up the research itself, his feedback has been crucial for the preliminary work. Mark Wiering accompanied me during the latter part and the completion of the research. His feedback contributed in perfecting the methods and results as well as many other fine details. Both supervisors have always been available and open for some sparring, which I value a lot. Of course I also need to thank all experts that made time for interviews, their input plays an important role in the results of this research. This research is therefore partly theirs. I also need the thank all respondents that contributed to the survey and "the beach" in Amsterdam Nieuw-West that helped approaching respondents, which has been

very useful.

Lastly, I must thank everyone who took the time to read this research. I hope it provided as much insights and sparked as much interest into the topic of sustainable urban development as it did to me. In my opinion, the conclusion of this research states some interesting questions that enable further exploration of questions regarding sustainable city planning. I also feel the overall notion of the research is positive, many opportunities exist to make urban areas a better sustainable place to live, it is mainly a matter recognizing and capitalising on existing opportunities.

Sincerely, Boris Duijst



### 6. Literature & Appendix

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