

Responsive public spaces

exploring the use of interactive technology in the design of public spaces

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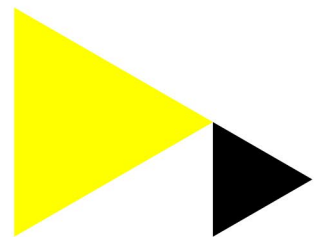
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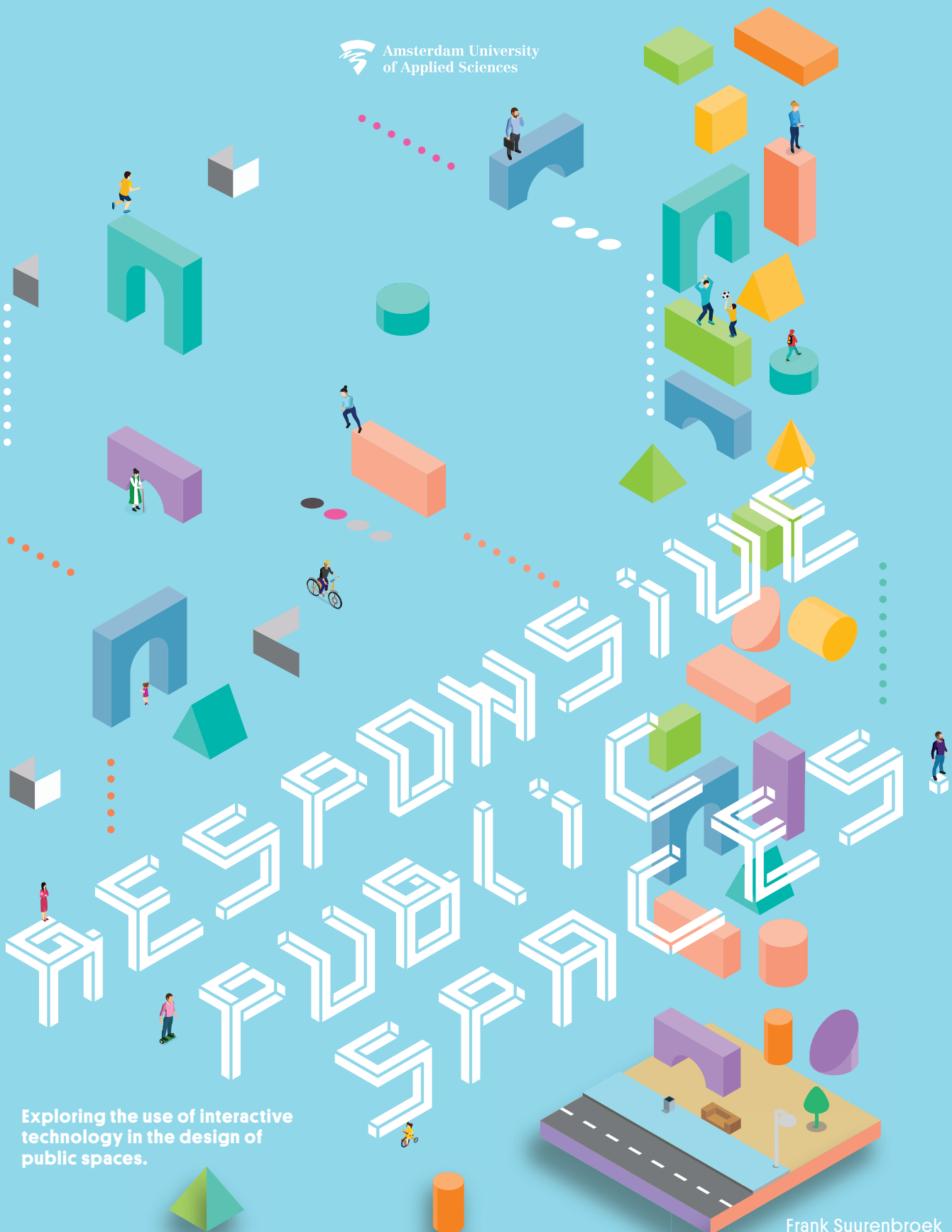
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Exploring the use of interactive
technology in the design of
public spaces.

Responsive Public Spaces.

Exploring the use of interactive technology in the design of public spaces.

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**Amsterdam University
of Applied Sciences**



Amsterdam University of Applied Sciences Faculty of Technology publication series

This publication series brings together the applied research of the Faculty of Technology at the Amsterdam University of Applied Sciences. The present publication is intended for professionals and provides them with the knowledge and expertise that was obtained in an applied research study by Amsterdam University of Applied Sciences in the metropolitan region of Amsterdam. This publication gives the reader pointers for improvements and innovation in technological professional practice.

The publication presents the results of the Co-creating Responsive Urban Spaces (Co-ReUS) project. This was a two-year action research on the use of interactive technology in the design assignment for responsive public spaces.

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These research programmes are:

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- Forensic Science

The Amsterdam University of Applied Sciences Centre of Urban Technology is where the applied research results are collated and shared.

Consortium for the Co-Creating Responsive Urban Spaces research project



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PART IV

Towards Responsive Urban Design

Responsive Public Space

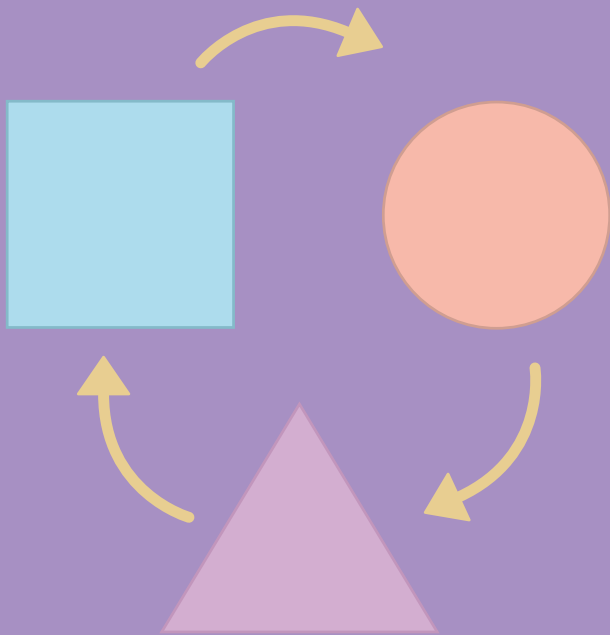


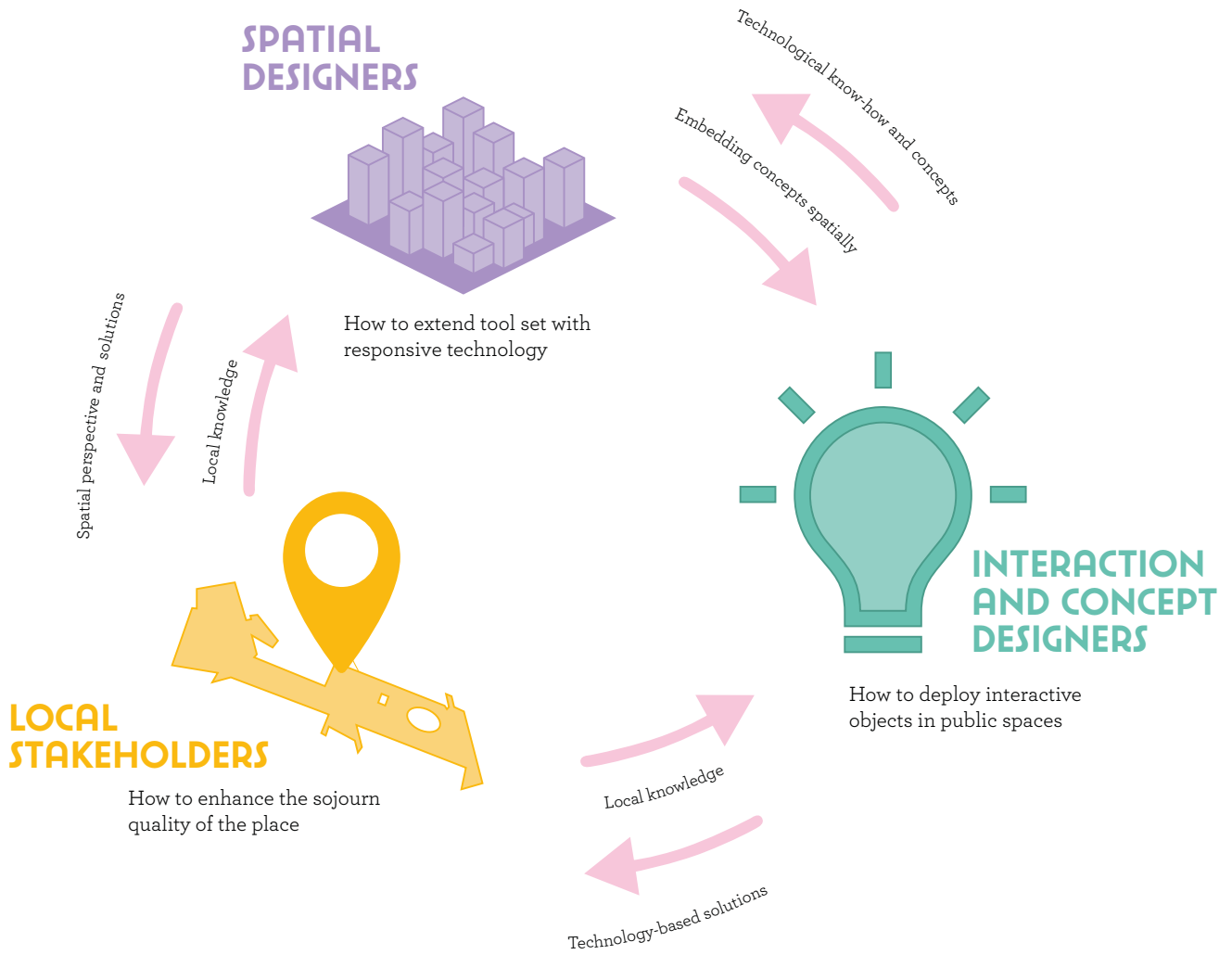
Part I: Towards Responsive Urban Design

1.

Opportunities for responsive public spaces.







Opportunities for responsive public spaces.

How can we use responsive technologies in the spatial design of public spaces to enhance their public domain qualities?

How can public spaces adapt in real time to their users, thereby improving the quality of the public domain? That is the central question addressed in this book. Our assumption is that responsive technologies, wireless networks, sensors, smartphones and technologies such as the Internet of Things offer an entirely new, complementary set of instruments for urban designers and formation of public spaces. What is lacking to date, however, is their translation into the praxis of spatial design and their application in ways that enhance the quality of public spaces as public domain.

Responsive public spaces

Our aim with this book is to contribute to the specific application of responsive technologies in the design and use of urban public spaces. Responsive public spaces use interactive technologies in real time to adapt to users and/or situations. The space creates conditions that enhance the quality for pedestrians and/or invite users to take ownership and be surprised or touched. This can improve the 'sojourn quality' (the quality of the space as somewhere to linger). Much progress has been made in the operation and properties of interactive installations in disciplines such as media architecture and 'urban interaction design', and through the debates around smart cities. The next step in this development is to put this into practice in spatial design. What forms of responsive *public* spaces are possible? Can urban spaces be designed in such a way from the perspective of responsiveness that they increase the quality of the location as a public domain?

Our hypothesis is that spatial designers can use responsive technologies to tackle public spaces in new ways that activate the public space and enhance the quality of the public domain. A central role is assigned to the use of technology in public spaces with a view to benefiting society. Since the start of the twenty-first century, technology companies have taken the lead in this field. For instance, Google is designing a digital infrastructure for a waterfront development in Toronto, Cisco is collaborating closely with cities such as Copenhagen and Kansas City on the real-time alignment of the use of buildings and urban spaces to users' requirements, and IBM boasts of a range of services on its website that can help architects and governmental authorities to make buildings and cities responsive.

Many of the applications for responsive spaces proposed by these companies concern more efficient management of traffic flows and energy consumption, personalising urban services such as transport or parking, and controlling safety. The city is seen primarily as a collection of infrastructure services that can be optimised with the aid of digital technology.

**Responsive
public spaces
use interactive
technologies
to adapt to users.**



Public space as a unifying social element

Besides being a spatial and infrastructural phenomenon, a city is also - and foremost - a social and cultural entity. Public spaces play an essential role in the process whereby communities of urban residents are formed. We may feel at home there, even though we are permanently surrounded by people we do not know and processes we cannot entirely comprehend (Lofland 1973; Boomkens 2017). Urban residents bump into one another and meet one another. They identify with a certain group, or on the contrary set themselves apart from that group; they learn to recognise others, whether as 'familiar strangers' or in a more categorical sense. The city gives them inspiration, or they might seek confrontation with it in demonstrations or political debates.

Given the current trend toward polarisation, thinking in terms of 'us' and 'them', and segregation, it is crucial for people to 'see' one another. Perhaps now more than ever, public spaces need to fulfil a proactive, unifying and encouraging role in encounters. In active public spaces, we unconsciously but repeatedly become accustomed to the unknown other. All these encounters and confrontations create the formation of a shared urban culture and sense of involvement and belonging (Giddens 1984).

Responsive technologies could be a new driver for this. What exactly are the possibilities for incorporating responsive technologies in spatial designs to improve the quality of public spaces? What new insights and applications play a role here? And how should the design process for public spaces be set up in order to ensure that the opportunities



Office Cleaning, Nika Radić, 2008 (photo: Nika Radić)

offered by these new technologies are utilised properly in the spatial design? We used action research to explore these questions. In this book, we aim to offer concrete pointers for designing responsive public spaces.

ArenA Boulevard as a test case

We considered the question of how to design responsive public spaces in such a way that they make a difference in a two-year programme of action research in and around ArenA Boulevard in Amsterdam. ArenA Boulevard can be seen as an extreme case but also as an example of a new type of public space that has emerged in recent decades. It consists of a collection of large-scale functional destinations located at a hub where various transport flows meet. A variety

of network communities congregate there: office workers from the region, day trippers and event audiences from all over the country who come to see their favourite artist perform, and tourists from all over the world who stay in one of the new budget hotels. The space is designed to cope with large volumes of people when concerts and soccer matches are on.

However, ArenA Boulevard can seem uninviting and empty outside the peak periods. How can responsive technology help engage the few users present more with the space during these quieter periods when the area is far too capacious and open to welcome the users? And what does this teach us about the quality of the public space?

The design assignment for responsive public spaces

Research on how responsive technology can be used in spatial designs to help activate public spaces is relatively new (Cantrell & Holzman 2016; Ratti 2016). The technology has already been applied a great deal for individual objects, but mainly in the arts. In museum exhibitions, responsive installations add new layers to the story, experience and immersion — while at the same time reshaping the relationship between the object and the visitor. Open-air artworks such as those of Studio Roosegaarde or the annual light festivals in Amsterdam and Eindhoven offer visitors temporary spectacular experiences. Artists, architects and designers have joined forces in networks for digital placemaking and urban media art.

**Public spaces
play an essential
role in the
process whereby
communities of
urbanites are
formed.**

Academia is contributing to the development of this interdisciplinary approach through international institutes such as the Institute for Advanced Architecture of Catalonia (IAAC) in Barcelona and MIT's Senseable City Lab. In the past decade, a new branch of business — urban interaction design — has emerged that works on these issues. These firms design and create interactive installations for clients. Those clients can be museums, public authorities, hospitals, amusement parks, the entertainment industry or even large multinationals. Many of these installations are produced for a controlled environment, often indoors. The installations are not so much a spatial element; instead, they are positioned in the surroundings and aimed at play and interaction between the installation and the user, or interaction among the users. What is more, it can be assumed that the users (for example, museum visitors) are receptive to the experience and interaction.

What is still lacking is a systematic link between these new disciplines and working methods on the one hand and the disciplines of urban planning and spatial design on the other. How can responsive technologies become part of the tool kit for designers of public spaces? How can the features of responsive technologies help enhance the quality of the public domain? And what should a comprehensive design process for responsive public spaces look like? Such an approach requires a new way of thinking about the design of urban spaces. As Cantrell and Holzman (2016) argue in their book *Responsive Landscapes*, this requires a procedure in which the design assignment is extended to incorporate the various forms the

space can take on after implementation. How can the experience of the space continually be adapted to suit the needs of users — and what design products and design solutions are then required?

First of all, the design of responsive public spaces requires new forms of interdisciplinary collaboration. Spatial designers and interaction designers need one another. They need to flesh out this collaboration in a broader process of co-creation with local stakeholders. Such collaboration is not inevitable. It demands a mutual understanding of each other's tool kit, approach and philosophy, as well as a common vocabulary with which to jointly work on the development of responsive urban spaces. Put briefly, a new playing field is needed. Secondly, that new playing field also requires a specific design methodology for systematically progressing, step by step, from the analysis into building blocks to the design solutions. Finally, reference images are needed that make it possible to imagine and discuss the nature, mechanisms, operation and manifestations of interactive installations.

Based on our action research, we show and explain the design assignment for responsive public spaces, using ArenA Boulevard as a test case.

The design process combines analysis and design. Like other spatial design assignments, a responsive space should be situational; i.e. designed, resolved and embedded to suit a specific situation. Especially when redesigning existing locations, analysis in the form of 'research for design' is a key step in the design process. The analyses in a design process should serve the design, offering building blocks 'from the bottom up' and 'from outside'. The analysis fills in the details of the diagnosis for the specific location, provides insight into starting points that can be elaborated on and into the mechanisms of the installations. It is also a tool whereby the different parties can learn to collaborate with one another.

Next, the design phases involve an iterative process of working from the concept to the detailed setup. In view of the many new elements in responsive spatial designs, it is essential to try out and test the ideas at an early stage with the intended users at the actual location. This provides information on technical, temporal and climate-related aspects in addition to the intended effects, and it generates ideas about how the intervention might evolve.

The diagram shows the sequence of steps in this research — and the design process.¹

1. This diagram draws on the philosophy of the Stanford Design Thinking method, without adopting precisely the same steps (d.school 2018).



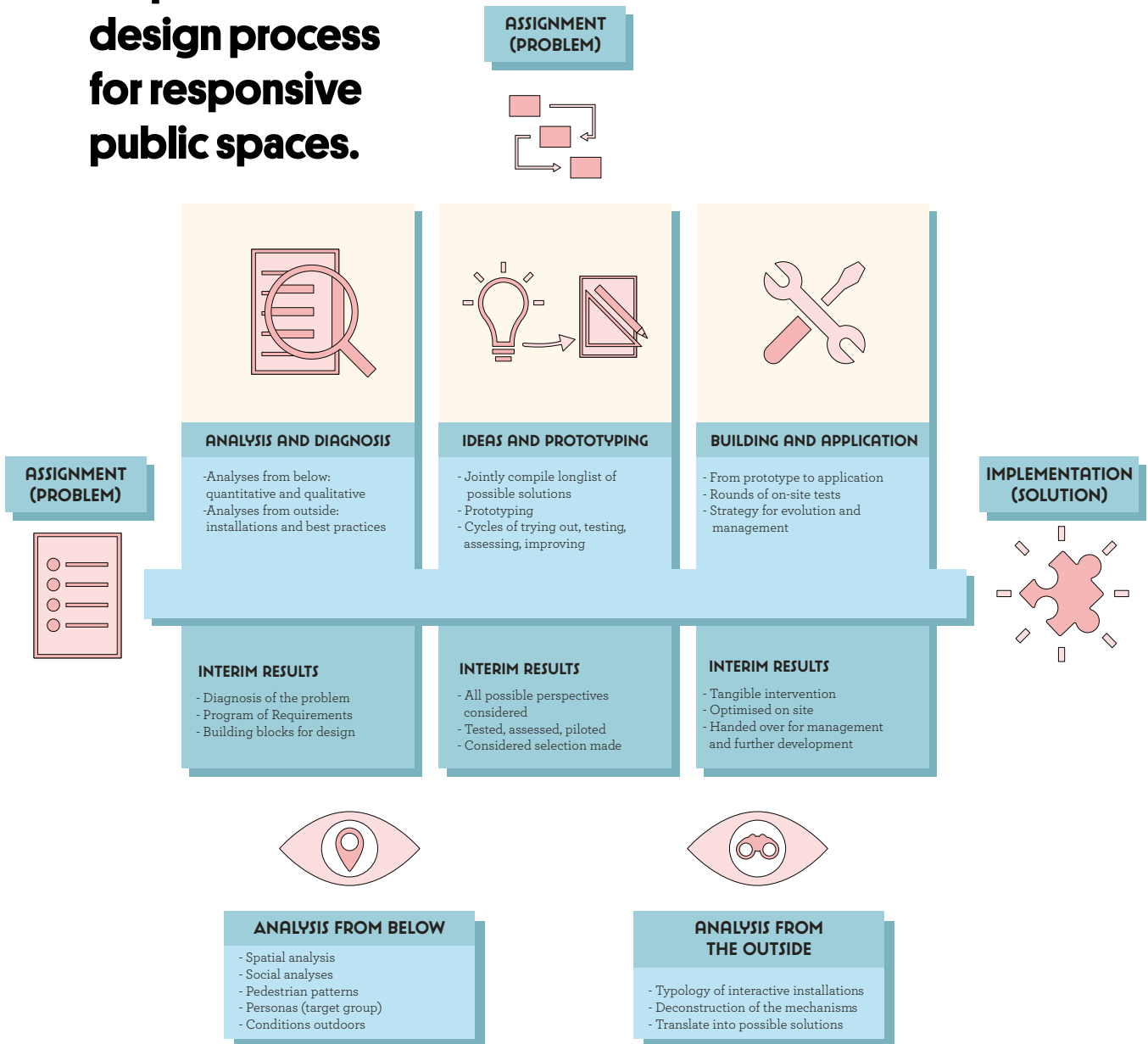
Julius von Bismarck, Benjamin Maus, Richard Wilhelm, Public Face I, Berlin, 2008

Urbanimals, LAX Laboratory for Architectural Experiments,
developed for Watershed's Playable City Award 2015 (photo: Paul Blakemore)





Steps in the design process for responsive public spaces.



Setup for this book.

The setup for this book follows the design process for responsive public spaces. It is therefore divided into five parts.

In **Part I**, we start with the specific assignment for public spaces. We discuss the importance of public spaces in detail and the pressure these days on the way they function. Then we briefly introduce ArenA Boulevard as an example of a new type of public space with a specific assignment that can be seen as a model for a large number of actual and potential public spaces in and around cities.

In **Part II**, we describe the design process itself and the new playing field this leads to. We also introduce the setup for the action research here. Designing a responsive space on the scale of a specific urban location requires collaboration between two design disciplines. On the one hand there are the spatial designers who traditionally work on designing and shaping public spaces. On the other hand there is the up-and-coming profession of interaction designers. These are designers who work on setting up interactive systems and their interfaces, and who have specialist knowledge of the operation and usage patterns of digital media and new interactive technology. Two other important parties are the local stakeholders and the municipality. Their professional and local know-how, expertise and formal roles are complementary and all needed. Local stakeholders have specific knowledge of the use of the place and they have specific objectives, interests and

expectations regarding how the location can function as a public space. The municipality occupies a special position as local authorities can have multiple roles and are also often the client.

A crucial factor for the collaboration between the design parties is knowledge of the approach used and potential benefits of one another's work. Because of the emerging nature of this field, a self-evident culture of collaboration has yet to develop. This part explores and explains how these disciplines can cooperate with one another in a process of co-creation.

Part III focuses on searching for building blocks for the design. We concentrate on the redesign of existing squares and streets. Rather than a device that can be applied in the same way everywhere regardless of the context, responsive spatial design constitutes a situation-specific design assignment. Analysis of the existing situation leads to the diagnosis of the assignment, based on which the first building blocks can be identified for the redesign. To this end, we analysed the physical space of ArenA Boulevard, the pedestrian flows, behaviour, the experience of the place and the target groups in turn. In short, the existing situation was mapped, which gives an insight 'from the bottom up' of the assignment and possible pointers for the design solutions. We call this 'the building blocks from the bottom up'.

In **Part IV**, the perspective shifts to the technological developments. We call them 'the building blocks from outside'. In this part, the interactive installations are classified according to a typology of five mechanisms. We present them using a wide range of

reference images. We then consider the design issues relating to responsive solutions. Finally, in this part we also look at the lessons that can be learned from environmental psychology. Together, they give an understanding of the possible effects, the intended mechanisms that responsive technologies can set in motion and the design patterns.

Part V concentrates on our ‘research through design’. This is where we switch from analysis to development and application. Our aim with this part was to get live the entire process of designing responsive public spaces by carrying it out from start to street. Specifically, we designed two responsive ‘interventions’ in a co-creation process, tested them with the partner companies and built prototypes to be tried out on users of ArenA Boulevard at certain test times in the winter.

The five parts encompass the practical knowledge that was acquired in our study of the design of responsive public spaces. The results of the research could be of significance for various professions:

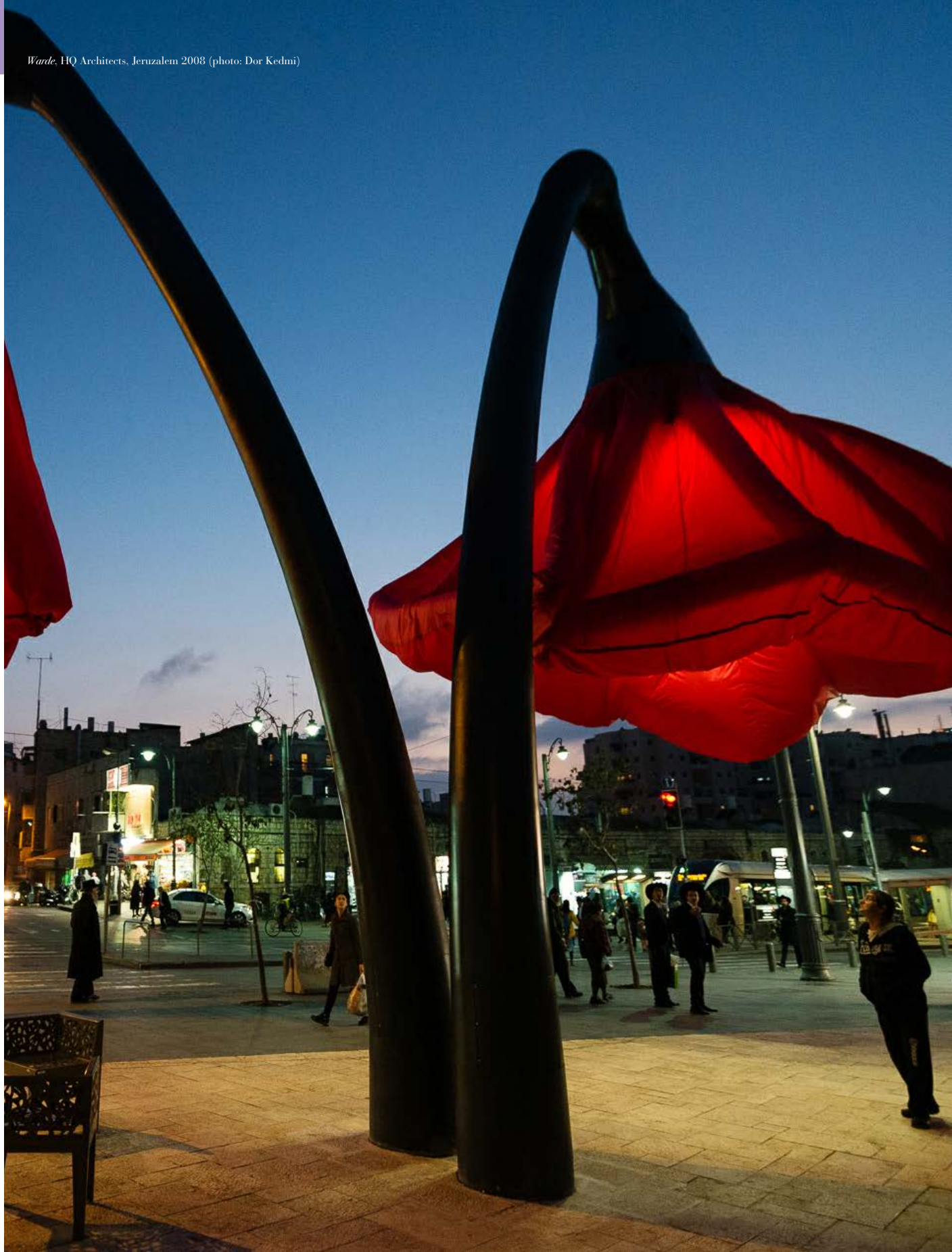
- **spatial designers:** a new set of tools is provided that can be used to enhance the quality of public spaces and also create new design products;
- **interaction designers:** responsive public spaces are highlighted as a new class of applications;
- **clients for public spaces:** the possibilities are presented, and that knowledge offers pointers for responsible commissioning practice;
- **companies, the municipality and local parties around ArenA Boulevard:** new forms of collaboration and solution areas are presented.

In the closing chapter, we translate the joint lessons from the five parts into a roadmap for the design process for responsive public spaces.



Body Movies, Relational Architecture 6,
Rafael Lozano-Hemmer, 2001
(photo: Jan Sprij)

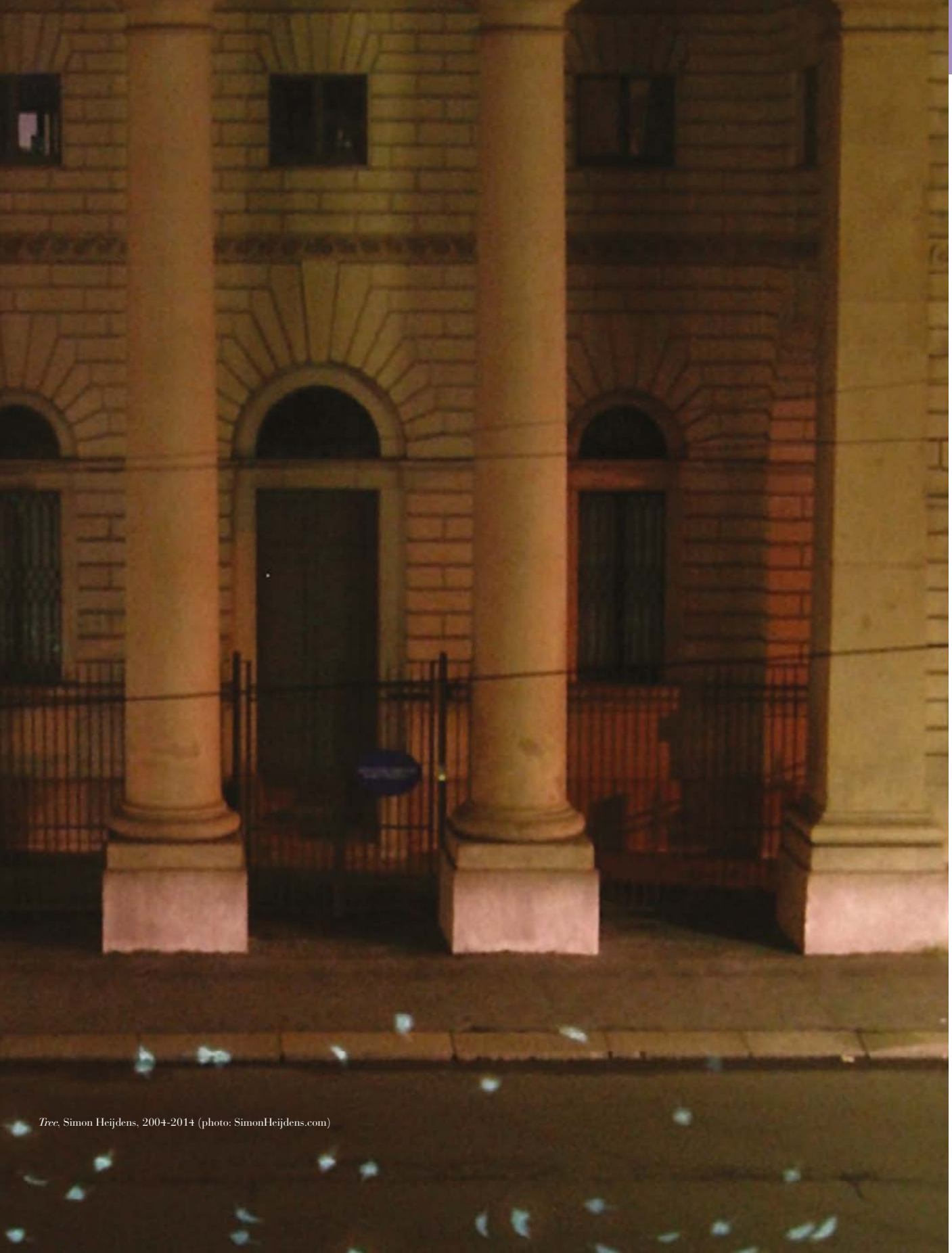
Warde, HQ Architects, Jerusalem 2003 (photo: Dor Kedmi)





The Pool, Jen Lewin, JenLewinstudio.com, various cities worldwide, 2012-2013
(photo: Sight and Sounds Media House)





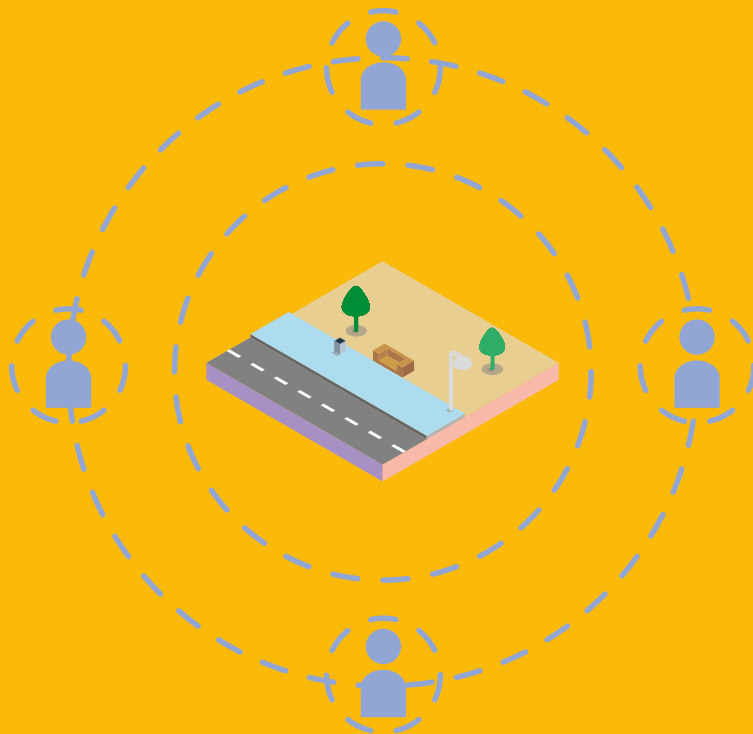
Tree, Simon Heijdens, 2004-2014 (photo: SimonHeijdens.com)

Part I: Towards Responsive Urban Design

2.

The physical public space as a social assignment.





The physical public space as a social assignment.

2.1 Introduction.

Public spaces have a crucial role in the functioning of cities. Highways, streets and boulevards form the connective elements in the urban fabric and provide access to individual locations and buildings. Parks, squares and shopping streets offer amenities where urbanites can enjoy leisure activities, meet one another or provide for their day-to-day needs.

The significance of public spaces for the city goes far beyond simply fulfilling these logistical functions. Public spaces also set the conditions for the city's social life. In public spaces, urbanites can become familiar with the rhythms of the city and its inhabitants. Urbanites assign meanings to places, and social connections are created through countless, often everyday individual and collective experiences and actions in public spaces. This is how an urban society emerges (Sennett 1974; Giddens 1984; Lofland 1998; Boomkens 1998; Hajer & Reijndorp 2001) that enables us to feel at home while surrounded

by strangers. A public space that fulfils this function is termed a 'public domain'.

Critics say the city's function as a public domain is under pressure. The increasing mobility and the rise of media technologies — first television and now mobile phones and smart-city applications — are undermining the function of the public space as a site of encounters. This erosion is amplified by broader social processes such as commercialisation and individualisation. Locations such as ArenA Boulevard, say the critics, may attract large numbers of visitors on certain occasions but they no longer live up to the ideal of an urban culture that is open and diverse, offering surprises and encounters.

In public spaces, urbanites can become familiar with the rhythms of the city and its inhabitants.

This chapter will consider the functioning of public spaces in a network society. We describe a number of views and developments that play a role in the current design and use of public spaces and the way in which they deal with the tension between strangeness and familiarity. What can we expect exactly in a network society from a public space and what minimum conditions must it satisfy? Whereas debates about public spaces are often all about the loss of meaning, we see new opportunities. We believe that new technologies and responsive installations can help public spaces develop into public domains in new ways.



2.2 Urban public spaces and public domains: the city as theatre.

Not every public space is a public domain. There is an awful lot of public space but public domains are much rarer. Public domains are specific locations that are used and visited as a matter of course by people from different backgrounds, and who differ in their purchasing power, preferences and lifestyles. Public domains are the places where the urban society presents itself to its members and where the diversity and changes in the urban society can be observed. City streets, parks and squares are specific examples of sites where there is overlapping use of the space and interaction between different social worlds.

The city is inhabited by an assembly of people who are strangers to one another (Lofland 1973). Squares, urban streets and parks play an essential role in the trust that strangers have in one another. Public spaces have an important social significance as sites where a wide range of urbanites encounter one another and where they have to relate to one another. They take notice of one another there and can build up mutual trust. In the literature on urban sociology, examples of vibrant public spaces range from city parks and squares to urban streets with lively pavements in cities such as Paris, New York, Barcelona and Amsterdam. This is where diverse groups live their daily lives. Users can temporarily

take possession of the public space and assign it their own meanings. Gatherings can also be organised in these spaces, ranging from festivals and events to demonstrations.

One of the metaphors that is frequently used to describe the public domain from this perspective is that of the city as theatre. Urbanites are simultaneously both the audience and the performers. They interact with one another in the public spaces and (unconsciously) show one another who they are through their behaviour, clothing and other symbolic practices. Together, they perform both their daily routines and their collective rituals (Nio, Reijndorp & Veldhuis 2008) in the public spaces. On the other hand, people become familiar with the 'performances' of other urbanites; they may identify with them, or on the contrary seek to be different from them. In public spaces, urbanites make their lives public (in the sense of exposed) and as a result they are able to form publics (in the sense of loose communities and groups) (De Waal 2013). All these social interactions can in the course of time lead to a certain familiarity with a location. The site gradually becomes loaded with specific meanings. We call this a 'sense of place'. The sense of place can induce a 'feeling of being at home', the experience we have that we belong with the space, and the space belongs with us.





People are increasingly staying and moving around in their private bubbles.

At the same time, urban researchers warn that various modern-day developments are putting pressure on the public domain. They argue that the increasing focus on the private domain of the home in particular is causing people to be less open to surprises and confrontations with the proverbial 'Other'. People are increasingly staying and moving around in their private bubbles. But functionalist, vehicle-focused post-war design principles are also fundamentally at odds with the experience of public spaces by pedestrians, and consequently damage the public domain. Furthermore, the rise of digital and mobile networks has changed how residents use and experience urban spaces and their city.

2.3 Tactics for feeling at home.

Numerous sociological studies have analysed how people who use an urban space deal with the tension between strangeness and familiarity. If you are to hold your own in spaces that are being visited by strangers at the same time, you need to be able to isolate yourself from others. According to Simmel, people can only survive in the city by adopting a reserved attitude. In urban public spaces, people try to protect themselves from the commotion and unpredictability of the world around them because of the huge number of stimuli they have to deal with. The urban way of life in public spaces is said to be characterised by impersonal, superficial and ephemeral anonymous contacts.

Sociologists such as Goffman, Jacobs and Lofland have shown that meaningful interactions do actually take place between strangers in public spaces. These interactions are not usually literal encounters that lead to conversations (let alone the free-ranging debate and political discussions that Arendt, Habermas and Sennett had in mind), but they do involve individuals with different backgrounds becoming aware of one another's presence and briefly looking at one another. People use a variety of tactics for dealing with strangers. Goffman (1963), for example, uses the term 'civil inattention' for the practice of keeping a certain distance so as to respect one another's privacy. If strangers come across one another in the street, they glance briefly at each other to take the measure of the other person, and then look away again quickly. He also discusses an attitude that he terms 'away':

we use non-verbal communication to show that we are currently not available for social interaction, for example by staring into space. Jane Jacobs pointed to the principle of 'eyes on the street', whereby people in the homes and shops bordering street pavements exert informal social control. According to Jacobs, city life can only regulate itself properly in densely built, multifunctional, diverse urban districts.

A sense of familiarity and of feeling at home in public spaces can also arise through 'public familiarity' (Blokland 2006; Van der Zwaard 2010). This is achieved when people who regularly encounter one another can recognise and place one another. In urban districts, people live among local residents whom they may not normally speak to but whom they do recognise on their daily or weekly routes. That can then result in familiarity with strangers, in other words repeated encounters with the same people in the street, at a public transport stop or in certain shops. Public familiarity can occur at a more categorical level in more anonymous urban public spaces. People recognise others as belonging to a different group.



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Lofland (1998) has pointed out that public spaces are not just places where strangers encounter one another. In addition to the public domain, she distinguishes the private domain, which consists of relationships between people who know one another well (family and friends), and the parochial domain, which is the domain occupied by 'the same kind of people'. Privatisation and parochialisation of public spaces do not result in separate domains; rather, they are strategies for adapting public spaces to people's own requirements and for feeling comfortable in a place. Thus individuals may use a 'privacy shield' in public spaces, for example by staring at their mobile phone screen or by being in a group.

2.4 The influence of the physical space.

If people are to feel at home and interact in a public space, that space should be properly laid out, feel pleasant and invite you to linger there, walk and look around in an 'open' manner. The physical space plays an important role, but it is difficult to pin down what that role is. Everyone is intuitively aware of spaces where people like to spend time and linger, as well as places that do not feel comfortable and tend to make you want to leave as soon as possible. The design and layout of the public space along with the adjacent buildings play a part in both situations.

The influence of the built environment on people's use and perception of streets and

squares has been the subject of extensive research by classic pioneers such as Jane Jacobs, Allan Jacobs, Gordon Cullen, Christopher Alexander, William Whyte and Jan Gehl. A well-functioning public space is both somewhere you linger (a 'place') and a passage to somewhere else (a 'link'). This translates into requirements for the layout, programming and design of the horizontal street space, as well as the vertical and three-dimensional street space consisting of the street facades and the coherence between them, the layout and programming of the plinths, and the tactile qualities and

New types of public spaces are appearing in addition to the familiar, like squares, parks and town streets.

rhythm of the buildings. The facades must 'collaborate' to a certain extent and offer users 'enclosedness'.

In studies of life in city-centre streets and squares, Whyte and Gehl have shown what criteria apply for a pleasant public space (see too Lang & Marshall 2016). Squares and parks have to be in the right location and have the right layout. They have to offer sufficient

reasons for people to visit them, so that multiple groups of visitors assign multiple meanings to them. There has to be enough seating. Having people there attracts other people.

Whyte and Gehl, however, pay less attention to the fact that in modern-day, dispersed cities there are ever fewer places that are meaningful for the entire urban society. The urban society consists of a mosaic of different groups, each with their own codes, territories and utilisation of places (Brunt 1989). This development has been reinforced by the social and spatial segregation of different segments of the population, increasing tourism in historic city centres and the rise of digital and mobile networks. People spend less time looking at one another in public spaces because of the use of mobile phones. On the other hand, new technologies also offer opportunities for a more responsive public space, as we demonstrate in this book. What is more, new urban sites have emerged on the edge of the city, such as centres for shopping and nightlife; they generally do not satisfy the spatial and programmatic criteria for a successful city according to Gehl and Whyte, but they do attract a diverse public.

2.5 New types of public spaces.

New types of public spaces have appeared in addition to the known, familiar kinds of public spaces such as squares, parks and urban streets. Social, economic, spatial and technological developments in retail, entertainment, recreation and mobility have

led to the growth of new urban locations in the outskirts of the city and beyond. These are often sites of regional significance, such as public transport hubs, business districts, stadiums, shopping malls and covered shopping and entertainment centres. As a result, various urban functions are now spread across the urban region. The new urban locations for homes, work, shopping and leisure are usually specialised rather than with a real mix of functions.

These new public spaces are not always public in a legal sense. Urban life plays out largely inside buildings, often without any sign on the outside of what happens inside. Opinion is very divided on the implications for society of these places. That is because some of these new urban places are mainly aimed at functionality and efficient flows rather than to linger. The political scientist Walzer (1986) differentiates between multi-layered public spaces and elementary public spaces by speaking of 'open-minded space' versus 'single-minded space'. A single-minded space is a functional and frictionless space that has only one usage function. An open-minded space is intended for multiple forms of use that cannot always be foreseen. Many of these new urban sites are single-minded spaces, despite the diversity of the people visiting them. Critics see these new urban places as the negation of the public. The anthropologist Augé (1992) has even called them 'non-places', places without any identity, history or social significance. The Barcelona architect De Solà-Morales (1992), on the other hand, sees shopping malls and out-of-town stores, amusement parks

and stadiums, large car parks and shopping arcades as the new meaningful places in the modern city, the collective spaces of our times. Hajer and Reijndorp (2001) contend that a public domain *can* emerge in places such as centres for shopping and nightlife because of the diversity in the groups of visitors and because parochial domains can come into contact with one another here, leading to interaction.

Pessimistic cultural considerations of public spaces regularly claim that the public space is under so much pressure that its very survival is in danger. The public character is being lost due to privatisation, increasing individualism and security requirements (Sorkin 1992). This is particularly the case for new urban places where the public space is privately owned and managed by those private owners. The commercial interests of the property owners are usually in conflict with public interests. For example, political demonstrations and handing out leaflets are not allowed in shopping centres. Vagrants and groups of youths loitering are not admitted. On top of that, there is now the question of security and the increased risk of terrorist attacks, including in stations, stadiums and entertainment venues.

In addition to their functional character, the specific rhythm of the new urban places is another aspect influencing their character as a public domain. That is because the new urban places are distinguished by temporal specialisation and a specific collective rhythm. They are often urban locations with major peaks in activity and extreme quiet periods that are determined by the opening hours of the shops, offices and entertainment venues. The place can sometimes become a public

domain during peak hours. The downside to the peak times is that the place can seem deserted and unappealing during quiet periods. ArenA Boulevard is one such new type of public space with major retail outlets and leisure amenities. It is a transport hub, shopping area, office location and nightlife centre and a point of convergence for different scales (from local to global), transport modes and groups of people with their own social worlds.

2.6 Networked urbanites and networked urbanisation.

The rise of places such as ArenA Boulevard is associated with changes in the use of space, which in turn is associated with broader social shifts. In this regard, the sociologist Barry Wellman (2003) talks of the rise of 'networked individualism'. Increasing individualism has caused us to see ourselves as belonging to an increasing range of specialised groups or communities. We feel a close bond with some groups and a passing connection with others. Thus everyone has their own collection of networks to which they belong; in our daily lives, we hop continually from one network to another. Digital media play an important role in coordinating our links to various communities. Firstly, a wide variety of communities can be found using online search engines, and we use social networks to foster the process of group formation and keep abreast of the network's activities.

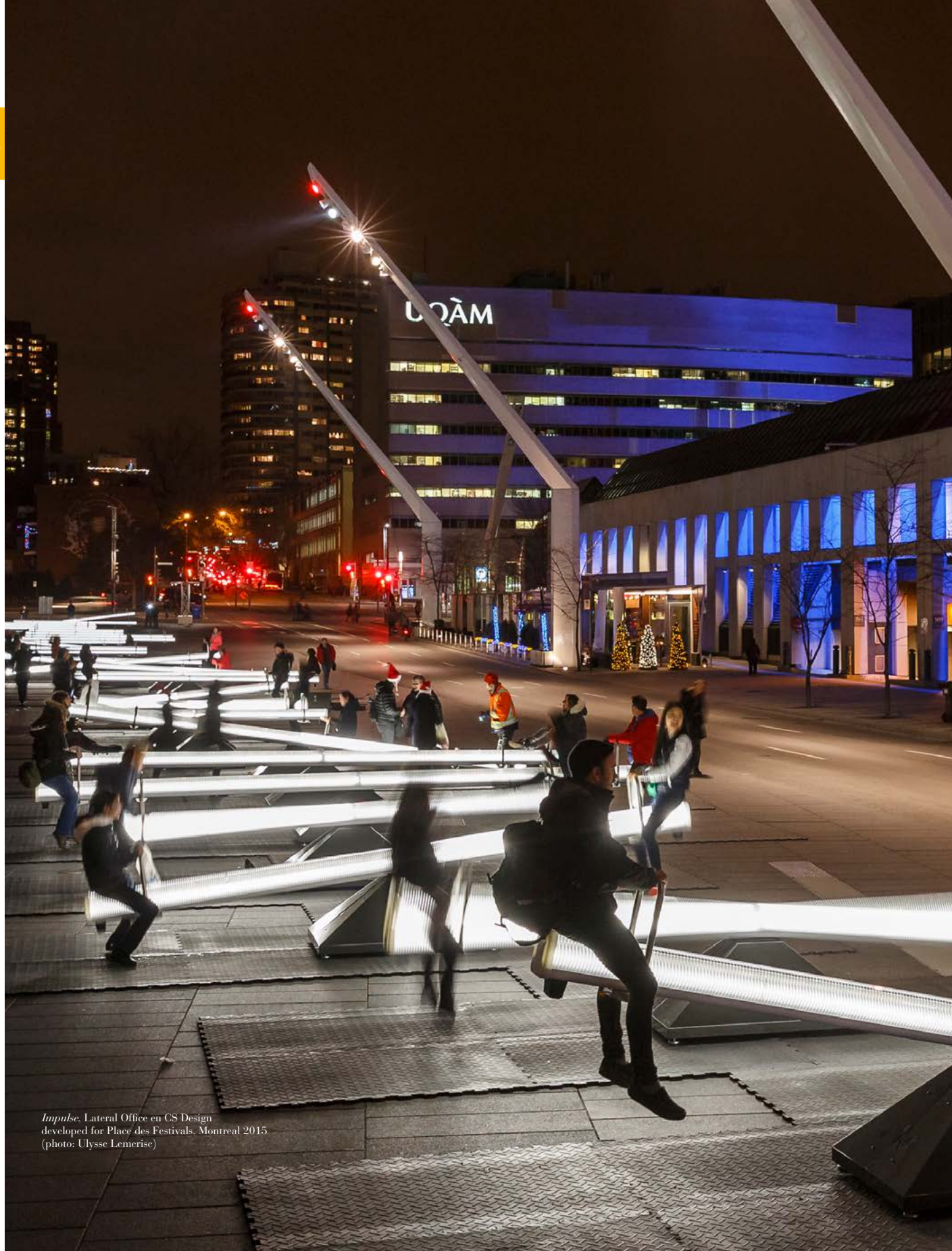
Almost all of these networks also have their own geography in the physical world. Some consist of app groups of local residents whom we see in the streets around our house, others may be a fan community or music subculture with members who meet up at locations across the country, or even around the world, at concerts and festivals. Our use of public spaces is associated with our connection to all these communities. This has led people to talk of the rise of networked urbanites, residents in an urban region who construct their own city through their mobility. These are inhabitants who use a large number of different places in a region. Many residents of suburbs and peripheral municipalities only visit the city centre on rare occasions to shop or go to a restaurant. A significant proportion of their lives is played out in new locations on the edge of the city that can easily be reached by public transport and/or the car, from shopping centres to cinemas or places such as ArenA Boulevard. These locations have significance on a greater scale, as a hub for the region.

People normally come there for one destination only, such as the large stores, offices, station, car park, hotels, entertainment venues or stadium (while they might combine this with one other destination). However, this creates a potentially interesting dynamic from the perspective of the location itself. Various urbanites visit such a place for their own reasons, which are often functional, or because the place has (perhaps temporarily) become part of the geography of one of the loose communities they belong to, for example when they go to a concert by a particular band in ArenA Boulevard.

Responsive public spaces can disrupt and stimulate interaction.

If we aggregate all the individual routes and motives, the result can be a diverse public. Such a location can then be one of the few places in the urban region where some people (such as the suburban middle classes whose lives are lived largely in the private domain of the home) can still encounter other citizens with a different background. They may, or indeed must, exit their functional mode as they walk towards a certain destination. People are never purely functional and purposive when they walk. There are always places where people are taken out of their own comfort zone.

Spaces like ArenA Boulevard (and comparable centres for shopping and nightlife) have a collective ritual or event-related character. Such spaces attract large numbers of 'fellow community members' at certain times. At ArenA Boulevard, these might be supporters of Ajax soccer club or fans of the artistes performing in Ziggo Dome or AFAS Live. A filter bubble applies at such times, as people want to see part of themselves (or their identity) confirmed by the other visitors to this destination for networked urbanites with a shared interest. A public domain can then emerge when the parochial domains of like-minded publics (briefly) overlap (cf. Hajer & Reijndorp 2001).



Impulse, Lateral Office en CS Design
developed for Place des Festivals, Montreal 2015
(photo: Ulysse Lemerise)

A public domain is also created when a visitor happens to end up in the parochial domain of another group (such as concert audiences). That is not always a pleasant experience, for example if a space is full of soccer supporters prior to or following a match.

2.7 The minimum criteria for a public domain.

Discussions of the public domain generally stress the importance of interaction between different groups, resulting in tolerance, civilised behaviour and a cosmopolitan attitude, which are seen as the essence of urban culture. Arendt, Habermas and Sennett set the highest bar. In their opinion, it is all about free-ranging debate and political discussions. Urban sociologists and geographers who have conducted a great deal of empirical research on the actual use of public spaces have more modest expectations. Their normative ideal picture of the public domain involves interaction, looking at one another, taking notice of one another, placing one another and therefore achieving a better understanding of one another. Even that is quite an achievement.

In this project, we aim to go one step further and define minimum criteria for what a public domain is and could be. The ideal of interaction could be asking too much in certain situations. That is because the public domain is often used and experienced in an individual manner without the possibility of interaction with others. Especially during quiet periods, for example if someone is walking along the street alone or in a small group, the public domain needs to be considered from a different perspective. That is also necessary because these days people are preoccupied with their mobile phone screens, constantly keeping up to date with their own social networks and using earplugs to shut out the sounds around them. In such circumstances, it is quite an achievement if people can be briefly taken out of their bubble by something that surprises or even disorients them. This is about enhancing their awareness that they are in a public domain and letting them briefly emerge from behind their shield of privacy. That requires a deliberate disruption to the way they walk and look, which can be done by fostering an atmosphere of receptiveness and surprises.

Matos Wunderlich (2008), for example, distinguishes three modes of walking: a purposive mode, a discursive mode and a conceptual mode. Many people use the public space in locations with a functional layout

(such as ArenA Boulevard) in a routine, purposive manner. The discursive mode of walking can be compared to the *flâneur's* strolling in which the route is more important than the destination. The conceptual mode of walking is comparable to the situationists' *dérive*, a meandering, deliberately disorientating form of walking. According to Wunderlich, the task with a design is to facilitate not just purposive walking practices but other ways of walking too. Turning the walking experience towards more discursive and conceptual pedestrian practices is a challenge. Thus the public domain with its tension between the alien and the familiar is about more than just being able to get your bearings and find your way.

2.8 The social assignment for the public domain.

We consider the development and role of the public domain to be a constantly changing and evolving social phenomenon. As a consequence, the meaning of public spaces is also continually changing. We therefore contend that the new urban places can develop further into public domains. ArenA Boulevard is one such place. At times it is already a public domain, and this development could be reinforced at other times. The large-scale programme in and around the boulevard attracts an incredibly diverse public: shoppers, people on a night out, office workers and tourists too since a number of hotels appeared. At peak times, ArenA Boulevard has everything necessary in terms of social aspects to become a public

domain. It is busy, and different social groups — from Ajax supporters to Drake fans — crowd onto the boulevard in waves.

The challenge for these new urban places lies mainly in the quiet periods. We believe that a responsive public space can have various effects on the urban public sphere. Behaviour and perception can be influenced by stimuli that push users in a certain direction (environmental psychologists talk of nudging). In our project, this is not just about improving the functionality, comfort, ease of orientation and legibility of the space ('wayfinding'), but also about enhancing the urban public sphere through disorientation and confrontation. This involves simultaneously reinforcing both the sense of feeling at home and interaction, which we see as the essence of the public domain. We are looking for a new equilibrium for such urban locations. Digital media installations can help with this.

The public domain can be strengthened by literally encouraging interaction between different users of the space via responsive installations. That can be done with a view to letting people linger in the space for longer, but also by mixing different parochial domains so that various groups (and individuals in those groups) are confronted with one another.

Secondly, an interface or intermediary can be created whereby people are confronted with a different ambience and social world. This does not necessarily require a literal overlap between different worlds; instead, the parochial domain of one specific group or the atmosphere at one specific time is revealed through an interface. In addition to a set of



Esplanade Almere

practices at certain times, the public domain can also be bolstered through a sense of place, through the specific emotions that a particular place evokes.

Thirdly, a more aware and responsive way of walking, lingering and looking can be encouraged at the individual level, for example by stimulating the senses and arousing people's curiosity. A brief, minor disruption can encourage walking as a creative spatial exercise and as an urban experience. That can be the germ for a public domain experience.

We believe that a responsive public space can play with that slight disruption of self-evident ways of looking, walking and sitting. The space can key into the various ways in which users increasingly use digital and mobile networks

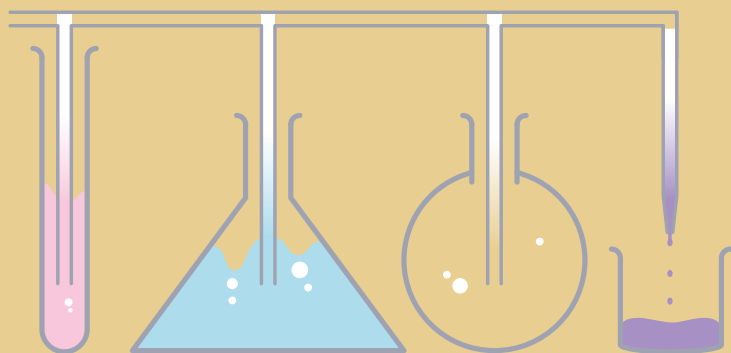
to get their bearings in public spaces and also experience those spaces through the digital media. In this way, the public domain can be strengthened as a public sphere. Whether this also leads to more interaction between various groups — fitting the ideal of an urban culture of openness, surprise and diversity — depends on the spatial and social features of the space in addition to the mechanisms of the installation.

Part I: Towards Responsive Urban Design

3.

ArenA Boulevard as a test case.





ArenA Boulevard as a test case.

ArenA Boulevard is a new type of public space with major retail outlets and leisure amenities. It is a transport hub, shopping area, office location and nightlife centre where different transport modes and groups of people with their own social worlds converge. The location is accessible by car or public transport from the city of Amsterdam, the region and the rest of the Netherlands. There is a combined station for the metro and mainline intercity trains. The location has significance on different scales: local, urban, regional, national and to some degree international as well. ArenA Boulevard is more mixed in character than the average out-of-town shopping centre. The boulevard is an extreme case in terms of its mix of functions and size, yet it is also a good example of the new emerging urban public spaces, with large-scale retail stores, entertainment venues, offices and hotels. It is an example of a new type of public space with a specific assignment that can be seen as a model for a large number of actual and potential public spaces in and around cities.

A wide range of different groups of people visit ArenA Boulevard. The place attracts an incredibly diverse public. Various groups of people come to the boulevard for a specific purpose. They may for example work in one of the offices. Shoppers may be looking for new furniture, need specific sports articles, want to

decorate the baby's bedroom or come for the latest electronic gadgets. People travel to the location to watch their favourite soccer club, see their favourite band or watch an event or film. They have been joined in recent years by tourists from all over the world coming to stay in one of the new affordably priced hotels. ArenA Boulevard attracts visitors from all ranks of society. However, the public space is primarily somewhere that people have to pass through, preferably quickly, to reach their destination, rather than being somewhere that creates a bond between people.

A sense of place has developed at locations like ArenA Boulevard thanks to the years of use by certain groups who have shopped there, gone there for a night out or attended sports and other events. This location has acquired significant meaning in the urban life and collective memory of the city because people have shopped there and gone out, and because of special events such as festivals, demonstrations and new rituals or collective celebrations (of Ajax becoming champions). ArenA Boulevard has a certain ambience and reputation, but there is little or no evidence of this during the quiet periods. At such times, there is essentially no difference between this large, unbroken public space and other locations with a more specialised character.

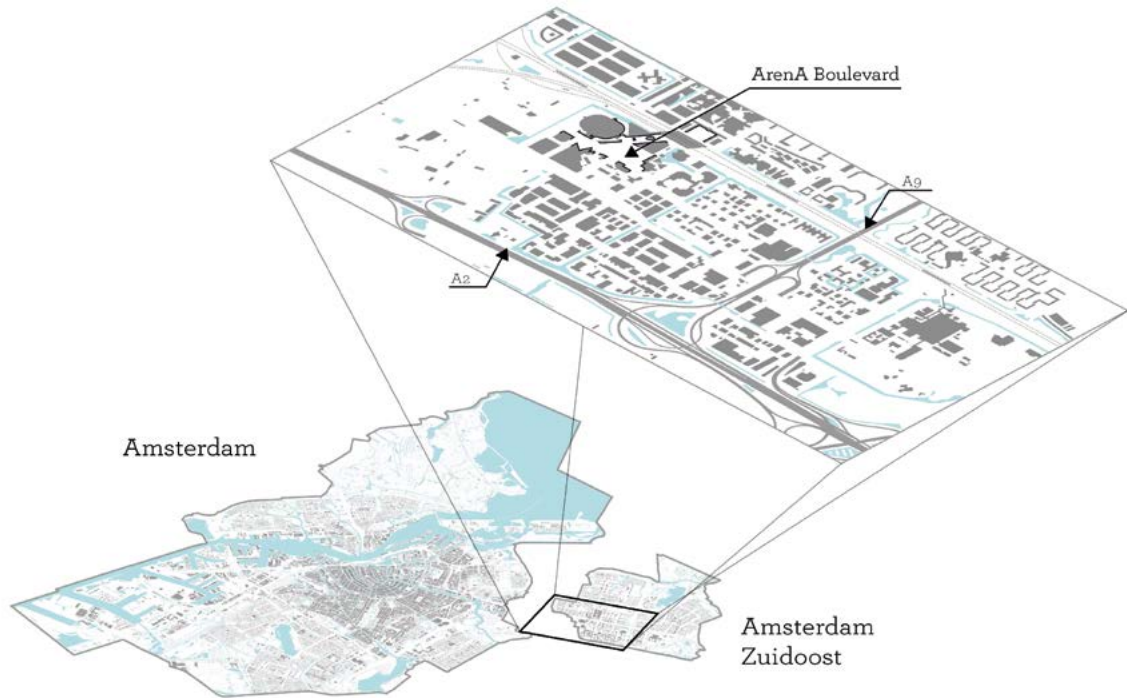


Figure 3.1: Location and position of ArenA Boulevard in Amsterdam Zuidooost district

ArenA Boulevard is situated in the Zuidooost district of Amsterdam. It was developed in the second half of the 1990s as a new urban hub. The development was prompted by Ajax soccer club's move from the old Ajax stadium (De Meer) to a new, larger, multifunctional stadium on the outskirts of the city. In the second half of the 1990s, the area between Amsterdam ArenA and Amsterdam Bijlmer station was still waiting to be built and developed on a grand scale.

The municipality of Amsterdam commissioned the firm of architects De Architecten Cie from Amsterdam and its partners Frits van Dongen and Pi de Bruijn to design ArenA Boulevard as a connecting element between the station and the stadium.

The new soccer stadium was designed with seating capacity for 54,000 and was opened in 1996. In addition to the stadium, AFAS Live (formerly the Heineken Music Hall) with capacity for 6,000 visitors and the Pathé cinema were the first functions on the boulevard. In the years that followed, the area was built up with large retail stores, offices, the Villa ArenA home furnishings shopping mall, the Ziggo Dome concert hall (with seating for 17,000) and more recently restaurants, cafes and several hotels. The new station was opened in 2007. The connecting passage under the tracks with the Amsterdamse Poort shopping centre on the east side has been widened and improved. The construction plans for the last section of undeveloped ground, ArenA Park, are now also at an advanced stage. This centre

The ArenA Boulevard is a new type of public space. The space is almost entirely pedestrian-only and the scale is huge.

for offices, shops and nightlife may currently lack a residential function but in a few years time, it will be possible to have a home overlooking ArenA Boulevard.

ArenA Boulevard is based on the spatial concept of the boulevard. The space is almost entirely pedestrian-only and the scale is large, as can be seen in the comparison of scales in Figure 3.2. The space is roughly four times as big as Leidseplein, a popular historical square in Amsterdam city centre.

ArenA Boulevard is more than just the area around a stadium. It was explicitly not designed as a stand-alone element but as part of a new nucleus on the outskirts of the city, comparable to other new hubs in European cities.

In 2007-2008, the public space of ArenA Boulevard and Amsterdamse Poort was redeveloped using a design by the landscape architects Karres+Brands. The design reinforces the link between the two areas on either side of the railway track. The new layout consists of paving using cobblestones. Groups of trees and long, curved benches were designed with the intention of creating 'sticky public spaces'. A web of lights made of coils and spotlights hangs in front of the Pathé cinema and AFAS Live hall like a starlit sky. The design for the western section of the boulevard was never executed.

The boulevard and the nearby Bijlmer district have now become 'mature'. Bijlmer was originally a modernist district where a high proportion of the residents came from Surinam or the Dutch Antilles. In the past twenty-five years, gallery-access flats there have been demolished or refurbished and new homes built. A car-showroom boulevard has developed along the A2 motorway. Now areas to the north and south of the plan area are being transformed from mono-functional industrial sites to mixed locations with highly urbanised residential communities. This brings the area to the brink of the next step in its development. Now it is possible to progress to giving the place a more comprehensive role and meaning for the city and the immediate surroundings. The location can be developed further into a metropolitan location with the appropriate associated public domain qualities.

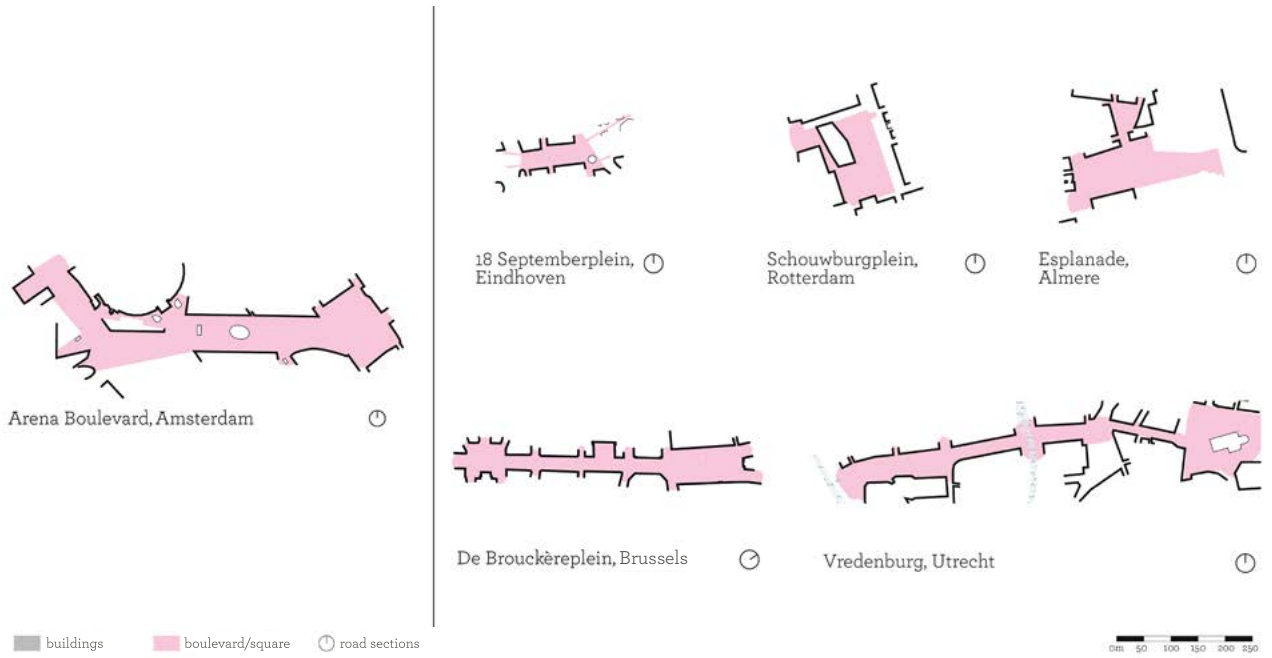
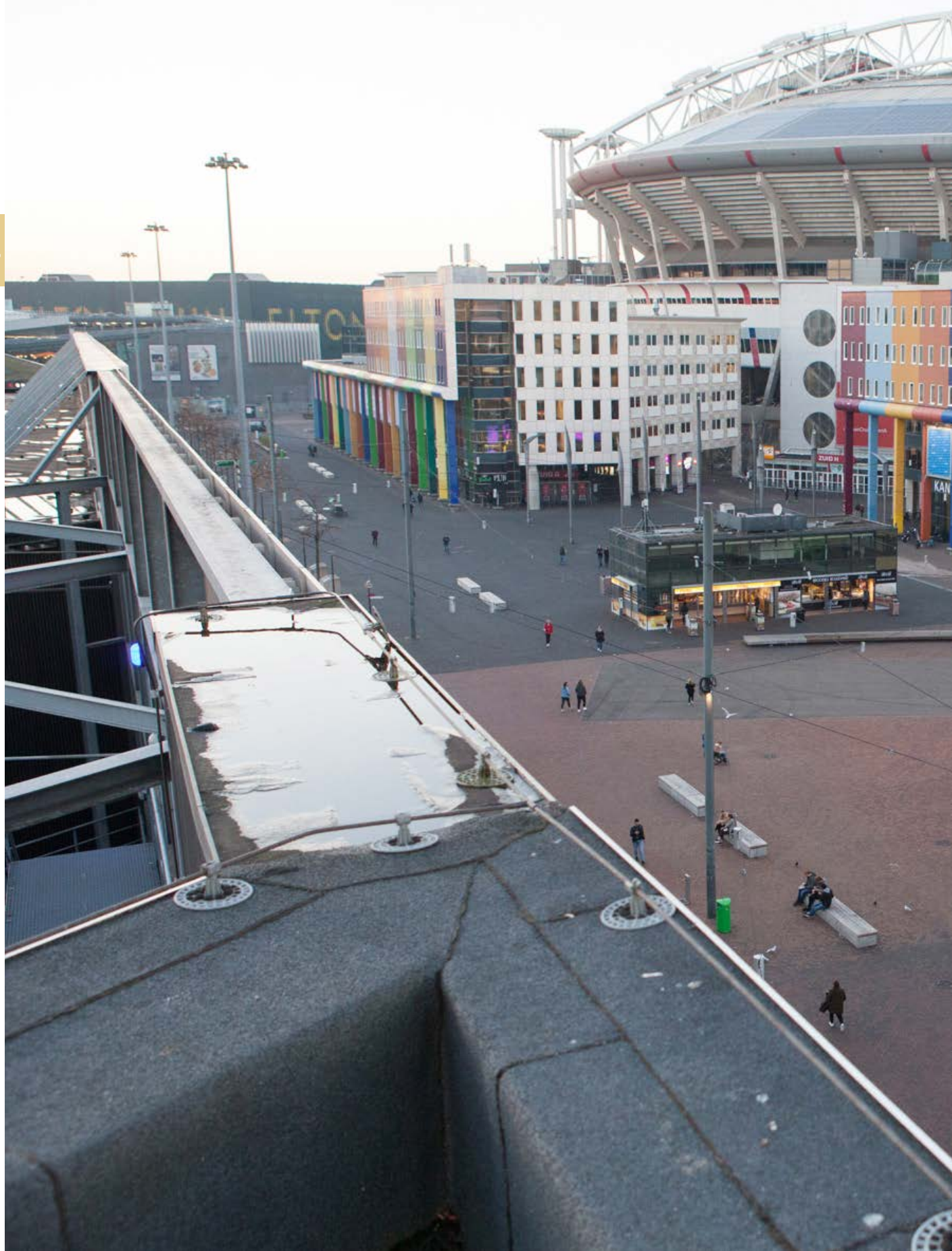
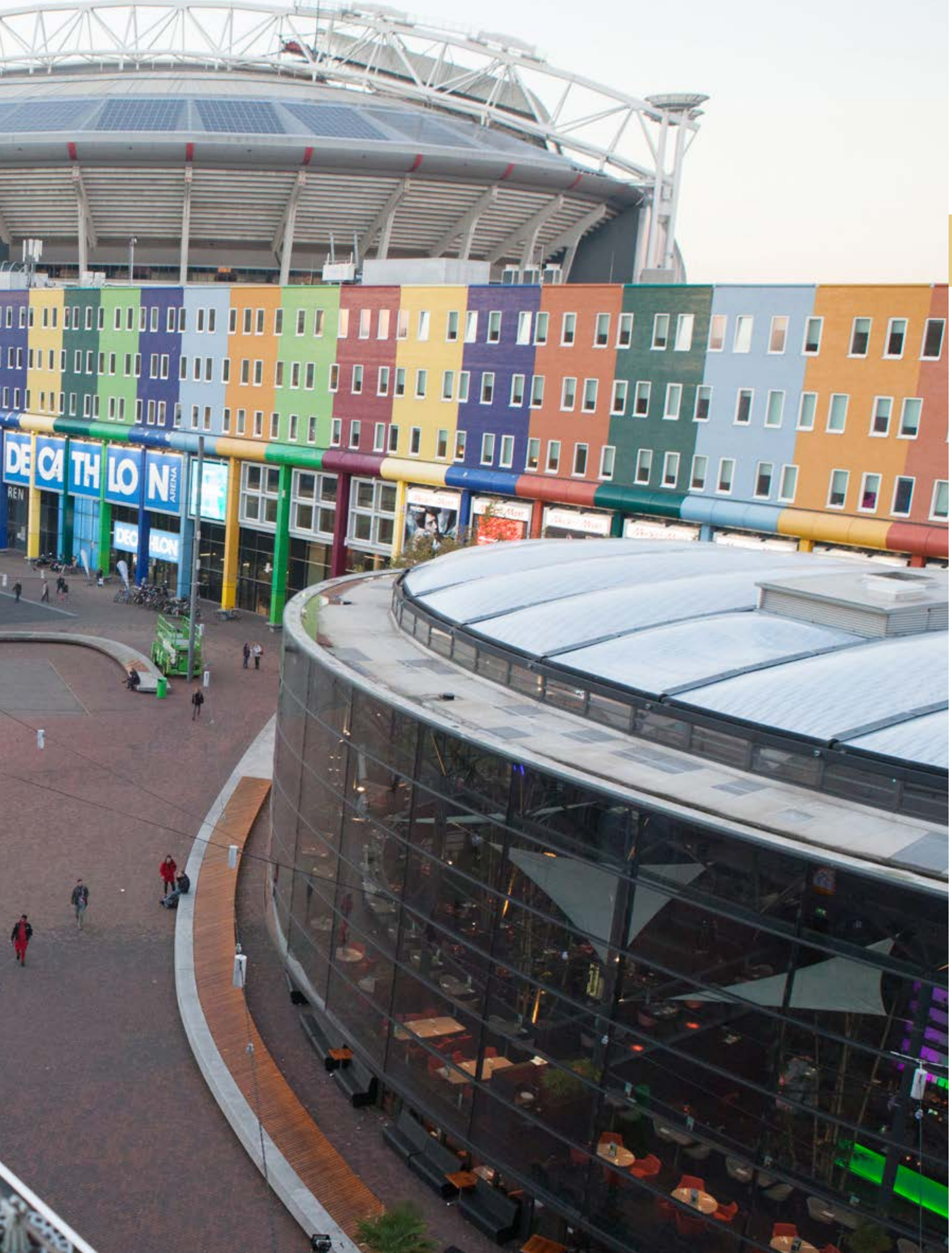


Figure 3.2: Comparing the scale of Arena Boulevard

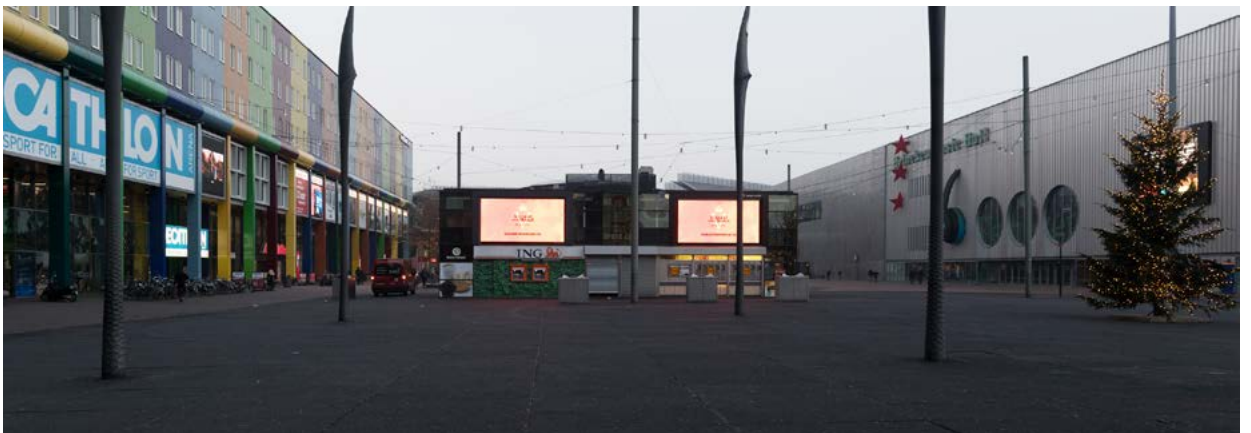
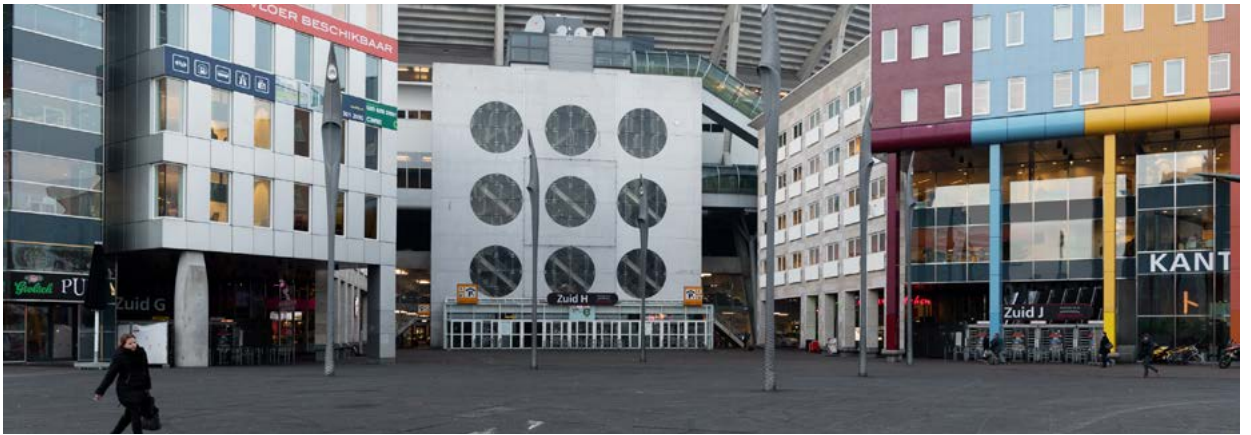




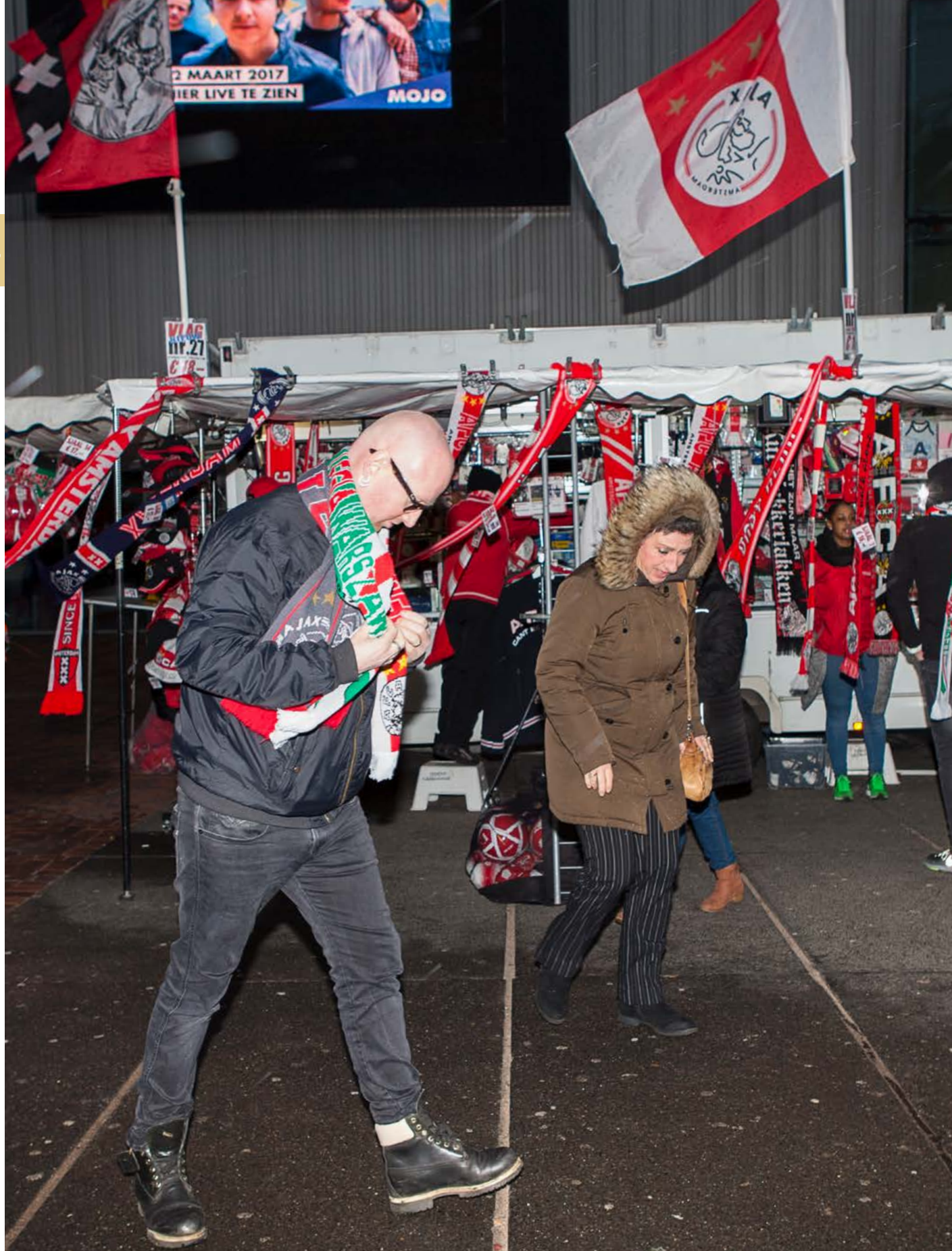














PART II/V

The Co-Creation Assignment

Responsive Public Space

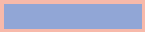


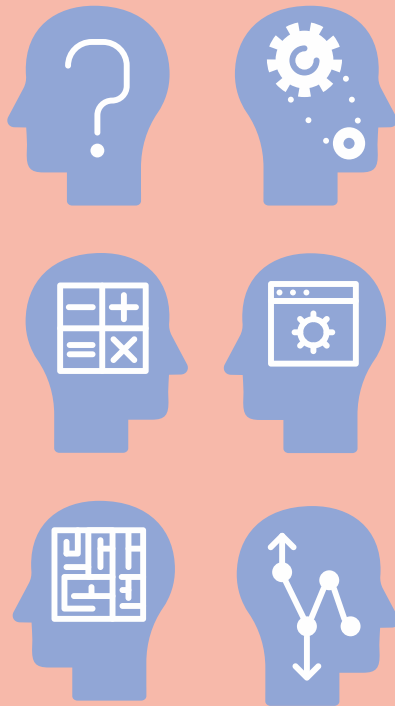


Part II: The Co-creation Assignment

4.

The design process & co-creation.





The design process & co-creation.

A crucial challenge in the design process for responsive spaces is the necessary collaboration and co-creation. Several different parties need to be involved in designing responsive public spaces: spatial designers, interaction designers, local stakeholders and the municipality. In the course of our two-year action research, these parties worked together in the co-creation sessions organised for this purpose. The analysis of how that process went and the discussions that took place offer insight into aspects and topics that are, or could be, relevant to the interdisciplinary design process. This chapter orders and presents these discussions and translates them into guidelines for co-creation in the design process.

4.1 The parties involved and the new assignment.

Co-creation involving different disciplines has become increasingly popular in the past decade. Collaboration between different specialised companies has become a necessity when developing innovative products. This

trend was driven by the specialisation of the larger (traditional) technology companies in the 1990s and the rapid development of digital technology since the start of the twenty-first century. Co-creation can take many different forms with a range of objectives and arrangements (for an overview, see Ramaswamy & Ozcan 2018).

The design of responsive spaces requires co-creation between the spatial designer and the interaction designer, and collaboration with local stakeholders and the municipality. A self-evident culture of collaboration has yet to emerge. To develop this, knowledge is needed of one another's approaches, working methods and products: what does each discipline do and what is required for the responsive design assignment? In this section, we compare and contrast the design assignment for responsive spaces with the conventional design products in the two disciplines¹. We also discuss the role of the stakeholders and the municipality, which are also part of this co-creation.

¹ Obviously, this discussion is primarily for illustrative purposes and the situation can differ for each assignment.

	TRADITIONAL SPATIAL DESIGN	RESPONSIVE SPATIAL DESIGN (OF FACETS)
FINAL PRODUCT	Final design for the entire space	Final design for a subarea
EFFECT	<i>Generic</i> , so that it can accommodate all (unforeseen) situations	<i>Specific</i> , so that it can respond to specific circumstances and modify the space
TARGET GROUPS	All target groups in principle	Possibly for more specific target groups
PERIOD	All conditions	Specific conditions and times
PARTICIPATION	To ensure support	To be able to target the design solutions in a highly precise manner
COLLABORATION	Can be done by one larger firm	Need to involve interaction designer

Table 4.1: Assignment for traditional spatial design compared with responsive spatial design

The design of responsive spaces requires co-creation between the spatial designer and the interaction designer, and collaboration with local stakeholders and the municipality.

	STANDARD INTERACTIVE INSTALLATION	RESPONSIVE SPATIAL INTERACTIVE INSTALLATION
FINAL PRODUCT	The object is the starting point, the space is the setting	The space is the starting point and the object is also a spatial solution
EFFECT	<i>Environment with few stimuli</i> ; the immediate surroundings can be modified to create the optimum conditions (as in museums)	<i>Environment with lots of stimuli</i> ; the object is part of surroundings that are rapidly changing and not entirely controllable
TARGET GROUPS	They know what they are coming for	May not know they will be encountering this
FUNCTIONALITY	Stand-alone/self-contained	Targeted/adaptive
TACTILE QUALITIES	Can be subtle because of the safe environment	Must be robust because of its position in the public space
COLLABORATION	Can in principle be created independently	Need to involve spatial designer

Table 4.2: Assignment for standard interactive installations compared with responsive spatial interactive installations

The spatial designer needs to look beyond the implementation phase and understand how elements in the space can be adjusted to deal with specific situations.

Spatial designer

The standard design product for public spaces is a design that is able to accommodate different target groups in an adaptive manner in any (unforeseen) situation. The design for a public space often appears 'straightforward' but that is precisely what makes it adaptive and legible for all users. The design for a responsive public space on the other hand requires a more specific interpretation. The spatial designer needs to look beyond the implementation phase and understand how elements in the space can be adjusted to deal with specific situations, times, atmospheres and target groups. This constitutes a further elaboration for a subarea.

The spatial design practice is highly differentiated with architects, urban designers and landscape designers. A typical feature of spatial designs, and urban designs in particular, is the need to work and think on different scales. The solution for a problem might not necessarily be found in the plan area itself. Thinking on different scales can be particularly useful if that helps reveal and flesh out the impact of the plan area and opportunities offered by the area in a way that benefits the responsive design task.

Interaction designer

The installation in a responsive public space has to function outdoors under a wide range of conditions. That imposes specific requirements on the interaction designer's design. The installation must be able to take a few knocks and the material must be vandal-proof. The installation will also be part of the outdoor space and a used object. What does that imply, for example for the recognisability and effectiveness of the shape, the operation and the image? Finally, the installation is also a spatial solution. How does the installation function and act spatially? This requires a number of steps, working from the inside outwards and from the concept towards applicability.

Like the term 'spatial designer', the term 'interaction designer' is a generic term for a variety of creative professions. Broadly speaking, several specialist fields can be distinguished. Some designers take a more artistically inclined and autonomous approach to the design assignment whereas others are more commercially minded and consider the installation's shape, impact and image with a view to creating an installation that is easy to use and easily recognisable. Furthermore, some design firms are specialised in *digital* solutions whereas others focus on creating *physical* objects. Regardless of the technique, the installation has to function as a spatial element — and help turn the public space into a public domain.

Local stakeholders

Local stakeholders are another important party in the design process in addition to the design agencies. The redevelopment or redesign of a public space will affect a location that has been functioning for a while and has developed a history. Stakeholders may include local residents, corporations, businesses and shops. The stakeholders located on ArenA Boulevard are mainly larger organisations and companies with a regional and national scope such as hotels, offices, the Ajax soccer stadium, a cinema, a home furnishing mall and large retail stores. There is no residential accommodation. Although these organisations' primary process takes place on their own property, behind the entrance, they share the outdoor space that serves as the route to the entrance for their customers and forms a communal area. An activated and properly functioning 'lobby area' enhances their shared image and the experience of individual visitors and users. Knowledge of local conditions and the users is therefore crucial to the design process.

Municipal authorities

In the Netherlands, the mandate for developing, redeveloping, managing and maintaining public spaces still lies almost entirely with the public authorities. That means that the design of responsive public spaces usually falls within the policy remit of the municipality. Aspects such as the management of the space, permits, policy and the public authorities' ambitions are of crucial importance. The design may be commissioned by the municipality or by a combination of clients, for example when a housing corporation, developer, property owner, investor or social organisation pays part of the costs of the intended improvement to the public space.

New playing field

The design of a responsive public space is a relatively new type of assignment in which both the 'product' and the co-creation process still need to crystallise. Spatial designers, interaction designers, local stakeholders and the municipality each contribute their share of the necessary expertise. They all need one another. But if they are to recognise and acknowledge the contributions made by others, they also need an awareness of their own specific added value. The design assignment therefore demands a new setting, or playing field. Based on our research, we sketch this domain by identifying the key contribution made by each discipline.

The design assignment demands a new Playing field, in which parties recognize and acknowledge the contributions made by their discipline and the others.

The diagram is constructed from two sections. On the left are three parties, each with their distinctive approach and focus. Each circle represents their individual traditional approach, focus and field of operation. There is only a small overlap between their fields of operation when designing a responsive space. The right-hand part of the diagram zooms in on that overlap, i.e. playing field. The priority here is to introduce complementarity in the collaboration. Local stakeholders know most

about the location, spatial designers can help read, analyse and (re)design the space, and interaction designers can propose installation mechanisms and examples and help people to imagine them. The municipality is not included in this diagram. The municipal authority can adopt various roles and have multiple responsibilities, but regardless of its role it is responsible for the public space and for managing and maintaining that space.

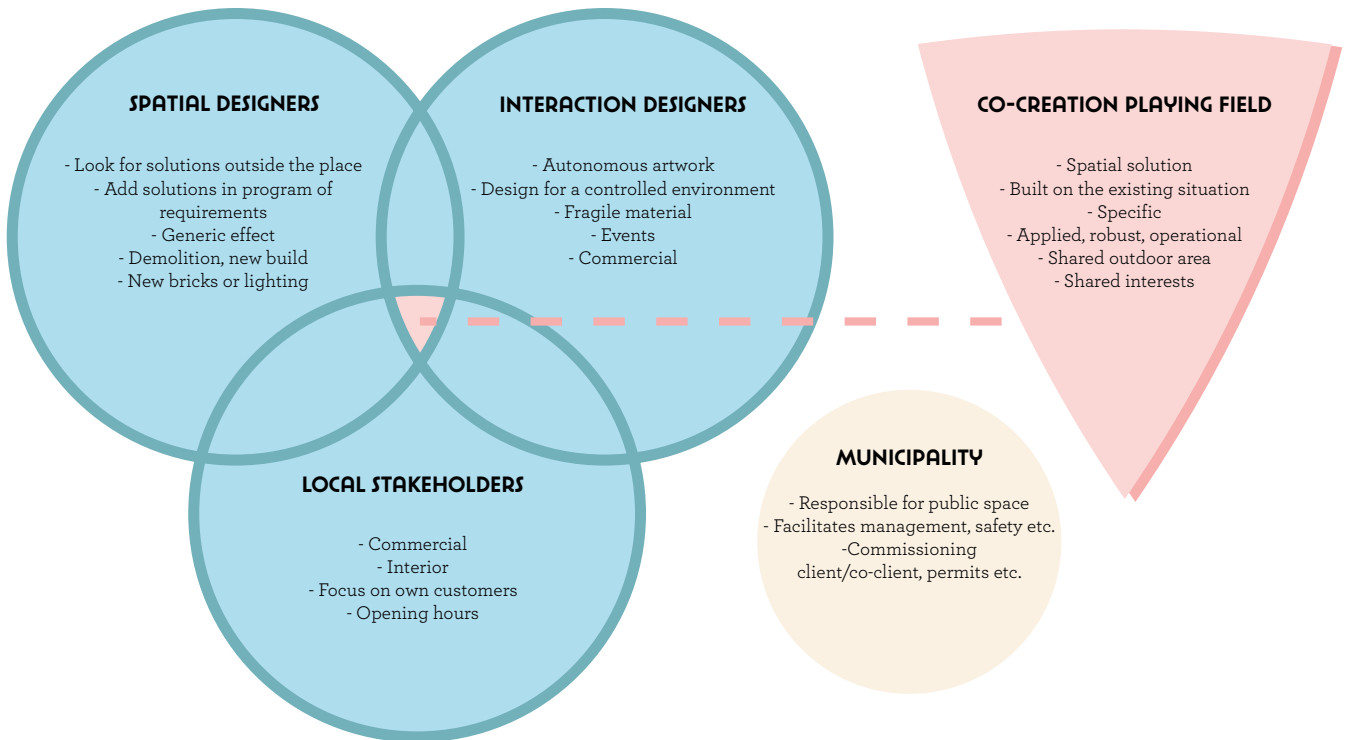


Figure 4.1: New playing field for the co-creation of a responsive public space

4.2 ArenA

Boulevard case: collaborative process.

Spatial design agencies, interaction design agencies and the larger businesses on ArenA Boulevard worked together in the research project. Other parties involved in the action research are the municipality of Amsterdam, Amsterdam Smart City, the Association of Dutch Urban Designers and Planners (BNSP), the Levende Stad (living city) foundation and three experts from the University of Amsterdam and Delft University of Technology (see www.responsiveurbanspaces.amsterdam/en/).

In the research process, the co-creation sessions formed the heart of the collaboration. The research team prepared the sessions, sometimes on their own and sometimes with one or two of the partners. The sessions were held at Amsterdam University of Applied Sciences or at one of the involved organisations. The process involved three steps in which participants worked from diagnosis to the design of prototypes. Each co-creation session had two goals: to promote substantive debate and to build a culture of collaboration. The organisations presented brief pitches about their work and the participants worked in mixed teams. 'Making' something together was a recurrent element that let participants become familiar with one another's expertise from the start and with the iteration between assignment and solution.

The phases and the interim and final results in our process are summarised in a diagram.

In the research project, too, spatial design firms, interaction design firms, local stakeholders and the municipality worked together. The co-creation sessions formed the heart of the collaboration.

Activities per phase of the project.

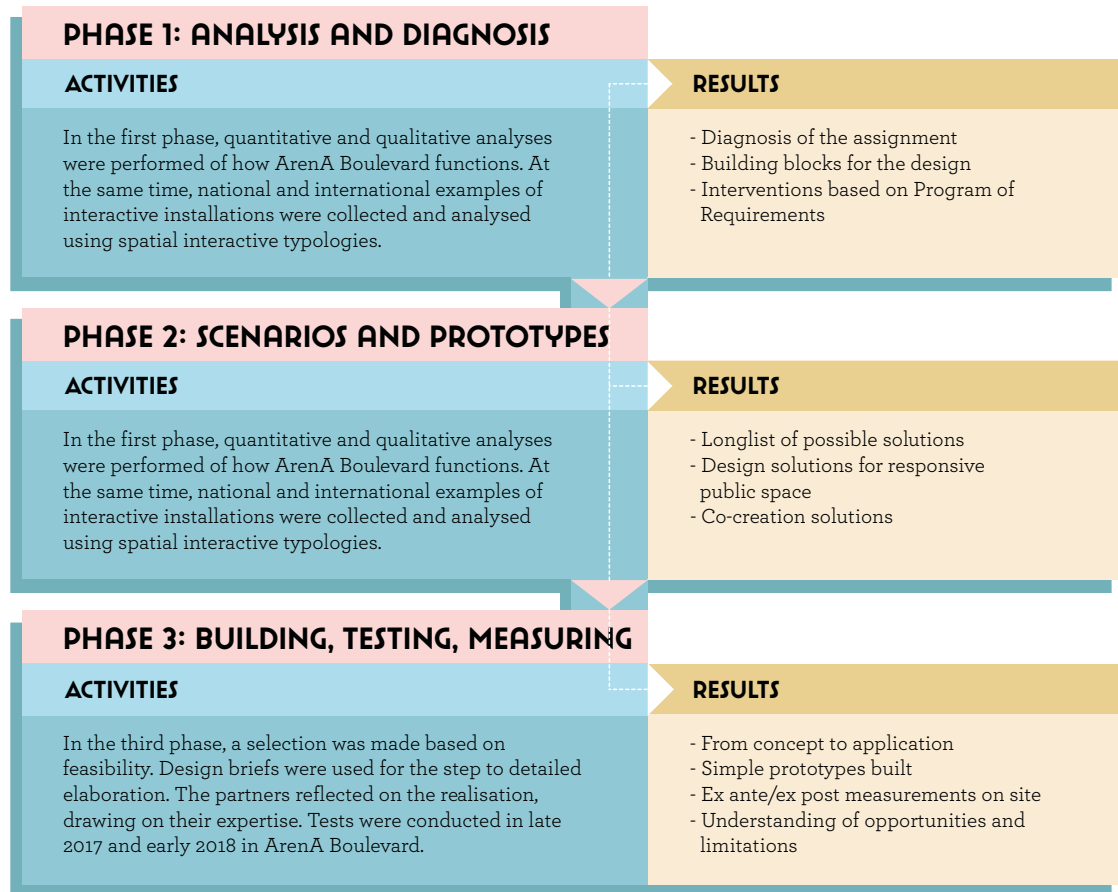
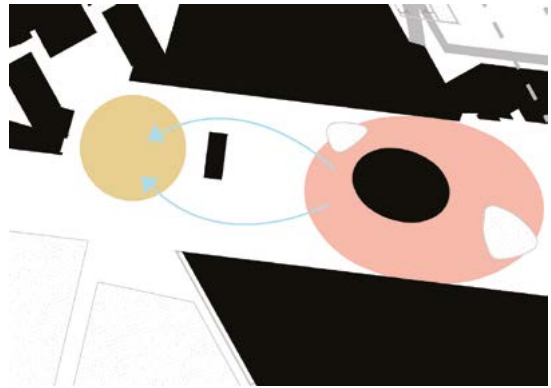


Figure 4.2: Summary of co-creation activities and results in the three phases of the project



a



b



c



d

Figure 4.3: Geographical perspective (a) and solutions from a broader spatial perspective (b, c, d)

The process was logged in reports, notes, interim products, maps, prototypes and other material generated during the sessions or in discussions in between sessions. The experiences with drawing up the design briefs and the prototypes were also used in these analyses. The material was coded and the reflections and lessons learned were ordered, which produced the following three lessons and points for attention. Based on this, guidelines are drawn up for the process, approach and collaboration.

4.3 Lessons learned and points for attention.

The co-creation session and the construction of the prototypes for testing were part of the research project. They offer insight into the kinds of discussions and choices that can arise and need to be dealt with during a design process. The insights are organised around three recurrent topics of debate about the space, the installation and the technology. In Section 4.4, we turn these lessons into a process design.

Space and responsiveness

The spatial design is an integral and consequently complex field of study in interdisciplinary collaboration. For example, what is the spatial shape for a responsive public space? The discussion about space soon took on a strategic dimension. Where should you do something and for what reasons? Where should you do nothing? Specifically, the key question concerned the

selection criteria for determining the precise location on the boulevard. Do you want to use the responsive setup to focus on a spot that already works well and could perhaps work even better, or do you want the design to focus on a part of the boulevard that does not yet work well at all and could as a result become slightly better?

In such discussions, there is a danger of the spatial perspective becoming confused with a geographical perspective. In contrast to the geographical perspective, the spatial perspective opens up solutions at multiple scales. This became clear in the sessions about the transitional area of the boulevard.

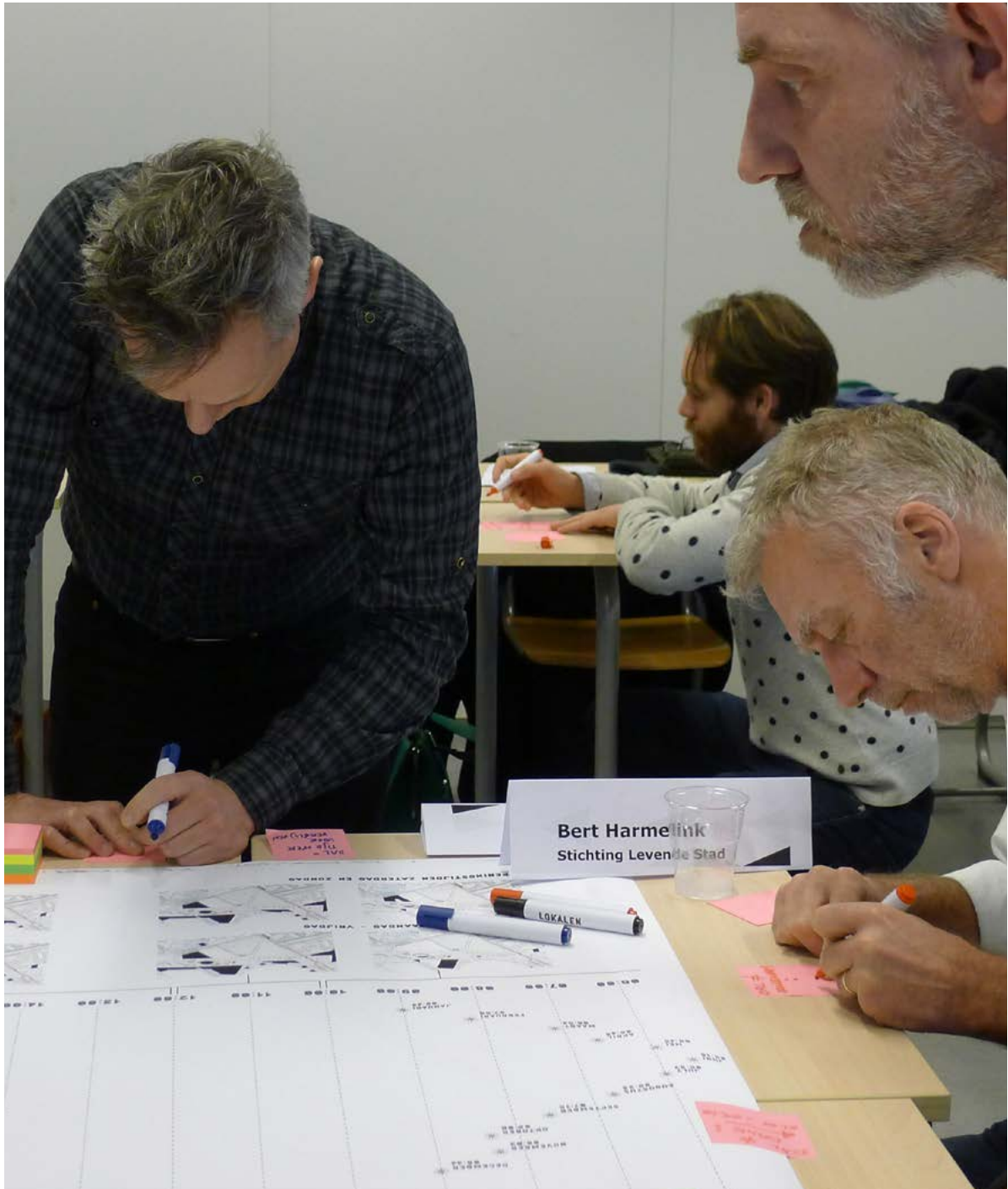
The geographical perspective involves looking for solutions starting from and in the spot itself (a). However, from the spatial perspective activation can also be achieved by reinforcing other spots. The figure shows three lines of thought. The central area could be expanded or the transitional area could at least attempt to exploit the crowds in the centre (b). The landing zone in the west could be reinforced, which would cause the position of the transitional area to pivot (c). The boulevard as a whole can be developed and programmed to form a network, creating clear-cut entrances and a series of cohesive subareas (d).

What kind of spatial element is the interactive installation? This question was asked on a number of occasions during the co-creation sessions. What does the installation refer to? Is it simply a different form and material manifestation of utilitarian street furniture such as tiles, street lamps, roads and traffic lights? Or is it more akin in its function to fountains and statues, which are not so much utilitarian as intended to make the space distinctive and consequently give a place cohesiveness and an identity? In other words, is the interactive installation a new manifestation within an existing repertoire or is it an entirely new phenomenon that still needs to be determined and described in detail? In our sessions, almost all of the installations seemed to refer to traditional physical phenomena such as roofs, pergolas, active plinths, fountains, city gates and street furniture. The new aspects were the scale, the material, form and of course the functionality.

In addition to the form that the installation takes, the perspective of the pedestrian ('locomotive') plays an important role in the design assignment. Traditionally, the spatial design prioritises a clear rhythm with an easily legible street profile in which the street furniture, trees and other objects are positioned in the space according to fixed lines and patterns. A clear-cut, consistent basic structure gives people an overview and a sense of direction (Bosch & Veenenbos 2011). As regards the facades, current design practice is to focus on active plinths and 'guiding' pedestrians with vertical rhythms and streets that have distinctive elements and/or landmarks at strategic locations (Gehl 2011; Kostof 1992). This means the responsive installation has to strike a subtle balance between simplicity and singularity. We can

learn here from the 1990s, when experiments took place with what in retrospect were 'over-designed' squares and streets. This led to an excess of stimuli for the user. The space became illegible. Users want to be 'invited' by the space, not forced by it (Lang & Marshall 2017).

The use of an interactive installation in the space also demands coordination with the rest of the space — and interaction with the user. How big is the object in relation to the scale of the space and the dimensions of the street furniture? Where is it visible from — and how does it 'communicate' with the other objects that it is related to, including in terms of its materials and colour, etcetera? What happens when someone walks past it, and from where? This also requires a jump in scale for the interaction designer. At the same time, there is the question of how the installation and its appeal relate to the many other competing stimuli. The outdoor space is not a controlled environment and users are not necessarily receptive to stimuli.





‘Get it out of your head, into the real world.’ -d.school-

Interaction installations and the space

The focus from the start was on thinking in terms of solutions and ‘making’ things, together. Various workshop instruments were prepared and used for this in the sessions. The program of requirements set the parameters but no further restrictions were placed on the form and detailed implementation. The participants could draw or fold shapes, use adhesives, paper or cardboard, wood or any other material as long as the ideas were tangible and conceivable. The three different parties and the municipality always worked in mixed teams. A total of 130 possible solutions were developed for the boulevard in the course of the project.

The concepts were diverse, ranging from analogue to digital solutions and all possible variations along that spectrum. The most fundamental variation was in the choice for a purely physical form, a purely digital form and a hybrid form. One third of the solutions were purely physical, the overwhelming majority were a hybrid form and one fifth were purely digital. When considering the materialisation, there was the question of how to make sure the installation remained robust outdoors and how to make it stand out among the many stimuli and given the huge scale of ArenA Boulevard. What aesthetic choice catches

people’s attention when outdoors? And if the installation is geared more to routing, how can it communicate in a way that is functional and clear?

The financial viability also played a role in the discussions. The local stakeholders in particular started asking about the feasibility and the costs from an early stage in the process. The interaction designers wanted to develop concepts first and only then examine the financial feasibility — ‘because if an amazing idea were to emerge, then it might be possible to find the budget for it’. Associated with that aspect, the opportunities for flexibility were also discussed: ‘A digital display seems an interesting option to me because you can keep adjusting it’.

A very different issue that was regularly discussed was the factor time. For how long and under what conditions should the responsive solution work? This concerns decisions regarding adaptation to:

- the weather and wind conditions, noise, crowdedness and seasons;
- the users and the atmosphere;
- artificial light and the colour of that light, the position of the sun, dusk and the evening.

Ultimately, the design will have to offer a solution for all these issues. The design will also have to be able to ‘survive’ other periods and times. It must not get in the way and it also has an aesthetic task: what impression does it give in terms of its materials, shape, etcetera? Dealing with all these questions involved combining the knowledge and experience of the local parties plus the expertise of the interaction designers plus the expertise of the spatial designers.

An important lesson from the project is that a series of unforeseen developments can change the space even in the course of the design process. In that sense, the outdoor space is the complete opposite of a museum interior. The following (partly unexpected) objects 'appeared' in ArenA Boulevard during the research project: Christmas trees, Christmas lights, telecommunications pavilions, advertising stands, fences, tents, a metres-long hammer and a series of concrete benches as protection against terrorism. Designing an interactive installation for an outdoor space essentially means designing a 'living organism'. This 'evolutionary' issue is in addition to the need to design for interaction. How should you deal with that?

The development of the installation also requires choices to be made in the degree of responsiveness. These choices are affected by the complexity of the installation. During the process, both simple analogue installations and more complex, playful forms were explored. The simplest form is the analogue solution, comparable to the blue circles in the district of Poblenou (Barcelona) whereby the pedestrian-space colonises the roadway. Another relatively simple form is a strip of light that reacts to users via a sensor and then changes the direction instructions in the pedestrian area accordingly. More complex forms require more of a response from users, or interaction or coordination between users. However, it became clear in the discussions that the use of an installation in the public space entails limits to the degree of responsiveness you can ask of users in a particular situation. If the boulevard is half empty and cold, you cannot expect people to start playing a game.

Technology and the gap between what is possible and what works

Finally, the technology presents a challenge in the design process that should not be underestimated. It became clear during the process that there are many uncertainties about the technical functionality and this requires extensive testing. There are various reasons for this uncertainty.

The outdoor space makes demands on the robustness of the technology, both because of the weather and because of the threat of vandalism. What is more, the technology may not work so well when applied outdoors. The light affects the visibility, colour and recognisability; this applies to artificial light (and the colour of that light) as well as to sunlight and other light sources (buildings). Sound can be affected by the wind, varying dispersed noise from the surroundings (for example from traffic and construction work) and the activities on the boulevard or in the vicinity of the spot. Of course the operation of the installation is also influenced by heavy rain, hail, snow, frost, thaw, etcetera.

Communication technology and the power supply also demand attention and testing as part of the underlying and supporting technical infrastructure. Communication technologies such as Zigbee and Arduino may not function so well if disrupted by other devices. The plug & play modules are often not nearly as robust as they seem. Wires are easily pulled loose — by someone walking into them, the wind or a dog knocking something. Sensors in particular are an issue in their own right. The signal strength and reach may simply be less than claimed by the manufacturer. They may also measure far

more than they need to measure. For example, pressure sensors measure heat as well as pressure.

In the discussions, the interaction designer was the indubitable expert on these topics but the other parties were able to ask the right questions about the technology because of their knowledge of the context, users and the spatial role. Building, testing, trial runs, rebuilding and testing again is a cycle that has to be repeated several times, initially in a workshop setting and ultimately at the public space itself.

4.4 A new approach.

The design of a responsive space requires a specific working method, both because of the substantive aspects and because of the need for collaboration. The analysis phase plays an important role in this working method. The diagram on page 82 was already introduced in Chapter 1.

In the analysis phase, the schedule of requirements is drawn up, refined and finalised. The analyses also provide the first set of substantive building blocks for the design phase. The process of 'tackling the analysis' also helps the different parties to properly get to know one another and each other's skills, as does the process of making things. This means the analysis phase is also an important element in building a culture of trust and cooperation.

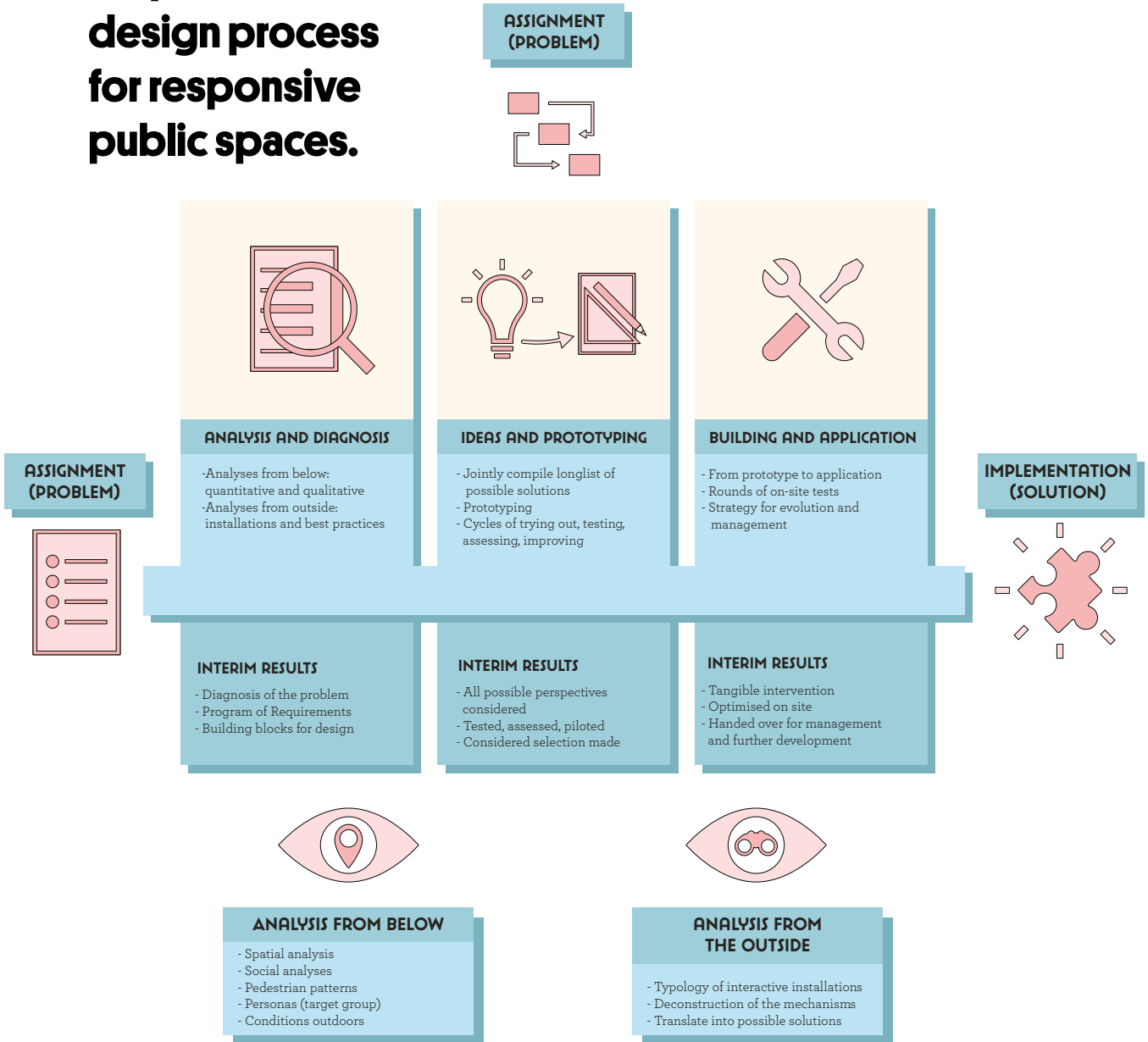
That collaboration enters a new stage in the design phase. The spatial designer and







Steps in the design process for responsive public spaces.



the interaction designer have to arrive at a symbiotic solution between technology and space and in the process learn to understand one another better (what does someone mean by an 'active plinth', or what does Kinect actually do, for instance). The intended end users, the people for whom the responsive setup is meant, serve as a unifying perspective. It is precisely here where the knowledge and experience of the local stakeholders play an important role once again.

The design phase is, however, also an 'uncertain phase' in which the possible outcomes and the link between the space, interaction and the users are still somewhat abstract and multi-faceted. 'Making' things from the start helps generate mutual understanding and insight. This is emphatically not an aesthetic exercise; it is about the low-tech expression of an idea or concept (d.school 2018). Furthermore, making and building objects from an early stage in the process ensures that multiple options remain available for longer in the process before the final decision is made to use a particular design (comparable to *redundancy* in the field of urban planning).

Co-creation is a crucial aspect of the design of a responsive public space. It brings together the know-how and expertise of the spatial designer, the interaction designer, the local stakeholders and the municipality. Each of these parties has one part of the 'puzzle' that is needed to arrive at well-thought-out, feasible solutions that can enhance the public space's function as a public domain.

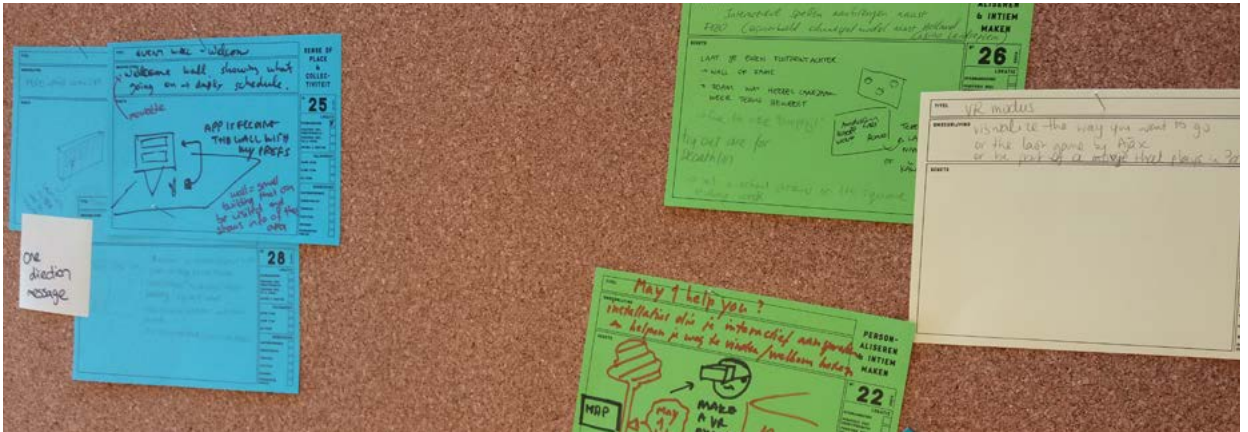
Our co-creation process has taught us a number of lessons for the design process:

- **Approach the design assignment as a new playing field in which each party contributes a specific part of its own expertise and practice.**
- **Start 'making' things immediately so that the participants become familiar with one another's added value, professional jargon and intentions.**
- **Consider how the installation will function in the conditions outdoors, because of the weather, the requirement of robustness, the periods when it does not work and the manner in which the installation functions with respect to the other 'stimuli' in the area.**
- **Keep multiple options open for as long as possible (redundancy) and test them as soon as possible.**
- **Use the analysis phase as well for nurturing a culture of cooperation.**

The substantive benefits and the steps are shown and explained in detail in the following chapters using the ArenA Boulevard case.









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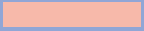
Research for Design:
'Building Blocks from the Bottom Up'

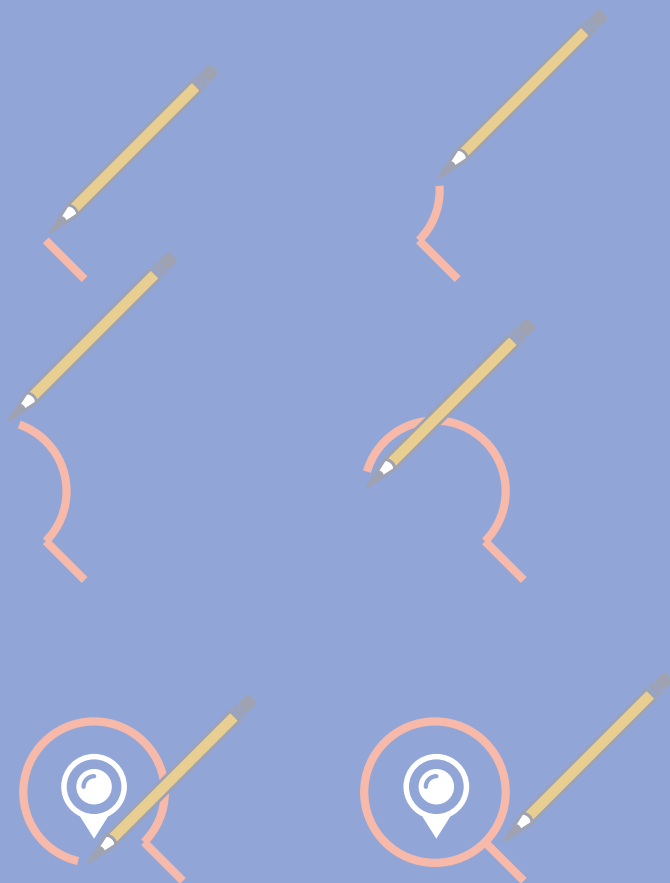
Responsive Public Space



Part III: Research for Design: 'Building Blocks from the Bottom Up'

Introduction.





Introduction.

In this project, the design of a responsive public space involved the redesign of an existing public space. This is a complex design assignment. Public spaces need to be attractive and usable for a wide range of user groups. What is more, the public space must be properly integrated in the existing urban fabric and at the same time have its own clearly recognisable identity. The implementation also has to take account of use in a variety of different conditions, including changing weather conditions from day to day and from one season to the next. The redesign of existing public spaces is even more complicated as there are already buildings in place and the space has been assigned and laid out. These locations have a history, various owners and disparate users that must be taken into account in the process. Furthermore, the designer largely has to work within the context of the existing urban fabric.

Redesign and transformation are situational design assignments. The existing situation has to be properly understood as it forms the basis for the design. This is not just about the physical environment and layout but also

about the functions, patterns of use, users and the location's identity. This knowledge should not be a list of facts or mapping but rather a cohesive interpretation of that information. What kind of space do the building facades create? How do the buildings relate to one another? What programmes are involved and who uses them as a destination? What happens on the ground floor and what form does the transition from indoors to outside take? How does the space function as a place, what visitors come there, how do they behave and what meanings do they assign to the space? Such issues are investigated in the analysis phase of the design process. Various methods are used in this phase to provide an understanding of various 'building blocks from the bottom up'. Which elements offer pointers for the redesign and which elements are more likely to give problems?

Such analyses are not aimed at producing generic academic knowledge and theories about how public spaces in general function; they are intended to reveal the story about the physical and social context of a specific location. Qualitative and quantitative methods

can in combination help refine the diagnosis of the assignment. This more precise diagnosis can then serve as the starting point for the design of a spatial responsive strategy. The individual building blocks – including knowledge of the spatial structure – can be useful again when filling in the details, for example on how the installation can help enhance and shape the space. The pedestrian flows can be important if a choice has to be made of the best location for an interactive installation.

The analyses 'from the bottom up' offer a basis and building blocks for the design.

More specifically, we distinguish the following four research aspects as the basis for the design of a responsive public space:

- **The physical space:** what kind of space is it and what conditions are created by the public space and the buildings with their entrances, facades and programmes?
- **User patterns:** how is the space mainly used, where and at what times, and where not? Where are the access points and where do pedestrian flows converge or diverge?
- **The users:** how do the users behave, how do they use and experience the space 'at eye level'? How do people view the space and how does what they see change under different conditions?
- **The target groups:** what target groups can be distinguished and how do they currently use the location? Who is the responsive design aimed at?

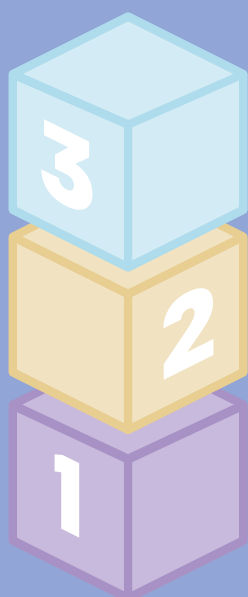
The above four aspects are analysed in the four chapters of the present part. The conclusion to this part brings the analyses together in the diagnosis of the place, the formulation of the design assignment and the set of potential building blocks for the design.

Part III: Research for Design: 'Building Blocks from the Bottom Up'

5.

The built environment: physical shapes and conditions.





The built environment: physical shapes and conditions.

Cities are made in their public spaces. This is where people encounter one another and briefly make contact, and where identity and engagement are formed. Everyone knows of spaces where people like to spend time and linger, as well as places that feel uncomfortable and tend to make you want to leave as soon as possible. The design and layout of the public space along with the adjacent buildings play a crucial role in both situations, but it is not always easy to pinpoint what that role of the built environment is. Classic studies have identified various aspects (Alexander et al. 1976; Cullen 1961; Gehl & Svarre 2014; Jacobs 1961; Jacobs 2008; Lang & Marshall 2017; Meyer et al. 2006; Whyte 1988), but each space has its own situational characteristics.

We need to deconstruct these features and characteristics of the built environment in order to discover what kind of a space it is, how it is constructed and where opportunities lie for enhancing its enabling role for the social city. These analyses form the basis for the design process in which funded choices are made regarding the location, shape, elements, materials and spatial effects. Furthermore, knowledge of the built environment shows up

any spatial characteristics that might currently be lacking and could potentially be resolved with a responsive design. The analysis shows ArenA Boulevard to be a space that is very different to a traditional urban spatial environment.

5.1 Approach.

The design for a responsive public space mainly has to work within the confines of the existing built environment. For our urban design research, we made use of comparative design research, profile analyses and an analysis of the transition from the inner world of the buildings and the public space. We present a brief introduction to these methods before applying them to ArenA Boulevard.

Comparative design research

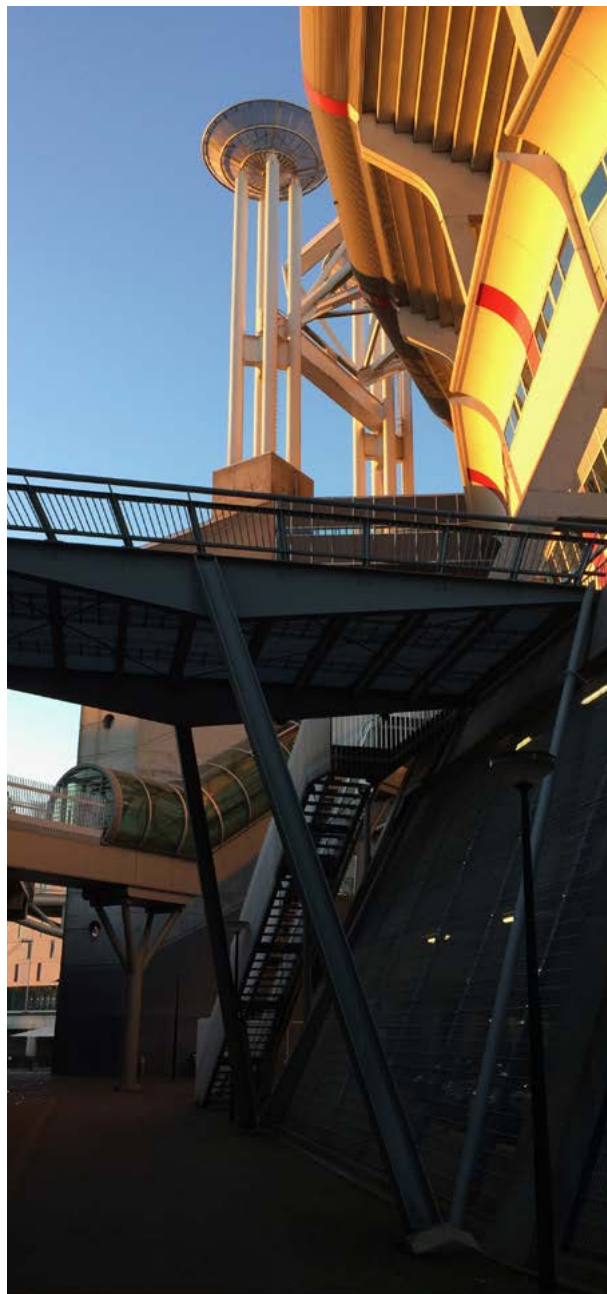
Every spatial design has an underlying, unifying core idea, which is termed the *parti*. This central idea helps in reading the (intended) cohesion between the different components, and their roles. The *parti* for ArenA Boulevard is formed by the modern-day

interpretation of the boulevard. Comparative design research of the archetypal boulevard enables the dimensions, scale, manifestation, rhythm and identity of the place to be specified and a typology of subareas to be distinguished.

Transition, 'locomotive' and connection: profiles and Nolli map

The street space is a configuration of the buildings, their volumes, tactile qualities, facades and functions and the layout, rhythm and visual manifestation of the public space. This requires an integrated analysis. To do this, urban design research uses drawings of cross-sections and profiles. Multiple profiles of different sections of the space show the continuities and differences between the subareas. They also reveal the rhythm seen from the perspective of the pedestrian ('locomotive'). What is known as a 'Nolli map' is then used to analyse the transition between the indoor world and the outdoor world. This map is a classic instrument named after the eighteenth-century architect and land surveyor Giambattista Nolli, who was the first person to map the public space in Rome in this way in 1748. The map shows that the border between the private and the public is fluid and runs along different lines to the hard border between the building facades and the street.

Together, the analyses provide an answer to the question of what kind of spatial configuration the ArenA Boulevard is and what conditions it creates.



5.2 The ArenA Boulevard case: the built environment.

ArenA Boulevard is part of a network of squares and spaces that connect both sides of the railway and metro track to create one large pedestrian area. To the east of the railway track is the residential and shopping centre of Amsterdamse Poort, which forms the heart of the Bijlmermeer district. To the west, the pedestrian area stretches to the north side of the Johan Cruijff ArenA stadium. The boulevard clusters entertainment, the stadium, nightlife, large stores and offices.

The boulevard is a huge spatial entity, with large, autonomous, building volumes.

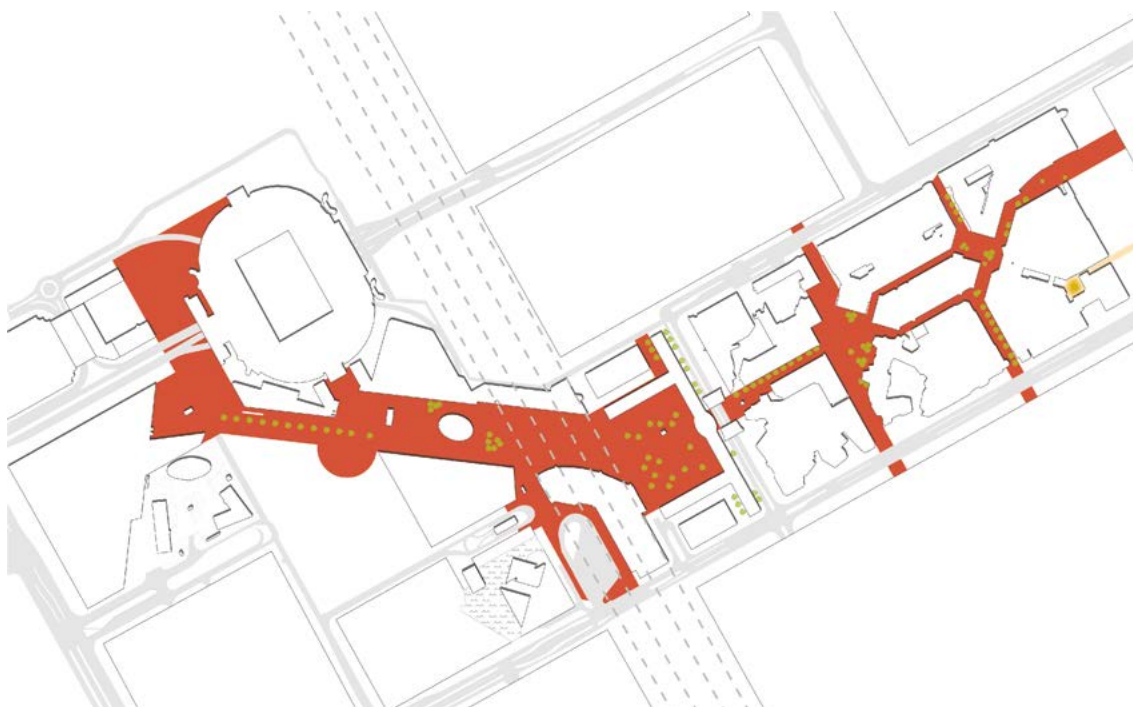


Figure 5.1: ArenA Boulevard and Amsterdamse Poort connected by a series of squares and spaces to create a single pedestrian area

A morphological map clearly shows the extent of the buildings and the large-scale open urban structure. In contrast to the squares in the historic city centre (see too Chapter 3), the area consists of a huge scale, with large, autonomous, building volumes that are oriented inwards and jointly enclose a space that can be rather amorphous. The distances are large, both between the different buildings and from the buildings to the main access points.



Figure 5.2: Morphological map of ArenA Boulevard

The spatial rhythm of ArenA Boulevard

The spatial concept of the boulevard was taken as the starting point in the original design for the ArenA surroundings. Specific reference was made to the Avenue des Champs-Élysées in Paris. However, the two boulevards differ significantly, not the least in scale and granularity (see Figure 5.3).

The Champs-Élysées consists of blocks that are made up of fine-grained groups of buildings, townhouses and shops. The dimensions of the buildings and the urban structure of the boulevard in Amsterdam

a much larger scale. The blocks on ArenA Boulevard consist of a single building or complex. The arcades containing the shops can also be seen as whole volumes. The building blocks are positioned on the boulevard as relatively autonomous islands. In a certain sense, the buildings are there 'despite' the boulevard. This difference in scale and address affects the rhythm of the space. In the Champs-Élysées, side streets between the blocks provide regular breaks in the linear structure of the boulevard. The individual premises within the blocks reinforce this rhythm.

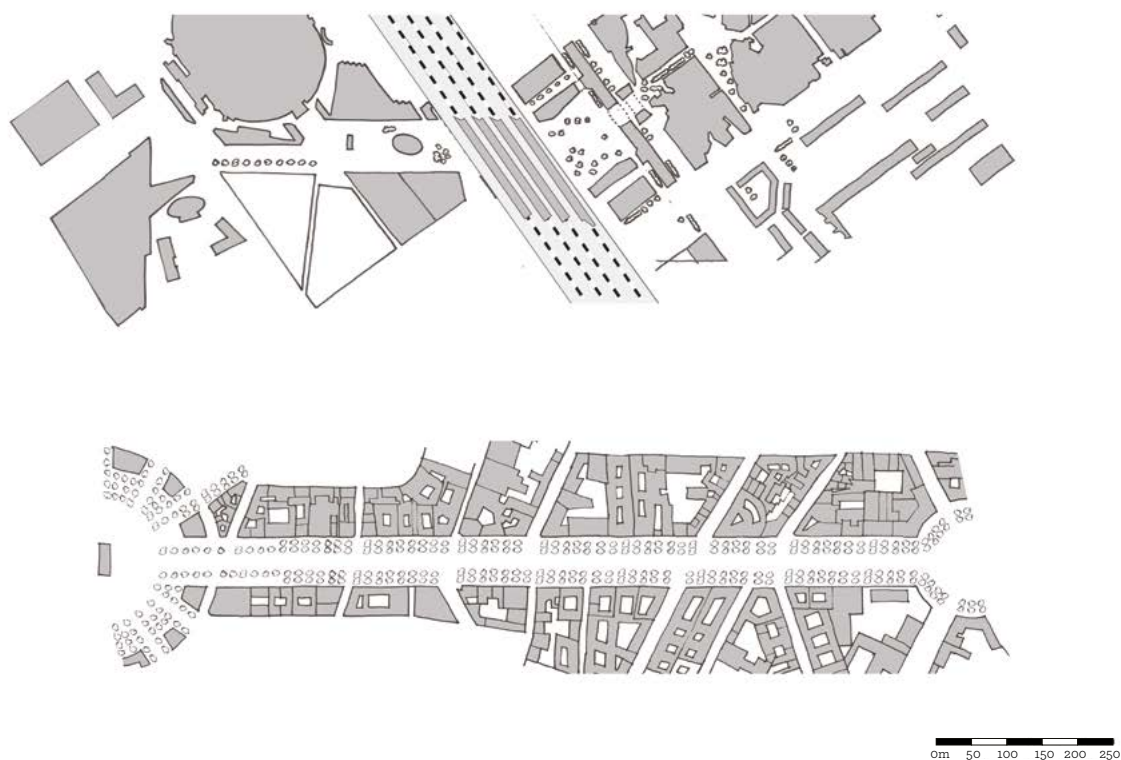


Figure 5.3: Morphological comparison of ArenA Boulevard and the Avenue des Champs-Élysées

A rhythm of side streets and fine-grained variation in the facades is known to benefit the sojourn quality (extent to which people are invited to linger) and the experience of the space (Pallasmaa 2012; Gehl & Svarre 2014; Sennett 2018). Such a rhythm is lacking in ArenA Boulevard and the building blocks are more monolithic in character. As a result, the space lacks a human dimension and offers pedestrians little guidance. The section of the boulevard on the station side is an exception to this. The scale there is smaller, more amenities adjoin the space and the JinSo pavilion breaks the space up into smaller

elements. The shopfronts on the north side come across as forbidding and impersonal in part because of the size of the arcades and the height of the roofs and columns. The irregular rhythm and the side streets going off in different directions tend to disrupt the unity of the boulevard rather than enhancing the cohesion as is the case in Paris.

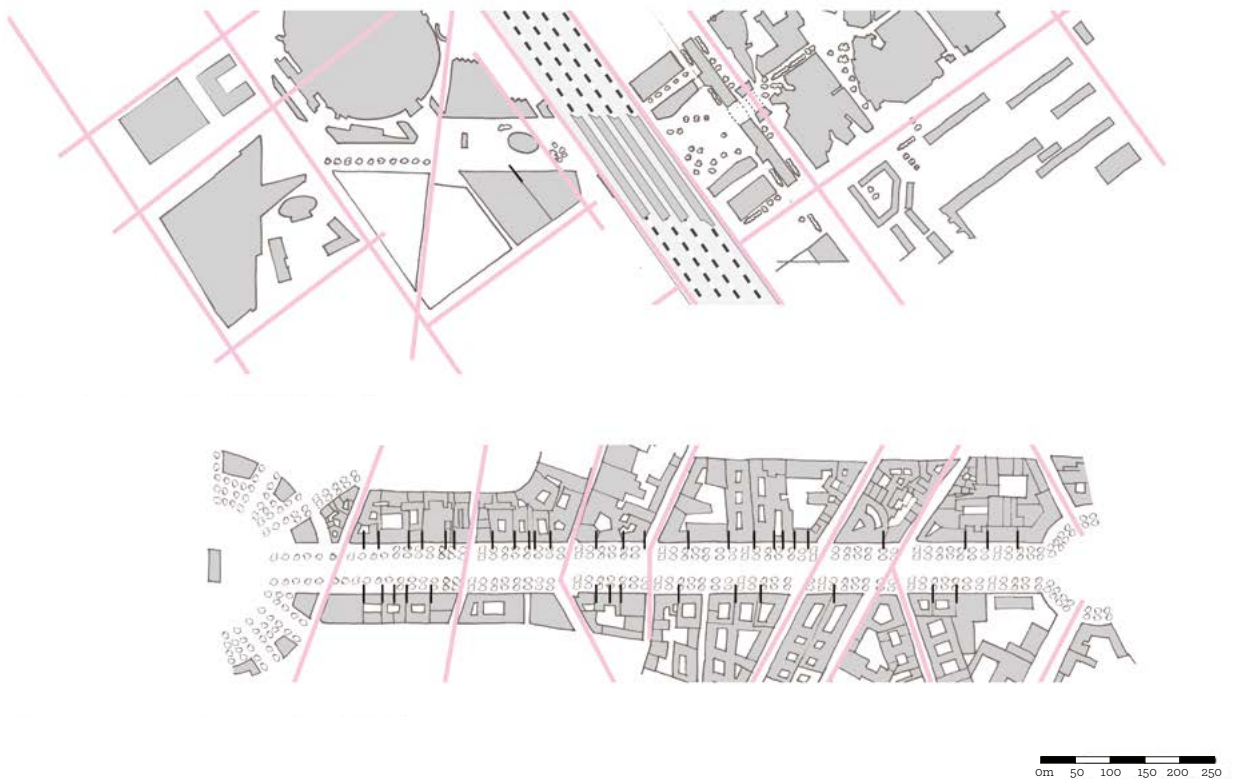


Figure 5.4: Rhythms in side streets and facades in ArenA Boulevard and the Champs-Élysées

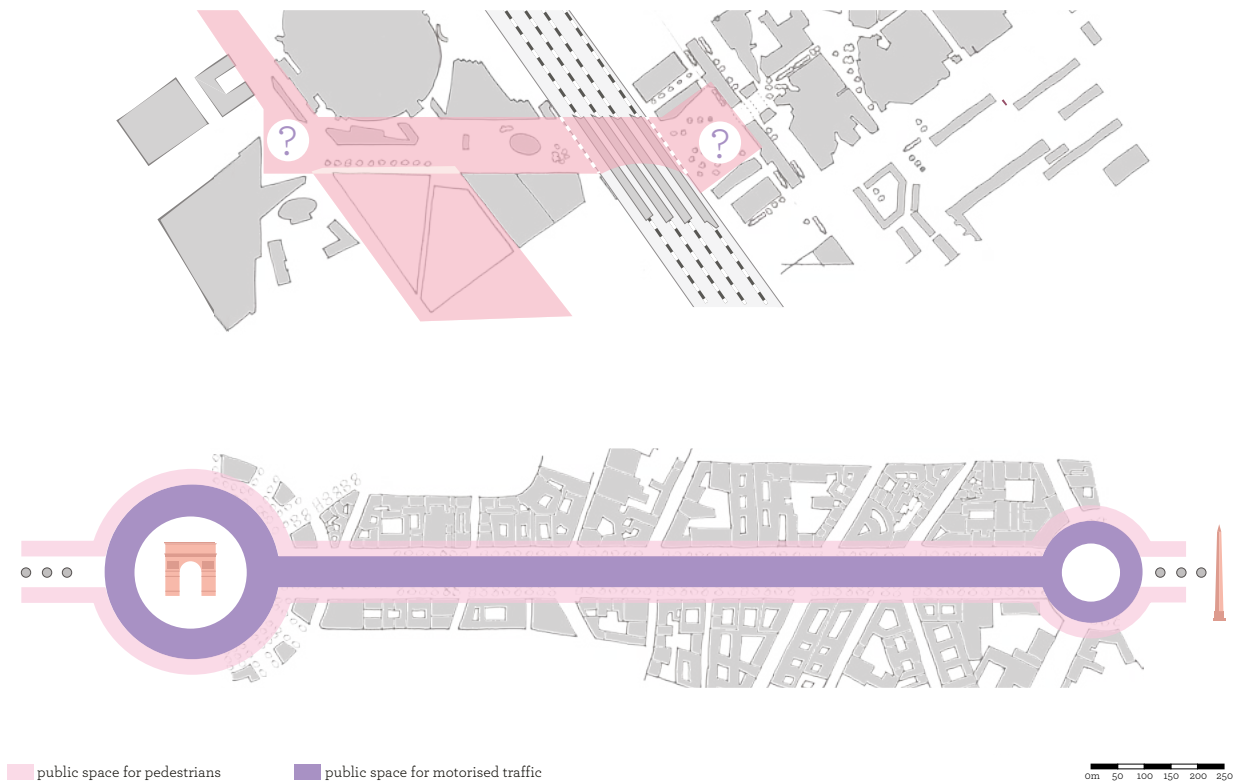


Figure 5.5: Main structure of the public space with start and end points of ArenA Boulevard and the Champs-Élysées

ArenA Boulevard also lacks clear-cut start and end points, which are important for the cohesion of an urban space (Meyer et al. 2006; Jacobs 2008; Adkins et al. 2012). At one end, the boulevard gradually disappears under the covered space of the station, whereby the roof is at an angle to the boulevard. At the other end is the Villa ArenA, which is also at an angle to the boulevard and not really a proper end point. The comparison is not entirely fair as the Champs-Élysées is the classic example of a boulevard, with the Arc de Triomphe at one end and the Luxor Obelisk at the other end.

For pedestrians, both boulevards are on an immense scale. The Champs-Élysées has an austere but consistent layout. The pedestrian space is concentrated along the two facades. ArenA Boulevard, on the other hand, consists almost entirely of pedestrian areas and the layout is far from being austere and regular. What is more, the space lacks clear guidance or concentrated areas for pedestrians. In principle you can walk anywhere.

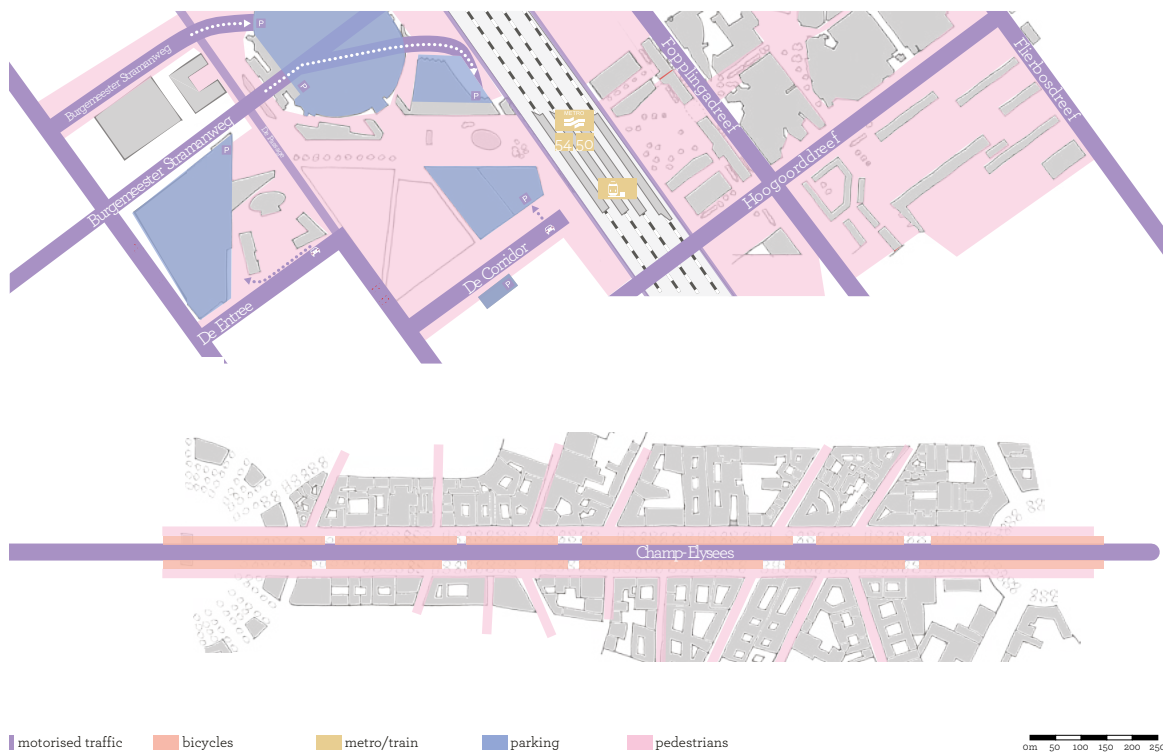


Figure 5.6: Organisation of motorised traffic (purple), pedestrian areas (pink) and the ends of the boulevard of ArenA Boulevard and the Champs-Élysées

The impression and experience of a place are partly determined by the way in which you proceed through the space. In traditional urban built environments, contrasts in panoramas with gatehouses, curved lines in the streets leading to the area and so forth play an important role (Cullen 1961; Kostof 1999; Pallasmaa 2012). They create the effect of a decor. Visitors to the Champs-Élysées can drive down the boulevard and view it from the car. That is not the case at all in ArenA Boulevard. Motorised traffic and parking are kept entirely to the rear of the boulevard, making the boulevard itself almost entirely pedestrian only. Visitors therefore enter the

boulevard via an intermediate world. Between arriving and actually entering the boulevard on foot, they first have to find a station, garage or parking space and gain access to the boulevard through a door.











The huge scale, the fragmentation and the lack of guidance in the ArenA Boulevard space can also be seen in the green structure. The greenery in the Champs-Élysées is part of the organisation and rhythm of the boulevard as a whole. Moreover, the greenery also serves as a buffer between the motorised traffic and the pedestrian areas. They can see one another yet the pedestrians still have their own 'secluded' space. The greenery introduces order and cohesion.

Greenery is used in a very different way in ArenA Boulevard, where it is more fragmented or landscaped: a row of trees, a temporary section of grass (ArenA Park) and a series of raised green islands. The latter are part of a landscaped redesign together with the long, curved benches (implemented as far as the FEBO snack bar), which sets the boulevard apart as a 'concrete plain' for pedestrians. At the same time, ArenA Boulevard 'lacks' contrasting modalities that restrict the space for walking, as in the Champs-Élysées, and thereby also mark and concentrate the pedestrian space.

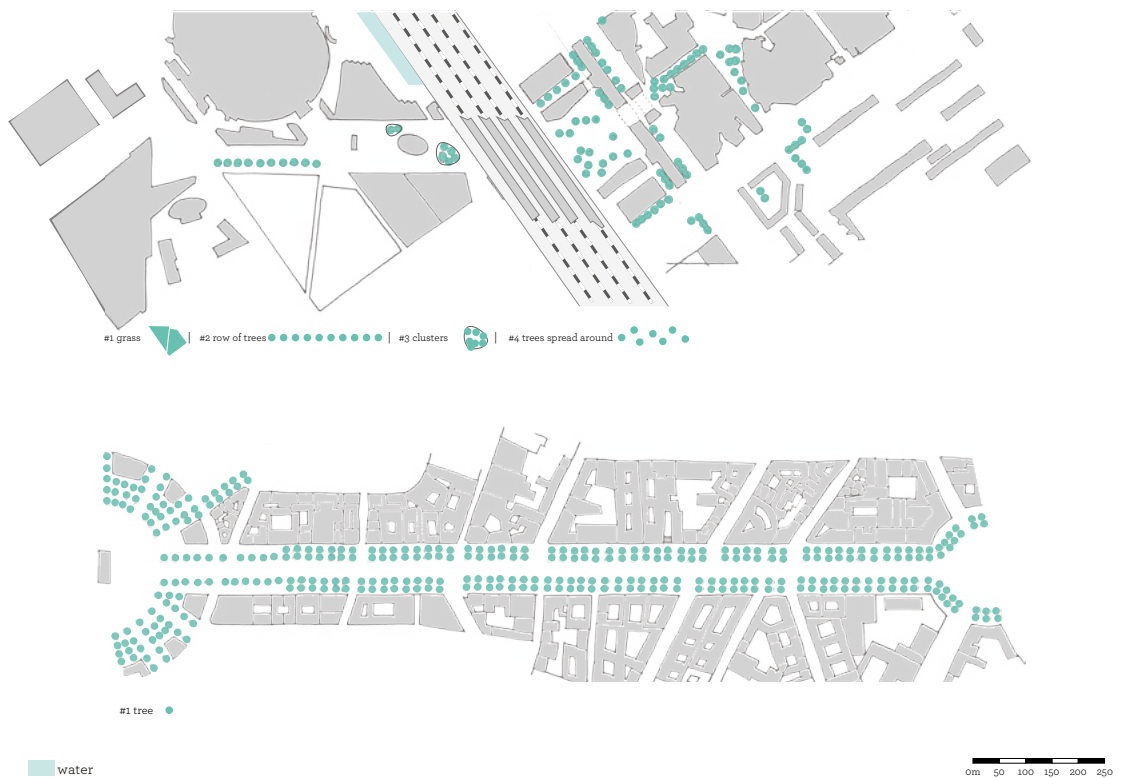
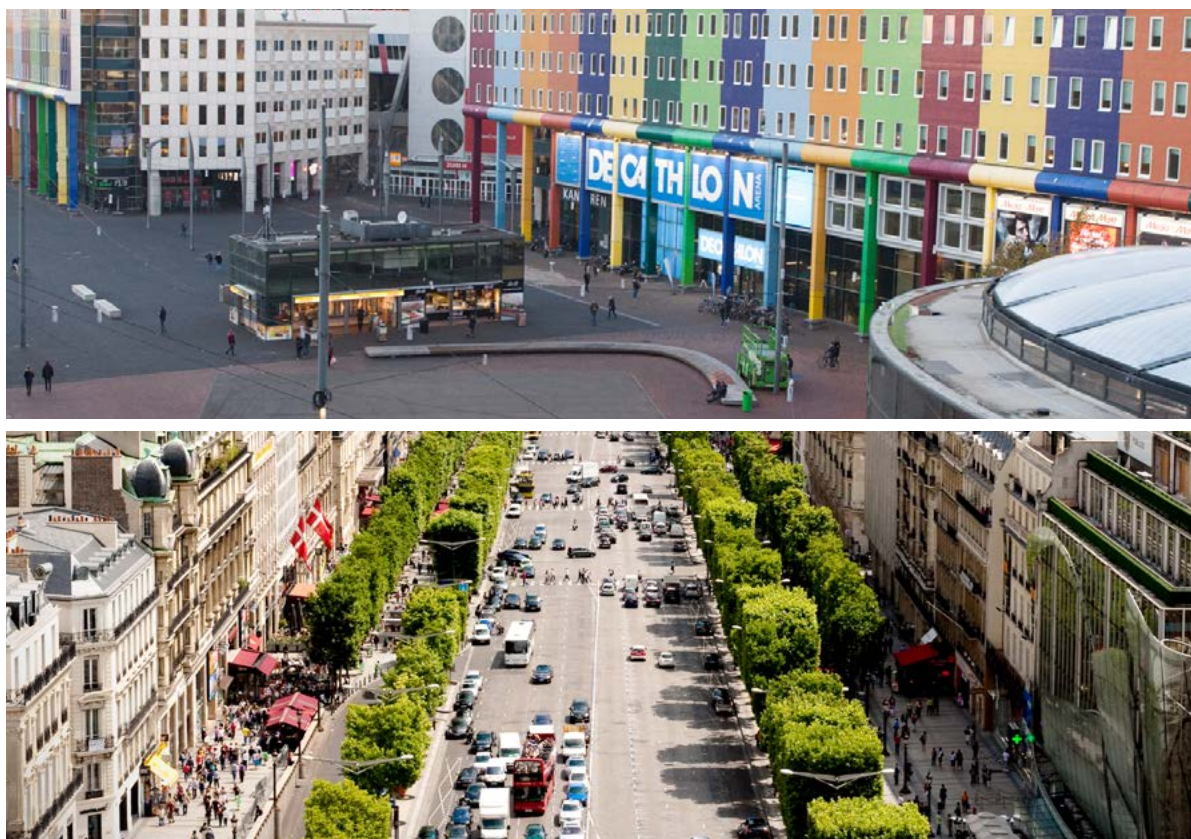


Figure 5.7: Structure and role of the greenery in the ArenA Boulevard and the Champs-Élysées

At eye level too, ArenA Boulevard offers only a limited degree of rhythm and overview. The public space of the Champs-Élysées forms a continuum whereas ArenA Boulevard consists of a series of subareas. The grass field is ArenA Park, where the absence so far of a physical volume constitutes a break in the public space of ArenA Boulevard. The shifting horizon of the buildings and

the lack of landmarks enhance the impression of fragmentation. ArenA Boulevard stretches out *despite* the blocks surrounding it, whereas the Champs-Élysées forms the support for the adjoining buildings and nearby residential districts.



ArenA Boulevard and the Champs-Élysées

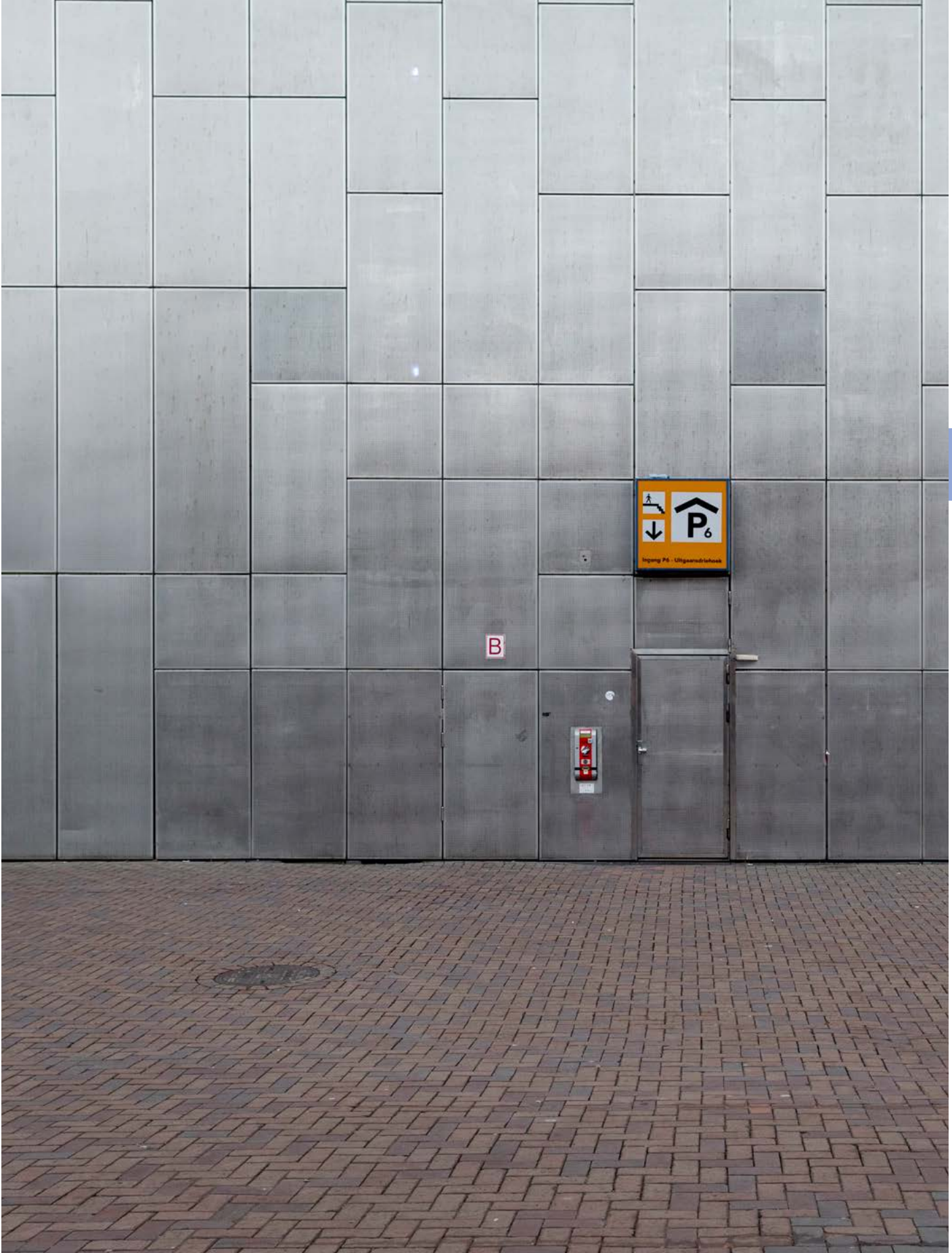




The table below gives a more detailed comparison of the two boulevards.

	HISTORICAL BOULEVARD (CHAMPS-ÉLYSÉES, PARIS)	ARENA BOULEVARD, AMSTERDAM
USAGE	Lingering and strolling.	Place of passage, with the exception of peak periods or sunny conditions..
MORPHOLOGY	Series of premises form urban blocks and boulevard.	The buildings take centre stage. Their composition does not form a boulevard space.
ARCHITECTURE	Varied facade through architecture with similar character and design, creating a cohesive and differentiated impression.	Each building has its own individual architectural design. They do not naturally form a 'Gestalt' together.
CONCEPTUAL ASPECTS	Texture, physical continuity, fine-grained structure, rhythm of side streets.	Random collection of objects (buildings). Constantly changing physical edges and dimensions. Coarse grained. Buildings take up an entire block. Not very finely meshed.
INFRASTRUCTURE, MOBILITY	Street profile creates order. Range of modalities. Through traffic is separated from traffic that is parking/parking spaces and pedestrian areas.	Cars are hidden. Different modes of transport, through traffic, parking traffic and pedestrians are segregated.
GREENERY	Rows of trees. Originally a reference to the trees on a bulwark and later used to separate and protect the pedestrian area from fast motorised traffic.	Landsaped design. Not applied systematically throughout the design (at least, not as implemented).
PUBLIC SPACE	Unambiguous, continuous, start and end points marked by landmarks.	A lot of public space but not much to go by, not much guidance. No physical start or end points. Few visual pointers for getting bearings.
FUNCTIONS	Mix of functions. Residential, retail, restaurants, businesses and cultural amenities. Clear-cut transition between private, semi-private and public spaces.	Functions are largely stand-alone functions within the general theme of leisure and retail; also restaurants and offices.

Table 1: Characterising the ArenA Boulevard space based on a comparative analysis with the Champs-Élysées



The conclusion can be drawn that the built environment of ArenA Boulevard actively creates conditions for its users only to a rather limited degree. The buildings do not foster unity and neither do the side streets, the greenery, the diverse panoramas, the start and end points, and the requirement to enter the boulevard via a transitional environment.

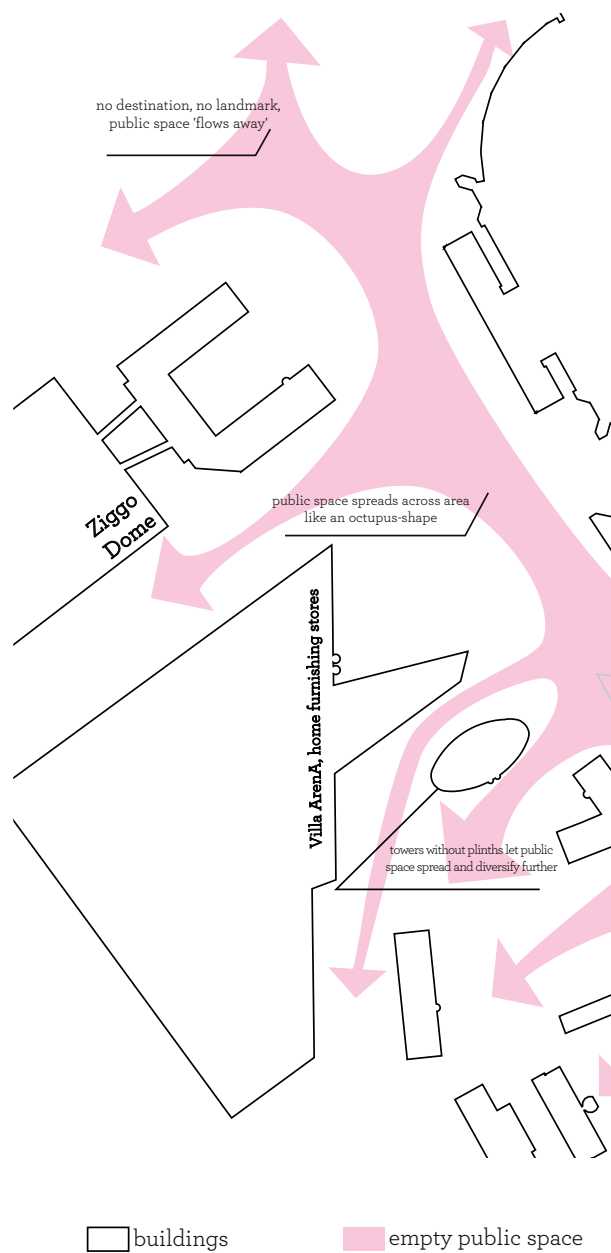
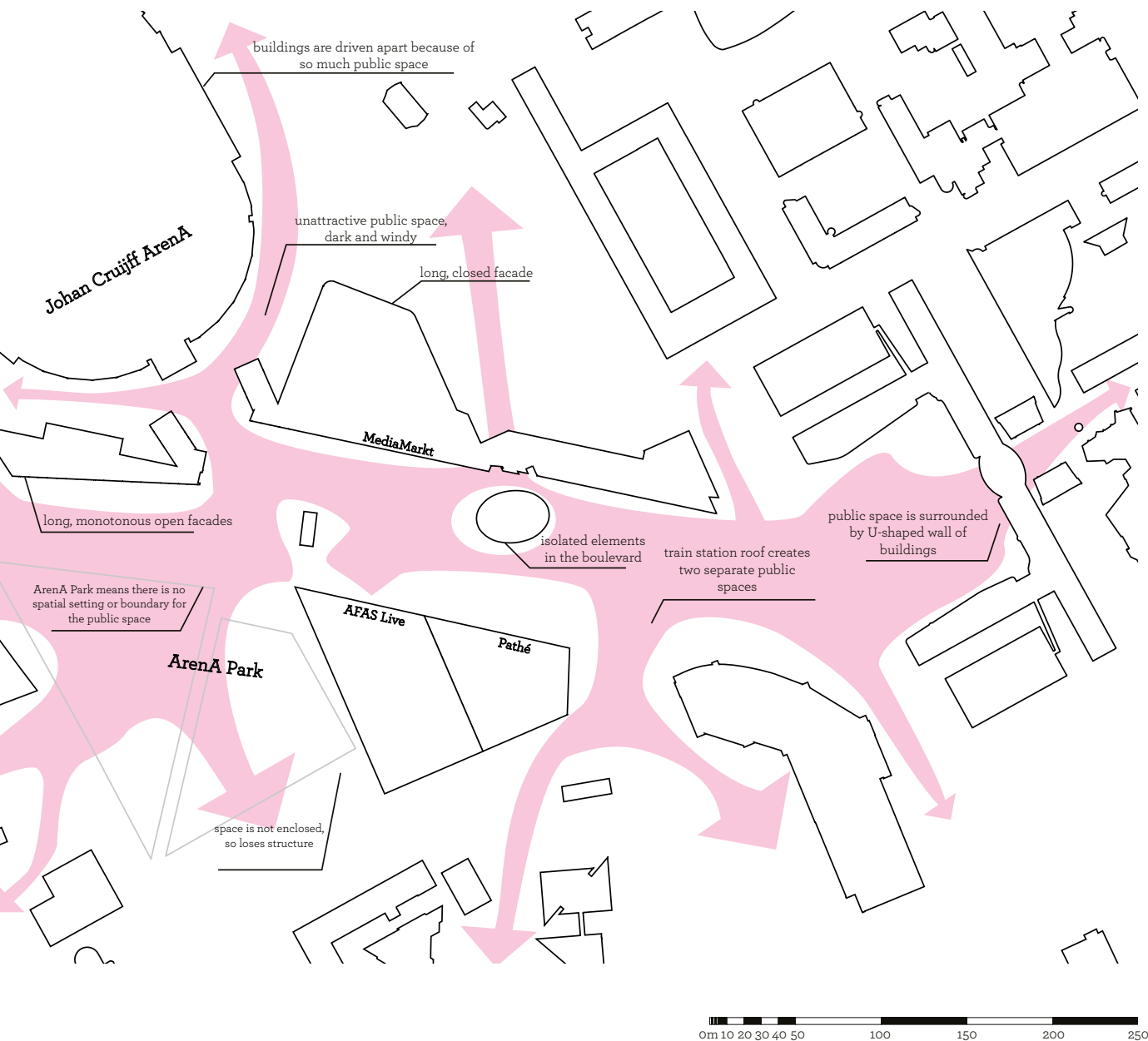


Figure 5.8: Integral Analysis Map of ArenA Boulevard











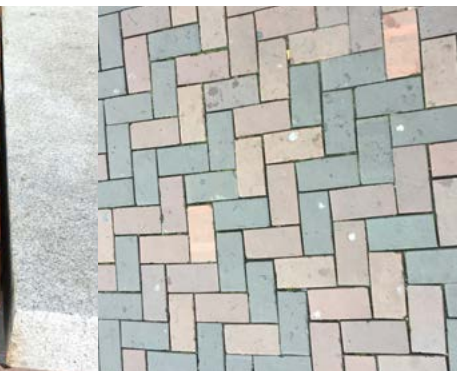
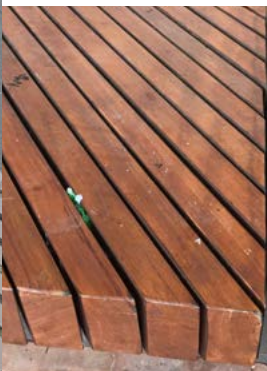


THE BUILT ENVIRONMENT: PHYSICAL SHAPES AND CONDITIONS



Pavement and street furniture on ArenaA Boulevard





Human dimensions and tactile qualities

The open character of ArenA Boulevard means that it works well during peak periods and when events are on. It is a frictionless space through which visitors can pass effectively and without any problems to reach their destination in one of the buildings. However, when the place is less busy, the built environment offers little to go by and little guidance for pedestrians. The austere and not very tactile structure of the building facades, the shifts in the building line, the lack of cohesion between the individual buildings, the lack of facades and other modalities coupled with the abundance of public space are far from creating a sense of 'enclosedness'.

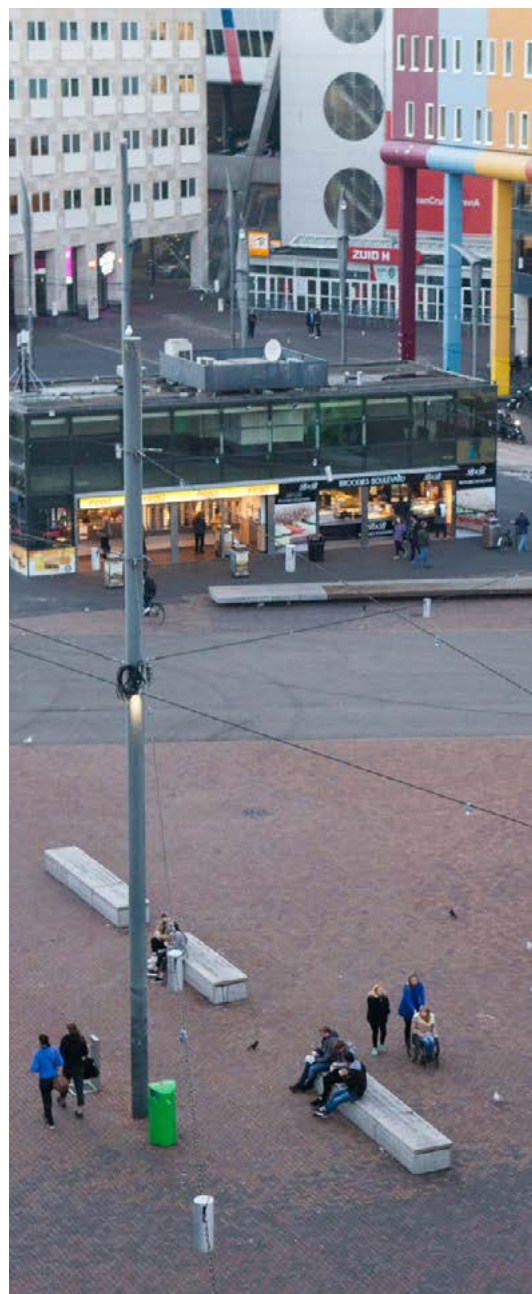
The scale, harshness and austere functionality of the surroundings can be seen in the street images.



5.3 ArenA Boulevard as a series of subareas.

At the same time, the fragmentation and size of the boulevard mean that subareas can be distinguished, with their own recognisable features. This insight is important for the design of responsive spaces for a number of reasons. What kind of place could best be enhanced? Where might that be an unattainable goal? And if we consider the subareas as independent entities, how can we then intervene to give the space more cohesion? The spatial fragmentation into subareas is shown up particularly clearly in a profile analysis. We distinguish between four subareas, which we have metaphorically termed the centre area, transition zone, landing strip and periphery.

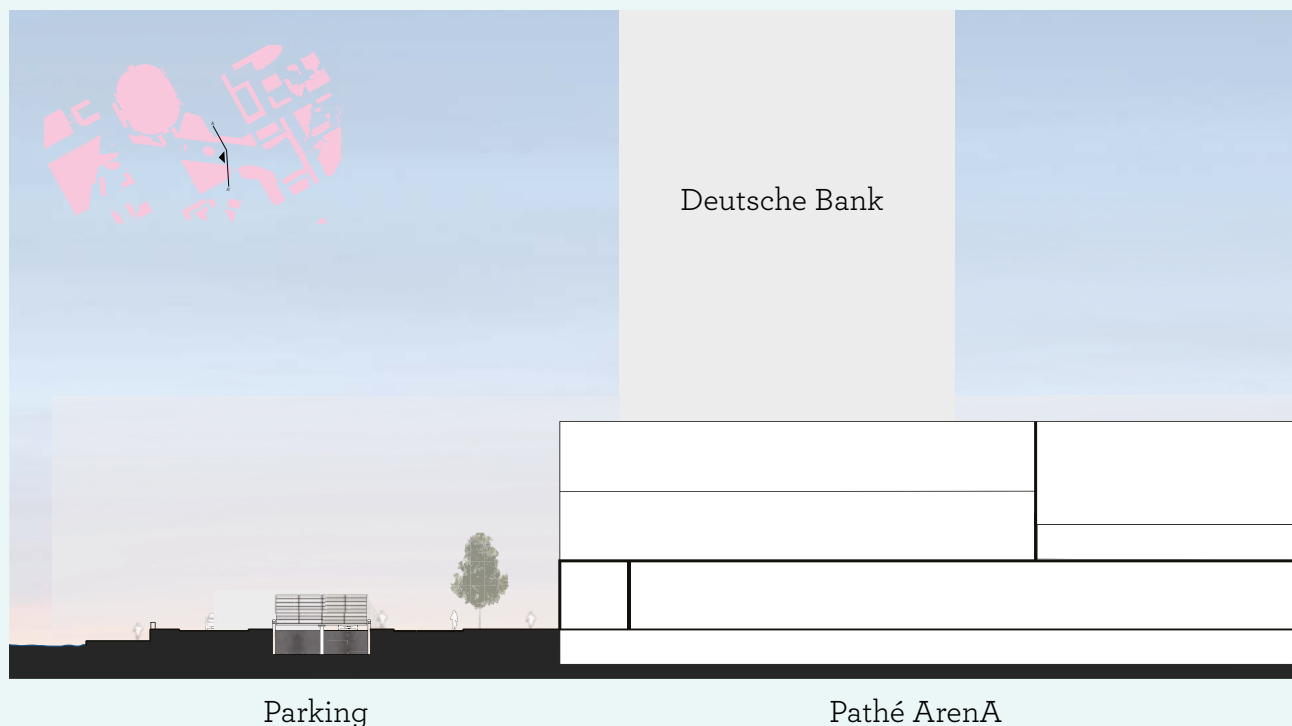
The boulevard works well during peak hours, but offers little guidance when less crowded.



Centre area

The first section of the boulevard can be seen as the centre area. The space here, next to Amsterdam Bijlmer ArenA station, is relatively compact with an active plinth and a lot of visitors. The pavilion with restaurant is in the middle of the boulevard, dividing the space into two parts, each about 22 to 26 metres wide. Together with the islands of greenery, these spaces are enclosed by the higher walls of the shops and the Pathé cinema. As a result, the place has dimensions that are on a relatively human scale, a situation that is reinforced by the active plinths with cafes and restaurants.

In the centre area the space is relatively compact and well-organized, with an active plinth and a lot of visitors.





Johan Cruijff ArenA

restaurant JinSo

Ichi-E

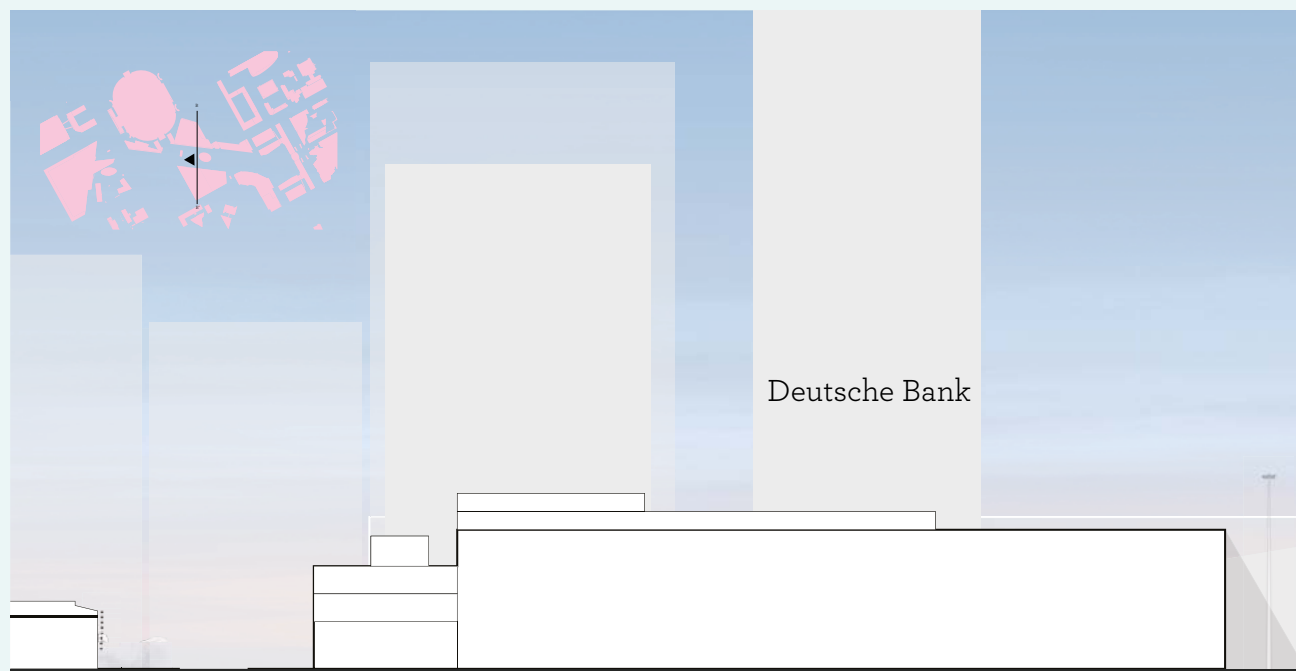
Parking

Transition zone

Beyond the JinSo pavilion, the boulevard widens to 70 metres. This space is still part of the centre area, in part because of the shop entrances, the pavilion with a sandwich bar and the FEBO snack bar, and the seating provided by the long, semi-circular benches. However, a transitional area starts from the FEBO snack bar onwards. This zone is in the middle of the boulevard but the walls are all

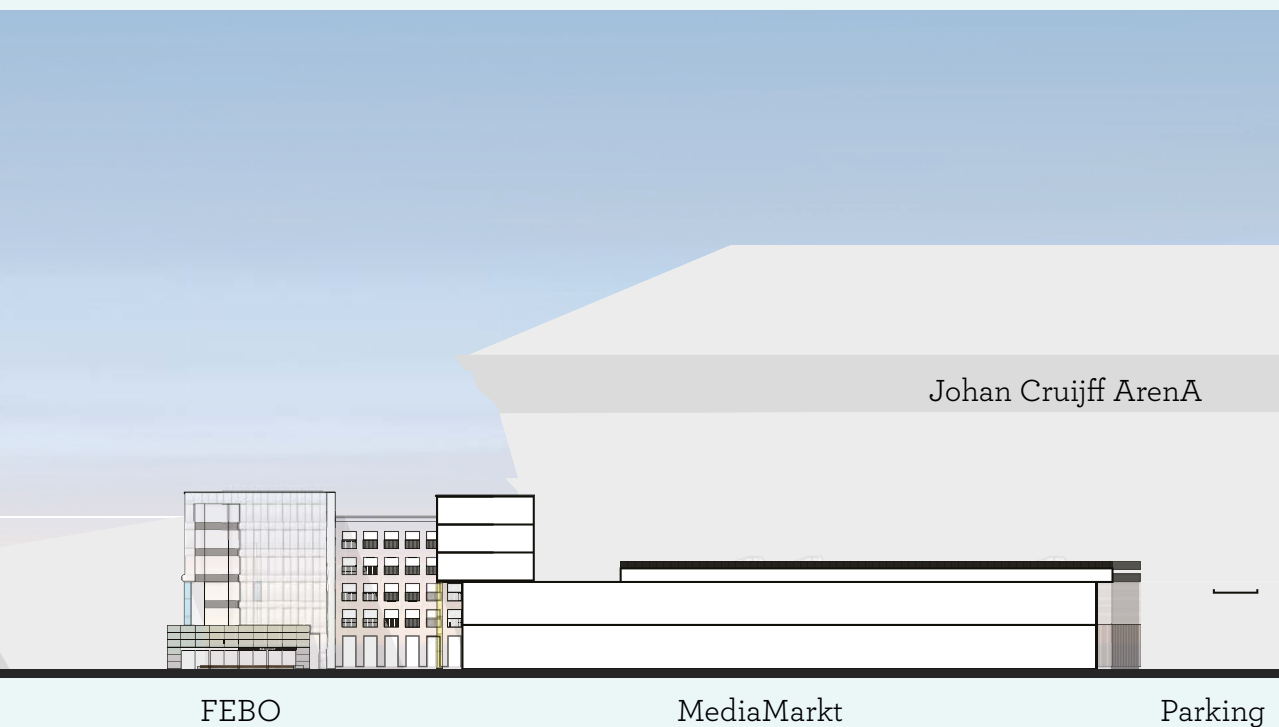
different, creating an asymmetrical space. On the north side, the wall recedes because of the entrance to the ArenA stadium. The boundary on the south side is formed by the closed, angular frontage of AFAS Live and by the grass field. To the west is the side of the casing building with a wide plinth while the border to the east is formed by the rear of the FEBO building. Yet this is also the space where visitors arriving from the car parks enter the boulevard and where they first experience ArenA Boulevard. People get their bearings and set off for their destination here. It is the transition zone taking people to and from the central area, the nearby offices, the ArenA, and the home furnishings shopping mall and hotels on the east side of the boulevard. As a transition zone, it is an amorphous space that has the potential to play a key role in giving the boulevard cohesion.

The transition zone is an amorphous space that lacks cohesion, despite its location.



Vanzz

AFAS Live



FEBO

MediaMarkt

Parking

Landing strip

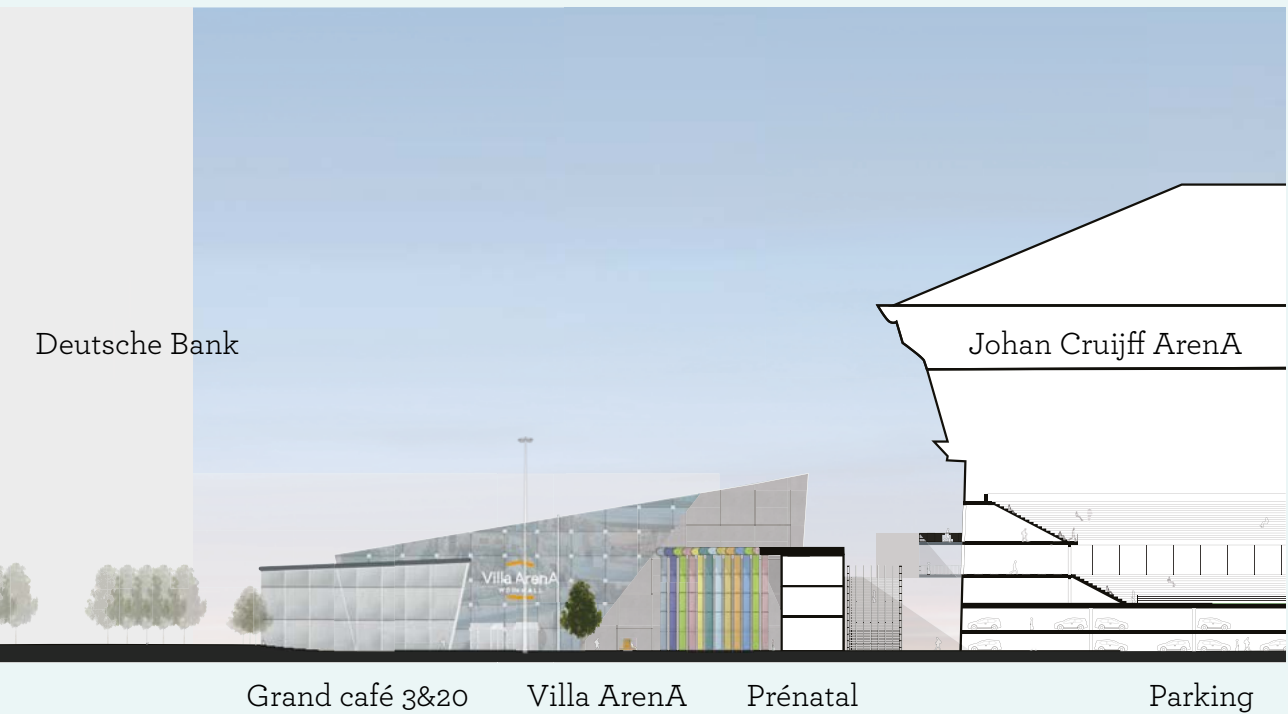
Next, an 80-metre wide street, similar in nature to a landing strip, stretches from the transition zone to the Villa ArenA home furnishings mall. Alongside this elongated strip runs a 100-metre wide grass field. As a result, the space only has one facade. The offices and multi-storey car parks beyond the grass shape the horizon, yet do not function as a facade.

The landing strip is a pedestrian motorway, lacking active plinths.

After sunset, the dark patch does serve as a kind of border. The shops are spread much further apart from one another in the landing strip. The home furnishings mall is also a stand-alone, specialised destination.

Spatially, the landing strip appears like a pedestrian motorway. The row of trees and street furniture emphasise the lengthwise axis rather than forming stepping stones that break up the space and make the distance seem shorter. The sense of being on a motorway is enhanced by the colossal street lamps. Finally, the spatial composition of the high-rise buildings (Deutsche Bank), the pavilion with a cafe and the side of the home furnishings mall does not function as a visual end point. This is a space you only enter if you need to and you know where you want to go.





Periphery

The fourth subarea is the equally amorphous space between Perry Sport and Villa ArenA. The Villa ArenA entrance seems to recede

because it is at an angle to the boulevard. A bicycle path crosses the boulevard and 'dives' into the submerged tunnel on the north side. The adjoining buildings do not add any particular shape to the place. Moreover, this is another huge space. For example, the distance between Perry Sport in the casing building and the entrance to Villa ArenA is almost as great as the entire length of the landing strip. Of all the ArenA Boulevard subareas, this is perhaps the subarea with the least spatial cohesion. It has more of the characteristics of a residual space or space for traffic.

The periphery manifests itself like a residual space or space for traffic.





Deutsche Bank

Johan Cruijff ArenA

Grand café 3&20

Villa ArenA

Offices

Restaurants

Hard or porous borders

The border of the public domain does not necessarily lie where the buildings adjoin the street. A Nolli map gives a more subtle picture of the relationship between the private inner world and the public outside world. Our map shows the spaces along a scale with four categories:

- public space with free access
- built-up private space
- unbuilt private space
- public space with restricted access.

The boundary between indoors and outdoors is a transitional zone. The shops and station offer free access to the public during opening hours. The same applies to the amenities near

Villa ArenA, although they are somewhat less accessible. Ballorig has an indoor play area for children as a specific target group. Semi-public areas are the car parks, the cinema, the concert halls and the stadium itself, all of which restrict access to people with tickets.

At the same time, there are also parts of the outdoor space that are less public, such as the inner courtyards of the office premises. The companies themselves are responsible for the maintenance. There are private surveillance cameras and barriers marking the boundaries. The logistical organisation and spatial construction of the boulevard have resulted in an entire separate world along the rear of the buildings, as can be seen in the Figure 5.11.

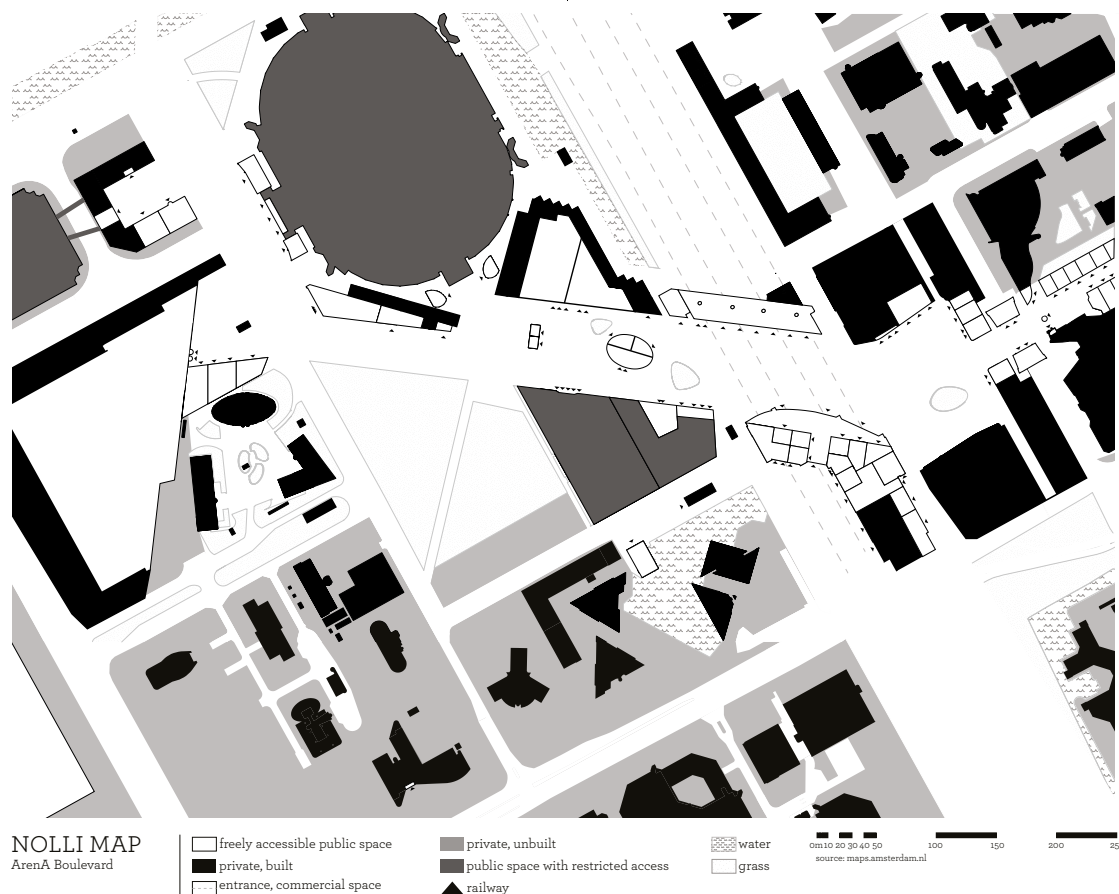


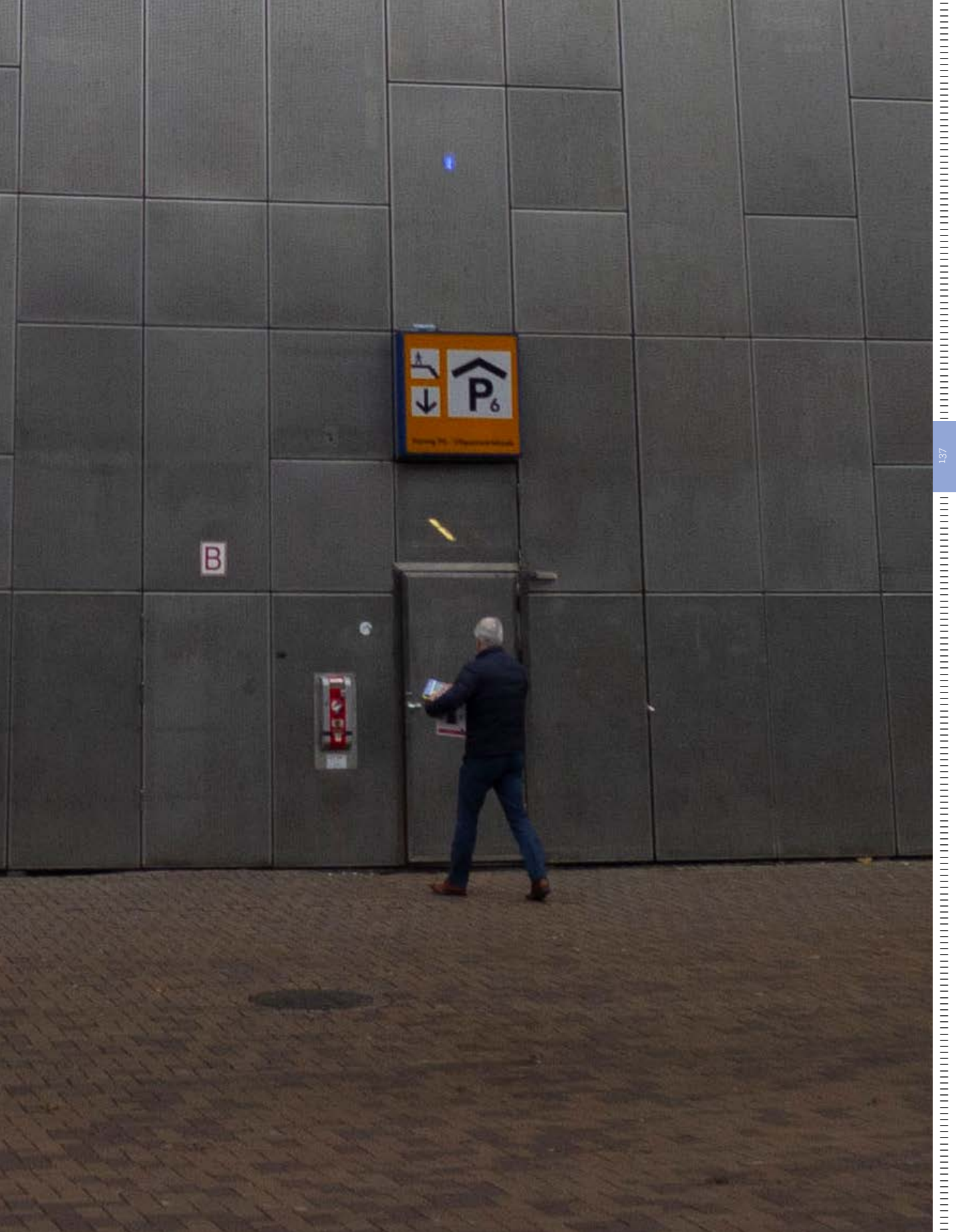
Figure 5.10: Nolli map of ArenA Boulevard



Figure 5.11: The world at the rear of the buildings lining the boulevard

This is where supplies are delivered for the companies and shops. For the stadium, it functions as a circulation space for visitors trying to find the right entrance (south, north, etcetera). The world at the rear consequently has symbolic meaning for the experience of the boulevard. It is the 'transit world' that you need to pass through in order to reach the boulevard. At the same time, each of these rear areas is a specific part of one of the buildings. And yet they do not play a role in unifying the boulevard as a whole.





5.4 Conclusions.

When compared with the historical boulevard, ArenA Boulevard lacks the spatial characteristics that provide cohesion, unity and rhythm. It is a huge space between large-scale, autonomous buildings, an extensive pedestrian area set up for coping with large groups of people and allowing frictionless flows. The built environment does little to invite people to linger. This effect is enhanced by the intermediate world formed by the entrances to the boulevard.

In general, pedestrians are offered little guidance or conditioning because of the lack of facades, active plinths, start and end points or any order in the public space. At the same time, the space is more differentiated than these general characteristics suggest. Four spatial subareas can be distinguished in ArenA Boulevard, each with its own features. In the analysis, we characterised them as a central centre area, a transition zone, a landing strip and a periphery. In the chapters that follow, this subdivision into four subareas will be seen too in the analyses of the climate, light and dark, pedestrian flows and how users rate the boulevard.

If we want to enhance the qualities of a place through a responsive design, the spatial analyses point to at least three potential building blocks.

Building blocks for the design

- **The spatial setup for ArenA Boulevard with large-scale open space between large-scale autonomous buildings lacks rhythm and cohesion, a start point or an end point. Use responsiveness to strengthen the cohesion and identity of the entire boulevard and to create more unity.**
- **The boulevard is split into four different subareas. Make sure that any responsive setup is able to link and unify multiple subareas.**
- **With the exception of the east side, the subareas have an amorphous shape in which the facades, plinths and layout do relatively little to create a space. Use the responsive setup to enhance the spatial conditions of the place.**

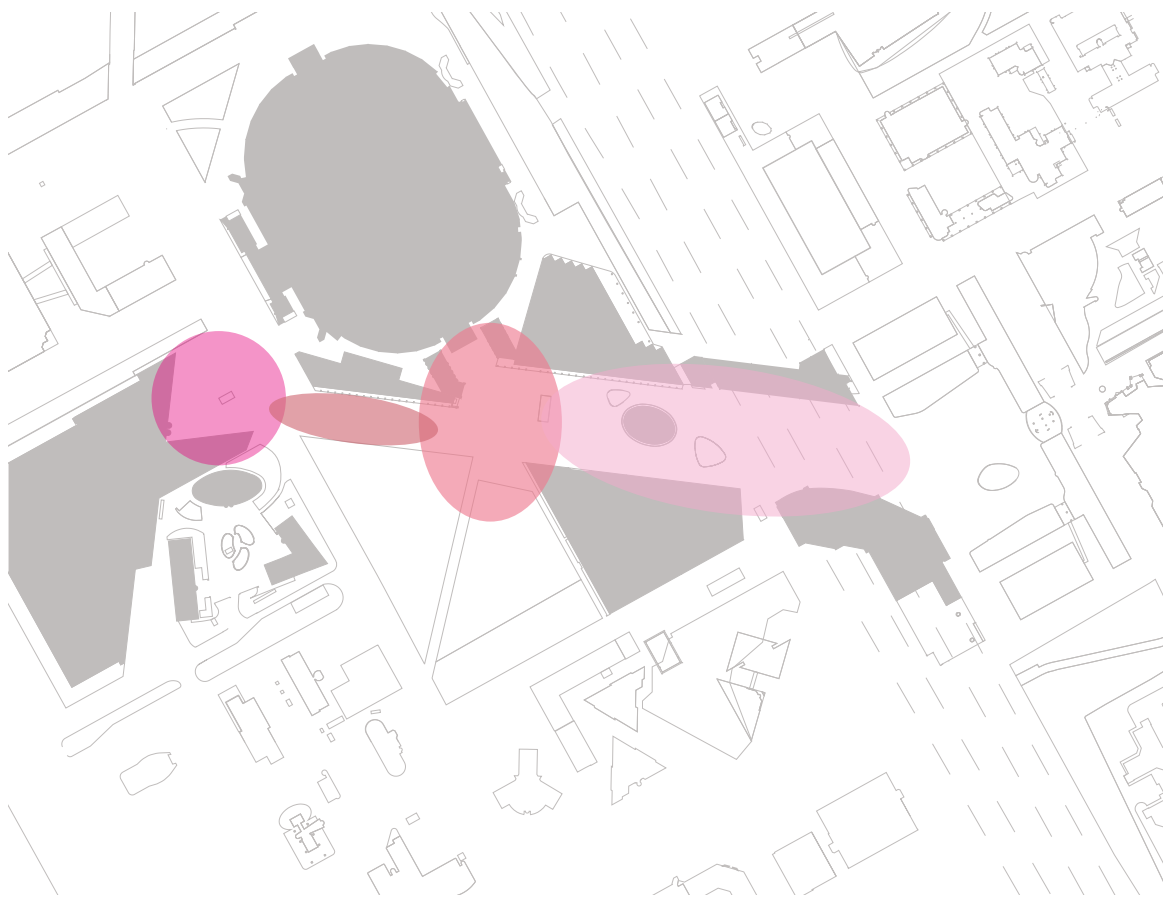


Figure 5.12: Map with the four subareas of ArenA Boulevard

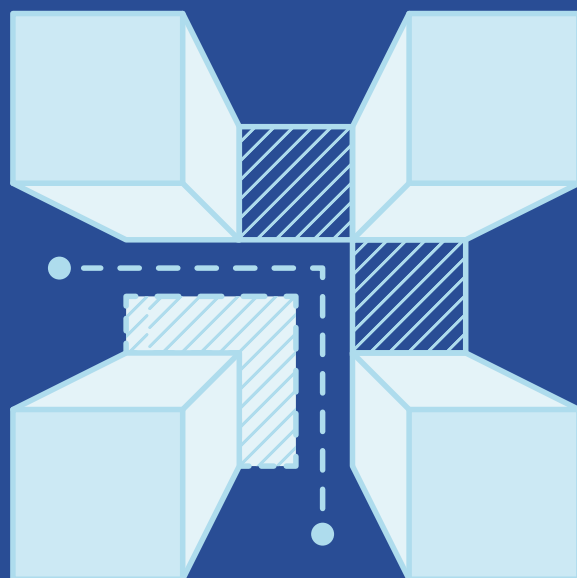
Four spatial subareas can be distinguished at the ArenA Boulevard, each with its own specific characteristics.

Part III: Research for Design: 'Building Blocks from the Bottom Up'

6.

Pedestrian patterns: flows, rhythms and routes .





Pedestrian patterns: flows, rhythms and routes.

The analysis of the conditions created by the built environment and the identification of situational features say nothing about how the space is actually used. Only by examining the different functions and the pedestrian flows can we get a picture of how, where and how intensively the space is used. This lets us find out where the sources of the space are located: where people enter the boulevard and where they go to, what the boulevard's utilisation rhythms are and what natural routes and places people choose. With this information, a responsive design can tap and connect to flows and rhythms. Indeed, decisions have to be made about whether to bolster busy spots or instead activate spaces that are currently underused.

The pedestrian flows give a top-down perspective. We see the patterns formed by the users but not who the individual users are, how they behave or what interactions take place. These aspects are discussed in Chapter 7. In the literature, studies of pedestrian patterns have adopted various different perspectives. We mainly want to explore how we can use knowledge of the pedestrian patterns for the

responsive design. To this end, we took time-lapse recordings from the roof of a high-rise office block, and at street level we drew the individual routes people took and catalogued the conditions of the place (access points, function, light, etcetera).

When designing a responsive public space, knowledge of the pedestrian patterns helps reveal what could be improved.

6.1 Pedestrians.

Pedestrians are crucial in ensuring a lively, safe environment and for how people experience streets and squares (see for example Jacobs 1961; Banerjee & Southworth 1990; Gehl & Svarre 2014; Sussman & Hollander 2015).

When designing a responsive public space, knowledge of the pedestrian patterns helps show what could be improved and suggest possible building blocks for tackling this in the design. However, collecting data on pedestrian patterns costs effort. Municipal counts of pedestrians are generally of only limited use as they are aggregated for the space as a whole, or for a few entrances or reference points. A more detailed picture is needed of the use of the space for responsive designs.

Furthermore, pedestrian flows are by definition complex patterns. Unlike motorists, who have fixed lanes and directions, pedestrians can choose from a hotchpotch of different passages and routes. What is more, these can change depending on the hour, day and season, and evolve over the years. It is known that purposive pedestrians tend to take the most efficient route possible (Gehl & Svarre 2014; Campanella et al. 2014). In the transport literature, it is assumed that pedestrians operate purposively, minimising costs and using a predetermined walking plan. If a pedestrian is confronted with unforeseen obstacles such as crowds, fences, building work or changes in the weather, they will make tactical choices that minimise the delay and loss of energy (Campanella et al. 2014).

Research has been carried out in ArenA Boulevard too to determine the pedestrian flows during events and concerts. Similar conditions to busy periods, such as prior to a concert, can also be seen at certain times on working days, for example between 17:00 and 18:00, because of the large numbers of office workers crossing the public space. Individuals who are part of a large crowd all using a public space for a specific purpose can demonstrate similar behaviour (Hughes 2003). However, individual visitors behave differently when they are alone or in a small group (Musse & Thalmann 1997). That is an important difference between peak periods and quiet periods. Our research focuses on the quiet periods, when pedestrian flows are relatively light.

In quiet periods, pedestrians are not able to walk along with the crowds on autopilot. As a result, the pedestrian patterns are affected more by any internal and external stimuli. External stimuli come from the shape of the space, the choice of paths available, the surroundings and the behaviour and sight of other pedestrians (Matos Wunderlich 2008; Middleton 2010). ArenA Boulevard gives pedestrians a great deal of freedom. The space can be seen as one big pedestrian area that occasionally becomes a shared space when a cyclist, moped or car crosses the boulevard. Cars, vans and lorries may use the boulevard for access only; this is enforced by barriers. The question is what pedestrian patterns are seen when the space offers pedestrians so much freedom.

6.2 Measuring and understanding pedestrian flows.

Various different research methods can be used to map pedestrian flows for a spatial responsive design. We opted for images recorded by a time-lapse camera and analysed using dedicated software, and for qualitative observations at eye level in which pedestrians' routes were noted down manually.

Camera recordings

Various studies have used time-lapse camera recordings to map the use of public space. Recording images with a camera over a number of hours gives a precise picture of the pedestrian flows in various parts of a space. These time-lapse images are then translated into 'heatmaps' by special software. These heatmaps reveal the commonly used routes, patterns and places. Where do flows diverge, cross one another and converge again? The heatmaps also show which places are used most intensively and which are barely used at all.

Qualitative observations

There is a long tradition of observing pedestrian flows by shadowing and tracking. In quiet periods in particular, qualitative observations are a good way of studying where people walk and stop in the space (see also Lucas 2016; Gehl & Svarre 2014). This gives a straightforward way of observing the space 'manually' and obtaining a more finely meshed

picture than that produced by the camera images. The observations are incorporated in street plans in which the pedestrian routes are noted down. Both the qualitative observations and the quantitative observations are samples. The number of observations is never completely representative. They simply give an indication of the patterns.

In quiet periods, pedestrian flows can be influenced by various aspects. The main variables that affect the patterns are:

- The access points: the places where people enter the boulevard, their destination (including the opening hours etcetera) and where they leave the boulevard again.
- The spatial structure in the public space (edges and plinths, opportunities to get your bearings), layout of the space, protection from or connection to other modalities.
- Ambience: the climate, lighting, darkness, sound, visibility and legibility of other people.
- The dynamics of the pedestrian flows themselves (habits, presence of other users, the 'internal' dynamics of groups of people who regularly occupy certain spaces, such as office staff).

In order to be able to interpret the pedestrian flows, we analysed the following aspects of the boulevard (in addition to the data collected on pedestrian patterns).



The access points, programmes and rhythm of Arena Boulevard

Analysis maps were used to record the access points, the main destinations and the rhythm of the place.

Lightscaapes

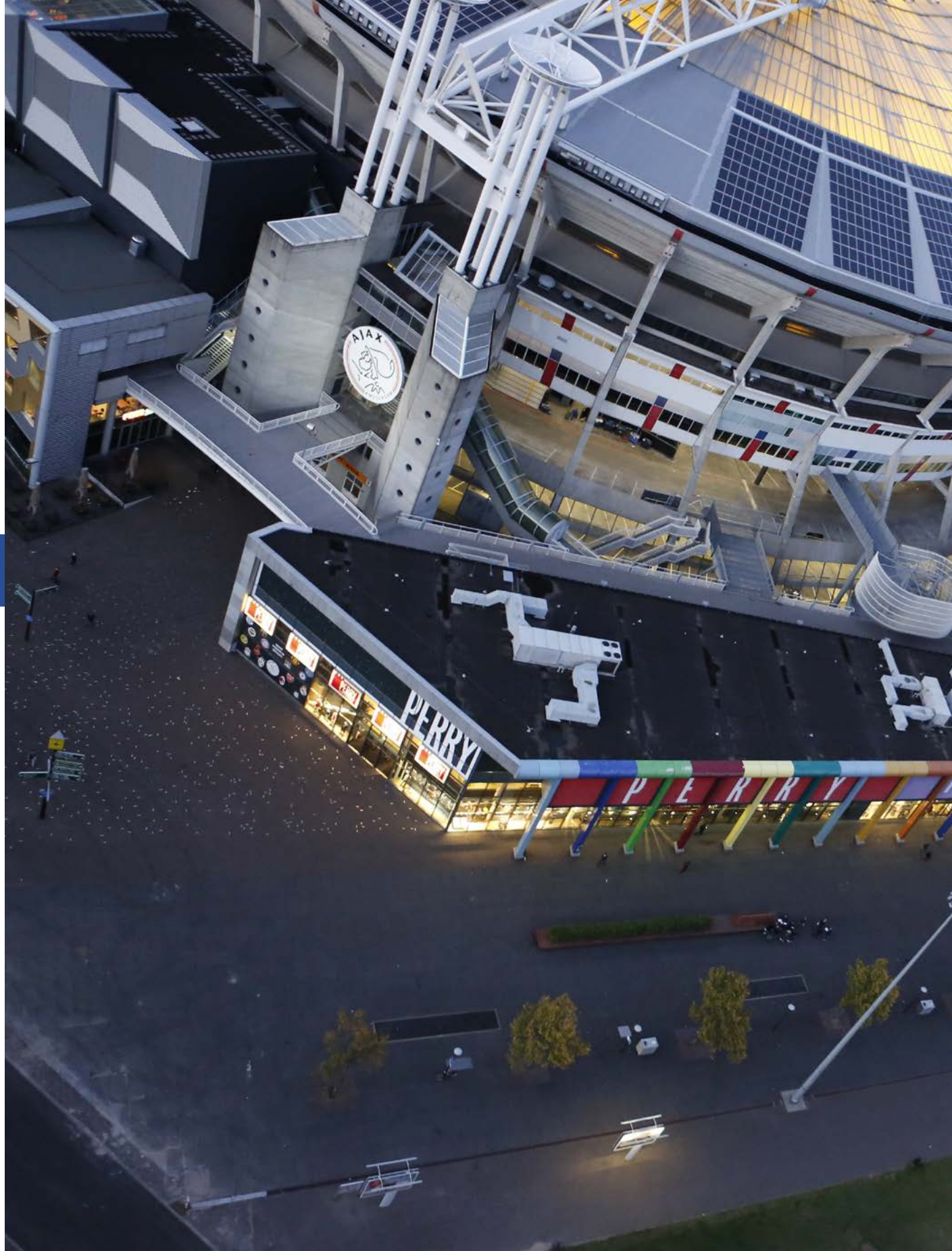
Light plays an important role in the evenings in particular. That applies to both the presence of light and the darker, contrasting spaces with relatively little light. Light also plays a role in public spaces as a 'third dimension' in which it creates an artificial cover for the space.

Soundscaapes

Sound can also play an important role as a soundscape — an intangible and invisible spatial condition that has a subconscious impact on how people experience a place. As with light, sound influences the experience both through its presence and through its absence. We did not carry out an extensive study of the ambient noise.

Climate-scapes

Heat, cold, wind, rain and the perception of the weather conditions are partly influenced by the spatial setup and the orientation and position of the buildings with regard to one another. Models developed by Eindhoven University of Technology (Blocken & Persoon 2009) enable the effect to be determined of common weather conditions (a westerly wind, for instance) on the sojourn quality (the extent to which users are invited to linger).





Time-lapse recordings and heat-map software.

Ex ante and ex post measurements of the pedestrian flows were performed using a time-lapse camera positioned on the roof of the Deutsche Bank offices. As part of the research project, software was developed to convert the time-lapse images into heatmaps. We share some of our practical experiences here for the benefit of other similar studies.

Filming

Permission for filming was requested from and granted by Deutsche Bank. Inquiries were made with the municipality concerning privacy but it saw no reason to make objections on that count. We drew up a research data-management protocol to document how the images would be stored and specify that the data would be kept on a disk that is not connected to the Internet. Furthermore, solutions were found for the power supply, the storage space on the SD card, weights to secure the camera and protection from the wind and rain. The images were recorded as uncompressed TIFF files for processing by the software. This means that the camera software did not edit the images or compress them.

The software

Each series of images recorded over four hours consisted of about 14,000 successive photos. The software processed these images by comparing each photo with the previous photo and producing a heatmap based on the differences. The images can only be analysed if they all have the same dimensions. In technical terms, the process works as follows. Each photo is comprised of pixels, each with its own unique

combination of x and y . Each pixel has its own colour value, expressed in terms of the R, G and B values. The software algorithm compares the RGB value for the pixel (x, y) in photo 't' with the RGB value for the same pixel (x, y) in the previous photo. That signals movement by pedestrians.

After all the images have been analysed, the software filters out the extreme outliers (biggest positive and negative differences) and uses the remaining data to create a heatmap. To filter out any random variability, a mask is created prior to the analysis that specifies what can and cannot be measured. This removes the distorting effect of screens, for instance. There are also three 'sliders' that can be used to adjust the thresholds. That is particularly useful in very dark situations where the colour differences are correspondingly small. They let you specify the size of change that qualifies as a 'difference'.



Timelapse recordings were also made from the roof of the Pathé ArenA

6.3 ArenA Boulevard case: pedestrian flows.

In our study of the boulevard, the focus is on the quiet periods in the autumn and winter months outside school holidays. In mapping the pedestrian flows for a spatial responsive design, a triangulation of research methods was used. As said, we opted for time-lapse images recorded by a camera from a great height plus observations at eye level in which routes taken by pedestrians were recorded manually. We used these data to create heatmaps and pattern maps revealing both the routes and the 'high and low pressure areas' of ArenA Boulevard. The data collection was determined on the basis of the times and conditions that are the focus for the efforts to make the space responsive. Thus data were collected for comparable times of day and seasons and under comparable climatological conditions. In research terms, the survey of the pedestrian flows was set up as an *ex ante* measurement and an *ex post* measurement.

The conditions of the boulevard as a pedestrian area

Pedestrians can enter the boulevard at many different points. The map shows the access points. The map shows a very fine mesh of different access points and consequently very different entry and exit points. In addition to the public multi-storey car parks, the offices, hotels and large commercial premises also have on-site parking. That means office workers or hotel guests who come by car to the boulevard enter it via these semi-public locations. Most visitors (and employees)

from Amsterdam and the region enter ArenA Boulevard from one of the larger car parks (in pink) or from Amsterdam Bijlmer ArenA station. In addition to the public multi-storey car parks, the offices, hotels and large commercial premises also have on-site parking. That means office workers or hotel guests who come by car to the boulevard enter it via these semi-public locations. The map shows the access points. The map shows a very fine mesh of different access points and consequently very different entry and exit points.

As the previous chapter already showed, ArenA Boulevard overwhelmingly consists of pedestrian space. In principle, users can choose their own routes.

Unlike motorists, who have fixed lanes, pedestrians can choose from a hotchpotch of different passages and routes.

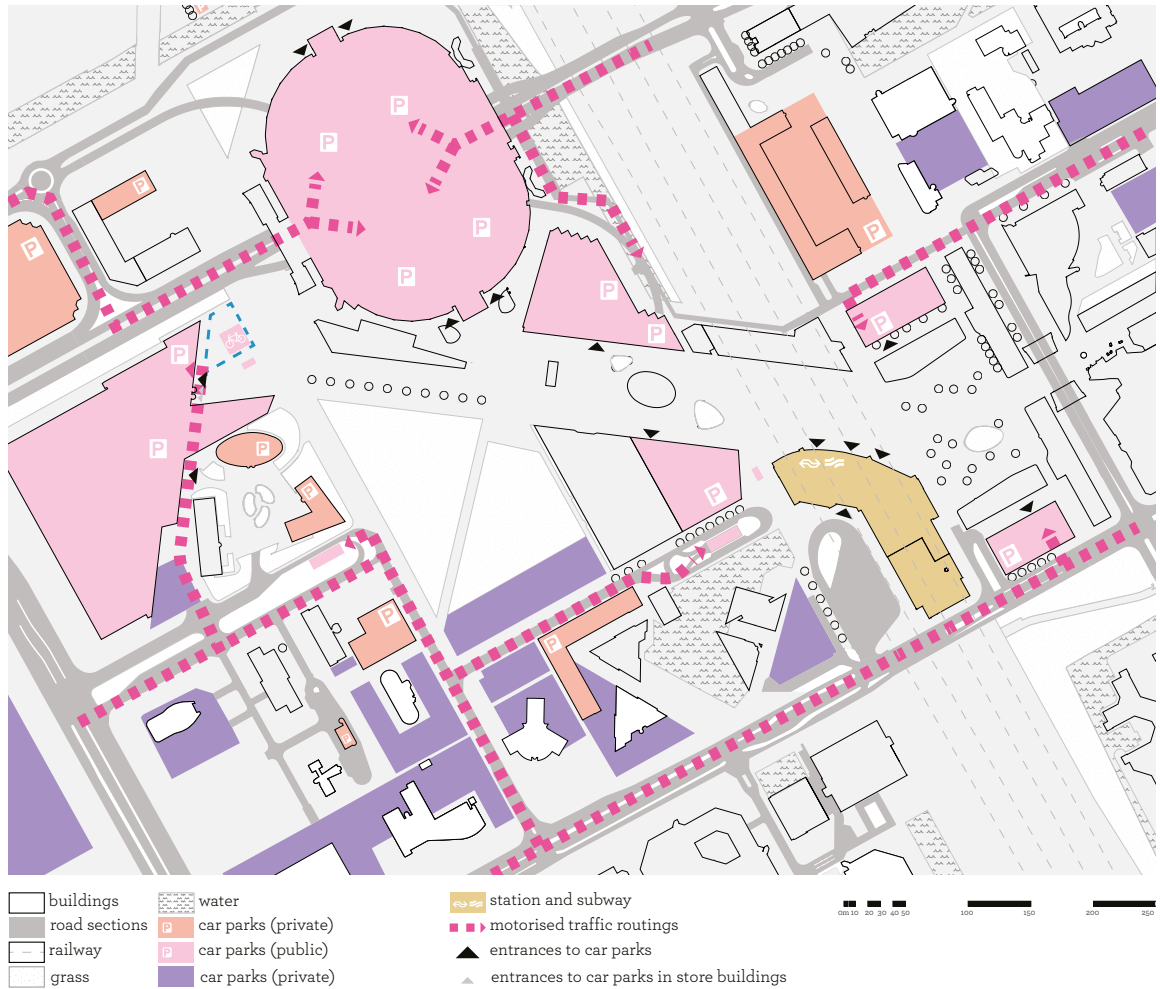


Figure 6.1: Access points in Arena Boulevard





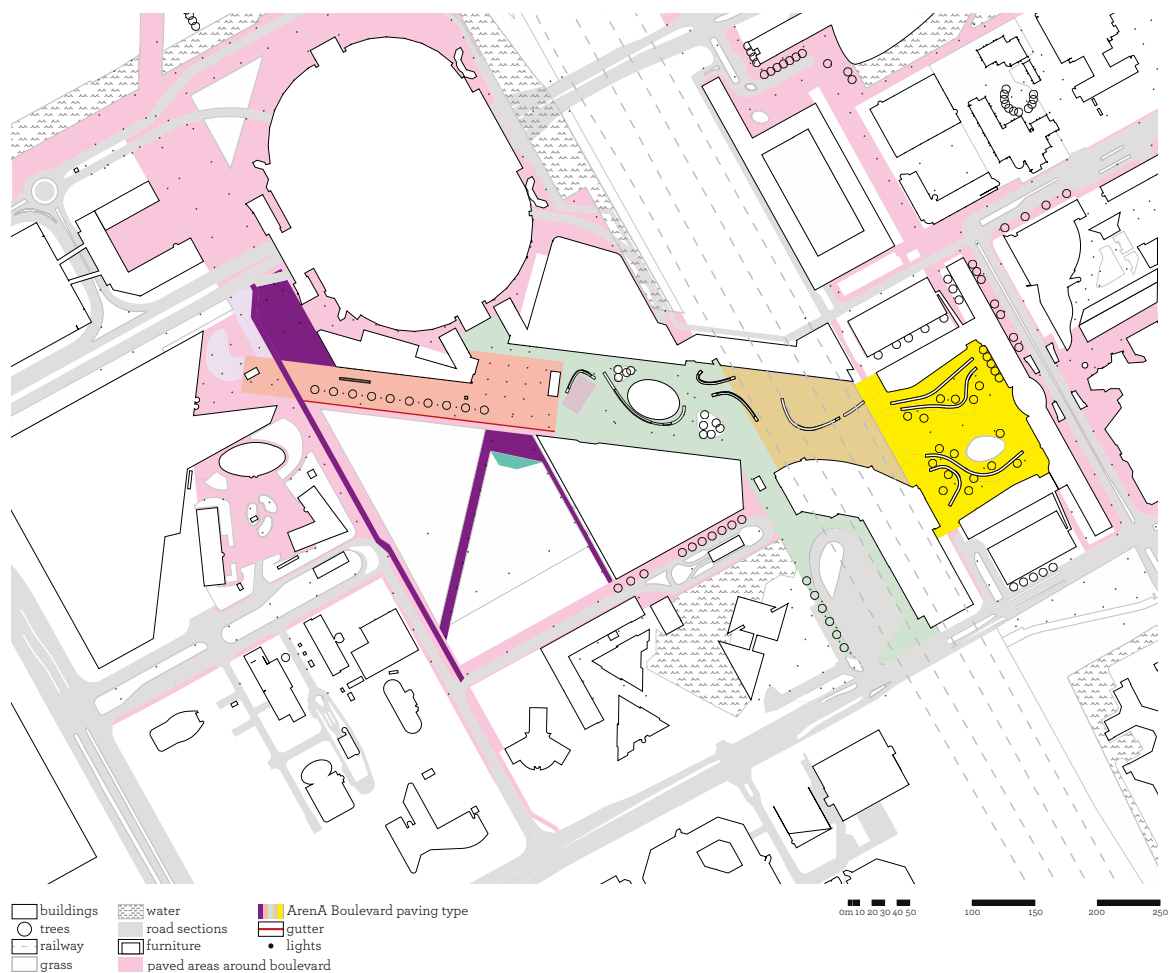


Figure 6.2: ArenA Boulevard as a pedestrian space

The map of the paving shows that the landing strip is subtly divided into several strips. The strips consist of the columns along the facade, the line extrapolating from the bench in front of Perry Sport, the line where the bins are positioned and (installed a few months previously) some anti-terrorism benches, the strip with street lamps and a row of trees, and a drainage gutter with different paving on the field side. The edge of the grass, along

which the tall street lamps and advertising pillars stand, forms the border for the paved surface. The FEBO and JinSo pavilions divide the space into two in the central area between the station and the FEBO snack bar. The landscaped semi-circular benches and islands with trees also restrict and influence possible pedestrian routes.

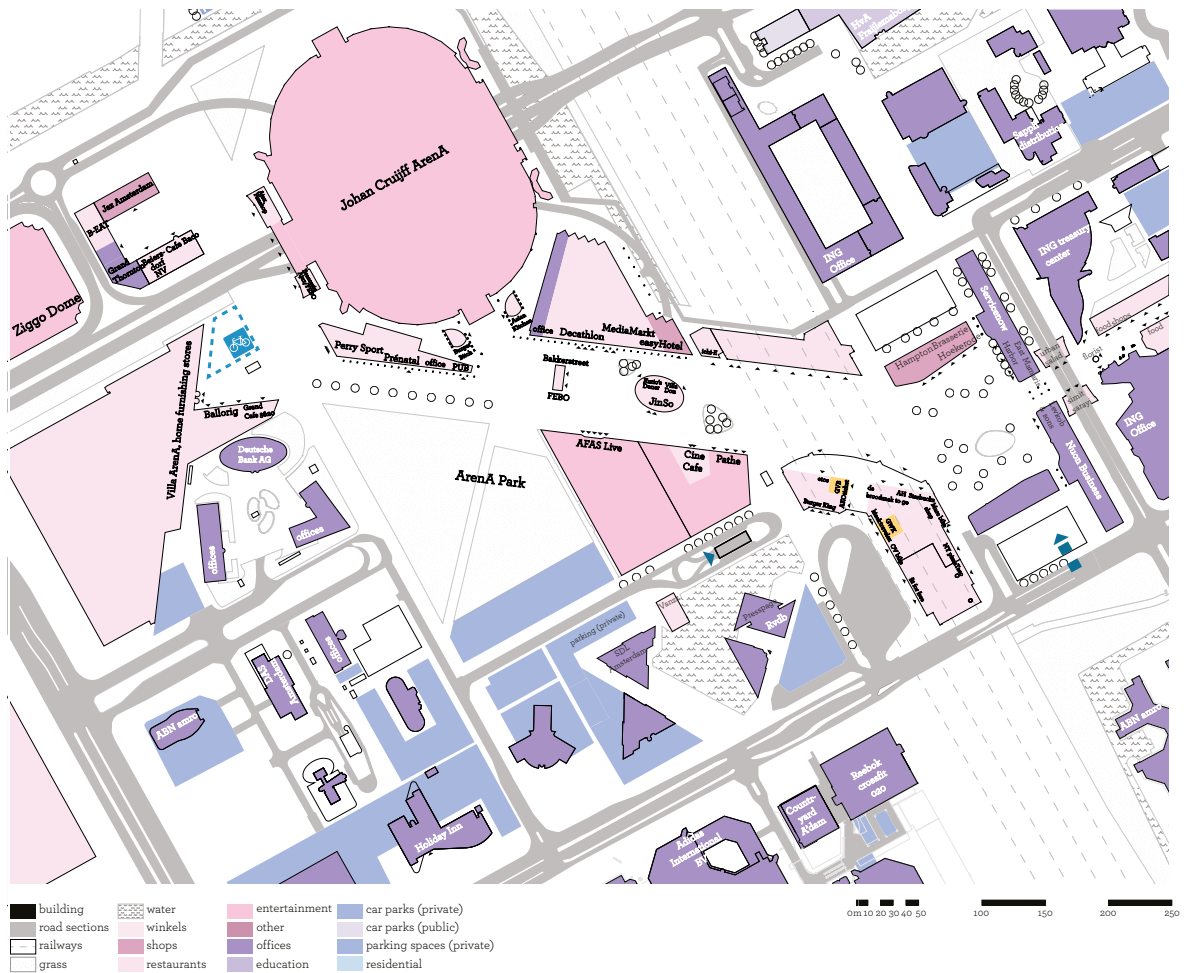


Figure 6.3: Function map of ArenA Boulevard

The rhythm in the use of the boulevard is partly determined by the functions and their opening hours and activities. The function map shows the functions clustered into the categories of retail, amusement, offices, hotels and restaurants/cafes. The hotels are on the boulevard above shops, behind the ArenA stadium and just south of Villa ArenA.¹ The Pathé cinema, AFAS Live, Johan Cruijff ArenA and Ziggo Dome are the major amusement functions.

¹ There are also hotels on the east side of the station and directly to the south, bordering the railway track. These hotels do not have any direct relationship with ArenA Boulevard and they have been excluded from the analyses.

The rhythm in the use of the boulevard is partly determined by the functions and their opening hours and activities.

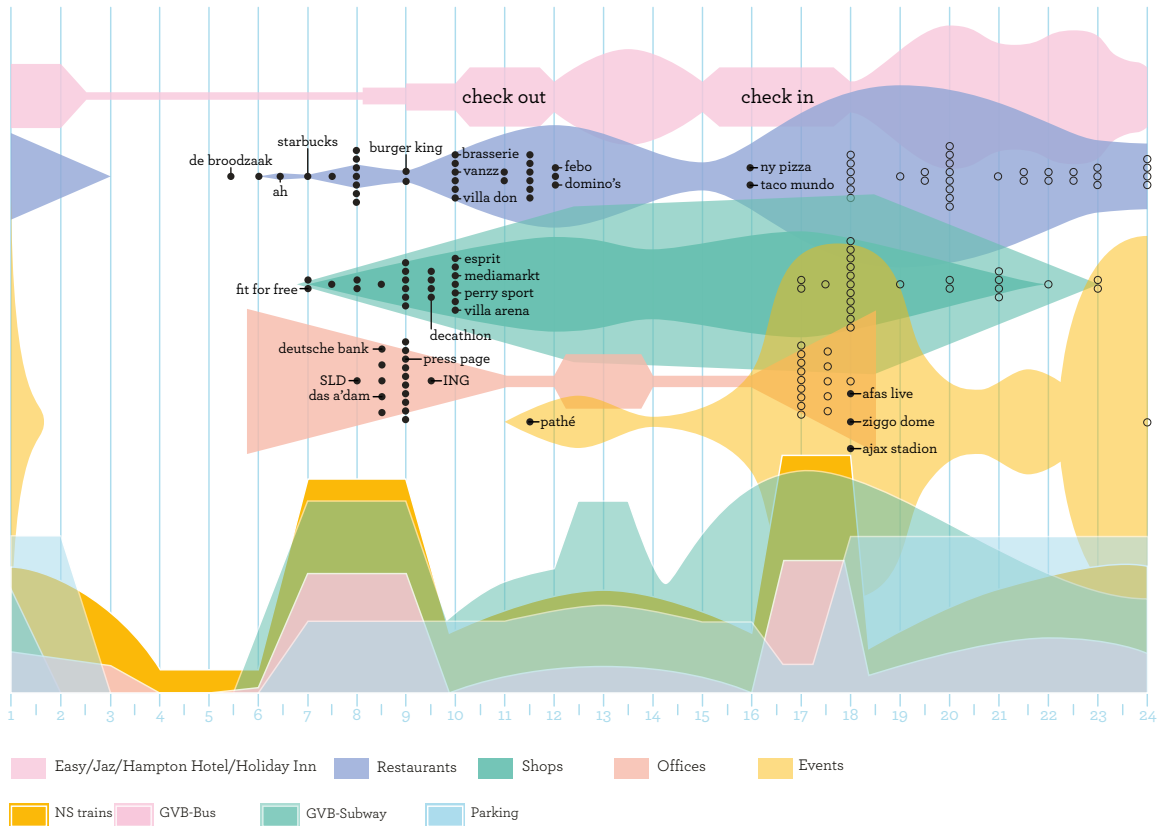


Figure 6.4: Picture of the rhythms in the use of ArenA Boulevard on weekdays. Based on opening hours, Google data on how busy stores are, check-in and check-out times at hotels, and public transport timetables.

The shops are large-scale retail facilities, specialised large stores. Villa ArenA houses a collection of furniture stores while the other stores are located in the arcade-buildings of the ArenA Boulevard with their entrances behind the columns. The office buildings are located at the southwest point, just to the south of Villa ArenA, and to the northwest on the corner next to the stadium (Endemol Shine).

The different functions have different opening hours and peak times. The following figure is based on the opening hours and an estimate of the number of users (via Google) and shows the rhythm and use of the boulevard during a 24-hour period on weekdays.



In the early hours of the morning, most activity is around the station. Sandwich bars and coffee bars open from 5:30 to serve the earliest customers. There is a peak between 8:00 and 9:00 for workers coming to the offices. Many of them arrive by car but some come on foot from the station. Hotel guests who are leaving need to check out by 10:00. That is also when the shops open, including in Villa ArenA. The cinema opens at 12:00 and all the restaurants and cafés are open then for lunch. Office workers also come out onto the boulevard for lunch, especially when the weather is dry. New guests can check into their hotel rooms from 15:00. The day's second wave of office workers follows at around 17:00, this time returning home or (briefly) visiting the restaurants, cafes, shops or entertainment venues. Villa ArenA closes at 18:00. The place is quiet again between 17:30 and about 20:00. Any events start after that but the shops close between 21:00 and 22:00. By 24:00 everything is closed and the final metro and train journeys start.

In the study, we focused on the quiet periods in the evenings during the autumn and winter months. Light plays a particularly important role in the evenings, both through its presence and through its absence, or dark, contrasting spaces with relatively little light. Light also plays a role in public spaces as a 'third dimension' in which it creates an imaginary cover for the space, or because dark spaces (the grass field) form a 'facade'. The map below shows the light intensities in ArenA Boulevard.

The area in front of Villa ArenA is darkest, along with the grass area. The shop windows at the bottom of the Arcaden look light in comparison. There is already more light in the

transition zone, in part because of the screens behind the FEBO snack bar, on the AFAS wall and above MediaMarkt. The network of artificial light starts at FEBO and continues to the roof covering the railway track. Finally, the roofing over the railway is an ocean of light. This reveals the same four subareas that were identified in Chapter 5.

From a climatological perspective, the buildings turn out to create a range of microclimates in the boulevard. They could affect the sojourn quality but could also influence the pedestrian patterns (choosing a route that avoids the wind). The figure below, which is based on measurements and models by Eindhoven Technical University (Blocken & Persoon 2009), shows the windy places when there is a south-westerly wind.

The map shows the change from east to west. The centre area is least windy, the transition zone somewhat more so and the landing strip and periphery most of all. These conditions can affect the sojourn quality.

Picturing pedestrian patterns

It turned out not to be possible for practical and technical reasons to film all spots on the boulevard in such a way that the images could be processed by the software. We therefore had to restrict our study of the pedestrian flows to two subareas in ArenA Boulevard: the transition zone behind the FEBO snack bar and the landing strip. The camera images were taken from the roof of the Deutsche Bank offices. Filming from other spots in the boulevard turned out not to be technically possible.²

² For example, we also filmed from AFAS Live and Pathé, but the light from the screens, the network of lights, Ziggo Dome and the street lamps was too variable to find patterns using the software.

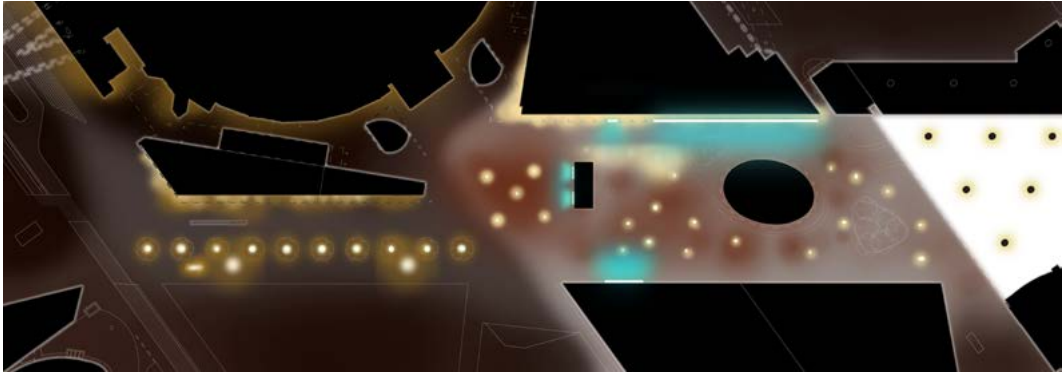


Figure 6.5: Light map for ArenA Boulevard (artificial light and diffused light from screens)

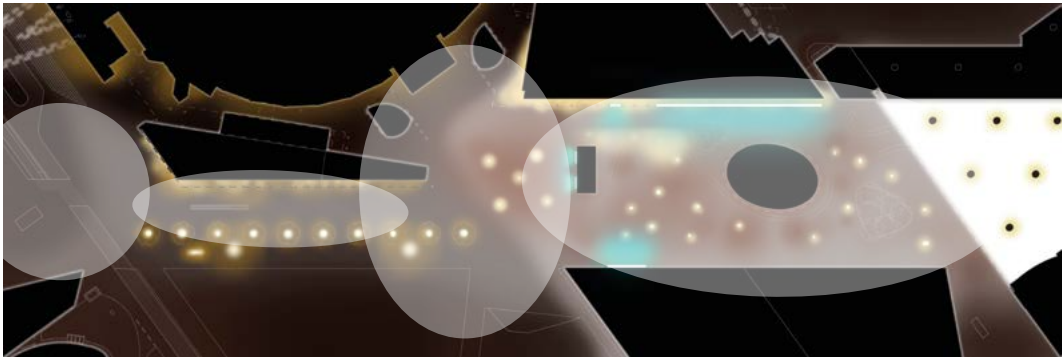


Figure 6.6: Four light-intensity areas in ArenA Boulevard

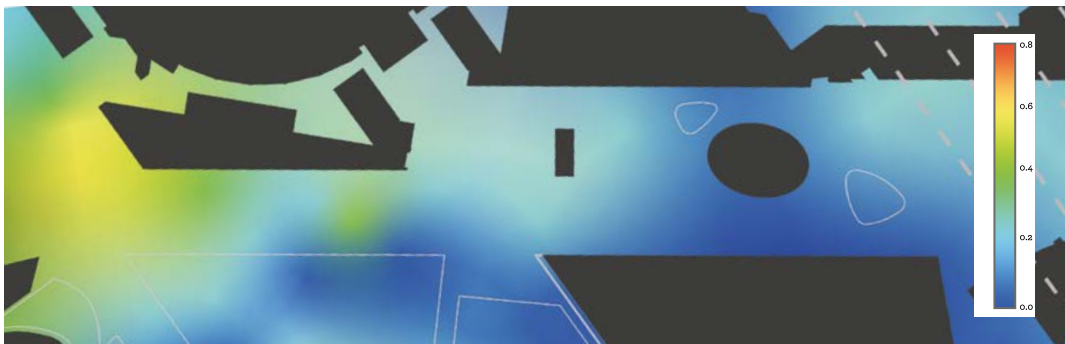


Figure 6.7: Climate-scape in ArenA Boulevard when there is a south-westerly wind (Source: Blocken & Persoon 2009)

Time-lapse recordings were performed for the ex ante and ex post measurements of the prototypes (see Chapter 12). These recordings were made on three days in early 2018 (30 January, 5 February and 6 February) from 17:00 to 21:00. This period encompassed relatively busy times when office workers were walking from work but also quiet periods after 19:00. To produce the heatmaps, the time-lapse images were subdivided into three 30-minute periods (17:00-17:30; 18:00-18:30; 20:00-20:30) so that we could compare them with one another. The final measurement took place on 6 February after we had removed the prototypes again. The climatological conditions on 6 February were comparable to those on 30 January and 5 February (see the figure with the heatmap for 6 February 2018).

The colours in the heatmaps show the routes and the intensity with which they were used. Knowledge of these flows points to the 'catch area' for the responsive installation and the places where pedestrians should be able to see and be prompted by the installation. Should a relatively quiet spot be chosen as the location for a responsive installation or on the contrary a busier spot? How should the installation incorporate this knowledge of pedestrian flows and occupation patterns? Manual observations were also conducted in the two subareas (the landing strip and transition zone) in October 2017 on five different weekdays, in the morning, afternoon and evening. That resulted in a total of 163 observations of pedestrian routes. We followed the users in a certain part of the boulevard and noted the route on a street map. Three maps were made of the transition zone in quiet periods in the morning, afternoon and evening. A summary map was also produced.

Furthermore, 120 students performed counts of the number of pedestrians under similar conditions on four evenings (Tuesday to Friday) in October 2016, from 18:00 to 19:00. To do this, the boulevard was divided into sections with the students counting the people who entered a section. These data give an indication of the differences in intensity in the boulevard (see figure) that we do not see in the other measurements.³

Pedestrian patterns: lessons and insights

The map of the intensity of use of ArenA Boulevard in the evening once again shows the division of the boulevard into four subareas.

Figure 6.9 then shows the pedestrian flows during three different time periods on 6 February 2018. The sun set at 17:35, so conditions changed around then from relatively light to dusk. The colours in the heatmaps show the routes and the intensity with which they were used.

The pedestrian flows move almost in a straight line across the landing strip. On reaching the transition zone, the flows turn towards the narrower passage between JinSo and the cinema (a). The straight paths in the landing strip are interrupted at various points by a path that crosses at an angle towards the corner of the Arcaden (b). Traffic from or to the entrance to the Johan Cruijff ArenA car park could be one reason for this. These people crossing the boulevard could perhaps be the same people who crossed at an angle from the grass area, purposively walking towards their goal (c).

³ The picture of the intensity of use in the central area is based on the qualitative observations.

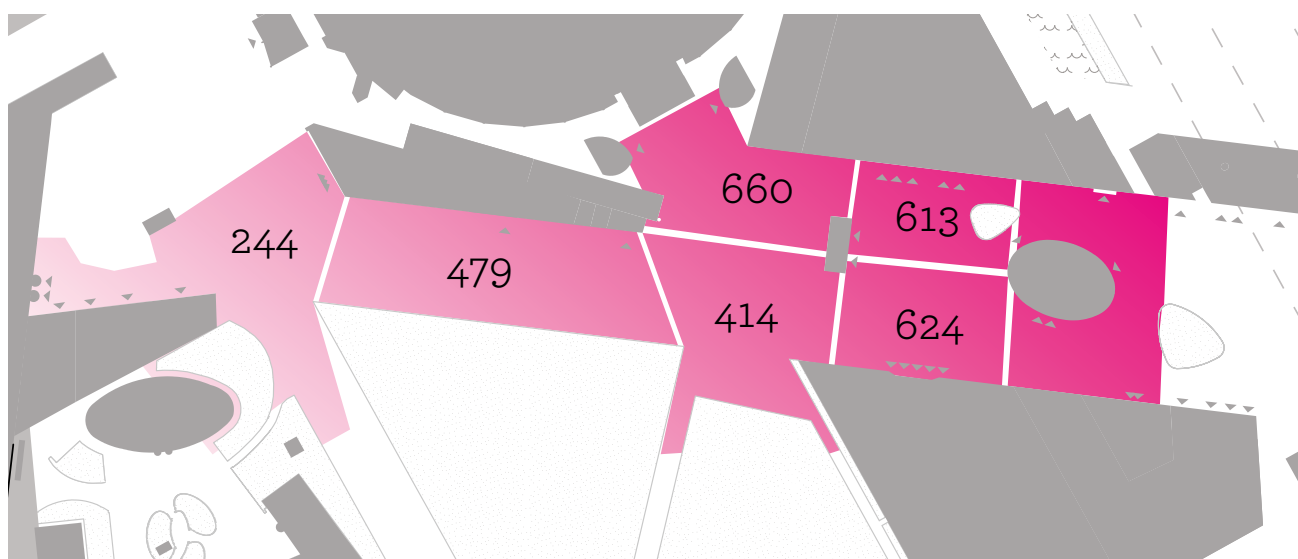


Figure 6.8: Differences in intensity of use in ArenA Boulevard

During this time period, the flows are concentrated at the edges of the space, near the Arcaden (d) and the border of the grass field (e). A smaller flow can also be seen of people walking along the north side of the row of trees (f). However most people choose the route on the grass side (e), which is also the shortest route between the offices and the station. A striking finding is that the open area between the row of trees and the Arcaden (g) is used less.

Various points can be seen where people choose different paths or where flows actually converge (h). One of the popular spots (i) is in front of MediaMarkt and Decathlon, just a few steps from the point where people enter and exit the shops. The curved bench also influences the choice of path for pedestrians here. In the transition zone, a diagonal path can be seen between the northeast side and the corner of the FEBO pavilion (j).

These data reveal an indication of the differences in intensity on the boulevard that we do not see in the other measurements.

Once dusk has arrived in the boulevard and most office workers have gone home, the pedestrian patterns change subtly (see middle map). The route along the grass is still the most commonly used route (e) but more people walk past the trees (f) compared with the previous map. The spaces in front of the Arcaden also seem to be used more intensively (d) whereas once again few people walk down the middle of the boulevard (g). The heatmap also shows the switch points where flows diverge or converge. The spot in front of AFAS Live is a crossroads for multiple destinations (h). This connects to the ArenA car park (and the stadium inner ring), the route along and under the Arcaden, the route along the row of trees and the route along the grass. There is another switch point on the east side of the boulevard (k).

Once it is completely dark, the grass park forms a dark, unlit 'facade'. The heatmap (map on the right) shows that the main flow now passes alongside the Arcaden (d). The strip alongside the grass 'facade' is still used, but less intensively compared with the Arcaden side (e). Two switch points can now be seen in the space, one next to Perry Sport (k) and one next to AFAS Live (h). These are points where people choose which path to take or where paths converge. Finally, there are more diagonal tracks, relatively speaking, compared with the earlier time periods (l).

Qualitative measurements were used to obtain a picture of the pedestrian patterns in the transition zone (19:00–23:00). The Johan Cruijff ArenA car park is an important access point. The stores were still open for a few hours during the measurement session, closing one hour before the session ended. Passers-by chose the direct route between the car parks and the stores, passing partly below the Arcaden. Furthermore, a relatively large group of pedestrians chose the inner ring past the ArenA. A cross shape can be seen in the transition zone itself, with the pedestrians crossing the space in a straight line and purposively.



17:00-17:30

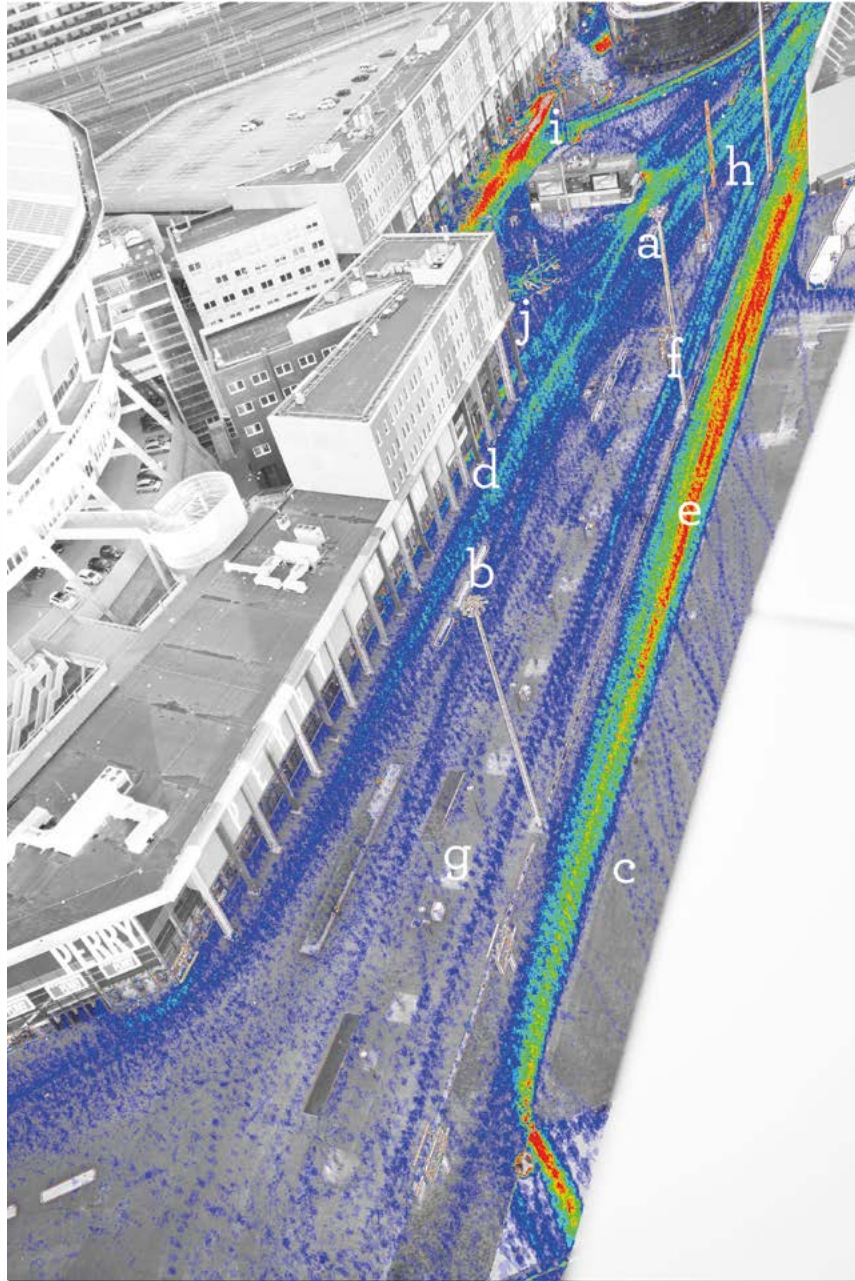


Figure 6.9: Heatmaps of pedestrian flows for the periods 17:00–17:30 (light); 18:00–18:30 (dusk); 20:00–20:30 (dark). Recording date: 6 February 2018

18:00-18:30

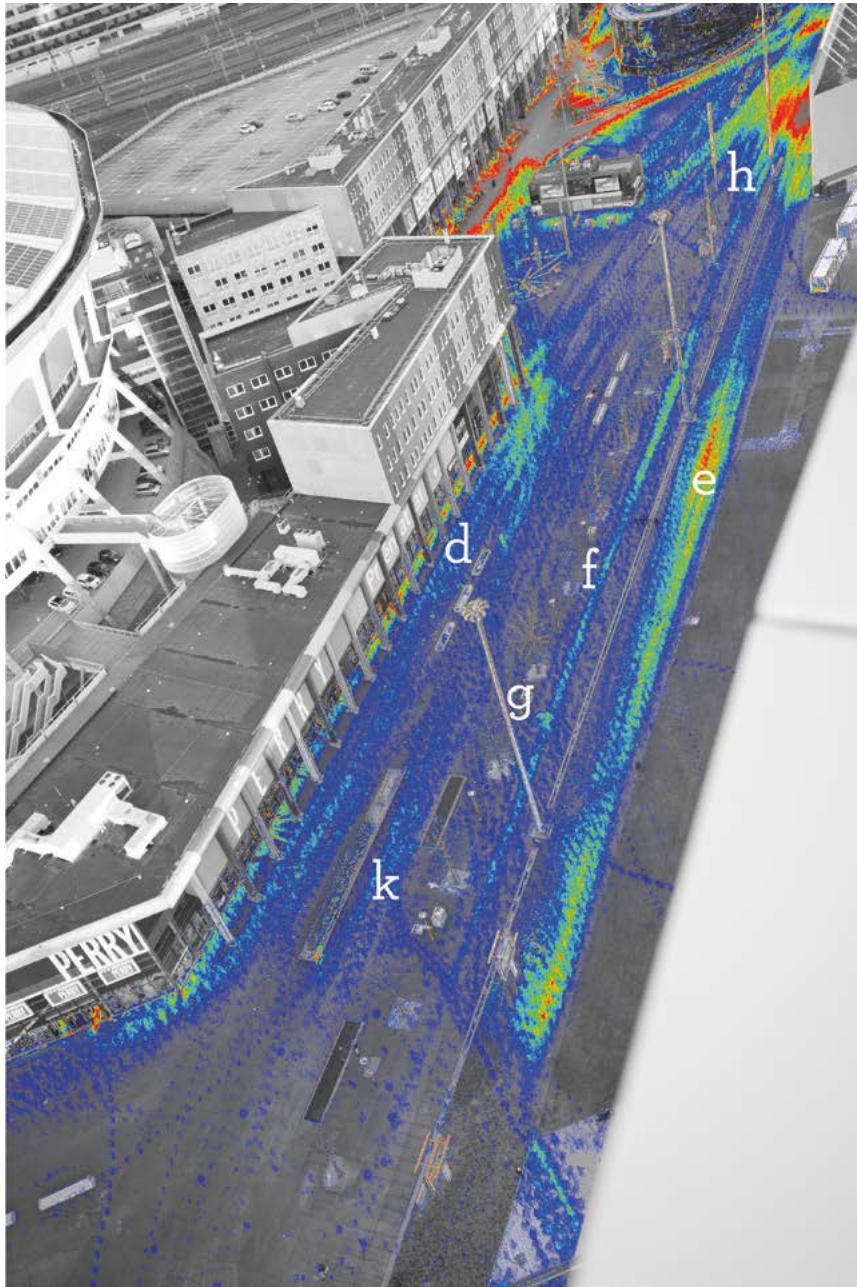


Figure 6.9: Heatmaps of pedestrian flows for the periods
17:00–17:30 (light); 18:00–18:30 (dusk); 20:00–20:30 (dark).
Recording date: 6 February 2018

20:00-20:30

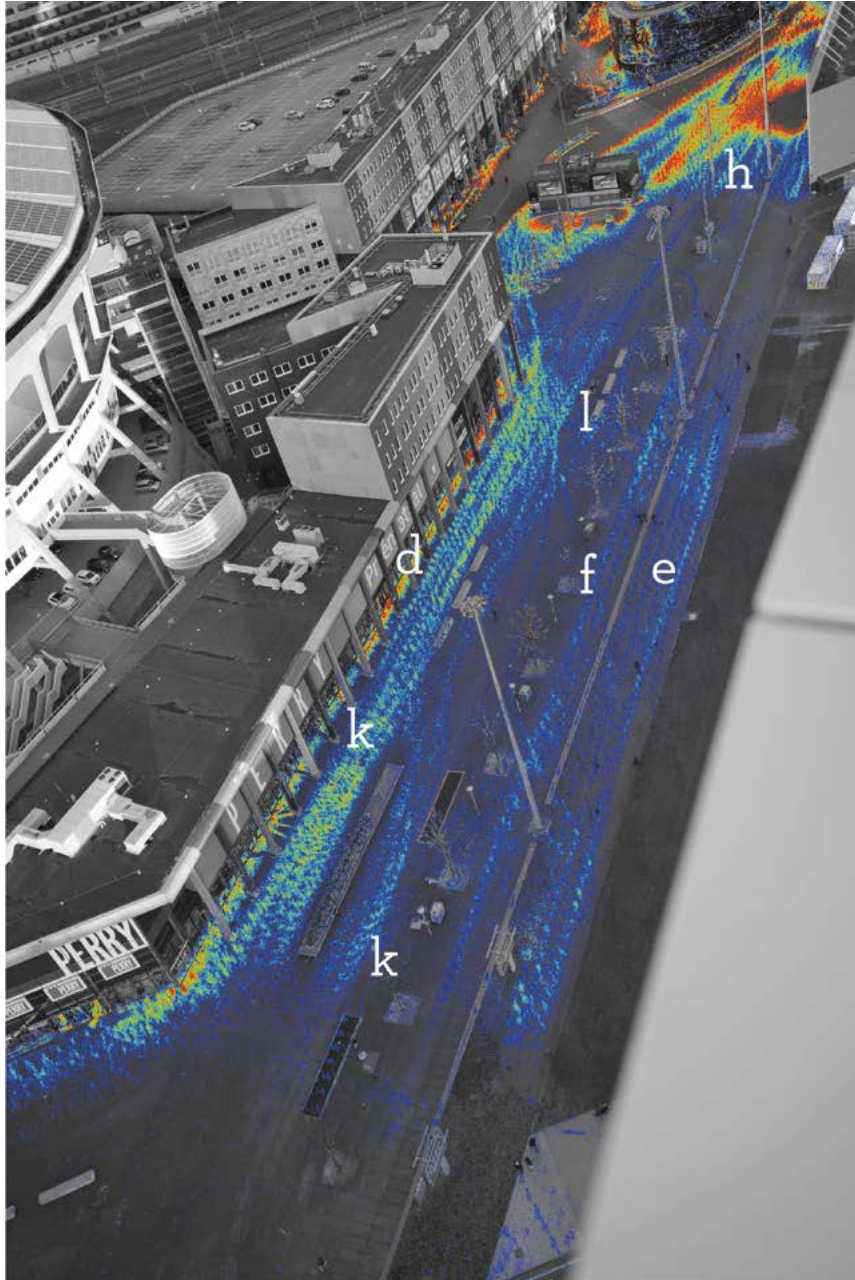


Figure 6.9: Heatmaps of pedestrian flows for the periods
 17:00–17:30 (light); 18:00–18:30 (dusk); 20:00–20:30 (dark).
 Recording date: 6 February 2013

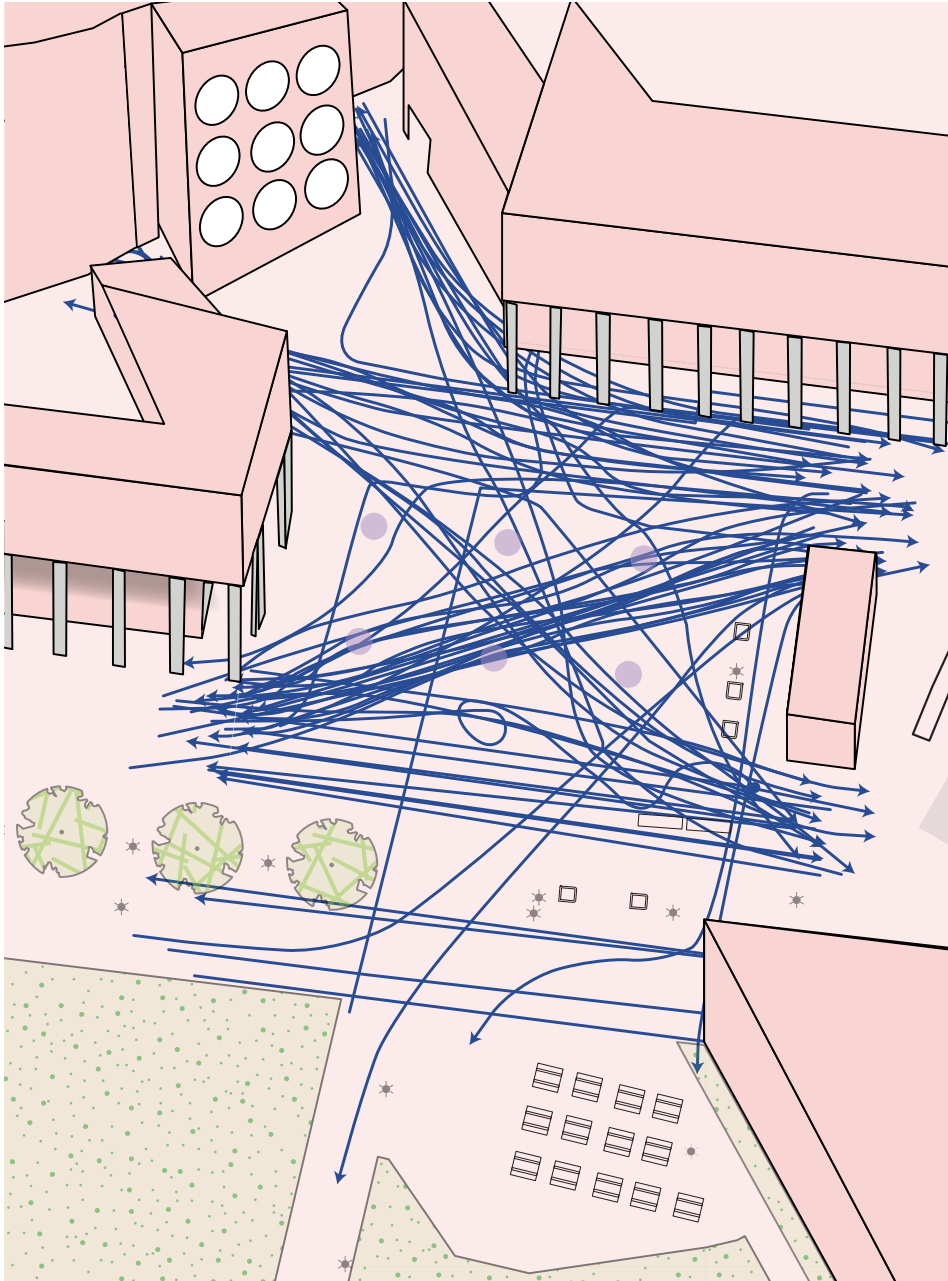


Figure 6.10: Qualitative record of the pedestrian patterns in the transition zone. Aggregate map: 19:00–23:00.

6.4 Conclusions.

The use of the boulevard is characterised by peaks caused by events and a regular rhythm related to the office hours and shop opening hours. The boulevard's four subareas, which were established and described in Chapter 5, can also be related to the intensity of use, amount of wind and light intensity. The centre area is busiest, has most artificial light, the highest concentration of functions and the least wind. Moving in the direction of the transition zone, landing strip and periphery, the boulevard gradually becomes less busy with less artificial light, fewer functions and less comfort. The offices and hotels, which are mainly to be found to the west of the boulevard, form an exception.

Various patterns can be seen in the pedestrian flows. Straight routes are mainly taken across the landing strip. The visitors act in a purposeful manner. Most passers-by choose the shortest route from their access point to their destination (station/car park to office/shops and vice versa). Once it is completely dark, more diagonal routes can be seen but they are still exceptions and seem to be the result of a targeted pedestrian route. The position of benches, paving and borders around the square mainly affect the pedestrian patterns once a route has been chosen.

People mainly walk along the edges of the square on the north and south sides. The conditions of light, dusk or dark seem to influence people's choices. When it is light, people are more likely to walk past the grass edge while in the dark they are more likely to choose the route alongside the shops. There

are slightly fewer straight lines to be seen in the evening. That could be due to somewhat more individual behaviour and the increase in groups other than office workers in the evening.

Two switch points can be identified in the boulevard: the area in front of AFAS Live and the space next to Perry Sport. At these points, the various flows converge or paths diverge.

Regarding the transition zone, pedestrians appear to cross the space purposively. It is a crossroads for multiple routes. In the evenings there is also an important route along the rear of the shops towards the hotel Jaz and Ziggo Dome.



If we want to enhance the qualities of a place through a responsive design, the flows point to at least four potential building blocks.

Building blocks for the design:

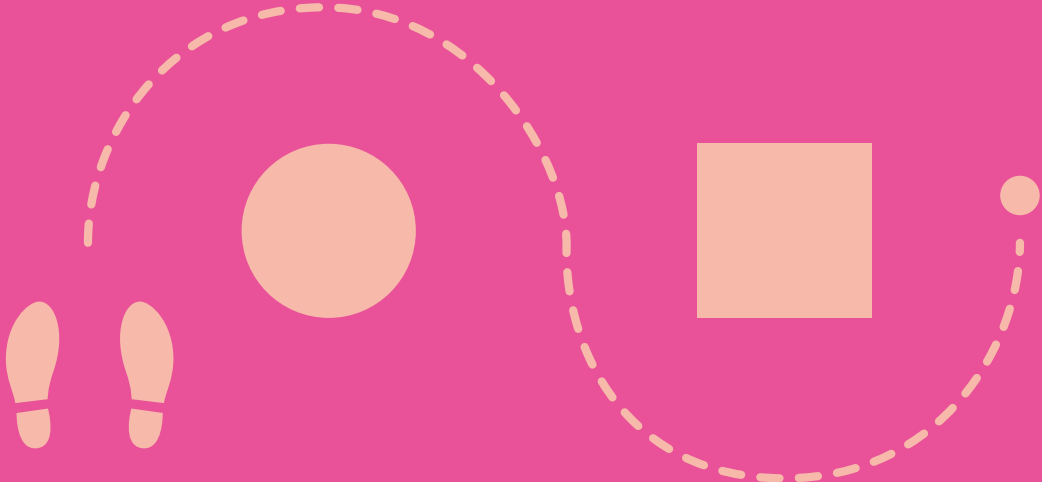
- There are clear differences in the boulevard between busy and less busy spots and routes. Hubs can also be identified where flows converge or diverge. These patterns show the flows that an installation could key into or influence.
- In the dark, the focal point of the pedestrian patterns in the landing strip shifts towards the arcades. The edge of the grass is then much emptier and darker. Could light be used to create a path that can become a central route in the dark?
- People spread out across the landing strip but once they have chosen a route, they keep to it and choose a fairly straight path. With knowledge of these patterns, a responsive design can key into this or alternatively disrupt it.
- The transition zone is used in a functional manner and the pedestrian patterns lead to a crossroads, a point through which most pedestrians pass. This suggests a natural central point for this subarea.

Part III: Research for Design: 'Building Blocks from the Bottom Up'

7.

The place seen
from eye level:
behaviour, use
and experience
of the space.





The place seen from eye level: behaviour, use and experience of the space.

The analysis of the built environment and the pedestrian patterns (Chapters 5 and 6) give us a picture of the conditions and rhythm of the place. This shows a large space that can be subdivided into four subareas. In quiet periods, users navigate the space in straight lines. But how do people experience the space? How do they behave and how do they perceive this place? We investigate these questions in this chapter. A responsive design can use this knowledge so that it can anticipate users' behaviour and perception of the space.

7.1 Approach to socio-spatial research.

A socio-spatial analysis can be used to study people's use and perceptions. This is important because a space can have various different meanings that remain hidden for professionals. People's use and appreciation of public spaces

can differ fundamentally from the ideas of urban planners and designers. Furthermore, the meaning of a space is determined not just by the spatial structure, the facilities and the ambience but also by digital and mobile media, visitors' motives at different times of the day, and individual and collective memories.

The social analysis can be broken down into a number of different questions. What groups of users are there at what times? How do people walk across and linger in the different parts of the space? What interactions are there between people? Which parts of the space do people find pleasant to walk through or linger in, which parts do they find unappealing, and why? Examining how a public space is used and experienced at different times and by whom enables a more precise determination of the assignment. An answer can then be given to the question of what a responsive space can add and enhance at a given spot.

Qualitative research methods such as observations and interviews have a long tradition in urban sociology and are suitable methods for investigating the behaviour and perceptions of individuals in the public space. Such qualitative studies can be used both for the *ex ante* measurement for the purposes of the assignment and for the *ex post* measurement after an intervention or prototype aimed at improving a spot. Since Jane Jacobs (1961), observations have been used in an inductive manner to investigate how public spaces function (for instance, Lofland 1973; Whyte 1988; Reinders & Ten Westeneind 2011; Van der Wilk 2016). The Danish architecture firm of Jan Gehl (2011) has taken the observational research of Jacobs and Whyte a step further, using maps to show how the sojourn quality of certain places can be enhanced.

Various qualitative methods and notation techniques need to be used for the analysis in order to obtain information about the spot in different ways. The combination of different research methods is termed 'triangulation'.

In the present study, we used a combination of observations, shadowing and street interviews, supplemented with photographs and time-lapse images produced by two GoPro cameras. These qualitative methods at eye level were used to investigate people's behaviour (how they walk, their attitude, how they look and the meaning they assign to spots). We used the same qualitative methods to examine the effect of a simple prototype for a responsive space on people's behaviour, interactions if any, how they looked and their perceptions (see Chapter 12).

Observational research

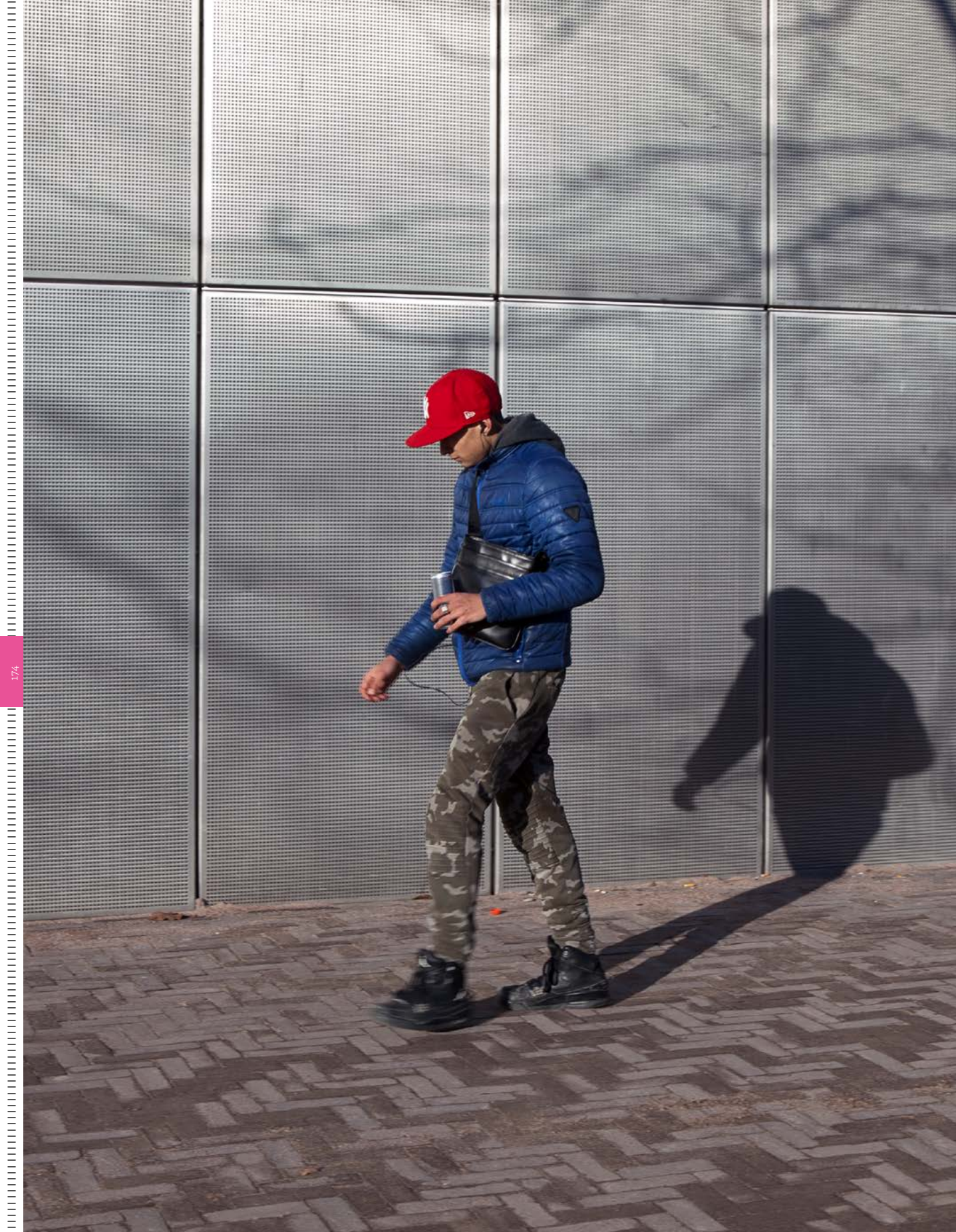
There is a long tradition in urban sociology of research that consists of meticulously observing people's behaviour in public space. Observations can be used to examine where people stand, sit and walk in the space and how they 'appropriate' the space and the street furniture. How long do they remain in the space? What groups of users can be distinguished? The observations can be incorporated in street plans or maps, in which people's usage is noted down. Various methods can be used to perform the observations. One is to do so manually, with the researcher observing the users. Another method is to use cameras that take time-lapse photos of the usage.

Street interviews

Interviews with various groups of users are an important tool for finding out what motives people have for visiting a space and what meaning they assign to it. The interviews must not last too long and should consist of only a limited number of questions.

'Walk-along/go-along' interviews/ 'shadowing'

The researcher can walk along with people for a while to find out what routes they take and how they experience different spots as they do so. During or after this walk, the researcher can ask a number of questions about the person's perceptions and the route. We used the shadowing method, but without ending with an interview after the route had been completed.



Picturing the usage

We incorporated the data from the observations and interviews in heat maps (showing pleasant and unappealing spots in the boulevard) and usage maps (showing interesting aspects of usage patterns in various parts of the boulevard) as a way of linking the observations to places and locations.

7.2 ArenA Boulevard case.

ArenA Boulevard is a large-scale functional, spatial environment that receives a diverse range of groups and visitor flows. Arena Boulevard experiences big peaks, when it is crowded, and other periods when it is very quiet. It is an important location for events. The space has fixed rhythms on weekdays too, determined by office hours, the opening hours for the shops and cinema, and times when an event is on in Ziggo Dome, AFAS Live Hall or the stadium. To some extent, the rhythm encompasses the entire ArenA Boulevard, in particular when events are organised (on occasion simultaneously in AFAS Live Hall, Ziggo Dome and the stadium). However, the various parts of the boulevard have their own rhythm linked to the office hours, lunch times and opening hours of the amenities. To understand what can be achieved with a responsive installation in quiet periods, it is also necessary to have information on the busy periods and the collective rituals of events and other happenings.

Chapter 2 already explained that ArenA Boulevard functions at all spatial scales, from local, urban, regional and national to global, and that it is visited by a diverse range of visitors. A public domain can emerge prior to and following events when the parochial domains of like-minded groups of visitors temporarily come into contact. The pedestrian routes of concertgoers cross those of shoppers and office workers. For example, at certain events, flyers might be handed out to arbitrary passers-by. In this way, passers-by (shoppers, office workers) are confronted with a different world merely by looking at it.

The public space is a communal space where a wide range of visitors may be surprised by the activities and a certain atmosphere, a spot that invites them to have brief encounters. In part because of this, the place already has a collective memory. For example, various events took place during the study period that visitors will remember, from concerts, the spectacular show *The Passion* and a Christmas show to soccer matches. Famous artistes performed there. However, the events mainly take place within the buildings and the boulevard itself is such a well-oiled machine that even the very next day there is often no sign of what happened the day before. The events and experiences leave little in the way of visible traces.

An ordinary weekday on the boulevard.

What is the situation on an ordinary weekday? Between 7:30 and 9:00, people walk purposively and fast from the car parks and station to their work in the office buildings. They take the shortest route along the grass patch. Then it becomes less busy. There is a quiet period between 10:00 and 12:00. At 10:00, the large stores open (MediaMarkt, Perry Sport) and the first visitors trickle into the shops. People from outside the city park their cars in the P+R under the stadium and then walk to the metro to spend a day out in the city centre. It becomes busy again in the lunch break, between 12:00 and 13:30, with office workers who go for a brief walk or fetch a sandwich from the other side of the railway track. There is a quiet period again in the afternoon, although there are slightly more visitors than in the morning. From 17:00, office workers leave to go home, heading towards the station and car parks. If there is an event on in Ziggo Dome or AFAS Live Hall, visitors arrive in the evening from 18:00 on. If nothing is on the programme, it can be very quiet, especially in the western part of the boulevard. In the eastern part of the boulevard near the Pathé cinema, it remains lively until at least midnight. JinSo is open until midnight. Perry Sport, Prénatal and Decathlon close at 21:00 while MediaMarkt is open until 22:00. In the evening, people who have gone out for the evening return to the car parks while tourists walk to the hotels. The pedestrian flows are mainly along the edges. On Wednesdays and in the weekends, there are far more families on the boulevard, shopping or going to see a film.

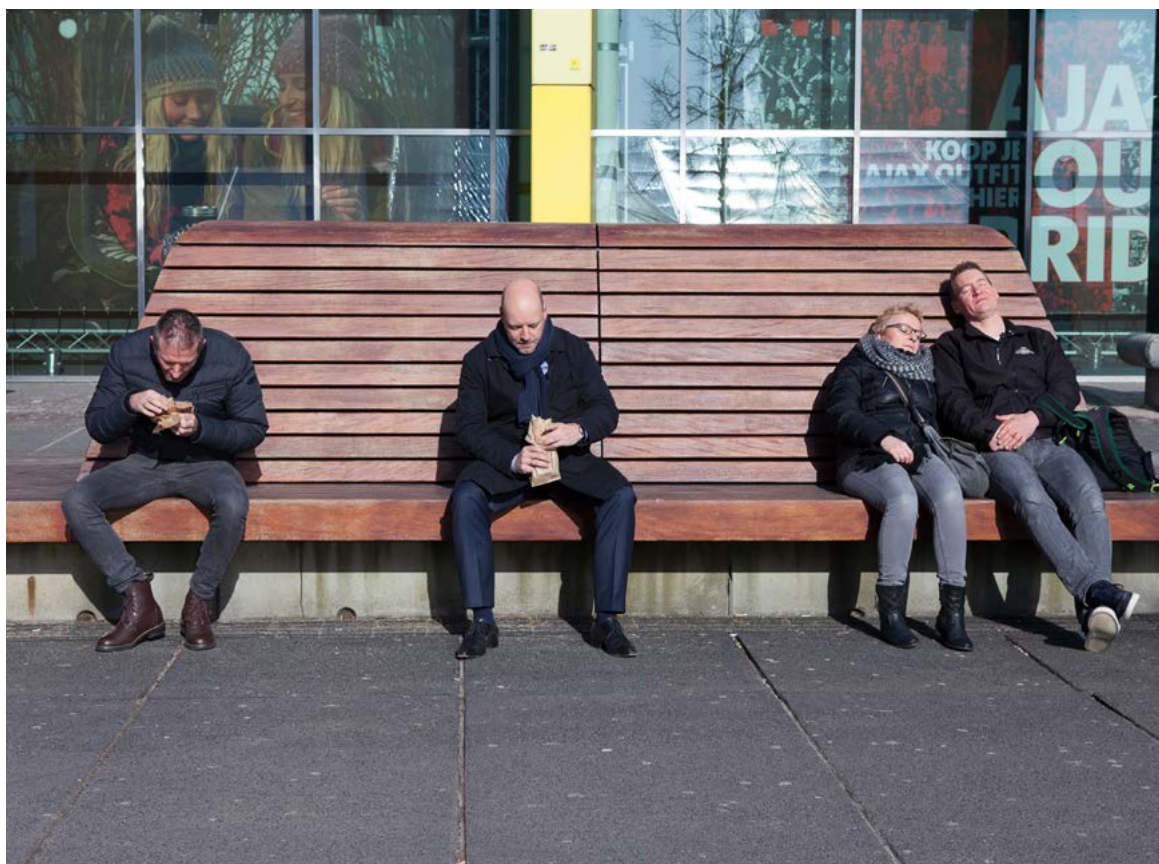




7.3 Behaviour in the space.

We performed observations in the boulevard to investigate how the space was used on a daily basis. Observations were made in the spring (March and April) and autumn (October) of 2017 on five different weekdays. Sessions lasted two to three hours and were held in the mornings, afternoons and evenings. This produced 150 observations, lasting 2 to 10 minutes. We used observations to scan the space. We stood in and walked through the space, observing what happened and noting this down on the street map of the boulevard, which we had divided into sections.

We continued with the observations for as long as was necessary to reveal patterns in how people walked, lingered, behaved and looked around them. After a while, certain spots, routes, behaviours and rituals began to stand out, such as the pedestrian routes across the square, the ways in which people walked, a smokers' spot and spots where people took selfies with the stadium. These observations gave information on the usage and behaviour by various groups of users in different parts of the public space at specific times.



Observations.

To get a deeper understanding of the use of the space (under different conditions), we observed not just pedestrian routes but also how people walked, where they stopped and stood, and whether they were alone or in a group. Who is doing what, where and at what times? How do they walk, stand or sit? We observed what people did other than walking purposively to their destination. Do they saunter, linger, sit down or look around? Do they make contact with other users? Who are those users? In doing this, we paid attention to the following aspects:

1. How people move forwards: how people walk, from advancing purposively with a firm step to sauntering and stopping from time to time. What routes do people take?
2. If people stand or stop for longer than three seconds, what exactly do they do while standing or sitting, for example waiting in front of a shop, smoking a cigarette, drinking

something, looking around, packing their shopping, looking at their phone or eating a sandwich on a bench, taking a photo, drinking, etc. In what spots do they do this?

3. How people look. Do they look at their surroundings (are they triggered by what they see in their surroundings), at other people, at the ground? How can people's attention be briefly diverted from their mobile phones? Do people still look at one another? Is there still visual interaction (watching and being watched) with other people or not?
4. What kind of people are they (male/female, age category, specific group)? Are they alone, in a pair or in a group of three or more? Are they adults only or do they have children with them?

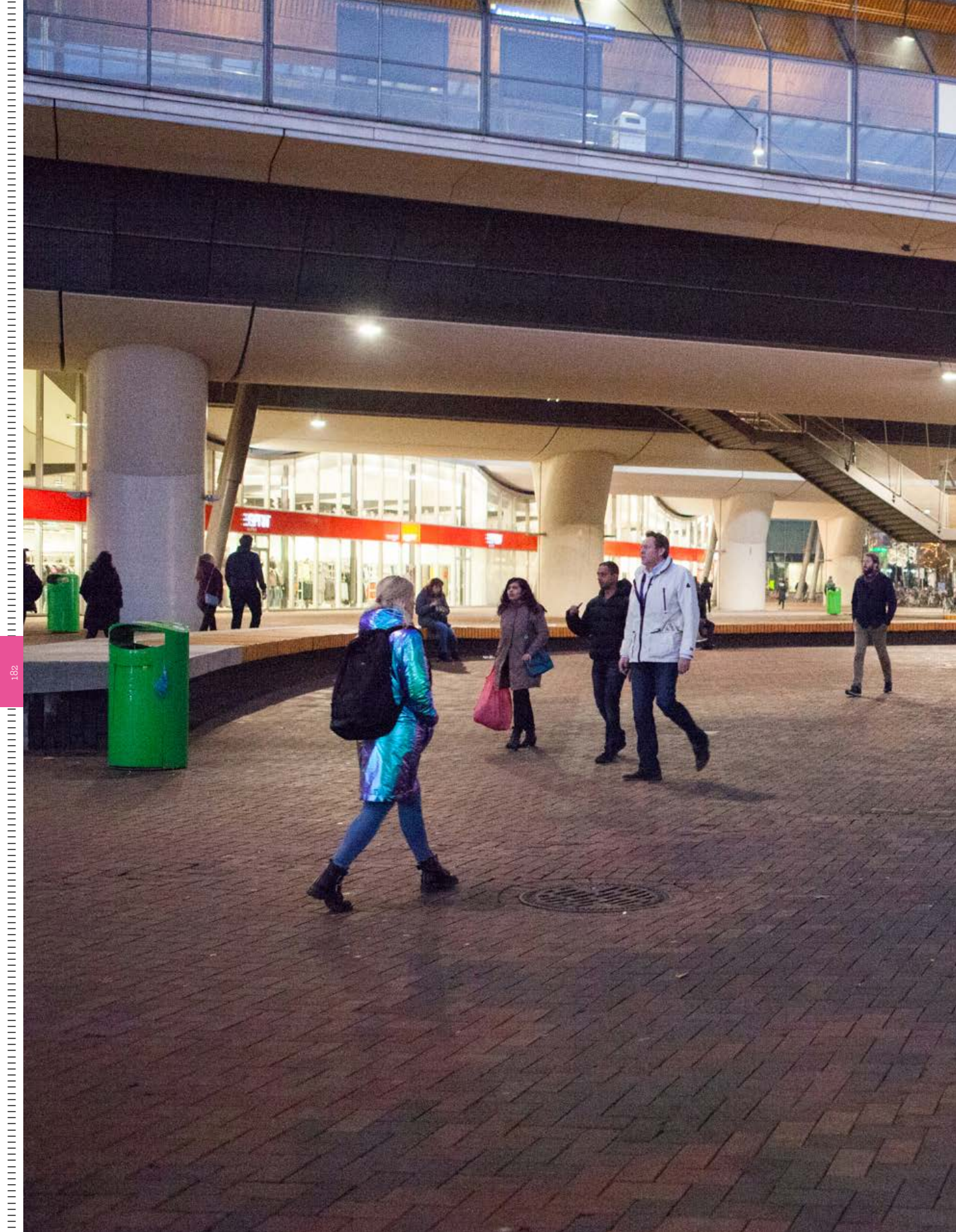
We noted the observations down on a street map and described the usage per area.



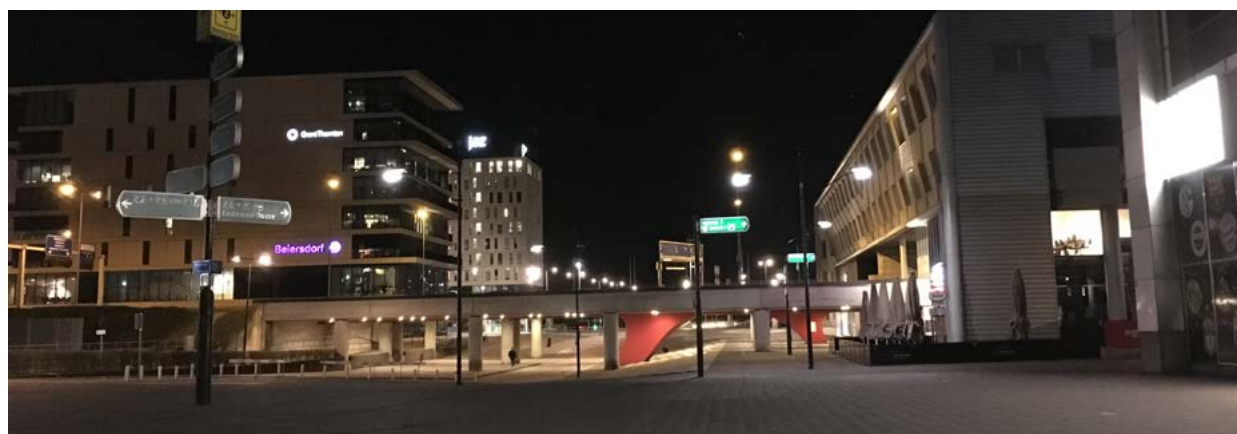
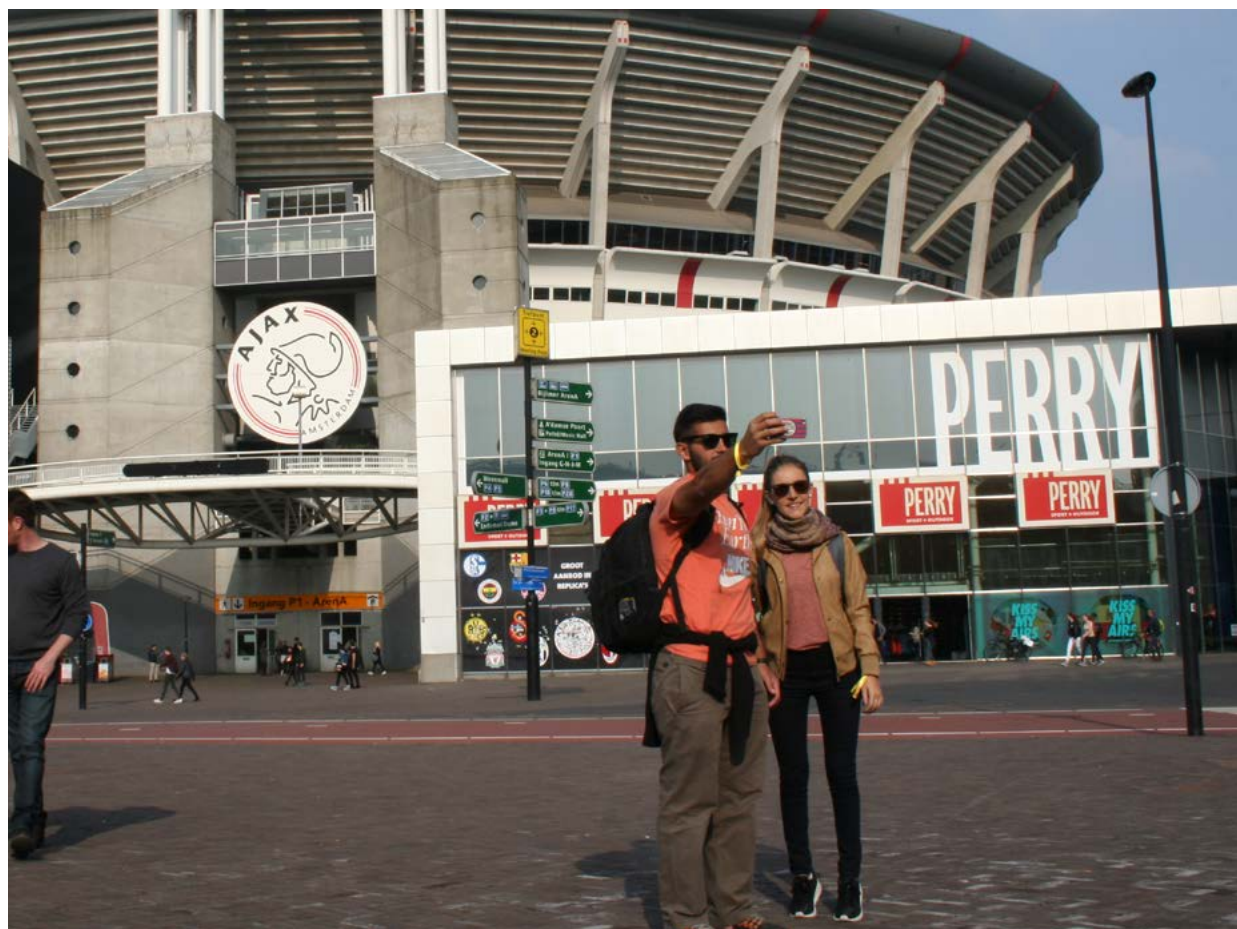


The observations show big differences between the different times of day and between places in the boulevard.











The season and weather have a major impact. Usage and behaviour vary a great deal during the seasons, the week and the day. There are huge differences between busy periods and quiet periods during the week and even within one day. The quietest periods of all are the mornings. The shops only open at 10:00. The situation in the afternoon varies. It is busier with children on Wednesday afternoons and in the weekends. The place is emptier on weekdays and during term time, with the exception of the lunch break when the weather is fine. There is more to do in the boulevard in the evenings (the cinema, pavement cafes; MediaMarkt is open until 22:00 and there is regularly something on in AFAS and Ziggo Dome). Yet if there are no events on, the boulevard is actually very empty and desolate after 18:00.

Morning

At the start of the working day, office workers cross the square from the station to the office buildings (returning in the evening). They generally walk quickly and purposively. People who are walking on their own are often talking on the phone or looking at their phone as they cross the space, so they pay little attention to the other visitors. Many people also have ear plugs. These individuals are clearly adopting a privacy shield. Shoppers also often walk purposively from a car park or the station to one of the big retail stores such as MediaMarkt. Both office workers and shoppers are usually in an individual bubble or a 'parochial bubble' (because they are in a group with colleagues or family members). There is minimal interaction with other groups in the public space. People sometimes glance at their surroundings while walking, but most people do not look at one another at all or only very briefly. The dimensions of the boulevard also mean that the distance between users is relatively large, especially in

the western areas. As a result, pedestrians do not need to adapt their walking routes to allow for other users, so you do not get the 'street ballet' that Jane Jacobs described as a feature of lively pavements.

Afternoon

On weekdays, the place suddenly becomes busy during the lunch break. Office workers walk in groups to the sandwich bars on the other side of the station. The office staff are now more receptive in their attitude and movement. Some workers from the office buildings go for a jog during the break. Another group of office workers has organised a boot camp. Sometimes some office workers play soccer on the grass field or in the boulevard. Children who are visiting the Johan Cruijff ArenA play with a soccer ball on the boulevard. ArenA Boulevard can be busy during the school holidays. The cinema attracts a lot of families with children. The Ajax shop and the stadium (with guided tours) are also a popular destination for families and groups of children.

The P+R under the stadium makes the boulevard an arrival space for visitors to the city. People from outside the city park their cars there and then either visit one of the destinations in the boulevard or take the metro to the city centre. So it is a final destination for some people but a transitional space for others who merely park there. When they emerge from the car park, they get their bearings, stand still and look around.

The main places where people linger, sitting or standing, are the benches, pavement cafes, and edges and corners of the square. The sunny side and the spots where visitors have a good overview are most popular. The benches on the eastern side are used when the weather is dry, but people rarely linger or stand still

on the western side of the boulevard (where there are few benches). In the afternoon too, most visitors in the western parts of the boulevard in particular (office workers, shoppers and day trippers) barely look at one another to briefly assess each other as they pass by. It is debatable whether this can still be characterised as 'civil inattention'.

If the observations are continued a little longer, it can be seen that the boulevard is used and 'appropriated' in other ways too that give the space a multifaceted meaning. Day trippers and tourists take selfies with the stadium, especially from the spot where the Ajax logo is clearly visible. When questioned, tourists said they came to this spot specifically to take a selfie. When a banner was hung on the exterior wall with a picture of Van der Laan, the mayor of Amsterdam who had just passed away, people took photos of that. It seems the space lends itself for the expression of public sentiment.

If the observations are continued a little longer, it can be seen that the boulevard is used and appropriated in other ways too that give the space a multifaceted meaning.

Evening

The experience of the space changes somewhat in the evening. Visitors (including office workers) are a little more aware of other people and look around more. The place's acoustics change too. You are better able to hear sounds, including the voices of other people ahead of you.

Office workers mainly walk along the south side of the boulevard past the patch of grass to their offices and back to the metro. This is their standard route. Shoppers and tourists are more likely to walk along the north side, past the shops. In the evenings, slightly more people walk past the lit-up frontage of the Prénatal store.

In the vicinity of the station and the cinema, the boulevard is lively until midnight. The restaurant JinSo is open until midnight. It can be very quiet in the evening in the western part of the boulevard, from the FEBO snack bar. The shops here close at 21:00.

Of all the groups using the boulevard, the tourists have the most open attitude during the quiet periods. They are receptive to diversion and interaction. For example, they might look for somewhere to get something to eat after checking into their hotel. They seem to be more open to surprises and other visitors than the office workers and shoppers. They use their mobile phones for navigation. The people going out for the evening also wander around somewhat more than the shoppers and office staff, as long as they have time before the performance starts. Google Maps is sending visitors who want to reach the hotel Jaz or Ziggo Dome down an alleyway behind the boulevard.

7.4 The appreciation of the place.

We investigated users' perception and appreciation of the space by conducting street interviews.

Interviews.

We conducted 163 interviews among visitors in February and March 2017. We asked them why they had come to the boulevard, how they had got there, how often they came and at what times. We also asked them for their opinion of the quality of the ArenA Boulevard public space, as scored on a 5-point Likert scale from very poor to very good. They were then asked to point to the most and least attractive spots on a street map, and explain why they thought this. They were also asked how safe they felt in the boulevard, what it was that made them feel safe or unsafe and whether there was anything they missed in ArenA Boulevard that they would like to do or see there. Furthermore, they were asked to give their age and the postcode for their town of residence. The sex, age category and whether the respondent was alone or in a group were also noted down. The interviews gave an impression of how people perceive the quality and safety of the area, an overview of the reasons for these perceptions and a map of the boulevard that shows the most attractive and least attractive spots.

ArenA Boulevard is seen as a functional space, a route to a destination (office, shop, place of entertainment). That is the case for office workers, shoppers and people going to AFAS Live Hall or Ziggo Dome: "Personally, I think ArenA Boulevard is somewhere you go because you've already planned something. You don't go to ArenA Boulevard just for fun, to see what's going on there. You are going to somewhere. Apart from that, I don't get anything extra out of the boulevard. It's not very inviting" (man in his twenties). The situation is different for tourists because they come to the place with different expectations.





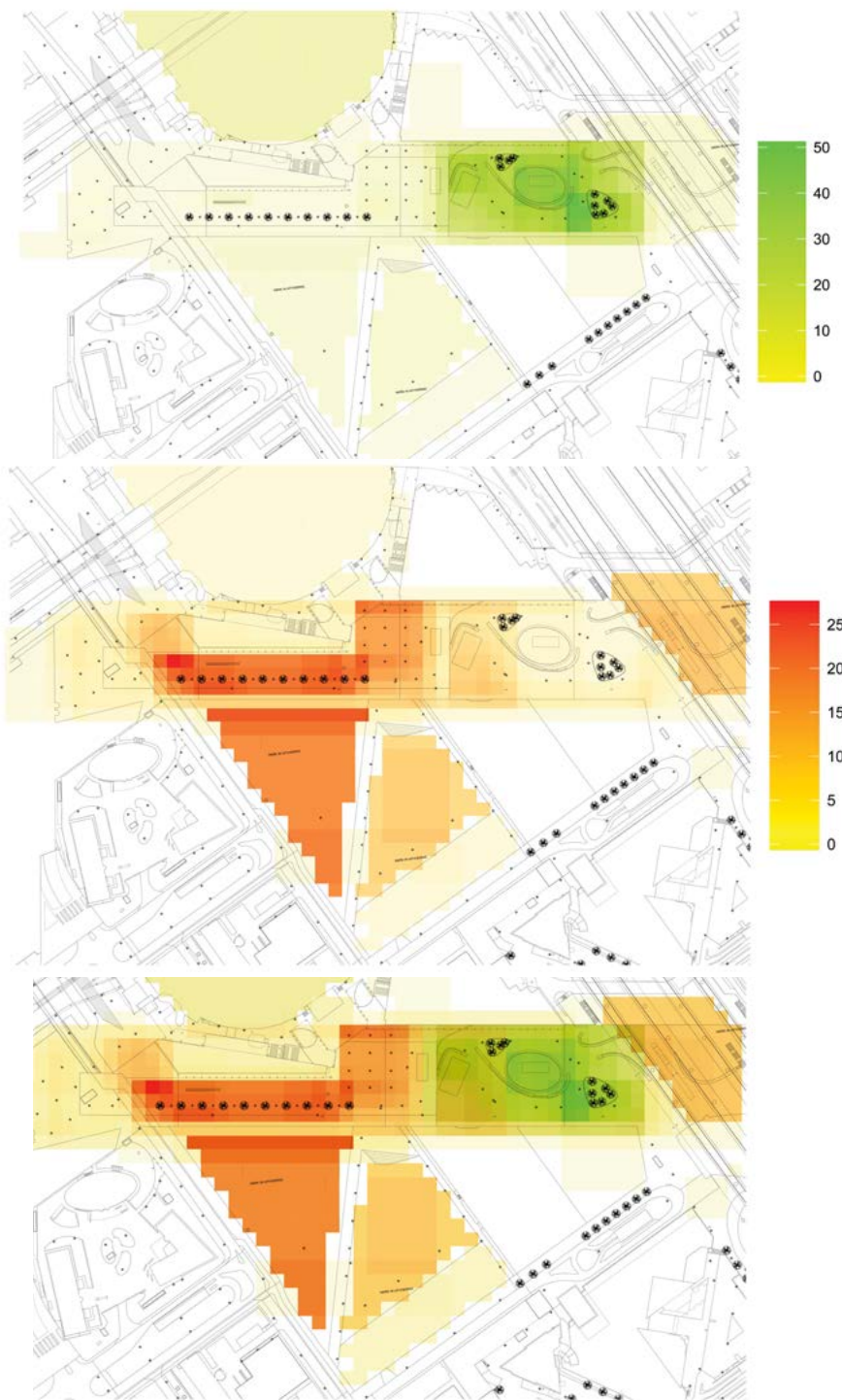


Figure 7.1: The extent to which respondents pointed to the space on the map as somewhere they found unappealing (top), appealing (middle).

A place of contrasts

Some of the interviewees gave ArenA Boulevard a neutral or poor score. They found it open, bare and unprotected, windy, somewhere with a lack of atmosphere, a lot of shadows and a grey ambience. It is not on a human scale. It is not clearly laid out. Visitors are not always able to find their destination, such as the stadium main entrance, the Ajax shop, the Holiday Inn or the entrances to the multi-storey car parks.

The boulevard does not correspond to what people think of with a square. “I think it’s basically too bare. It’ll never be a lively square. The buildings are too big, with too much concrete” (woman in her forties). People often have traditional expectations of the square area. ‘It’s pretty boring here. They should do something spectacular here. A fountain or something else impressive. Now there’s nothing going on at all’ (man in his sixties). “Why don’t they have some of those street performers like at Leidseplein [square in Amsterdam city centre]? Some music and atmosphere. Now it’s mainly people walking back and forth” (man in his forties). What people miss are trees, plant pots, signs giving directions and small-scale activities (a market, play areas, a playground, a soccer pitch or basketball court, better bars and eateries, a cafe with dining area, coffee bars, sandwich bars, pavement cafes, more small stores, a supermarket, a fountain or statue/public art, more seating in the sun, or street music/street performers). The suggestions are geared to the human scale: small-scale, with ambience, more greenery, amenities and more bustle.

People find the east part lively and attractive with the lights in the trees and benches with people sitting on them. But “it’s one huge empty space behind the FEBO”.

A majority of the respondents scored ArenA Boulevard as neutral to good. The reasons people gave for finding it attractive were mainly connected to the busy periods: lots of seating, welcoming, busy, lively (“You’re never alone”). But they also mentioned the open character and good overview, along with the shops and leisure facilities.

The appreciation also reflects the developments that have already taken place. People who had been coming to the place for a while compared it to a number of years ago and said it had improved with the benches, cafes, restaurants and new station. “It’s becoming more and more lively. The place has been getting more of an atmosphere over the years with Ziggo Dome, all sorts of nice things” (man in his thirties). That mainly applies to the area on the east side.

“I think it’s basically too bare. It’ll never be a lively square. The buildings are too big, with too much concrete”

Personal safety

The respondents gave the boulevard a score of good to very good for personal safety, even in the early evening up to 21:00. This applies to female respondents too. That is because the shops are open late and the space is well lit (although much less so along the edges). The space was perceived as open, spacious and providing a clear overview. There are no dark corners. "You are never alone," as one person said. You see everything that is going on and it is never empty. The shops are open late too. There is certainly enough social control in the eastern part. People also stress the advantages of the boulevard's functional character: there are no irritating or drunken people causing a nuisance as are found in the city centre.

However, there is an increasing sense of insecurity after working hours (from 17:00) and especially after the shops shut (from 21:00). There are sometimes youths loitering beneath the station, which can make people feel unsafe. People also feel unsafe after soccer matches and in the multi-storey car parks. Women in particular sometimes prefer to walk together to the car park. That is mainly the case after 22:00. "When I was still working for Telfort in the Margriet building, we had a system where you could walk back to the car with fellow workers so you didn't have to go alone" (woman in her late thirties).

One proviso that needs to be made with regard to these street interviews is that people who feel unsafe will probably not be coming to the boulevard in the evening. Office workers generally feel safe in the boulevard but they do not know what it is like in the evening as they are not there then. People who come there several times a week also feel safe, as do the people who are there for the first time. The people who only come a few times a year are the ones who feel least safe.

**There are differences
in perception
and appreciation
between regular and
occasional visitors
and between the
different groups that
use the spaces.**



7.5 Spatial/social subareas.

The usage and perception of ArenA Boulevard vary considerably depending on the spot in the boulevard, the group of users and time of day and how busy the place is. There are differences in perception and appreciation between regular and occasional visitors and between the different groups that use the place: office workers, shoppers, tourists, people going out and day trippers. Like the spatial analysis, the social analysis reveals a subdivision of the boulevard into four areas: a centre area, a transition zone, a landing strip and a periphery. The behaviour, usage and appreciation can be clustered per subarea.

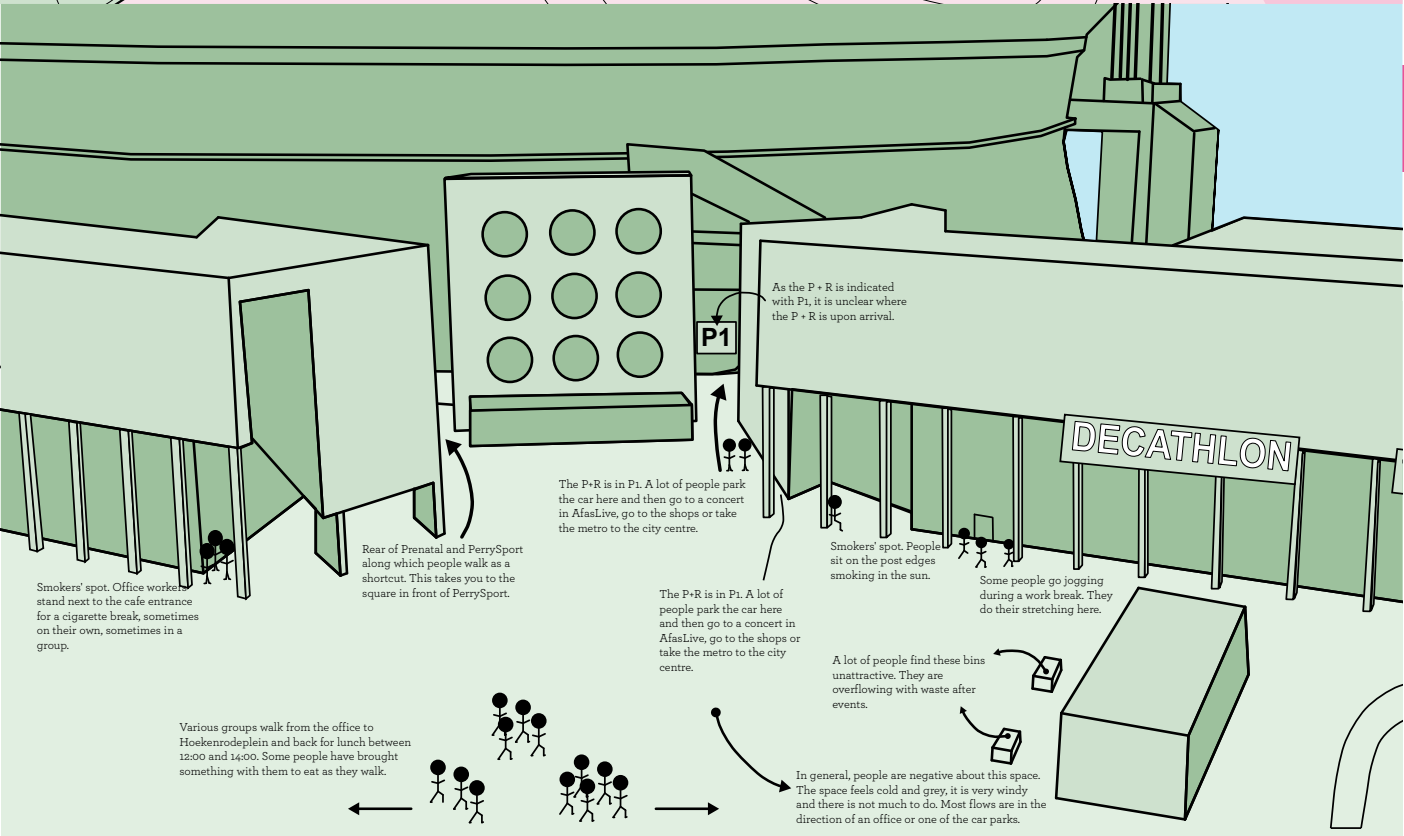
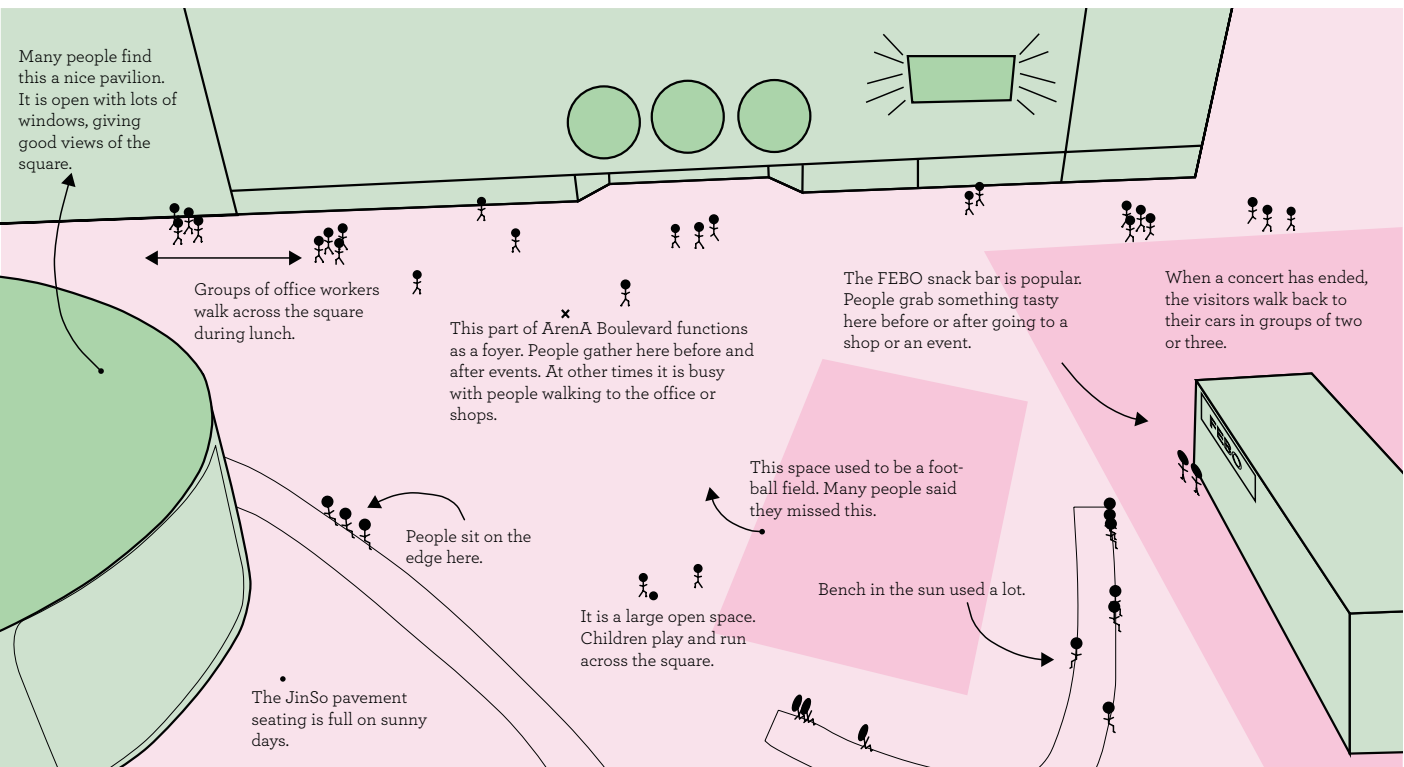
Centre area

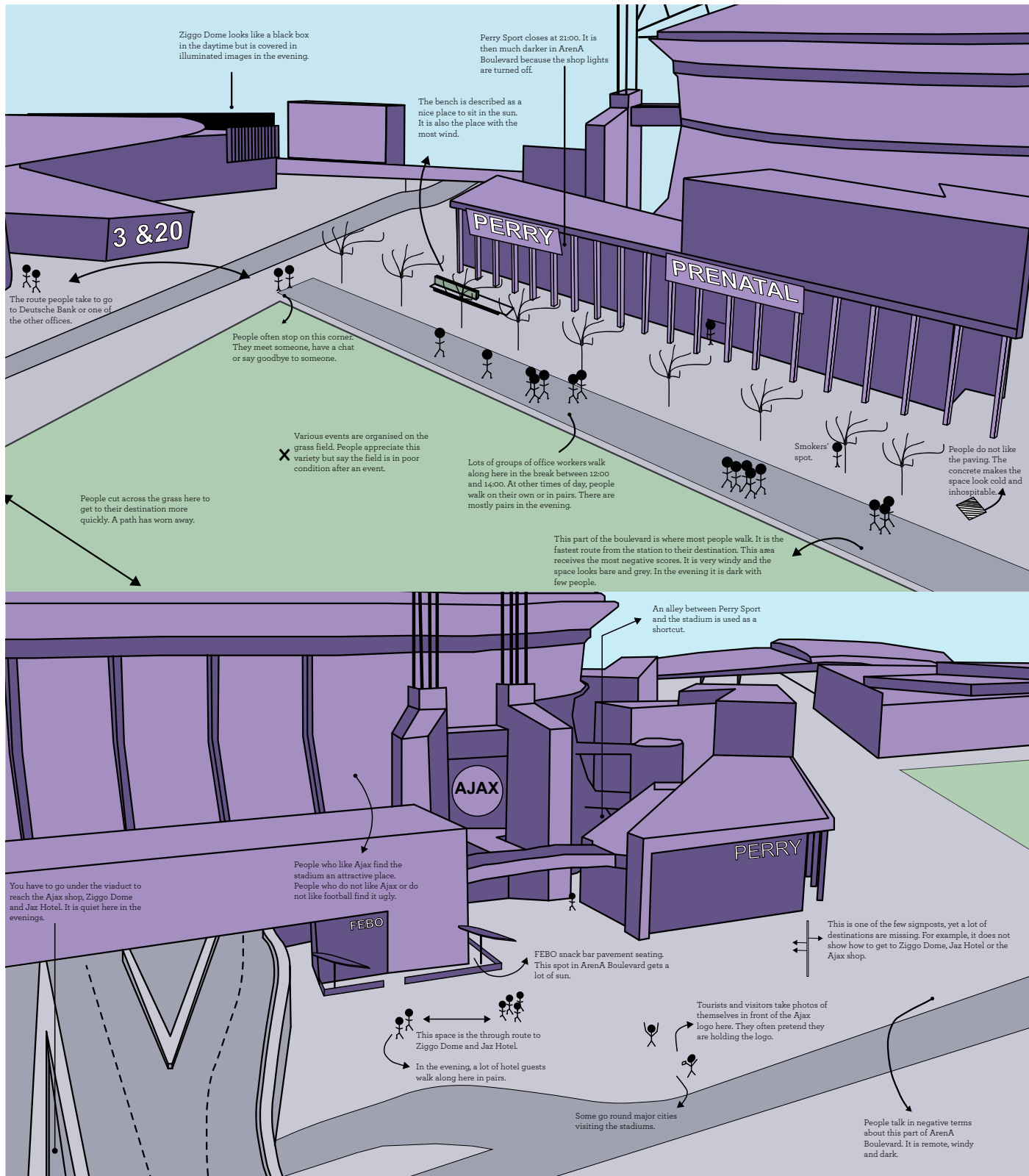
This part of the boulevard scores highest for attractiveness in the heat map. It is the busiest, most lively and welcoming place with the most social control. There is a lot of seating. It serves as a 'foyer' for AFAS Live. It is a place that functions reasonably well but it is not actually designed as a foyer. It rather lacks a playful element, but its emptiness also has virtues. Children play and run around the square. There are 'eyes on the street' thanks to the pedestrian flows and the JinSo pavilion's glass front and pavement seating. The MediaMarkt store is a key destination. The centre area is a pedestrian route and place to linger. Of all the different parts of the boulevard, it comes closest to qualifying as urban theatre. But it can also be quiet in the evening if there are no concerts in the AFAS Live Hall.

Should we enhance a subarea that works already or focus on modest improvements of strictly functional spaces?

Transition zone

This area lies behind the FEBO snack bar. It scores poorly for attractiveness and sojourn quality. This is where people experience the start of the boulevard's 'emptiness', the grey and windy atmosphere and the lack of a clear overview. In the quiet periods, the south side is mainly used as a pedestrian route between the office buildings and the station. The section in the middle is a spot where diagonal routes cross. This is a point where many people from outside Amsterdam try to get their bearings as they emerge from the P+R car park (this is where they arrive in Amsterdam) and head off to their destination. People walk here purposively, but because they have to get their bearings they are sometimes briefly more receptive to their surroundings.





Landing strip

This elongated area lies in front of the Prénatal and Perry Sport stores. It is considered to be the least attractive place in the boulevard. The north side next to the shops feels closed off. There is little to see and only Prénatal has an entrance on this side. Office workers walk alongside the grass patch. In the evening, there are pedestrian routes along the lit-up facade. People walk quickly, purposively and in a straight line. The lights in the frontage are turned off at 21:00. The place hardly invites you to linger at all. Few people sit on the benches.

Periphery

This area also scores poorly for attractiveness. There is little seating. The space has no quality as a place to linger. It does encompass various key pedestrian routes to office buildings, Ziggo Dome, Hotel Jaz, the main entrance to the stadium, the Ajax fan shop, Villa ArenA and a car park. The destinations are difficult to find. The pavement seating for the FEBO snack bar near the stadium is well positioned to catch the sun. The space in front of Villa ArenA lies in the shade. In daytime, it is a popular spot for taking selfies with the Ajax logo on the stadium in the background, but it can be very quiet here in the evenings. People walk quickly and purposively through this area.

7.6 Conclusions.

The four subareas of the boulevard that were identified in Chapter 5 and elaborated on in Chapter 6 are also reflected in people's appreciation, behaviour and usage of the space. The busier areas on the east side score higher than the emptier spaces on the west side.

ArenA Boulevard is a place of extremes. There are big differences between the quiet periods and the busy periods, just as there are between the daytime and evenings, summer and winter, and different subareas in the boulevard. The division of the boulevard into four subareas raises the question of what strategy should be the basis for introducing responsiveness. Should it be about further enhancing an area that works well or about making a strictly functional space somewhat more attractive?

If we want to bolster the quality of the place with a responsive design, the social analyses point to at least three possible building blocks.

Building blocks for the design

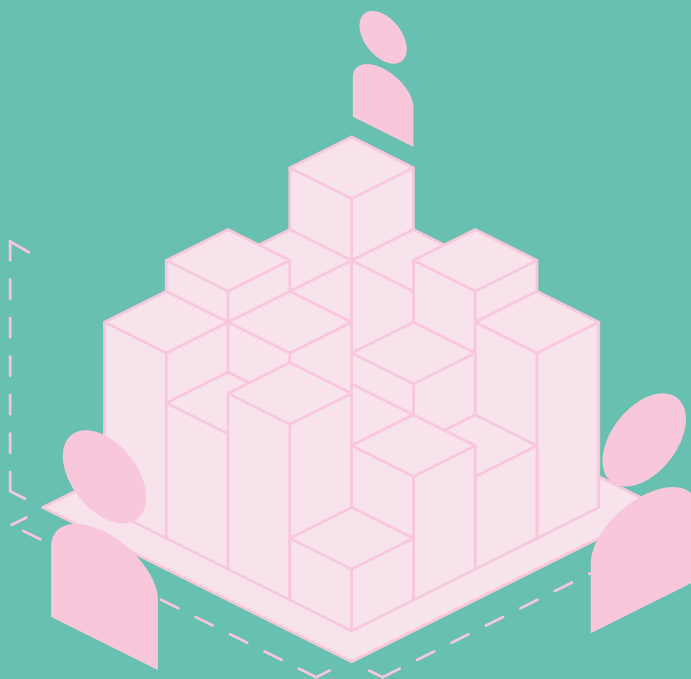
- **Most people cross the boulevard in a straight line and purposively. Their attitude is usually 'closed'. The walk is a necessary activity. This should be taken into account by briefly drawing people out of their own bubble. In the evening, key into their sense of safety.**
- **When talking about their positive memories of the boulevard, people often point to the peak times, events and festivities in the interior world of the buildings. Use the quality of the peak times and the interior world when enhancing the public space during the quiet periods.**
- **A typical feature of the boulevard is the fact that it is used by different groups of visitors and the temporary 'parochial' ownership by like-minded groups. The pedestrian routes of different groups of users may cross. Use this as a tactic in a responsive design to strengthen the public character.**

Part III: Research for Design: 'Building Blocks from the Bottom Up'

8.

Clustering the users: target groups and personas .





Clustering the users: target groups and personas.

8.1 Approach.

It is important to define the general target groups for whom a design is intended. Research is needed to determine the target groups for an intervention in public space. This can take the form of observing and interviewing users. Target groups can be distinguished on the basis of the general motives governing why they use a certain (public) space and the destinations around it. Each group uses the space in different ways and at different times of day. Sometimes they take different routes.

However, target groups are never homogenous. There can be considerable variation between the people within a broadly defined target group. On the other hand, there can be similarities between people who belong to different target groups. That means you can also cluster members of different groups based on their behaviour, household composition or interests.

The people within a target group can be differentiated according to their:

1. behaviour (motive for the visit (necessity or pleasure); first visit or a standard routine; alone, as a couple or part of a group, etc.);
2. demographic characteristics (sex, age, social class, household type, ethnicity);
3. lifestyle/mental type (values: rational versus emotional, or introvert versus extravert, urban lifestyle or not, interests, etc.).

Interaction Design normally uses personas as a way of getting a feel for a target group, creating a design for them and testing it. A persona is a fictional representative of a target group. Personas let you see things from the perspective of a range of different users and get a better understanding of the requirements and preferences of various users. This approach also avoids having interactive installations that are intended primarily for the target group to which the designer belongs.

To create a convincing persona, the above variables need to be taken into account. They let you fill in the details for a persona, which gives that character more 'depth'. Various personas can be constructed for each target group, differing in their behaviour, demographic characteristics and values.

8.2 The ArenA Boulevard Case: target groups and personas.

The boulevard is surrounded by a diverse range of destinations (offices, a metro and intercity train station, nightlife and entertainment venues, a stadium, a cinema, hotels, large stores and car parks), which attract a number of distinct target groups to the boulevard. The destinations have different opening hours and peak times. The events that are organised, the time of day and the day in the week all have a major impact on the composition of the target groups.

The ArenA Boulevard is a public space where different groups of visitors come into contact so that their worlds briefly overlap. For many people from outside Amsterdam, ArenA Boulevard is one of the few urban public spaces outside the city centre that they ever visit.

We distinguished a range of different groups based on our observations and surveys. Below, we sketch personas for six different target groups. Each persona has been assigned a name, certain behaviour, a demographic profile and a lifestyle.

Shoppers

The shops open at 10:00 in the morning and many stay open until late in the evening. These large-scale, edge-of-town stores are a destination. Visitors travel to the boulevard specifically for them; they do not necessarily hang around as they might in traditional shopping districts in the city centre with smaller outlets and a diverse assortment of shops and eateries. Shoppers are to be seen throughout the day, although the place is still quiet in the mornings. It is particularly busy on Saturdays. The shoppers go to MediaMarkt, Decathlon, Perry Sport, Prénatal and Villa Arena. Their visits are mostly purposeful. Some combine their shopping trip with a visit to the FEBO snack bar.

Persona

Erik and Birgit, a couple in their thirties, live in Amstelveen and come to ArenA Boulevard once every two months for MediaMarkt and Perry Sport. They park their car in a multi-storey car park and like to return to their car as soon as they have finished shopping. They usually come with their two children. Their 11-year-old son always wants to visit the Ajax shop. Occasionally, they grab a snack from FEBO before going home. Their children always enjoy the trip to ArenA Boulevard more than they do. The children also know ArenA Boulevard from the various artists who have performed there, but unfortunately there is never any sign of all that when they visit the shops.

Office workers

There are a lot of office workers using ArenA Boulevard on weekdays. The busiest periods are between 7:00 and 9:00, between 12:00 and 14:00, and between 17:00 and 18:00. Office workers walk purposefully from the station/car park to the office at the start of the

working day and back again at the end. The office workers are less single-minded during the lunch break: they look for somewhere to sit, fetch a sandwich or watch the preparations taking place for an event.

Persona

Hans, aged 50, works five days a week for Deutsche Bank. He lives in Almere and commutes every day by train. He walks fast and purposefully along the patch of grass to the office. At the end of the afternoon he walks along the same route in the opposite direction, as fast as possible back to the station. In the lunch break, he often goes for a short walk with two co-workers. They buy sandwiches in the Amsterdamse Poort shopping mall on the other side of the station. He has more time during the lunch break and is a little more receptive to what is going on around him.

Tourists

Tourists can be recognised not just by their wheeled luggage but also from the way they walk. They sometimes wander around disorientated, looking for something. At certain points, they stop and check their smartphones to find the way to the hotel. There are also tourists who come to the boulevard specifically to take a selfie with the stadium in the background. Tourists are receptive to the opportunities the boulevard has to offer for amusement and diversion. In addition to the individual tourists, business travellers and couples, there are also groups of three to four tourists, often men only or women only. There are numerous business travellers as well as the tourists who are on holiday.





Persona

Manuel and Alfons from Madrid are in Amsterdam for a conference. This is their first time in ArenA Boulevard and they had trouble finding the way to their hotel, Jaz. The route planner on their phone took them down an alleyway around the back of the shops. Now that they have checked in at 22:00, they are looking for somewhere to eat. They find it difficult to get their bearings in the quiet square, which is poorly lit along the edges. They are looking for some entertainment. They are not really able to find this in the square and they decide to travel to the city centre to get a bite to eat.

Day trippers

People from outside Amsterdam park their cars in the P+R under the stadium and then walk to the metro station. For them, ArenA Boulevard is an arrival point and passage. This group comprises both families with children and couples visiting Amsterdam city centre for the day for the museums or to go shopping. There are also day trippers who take the metro to the boulevard, for example to visit the stadium and the Ajax shop.

Persona

Luuk and Marja, a couple in their fifties from Deventer, have just parked their car in the P+R under the stadium. That is handy and incredibly cheap. They will be spending the day shopping in the centre of Amsterdam. When they come out of the car park, they turn left immediately after the exit to go to the station. The first time they came, they could not get their bearings. They find ArenA Boulevard just a large, bare square that they want to leave as soon as possible. It is nothing like the lively, inviting squares in historic city centres.

People going out

The Pathé cinema is an important destination for people visiting the boulevard for entertainment. A lot of families with children visit on Wednesday afternoons and during the day in the weekends. People also go to the restaurants with the pavement seating and the Grolsch Café near the station.

Persona

Joyce and Roy live in Gein, a district in south-eastern Amsterdam. Once every two months, they take their two children to a film in the Pathé cinema during the day in the weekend. It is easy to get there with the metro and they find the cinema more comfortable and cleaner than the ones in the city centre. ArenA Boulevard is also more fun to take the children to. They think the boulevard is spacious and lively. After the film, they always pop into Perry Sport and MediaMarkt. They do feel the boulevard lacks a nice spot to have a bite to eat with the children, though.

Events audiences

ArenA Boulevard takes on a different atmosphere during events. There are large crowds, especially just before and after soccer matches, events and concerts. The people coming for a specific event share the same atmosphere and interests at such times.

Persona

Kirsten, aged 23 and from Eindhoven, comes to ArenA Boulevard once every six months with three friends for a concert. She just saw Demi Lovato in AFAS Live. They came by train and enjoyed the anticipation along with the other fans as they waited outside AFAS.

Families with children

As our research showed that a lot of families with children visit ArenA Boulevard, we have also marked families as a distinct group based on demographic characteristics. We therefore treat families here as a separate group.

Families can be found among the tourists, day trippers, people going out and shoppers. Families may come for Ballorig, one of the large stores, or to see a film or go to one of the events in AFAS or the Ziggo Dome. They also visit the Ajax shop and the stadium. Some families park their car in the P+R and travel on immediately to Amsterdam city centre. Tourists can also be families with children. Children sometimes run across the public space, get their photo taken and eat French fries and ice cream from FEBO. A visit to ArenA Boulevard can be a day out for families even though there is not much for children to do in the boulevard itself. We described them as personas in two other target groups (shoppers and people going out).

Facility workers and shop staff

Finally, there is another important group of people who work here in addition to the bank employees: facility workers and shop staff. Facility staff are already busy in the early morning, before the office workers pass through the boulevard on their way to work. This is when logistical processes take place such as the delivery of cleaning products, drinks and food. Most of these goods are delivered by lorry, and consequently arrive on the logistical, rear side of the buildings. However, some goods are delivered by smaller vehicles that cross the boulevard. Other facilities staff are involved in one of the events or other public activities due to take place. Crush barriers, traffic cones and other traffic-regulating objects are delivered and set up. The facility staff are typified by their work clothing and their purposeful use of the boulevard. Then there are the sales staff in the large stores such as Perry Sport, Decathlon and MediaMarkt.



8.3 Focus and target groups.

We formulated the target groups on the basis of our programmatic and social analysis of the boulevard. The target groups play a crucial role in the design process. Which target groups is the responsive design aimed at? A design can be geared to diverse users or to a specific group. That is a tactical choice. It also depends on the kind of responsive installation. There are at least three options.

Firstly, a responsive design can attempt to accommodate as many different target groups as possible. In that case, it needs to serve a more general goal, such as expanding the routing and the legibility of the space and enhancing the distinctiveness, atmosphere and sense of place. This applies in particular to responsive installations with a more understated, ambient character that can be experienced on an individual basis. The advantage of this strategy is that it ties in with the diversity of the people visiting the open space and the fluctuations in their presence over time.

A second option is a focus on individuals from different target groups. Interactive interventions are then intended to generate new clusters between the groups of visitors by personalising and creating intimacy. This gives visitors in different groups the feeling that they are welcome. An intervention can then make an appeal to something (a feeling of being at home, a particular interest) that transcends the individual groups.

A third option is to focus on a specific group that is relatively easy to activate. This is particularly relevant for responsive installations that call for active use. Some groups who use the boulevard already have a more open and 'discursive' stance. In the context of ArenA Boulevard, these are the children (and therefore families) on Wednesday afternoons and in the weekend, and primarily tourists and people going out in the evenings. Children could serve as links between diverse social groups in society. Parents can become involved in a responsive space — and therefore with other groups of visitors — through their children. Tourists and people going out are potential early adopters in the evening and after dark. They are more open to diversion and the surroundings than the more self-contained and purposeful visitors with a specific goal, such as the office workers and shoppers.

Focusing on one target group does not imply exclusivity. The focus on a willing target group ensures there are people who are prepared to take the first step and who can be incited to act. The design challenge is to make sure the installation is still inclusive so that it is attractive for the other groups using the space. The activation of the place makes people see others even if they do not use the installation, as a game emerges of watching and being watched.



Shoppers



Office workers



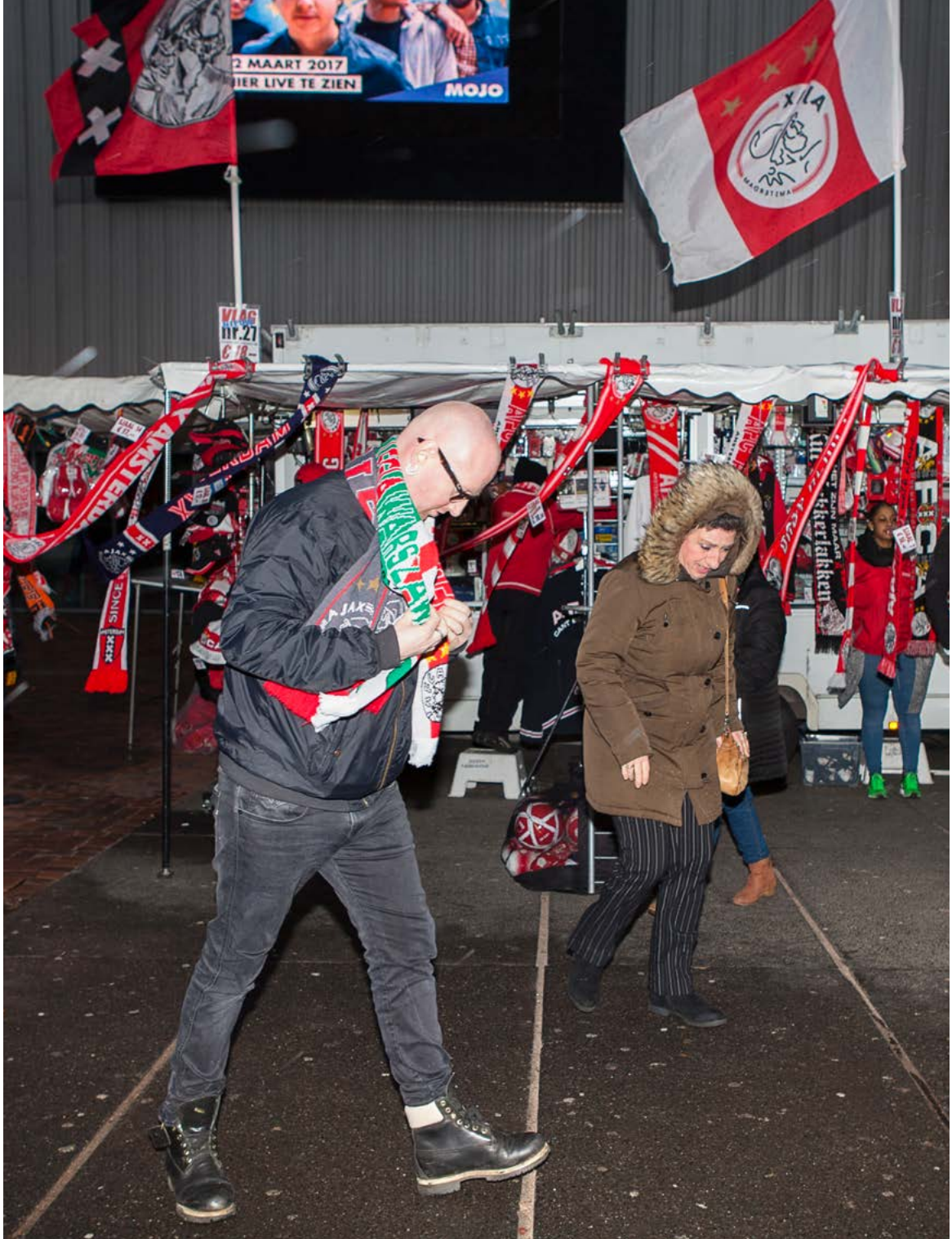
Tourists



Day trippers



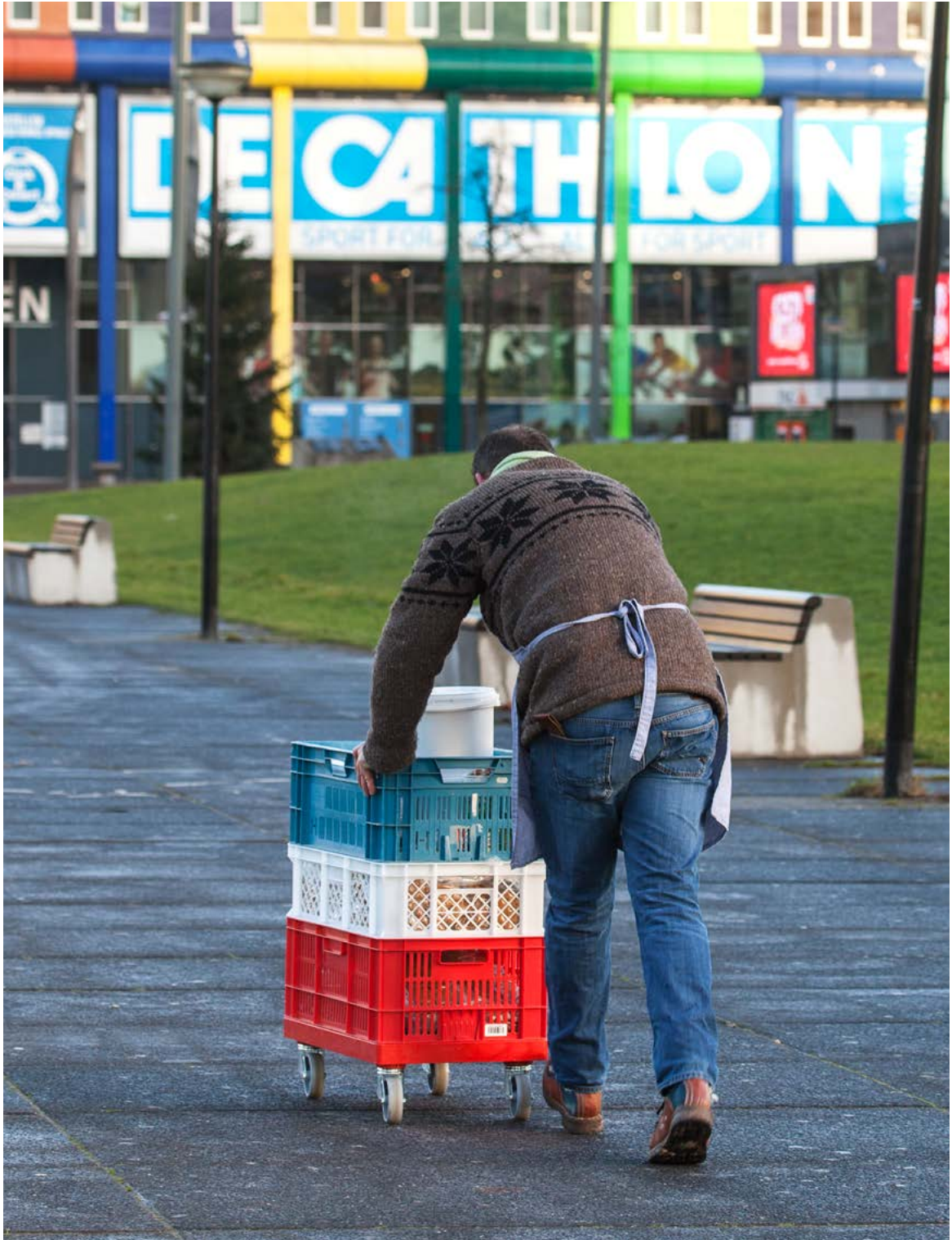
People going out



Events audiences



Families with children



Facility workers and shop staff

Conclusions

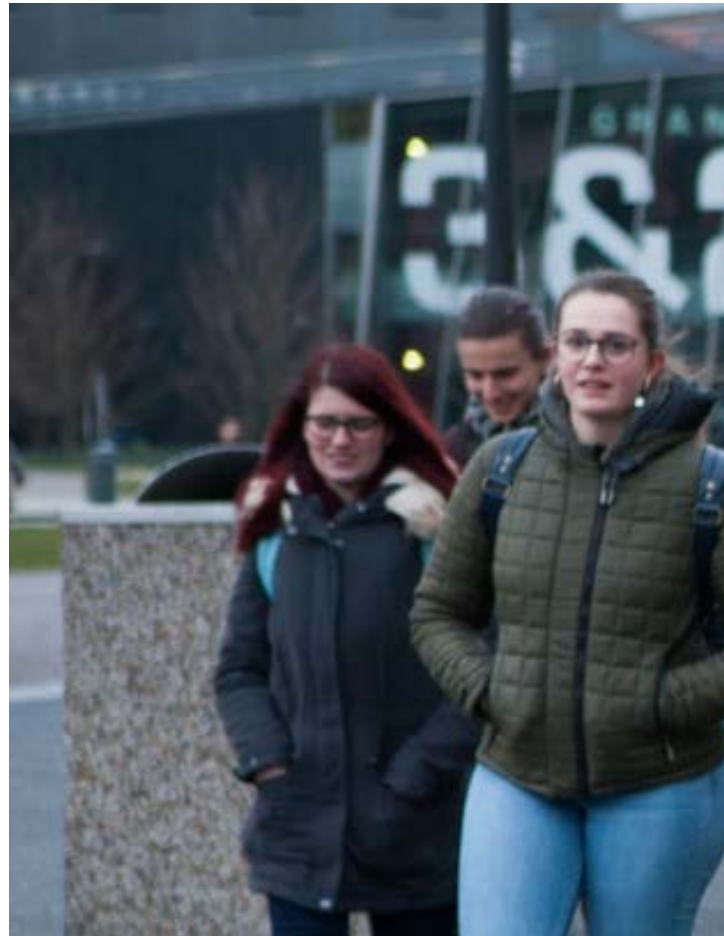
ArenA Boulevard is typified by the diversity of the groups using it. They are not all there at all times or in all conditions, even though they have a known rhythm up to a certain point. The distinctions between the target groups adds focus to the installation and forces a strategy to be adopted for the manner in which the installation appeals to and involves one or more target groups.

If we want to enhance the qualities of a place through a responsive design, the analyses point to at least four potential building blocks.

Building blocks for the design

- Some groups are more open to a responsive installation than other groups. On Wednesday afternoons and in the weekend, children are the most receptive. In the evenings, it is mainly tourists and people on a night out and waiting around who are more receptive. Focus on these early adopters for interactive installations that call for active use.
- The installation must also appeal to other groups. Develop a strategy whereby the installation enhances the meaning of the boulevard as well so that it appeals to the 'regular' groups too.
- The installation is an evolving model. Develop a tactic for how the installation can address the other target groups after the early adopters. And pay attention to the significance and added value for different target groups at different times.

- A strategy that is more suitable for relatively understated, ambient-like installations is less geared to specific target groups, and primarily keys into behaviour (such as guides for walking routes, arriving and getting your bearings in a space), the atmosphere of a place and the possibility of experiencing the responsive installation individually.



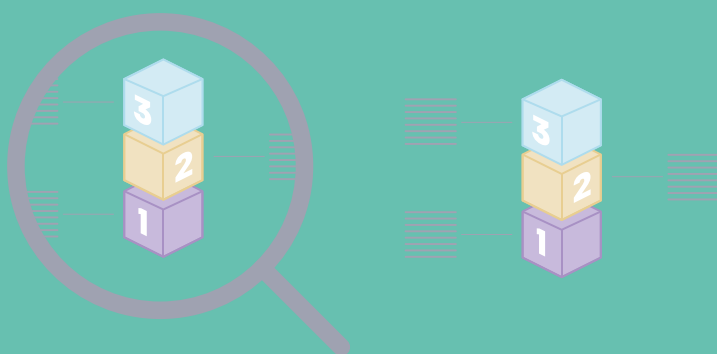
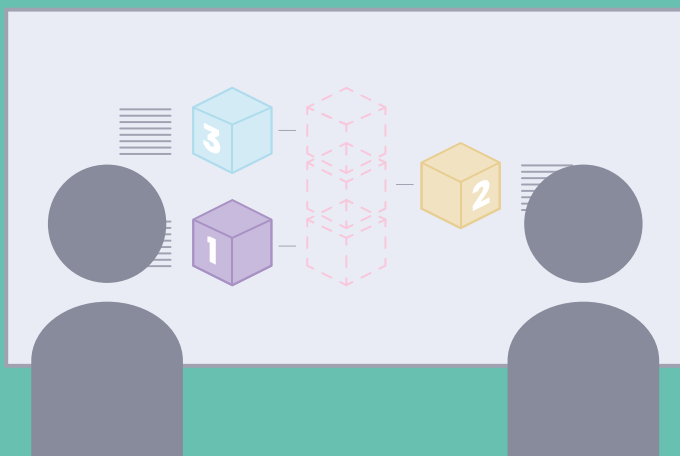
**'Some groups are more open to
a responsive installation than
other groups.'**



Part III: Research for Design: 'Building Blocks from the Bottom Up'

Conclusion.





Conclusion: diagnosis, assignment and building blocks from the bottom up.

This part considered four research aspects as the basis for the design of a responsive public space. A central role is played by the diagnosis of the assignment in which the problems and shortcomings are identified along with the opportunities and potential positive features of ArenA Boulevard. Such a multi-layered analysis can be performed for various types of public space. ArenA Boulevard is an exceptional space because of the huge scale, the extreme fluctuations in the use of the space, and the diversity of the users. But even with smaller public spaces, research for design provides a sharper view of the diagnosis while also offering various substantive building blocks for elaborating on in the design process and for rooting and embedding the design choices in the situation.

If we combine the four different research aspects, this produces a fairly integrated diagnosis of the way in which ArenA Boulevard functions as a public domain and of the specific characteristics of the subareas that make up the boulevard. The analyses also offer

an initial set of building blocks that can be elaborated on in the design phase.

In this conclusion, we construct the diagnosis, assignment and building blocks for the design based on this analysis.

Diagnosis

The design of ArenA Boulevard refers to historical boulevards but it is actually a very different kind of space on a huge scale. The buildings are autonomous and work together to shape the public space only to a limited degree. The space lacks shelter ('enclosedness') and a recognisable spatial shape at various points. Most of the buildings have austere, closed walls. As a result, the space does not in itself invite people to linger, especially not during quiet periods.

The boulevard space is split into four different subareas. The centre area lies on the station side. Here, the building facades with active plinths join with the pavilion to create a space on a human scale that is manageable in terms

The ArenA Boulevard is an exceptional space, in its size, spatial configuration, high and low intensity and its divers groups of users.

of its dimensions, scale and getting your bearings. An amorphous transition zone starts from the FEBO snack bar. The building facades recede. The grass area that is set to become a construction site forms the border of the third area, the elongated landing strip leading to Villa ArenA. The fourth area lies in the western part of the boulevard: the amorphous, 'unwalled' space between Perry Sport and Villa ArenA. There is also a world at the rear of the buildings in addition to these four subareas.

The division into four subareas is also seen in the differences in usage intensity, the kind of pedestrian patterns, the social analysis and even the climatological maps. The centre area is appreciated by users, offers comfort and is the busiest part. People crossing the transition area are in a hurry. They walk purposively from the access point to their destination. Only when people enter the boulevard from one of the multi-storey car parks do they stop

to get their bearings and actively, if briefly, look around. Users give the transition zone both positive and negative scores. The landing strip and the periphery are emptier and more extensive and both receive more negative scores.

The boulevard has a fluctuating but clear rhythm. In the mornings, it is a functional passage. That changes during the lunch break, after which it reverts to being a functional place. Only as evening approaches does it become somewhere full of expectation, a place where something is about to happen. The space also appears in many guises. It can be a lively urban space in fine weather and in the early evening prior to a concert or event. The publics take on a distinct form and people are curious, expectant and receptive. In the quiet periods, at dusk and where there is little to do in the huge buildings, the area feels vast and desolate. There are no traces then of previous crowds and excitement.

The quiet periods are the rule and the busy periods are the exception. In the quiet periods, the people present are engulfed by the wide open space. At such times, the boulevard's spatial layout has an adverse effect. The space is almost entirely reserved for pedestrians, yet the facades and the layout of the public space offer pedestrians little guidance. In principle, pedestrians are left completely free to choose their own path and route. This leads to the pedestrians spreading out, which enhances the space's sense of emptiness. Even so, there are a few spots in the boulevard where the flows diverge or converge. There are also clear differences between the preferred routes in daytime and the routes in the evening in the dark.

ArenA Boulevard is perceived to be a functional space, a route people take to their destination. Office workers and shoppers are most purposeful in their use of the space. There are also groups that use the space and take ownership in different ways, for example tourists and people going out (including families). The different groups differ in their pedestrian patterns and attitude. Tourists roam most and are most open to diversion and activities, along with the people waiting for an event and the office workers going for a stroll during their lunch break. Office staff and shoppers in the evening are more purposeful and much less likely to look up or around.

The assignment

For our 'research through design' component (see Chapter 12), we determined the assignment based on the four research aspects; this intended to strengthen the responsive spatial design. This reveals a number of dilemmas where choices have to be made for the responsive design, for example concerning the spots, times and target groups.

Spots

When faced with an extensive space like ArenA Boulevard, the question is which spots should be selected for an intervention using an interactive installation — and what kind of spatial intervention is intended. Various different assignments can be pinpointed in different subareas of the boulevard. One choice could be to further improve a spot that is already functioning reasonably well (such as the centre area), another to enhance a spot that is functioning poorly. We selected the transition zone and the landing strip, two subareas that score poorly in terms of spatial and social aspects. At present, the transition zone is a diffuse, ambiguous space where

various diagonal routes cross. Yet it is also a space where people are receptive to their surroundings. Furthermore, it is possible to 'draw off' crowds here. This spot could take on more of the character of a public domain. The landing strip is the least attractive part of the boulevard, an area people walk through quickly and purposively. Our assignment is to make the walking experience more pleasant and to cluster the pedestrian flows.

Times

ArenA Boulevard is characterised by a strong rhythm of busy and quiet periods. A choice could be made to have interventions during busy peak periods or alternatively to opt for the quiet periods. The peak times offer opportunities for further enhancing the public domain aspect. However, we decided to go for the quiet periods and the 'margins' of the quiet periods. We see an assignment in taking the afternoons (between 14:00 and 17:00) and evenings (between 19:00 and 24:00) and investigating how people could be briefly drawn out of their bubble and their purposive walking. In the afternoons and evenings, variation among visitors can be seen ranging from primarily purposive walking (office workers and shoppers) to more 'discursive' walking (tourists and people going out). During the quiet periods in the morning, office workers walk purposively to their destination and there are few other visitor groups in evidence.

Groups

ArenA Boulevard is visited by many different groups, as described in the chapter on target groups. We have not focussed on a single target group. Rather, we wanted to explore how different groups respond to the different mechanisms of an installation. We wanted to



create an installation that appeals to many different groups, with a view to enhancing the public domain.

Building blocks

Based on the analyses, building blocks were identified in each chapter. These are the characteristics and features of the boulevard that could be exploited, or alternatively negated, by the design. Summarising, we broadly see the following building blocks.

General

- The quality of the public domain during quiet periods demands a high level of ambition coupled with modest expectations. A responsive installation can bolster the public domain by enhancing the interaction between different users (briefly noticing one another). In quiet periods, an installation could sow the seeds for a public domain experience by briefly drawing people out of their purposive mode and their personal bubble.
- ArenA Boulevard's identities are formed during the events and in the buildings themselves. There is little in the way of traces and other signs of this in the boulevard after the events. However, these happenings still offer a rich source for the use of a responsive installation.

Built Environment

- ArenA Boulevard's built environment with vast public space between huge, autonomous buildings lacks the traditional rhythm with cohesion and start and end points, in contrast to the classical boulevard design to which it refers. A responsive design has the potential to enhance the cohesion and identity of the entire boulevard 'from the inside'.

- The boulevard breaks down into four different subareas. A responsive design could aim to link and connect some of these subareas — without attempting to resolve the problem of the boulevard as a whole in one go.
- With the exception of the east side, the subareas have quite an amorphous shape in which the facades, plinths and layout do relatively little to create a spatial environment. A responsive setup could seek to tackle these spatial shortcomings and in doing so, enhance the quality of the surroundings.

Pedestrian patterns and flows

- There are clear differences in the boulevard between busy and less busy spots and routes. Hubs can also be identified where flows converge or diverge. These patterns show flows that an installation could tap into or influence.
- Once pedestrians have chosen a route, they keep to it and choose a fairly straight path. With knowledge of these patterns, a responsive design can key into this or alternatively disrupt it.
- In the dark, the focal point of the pedestrian patterns in the landing strip shifts towards the arcades. The edge of the grass patch is then much emptier and darker. Could light be used to create a path that can become a central route in the dark?
- The pedestrian patterns show the transition zone as a space that people cross diagonally. That suggests a natural crossroads in this subarea.

Users and their experience

- People walk through the boulevard directly, purposively and 'closed off'. Even briefly drawing them out of their personal bubble is an ambitious enough assignment.
- People are already reasonably satisfied with the boulevard and point to positive memories of the peak times, events and festivities in the interior world of the buildings. The peak periods and that interior world form a rich source that can be exploited.
- A distinctive feature of the boulevard is the fact that it is used by different groups of visitors and the temporary 'parochial' ownership by like-minded groups. The pedestrian routes of different groups of users may cross one another. Use this as a tactic in a responsive design to strengthen the public character.

Target groups and rhythms

- Some groups are more open to a responsive installation than other groups. On Wednesday afternoons and in the weekend, children are the most receptive. In the evenings, it is mainly tourists and people on a night out and waiting around who are more receptive. Focus on these early adopters for interactive installations that call for active use.
- The installation must also appeal to other groups. Develop a strategy whereby the installation enhances the meaning of the boulevard as well so that it appeals to the 'regular' groups too.

- The installation is an evolving model. Develop a tactic for how it can address the other target groups after the early adopters. And pay attention to the significance and added value for different target groups at different times.
- A strategy that is more suitable for relatively understated, ambient-like installations is less geared to specific target groups. Such a strategy primarily keys into behaviour (such as guidance for walking routes, arriving and getting your bearings in a space), the atmosphere of a place and the possibility of experiencing the responsive installation individually.

In quiet periods, an installation could sow the seeds for a public domain experience by briefly drawing people out of their purposive mode and bubble.



PART IV/V

Research for Design:
'Building Blocks from Outside'

Responsive Public Space



Introduction.

'Isn't it the same as Christmas Lights on buildings what you are doing in your research?' Hank Haeusler, the Australian researcher into media architecture and responsive spaces, is often asked this and similar questions by curious colleagues who have only a vague understanding of his work (Haeusler 2017). And perhaps this association is not surprising: the images that immediately come to mind in connection with media architecture and responsive spaces are often Las Vegas or Times Square, where exuberant lightshows and facade-covering LED screens respond to their surroundings and, as ornamentation, contribute to the special atmosphere in those places.

Of course designing responsive spaces involves more than simply mounting flashing lights on buildings. Three 'building blocks from outside' can play a role in guiding the design process. The first of these addresses the confusion expressed by Haeusler's colleagues, which indicates that there are still many misunderstandings between different disciplines about the nature of responsive installations, not to mention the role they can fulfil in activating public spaces. It is therefore

important to make these installations and their effects imaginable in a concrete way and to discuss them using a structured typology of reference images. This structured typology of reference images is our first 'building block from outside': it forms the basis for a shared vocabulary and opens up the mechanisms through which an interactive installation can make a space responsive. A typology like this can facilitate discussions during co-creation sessions and provide leads in the search for solutions during the design process. Chapter 9 identifies five mechanisms and explores their possible effects using concrete reference images.

The second building block addresses the need for a better insight into the concrete design decisions to be taken for interactive installations themselves. This is the focus of Chapter 10. An interactive installation must be embedded in a specific location. Therefore, in order to successfully activate the public space there, the way the public can experience an installation in that space must be taken into account. 'Expanded scenography', originating in the world of the theatre, provides a useful framework as the second 'building block from

outside' to discuss the design of responsive spaces. From this perspective, we look at the way design elements play a role in affectivity (the public's sensory experience of an installation); materiality (the installation's material and spatial embedding and how it is experienced); relationality (new relationships that develop via the installation); and time (the way an installation and its use develop through time).

In Chapter 11 we turn to the findings of environmental psychology for our third 'building block'. Responsive installations aim to create a special atmosphere in the public space that adds meaning, puts visitors at ease or is even slightly alienating. Environmental psychology investigates the influence of various stimuli or cues on the experience of a space. This research is often targeted at explicit goals such as creating an atmosphere that makes people stay in a shopping centre longer or that tempts them into buying something. But for creating atmospheres that can improve the quality of the public space, this discipline also provides concepts and insights that can be used as a 'building block from outside' when designing and evaluating responsive installations.

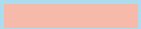
The Dancing Traffic Light Manikin by smart. Agency: BBDO Berlijn (2014)

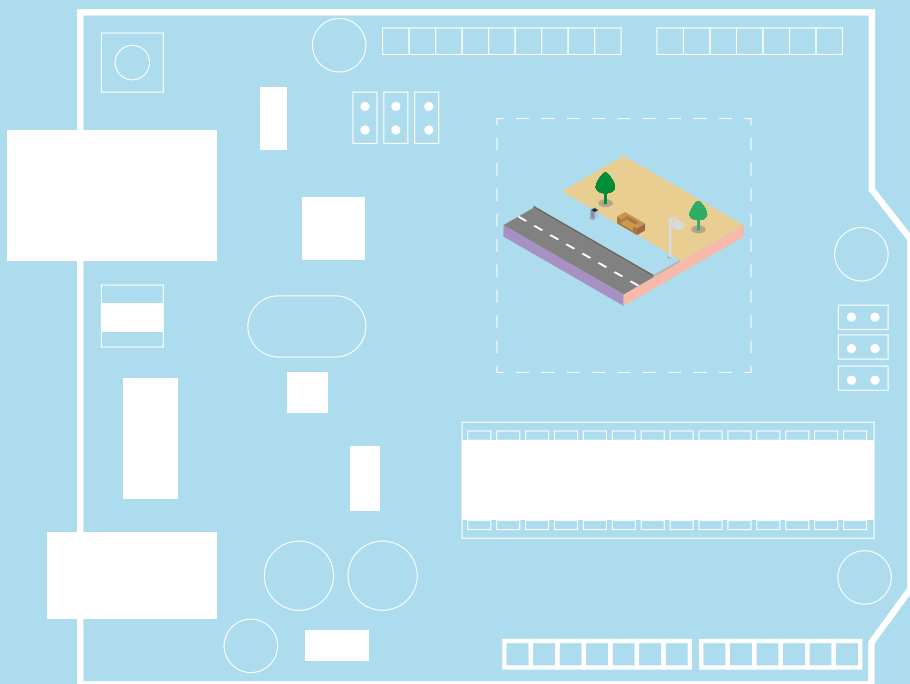


Part IV: Research for design: 'Building Blocks from Outside'

9.

Typology of Responsive Installations: Five Mechanisms of Responsive Technologies.





Typology of Responsive Installations: Five Mechanisms of Responsive Technologies.

Feeling at home among strangers. That is, as we wrote in earlier chapters, the essence of public space as public domain. The public domain enables urbanites to experience a city's collective rhythms and acquire an understanding of a location's various histories and symbolic meanings. This is where urbanites take note of each other, become familiar with each other, are confronted with each other or talk to each other. In order to function well, the public space must provide urbanites with the opportunity to feel at home there, to appropriate the space, to create a safe environment where they feel at ease and

where they can take in the diverse impressions of the city. In this chapter, we formulate a typology of interactive installations based on reference images and explore how these installations can create a public domain by making public space responsive.

We present the typology in five 'mechanisms', which are the ways responsive technologies, their software, hardware and interfaces as well as their spatial embedding direct the individual and/or collective experience and use of public spaces. The mechanisms are also a lense through which reference images

of responsive technologies are analysed. We will use these mechanisms to describe the functionality of these types of installations, and discuss the desired effects of responsive spaces in the design phase are discussed.

The need for such a typology and a shared frame of reference arose during our co-creation sessions, when parties from various backgrounds discussed the design of interactive installations. Each of these different parties had their own ways of thinking and talking about public spaces, social interaction and technology. This resulted in equally different design strategies, and divergent expectations about the use of responsive technologies. Some of the first sessions were therefore dedicated to looking for shared references and formulating typologies as a shared vocabulary.

In the design process, typology and reference images help to provide insight into the desired effects of interventions. This knowledge complements the 'building blocks from the bottom up' in Part III. The building blocks from the bottom up combined with the building blocks from outside create a bridge from the 'problem space' to the 'solution space'. Which specific qualities of the existing public space do we want to improve? For whom? And how can responsive technologies and spatial design contribute to these improvements?

In order to be able to discuss these questions and formulate a typology, we analysed dozens of examples of existing responsive technologies together. A few existing studies were particularly useful in introducing us to these projects, notably *What Urban Media Art Can Do* (Pop et al. 2016), *State of the Art and Best Practices Collection. Active Public Space*

How can responsive technologies contribute to the quality of public spaces?

(Markopoulou et al. 2017); the procedures from the Media Architecture Biennales held in Sydney and Aarhus (Dalsgaard & Fatahgen Schieck, 2014, 2016); and the compendia and website archiving entries for the Media Architecture Awards (Hespanhol et al. 2017; Awards.mediaarchitecture.org, 2019). Besides this, we participated in several international congresses and symposiums to both garner good examples and subject our approach to scrutiny (see, for example: Suurenbroek, De Waal & Nio 2017). How are existing responsive technologies meant to improve the quality of public spaces? Which devices do they use to achieve this?

By linking such analyses of existing installations with knowledge about the location itself, as well as assessments of the qualities of public spaces in the specialist literature, we have drawn up a typology of five mechanisms. Separately or together, these mechanisms can activate urban spaces to become public domains. *Sense of place* reinforces the identity of a location, shows the stratification of its symbolic meanings, and makes visitors feel at ease in the location. *(Playful) interaction* enables visitors to a location to enter into (fleeting) new social relations with each other. *Personalisation* enables visitors to feel at home in a location and appropriate it by, for example, personalising their experience. *Routing & legibility* improves visitors' ability to orientate themselves in a space, clarifying the relationship between subareas and helping visitors to find their way. Lastly, *Control*, which includes responsive technologies aimed at managing (undesirable) social processes in the public space. We discuss each of the five mechanisms below, accompanied by the reference images and a detailed description and analysis of their effects.

The 'sense of place' mechanism attempts to capture and visualise a location's rhythms, and to make its stratified historical meaning accessible to individuals and collectives, both now and in the near future.

9.1 Sense of Place.

The aim of sense of place as a mechanism for responsive public spaces is to record the collective meanings that are associated with a location and make them visible again. Conceptually, individual experiences are consolidated as collective experiences, and these collective stories, practices and meanings are made experienceable again, so individual visitors to a location can identify with them, even if the events they refer to are not occurring or immediately visible at

that moment. The sense of place mechanism attempts to capture and visualise a location's rhythms, to represent the collective identities and meanings of various publics that are connected with a location, and to make a location's stratified historical meaning accessible to individuals and collectives, both now and in the future.



Washington Canal Park, OLIN, 2012
(photo: OLIN / Sahar Coston-Hardy & Karl Ruiner Blumenthal)

Such a responsive approach of sense of place can contribute significantly to the functioning of public spaces as public domains. A pre-condition for developing a sense of place is that a common public must be at a location at the same time so that various interactions can develop into collective meanings that are associated with it. It is precisely this simultaneously shared experience that is under threat from the rise of network urbanism. New types of public spaces such as ArenA Boulevard are mainly experienced as functional spaces. Due to its function as a multi-modal transport hub, ArenA Boulevard is an important interchange and point of entry into Amsterdam; its zoning for large-scale retailing means it is above all a practical destination. The meaningful experiences that are organised here mainly take place in the inaccessible and semi-public spaces of the ArenA, AFAS Live or Ziggo Dome. The rise of network communities, with their diverse rhythms and scales within which they operate, makes it more difficult to refer to a public that can develop in the course of time as people become aware of each other's presence.

The sense of place mechanism makes it possible, with the use of responsive technologies, to link yesterday and today, bustle and quiet, and inside and outside with each other. This can be achieved through a variety of approaches. The rhythm or the mood of a location can be measured using different types of sensors or by actively asking passers-by for input using a voting device, mobile app or some other interface. It is also possible to analyse the representation of a location on social media. These rhythms can be portrayed in a variety of ways at the location itself, ranging from the very prosaic (a measuring device that records exactly how



many people passed by at specific points in time) to the very poetic (abstract images of rhythms that cannot be directly traced back to actual events). Some installations in this category show an 'average', others, by contrast, make a sequence of individual experiences visible that together add up to a unified whole.

Stories about and interpretations of a location can also be written down as narratives and made accessible again at the location itself. These include written histories, audio recordings and videos. They might concern the history of a location or the plans that are being developed for its future. And all these stories can in turn be made accessible in different ways: installations such as 'audio benches' that tell stories, video projections, urban screens, or QR codes, iBeacons or urban gaming, which provide access to stored stories on external websites.

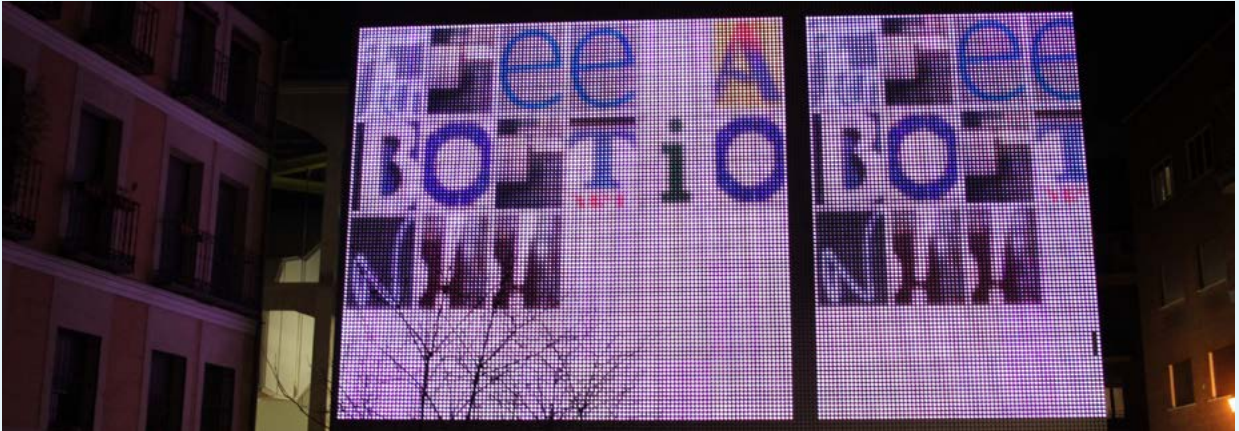
The 'sense of place' mechanism is also a spatial stylistic device. It shifts the built space from a neutral backdrop to a condition-creating 'enabler'. Using the mechanism for a specific wall, for example, can instantly add cohesion and unity to a whole space. A central position in the middle of a square or two-thirds of the way up a space can create the same spatial effect as a fountain or statue. The installation creates a shape, and connects a space or differentiates it into subareas. Sense of place connects: distributing an installation over several locations in a space can reinforce cohesion. The relationship with the user is also part of the spatial assignment. How does the object relate to the experience of arriving in the space: is it immediately visible or in fact waiting to be discovered 'around the corner'? It is in the very connection between 'place', 'space' and 'shape' that the new repertoire develops for reinforcing the public space.

Finally, various 'editorial' concepts are conceivable. A sense of place platform can be scrupulously curated by professional story-tellers or, by way of contrast, created by inviting all passers-by to contribute their own stories and meanings. The goal might be to create an inclusive, collective meaning that interconnects all the visitors to a location. On the other hand, a more dialectical approach might be chosen, juxtaposing the meanings of a location or focusing on the experiences of specific publics.

The 'sense of place' mechanism thus makes it possible to add layers to locations that at first appear to have only a single meaning, and to make other meanings visible. This mechanism makes it possible for the unique and temporary events that take place in the soccer stadium and on the concert stages at ArenA Boulevard to be experienceable by wider target groups that visit the boulevard at other moments. This way, they can become part of the boulevard's collective identity, precisely at the times when it is empty.

Urban Alphabets

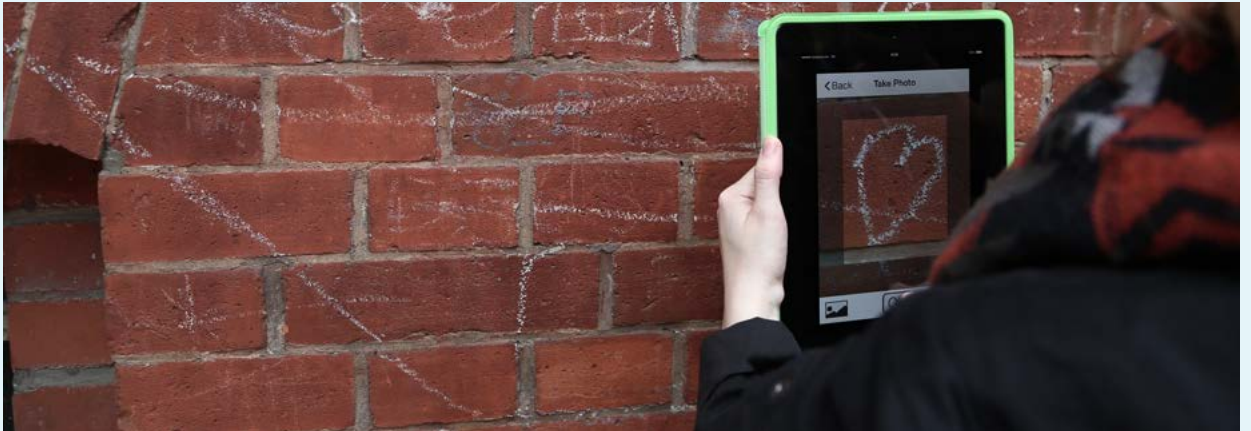
Suse Miessner



Urban Alphabets is an example of a *crowd-sourced* project that uses urbanites' contributions in an attempt to capture a collective sense of place. This is made manifest here by using a city's typography. People who are interested can use their mobile telephones to photograph letters used in graffiti, shop signs, advertising columns and other texts found in the city. All these letters together create an alphabet that is made visible on a screen in the public space. The installation encourages passers-by to pay attention to typographic details in the urban design that contribute to the development of a local identity. Spatially, the installation transforms an almost blank wall into one that is a lively focal point. This contributes to the cohesion in this hybrid space, with all its variations in height. From this point of view, *Urban Alphabets* is also a good example of how 'urban screens' can be used as a stylistic device in spatial design and of the activation of the physical space as a responsive backdrop.

**Crowd-sourced
contributions
from urbanites
capture a
collective
'sense of place'.**

Urban Alphabets, Suse Miessner, as part of Connecting Cities/Participatory City, 2014 (photo: Public Art Lab)



i-500

Paul Thomas, Chris Malcolm and Mike Phillips



i-500 is an artwork that poetically portrays the rhythm of the campus of Curtin University of Technology in Perth, Australia. In the background an operating system for architecture records various activities in the building, including the number of visitors, their activity in the physical space and on the Internet, and the indoor climate. An algorithm converts these details into an abstract projection on the ceiling of one of the buildings. The creators hope that, in the course of time, these poetic visualisations will familiarise visitors with the rhythm of the building. They were inspired by the *flâneur*, the mythical urban figure who appeared in Paris in the late nineteenth century. The *flâneur*, as described by Walter Benjamin and Baudelaire, found a footing in the alienating experience of the up-and-coming metropolis by undergoing and gradually absorbing the rhythms of the city (Thomas 2008). Although this installation is inside the building, the concept of representing the location's rhythm abstractly is an inspiration for using it in

the public space as well. As in the previous example, it can mark a particular wall or spot. Its use on the ground between various buildings also creates the possibility for a choreography between the activities from the various inside worlds to literally come together in the outside world. Here, position and the inter-play of lines can respond to specific wishes, for example, to increase interaction or divide separate spaces into subareas on a human scale.

i-500, Paul Thomas, Chris Malcolm & Mike Phillips, 2009 (photo: i-500)





Office Cleaning

Nika Radić



Office Cleaning, Nika Radić, 2008
(photo: Nika Radić)

Office Cleaning is an installation that aims to make the presence of marginal groups visible. They are often invisible but make an important contribution to society. To provide an insight into these layers of a location, Niki Radić projected videos onto the exterior walls of buildings showing cleaners at work when all the other users have gone home. It is as if the walls have become transparent, showing a reality that is never visible in the public space. Spatially, this can, like the *Urban Alphabets* installation, accentuate a wall and reinforce composition and cohesion. Besides this, the installation makes it possible to literally connect the interior world behind the facade with the exterior world. Through its size, colour, positioning, height from the ground and shape (a square window or a completely different shape), the installation can contribute spatially to the 'communication' between a building's walls and the particularisation of the wall or facade itself.

The installation opens the (hidden) interior world to the exterior world. Shape, colour, size and positioning are also spatial instruments in the design of the adjacent streets or squares.



Saving Face

Karen Lancel & Hermen Maat



Saving Face, Karen Lancel & Hermen Maat, 2012-2017 (photo: Lancel/Maat)

The *Saving Face* installation by Karen Lancel and Hermen Maat enables visitors to merge with the public in a space by using a touch-and-video interface. When visitors stroke their faces in front of a small pillar fitted with a camera, the parts of their faces that they have touched are projected onto a large screen. The image of their face slowly blurs until it is absorbed into a composite image of all the other faces that have been photographed there up to that moment. This installation goes one step further than *Urban Alphabets* and *Office Cleaning* by focusing on the users of the space. Buildings thus become the backdrop (projection screens) of a location. A wall that is used for projection is often a partly blank wall. The exact position of the projection, its height, and the use of colour are also stylistic devices to spatially emphasise the walls that, together, create the streetscape.

**The connection
between user and
installation is direct.
Positioning of the
column is also a
spatial instrument.**





The Mood Gasometer / Public Face Wilhelmer, Bismarck and Maus



This installation consists of an eight-metre-high neon smiley sculpture that was first mounted on an old gasometer in Berlin, then on a lighthouse in Lindau and finally on a block of flats in Vienna. Cameras at various places in the city chart the facial expressions of passers-by that are then used to measure the mood. The happier the facial expressions of passers-by, the happier the smiley smiles upon the city. And the opposite also happens: grumpy faces in the city make the smiley's mouth turn down. The large size of this artwork automatically turns it into a landmark that directs people's attention to an existing building in the city. The artwork is also visible from a considerable distance, temporarily lending a particular character to a whole neighbourhood or city district. Spatially, it makes a considerable leap in scale in relation to a single public space. The concept could, however, also be applied on a smaller scale, in a square or street, for example, or even at locations within a square or street. Besides this, it is also suitable for

large-scale surroundings, making the mood inside an adjacent building or complex visible to the outside world. Finally, it might also be possible to use the installation to provide an echo of the previous evening's experiences and moods or to create a barometer to predict the mood later in the day.

The installation represents the atmosphere in the city or space, while the artwork's monumental shape also creates a landmark.

Public Face, Julius von Bismarck, Richard Wilhelmer and Benjamin Maus, Media Facades Festival Berlin 2008 / Lindau am Bodensee, 2010 (photo: Public Art Lab)



Tree

Simon Heijdens



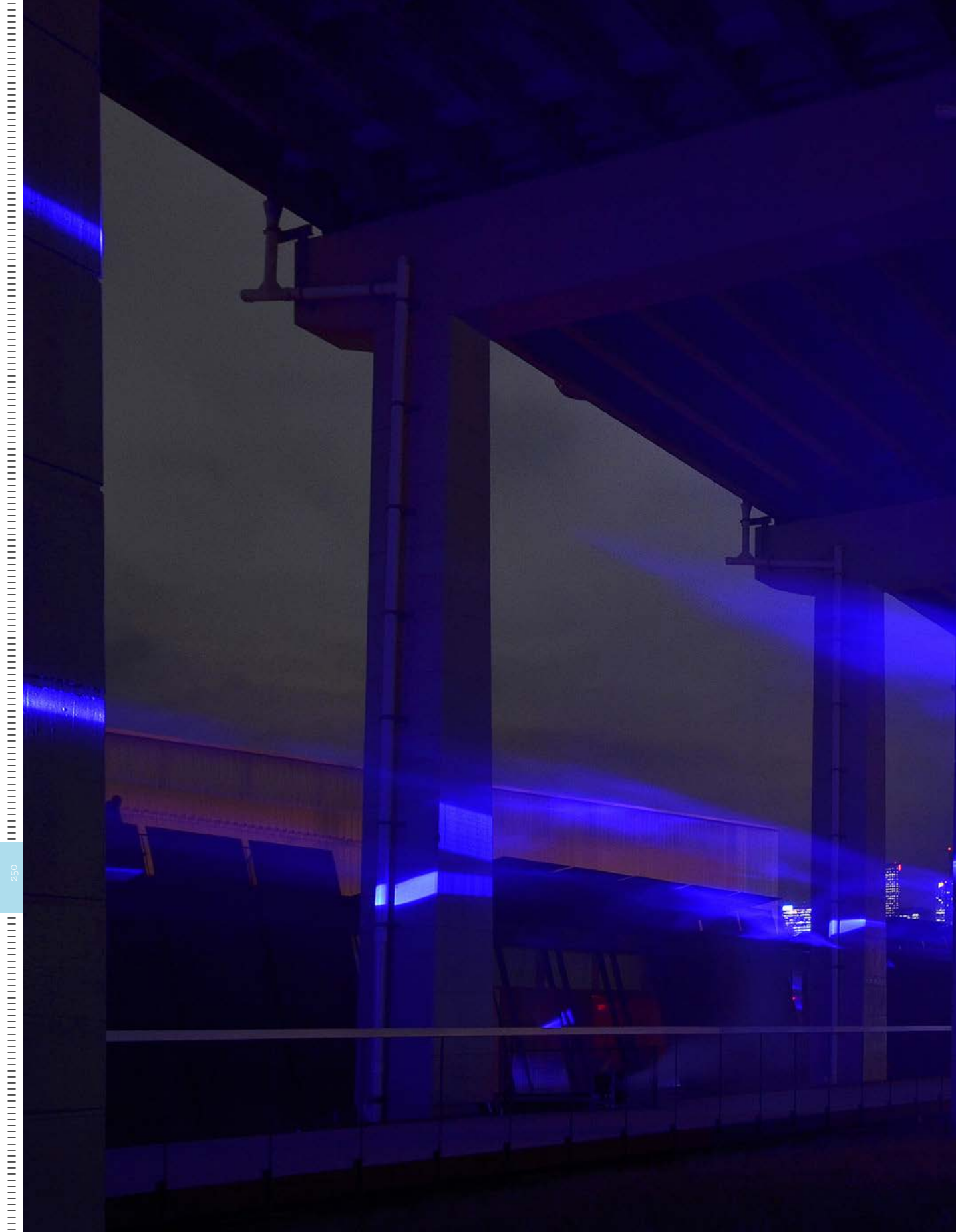
Tree by Simon Heijdens is an installation that emphasises the relationship between the city, humans and nature. It consists of an eight-metre-high, monochrome projection of a tree whose branches sway with the wind that is measured at any particular moment. If there is a storm in the city, the virtual tree lashes wildly backwards and forwards; if there is only a gentle breeze, the projected tree barely moves. Every morning, the tree is covered with leaves but each time somebody walks past it, a leaf flutters to the ground. A heap of leaves gradually accumulates at its base, becoming an ever more radiant source of light and drawing attention to the rhythm of how the location is used. When a passer-by walks through the heap of leaves, they are virtually swirled up, before they regroup and float down again. It is a subtle and poetic way to illustrate a sense of place and highlight one specific aspect—our relationship with nature in the city.

Spatially, the installation emphasises the specific part of a space and its walls. It creates a focal point, (temporarily) turning a side or rear wall into a facade. The installation links the building's wall in a flowing movement with the street.

The installation links the building's wall in a flowing movement with the street.

Tree Simon Heijdens, 2004-2014
(photo: SimonHeijdens.com)









Waterlicht Studio Roosegaarde



Waterlicht by Studio Roosegaarde is a temporary installation that projects a blue haze onto an entire square (here, the square in front of the Rijksmuseum in Amsterdam). This creates a layer of undulating projections several metres above ground level that create the illusion of flowing water, as if a catastrophic flood has just occurred. Visitors walk underneath this haze and literally feel as if they are walking underwater. The aim is to draw attention to themes such as water management and climate change. This is a fine example of how an added layer of meaning is created that links the location to the surrounding rivers and coastline, and the possible threats they pose. The result is an experience that is both aesthetic and political, individual and potentially collective. It is also a unique, exceptionally photogenic experience, earning it a second life on social media. Its impact is thus not limited to the location itself, as the experience of this specific location in the city is also made

visible for a much wider audience. Spatially, the installation opens up the possibility for virtual vaulting: an 'upper world' that adds identity, differentiation or emphasis to a entire space or parts of it.

**The experience
of *Waterlicht* is
both aesthetic and
political. The space
is temporarily
overarched and
produces new
coherence.**

Domplein OKRA landschapsarchitecten



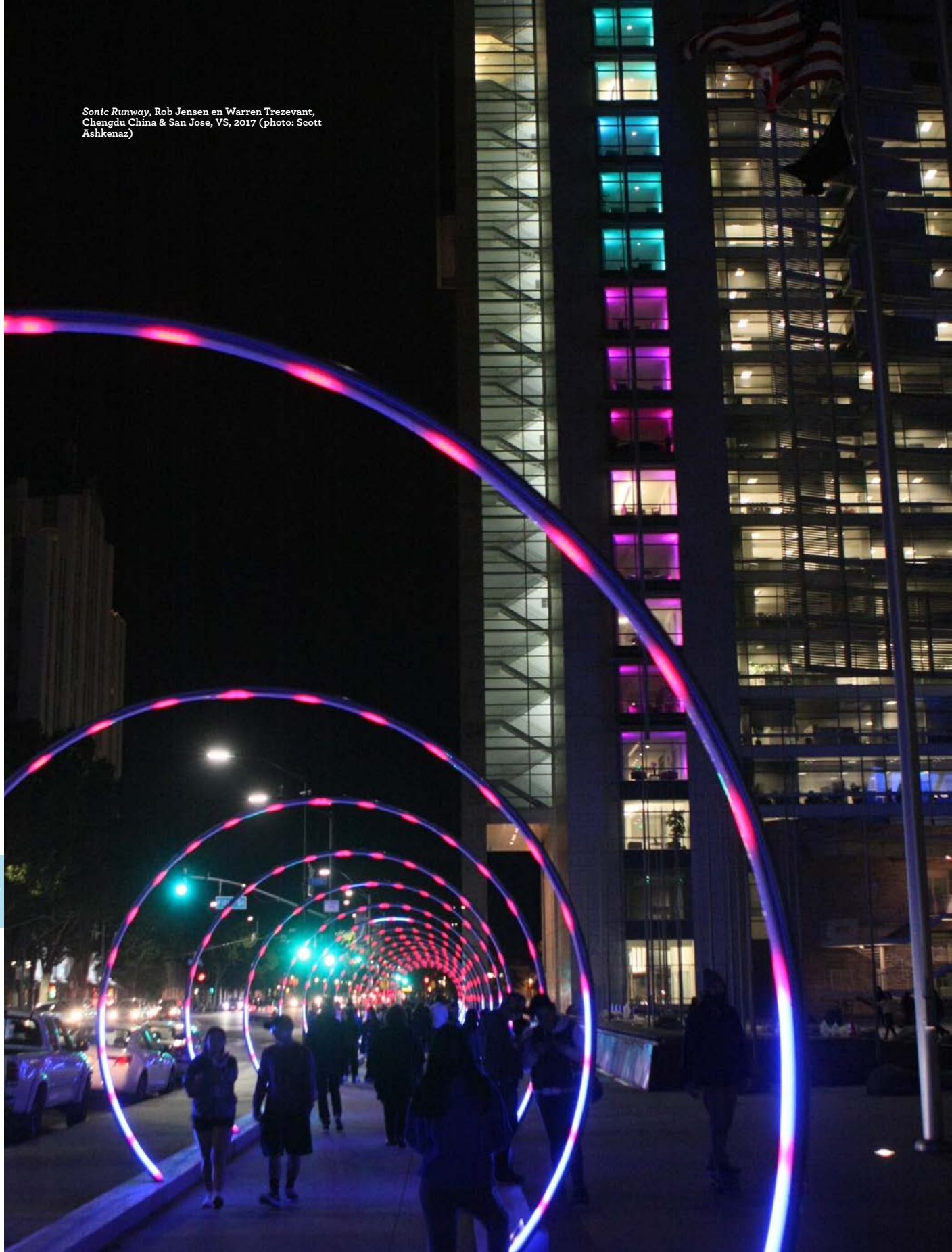
The Dom Tower (Domtoren) in the Dutch city of Utrecht stands on the location of an ancient Roman fort. At the beginning of the 21st century, the remains of this fort lie buried several metres below the ground. How can the historical layers of this location be made visible for our times? OKRA Landscape Architectural Firm took a hybrid approach. A line of steel tiles has been put in the street to indicate the outlines of the old fort. When it is dark, this line is marked by light projections that also shine vertically into the air, creating the illusion of a physical, three-dimensional boundary. This reinforces pedestrians' sense that they really are crossing a border and entering a historic zone. This technology also makes it possible to give public spaces a different shape or to 'carve out' routes at specific times, for example, after dark. This turns it into a device for encouraging people to choose the same routes when an area is deserted, for making a space more playful, for making people look up, and for reinforcing the illusion or sense of liveliness and safety.

This technology also makes it possible to give public spaces a different shape or to 'carve out' routes at specific times, for example, after dark.



Domplein, OKRA landschapsarchitecten
Utrecht, 2010 (photo: Ben ter Mull)

Sonic Runway, Rob Jensen en Warren Trezevant,
Chengdu China & San Jose, VS, 2017 (photo: Scott
Ashkenaz)



9.2 (Playful) Interaction.

‘Playful interaction’ is the mechanism that links urbanites not only with a location’s rhythms, stories and meanings but also with other people. In this sense, it is the mechanism with the greatest scope and potential for activation as well as the highest ambitions with regard to the qualities of the public domain. (Playful) interaction uses responsive technologies to enable visitors to a location to enter into relationships with each other, ranging from everyday encounters and brief, often playful confrontations to an exchange of opinions. The mechanism is related to various traditional theories about public space as a meeting place, as an agora where urbanites meet, exchange ideas and are thus able to create a public. It differs from the sense of place mechanism in two ways. Here, the emphasis is on the social, cultural and political relationships between citizens that are formed via the responsive technology rather than on the relationship between the visitor and a location. Besides this, it is more concerned with the here and now and the people who are present than with the ‘sum total’ of events and publics over time. Of course, the two mechanisms overlap. Sense of place is slightly more passive, more ‘ambient’—visitors consciously or unconsciously experience the specific representation of a location through an interactive installation. By contrast, (playful) interaction requires an active contribution from passers-by: they are supposed to take an active role in the installation and enter into a relationship with other visitors to the public space in or through the installation. The playful mechanism thus places more demands on the users of

a location, whereas the collective aspect of the sense of place mechanism can also be experienced individually. On the other hand, passers-by can also watch the playful interactions of others, assuming a more passive role as spectators.

Traditional socio-cultural theories about public space emphasise the importance of everyday encounters, and focus on affective relationships. Nowadays, public spaces are not immediately expected to bring out democratic or rational debates. Instead, a number of visions put the focus on the affordances of public space to build familiarity and trust between urbanites. Urbanites get to know each other by observing each other from a certain distance, overhearing conversations, or having a chat with someone. The playful interaction mechanism contributes to this process. The exchanges facilitated by this mechanism do not necessarily lead to new friendships or a close, homogeneous community but rather to a fundamental trust that perpetuates the idea of the city as a community of strangers.

Playful interaction also fits in with a trend that allocates a greater role to the experience of places. This is a perspective that, partly driven by Richard Florida’s influential study *The Rise of the Creative Class* (2002), gave direction to area development. According to Florida, cities around the globe are competing with each other to attract companies and the ‘talent’ of the creative class. Highly esteemed, vibrant public spaces are an important drawcard in this process. Events such as festivals and playful performances in the public space, where visitors collectively undergo a temporary special or exciting cultural experience, can play an important role here. An event-based approach like this also fits in with network urbanism. If spatial

use fragments as a result of increasing individualism, digital-media use and growing mobility, then the functionality of central squares as public spaces that are used by all urbanites will become less self-evident. The public domain will then manifest itself at a variety of locations in the city that, in turn, try to attract publics by hosting spectacular experiences. If successful, these event locations can then become the sites where the social worlds of diverse groups (temporarily) overlap. Events that draw a diversity of groups can activate locations in a city as meeting places.

However, the event-driven, (semi-) privatised public space is not without its critics. In reaction to the rise of the consumer society, a variety of art movements over the last fifty years have instead conceptualised public space as a place where completely new types of social relationships might become possible. As early as the late 1950s the situationists were resisting the commercialised spectacle society that reduces citizens to consumers. With their artistic interventions in the public space, the situationists hoped to undermine this dominant culture and make new relationships conceivable between urbanites and with their surroundings. In the art world, this movement continues to be an important source of inspiration for creating interactive installations.

(Playful) interaction as a mechanism for responsive public spaces interprets the function of public space as a meeting place in different ways. At the same time, the various approaches to public space mentioned below are not isolated from each other but can also overlap. First, if we consider public space as a political arena, several approaches

are possible. Interactive installations can act as arenas for public debate. In that case, there is not only an installation to design, but also a spatial arrangement to take into account. There was good reason for the traditional agora having a spatial layeredness to accommodate different debates and provide participants with a safe spot from which to follow debates. In today's

(Playful) interaction temporarily connects visitors of a space. It interprets the function of the public space as a meeting place.

interactive installations we often see a screen or some other interface that passers-by use to contribute to a public discussion. The relationship with the physical space is mainly that of an installation space. Passers-by can give their opinion or, for example, vote for or against a proposition, and the individual contributions and collective outcomes of that debate are, in turn, made visible. In many cases, however, a responsive installation does not so much facilitate a debate as introduce an

issue for debate. Rather than being an arena for debate, the installation is a conversation piece that stimulates awareness and discussion among by-standers in the public space around the installation.

A sub-genre in this category concerns data visualisation in the public space. Data about, for example, electricity use or pollution are reproduced using an interface, not necessarily in real-time, to raise awareness of an issue and help create ‘issue publics’ (communities that concentrate on a defined issue such as sustainable energy, focusing on a particular issue (see, for example, Claes 2017). Responsive installations like this often revolve around the question of ‘citizen engagement’: how can citizens become involved in social and local issues in new ways through responsive installations? In this sense, it is mainly a canvas for promoting a collective message.

A second, more socio-cultural category consists of installations in which visitors briefly interact with each other. This might involve playing a game together that has specific goals, rules and scoring, often with a competitive element and high scores. Buildings, facades or screens in public space are then reminiscent of a public video arcade where passers-by can game with each other. This is the focus of a completely new urban-gaming movement.

There are also many installations based on the principle of free play. They are more like a playground. There are no specific rules or established goals but rather an environment or ‘world’ that reacts to players and provides a number of expressive tools. And just as the see-saw or duo-swing in a real playground

invite players to co-ordinate their activities, these projects also invite players to work together or co-ordinate, resulting in a brief, shared choreography.

Occasionally, the playground metaphor is used literally. The Canadian project *21 Balançoires*, for example, consists of a series of swings that make music when visitors move them back and forth. Sometimes variations on long-forgotten games and drama genres are used. Rafael Lozano-Hemmer’s *Body Movies* installation, for example, uses the concept of seventeenth-century shadow plays: passers-by are invited to use their bodies to create silhouettes on a building’s facade. It is not immediately obvious to the users what it is and how it works; they have to make an effort and really look or talk to others who already understand it.

Spatially, the installation can turn rear walls into front facades, activate and particularise the space or interconnect subspaces.

Many examples in this category refer to the concept of 'relational aesthetics' (Bourriaud et al. 2002) used in the world of art. In this vision, artworks are not intended to represent an autonomous, artistic expression but rather to serve as the object, or focal point, around which (brief) social relationships can develop. In the case of responsive installations, these relationships can develop both *in* and *around* the installation. Passers-by can interact with each other in a playful environment or, as spectators, react to the interaction of others. The hope is that all these fleeting, everyday encounters will play a role in creating trust between urbanites and thus contribute to a sense of the city as a community of strangers. Spatially, it is also a device to play with, shift or actually emphasise new focal points.

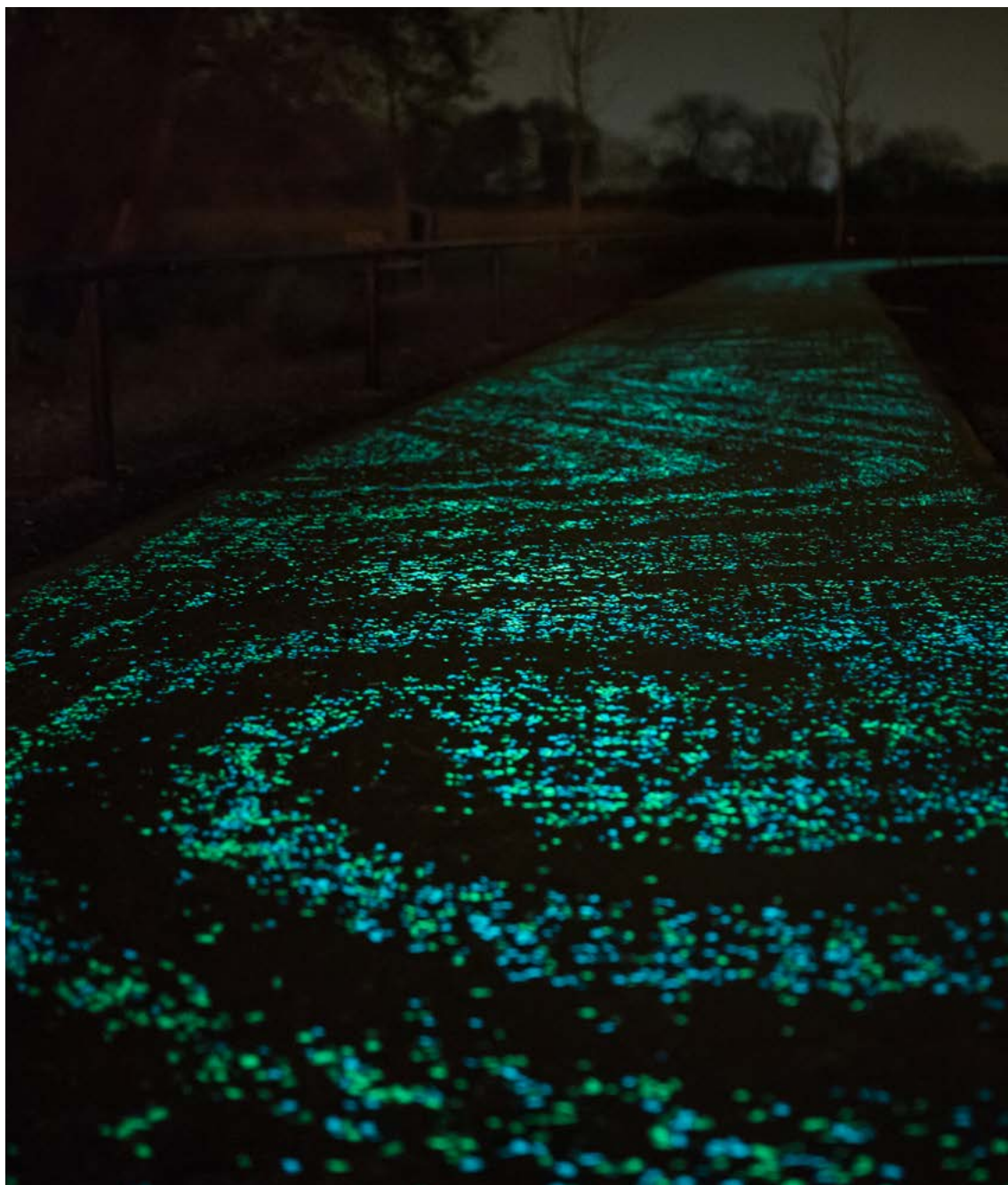
Responsive applications that are based on the (playful) interaction mechanism often resemble games. Play, more than anything else, attracts passers-by to participate in an installation. Especially in a public space where people are looking for a way to pass the time, a playful approach is the obvious response to the intrinsic motivation of visitors who are looking for a good time or special experience. This is especially true during festivals and events.

There is a further reason why play is an interesting design approach for this mechanism. Play creates a 'magic circle', a temporary arena in which other rules briefly apply. This provides opportunities to experiment and relaxes social constraints, encouraging people to join in. Passers-by are often hesitant to participate in a performance in the public space, especially if they are asked

about their opinions or political views (Claes 2017). In a community of strangers we prefer to keep some aspects of our identity private. A playful experience gives us a certain licence for experimentation and expression. In the magic circle of the game, according to the implicit social contract, we do not represent ourselves but temporarily acquire a free role that the game requires of us.

Spatially, the play mechanism opens up various possibilities. It can turn rear walls into front walls, temporarily and adaptively, and it can activate and particularise the street space in front of us. The mechanism also has the advantage of expanding a space and inducing users to discover new routes. To achieve these aims, the installation is not limited to a static location but can become part of a larger series of locations and positions in the space and its immediate surroundings.

The playful interaction mechanism places several demands on a location. Users must enter it with a degree of open-mindedness—and a minimum number of visitors is required (no play without players). The question is then how long an installation remains 'viable' or in fact continues to develop through its users. Strategically, the installation is also a colonising and pioneering mechanism to explore undiscovered locations or link under-utilised locations with busier areas.



Van Gogh Path, Studio Roosegaarde
(photo: Studio Roosegaarde)



Body Movies

Rafael Lozano-Hemmer

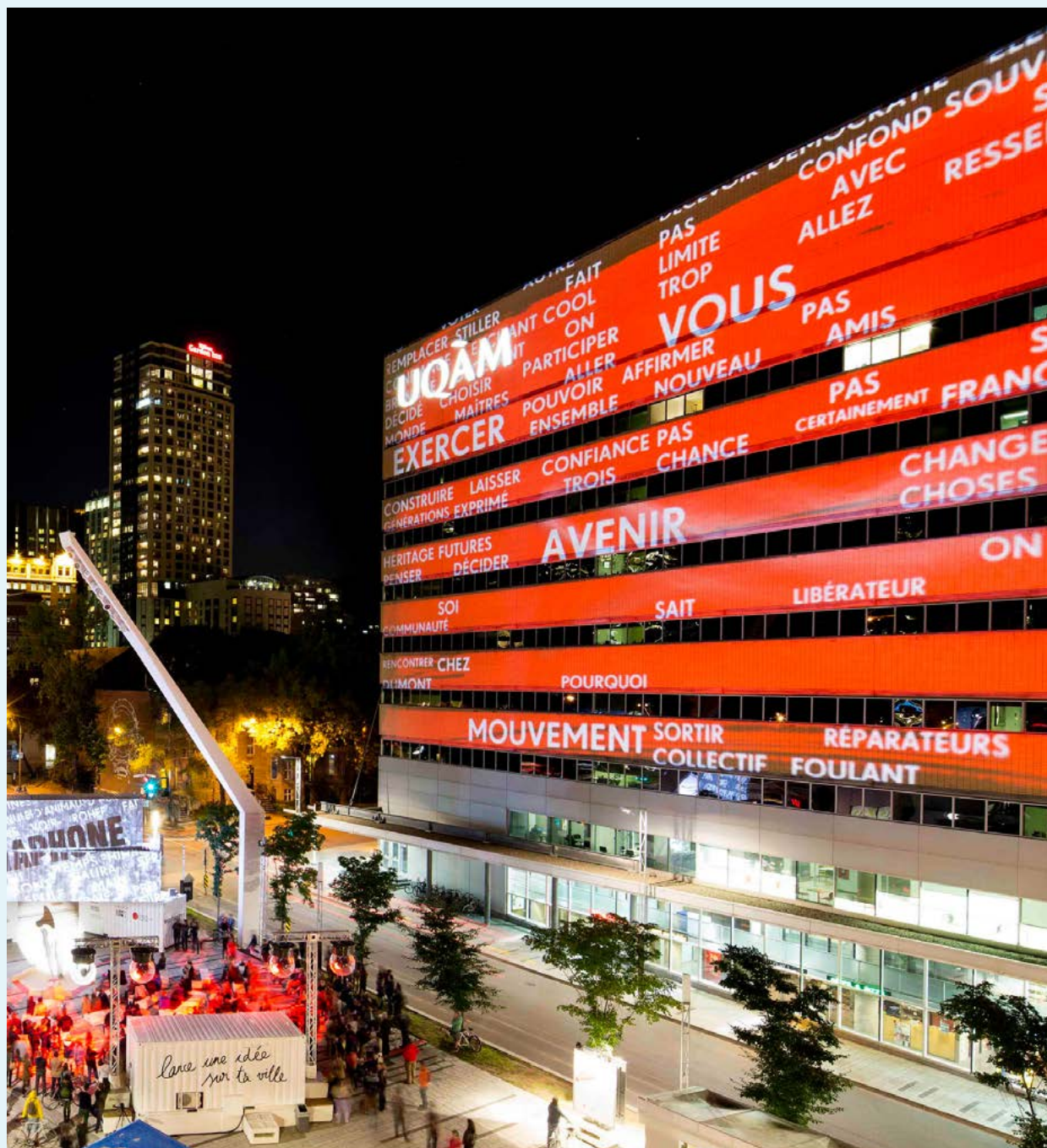


Body Movies is an installation that has been exhibited in several cities around the world. It was inspired by a seventeenth-century engraving of shadow plays that were popular at the time. Passers-by are encouraged to 'project' their own shadows onto a blank wall in the public space by moving in the beams emitted by a powerful light source. At the same time, photographs of passers-by in the public space are also projected onto the wall. The bright light makes them difficult to see, and they only become clearly visible in the shadows created by the 'players'. Several people can create shadow shapes on the wall at the same time and, after a while, a spontaneous choreography often develops, with players doing their best to make all the passers-by in the photographs clearly visible. If they succeed, they are rewarded: a new photograph is projected onto the wall. A game develops that encourages low-key, playful interaction between strangers, briefly bringing them into contact with each other. Spatially, this installation also makes it

possible to (temporarily) radically alter the shape of a location. Its scale and complex playfulness allow it to go much further than an installation like *Office Cleaning*. *Body Movies* provides a high 'sojourn quality', with spectators becoming participants and acting together. Spatially, it provides an opportunity to turn a space that has a single orientation point into a space with multiple orientation points or turn a rear wall into a front wall. Furthermore, it can be used as a device to connect spatial fragments, create new connections and/or create a stepping stone between active and less active locations, inside and outside.

The shadow play turns spectators into actors.

Rafael Lozano-Hemmer, *Body Movies*, Relational Architecture 6, 2001. Jan Sprij en Antimodular Research.



Mégaphone

Moment Factory & Étienne Paquette



Mégaphone was a temporary installation that briefly activated a public space in Montreal as an arena for debate. A number of containers were used to demarcate a small, clearly defined area with a stage on which a megaphone was placed. Speech recognition software recorded texts spoken by passers-by and converted them into projections that appeared on the facade of an adjacent building. Spatially, the two scale levels are interesting. This opens up possibilities for the design. The small-scale object might be a kiosk, photo booth or, as in this instance, an industrial statement. This object can be used to emphasise spatial patterns (lines, squares etc.) as well as routes, entrances and central locations. Is it, for example, intended to interrupt the flow of people by placing it in the middle of the fastest route or actually activate an under-utilised location? The shape, colour and ambience of the object can also enter into a relationship with the large wall that is used for the projection. Finally, this relationship can also be used to give spaces more cohesion, differentiation and shape.

Mégaphone, Moment Factory, Montreal, 2013.

**Speech recognition
software record
texts spoken by
passers-by and
converts them
into projections
that appear on
the facade of an
adjacent building.**

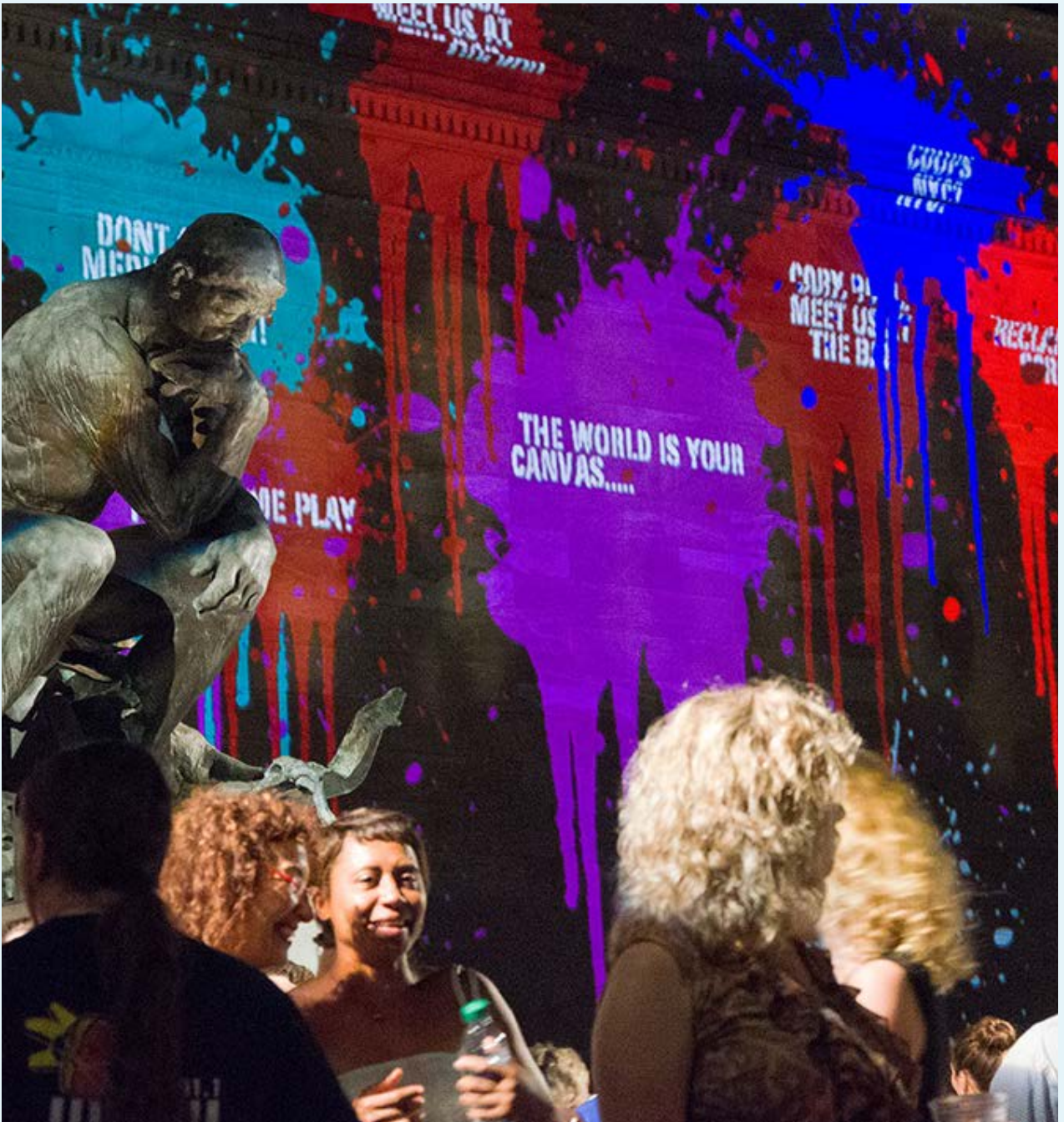
SMSlingshot VR/Urban



SMSlingshot is an example of an artistic intervention in the public space. VR/Urban looked for a way to address the commercialisation of our everyday surroundings. Public spaces are increasingly dominated by advertising messages instead of social or political interaction. This installation gave urbanites the opportunity to seize back the public space. Using a catapult, they could sling messages at a facade. The catapult was fitted with a mobile telephone that they could use to type in text messages. When the message had been 'slung', it was projected onto an interior wall. This is an example par excellence of a temporary, activist, event-like installation. Spatially, it is a device to temporarily activate and add meaning to a location.

This installation gives urbanites the opportunity to seize back the public space. It put a wall temporarily in the centre of attention.

SMSlingshot, VR/Urban - Christian Zöllner, Patrick Tobias Fischer, Sebastian Piatza en Thilo Hoffman, Cleveland 2012.



Shadowing Chomko & Rosier

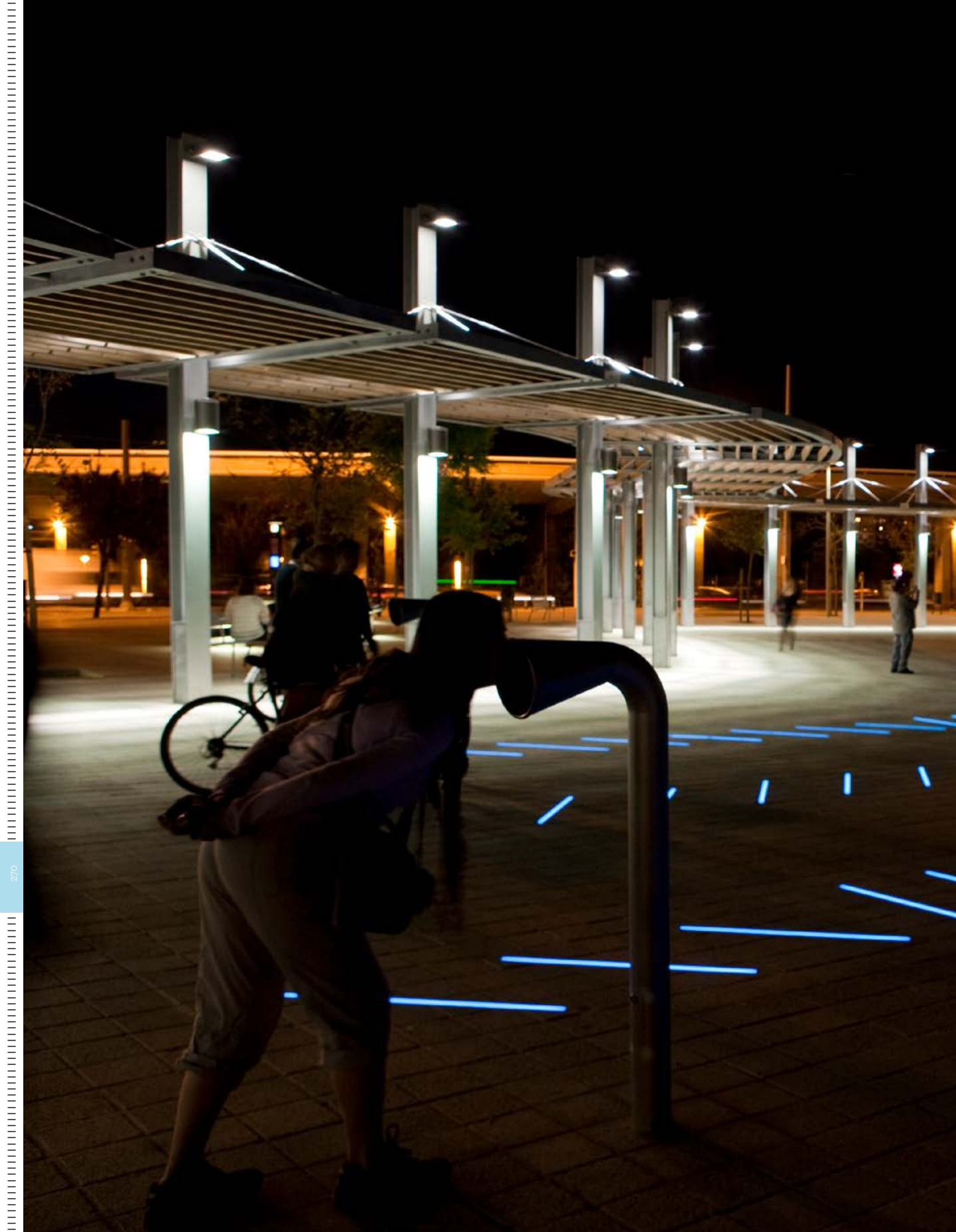


Shadowing is an installation that projects the shadows of earlier passers-by in the beams of a street light. The installation uses this slightly alienating experience to draw attention to other, usually anonymous urbanites who use the same space; it casually creates a relationship between passers-by that goes no further than a perception or an awareness of sharing the space with many others. Spatially, the street lights emphasise the use of light in the public domain as part of the urban experience and they create small focal areas that can arouse curiosity. On a more critical level, the installation also refers to the surveillance made possible by technology, which is omnipresent in public space. For some, it provides a sense of security; for others, it leads to an ominous sense that they are being spied on everywhere and all the time.

The installation projects the shadows of earlier passers-by in the beams of a street light. Spatially, new focus areas are addressed.

Shadowing, Chomko & Rosier, 2014
(photo's: Farrows Creative)









BroomRuum!

David Torrents & artec3; LEDsCONTROL



BroomRuum! is a large-scale interactive light-installation that has been completely integrated into the architecture of the Plaça de les Glòries Catalanes in Barcelona, where the DHUB design museum is located. The installation consists of nearly 10,000 LEDs that create a rhythmic pattern on the square's surface. These lights react to the noise in and around the square when the installation is on in the evenings. Special sensors measure the ambient sound and convert its intensity in a moving colour pattern. These sensors are instantly recognisable for the public: they resemble periscopes that stick up out of the square to explore the surroundings. This design encourages passers-by to experiment: by whispering, shouting, singing or clapping, they can change the pattern of light on the square. It results in playful interactions, with passers-by trying to control the pattern of light or enjoying the ability to influence it. Spatially, the installation creates a new urban 'carpet'. During the day, the surface is barely distinguishable from the other public spaces

but in the evenings the square is transformed. The integrated strips are a device that, in a simplified form, can also be used as a structuring principle and stylistic device to 'carve out' a location's shape and route.

This large-scale interactive light installation has been completely integrated into the architecture the square.

BroomRuum! David Torrents en artec3 Studio. 2014.
(photo:Xavi Padrós)

Happy Wall

Thomas Dambo



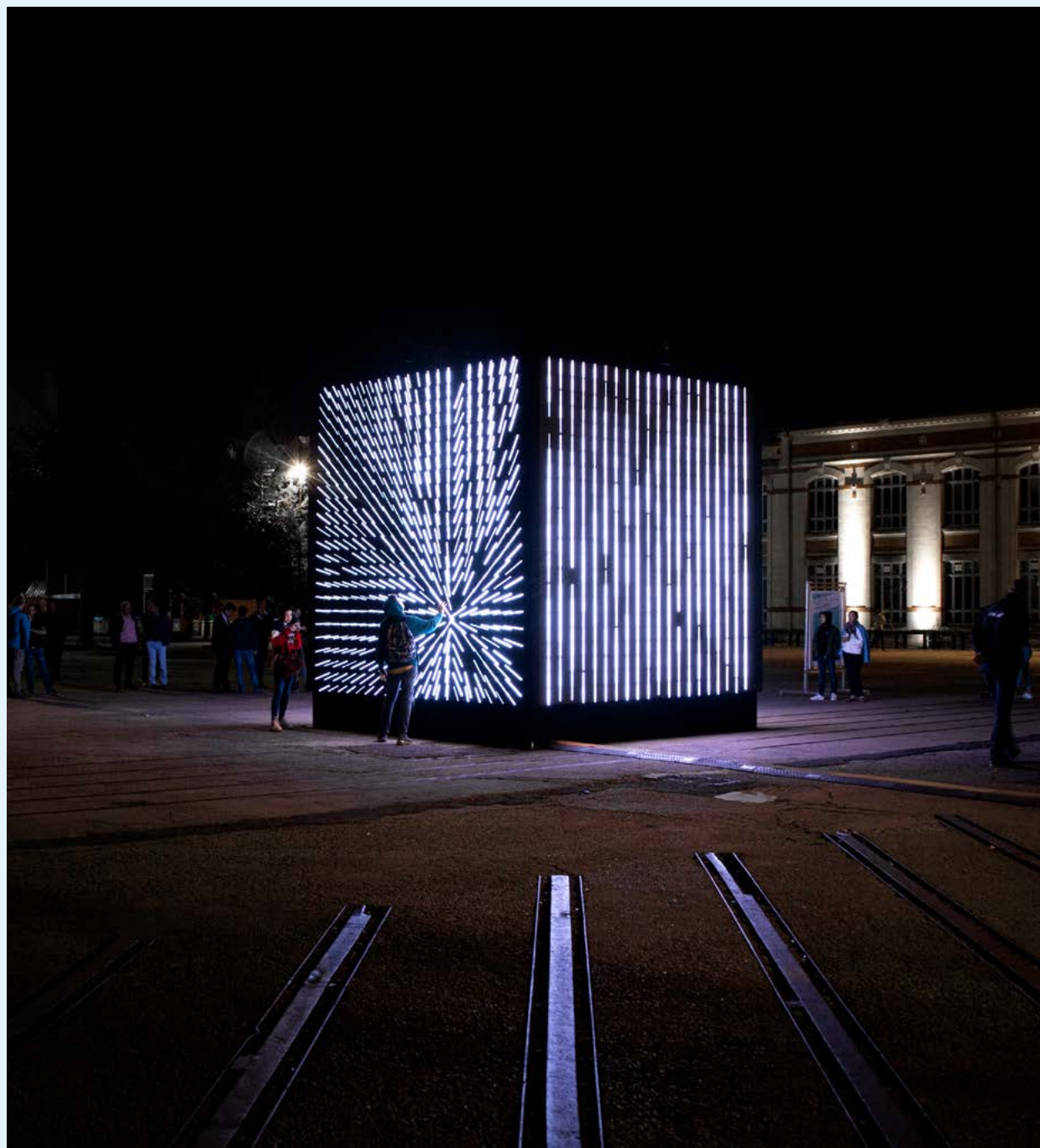
The *Happy Wall* consists of 1,728 wooden panels that are black on one side and brightly coloured on the other. Together, they create a four-metre-high wall of ‘pixels’ that was used to screen off a building-site around an underground station in Copenhagen. By flipping the panels over, passers-by could leave drawings or texts on the wall. They were able to use a mobile ladder to also change the colour of the higher pixels. This simple concept and the low-tech interface were contagious: within no time, dozens of messages and simple graphics appeared. The installation’s scale means that passers-by have to use their whole body and encourages collaborative efforts. The project also developed into a good example of social-media urbanism: photographs of the *Happy Wall* were posted thousands of times on networks such as Instagram, thus reinforcing the aura of the location beyond its physical location.

The installation is an analogue version of the digital world. Spatially, it is therefore an active and activating construction screen. The possibilities are, however, much greater. It is an installation that can (temporarily) activate an existing (blank) plinth. But it can also be used in the middle of a space to create new, temporary shapes or routes.

***Happy Wall* is a four-metre-high wall of ‘pixels’. Its simple concept and low-tech interface are contagious and activate blind plinths or building fences.**

Happy Wall, Thomas Dambo, Copenhagen 2014
(photo: www.thomasdambo.com)





Control Iregular



Control consists of one or more large sculptural LED screens placed in the public space. The screens display an abstract and monochrome inter-play of lines whose intensity varies. Sometimes the lines are long strips that resemble life-size, moving barcodes, at other times they are like short, flickering diagonal lines that descend like rain across the screen. Visitors can influence the pattern by walking past the screens, by using their hands to interrupt the play of lines, or by physically pushing the vertical rays of light away. Several people can interact with the screen simultaneously, creating a playful choreography. The LED screens can create several spatial effects, depending on the technical requirements. Placed along the length of a building-site fence, they can create a silhouette of the spatial shape and active ground floor that will be created by the new building. The use of colours and shapes enhances the experience of a space as a location between two walls. Fitted to an existing wall, as in the example, it can

concentrate users and create new routes. On a larger scale, the installation can subdivide spaces or, for example, shift the focus from the buildings to the communal focal point of a space. At the same time, its use depends on the open-mindedness of visitors and the accessibility of the installation's concept for the users (do they understand what is possible?).

**Visitors
influence the
pattern, while
the object also
organizes the
space.**

Control No Control, Iregular, Nantes, France 2012
(photo: Daniel Iregui)

Urbanimals

LAX Laboratory for Architectural Experiments



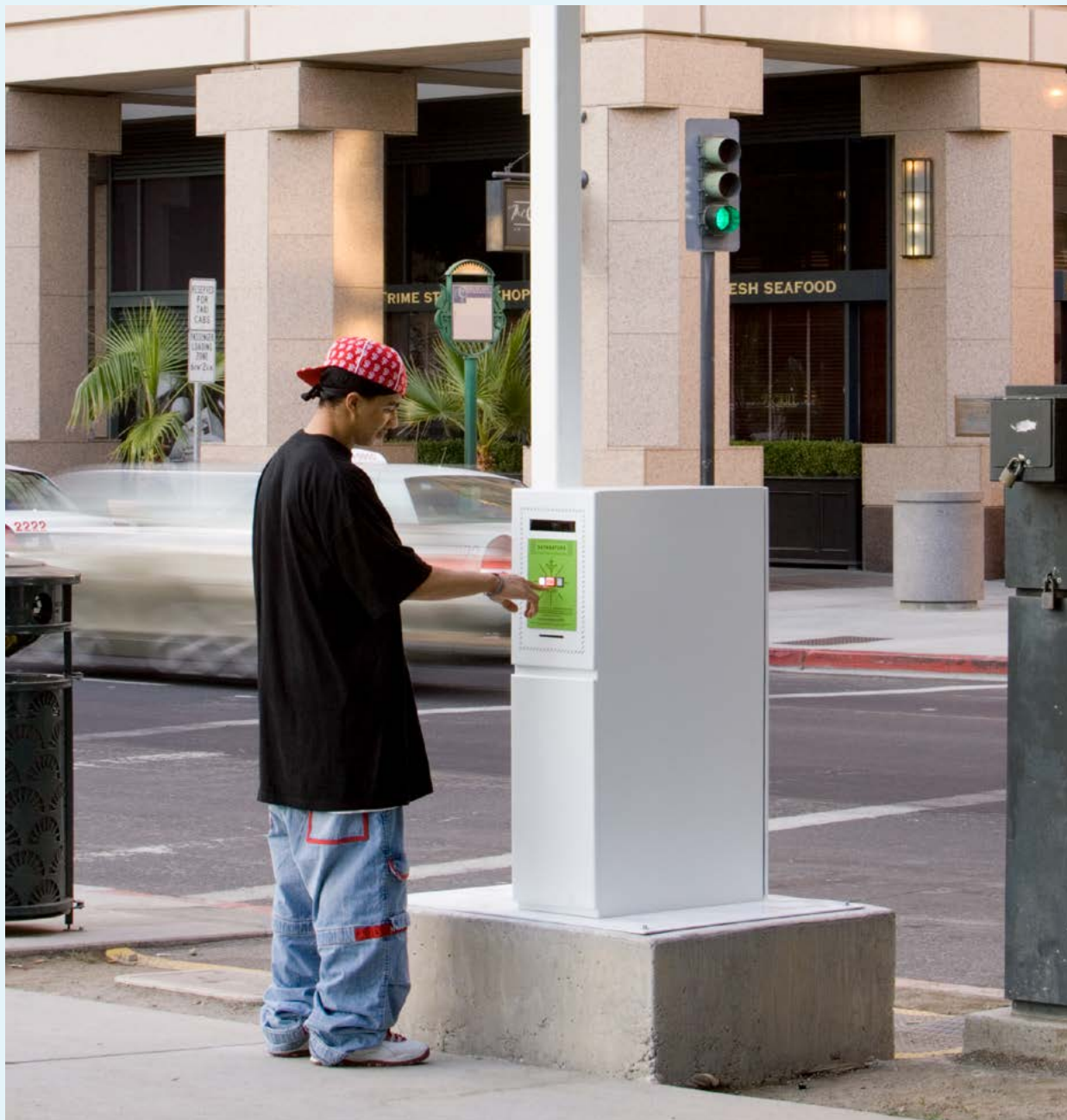
For their *Urbanimals* installation, the makers selected eight animals, including a kangaroo, a dolphin, a beetle and a rabbit, that come to life in different locations in the city through projections. The dolphin suddenly appears on the wall of a dark tunnel, a little beetle unexpectedly crosses the road in a dark spot in the city, a rabbit challenges passers-by to start sprinting. The projections react to the behaviour of on-lookers, and each animal has its own character: one is shy, the other cheeky. They mainly appear in places that passers-by hardly notice or places that are not intrinsically attractive because, for example, they are being converted to a new use. They are aimed at briefly disrupting the usual routine of passers-by. The animals have a clear, cartoon-like appearance and their playful behaviour is intended to encourage passers-by to pause for a moment and take a fresh look at their surroundings. A kangaroo projected onto a wall, for example, invites

passers-by to start skipping with it. The size and scale of this installation make it a subtler intervention than the *Control* installation. It is therefore best used in locations that are frequented by pedestrians anyway.

The projections react to the behaviour of on-lookers, and each animal has its own character. Places are made visible.

Urbanimals LAX laboratory for architectural experiment, ontwikkeld voor Watershed's Playable City Award 2015 (photo: Paul Blakemore)





9.3 Personalisation.

Personalisation addresses the question of how urbanites can appropriate public spaces and personalise the use of urban spaces. Whereas the sense of place and (playful) interaction mechanisms are concerned with how urban publics and communities can develop in the public space, personalisation addresses the reverse issue: how can we, as individuals, stand our ground among all these collectivities, how can we feel at home among strangers? Social-science research into public spaces has paid little attention to this subject, and little is known about how to orchestrate such experiences. Nevertheless, this is an important mechanism. A city as a successful community of strangers does not only provide urbanites with opportunities to come into contact with each other in public spaces but also with enough opportunities to lead their individual lives as they wish, and to feel at home. But how should this process be shaped, when the urbanite is surrounded by the countless impressions, lifestyles and functions that the modern city offers? And how can we guard the balance between appropriation and privatisation on the one hand and encounter and exchange on the other?

These are questions that have preoccupied thinkers and researchers since the development of the modern metropolis during the second half of the nineteenth century. At the beginning of the twentieth century Georg Simmel (1969) was already writing about the blasé attitude that he encountered in the modern urbanite. As a reaction to the information overload in the metropolis, citizens tend to withdraw into their private world in the middle of the public domain. More recently,

the mobile telephone has been discussed in similar terms: it functions as a 'territory device' (Ito et al. 2006), allowing us to create a private space in the public domain. All these practices have a defensive character: urbanites arm themselves with their indifference and various social-media practices against the information overkill in the big city and create their own private bubbles in the public space.

Personalisation is about the ways in which urbanites can appropriate public spaces and the need to feel at home among collectivities and strangers.

Other thinkers take a more positive approach to the possibility of 'feeling at home in the public space'. As early as the nineteenth century, for example, the French poet Baudelaire introduced *flânerie* as the attitude of the artist: from the abundance of impressions in the city, the artist

selects those elements that provide inspiration for a new work of art. Various philosophers have continued to shape the now mythical figure of the flâneur. Walter Benjamin, for example, referred to the flâneur's capacity for 'absent-minded attention'. We usually perceive the multitude of impressions in the city unconsciously. At the same time, we have the ability to draw meaning from them, and to select from all those impressions those that are relevant to us. This is precisely what the personalisation mechanism enables urbanites to do: to make a selection from a multitude of impressions. A personal meaning can then be attributed to a location or an experience. This is how innumerable services now help urbanites to find specific locations and individuals in the city in real-time. From TripAdvisor to the Dutch lens restaurant guide and from dating apps such as Grindr to sport apps such as Strava, apps direct us to restaurants, dates or cycle trips that match our personal tastes.

Conversely, apps like meet-up.com or social networks and messenger services such as Facebook or WhatsApp enable us, together with a specific group, to temporarily shape a space according to our wishes. The Coffeecompany is turned into a temporary meeting room; the city park is turned into a meeting place for a bootcamp or game of soccer that has been organised online. The personalisation mechanism has a two-way effect here: interactive technology helps us to 'filter' the city, and our own behaviour in turn feeds the databases and algorithms. Our own running route on Strava, the reviews that we post on lens.nl, and our Facebook selfies of a visit to a particular location increase the density of the information landscape that has become part of physical locations, and help the next visitors to find their way.

As a mechanism, personalisation usually takes the form of an app. The smartphone is a personal technology par excellence, enabling urbanites to download personalised information about a city and its inhabitants. But the mechanism can also be implemented in the public space: digital displays, for example, provide personalised information by using facial-recognition software.

An approach like this can, however, also undermine the feeling of being at home. If responsive technology addresses an individual in the public space, he or she is no longer anonymous. An individual might then feel observed, the very thing that can disturb our ability to feel at home among strangers. iBeacons are subtler from this point of view: they can send information to the mobile devices of passers-by at a particular location and include the possibility of personalising it.

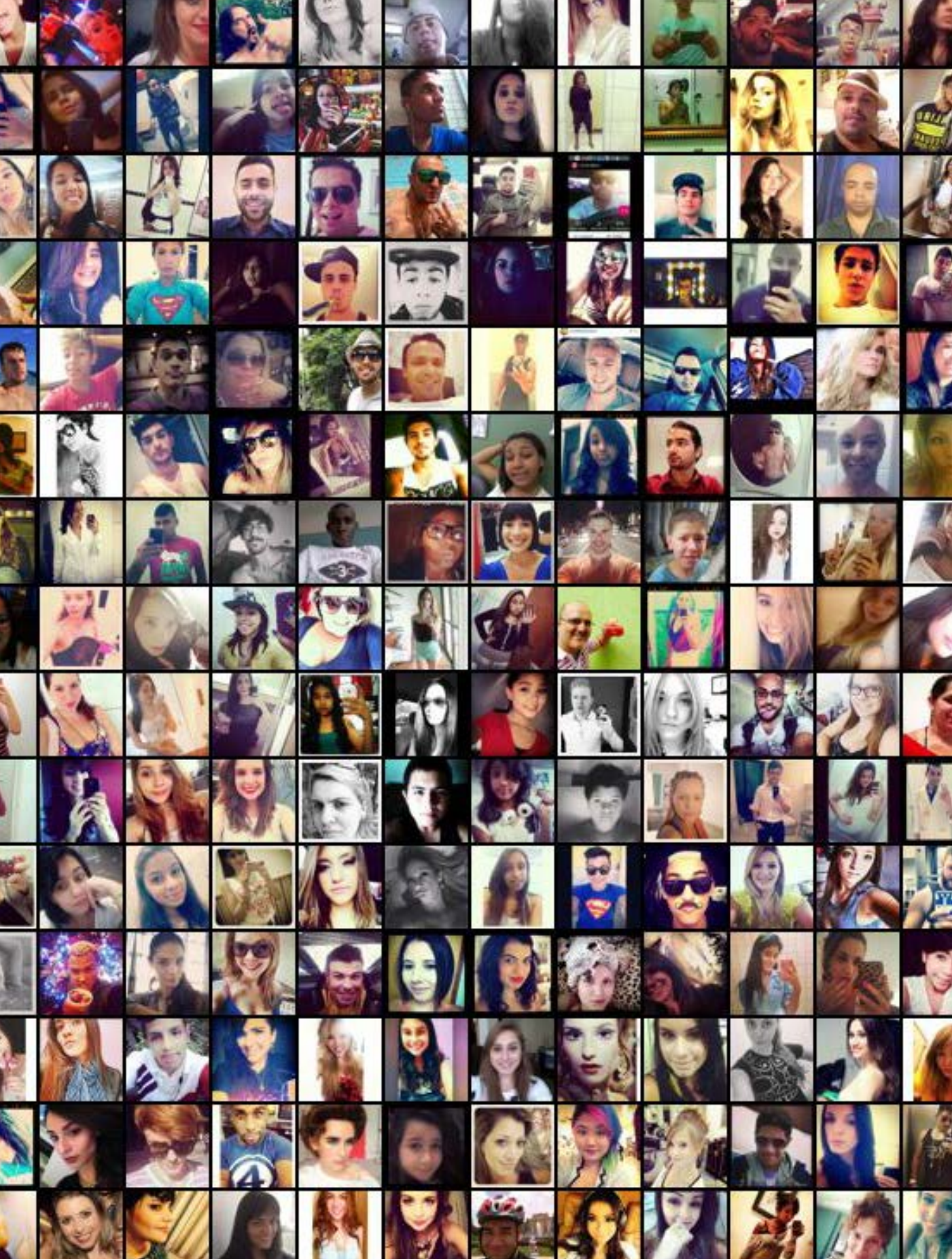
The personalisation mechanism is accompanied by a certain tension with regard to how the public domain functions. It provides urbanites with the opportunity to personalise the use of space and to select from the overwhelming choices on offer in a city that which interests them as individuals. This mechanism might thus contribute to the further privatisation of the public space and the development of separate worlds of experience in the city. Yet this need not have a negative effect on how the public space functions. The boundary between the private bubble and the experience of the public space is porous: simply looking up from the newspaper or mobile telephone for an instant is enough to burst the bubble. The very experience of a private bubble can provide people with the confidence and foothold they need to feel at ease in the public space. This mechanism can also make it possible for a

variety of groups to simultaneously use the same location. When they are linked via an app or a website, they can arrange to meet at various locations. A park then becomes a meeting place for soccer teams, groups of friends having a barbecue, and parents with young children; a cafe becomes a venue where freelancers hold business meetings, school pupils do their homework, and two potential lovers encounter each other for the first time on a date arranged by a dating app. From within all these temporary bubbles, urbanites can in turn relate to each other. Locations on or around transport hubs are particularly well-suited for these sorts of digitally arranged meetings because they are easy to reach.

Perhaps the most important design issue raised by this mechanism is how it should be turned into a spatial design. The interaction between users and their surroundings mostly occurs on the screen of a mobile telephone. How can the spatial design of the public space facilitate this dynamic? On the one hand, it is important for spaces to be organised in such a way that they can be appropriated by a variety of groups. Is it possible to temporarily appropriate part of the space? On the other hand, specific cues in a space can make the presence of diverse publics possible, or encourage users to appropriate the space online too. Think, in this regard, of the various selfie-spots that are frequently photographed and shared via social media. The photograph might be considered an act of appropriation, the online sharing possibly contributes to a sense of place for a particular location or alerts future visitors to the attractiveness of that location.

The interaction between users and their surroundings mostly occurs on the screen of a smartphone. How can the spatial design of the public space facilitate and deploy this dynamic?

Selficity, Lev Manovich, Moritz Stefaner, Mehrdad Yazdani, Dominikus Baur, Daniel Goddemeyer et al. 2014
(photo: <http://selficity.net>)



Project Superilla Barcelona en IAAC



Project Superilla is a spatial experiment in Barcelona. The space for car traffic in the Poble Nou district has been halved. This experiment explores how this new public space can be used. Besides new cycle lanes, plants, playgrounds and charging points for electric vehicles, a series of large blue circles invite users to interpret the space themselves. People can thus temporarily personalise the space. Children appropriate the circles as play areas; pedestrians choose the circles as new routes.

With *Project Superilla* cars have been banned from a large part of the roadways. Large blue circles invite urbanites to colonize these new spaces for pedestrians.

Superilla Poblenou, IAAC Institute for Advanced Architecture
Catalonia, Barcelona (photo's: Frank Suurenbroek)



Crown Fountain Chicago



Over the years, the *Crown Fountain* has become a famous landmark in Chicago's Millennium Park. The fountain, designed by Jaume Plensa, is a clearly recognisable object that is used as an orientation point and as a meeting place. The way it has been situated in the space and its function as a fountain contribute to its role. On warm days it invites children to splash around in the water. To a certain extent, the fountain also includes the sense of place mechanism. Short, slow-motion video films of the neighbourhood residents shown on the fountain give an impression of the neighbourhood's diversity. Originally, new films were to be added to the repertoire but that has not happened yet. Spatially, the object is more layered than a traditional fountain. The many activities that are organised here make it a drawcard, and its size makes it clearly visible from a distance. In that sense, scale, programme as well as a reference to traditional objects on the street are a highly effective combination.

***Crown Fountain* has become an important landmark and orientation point. The fountain show short, slow-motion video images of the neighbourhood residents.**

Crown Fountain, Millennium Park Chicago, VS, Krueck+Sexton architects - in samenwerking met kunstenaar Jaume Plensa. 2004
(photo: ©Hedrich Blessing)



#MTLmoments Tourisme Montréal



#MTLmoments is a campaign launched by the Montreal tourism board. A physical installation—a photograph frame—in the public space encourages visitors to take selfies that they can use to make their presence known via social media. From the viewpoint of the mechanisms, the effect of the installation is two-fold: firstly, it enables visitors to appropriate a collective experience and record it for their own use; secondly, by adding the hashtag, all those photographs together portray an image of the mood at various squares and events in Montreal, thus contributing to a digital representation of the sense of place. This representation might persuade others to also visit an event or at least make them aware of it.

**A physical installation
-a photograph frame-
in the public space
encourages visitors to
take selfies that they
can use to make their
presence known via
social media.**

Photo's:
@dodongtheexplorer (Instagram)
Demetrius Caesar (Facebook)
Zarzo Rajikovic (Facebook)



Heart of the City

Anaisa Franco



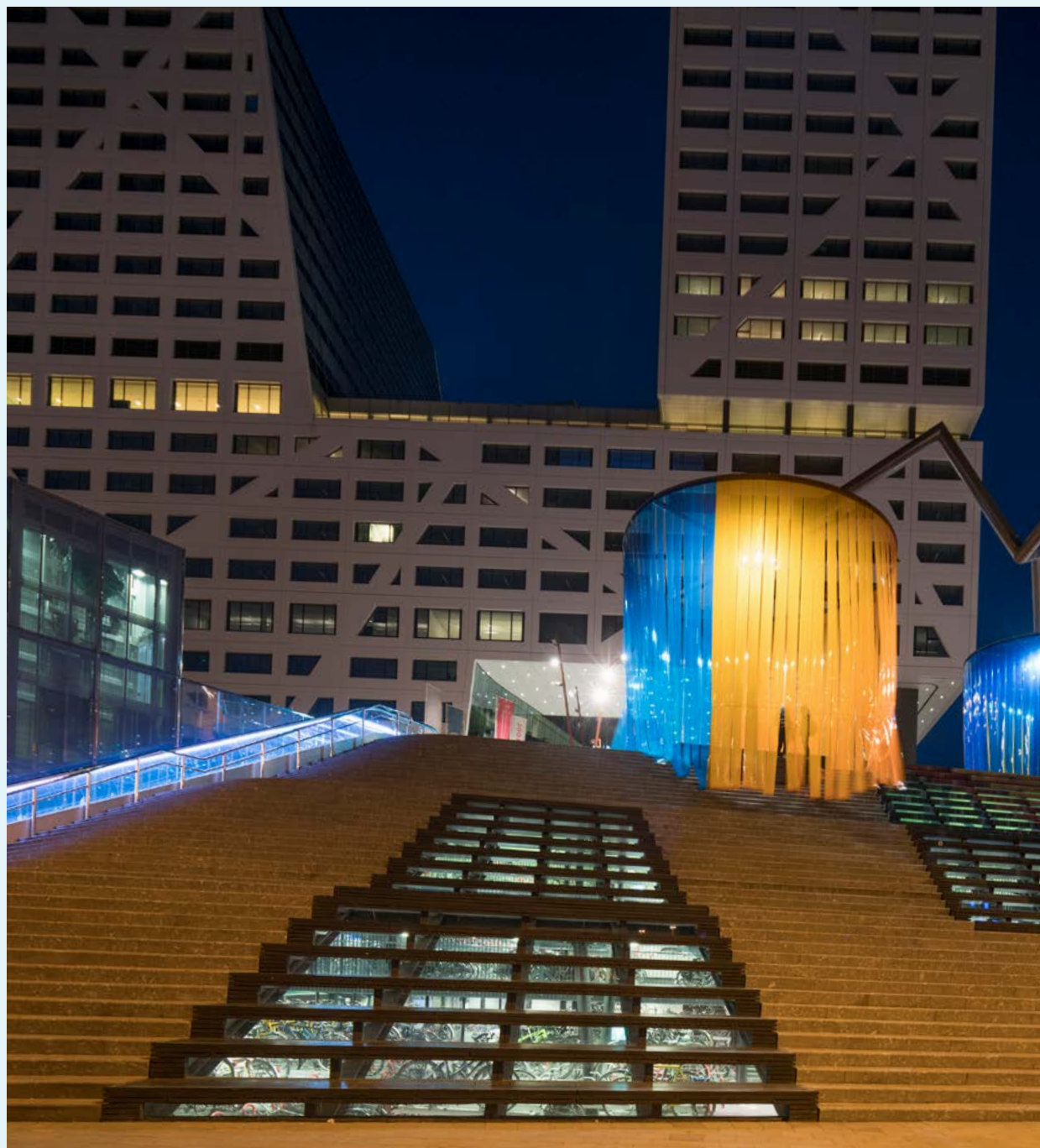
Heart of the City is a piece of furniture that invites passers-by to sit down for a minute and create a place of their own so they can contemplate their surroundings. Visitors can put their finger in a sensor placed in the middle of the sofa; the installation then measures the user's heart rate, and the LED strips in the sofa pulsate with the heart rate: the installation takes on one of the personal characteristics of its users. Even if people walk past it individually, the unusual object and the pulsating light contribute to a personal experience of the space.

Spatially, the installation's effect is closest to a fountain or pond: it adds a living rhythm to a location; there is something organic to be seen. As far as personalisation is concerned, the meaning and attractiveness for individual passers-by are enhanced if the installation was shared with them earlier online (now they have seen it themselves)—or if they are the first to share it.

***Heart of the City*
invites passers-by
to create a place of
their own. Spatially,
it adds a living and
personal rhythm to
the location.**

Heart of the City, Anaisa Franco Studio, gepresenteerd tijdens
het VIVID Light Festival Sydney 2015
(photo: Anaisa Franco)





Aura Utrecht

PolyLester



Aura Utrecht is an installation by the PolyLester design studio that has been placed on the steps of the Jaarbeursplein in the central station area in the Dutch city of Utrecht. The installation consists of three circles that have been demarcated by ‘curtains’ made of colourful plastic strips. They invite passers-by to temporarily occupy the spaces and, protected by the curtains, create their own space in the public sphere, either alone or in small groups. They provide a brief private or parochial experience amid the crowd and noise in the station area, allowing users to observe life on the square through the colourful filter of the plastic strips.

In this case, the personalisation mechanism concerns more than the individual users: on their own in an empty space, people probably would not enter these circles. Their attraction and quality lie in the contrast they form with the hustle and bustle. The circles provide an organising principle for the space and shift the focus to the centre; they break the otherwise wide—even alienating—flight of stairs.

The attraction and quality lie in the contrast they form with the hustle and bustle in this station area.

Aura Utrecht, PolyLester, 2016
(photo: Ossip van Duivenbode)

9.4 Routing & legibility.

Spaces only have meaning when people can orientate themselves easily in relation to them. This is one of the most important lessons from *The Image of the City*, Kevin Lynch's pioneering, explorative study written in 1960. Lynch was one of the first researchers who looked at the way city-dwellerurbanites ascribe meaning to urban spaces and how they navigate their way through the city. A key term in this context is 'legibility': the extent to which people can recognise points in the city and relate them to each other in a coherent whole, a 'mental map' that makes the city accessible for them.

The routing & legibility mechanism addresses the legibility and possibility of navigating in the public space. How can responsive technologies make spaces more 'legible' and, in the process, more active? Nowadays, the spatial as well as the virtual (digital) representation of public spaces play a role in this. Lynch's theory was that urbanites organise the city using a number of points in the physical space. 'Landmarks' include buildings, statues and squares whose unique identity makes them clearly recognisable. 'Edges' are recognisable boundaries that divide up the urban landscape; these include railway lines and motorways that split up a city neighbourhood. 'Paths' are the routes that people usually take to reach their destinations. 'Nodes' are hubs such as squares and intersections where various routes intersect and that count as orientation points. Finally, 'districts' are neighbourhoods to which a common identity is ascribed.

Notably, these elements are partly organised on the basis of objective physical criteria such as a large building or railway line, but the more subjective meaning that people ascribe to them or behaviours that have simply developed in a certain way over time are also crucial, for example, the habitual behaviour related to the choice of routes through the city.

Lynch's book was aimed at giving designers concrete guidelines. He was not solely concerned with improving the facilitation of routine trips. He also thought designers had a duty to encourage urbanites to explore new spaces and publics outside their well-trodden paths and familiar places. 'The function of a good visual environment', wrote Lynch, 'may not be simply to facilitate routine trips nor to support meanings and feelings already possessed. Quite as important may be its role as a guide and a stimulus for new exploration.' In other words, improving the legibility of a location must first and foremost enhance the public domain. Similarly, we saw in chapter 2 that Matos Wunderlich calls on designers to not only facilitate purposive routes but to also consider ways of encouraging discursive routes. These discursive routes are based on a more open attitude, with pedestrians having an interest in their surroundings and allowing themselves to be enticed by or surprised into absorbing the various meanings that are associated with those surroundings.

Visual media are an important device for orientating ourselves in the built environment and attributing meaning to it. They vary from facades, shop fronts, stained-glass windows, inscriptions and sculptures on buildings and in the public space to structures covered with advertisements aimed at drivers. These

media can be augmented by responsive technologies. Firstly, an installation itself can—to use Lynch’s terminology—function as a landmark, node or edge. The *Crown Fountain* in Chicago is an example of an installation that has become an important landmark in the city: it is used by inhabitants and tourists to orientate themselves in the city. Media facades can mark a route or node, or emphasise a building’s role as an ‘edge’. Besides this, responsive technologies can not only mark existing routes and nodes but also guide urbanites. Matrix displays above the road or interactive light installations on squares or boulevards can guide traffic and adapt the route to changing circumstances. Interactive kiosks and information pillars can offer suggestions and help visitors to orientate themselves in their surroundings. Experiments are taking place in Japan with robots that guide visitors around a shopping centre.

Finally, digital apps, too, can guide visitors. Many urbanites and visitors use apps such as social networks, Google Maps and TomTom to orientate themselves in the city. Such apps not only tell users what and when things are happening in the city in real-time but also indicate the fastest or most efficient route, using live traffic data and public transport information. Efficiency sometimes has little to do with the attractiveness of the route in this context: tourists at ArenA Boulevard, for example, are guided back to their hotels via the unpleasant rear side of the boulevard instead of along the boulevard itself.

As GPS navigation gradually became more widespread about ten years ago, critics feared it would undermine our ability to orientate ourselves and build meaningful relationships

with spaces. They argued that people who slavishly follow the instructions of algorithms forget to look around them. A more commonly heard objection is that making our orientation in the city more responsive might also undermine the function of public spaces as meeting places. Are the algorithms controlled by commercial interests and do the responsive apps that we use to orientate ourselves in the city mainly focus on customised offers from commercial parties? Will the route planner in the future send us exclusively to places in the city that are relevant to us personally? And will we, in our mental map of the city, still be able to connect different locations and their associated publics with each other as part of a larger whole? Or will the only lasting impression be our individual network city as a personalised cut-out of the urban community?

In a nutshell: can the routing and legibility mechanism as a responsive design also be used to encourage visitors to a location to follow more discursive and conceptual ways of getting around and discovering new meanings? This is an important design task when this mechanism is used.

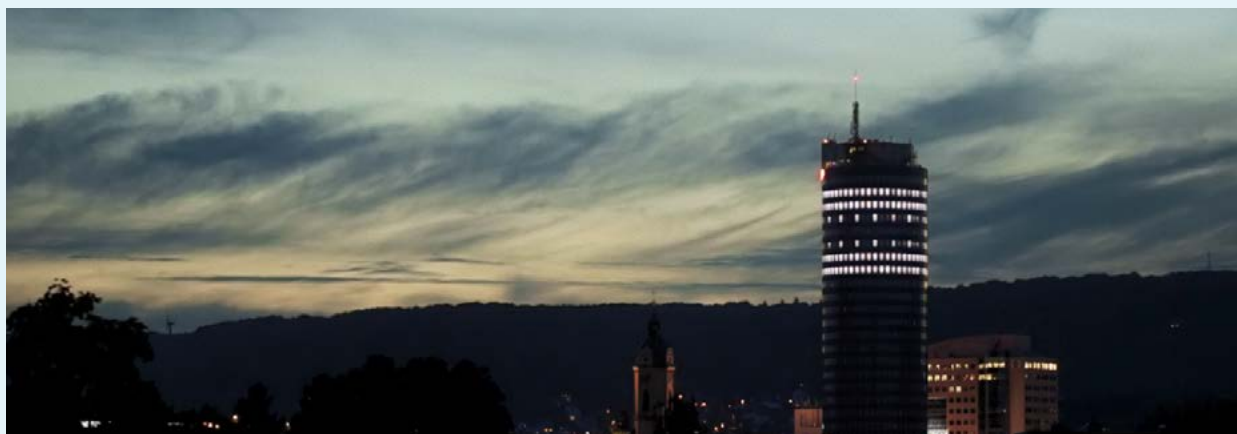
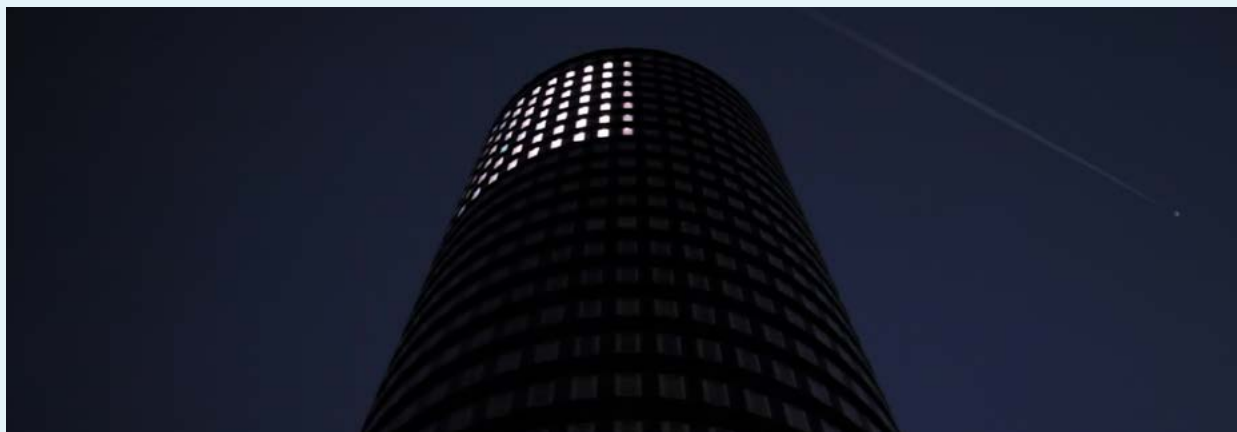
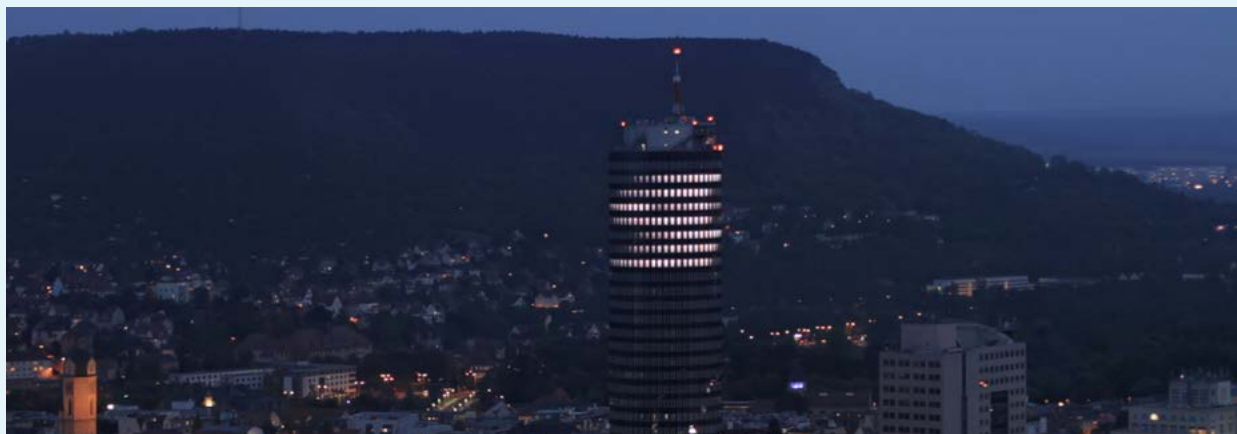
Leuchtturm Florian Licht

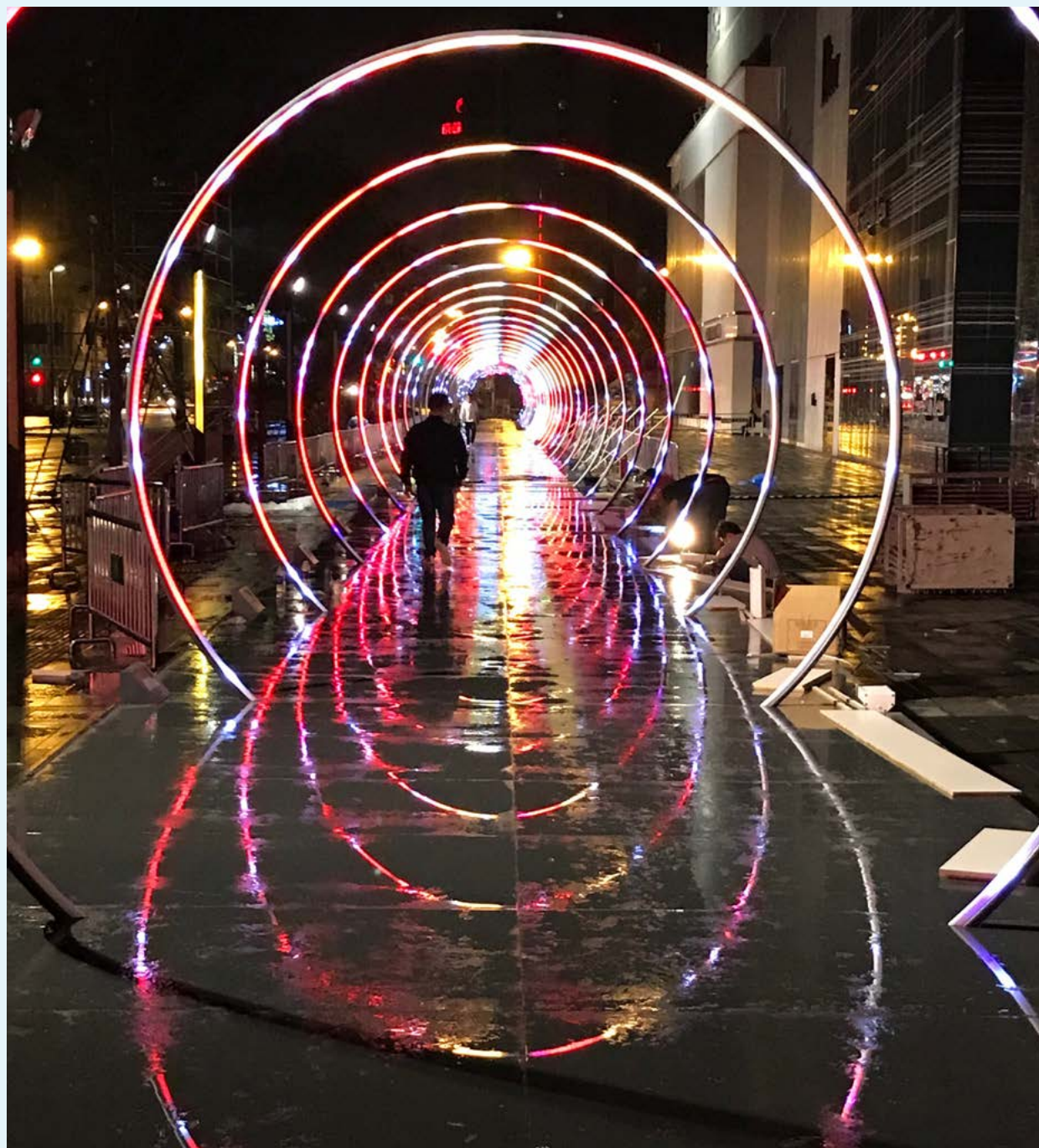


Florian Licht used the *Leuchtturm* installation to emphasise the JenTower's status as a landmark in the German city of Jena. Powerful lights placed in front of the windows on the top floors were linked to create patterns in the lighting. The office block looked as if it had become a lighthouse. This slightly alienating effect was intended to make passers-by pause and reflect. The example shows that a strictly utilitarian function, in this case office lighting, can also be a device to add meaning to a location's immediate surroundings.

The installation shows that a strictly utilitarian function, in this case office lighting, can also be a device to add meaning to a location's immediate surroundings.

Leuchtturm, Florian Licht, Jena, 2015
(photo: lichtundsoehne)





Sonic Runway

Rob Jensen & team



Sonic Runway is an installation that was made for the Burning Man festival and then moved to San Jose in California. The artist, Rob Jensen, used the installation to convert sound into light. The 'runway' uses semi-circles and LED lights to process ambient sound into light that races through the installation at the speed of sound. When you walk through it, light and sound are synchronised. The installation makes visitors aware of their surroundings and ambient sounds. With regard to routing and legibility, the installation differentiates the possible routes that visitors can follow: a rapid transit route without obstacles or a route that allows visitors to saunter with an open mind through their surroundings.

The installation makes visitors aware of their surroundings and ambient sounds, and differentiates possible routes that visitors can follow.

Sonic Runway, Rob Jensen en Warren Trezevant,
Chengdu China en San Jose, VS, 2017
(photo: Rob Jensen en Scott Ashkenaz)

Urban Code street game design system

Troy Innocent, Melbourne



Urban Code is an urban game with a type of way-finding. The installation consists of objects that have been attached to walls in the city. An app prompts the objects to reveal sounds, stories and images of a fictive micronation. The game is also intended to be a type of disruptive way-finding: the route does not take players from A to B but allows them to discover the location themselves. This type of urban gaming is more or less invisible but this is what makes it easy to use. Spatially, the intervention creates the opportunity for people to move through the space in a new way and to achieve an improved mix of disrupted ('discursive') and routine ('purposive') approaches.

The game is also intended to be a type of disruptive way-finding: the route does not take players from A to B but allows them to discover the location themselves.

Urban Code street game design system,
Troy Innocent, Melbourne, 2016-2017



Van Gogh Path Studio Roosegaarde



The *Van Gogh Path* consists of thousands of reflective and illuminated stones that light a cycle lane in Nuenen, in the Dutch province of Brabant. The pattern was inspired by Van Gogh's painting *De sterrennacht* (*Starry Night*). During the day, the small stones absorb sunlight, which they in turn radiate at night. This installation does not only mark the route: with its references to van Gogh it also emphasises the sense of place.

This technique does not only mark the route: with its references to Van Gogh it also emphasises the 'sense of place'.

Van Gogh Path, Studio Roosegaarde
(photo: Studio Roosegaarde)



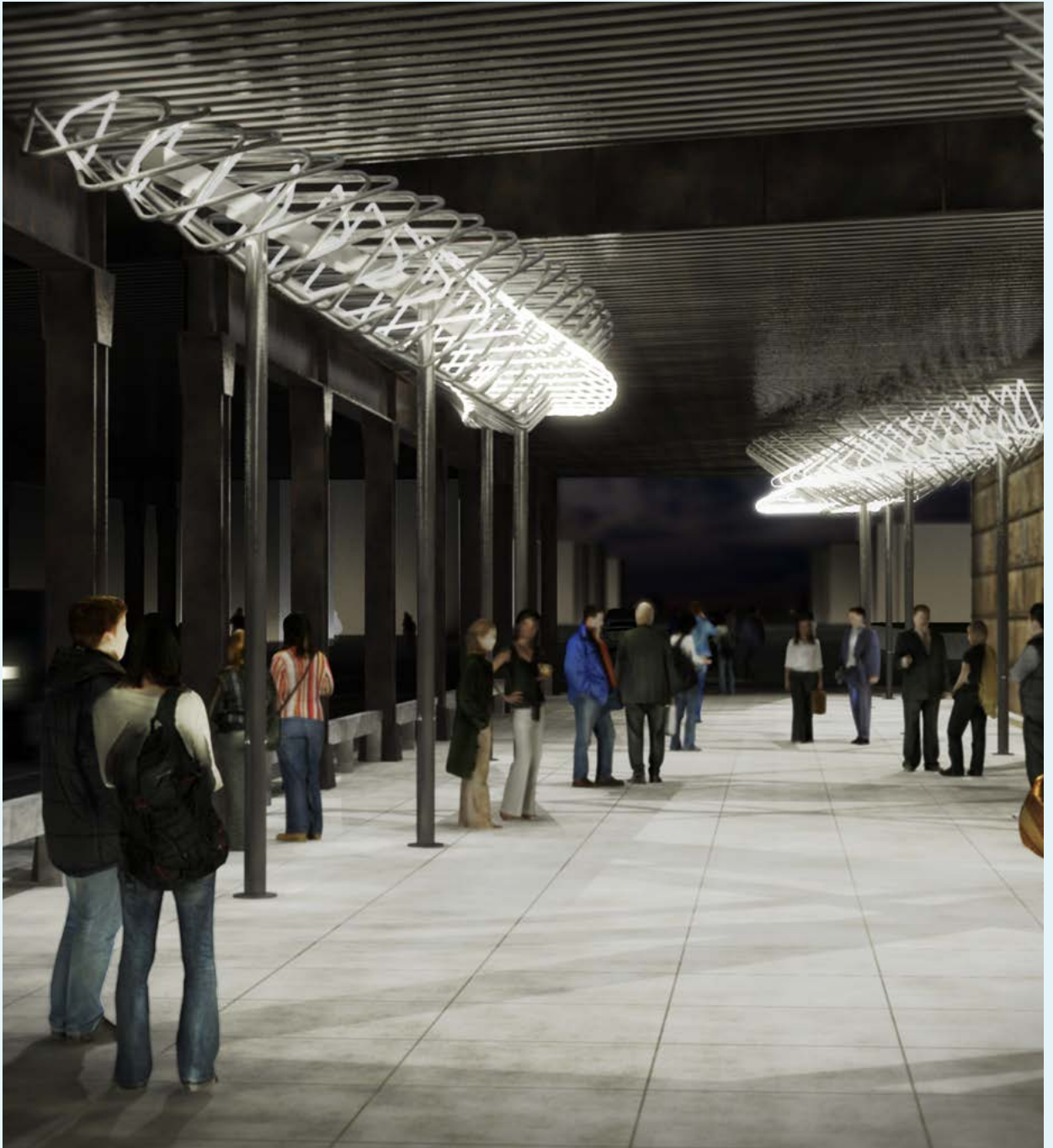
Lightweave Future Cities Lab



Lightweave is an interactive installation that livens up a pedestrian tunnel in Washington DC. *Lightweave* converts ambient sounds into dynamic light patterns and auroras. When it is quiet, the light moves calmy and serenely. The sound of passing trains or cars sets off a light effect, rather like the ripple effect of a stone thrown in water, which gradually fades away. It creates a pleasant and, according to the designers, meditative experience for pedestrians. The tunnel has become more than merely a functional thoroughfare: it is now a destination and part of the city's identity.

The tunnel has become more than merely a functional thoroughfare: it becomes a destination and urban place of the city.

Lightweave, Nataly Gattegno en Jason Kelly Johnson, Future Cities Lab, Washington DC, VS, 2018-2019





Swarm Compass NTT & Ars Electronica Futurelab



NTT and the Ars Electronica Futurelab developed a routing system that uses drones. A swarm of drones that can change colour guides pedestrians through crowded streets during events that attract large numbers of visitors. They can indicate accessible routes or block routes that are (temporarily) closed because they are too crowded. The use of coloured lighting and the dynamics of the drones' movements can also be used to reinforce the atmosphere of a location.

A swarm of drones that can change colour guides pedestrians through crowded streets – and can respond and react to the atmosphere and dynamics of a location.

*Swarm Compass, Ars Electronica futurelab en NTT Service Evolution Laboratories, 2018
(photo: Ars Electronica futurelab en NTT Service Evolution Laboratories)*

9.5 Control.

Control is the most controversial mechanism when it comes to the use of responsive technologies in the public space. This mechanism is intended to direct and regulate behaviour in the public space according to pre-determined aims. These often concern improving security or using municipal services or resources more efficiently: optimizing the flow of traffic through the city, for example to improve access to specific locations; controlling entry to particular locations by using gateways or cameras; and compelling and encouraging desirable behaviour, or discouraging undesirable behaviour such as jaywalking, nuisance, or violence. This mechanism can help make a location feel safer or more pleasant for visitors so that it becomes more attractive as a meeting place. But at the same time, the use of this mechanism also raises serious questions. Who decides what constitutes desirable behaviour? Is it not the essential quality of the public domain that it provides an enormous freedom for diverse lifestyles and political views to be represented? Doesn't such an approach contribute, above all, to even more privatisation and commercialisation of public spaces? And doesn't the use of this mechanism systematically exclude certain groups?

The control mechanism is frequently linked to various smart-city applications aimed at optimising the way the city functions (De Waal & Dignum 2017). One of the best known and most discussed examples in this category is the Centro De Operações Prefeitura Do Rio, the control room that the city of Rio de Janeiro

commissioned together with IBM in the run-up to the 2016 Olympic Games. Various information flows about how the city was functioning—from the traffic situation on main roads to the weather forecast—were projected onto large screens in a hall, where they were monitored by officials from various municipal services who could intervene if required. This example has been replicated many times in the form of 'urban dashboards' that local authorities have established in recent years, again with the aim of being able to respond quickly to developments in the city (Kitchin 2014).

Similar control rooms on a smaller scale have also been developed for specific locations: IBM created software for the Carnegie Mellon University campus, for example, that enables the university to use electricity more efficiently. Many similar examples are used at the operational level of public spaces and do not immediately affect the way they are used as public spaces. But a number of examples do also focus on influencing the use of a space. An example is the Stratumseind 'living lab' in the Dutch city of Eindhoven. For several years now, cameras and sensors have been used to chart the behaviour of nighttime revellers here. Details ranging from how full the parking garages are to the noise level on the street are collected and, together, they give a picture of the mood in the area. Research is currently being conducted into how this data can be used to adjust the colour and intensity of the street lighting, with the aim of influencing the atmosphere in the area and reducing violence among revellers.

Other projects aim to actually encourage a specific type of behaviour by using play and gamification. StreetPong, also known as ActiWait, invites pedestrians on opposite sides of a pedestrian crossing to play with each other on a small screen while the light is red: this will hopefully make waiting more pleasant so that fewer people jaywalk. The makers of the Smart car initiated a similar project to address the same issue: the little red man in the traffic light was replaced by a dancing figure whose moves were based on the dance movements of passers-by in a small studio at a nearby square. Although both examples have a high gimmick content, they are examples of how the control mechanism can be used to stimulate specific behaviour in the public space.

Experiments using the control mechanism in China go much further. Cameras equipped with facial-recognition software record pedestrians who cross the street when the light is red. In Shenzhen they are then publicly pilloried: their photographs, together with their names and national identity numbers, appear on large screens in the public space. Next, offenders receive an automatic fine via SMS (Baynes 2018). Similar experiments are being conducted in the Netherlands. Rotterdam's RET public transport operator was experimenting with facial-recognition software in trams and buses as early as 2010. If a camera recognises a passenger who has been barred from using public transport due to previous misbehaviour, RET staff receive an alert so they can take action against the passenger.

Such measures are intended to improve security in public spaces and on public transport but there is also considerable criticism of their use. They are part of a broader development that has seen public spaces increasingly dominated by control, with targeted groups often being excluded. Take, for example, 'bum-proof' benches, designed to make lying on them uncomfortable. Critics maintain that these measures mean public spaces are increasingly dominated by comfort and consumption; behaviours or publics that do not fit in with this are discouraged from using the space. This is precisely how the public space loses its character as an inclusive meeting place, as a stage where all urbanites can be present, or as a place for political resistance. In short, this mechanism always involves a fine line between on the one hand enhancing the attractiveness of public spaces by making them safer and more comfortable, and disciplining and even excluding visitors on the other.

StreetPong / ActiWait Urban Invention

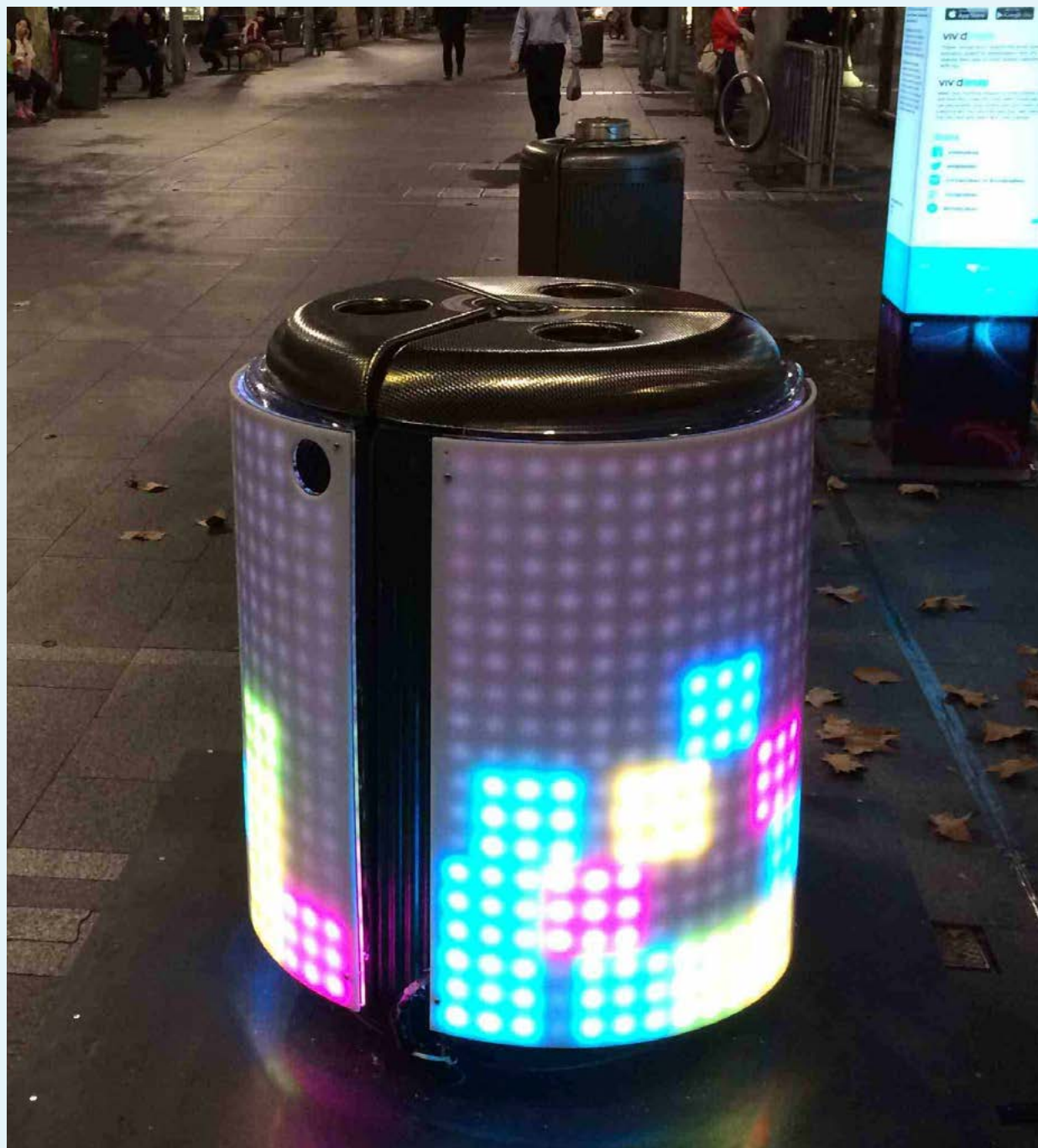


StreetPong is an attempt to induce pedestrians to stop and wait while the traffic light is red. Screens have been mounted on opposite sides of the pedestrian crossing. When the traffic light turns red, the waiting pedestrians on either side can play Pong with each other. The aim is to use gamification to compel good behaviour.

When the traffic light turns red, the waiting pedestrians on either side can play Pong with each other.

StreetPong/ ActiWait, Urban Invention, Hildesheim, 2014
(photo: Urban Invention)





Tetrabin

Steven Bai

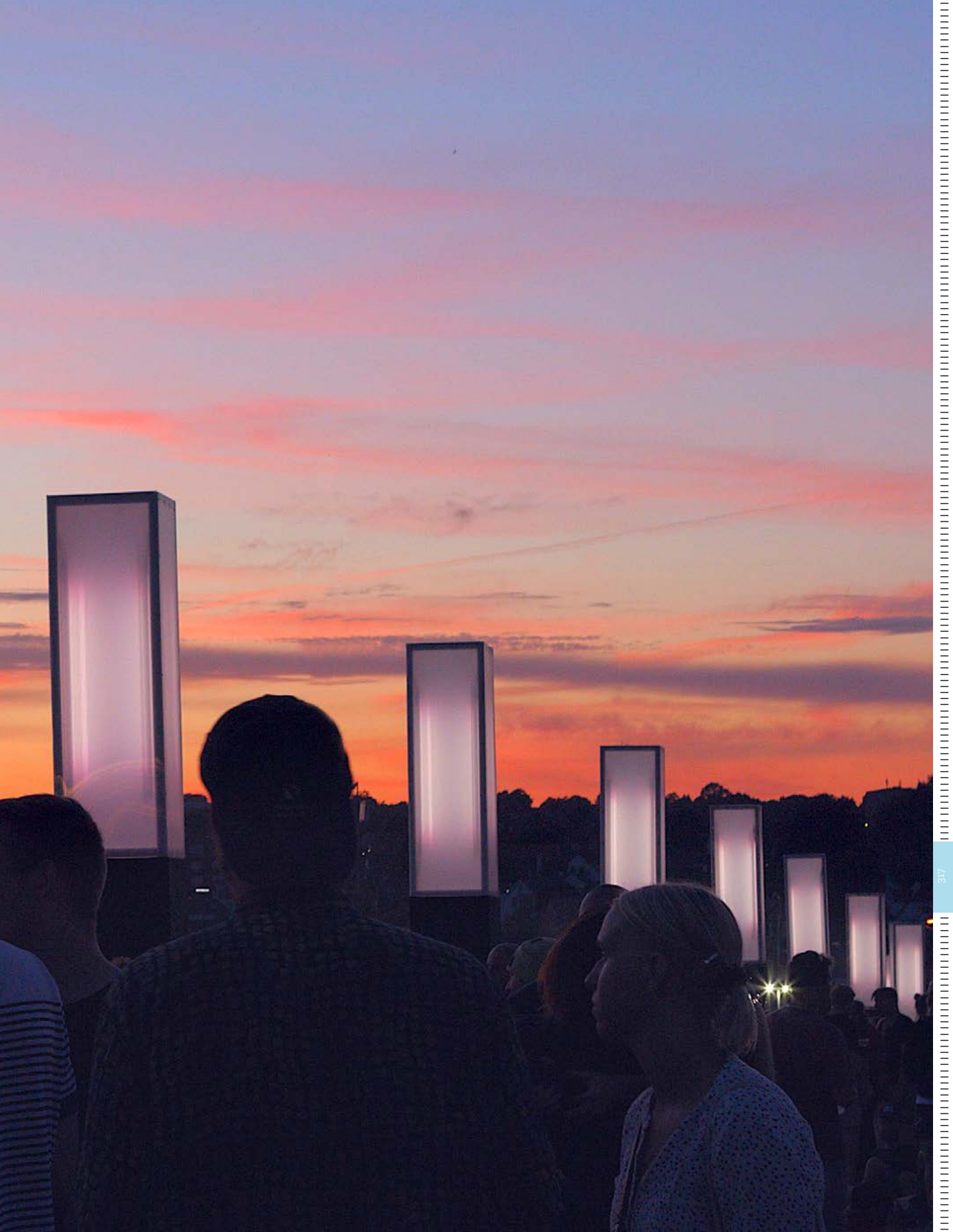


Tetrabin invites visitors to public spaces to throw their litter into the rubbish bin. A LED screen has been wrapped around a rubbish bin. The screen's low-resolution pixels are strongly reminiscent of the aesthetics of the first computer games. When litter is thrown into the rubbish bin, tetris-shaped pixels appear whose form and direction are determined by the timing and shape of the binned object.

The texture is reminiscent of the aesthetics of the first computer games. Street furniture is given a new spatial meaning.

Tetrabin, Sencity Corporation, Australië en Azië, 2018
(photo: www.sencity.city)





Northside Beacons Kollision



Kollision designed an installation for the Northside Festival in Denmark consisting of sixteen tall beacons that spanned the entire length of the festival grounds. The lighting design contributed to the dreamy festival atmosphere but it was also aimed at encouraging visitors to help recycle rubbish. Special containers for plastic rubbish were located at several points on the site. Each 'donation' was rewarded by the beacons emitting a short pulse of white light over the entire site. The scale of the lighting installation ensured that each reward was collectively registered, continuously drawing attention to the issue without over-emphasising it.

The beacons 'flash' as a reward for the recycling of rubbish. Their positioning and collective 'flashing' form the beacons that delineate and oversee a space.

Northside Beacons, Kollision in collaboration with Down the Drain Production and Martin by HARMAN, Northside, Denmark, 2018

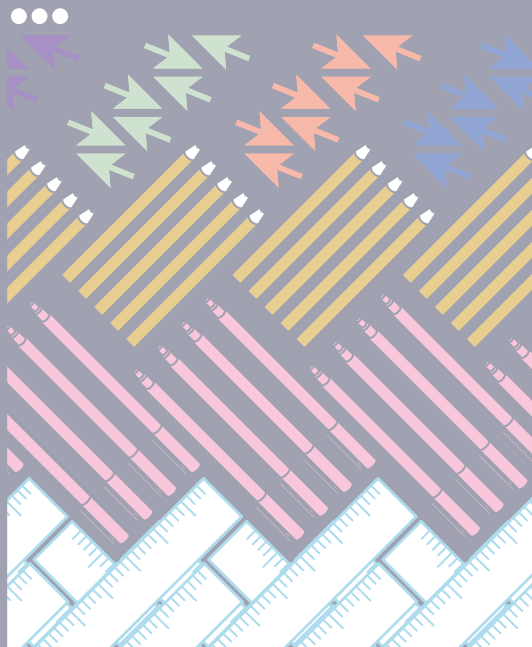


Part IV: Research for design: 'Building Blocks from Outside'

10.

Design patterns for responsive installations.





Design patterns for responsive installations.

How can you put an interactive, responsive installation in a space in such a way that it successfully contributes to the planners' objectives? Or, turning the question around: how will the public experience the installation? In early twenty-first century, disciplines such as media architecture and urban interaction design have started to address this issue. They naturally build on the insights into the use and experience of space developed in other disciplines such as urban planning, urban sociology, art in the public space, and environmental psychology.

An additional source of inspiration has been the world of theatre. Theatre has a long history of staging experiences directing actions in time and space while using props and soundscapes. In recent years, the theatre world itself has also developed an interest in activating public spaces outside the traditional realm of the theatre, opera or black box stage. Expanded scenography is a new approach developed in the world of performance studies that addresses the design and experience of the public space (McKinney & Palmer 2016). As with the design of responsive spaces, the

focus is on the layers of different (media) experiences, the material surroundings where they take place, the temporal perspective, and the new relationships between visitors in a space that can develop from this combination of factors. Expanded scenography thus also provides a good framework to analyse the design of interactive installations in the public space. In this chapter we use this framework as a starting point for discussions about design strategies for responsive spaces.

10.1 Expanded scenography.

Sigrid Merx and Liesbeth Groot Nibbelink, both researchers at the University of Utrecht, used the ideas found in expanded scenography and McKinney and Palmer's work to establish a framework that can be useful for the design of responsive spaces. This framework has four aspects that are individually translated into the design of responsive installations (McKinney &

Palmer 2016; Merx 2018). In order to also cover the wider spatial embedding and all possible options, we add a fifth aspect: spatial composition, a concept we borrow from the discipline of spatial design (Leupen et al. 2010). We briefly discuss the five aspects below, before exploring them in more detail in the sections that follow.

- *Spatial composition* concerns the spatial form and composition of the responsive design as a spatial intervention. It is the spatial rationale that also underpins a traditional spatial design. Questions that can be posed in this context address the scale of the entire space and where the installation should be positioned in that space. Which spatial problem is the intervention intended to solve? How will the solution be integrated into the existing situation? And how does the intervention relate to the surrounding buildings and the public space that remain unchanged? And, on a more abstract level, to what extent does the installation in its appearance and meaning refer to traditional design elements in the public space? Or does it in fact react against them?
- *Affectivity* describes the response that an installation evokes in users or passers-by. How does the installation catch their attention? Which sensory devices (light, sound) play a role here? This is never a clear-cut stimulus-response relationship but rather a (limited) set of potential experiences that can be induced by a responsive installation. The precise use and experience of an installation can never be predicted

and depend on external factors such as the weather, or the ‘role’ played by passers-by: sometimes it might be tourists looking for entertainment, at other times it might be commuters whose goal is to get to the office.

- *Materiality* considers the material embedding of an installation in the public space. This concerns not only the space that the installation itself occupies—a screen that is mounted onto a building’s wall, for instance—but also the space occupied by passers-by who might briefly slow down to see what is on the screen or stand still to interact.
- *Relationality* refers to the way an installation facilitates encounters and makes fleeting new relationships possible between visitors to a space, both with each other and in a feeling of connectedness with a building. The relationship between the urbanite and an installation, and the way this is mediated through the interface, can also be addressed under this heading.
- *Time* Experiences with responsive installations unfold in time and on several levels. The experience itself is of limited duration, and can be seen as a dramatic experience that unfolds in time. The location itself has its own rhythms throughout the day and year that influence the experience of an installation. Installations themselves also have a specific lifespan, from temporary installations at festivals to enduring sculptures that are a permanent part of the public space (but also require maintenance).

As was the case with the framework for the mechanisms for responsive installations, these five dimensions must also be understood in connection with each other. Obviously, the experience of a space or the relationships that develop there cannot be seen in isolation from the surroundings, memories or duration of the experience. For the design process it can, however, be helpful to describe them individually and break each dimension down into the aspects, lessons and focal points that are relevant to a design. Our goal in doing this is to provide building blocks as well as inspiration for the design process.

10.2 Spatial composition.

Met deze dimensie focussen we op de The focus of this dimension is on the 'traditional' spatial design tasks that are relevant to the responsive design. These questions bring out three particular aspects:

- the type of intervention and the type of spatial effect that is intended;
- how a proposed intervention relates to elements that will remain unchanged;
- the intervention's appearance in view of the traditional solutions and objects in the spatial design.

The space of a street or square is shaped by buildings with their walls, materials, programme and appearance as well as by the design and programming of the public space between them (Meyer et al. 2006; Kostof 1999; Klanten et al. 2012). In urban planning other, larger scales also play a role, but for responsive

designs the emphasis is on the street or square level; other scales are mainly important for understanding the way the space is entered and 'fed', and how a space relates to nearby locations.

A responsive design solution acts upon a spatial problem. After all, not every space functions as intended or hoped. A building's walls, for example, might not succeed in creating a pleasant space: the building's position might mean a side or rear wall is exposed to an open space. A lack of cohesion might also be caused by a fragmented appearance as buildings have been demolished or added over time, disrupting the unity of a space. Or the wall of a building's ground floor might be blank, functioning as a plinth and thus lacking a street programme. Finally, a space might simply be too big, too small, too empty or too diverse. A responsive solution is aimed at solving these spatial deficiencies with new—but nonetheless spatial—solutions.

Of course a responsive intervention does not alter an entire space. Just as with the traditional practice of redevelopment and renovation, large parts of a space will remain unchanged. The design must therefore explain how the intervention will deal with those aspects that do not change. As with the spatial practice of transformation and redevelopment, there are two options. The design can merge the intervention with the existing situation and tradition, seamlessly building forth on them. Or the design can be a radical break, allowing a new symbiosis and appearance to develop. The responsive design also creates an extra task: what to do with the installation when it is not in use. What sort of object and shape in space will it be at those times? The design must answer all these questions.



Connected with the previous point is a third, slightly more theoretical, architectural issue: what is the object's position within the tradition of spatial design? Is it a new type of street furniture that dominates the appearance of a space, as the old Dutch Girobus, Krul and Peperbus once did? Or is it actually intended to be a more austere, functional type of street furniture such as street lighting? Conceptually, it might also be intended as a new variant on the fountain, pergola, statue, pavilion or kiosk. Clear choices must be made for the design here, on both a conceptual level and on the practical level related to the location itself. In this last issue, the spatial design and the interaction design emphatically overlap: this might be the core of the new overall design task.

10.3 Affectivity.

Affectivity is the dimension that describes the (sensory) experience of interactive installations, and includes a number of design elements that can play a role in creating specific experiences. An important aspect for designing responsive installations is the initial appeal that installations make to passers-by. How can you ensure that an installation even catches people's attention? Research shows that many installations are ignored by the people that walk past them. Just as many web surfers barely notice banner advertisements anymore, so too have urbanites developed 'display blindness' (Müller et al. 2009): public spaces, with their abundance of stimuli, cause an information overload, and people ignore many of the signals in order to cope.

Brignull and Rogers (2003) have shown that passers-by go through three phases in relation to interactive installations: from 'peripheral awareness' (out of the corner of their eye, they perceive that there might be something interesting going on) to 'focal awareness' (the object now receives their full attention) to 'direct interaction activities' (passers-by have now become active users and interact with the installation). Each phase has a threshold that has to be crossed; passers-by must be sufficiently motivated to interrupt their current activity, shift their attention and contribute. Müller et al. (2010) call this phenomenon the 'audience funnel'.

The 'honeypot effect' plays an important role in the step from peripheral to full attention (Brignull & Rogers 2003; Müller et al. 2012). Put simply, the more people cluster around an installation, the more others will be motivated to have look at what is happening. Attracting the first interested person thus becomes the crux. Some installations try to boost this process, using animators who kick-start the action by interacting with the installation; others use a 'call to action' to catch people's attention—a textual appeal, for example, or an animation depicting the anticipated interaction. Research shows that neither method is particularly effective: text and image are often too complex to be grasped quickly. Mirroring the silhouette of a passer-by often works better: if the passer-by recognises him- or herself, it might act as a trigger to stand still and take a better look (Müller et al. 2012).

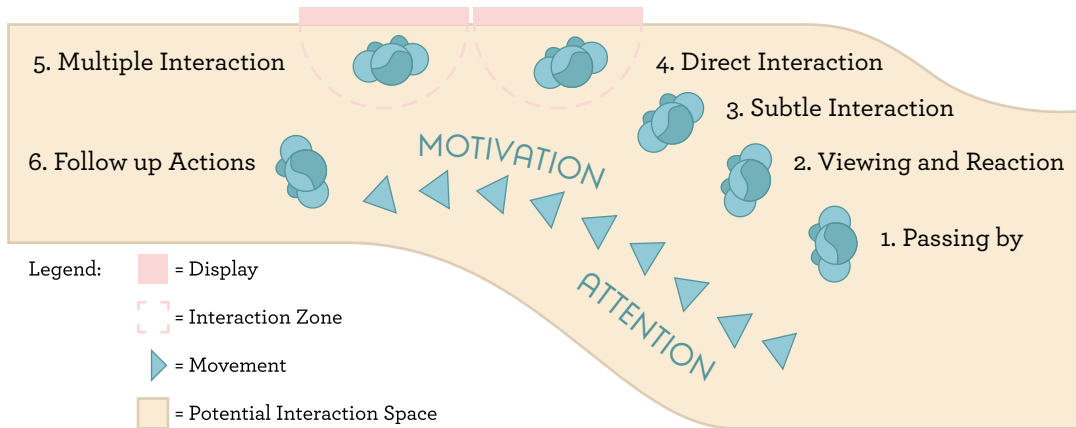
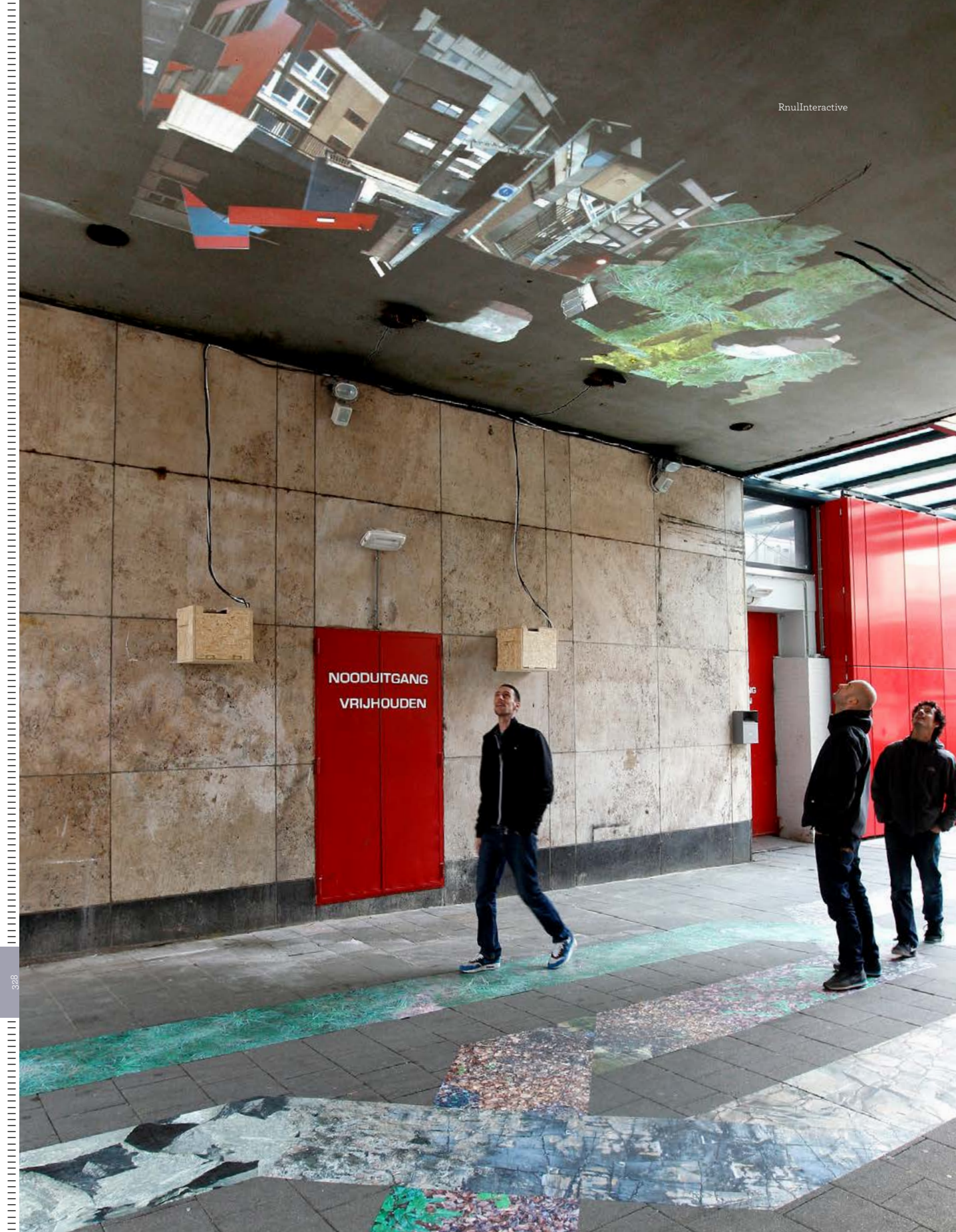


Figure 10.1: The 'audience funnel', from Müller et al. (2010)

If passers-by actually want to play an active role, they have to cross another threshold. This often involves overcoming feelings of embarrassment—people prefer not to be the centre of attention in the public space. Brignull and Rogers (2003) specify a number of aspects that can encourage people to take this step: users must have a clear idea of what is expected of them; they must feel confident that there is an 'easy exit'—that they can simply leave the interaction pattern (Brignull & Rogers 2003); and it helps if people can learn by watching each other in a process referred to as 'social learning'.

**How is the
installation
noticed and what
is the (sensory)
experience?**



NOODUITGANG
VRIJHOUDEN

10.4 Materiality.

The explanation of affectivity above shows that the experience of an interactive installation is a spatial one. The trajectory from peripheral to full attention is a process that usually takes place while moving through a space: a pedestrian walks along, perceives in the peripheral attention mode that there might be something interesting happening, and must then quickly (and unconsciously) decide whether to stand still or not. Müller et al. (2012) refer to this as the ‘landing effect’: the space where passers-by discover that an installation is active. By that time, passers-by have often already walked past the installation, and to participate they must retrace their steps. One solution to this problem is to alert passers-by to the installation at an earlier stage in the space or to put several manifestations of the installation in a space.

In a study into the embedding of a series of installations, Fischer and Hornecker (2012) distinguished a number of different spaces that develop around an interactive installation. The first is the ‘activation space’, the place where passers-by first become aware in their peripheral attention mode that an installation is active. The ‘comfort space’ is the place where people can safely watch others who are interacting at that moment: this is where passers-by give the installation their full attention but have not yet decided whether they want to be personally involved with the installation. In the ‘potential interaction space’ people can play an active role. If an installation uses a camera as an ‘input device’, this is the area where participants might be spotted by the camera. The ‘interaction

How does the installation organise the interaction between users?

space’ is the place where participants actually respond to the installation, with a ‘social space’ immediately surrounding it. This is where interaction takes place between the installation’s players or users and other passers-by—they might start talking about what is happening on a screen, for example. Finally, ‘gap spaces’ are spaces that cannot be used because, for example, a road or cycle lane cuts through the space where the installation is visible or because it is obscured by flower boxes or other objects.

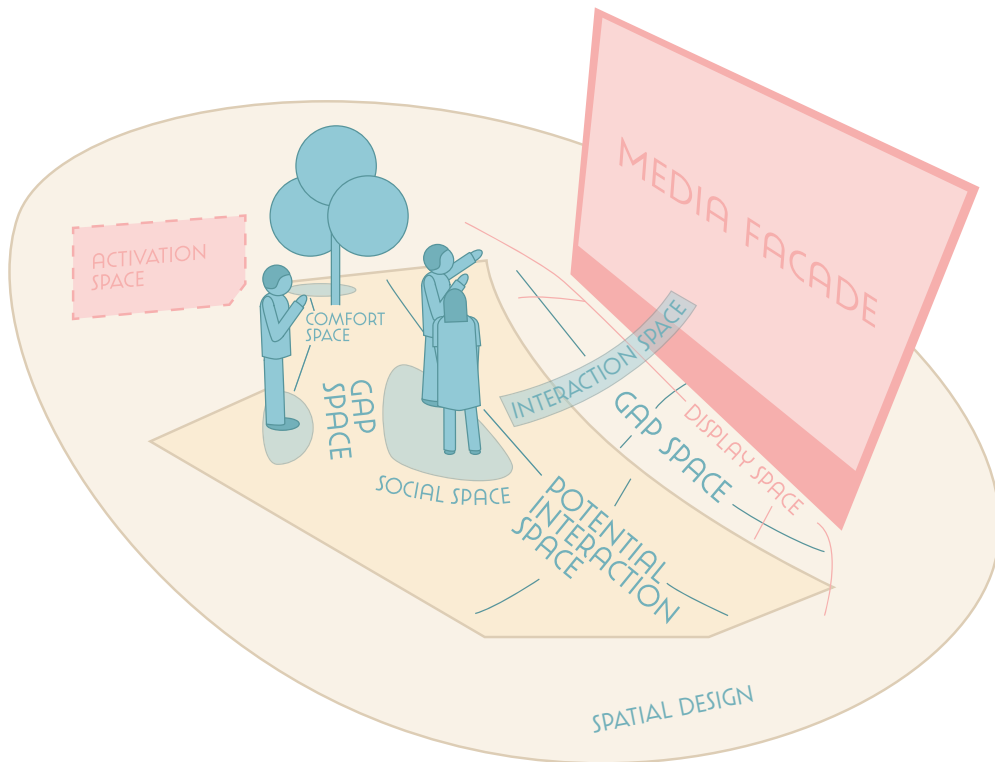


Figure 10.2: Various spatial zones around interactive installations (Fischer & Hornecker :2012)

Achieving successful installations depends on a number of factors. First, there must be enough room around the installation to allow passers-by to see what is happening from a safe distance, without feeling that they themselves must immediately be active. Second, successful installations often have a large ‘potential interaction space’. This makes the opportunities for interaction more visible and increases the likelihood of participation—people tend to overlook the option of giving input if an installation consists of only a push-button on a post, for example. A direct spatial and visual link between the installation and the potential interaction space is also important. The spot where the installation is most visible is usually also the best space to

plan the ‘potential interactive space’. Although this may sound logical, it is not always the case. A projection on a wall might be most clearly visible from the other side of the street, whereas the interaction zone has in fact been planned right in front of the wall (Hespanhol & Dalsgaard 2015). Similar insights show that designing an installation is not restricted to the interaction design and the appearance of the installation itself but also includes an effective spatial plan. This might lead to interventions in the physical space—benches in the social space, for example, or flower boxes to create a comfort space where people can observe an installation from a safe distance.

It is important not to lose sight of a location's connotation here. Locations have a high degree of social coding with an associated pattern of expectations related to behaviour. This can vary, depending on the time of day and different groups of users. Research shows that it is difficult to break such patterns. At a location that has a meaning for passers-by as a formal space or a short-cut to reach a specific destination, passers-by will be less inclined to cross the threshold to full attention or participation. In a party or festival setting, on the other hand, they will do this much more readily (Akpan et al. 2013; Behrens et al. 2013). Aurigi (2012) therefore encourages designers not to see an interactive installation as an add-on that provides an extra, gimmicky, layer of interactivity to a location but to use a specific location and its meanings themselves as starting points.

10.5 Relationality.

A fourth aspect in the design of responsive installations is the way they enable users to participate and, through the installations themselves, make contact with other urbanites. Hespanhol and Dalsgaard (2015) distinguish three types of installations that are responsive in different ways. 'Responsive ambient' installations passively record input from passers-by. They include sensors that count how many people walk past, or social-media trackers that store the tweets left by passers-by at a location. The feedback often consists of an indirect, aggregated representation that shows a location's activity or mood. It is often not immediately obvious where the measurement takes place.

Everybody who is in the 'potential interactive space' can participate at the same time.

'Performative interfaces', on the other hand, are installations that actively ask users for input in a clearly recognisable 'potential interaction space'. In this type of interface, only one or a few participants can provide input at the same time, and there is therefore a clear distinction between the performer and the public. 'Allotted interfaces' allow larger groups of users to provide input simultaneously: everybody who is in the 'potential interactive space' can participate at the same time, so that the distinction between the performer and the public is not as clear-cut (Hespanhol & Dalsgaard 2015).

Input can also be obtained in a variety of ways. Hespanhol and Dalsgaard's diagram (2015) provides valuable insights here, distinguishing different types of input. One of the most frequently used strategies is 'shadowing': sensors such as a camera record the body movements of passers-by and represent them in some way in the installation. A second strategy is a remote control: passers-by can provide input by

using a remote-control device such as a button panel to vote. A third strategy is the ‘smooth operator’, which consists of sensors that in one way or another record forms of presence or use of space, translating these data to a shape in the background; this is the most frequently used interface for the responsive ambient interfaces referred to above. The ‘soapbox’ enables two or more people to communicate with each other via a screen by, for example, leaving text messages.

This way, new relationships develop not only in the installation but also through the installation. Hespanhol & Tomitsch (2015) refer to installations that serve as ‘conversation starters’: people start talking to each other about what they see in the installation. This observation has far-reaching implications for responsive installations. If the aim is ‘playful interaction’, the interaction does not necessarily have to be integrated into the design of the interface itself, as the main aim is to trigger a social interaction in the public space. At the same time, the physical space must be organised in such a way that there is enough room and opportunity to make this possible.

In this process, the representation of urbanites in the interactive installation also plays an important role. Here, too, the possibilities are infinite: from individual to aggregate, and from text or avatar to photographic images. Research by Valkanova et al. (2014) provides valuable insights into the effects of these options. The researchers tested different manifestations of *MyPosition*, an interactive installation consisting of a screen inviting

passers-by to vote for or against a particular proposition. The researchers tested different ways of representing the votes cast. In the first version, each vote was represented by a neutral square box; in the second version, the participant’s silhouette was added to the box; in the third version a photograph was added. The version showing the participants as silhouettes led to the highest participation rate in the installation. However, the version displaying the photographs resulted in more interaction between spectators in the ‘social spaces’ around the installation (Valkanova et al. 2014).

Finally, the design of responsive installations must include relationality in other ways. Research by Müller et al. shows that people who use a public space on their own tend not to participate in responsive installations; they are more likely to participate if they are in a group. However, Müller recommends that there be something that each member of a group can experience, either as a participant or as an observer (Müller et al. 2012).

10.6 Time.

Finally, we consider time as a factor in the design of responsive spaces. Time is important in a number of ways. Two aspects are related to the location: the rhythms that determine a location's rhythm in the course of the day, setting the tone with regard to different types of visitors and their expectations of the location; and, in a similar way, the weekly, monthly and yearly rhythms that influence the location, from long, dark winter nights to seasonal events and rituals.

How long does an experience last, is there a beginning and an end, a loop or a generative pattern that unfolds in the course of time?

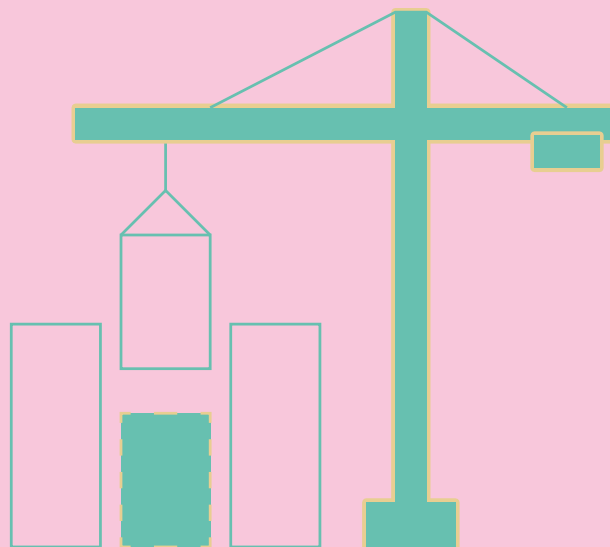
Time also plays a dual role in relation to the installation itself. The first concerns the installation's lifespan: how long does an experience last, is there a beginning and an end, a loop or a generative pattern that unfolds in the course of time? The second concerns the installation's development over time: for what period of time was it designed? Tomitsch (2016) distinguishes here between 'spectacle placemaking' and 'infrastructure placemaking'. Spectacle placemaking installations are made for a limited time for, say, a festival. Infrastructural placemaking installations are a permanent part of the public space and must therefore take greater account of the cultural repertoires and pattern of expectations related to behaviour at a particular location. Tomitsch takes the Crown Fountain in the Millennium Park in Chicago as an example: the installation's fountain shape and setting in the park invite carefree behaviour, with children and adults making grateful use of the fountain's cool water on hot days. The fountain itself shows a series of slow-motion videos of the neighbourhood's residents from different cultural backgrounds. The idea was to add new videos over time but this has never happened.

Part IV: Research for design: 'Building Blocks from Outside'

11.

The Atmosphere in Open Public Spaces.





The Atmosphere in Open Public Spaces.

Harry van Vliet

11.1 Introduction.

A space's atmosphere is an important factor in how that space is experienced. In fact, festival visitors consider the atmosphere as the most important factor in how they experience a festival (Van Vliet 2012). Atmosphere is also what distinguishes physical shops from online web shops (Van Vliet, Moes & Schrandt 2015). Much research underlines the influence of atmosphere on cognitive and emotional processes. As early as 1956, research showed that an assessment of facial expressions in photographs depended on the atmosphere of the space in which the photos were viewed (Maslow & Mintz 1956). The importance of atmosphere inspired the search for ways to influence visitors and allowing them to react to, and even (co-)design, a space's atmosphere – from museum spaces (Noordegraaf 2012) to urban spaces, from consciously-manipulated spaces to the now inevitable layer of digital information that has entered the public sphere (Mitchell 2005).

Researchers have been studying the influence of atmosphere for decades, particularly through the lens of environmental psychology, which focuses on the interplay between humans and their environment (Mehrabian & Russell 1974; Steg, Van den Berg & De Groot 2012). A milestone in atmosphere research was the introduction of the concept of 'atmospherics' by Kotler (1973). From here, research into atmosphere mainly took place in the context of marketing research into consumer behaviour in shops and service environments such as restaurants, hotels, museums and festivals (Van Vliet 2014). The question here is whether these gathered insights contribute to understanding how atmosphere works in open public spaces.



11.2 Atmosphere: studied and explain.

A considerable amount of research into atmosphere focuses on cues: the specific characteristics of spaces that (might) determine the atmosphere experienced. Of these 'cues', the influence of music has received the most attention. For example, the music's tempo has been shown to influence the consumer's pace in a shop, the number of purchased products and how long they spend in the shop. A piece of music's familiarity influences the experienced length of stay in a shop and while waiting in line. By creating a pleasant mood, music indirectly influences product choice and exploratory behaviour in a shop. Other studies show how pleasant scents in a shop can influence experienced length of stay, number of purchases and exploratory behaviour in the shop – for example, the smell of chocolate in a bookshop can have a positive effect on the number of cookery books sold. Besides music and scent, other factors such as colour, light, product placement, product information, shop interior and shop assistants' behaviour can all influence how atmosphere is experienced and the consumer's buying behaviour (Turley & Milliman 2000; Olahut, El-Murad & Plaías 2012; De Farias, Aguiar & Melo 2014).

In order to explain these and other results of atmosphere research, the S-O-R (Stimulus – Organism – Response) model from environmental psychology is often cited: environmental stimuli (S) are processed by an organism (O), which results in the showing of a response (R). While the S-O-R model is adapted to many empirical studies into atmosphere, the concept does have serious limitations.

When it comes to environmental stimuli (S), the *umwelt* is so richly filled with possible stimuli and information that can directly or indirectly influence a person's thinking, actions and feeling that it's impossible to chart out all the possible influences and possible interactions. Even a relatively clear and orderly environment such as a shop is already an endless 'group of cues, messages, and suggestions' (De Farias, Aguiar & Melo 2014, 87). This flood of information is often dealt with pragmatically by splitting up the possible stimuli into groups – such as 'ambient', 'design' and 'social factors' – so statements can be made on these categories. Another approach is to take a holistic view. When you walk into a space, it's not as if you are just hearing music, smelling something or feeling the temperature. You are actually getting an overall impression of the space by absorbing all these different factors. In a fraction of a second, a space already provides an impression – 'we grasp the atmosphere before we identify its details or understand it intellectually' (Pallasmaa 2014, 232). Hence,

Motivation, mood, attention, involvement and social context are just a few of the factors that clearly influence the experience of atmosphere.

people are often asked about their general impression of the space – even though it's often the case that the researcher's actual interest stems from the effect of a particular intervention.

The S-O-R model argues that environmental stimuli ensure that the environment 'does' something with a person (the 'O') in that environment, and specifically with the emotional state of that person. This emotional state is often described through the PAD model (Mehrabian & Russell 1974). However, this view of emotions is not without its problems (Van Vliet 2018). Various studies have also made clear that the 'O' is more complex than what can be uncovered by mere measurement of, for example, arousal. Other factors such as motivation, mood, attention, level of engagement and social context can also measurably influence how atmosphere is experienced.

Within the research, the response (R) is made up of a collection of measured (dependent) variables, such as sales, time spent in the shop, number of observed items, purchasing, purchase intention and purchase attitude, along with more general variables such as enjoyment, satisfaction and loyalty (Turley & Milliman 2000, among others). Nevertheless, there is one important recurring view that responses to an environment can be described as 'approach' or 'avoidance' behaviour. 'Approach' designates wanting to stay in a space to explore; 'avoidance' represents not wanting to explore and leaving. This division can be further anchored in research into emotions and hereby seems to be a primary concept when describing the experiencing of atmosphere of a space (Van Vliet 2018).





11.3 New starting point.

For the most part, research into atmosphere in other sectors besides retail, builds on earlier research and theorising around the consumer experience in shops – and thereby also ‘inherits’ the same problems and shortcomings. This not only includes the weaknesses in the theory behind the S-O-R model, but also how research results don’t always point in the same direction – and are, on occasion, even contradictory. This can be partly traced to differences in the operationalization of the constructs, the applied research methods and the specific situation wherein the data is gathered. At first glance this state of affairs may seem disappointing for the describing of atmosphere in public spaces, but the exposed weaknesses actually offer an opportunity to give form to new ideas around atmosphere in open public spaces. In other words: we can learn the most from theoretical shortcomings. Here, we will focus on three aspects – motivation, responsiveness and perceivedness – that we can then use to interpret the atmosphere of public spaces.

A first recurring factor when it comes to people entering a space is their motivation for being there. The difference between ‘hedonistic’ shopping (‘for fun’) and ‘utilitarian’ shopping (‘task related’) can be totally different starting points for the shopping experience (Van Vliet 2014) and lead to a different experience of the atmosphere (Rayburn & Voss 2013). A study by Kaltcheva & Weitz (2006) showed that consumer motivation is an important moderator in the effect of a shop environment’s generated ‘arousal’. With a more recreational motivation to shop, the generated ‘arousal’ has a positive effect on the experienced pleasure; while with a more task-oriented motivation the generated ‘arousal’ has a negative effect on the experienced pleasure.

Secondly, individual differences can play a role in the experiencing of atmosphere. The influence of a person’s characteristics on their experiencing of a space forms a recurring theme in atmosphere studies from Mehrabian & Russell (1974) through to Forest (2014). Research has been done into ‘environmental dispositions’: the differences between people in how they interact with an environment. The most well-known measuring instrument is probably the Environmental Response Inventory (ERI) from McKechnie (1970; 1977), which consists of 184 statements about everyday situations. In addition, a specific disposition has been put forward in terms of atmospherics: ‘atmospheric responsiveness’, characterised as the level of how sensitive people are to environmental stimuli (Eroglu, Machleit & Davis 2001).

Thirdly, an essential distinction must be made between ‘intended atmosphere’ (what the designer attempts to evoke through his design) and the ‘perceived atmosphere’ (how the atmosphere is actually experienced by consumers). In other words, a space arranged with the goal of feeling warm and inducing wonder will not necessarily be experienced as such by the people in that space. This is not to say that the objective describing of a space and studying the effects of environmental cues is useless. A space might be ‘compelling’ in its possible interpretations, from subtle ‘affordances’ to explicit directions regarding the atmosphere it should have. The difference between ‘intended’ and ‘perceived’ might appear logical but it is not always a starting point in the formulation of theories.

11.4 Heading outdoors.

Most atmosphere research revolves around indoor spaces: shops and exhibition areas. In only a few cases does it concern the role of, for example, the shop window or the exterior as influences on how the atmosphere is perceived or one's intention in visiting the space (Olahut, El-Murad & Plaías 2012; Mower, Kim & Childs 2012). Also, relatively little research has been done on the 'atmospherics' of the surrounding shopping environment, with most of these revolving around malls (Michon, Chebat & Turley 2005, among others). Research undertaken into city squares and parks do contribute something in terms of focus, in that these often approach their subjects in a similar way as with shops: establishing the influence of certain characteristics on one's appreciation of a stay in that environment. Hence with research into squares and parks, factors such as arrangement, presence of trees, shadow, surrounding sounds, facilities and maintenance (Raskovic & Decker 2015; Ezennia, Uwajeh & Irouke 2017; Liu, Xiong, Wang & Luo 2018) have been studied to see what effect these cues had on aesthetic appreciation, length of stay, return visits, satisfaction and so on.

The results of such studies do not do justice to the specific character of the exterior space. The reason for this can be clarified by Kotler's (1973) description of the concept atmospherics: 'the effort to design buying environments to produce specific emotional effects in the buyer that enhance his purchase probability' (p. 50). Independent of the specific aspect of purchasing, there's a more general statement to be found here about the conscious manipulation of a space to

People also visit a park for several reasons: to relax, jog, escape from home or work, get outdoors with the children, and so on.

achieve a certain effect (behaviour, cognition, affect) in people in that space. This effect is easy to imagine with shops (make a purchase), but with exterior spaces there is no such clear goal. Squares and parks have diverse functions, which play a role in such things as mobility, relaxation/rest, meeting place/social interaction, sense of wellbeing, recreation, sustainability (such as with water management in parks) and the (aesthetic) appearance of a city. People also have various reasons for visiting a park: relaxation, jogging, escaping home or work, going outside with the children, et cetera (Burgess, Harrison & Limb 1988). In this way, exterior spaces often offer a 'variety of opportunities' instead of a single goal that can be supported or enhanced with cues within that space. This

undifferentiated nature of exterior space, both in function and in use, is both a strength and a weakness. The strength is within the great diversity of users; the weakness is in the often-contradictory functions, whereby the space can appear to lack a sense of community and shared experience.

We can compensate for the weakness by employing the three previously mentioned distinguishing components of atmosphere. By responding to the different user motivations, we can explicitly address these motivations. The mentioned ‘variety of opportunities’ for a public space does not have to mean that these opportunities have to be invisible or undifferentiated. In fact, in making these functions more explicit, visitors to the space can better relate to it and use the space in a way that fits with their motivation. This does not have to lead to a confusing space where different functions run through each other. A unity in the diversity can be achieved by making particular design choices. A good example of this is Copenhagen’s Superkilen park (Markopoulou, Farinea & Marengo 2018). The park is divided up into three different functions, which are each marked using different colours. A red square invites cultural exchange and sport activities by placing various game and sports facilities in the space. A black square functions as an urban living room with tables and benches, along with the possibility to BBQ and play chess. The green part of the park is meant for picnics, sunbathing, family outing and community activities. Unity has been created through the location, design and colour use.

People differ in their sensitivity to their surroundings. This opens up all sorts of opportunities to add more layers to an environment. These layers might consist of the previously mentioned cues; light, scent,

We describe a space using words such as cosy, crowded, comforting, organised, inspiring, dismal.

sound and temperature can lend themselves well to (inconspicuous) manipulations that can be noticed by those that are sensitive to them, and therefore build a stronger connection to the space. The creating of certain scent sensations, for example by having plants in specific spots, or inducing temperature changes by ‘designing’ shadows (Tanizaki 2001) in unexpected spots, can also create a certain connectivity with the space. In addition, soundscapes (with the amplifying, or even filtering, of certain sounds) or introducing a sound that doesn’t fit with the context, can also give an extra dimension that not only pulls the attention of certain people, but also gives them a sense of intimacy by the small-scale, the joy or surprise brought about by noticing this intervention, or the possible triggering of personal memories.

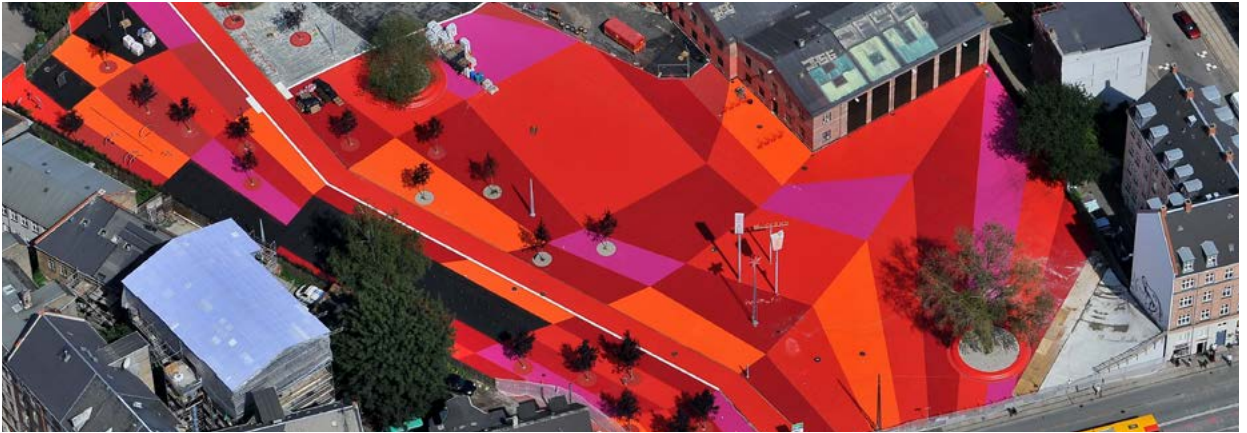
Light is an often-used cue to add layering. A good example is the temporary light installation around the Dom church tower in Utrecht, where subtle lines of coloured light outline the original position of the Roman

defence wall on the surrounding streets. While hard to miss, particularly at night, the meaning was not always evident and unfolded only through a public debate. Another example is the *Shadowing* project in Bristol that uses footage of the interaction between passers-by and their shadows in alleys, parks and squares (Markopoulou, Farinea & Marengo 2018) – adding a special layer of meaning and playfulness in an otherwise everyday location.

An important factor in experiencing atmosphere is the personal evaluation of the space. We describe a space with words such as cosy, crowded, uplifting, organised, inspiring or gloomy. Countless terms exist that can describe the impression a space makes. Kasmar (1970), alone, found five hundred different adjectives used by his study's participants to describe just a few different spaces. But while the interpretation of a space can seem like a game of endless combinations, interpretation does not have to remain noncommittal: a space forces certain interpretations ('affordances'). These can often be brought under the aspects of order, spatiality, variety, complexity, coherence and size – all common qualities in architecture and planning. At the same time, the personal evaluation of situations can be brought back to a limited number of essential variables (Van Vliet 2018). Such 'appraisal' variables can include 'agency' and 'controllability'. One can also play with such appraisal variables in the design of a public space. A good example is the interactive installation *BruumRuum!* in Barcelona (Markopoulou, Farinea & Marengo 2018). Through sensors listening to surrounding sounds of the city and passers-by (conversations, laughter, yelling), 900 LEDs embedded into the city square are

steered to change colour and make figures and movements. The installation invites manipulation by passers-by (agency) of its forms and colours, whereby an interactive game arises between square, visitors and surrounding with the suggestion of control (controllability). Visitors who were asked about the installation said it created a better relationship with the space and increased their sense of safety.

There are yet more 'appraisal' variables that can be translated into starting points for design and implementation; together with the other components of atmosphere—motivation and 'atmospheric sensitivity'—this analysis might be a leap forward in our thinking about atmosphere in public spaces.



Superilla Poblenou, IAAC Institute for advanced architecture
Catalonia (photo: Jens Rost)

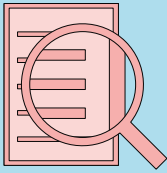


Shadowing, Chomko & Rosier, 2014 (photo: farrowscreative)



BruumRuum!, David Torrents & artec3 Studio, 2014
(photo: Xavi Padrós)

DIAGNOSIS AND MECHANISM



Which situational spatial and social problem does the design task focus on?
Which of the five mechanisms should the responsive installation use to activate the public space as a public realm?

• Sense of Place • (Playful) Interaction
• Personalisering • Routing & Leesbaarheid • Control



CONCEPT

SPATIAL COMPOSITION



Which spatial solution is the responsive intervention intended to provide?

INTERVENTION

What spatial problem is the installation to solve so that the built environment can create the right conditions to facilitate a public domain experience? Which spatial design choices and compositions must be made for the intervention?

SPATIAL SHAPE

Will the intervention refer to traditional spatial principles such as walls, active plinths, enclosedness, differentiation, etc.? Or will a new sort of shape, appearance and spatial composition be chosen?

RELATIONSHIP WITH THE SURROUNDINGS

How will the intervention relate to aspects of the surroundings that remain unchanged? And what message and ambience will the intervention have when it is not in use?

DEVELOPMENT

How will the installation develop over time? Will the installation adapt to the rhythm of a location? Will the interaction follow the same pattern every day? Or will the content be changed regularly? Will this be done via an editorial plan or by a curator?

AFFECTIVITY



How will users or passers-by experience a responsive installation?

INTENSITY

Is the intended experience peripheral or does it require active participation from passers-by?

CALL TO ACTION

How will the installation attract attention?

SOCIAL LEARNING

How can users quickly and easily understand what they are meant to do? By watching others, for example?

EXIT

Can users also leave the interaction easily?

MATERIALITY



How is the spatial use of the installation embedded in the public space?

SOCIAL CODING

What are the existing practices and habits at a particular location? Does the proposed installation fit in with this existing social coding?

ACTIVATION SPACE

In what places will the public be made aware of the installation?

LANDING ZONE

Is there room around the activation space where passers-by can easily stop to observe the installation from a distance?

COMFORT SPACE

Will there be a space where spectators can gather who do not immediately participate in the installation but prefer to (initially) observe it?

(POTENTIAL) INTERACTION SPACE

Is there a logical relationship between the place where the installation is clearly visible and the place where passers-by can actually provide input?

What is the motivational basis for the responsive design: how is it motivated, what are its intended effects, what is the location like? How can the concept for the installation be described? What is the installation intended to achieve in its direct relationship with users? And how will the concept be shaped? What will the installation look like, how will it sound, and how will passers-by experience the installation?

RELATIONSHIP



Which relationships will develop between users and the installation and between users themselves?

INTENSITY

How can passers-by provide input? Will this happen automatically because sensors 'perceive' them (ambient interaction)? Is active participation required (performative interaction)? And will this participation be individual, or can several people participate at the same time (allotted interaction)?

INPUT

What type of interface will be used? Will there be a remote-control device or panel to control the installation? Will passers-by be able to use their bodies to interact (shadowing)? Or will they interact using their own (mobile telephone) devices (soapbox)? Or will their presence or absence be recorded by invisible sensors (smooth operator)?

REPRESENTATION

How will input from passers-by be represented? Will their individual contributions be visible? And if so, will individuals be identifiable or anonymous? Or will the input from passers-by be aggregated in a total or an average? Will outcomes directly translate into a concrete meaning? Or will input be represented by an abstract pattern?

ARENA OR CONVERSATION PIECE?

Where will the interaction take place? In the installation itself (arena)? Or is interaction to develop in the public space, having been prompted by the installation (conversation piece)?

TIME



How will the experience of the installation develop over time?

RHYTHM

What is the rhythm of the location for the proposed responsive installation? How does this rhythm change in the course of the day, and throughout the year? How will the installation connect with these patterns?

DURATION

How long will the experience last for the user? Will this be pre-determined or will users themselves decide how long they want the experience to last?

DEVELOPMENT

How will the installation develop over time? Will the installation adapt to the rhythm of a location? Will the interaction follow the same pattern every day? Or will the content be changed regularly? Will this be done via an editorial plan or by a curator?

MAINTENANCE

How will maintenance be organised in the course of time? Will certain hardware and software components need to be updated or replaced as time passes?

A nighttime photograph of a city street. A red laser line is projected across the dark asphalt pavement, starting from the bottom left and extending towards the right. In the background, a modern building with a curved facade and many lit windows is visible. A tree stands in the middle ground. Large white text is overlaid on the image.

PART

VW

—
An Experiment

—
Responsive Public Space



Research for design: An Experiment.

In order to gain and provide insights into the process of co-creation and the production of a responsive design, a 'research through design' programme was set up and implemented as part of the Co-ReUs research project. Its goal was to understand the process of designing responsive public spaces by implementing it ourselves.

Designing a responsive space involves several parties: spatial designers, interaction designers, local stakeholders and the city council. This was precisely the mix of parties we worked with during the two-year research project: together, we moved through the three phases from analysis to implementation. The making process was central to the co-creation sessions.

Based on these sessions, two concepts were then selected for implementation. We developed these concepts in simple prototypes that we then placed and tested at ArenA Boulevard. In this part we report on the production and tests in order to distil and provide a concrete insight into the lessons for the design. This is preceded by a cartoon strip that shows the design choices underlying the interventions.





Part V: An Experiment

12.

Spatial interactive interventions.



Spatial interactive interventions.

12.1 Objectives and approach.

One part of the study involved going through the entire process from assignment to idea, construction and on-site testing. Two prototypes were built. This was done using results from the co-creation sessions (see Chapter 4).

Prototypes with different mechanisms are a way of developing a deeper understanding of the application and implementation of interactive designs in a public space. They can give a more thorough grasp of the problem presented by the spot, on the basis of which knowledge can be developed about the nature of the public domain and the effect and composition of interactive installations as a spatial strategy.

The design of a responsive space is both a spatial assignment and a social assignment. The starting point when creating a prototype is to enhance the spatial quality as both a place to linger and a place of passage, based

on the premise that this helps strengthen the public domain. The question then is how an installation can activate people. It is difficult to draw people out of their bubble in the public space because they are making phone calls, checking their phone, have earplugs in and are listening to music, are chatting to others in a group or are simply in a hurry. That makes certain demands on any responsive installation. The problem of how to briefly draw people out of their bubble (like throwing a pebble at a window) needs to be investigated. The designer's task is to create an installation that uses the 'pebble' to draw in the users and passers-by.

The interventions can be deployed to further problematise the nature and assignment of the responsive space and both qualify and enrich the nature of the public domain. Two prototypes were used to test a range of settings for four different mechanisms: a sense of place, (playful) interaction, personalisation, and routing & legibility (see Chapter 9).

After determining the location of the prototypes (based on preliminary studies), we explored how people respond to them. For example, do they slow down, stop, get their bearings, look

at one another and start interacting with the installation? The underlying questions are what this means in terms of enhancing the quality of the public domain and in terms of the intended operation of the mechanism that is being applied.

Questions and measurements

Our working hypothesis is that you can use minor interventions (lighting, sound, urban screens, paint) in public spaces to briefly draw people out of their bubble in a targeted manner, thereby sowing the seeds for a public domain experience. Such an intervention may cause visitors to start experiencing the public space differently. Interventions like this make it possible to interrupt the purposive, routine walk. We are building on studies of interventions in the public space (varying from mirrors and floor markings to interactive installations) that are capable of interrupting routine behaviour and ‘civil inattention’ (Martin, Dalton & Nikolopoulou 2013; Nikolopoulou, Martin & Dalton 2016). We assume that interventions that affect people’s individual experience of the space could potentially also lead to a form of interaction between people and enhance the city as theatre, meaning a public domain where interactions can take place between different groups in society.

The research question is as follows. What effect does a responsive installation have on how different groups of visitors use and experience the space? 1. Are they aware of this? 2. In what category does the installation’s effect fall? Do people change their route, slow down, stop for a moment, look at the installation, or start interacting with it? 3. Which elements trigger them, and in what way? 4. Do visitors start interacting with one another (whether within a group of acquaintances or with strangers)?



Prototypes are a way of developing a deeper understanding of the assignment and implementation of interactive designs in a public space.

Ex ante and *ex post* measurements were performed to determine the effect of an installation's mechanism. The method used for the *ex ante* measurement was explained in Chapter 7. As in the *ex ante* measurement, the *ex post* measurement consisted of a combination of methods (triangulation). Various methods were used to measure the effects of the installations, focusing on pedestrian patterns/routes, behaviours and experiences.

1. Pedestrian patterns: these were investigated using a time-lapse camera looking down from above that captured users as 'agents' (see Chapter 6). The expectation was that

the interventions would lead to changes in pedestrian flows, the intensity of different routes and the points where people linger. Comparable circumstances (in terms of the weather conditions and how busy the place is) are required for the *ex ante* and *ex post* measurements.

2. Behaviours: these were investigated using qualitative observations of pedestrian routes and the points where people slow down or stop. How do people walk (purposely or not) and how do they slow down in response to the installations? Observations are suitable for examining how people react to an installation, how they start to look at things differently, walk differently or slow down, where they stop and how they interact with the installation (and for how long), and whether they interact with other people. We examined where the installation's 'landing effect' started and the spots from which you could see the installation. Observations can be noted directly on a map as qualitative descriptions of a social situation but they can also be recorded using (GoPro) cameras that take time-lapse photographs that can be analysed later.

This chapter deals with two prototypes that were tested in ArenA Boulevard, the underlying mechanisms and how people responded to the interventions — the user experience. It then relates the prototypes to the overarching concepts and themes in how people experience the public domain.

Ex post measurements.

Various methods were used for the ex post measurements of the interventions in ArenA Boulevard. Firstly, a time-lapse camera was installed on the roof of the Deutsche Bank building to capture images of the changing pedestrian flows. Secondly, 'manual' observations were used with observation schedules that were similar to the schedules for the ex ante measurement. Each observation lasted from two to ten minutes. Thirdly, street interviews were held to assess people's experience (with questions such as: Did you notice the installation, and what was it that made you notice the installation? Do you feel it has made this space pleasanter? Did it change the way you walk across this space or use it? What is the purpose of your visit?) The prototype in the transition zone was tested in the evening of 19 December 2017 and in the daytime on 20 December 2017; the prototype in the landing strip was tested in the evening of 30 January and of 5 February 2018. An additional ex ante measurement without a prototype was also performed in the landing strip in the

evening of 6 February. The measurements were concentrated in the evening hours as both prototypes used light a lot. A total of 106 usable street interviews were conducted in the ex post measurements. Two different variants were tested of the second prototype, on two evenings. This meant more interviews could be completed: 35 on 30 January and 37 on 5 February. Both prototypes were also filmed using two GoPro cameras attached to lamp posts.

It turned out that the time-lapse images of the landing strip with the first prototype with a single LED strip could not be compared with the ex ante measurement due to differences in the camera settings. We therefore only performed comparisons of the ex ante and ex post measurements in this section of the boulevard of the second prototype with the double LED strip. The time-lapse images of the first prototype (the compass) on 20 December were unusable as that was a very misty day and the pedestrian flows were not visible. The time-lapse images of the pedestrian flows on the previous evening, 19 December, were too affected by the presence of the researchers, a photographer and a filmmaker.

	PROTOTYPE 1 TRANSITION ZONE	PROTOTYPE 2 LANDING STRIP
OBSERVATIONS	88x	69x
INTERVIEWS	34x	72x

12.2 ArenA Boulevard case: testing prototypes.

Two prototypes were tested in ArenA Boulevard. The installations were composed of lighting (LED strips and gobo projectors), paint, sound and LED screens. We simulated 'responsive ambient' sensor technology in the installations in some respects (by having the LED lighting flicker and by projecting personal messages for passers-by on the LED screens).

Prototype I: Transition zone

The assignment for the transition zone as set out in the design brief was:

To strengthen the place as a space in order to make the entire boulevard more cohesive; to enhance the quality of the place as a point of entry and somewhere to get your bearings, especially in the evening; to give the boulevard a more multi-layered identity and quality as somewhere to linger from the perspective of passers-by and users; to combine 'routing & legibility' with the mechanisms of 'playful interaction' and 'sense of place'.

The installation consisted of a compass painted using white milk paint, showing the outlines of buildings that are destinations in ArenA Boulevard and lit with UV lighting, four illuminated paths with footprints and two urban screens on which thirteen questions about ArenA Boulevard were projected in a loop. Three areas in front of the screens that were part of the compass were illuminated by

flashing light from three gobo projectors. The location for the compass in the transition zone was based on the point where the pedestrian flows crossed as observed during the *ex ante* measurements, along with the visibility of this spot from the entrances to several multi-storey car parks and from the landing strip and centre area. Various references from the co-creation sessions with stakeholders were used when building the prototype.

The following mechanisms were tested in this prototype:

- legibility, orientation and routing (the compass as a landmark and the footprints);
- a sense of place and identity (the compass and the questions on the LED screens);
- playful interaction (the quiz with questions on the LED screens and the gobos);
- making the installation more personal (sending personal messages to passers-by to tempt them to take part in the quiz).

This prototype was tested during three quiet periods on 19 December (in the evening) and 20 December (in the morning and afternoon). The flashing light from the gobo projectors and the UV lighting could not be seen in the morning so we removed them. The illuminated footprints were also replaced by moulded footprints in A4 size in the daytime. As a result, only a 'stripped-down' version of the installation was tested during the daytime. The weather was grey and drizzly, and there were a lot of distractions in the surrounding area, such as a Christmas tree with lights and the light from the street lamps.

Numerous passers-by stopped to watch what was going on as the prototype was being constructed, with weed burners to dry the paving tiles and then the painting of the

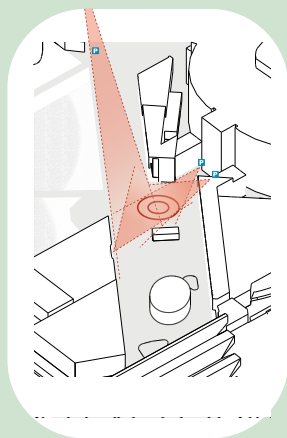


Design Brief for Prototype Transition Zone

The diagnosis of and assignment for a responsive solution were formulated on the basis of the 'bottom up' analyses (see part III). The possible solution was tested as a prototype.

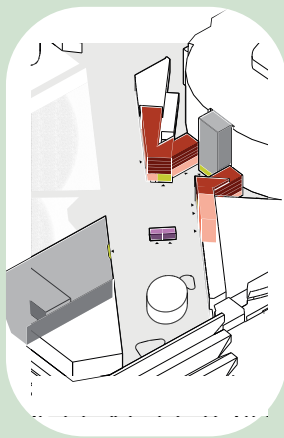
Analysis

DIAGNOSIS OF TRANSITION ZONE



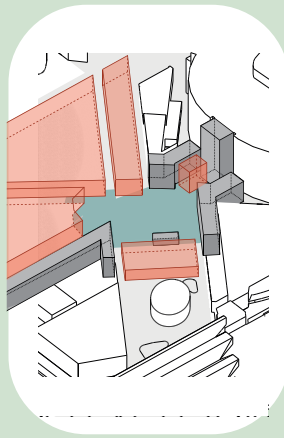
SWITCH POINT ON THE BOULEVARD

The transition zone is a central switch point on the boulevard but is an ineffective orientation point.



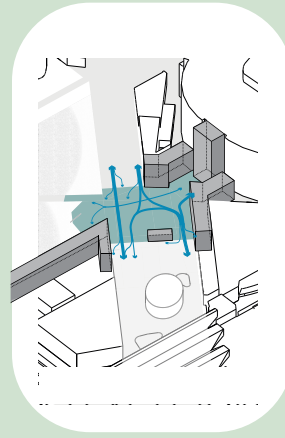
LACKS FUNCTIONS

The plinths are mainly blank and the space hardly includes any designated functions.



LACKS SHAPE

It is an amorphous space, where the walls fail to provide cohesion.



IT IS AN INTERSECTION

The transition zone is used functionally, with clear-cut routes for pedestrians.

ASSIGNMENT: TREAT AS A CITY SQUARE

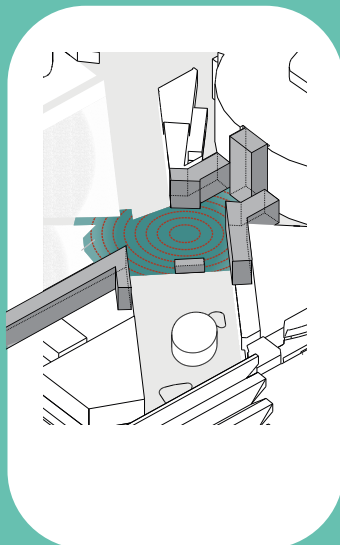
PROGRAMME SPECIFICATIONS

- Spatially reinforce the location so the cohesion of the whole boulevard is increased.
 - Reinforce the quality of the location as an entry and orientation point, particularly in the evening.
- Contribute to a more layered identity for the boulevard and improve its sojourn quality for passers-by and those who use it.
- Combine 'routing & legibility' with 'playful interaction' and 'sense of place' (chapter 9).

Design

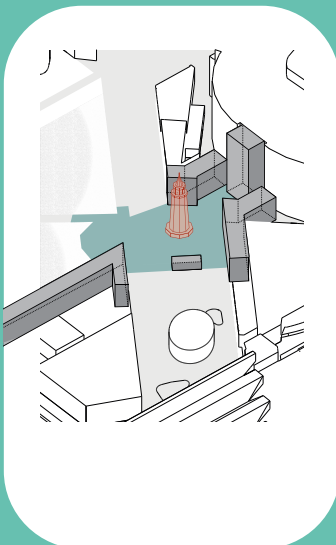
DESIGN PRINCIPLES

REINFORCE



Reinforce the space from within rather than starting with the walls.

CONNECT



Draw on the busy central area and reinforce the location as the boulevard's roundabout.

ENRICH



Charge the central point with meaning and activities that use the boulevard's identity, buildings and peak hours.



BUILDING BLOCKS FOR PROTOTYPE

1.



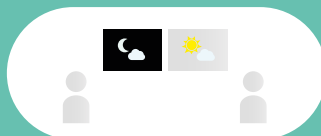
ILLUMINATED PATHS
CREATE SIGNPOSTING

COMPASS ROSE REINFORCES
ORIENTATION



2.

3.



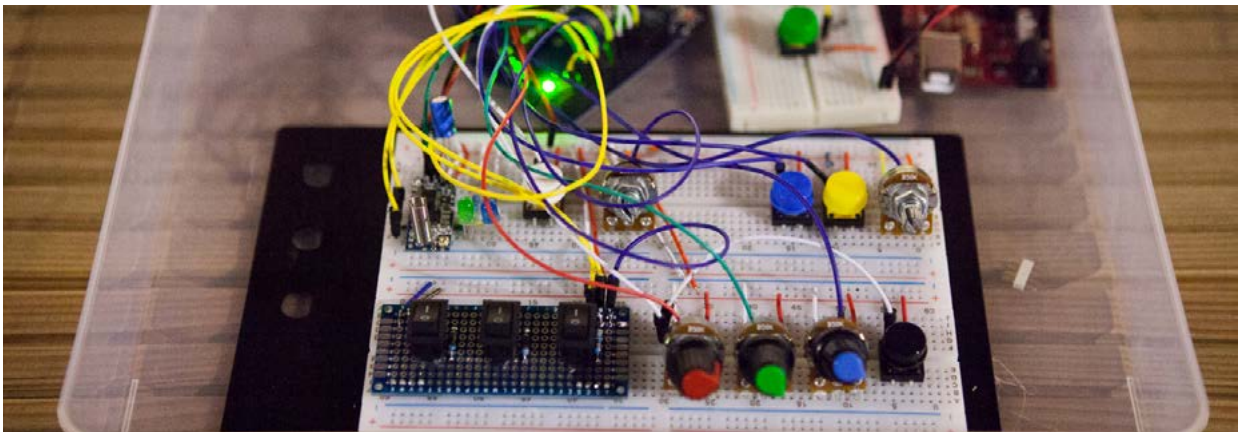
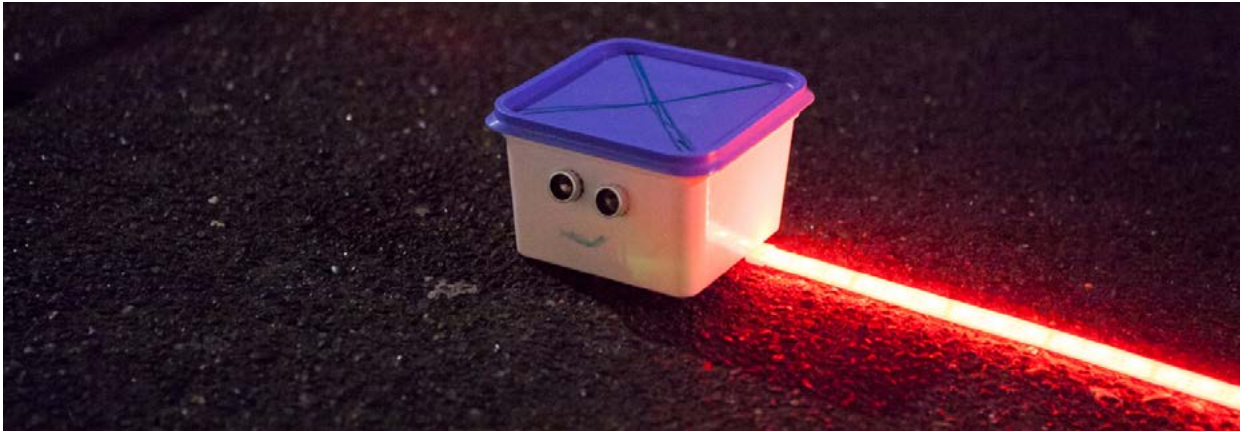
URBAN SCREENS FOR
INTERACTION WITH
SURROUNDINGS

GOBO FOR AN
INTERACTIVE GAME



4.





compass. People were curious about this unusual event. The interviews revealed that office workers had seen the prototype being constructed from their offices and had then gone to have a look. 'We saw you yesterday but I don't think I'd have noticed so quickly otherwise' (woman in her twenties, office worker). 'I saw what you lot were doing yesterday. I didn't know what it was going to be but I did recognise all kinds of things in it. I think it looks good' (man, office worker).

The effect of the lighting, compass and urban screens

It turned out that the effect the installation had depended on the period (evening versus daytime) and how busy the place was. The intervention had most effect in the evening and at lunchtime when office workers were more receptive to it. There were too few people in the boulevard in the morning. At that time of day, office workers walk purposively towards their destination. There are still a lot of people walking purposively towards their destination in the afternoons and evenings (both shoppers and day trippers who have parked their car in the P+R and are walking to the metro). When they emerge from the car park, they briefly get their bearings. These people are in a hurry in a world of their own — they do not notice the intervention. They may walk purposively or dawdle but they are either concentrating on one another or their children, or they are in a world of their own. People going out somewhere may also be in a hurry depending on how much time they have before the performance begins. 'Basically because we don't have time. Otherwise I'd have walked over to it. But now I have to pop into MediaMarkt and the film starts in fifteen minutes so it's an easy choice. Otherwise I'd have had a look at the arrows' (two men

'We were just chatting. We walk right past everything. We were just in our own bubble on our way to Perry Sport shop.'

in their forties). The shoppers are usually focused: 'We were just chatting. We walk right past everything. We were just in our own bubble on our way to Perry Sport' (two women, shoppers).

Especially during the daytime, a lot of people did not notice the installation. They walked across the compass without even seeing it. Some people glanced at it without slowing down. A number of people also stopped briefly to look around. Office workers were particularly likely to respond to the intervention during the lunch break. They noticed the intervention, which made them curious. Some stopped at the compass, sometimes only for a few seconds, sometimes for half a minute, and discussed it with one another. It became a conversation piece. Some had seen it being constructed. The office workers were enthusiastic about the fact

‘If there’s nothing happening, you start doing your thing on autopilot. This makes you look up for a bit.’

that something was happening in this space. They were less rushed, or not rushed at all, compared with the morning. They roamed around more and there were more people in the space. They were looking for something to pass the time, for diversion and amusement.

Lighting

It is difficult to ascertain from the observations and street interviews whether the installation enhanced the sense of place. The UV lighting created a kind of theatrical atmosphere between the lamp posts, with darkness behind. The installation stood out mainly in the evening. The ArenA Park was dark and delimited the space. The buildings lining the boulevard are easier to see in the daytime compared with the evenings. People walking towards the compass often noticed the footprints first. The flashing footprints and the three flashing gobo projectors



determined the installation's 'landing effect'. 'I was walking from the station to the Decathlon and wondered what it was. I noticed the footprints in particular. I think that makes it a bit more lively. I think that's a plus' (man in his twenties, works in a shop on the boulevard). 'I was surprised. We saw those feet and then we saw 'ABC' and after a while we saw 'play. Those feet do attract your attention. You feel drawn to join in. You become part of some kind of game and then you do want to join in. I saw those letters at once and thought, right, I'm going to stand on them and then I saw oh, that must be part of it too' (three people in their twenties, on a night out). A group of tourists, a family with two children, were triggered by the installation. They were walking across the boulevard from AFAS Live. The children responded to the flashing lights and the gobo projectors. The children jumped across from A to B to C for a while and ran over the compass. The parents watched the children play, which meant they too noticed the intervention. However, they did not start to do the quiz.

The installation's lighting had much less impact during the daytime. The flashing light from the projectors was not very noticeable during the day. The moulded footprints that replaced the illuminated footprints were also rather inconspicuous. As a result, the installation did not affect the pedestrian routes during daytime and only had a limited effect in the evening.

Some visitors had greater expectations of the responsiveness of the footprints in the evening. 'I saw a box and wiring so I thought, OK, lights will come on. But of course those steps are already lit up. I thought if you stood on them that would turn on a light, but that

'She immediately saw the lights and wanted to play.'

wasn't the case. I thought that was a shame. It would have had more of an effect for me' (woman in her forties, on a day trip). 'I noticed the footprints. They weren't lighting up when I walked by. I didn't stand on them. Are you supposed to?' (man in his thirties, hotel guest).

Adults see the footprints as something for kids. 'We thought: those are footprints and you're supposed to stand on them but we nearly slipped. I feel drawn to walking over them. But it's more of a kids' thing' (man in his twenties, works in ArenA Boulevard). Children do indeed seem to respond much more easily to the lighting than adults: 'She immediately saw the lights and wanted to play' (family with two children, tourists).

Compass and footprints

The prototype aroused people's curiosity but offered little in terms of orientation. People did look at it and sometimes they slowed down (which meant it affected their walking). The compass looked somewhat flat and pallid in the daylight. The compass did little to give people their bearings on arrival. Almost all visitors who were trying to find their way (sometimes with their mobile phone in their hand) walked over the compass without seeing anything. The compass was at some distance from the P+R and without the lights it could not be seen by most people as they walked out of the car park and took an immediate left round the corner towards the station. Nevertheless, the observations showed that slightly more people walked from the Johan Cruijff ArenA car park to the middle of the transition zone (where the compass was). However, the illuminated paths with the footprints did not guide people properly or draw them in towards the compass. When seen from the P+R, the footprints stood out

less because of the light from the street lamps. 'You don't really see the footprints because of the lamps on there. It would be better if they could be turned off' (man, office worker). The compass could not be seen from a distance and could not be comprehended from a single glance. It was not immediately clear that the compass could help you find your way. The compass was not easy to understand from a distance, but neither was it when you enter it. 'Well, there was a giant thing in the middle. The white paint on the floor, yes. I thought, what does this say?' (group of six people, hotel guests). 'You've no idea what's there, though it does look cool when seen from above' (three women in their twenties, office workers). The compass seemed to surprise people who did notice it. 'I find the compass somewhat nicer and more attractive because I find it quite ingenious. I couldn't see so well what it was. It's not immediately clear what it is. So that makes you examine it' (woman in her thirties, office worker).



Urban screens

Urban screens were deployed as a potential instrument for enhancing the public space through the mechanism of playful interaction and — because of the kinds of questions — the sense of place. Thirteen questions (in Dutch and English) were projected onto the two screens. The questions dealt with ArenA Boulevard and its identity. Some visitors responded to the screens in the evening. ‘I like games and quizzes so I went and had a look. You can hardly miss it. They are two incredibly big screens’ (man in his forties). People also watched other people responding to the screens (the honeypot effect). ‘We noticed something on the floor and saw these hanging and the lights. But actually it was because I saw those people — they were looking. It was like I don’t really understand what is going on here but then I saw it. I was surprised. It’s a nice way of making people answer questions and play’ (man and woman, office workers who were shopping). Lots of visitors boost the effectiveness of the screens, as people can watch others from a distance as they look at the screens. ‘I might come over and have a look if people are busy with it. Just for five minutes’ (three women in their twenties). While the compass can attract groups and individuals, the quiz on the LED screens is mainly for groups of people. ‘I think that once you see people doing it and you’re walking here with someone else or in a small group, you might go over to see what they are doing and stand there with them. So that you get some kind of social interaction’ (three women in their twenties).

There was little response to the screens in the daytime. Especially in the morning, people did not have the time to look at them. In the evening, larger letters and more icons could help to grab the attention of passers-by. Using (small) letters only is not enough to catch people’s attention. To stand out from a distance, a LED screen needs recognisable icons and/or sound. Children, for instance, responded to the screen when they saw a picture of Pingu. Our aim of persuading passers-by remotely to take part in the quiz with personal targeted messages on the LED screen turned out not to work. Passers-by did not notice these messages on the LED screens.

There were three kinds of response to this installation. Some people found it fun. The fact that others did not immediately understand it can be interpreted as a form of disorientation. A few people started interacting with it. ‘It’s quite desolate here, so it adds something. It’s nice that it is interactive. It makes it more lively’ (group of six people, hotel guests). ‘An installation like this, yes it’s fun. It’s so dreary here. Any initiative is nice to cheer things up so that goes for this one too’ (man in his twenties, going out for the night). ‘I thought it was amusing. It adds atmosphere and positive interaction. A positive vibe, shall we say’ (man and woman, office workers). ‘I do like the fact that you’re doing this... It makes it that little bit more playful. Somewhat more human. Things like this make it a little friendlier’ (man in his thirties, office worker, off to the cinema). ‘If there’s nothing happening, you start doing your thing on autopilot. This makes you look up for a bit’ (four men, going out for the night).

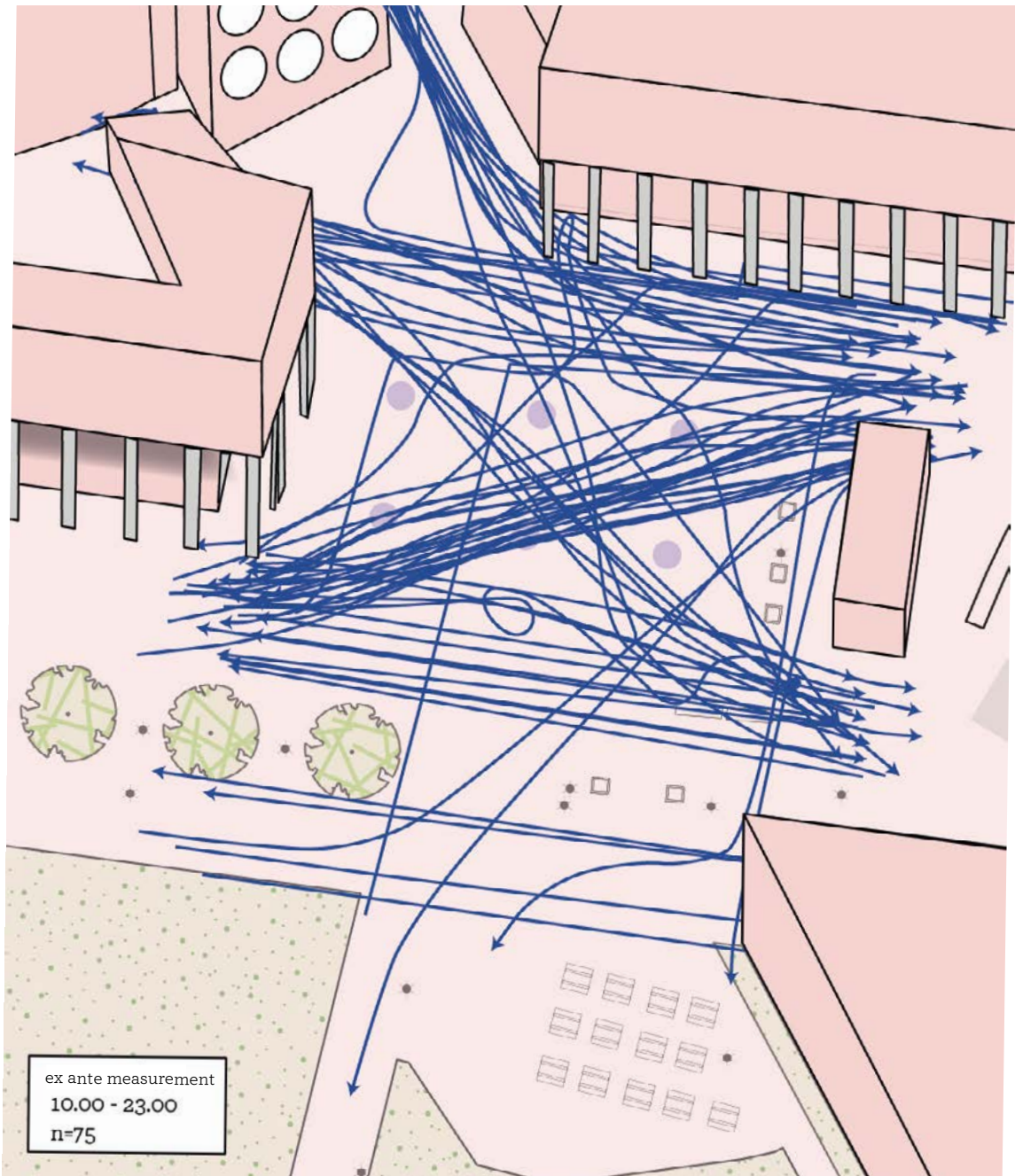
WANNA PLAY?

FEBO

FEBO

FEBO

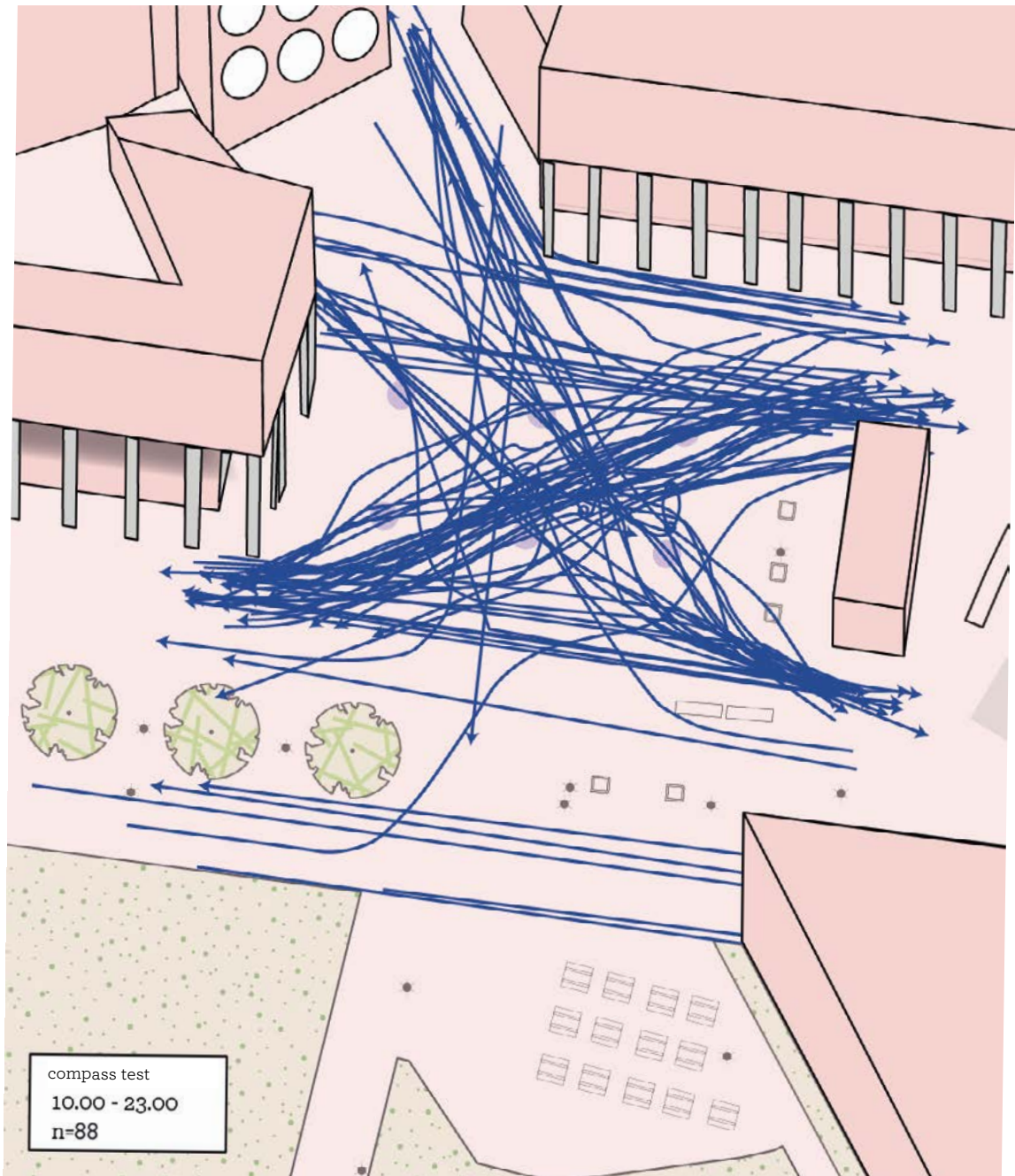




Ex post measurement in transition zone

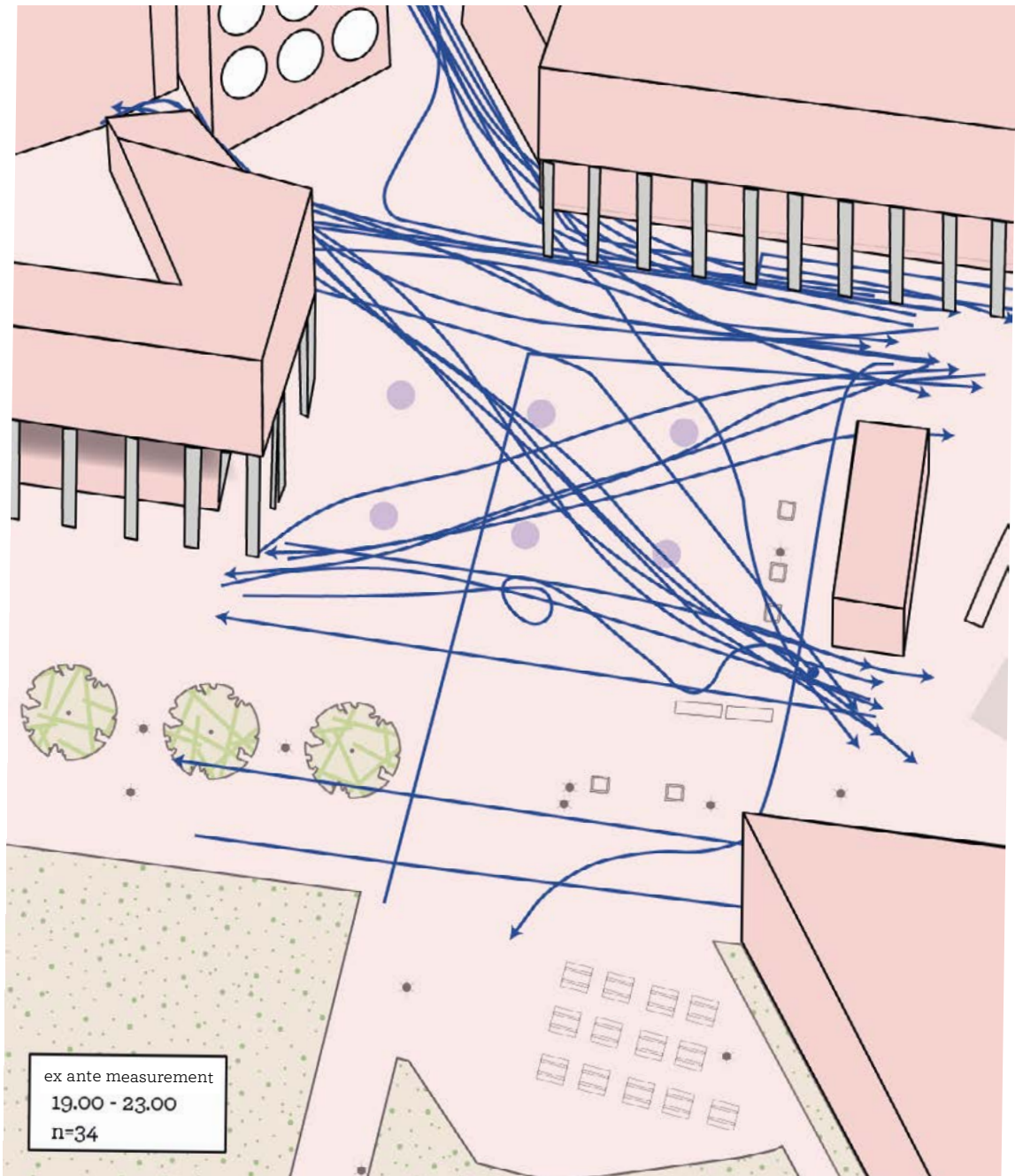
We produced maps of the transition zone based on the manual observations. Four maps of the ex ante and ex post measurements (in the evening from 19:00 to 23:00 and of the three quiet periods combined) show the changes in the pedestrian routes as a result of the intervention.

1. They show that people are slightly less likely to walk in straight lines in the evening (and possibly walk slightly less purposively) when close to the prototype with the compass.

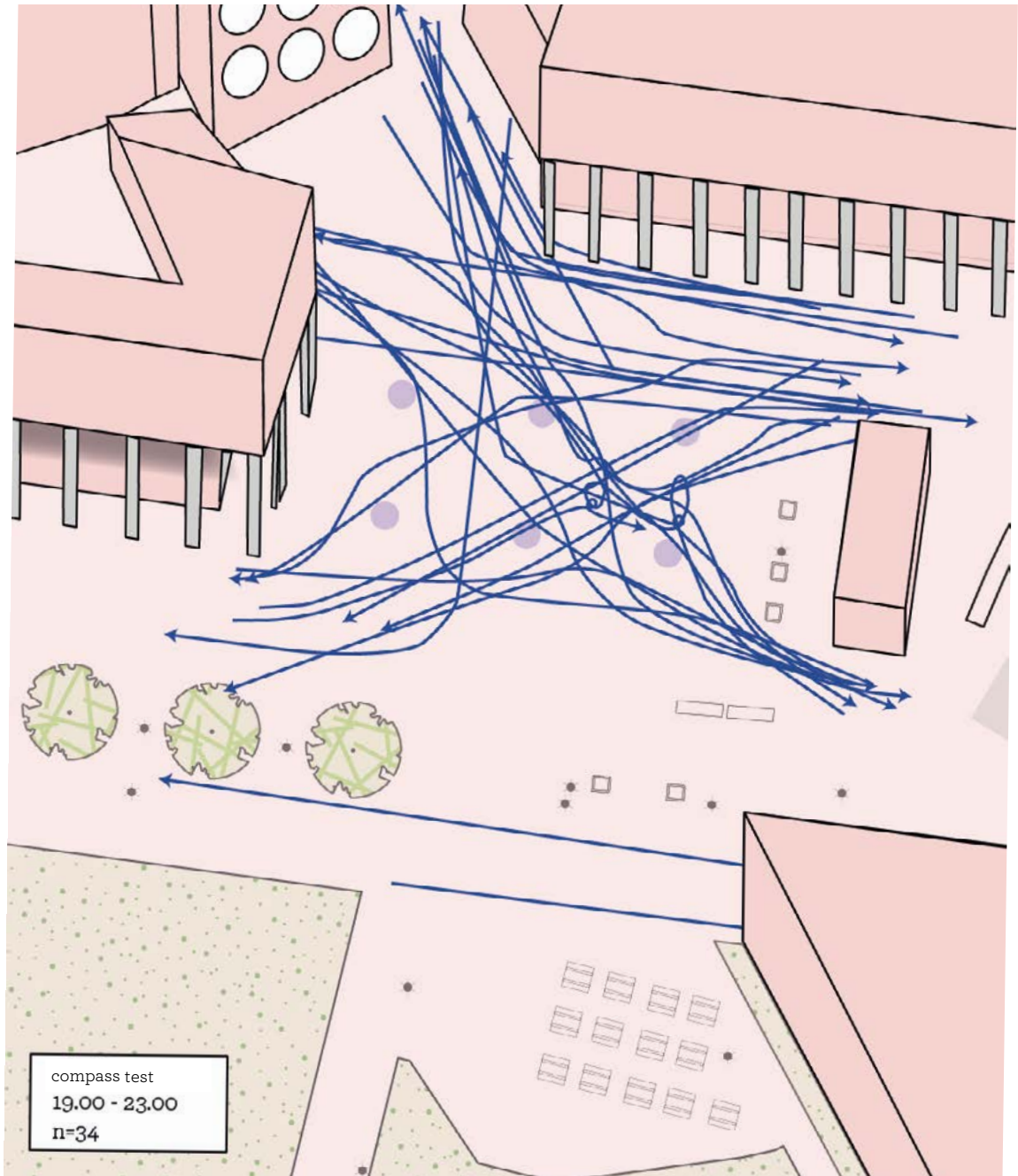


2. The combined map and evening map show that the point where the diagonal routes cross has shifted slightly to the right.

3. The maps show that slightly more people walked from the Johan Cruijff ArenA car park to the middle of the transition zone (where the compass was), rather than immediately turning left.



Ex post measurement in transition zone



Mechanisms, groups and times

In testing this prototype, three mechanisms stood out with a potential for enhancing the public domain: a sense of place, routing (slowing down the pace), and playful interaction/conversation piece (surprise and curiosity). The installation is a strong visual intervention that has to compete with its surroundings. An improved version of this prototype tested at busier times (especially in the evenings) might be able to draw more people out of their purposive walking and their bubble. The LED screens could show more familiar images in order to persuade both children and adults to take a look at the screens. The challenge is to improve this installation and make it appealing to parents and children, and something the children can really play with so that the parents linger here as well.

Tourists and people going out for the evening turn out to be more receptive to this installation than shoppers and office workers. Indeed, a distinction can be made between the utilitarian ('must') visitors and more hedonistic ('lust') visitors (Van Hagen 2011). The utilitarian visitors (a lot of office workers) pass by the installation during the quiet periods. Interestingly, the shoppers also fall into the category of the utilitarian visitors. Indeed, they are there to make targeted purchases in the large stores. In the evenings, the shoppers walk straight past towards the car park. More office workers are receptive to the installation between 12:00 and 14:00. People who are not in a hurry turn out to be more curious and are more open to diversion and amusement. Even utilitarian visitors are able to walk in a more discursive manner during the break. The same applies to the shoppers during the daytime, who

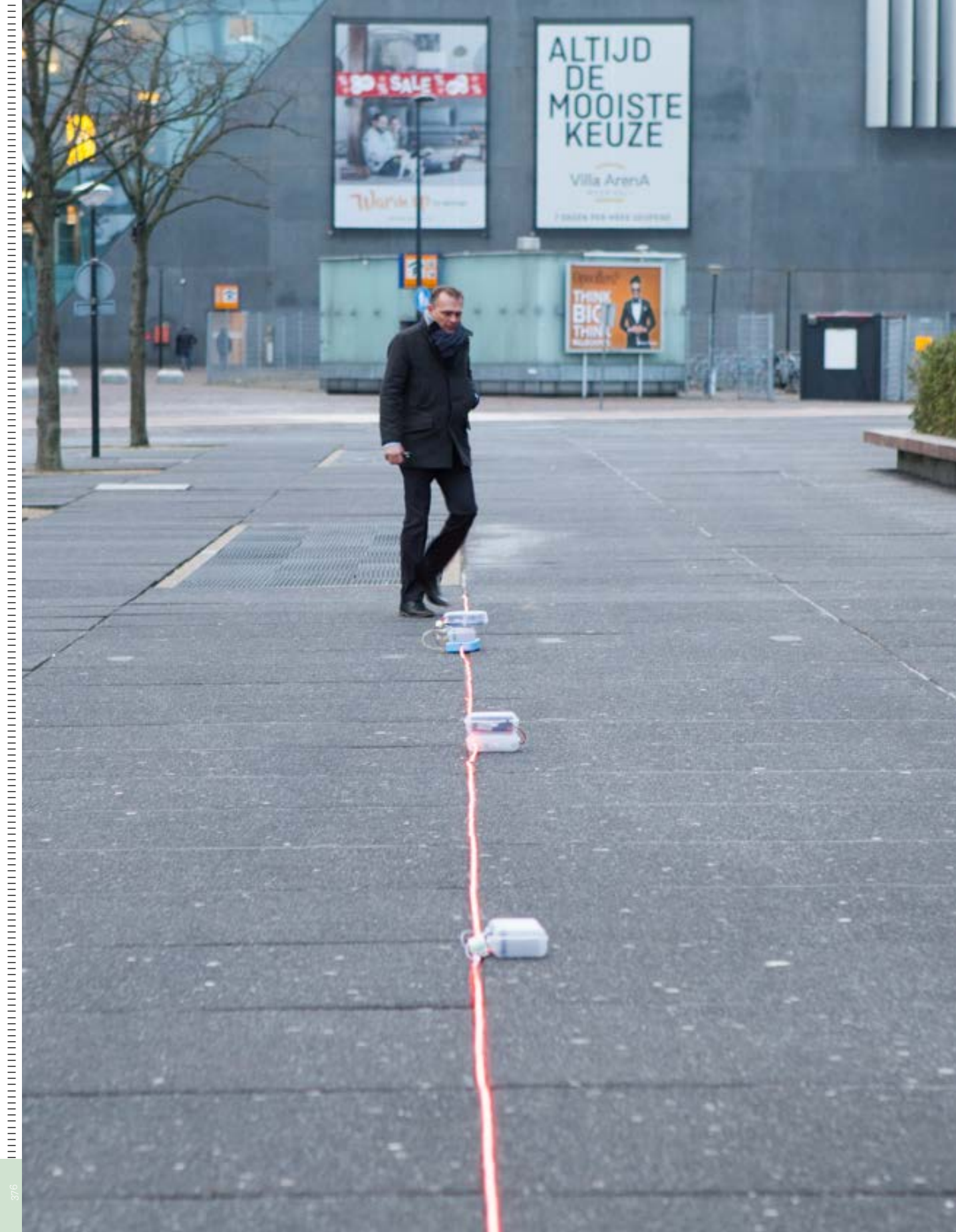
stroll somewhat more then. It seems there are different kinds of 'discursive walking' (Matos Wunderlich 2008): a kind that focuses on the person's own world (their phone, their own group) and a kind that focuses more on the external world. Seeing or 'noticing' the installation can be interpreted as a very minor interaction with the intervention and the surroundings. Encouraging 'discursive walking' slightly strengthens or ruffles the public domain, briefly disrupting the routine walk because people look at things differently, are drawn momentarily out of their bubble, are momentarily distracted and look around consciously for a moment.

**Some people slowed
down briefly as they
looked at it and
wondered what they
were seeing.**

This installation was able to have an effect in the evening and during the lunch break in particular. Some people slowed down briefly as they looked at it and wondered what they were seeing. In other cases, there was some interaction. Children played with the footprints, stood in the light from the gobos and brought their parents with them. One or two groups had a go at answering the questions. People who had a look at the screens and stood in the light cast by the gobo projectors were in turn looked at by other passers-by. The installation can also prompt a short discussion within small groups of people. This means the compass and LED screens are potential conversation starters. Individuals in the same groups can start talking to one another about them, which is what happened during the lunch break (for the compass) and in the evening (for the LED screen).

The installation did not offer sufficient reason for people to linger and interact with it during the daytime quiet periods. Many people are walking purposively at those times. It is difficult to enhance the public domain with interventions of this kind during quiet periods. Such interventions seem to work better in 'transitional periods' when it is slightly busier, as in the margins of the quiet periods: the lunch breaks between 12:00 and 14:00 and the end of the afternoon/start of the evening. There are transitional periods in the afternoon that are important for enhancing the public domains. People start walking more discursively at such times. It needs to be slightly busier in part because people enjoy watching other people doing something. The LED screens appeal in particular during somewhat busier times and transitional periods, and much less so during quiet periods. You need spectators for such screens. People just walked past the screen during daytime. The screen was less conspicuous then than in the evening.





Prototype 2: Landing strip

The assignment for the landing strip as set out in the design brief (November 2017) was:

- Enhance the quality of this strip as a place of passage for pedestrians.
- Help make the walk feel less extended and lengthy.
- Enhance the legibility and guidance (especially in the evenings).
- Make the route more collective and/or more personal.

The *ex ante* measurement in this space showed that people walk fast and purposively across this part of the boulevard. That is very much the case for the office workers, who overwhelmingly walk along the south side.

The decision was made to use LED strips and sound for this prototype. The intervention consisted of two parts: three LED strips and three speakers, spread across the row of trees and broadcasting sound/music. Music, both calm and loud, was played by bands that had performed one week earlier in AFAS Live (alt-J and Stereophonics), as well as bird noises and the sound of a soccer match (Ajax versus Feyenoord) with classic commentary by Jack van Gelder. A different clip was played every half hour. Based on the experience with the first prototype, tests were conducted in the evening only, on two different dates. On 30 January, LED strips were laid in a continuous straight line along the row of trees while on 5 February the LED strips were laid next to one another to create a path. Different colours were also tried out for the LED lights (red and cooler colours), as were flashing LED strips.

The following mechanisms were tested in this prototype as a 'lens' for investigating possible effects:

- routing & legibility (using the LED strips to guide people along a route);
- sense of place (sounds and music that are related in some way to the boulevard);
- personalisation (sounds/music).

The installation had multiple objectives. Firstly, it aimed to reduce the perceived length of the route by improving the spatial quality and making the place more lively (with lighting and sound). Secondly, it was an experiment in manipulating pedestrian patterns by illuminating a more concentrated route down the middle of this space during quiet periods. Thirdly, the installation experimented with the possibility of getting people to walk less purposively and more discursively.

The effect of the sound and LED strips

The second prototype in the transition zone (LED strips and sound) turned out to be easier and quicker for visitors to recognise and understand than the prototype with the compass. People experience the light and sound for longer and have more time to become curious. Passers-by have longer to understand that something is going on. This prototype with LED strips and sound can also be experienced properly on an individual basis by people who are walking on their own. Some of the office workers who walked past the GETZ facade from their office to the metro station continued to walk past purposively. Not everyone noticed the installation due to the large scale of the space and the fact that many people stayed in their bubble. We

Design Brief for Prototype Landing strip

The diagnosis and assignment for a responsive solution were formulated on the basis of the 'bottom up' analyses (see part III). The possible solution was tested as a prototype

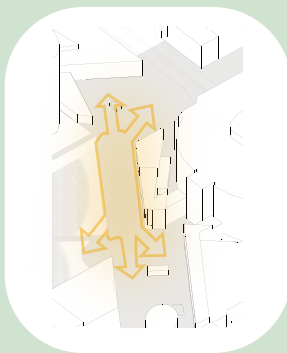
Analysis

DIAGNOSIS LANDING STRIP



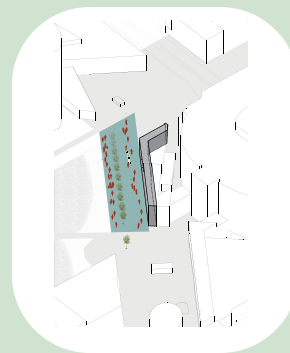
UNRESTRICTED PEDESTRIAN AREA

Traditionally, space for pedestrians is scarce and defined but at ArenA Boulevard pedestrians can walk everywhere and anywhere.



LACK OF GUIDANCE

The landing strip lacks spatial guidance for pedestrians; it also has few destinations.



MOTORWAY

People walk through the boulevard quickly and purposefully. The distance feels long and it is monotonous.



ASSIGNMENT: TREAT AS AN URBAN PASSAGEWAY



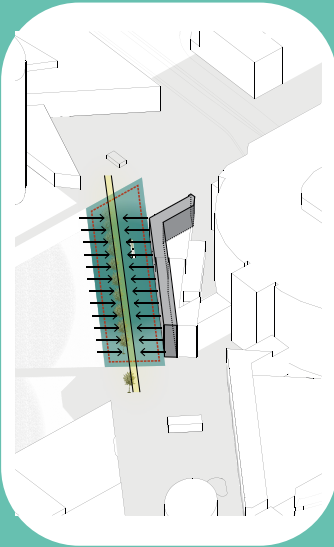
PROGRAMME SPECIFICATIONS

- Improve the pedestrian quality of this strip as a passageway.
- Help reduce pedestrians' sense that they are covering a vast distance.
- Improve legibility and guidance (especially in the evenings).
 - Make the route more collective and/or personal.

Design

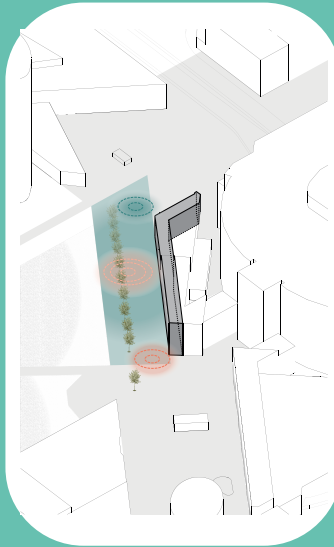
DESIGN PRINCIPLES

CLUSTER



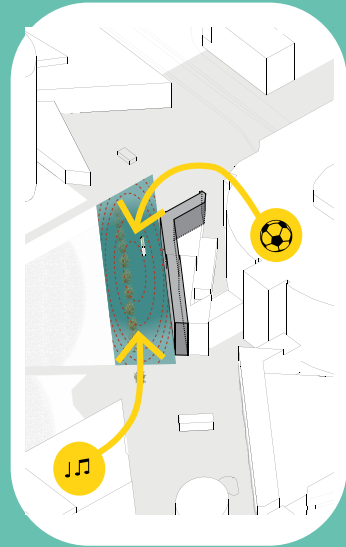
Cluster the fragmented pedestrian flows during off-peak hours by 'carving out' a path in the centre of the space.

BREAK



Break the distance and interrupt the monotony by particularising the path at three points.

ENRICH



Add identity to the location by bringing the inside world outside.



BUILDING BLOCKS FOR PROTOTYPE

1.



LEDs TO CREATE
PATHS AND ZONES

SENSORS THAT REACT TO USERS
AND LIVEN UP THE ROUTE



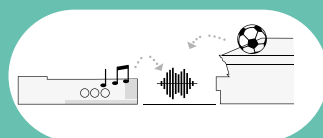
2.

3.



SOUND AS STRATEGY TO
BREAK THE DISTANCE

IDENTITY OF INSIDE WORLDS
REINFORCES IDENTITY



4.

mainly spoke to people who walked along the installation and probably saw or heard it.

In general, people reacted more positively to the sound than to the LED strips. People find sound adds more than light. They preferred calm music and bird noises. Some people would prefer not to hear anything. The LED strips were appreciated more on the second evening (as a path) than on the first evening (as a straight line). The prototype had various 'landing zones'. For some, it started with the first loudspeaker in the series while others saw the LED lighting from a distance. The installation was too compact to start activating visitors at the switch points further away (where pedestrian flows diverge or converge).

Sound

Music, bird sounds and the sounds of a soccer match were used to explore how to enhance the sense of place, how to give the space a more personal character and how to make the route more pleasant.

People responded by looking up from their phone screens, walking towards the trees, stopping and listening, or simply looking around while still carrying on walking. When they briefly take a look, they do so in a different way to people looking at the compass. That is because the experience lasts longer. People are also better able to understand what it is. As a result, they tend to walk on more with the music. That music serves as background sound, whereas people look around, searching, when they hear the bird sounds and soccer commentary. There is

	30 JAN (LED LIGHTS IN STRAIGHT LINE)	5 FEB (LED LIGHTS AS PATH)
SOUND	16x	10x
LIGHTING	5x	11x
SOUND + LIGHTING	10x	6x
NEITHER	3x	3x

People responded by looking up from their phone screens, walking towards the trees, stopping and listening, or simply looking around while still carrying on walking.

a genuine response to the soccer commentary, with people walking up to the speakers so that they can hear it better. Some people remarked that if music had been the only sound, they would not have noticed it without the LED lighting.

People were surprised mainly by the bird sounds and the soccer sounds. The surprise generated by the bird sounds is of a different kind to that generated by the soccer. After all, bird song is not what you expect on a dark winter's evening in a concrete environment like the boulevard. The soccer sounds surprise people because they wonder what match is playing and whether there is even a match

going on at that point. Soccer sounds are a reference to the boulevard's collective memory. People are less surprised by the mellow music as they are familiar with it from shopping centres and multi-storey car parks. 'I didn't think it was strange hearing that as you always hear it in shopping centres' (man in his twenties, office worker). Not everyone noticed the bird noises as they cannot be heard so well even from a distance of a couple of metres. 'I can hear them now [bird sounds], but I didn't notice them. My head is usually in the clouds' (man, hotel guest). Some people did not hear the music either due to the large scale of the space and the fact that many people stayed in their bubble. People who were talking to one another were also less likely to notice the music. 'Music doesn't make any difference. Because I was talking to my friend and I was focused on what she was saying. Other times, I listen to my own music' (two women in their twenties). People's response to the soccer commentary varied considerably and depended on whether they liked soccer or not. Some people found it fun and a nice surprise whereas others found it frenetic. You need to be a fan of soccer, or as one person said: 'I'm not sure everyone will want to hear this.' Some people said the volume was too high for the soccer sounds. If soccer sounds were being broadcast, people were quite quick to suggest playing calm music or bird sounds. That is more neutral.

The bird sounds were the most neutral. They were not so much more pleasant as more comical, sociable and amusing. Most people preferred quiet, mellow music at not too high a volume. 'Everyone has different taste in music so I think you need to keep it neutral' (woman in her forties, shop worker). 'It mustn't be heavy music. Not music with a fast beat.

Nice and neutral' (man in his twenties, office worker). Some people found the music by alt-J melancholic or depressing. Because the space was personalised through the use of sound and music, the answers were very varied even within groups of only two people. Musical preferences and whether or not people liked soccer had a big impact on their experience of this prototype's sound dimension. People's appreciation depends on their personal preferences (for music and soccer). While one person might prefer mellow music, another might like hip hop: 'It stays light for longer in the summer and there are more events, people hang around for longer, so you need a different kind of music. And music that fits in with the times — some nice hip hop' (woman in her forties, shop worker). Music and sound clips can be a way of confronting visitors with the atmosphere of other parochial groups.

The interviews show that people often mention a change in the atmosphere as a result of the intervention. The answers fall into two categories: fun/amusing/pleasant and surprising/confusing/disorientating. That shows that music and sound clips can make a route more pleasant but also that they can be disorientating and confrontational. Some examples of the first category: 'I like it. It's natural. Kind of that feeling that you're walking through a city. It put a huge smile on my face straight away as I walked here so yes, I do like the bird noises' (woman in her thirties, office worker). 'The music is relaxing, it would be nice every evening. Usually this walk is sad. It has changed my route' (woman in her thirties, office worker). 'It's really cold and windy here so some music will always be an improvement (man in his thirties, office worker). 'Music is calming. I'd like to hear it more often, in an area like this in the dark'

(woman in her twenties). 'The birds make me feel like it's spring' (man, shopper). 'Every day, I walk from the station to work and from work to the station, so it's fun to hear some nice music as I walk' (woman in her fifties, office worker). 'Music is nice. It makes the place pleasanter. Calm music' (two women in their forties, office workers).

Some examples of the second category: 'I have heard some birds, but actually I was really busy in my mind. This time of the day we don't hear these kinds of noises, so it's not normal' (man in his thirties, office worker). But it had little impact on him: 'I was concentrated on the issue in my job. It didn't take me out of my own thoughts.' A group of three tourists found the bird sounds more disorienting: 'It feels like nature, but the other side is like it's also a bit creepy, it gets towards a plastic world'. Another comment: 'The bird sounds are uncommon. You don't expect birds in that area here, that loud. It was a positive effect' (woman in her twenties waiting for her boyfriend after a job interview). 'I did notice those birds. I thought: that's weird, because it's dark and you don't normally hear them then. Plus it's a bird that you wouldn't find here. The bird sounds did draw me towards them. I was wondering where the sounds came from' (woman in her forties, going out for the evening). 'I liked the birds but I did think: huh, that doesn't fit with the season' (man in his forties, shopper). 'Is that soccer real? Is it live? We were wondering whether it was a soccer match or a cup match' (man and woman in their twenties, office workers). 'I wondered immediately whether the soccer recording was recent' (man in his thirties, office worker).



‘The lights do invite you to walk through there. It did affect how I walked.’

Lighting: LED strips

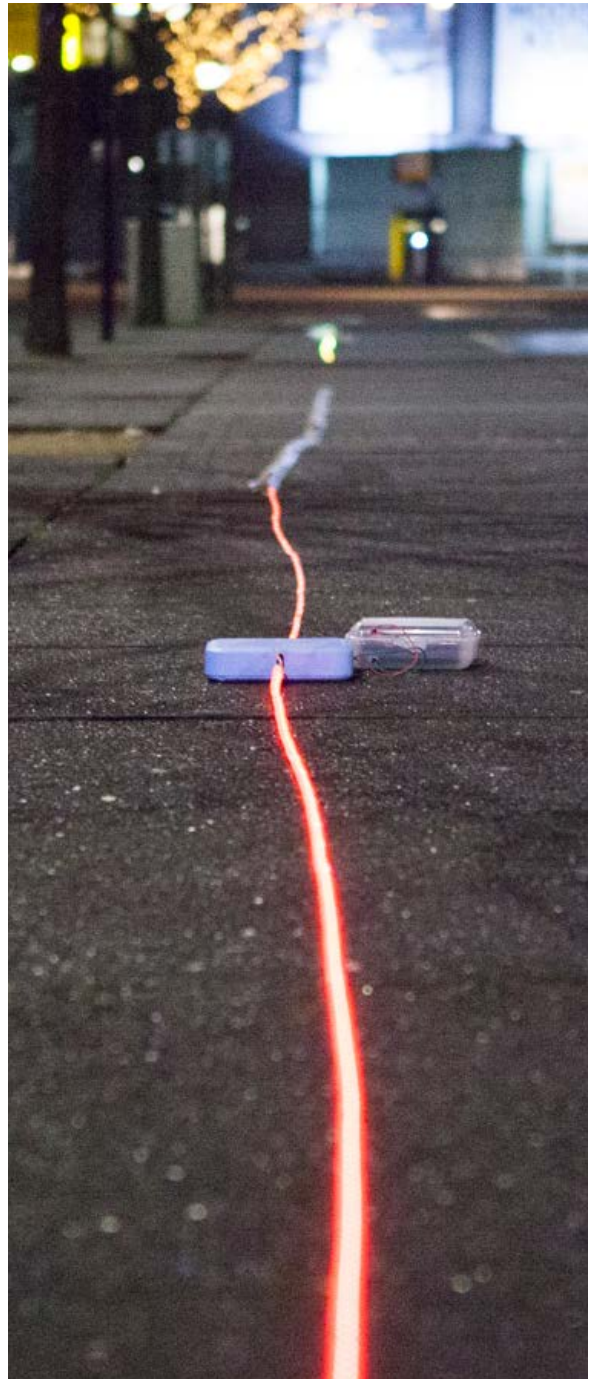
People responded more to the LED strips laid out in parallel strips (second test evening) than laid out lengthwise (first test evening). More people walked up to the parallel strips than to the straight line. Children also responded to the LED strips, which meant their parents followed them towards the strips. The effect of different colours on the experience was not investigated.

As a path, the LED strips mainly influenced the pedestrian routes of office workers and tourists. Visitors (office workers walking alone and tourists in small groups) adjust their routes slightly, pay attention to what they are seeing (not just the LED strips but also the boxes containing the batteries) and sometimes slow down or stop for a moment. ‘I walked a little bit slower than just walking by’ (woman in her twenties). ‘Normally I just walk by but now I’m paying attention to it. I noticed it and looked at it. It changed colours’ (woman

in her thirties, office worker). ‘The lights do invite you to walk through there. It did affect how I walked’ (man in his thirties, office worker). ‘You walk parallel to the lines. You’re guided more by the lines’ (man in his forties, office worker). ‘You want to come towards the light’ (three men in their forties, hotel guests). Tourists respond more to the LED lighting than to the sound whereas in general the office workers are slightly more likely to respond to the sound. The shoppers tended noticeably to carry on walking purposively without deviating from their route. ‘It didn’t change our route. We came from the car park and we chose the shortest route to MediaMarkt’ (mother and son, shoppers). Students and young people seemed less impressed with the installation and its setup. The reactions to the lighting were less emphatic than the reactions to the sound. People found the lighting striking rather than confusing: ‘I always like it when there’s light in the street from below. It also kind of shows you a route but it doesn’t make me walk any differently’ (man in his forties, shopper). ‘The lighting is nice, it makes it pleasanter’ (mother and daughter, shoppers). ‘I noticed the LED lighting before I noticed the music. You walk towards the light. It’s new so you think what’s that, and you go and look’ (two men in their forties, office workers).

The responsiveness and effectiveness are mainly determined by the combination of light and sound. ‘If it was just the lighting, I’d simply walk on but because of the sound I stopped for a moment too’ (woman in her thirties, office worker). People wondered whether the music and the lighting had something to do with one another. Was there an interaction between the lighting and the sound? ‘We were not sure about the relation between the lights and music. Lights could add something if it’s in line with the music’

(man and woman in their thirties, office workers). One person assumed that the lighting was responsive. 'I like the interaction between the music and the lights and that little path. It's nice that it changes. That makes it cheerful. The lights are fun; it gives you a "wow" feeling when you walk along them' (woman in her thirties, office worker).

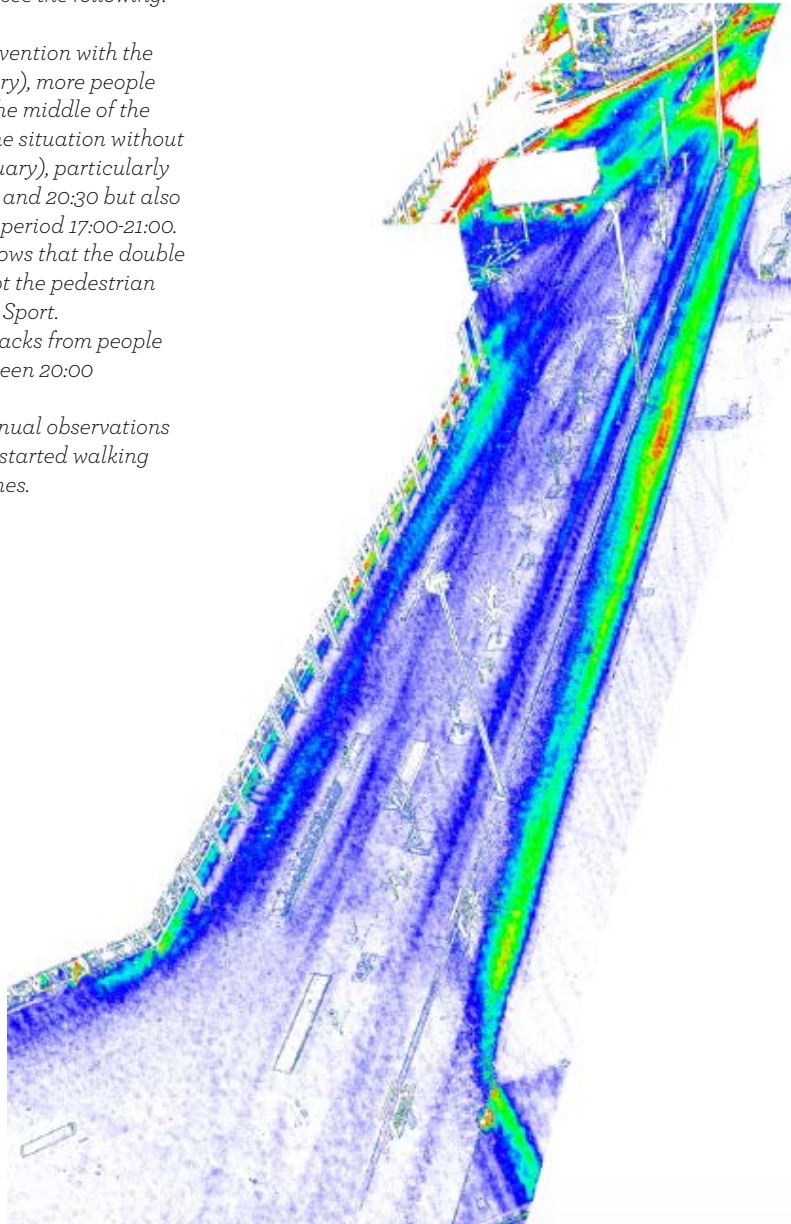


Ex post measurement of the landing strip

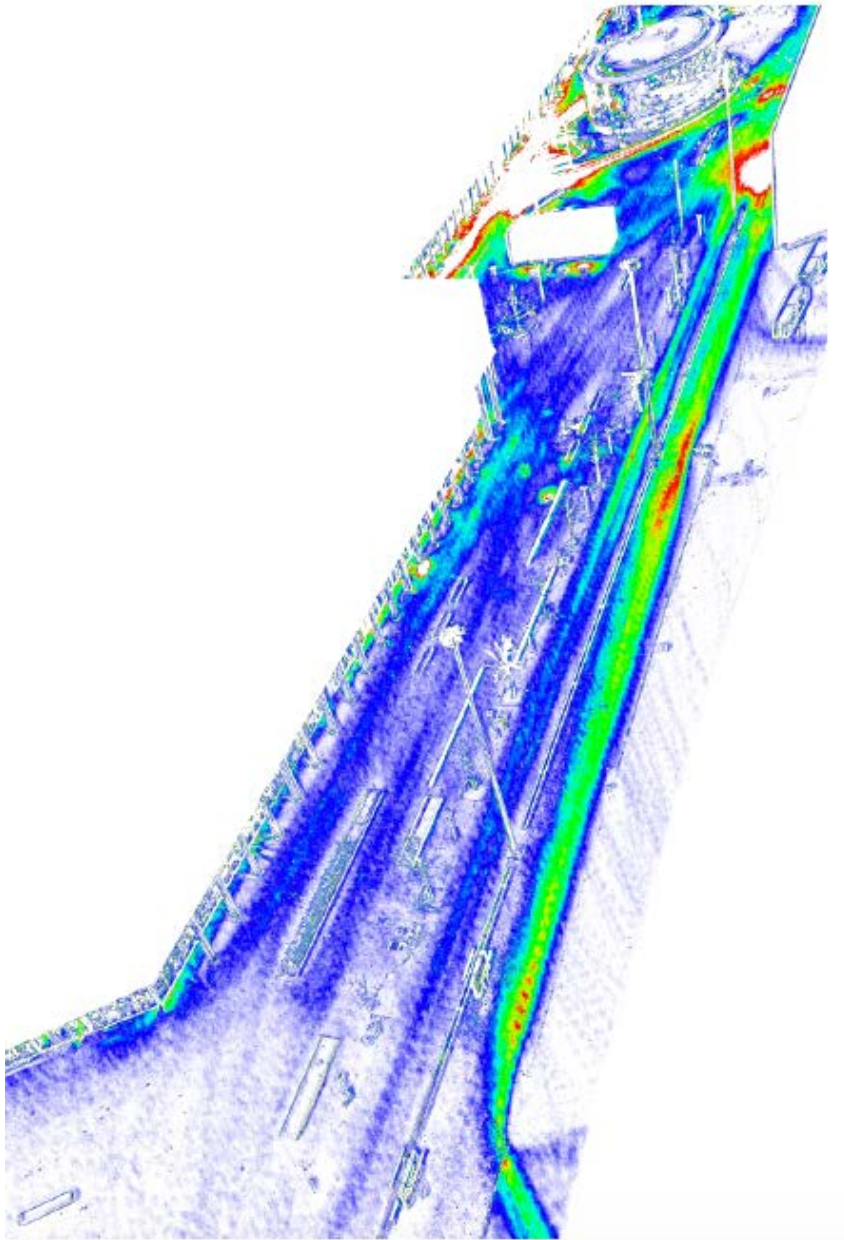
6-2-2018, 17:00-21:00 (*ex ante*)

If we compare the heat maps from the *ex ante* and *ex post* measurements of the periods 20:00-20:30 and 17:00-21:00, we can see the following:

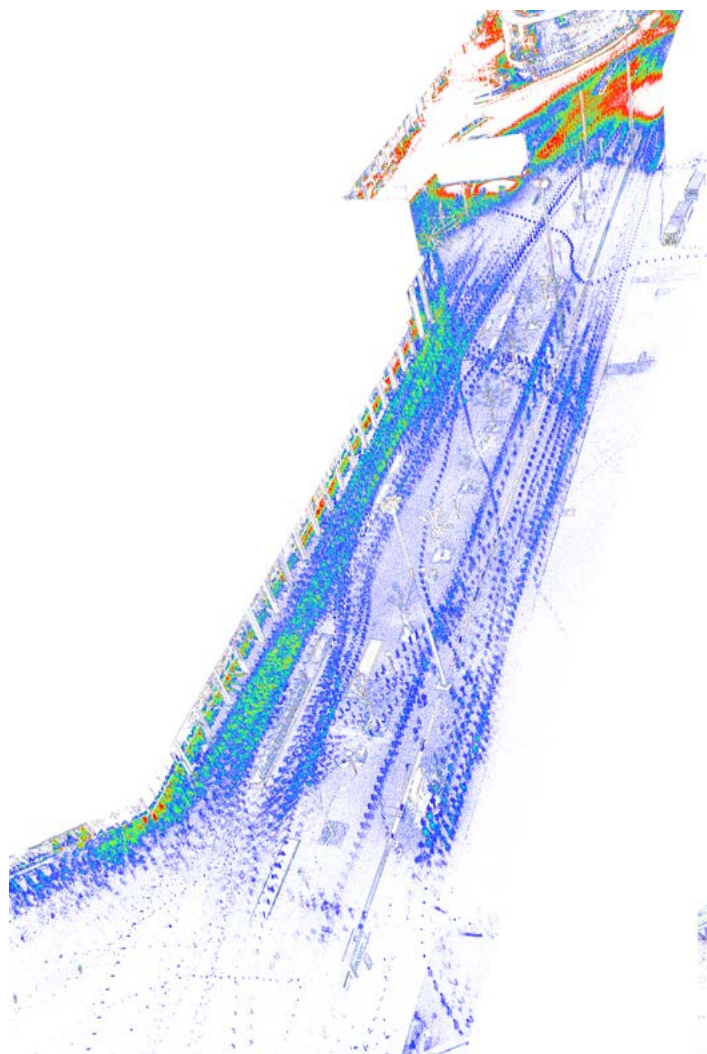
1. In the heat map of the intervention with the double LED strips (5 February), more people can be seen walking down the middle of the boulevard compared with the situation without LED strips or sound (6 February), particularly in the period between 20:00 and 20:30 but also more generally in the entire period 17:00-21:00.
2. The map for 20:00-20:30 shows that the double LED strips somewhat disrupt the pedestrian flow switch point near Perry Sport.
3. There are fewer diagonal tracks from people crossing the boulevard between 20:00 and 20:30.
4. The maps based on the manual observations also show that more people started walking between the parallel LED lines.



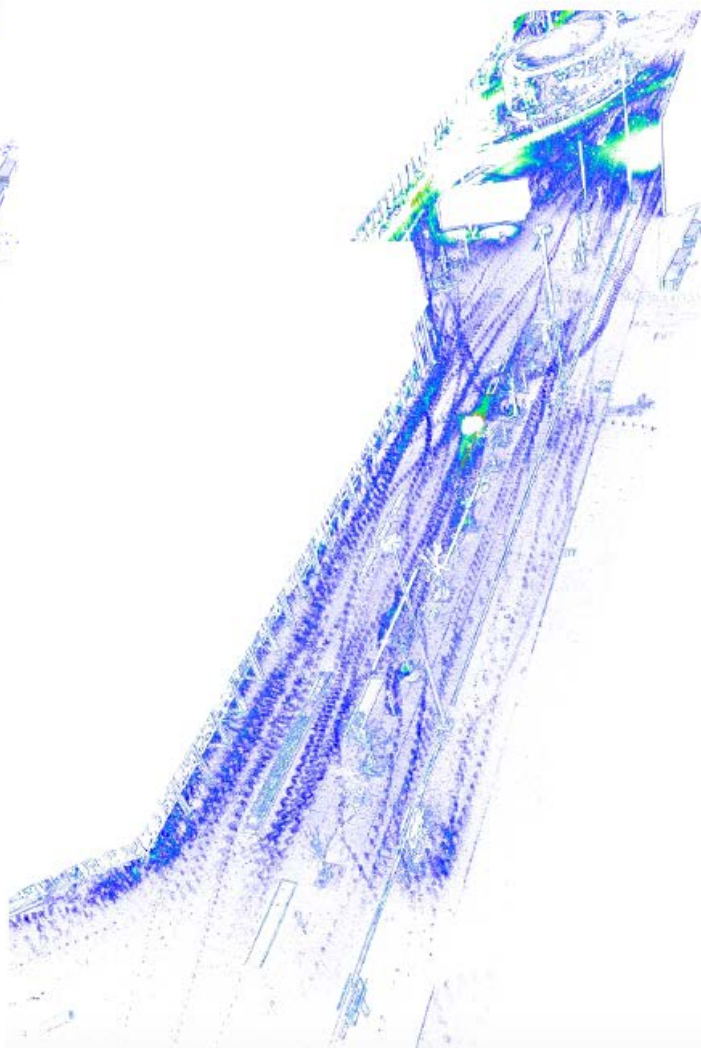
5-2-2018, 17:00-21:00 (*ex post*)

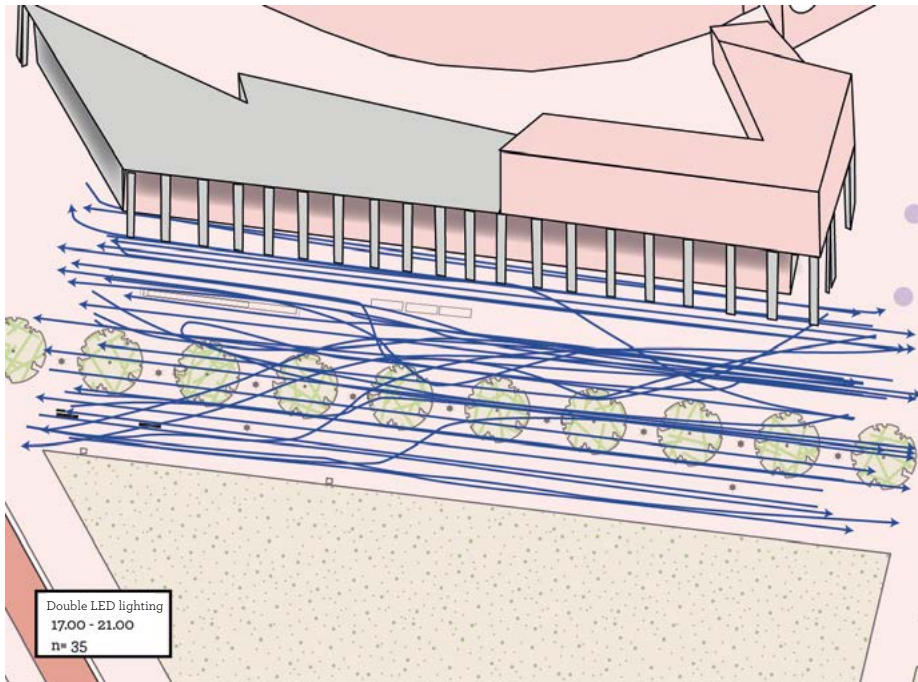
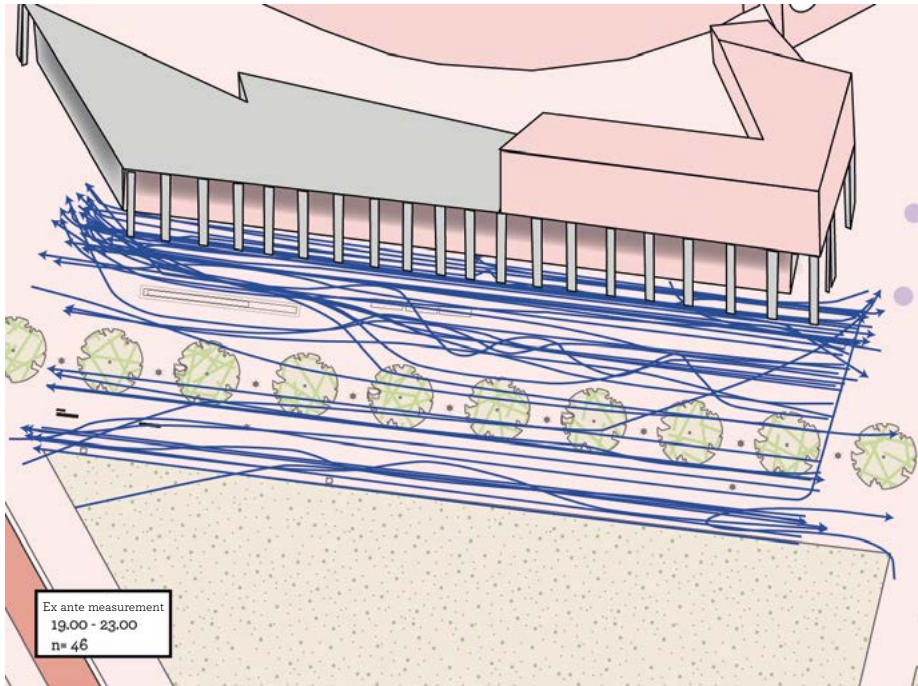


5-2-2018, 20:00-20:30 (*ex post*)



6-2-2018, 20:00-20:30 (*ex ante*)





The responsive intervention added something to this public space that people experience as cold and lacking in atmosphere.

Mechanisms and groups

This prototype is focused on three mechanisms: sense of place, personalisation and routing. A striking number of the comments made by the interviewed passers-by concern the atmosphere. The intervention added something to a public space that people experience as cold and lacking in atmosphere. 'I like atmosphere and this is atmosphere, pure atmosphere. With the bird sounds and the LED strips. Atmosphere makes it lively' (woman in her forties, shop worker). The installation generates both pleasant sensations and surprise and confusion. The sound element is more effective in this regard than the LED strips. Sound seems to have more impact in terms of drawing people out of their bubble. People hear the sounds and look up; sometimes they laugh and point. The bird sounds and soccer sounds in particular do not match the urban background noise we expect

as a matter of course and no longer notice. Accordingly, sound seems to be a trigger capable of drawing people out of their bubble. They then notice the LED lights on the ground and look at them. A few visitors adjust their route slightly and pay attention to what they see and/or hear, although most people do not change their pace. One or two people certainly started walking in a more discursive manner and some slowed down. Particularly in combination with music, it could affect the route people walked, including for office workers as they walked back to the station (on their own) in the evening. The interviewed women who were walking on their own were particularly positive about the change in the atmosphere.

Office workers who walked along the south side hardly adjusted their route at all. Yet there were also office workers walking alone to the station who let themselves be influenced by the installation. Groups of tourists responded more to the prototype than groups of office workers, who purposively kept walking along the same path. In general, tourists roam more when walking along ArenA Boulevard. Shoppers showed less of a response than the office workers. In the evenings, shoppers coming to ArenA Boulevard are purposive. People who work there every day are sometimes curious, especially during the break and after work. It breaks up the routine. The intervention shows that light and sound in combination affect people's experience. The intervention has most impact on the routines of the daily users. In that respect, it achieved the goal of making this part of ArenA Boulevard more pleasant and the route less tedious. The responsiveness could be improved by having interaction between the lighting and the sound and by having LED lights that 'accompany' the visitors as they walk.



12.3 What we learned from the prototype designs.

Mechanisms

- Various mechanisms can cause a ripple in the public domain and draw people out of their bubble: a sense of place, routing (slowing people down), playful interaction (causing surprise and curiosity) and personalisation (feeling at home). With regard to both prototypes, the comments by the people who were interviewed were often about the atmosphere.
- An installation can embody various mechanisms, depending on the design. The effect is greatest mainly with a combination of mechanisms. The operation of the mechanisms is also affected by the positioning in the public space, the time of day, the weather, how busy the place is and the kind of visitors.
- A mechanism can generate a wide range of responses from visitors. The responses can be divided into two categories: it is pleasanter (fun/amusing/lively), and it is a surprise and disorienting.

Elements

- The elements that made up the prototypes (lighting, paint, sound, LED screens) triggered the visitors in different ways. In our test setup, people responded most to lighting and sound in the evening. The reactions to the different kinds of sound (birds or music) varied a great deal. The LED screens did not

have enough of an impact: the letter size used for the questions was too small and there were too few people during the quiet period used for the test.

- The elements cannot be disassociated from the spatial context. The placement of the installation in the space and with respect to the pedestrian flows and access points is a crucial factor in how the installation is experienced. The compass was slightly too far from the access point where people get their bearings.
- It is advisable to measure the effect of an installation at different times of day, both during the daytime and in the evening, when it is quiet and when it is busy, as the effect of a mechanism can vary considerably. After an initial measurement, the prototype can be improved by adjusting the mechanisms (changing the 'settings') and the installation's design and setup, depending on the spatial and social assignment for the specific public space. Then the prototype can be tested again to see whether a different, more desirable effect is achieved.

Times of day and duration

- The installations with lighting (including the LED screens) work best in the evenings. They have little to no effect during the daytime.
- The tests were performed in the winter during quiet periods. Using lighting becomes more difficult from the spring. Different installations are needed then.
- The place's rhythm and the quiet periods. Responsive installations vary between quiet periods in their impact: evenings versus daytime, or very quiet periods versus slightly busier periods. Quiet periods are well suited to installations that enhance the individual experience of an atmosphere.

The transitional periods are also important – the lunch breaks and the times between busy and quiet periods. Rather than trying to enhance the public domain during quiet periods (meaning interaction between different social groups), it is better to focus on the margins of those quiet periods, the transitional periods between a busy place and a still place. Just as there are potentially meaningful transitional areas in the boulevard, so there are also meaningful public transitional periods that can be strengthened using a responsive public space.

- It is not clear whether an installation would still arouse curiosity and surprise on a second visit. That is probably not the case for frequent visitors such as office workers because it would no longer be new, and would simply become a standard fixture. You would have to create something that would still stand out on subsequent occasions.

Groups of visitors

- There is a relationship with whether people are hedonistic, pleasure-oriented travellers or utilitarian, purposive travellers, and consequently with the kind of visitors: hedonistic travellers (tourists and people going out) are more receptive to the interventions, but utilitarian travellers (office workers and shoppers) are not a static group. For example, office workers have a different attitude during their lunch break and are in less of a hurry than during the morning and evening rush hours. Visitors in a particular category can also differ in their behaviour and motives, for example depending on whether this is their daily routine or their first visit, or whether they are alone or in a group. What is more, there are differences within target groups in demographic

characteristics (such as age and sex) while individuals differ in their values and degree of receptiveness.

- The second prototype (LED strips and sound) and the compass in the first prototype can also be experienced individually by people walking on their own (because of the atmosphere) whereas the LED screen mainly triggered groups of people (playful interaction).
- Children form an important target group for the lighting interventions (gobo projectors, LED strips and footprints). They respond much more quickly to the lighting than adults.

Experiencing the public domain

- The prototypes did not (as yet) create a public domain in the strict sense, namely a site of shared experiences, an atmosphere in which you meet the proverbial Other and a place that invites you to linger, where interactions take place between different groups (watching and being watched). Of all the interactions, the LED screens have the greatest chance of generating a public experience in the somewhat busier moments.
- The prototypes did lead to a more discursive style of walking, standing and looking, from alert and surprised to disoriented. Some people slowed down. A minor intervention can be a surprise and become the germ of a public domain experience.
- People's individual experience of the prototypes can be described using concepts such as atmosphere and a sense of place. In a few cases, this leads to a more active experience, with people slowing down, standing still, looking around searching or actually engaging in a conversation or a game.

12.4 Conclusions.

This research-through-design experiment has enhanced our understanding of responsive public spaces. More specifically, the design process offers opportunities for creating a public domain. In this conclusion, we look first at the insights and then at the opportunities.

Prototypes, responsive installations and the spatial design

What insights do the prototypes provide for the application of interactive installations as a new set of tools for spatial design? A number of lessons and observations can be given in this regard.

The theatrical element offers the possibility of enhancing a space from within. It shifts the attention from the margins of the space to a common central point. The study shows that this requires more than one solution. Thus the installation must as a minimum allow for differences in light and darkness, busy and calm periods and the degree to which users are receptive. Furthermore, the installation must also have the potential to be three-dimensional in a flat space. It is not enough to just be visible. The installation must aim to capture people's attention from a range of distances, under a range of conditions and for a range of users, today, tomorrow and in a number of months' time.

The tests with the LED strips, in particular with the path that they were used to create, point to the possibility of interactive installations as design and layout elements. They can be used to temporarily mark off or differentiate spaces. In practical terms, it becomes possible to mark and 'load' routes at different times of the day. That means they also have the potential to be a design element that connects different subareas.

The sound in the trees came from above, as did the lighting for the compass. As in the reference images in Chapter 10, thinking about responsive spaces thereby brings in the 'upper side' of the public space as a design task. Having an interactive application means that the applications can vary depending on the time and moment, making them more active elements than street lighting, for instance.

Furthermore, the different effects produced by the prototypes point to the need to align interactive installations very precisely. Consequently, a spatial responsive design requires much more precise handling of the factor time by the spatial designer. Partial implementations relate not just to a specific place but also to specific times. Following on from this, the design also has to address the question of duration and evolution over time. Should the design remain the same or should it be capable of adapting and being refreshed?

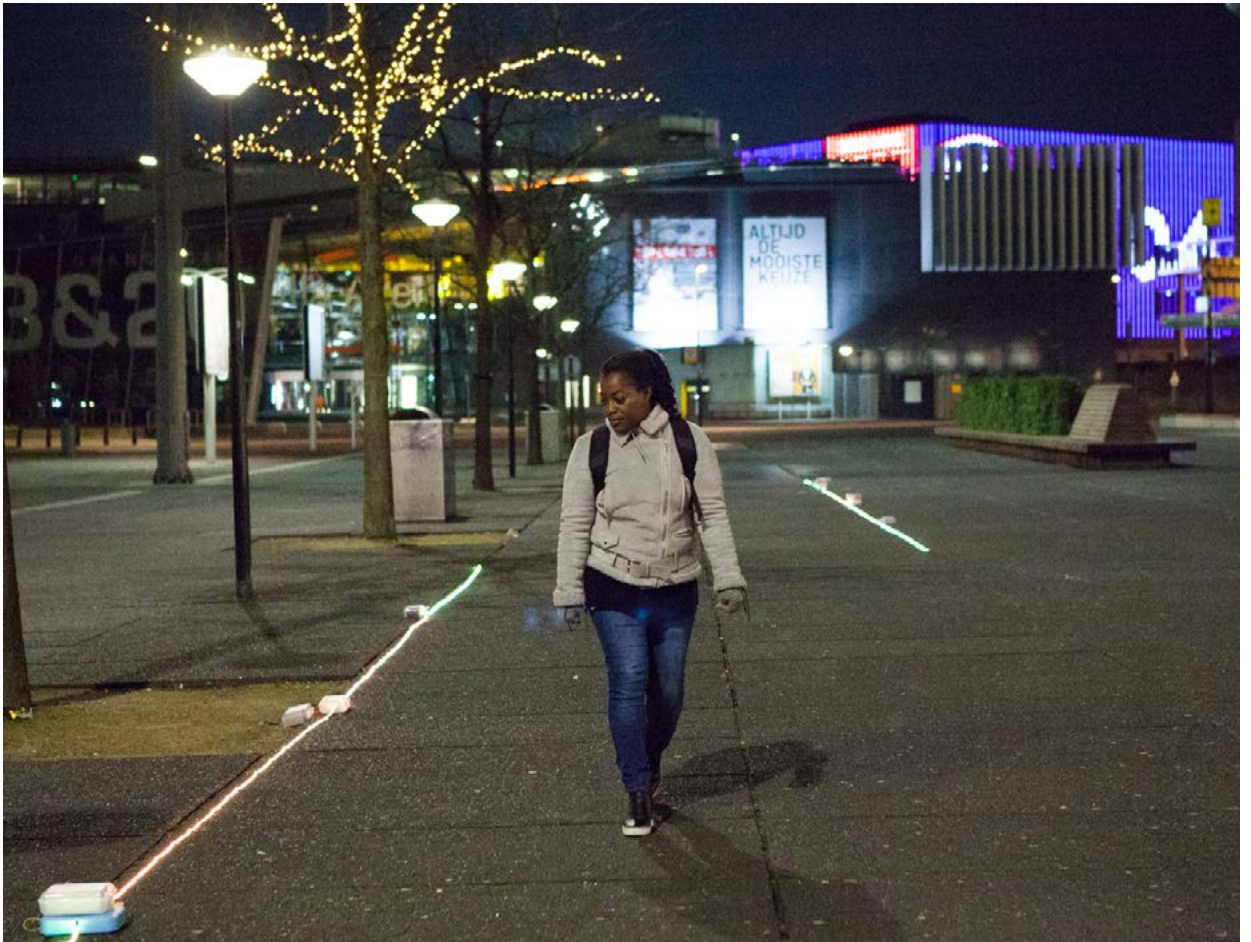
It is increasingly common for prototypes for possible applications to be tested in the public space. For example, new cycle paths are tried out simply by indicating the route with paint. The prototypes for this study went further but at the same time they were relatively simple in comparison with the prototypes used in the field of interaction design. In our study, we learned several lessons from the development and application of prototypes in public space and the spatial design.

- It gave an understanding of the entire trajectory of the interdisciplinary process from idea to placement and all the activities and issues that arise in the intervening steps.
- The construction process of the placement is potentially just as valuable as the installation itself for making contact with the users of the space. People notice the installation being constructed, come to have a look out of curiosity and start a chat. This makes the construction process a conversation piece, leading to participation in the planning process.
- Once the installation is there, it becomes clear how it works but perhaps even clearer what could be improved or done differently. That is more than simply a technical adjustment. The adage of the Design Thinking method applies: now that professionals and users can see what this does, they are better able to express what they actually want.
- Testing the prototype necessitates measurements on site and precise observations of the space's users. That provides a lens that gives an even better picture of the place's characteristics. There can be big differences in how it appears in the light and in the dark, in the sun, rain, mist, wind, in daytime, in the morning and in the afternoon. Working with prototypes is also a way of looking at the place afresh as professionals, stakeholders and users, free from the (unconscious) images and opinions that generally colour our observations.
- Finally, testing prototypes is also about the representational value of a potential interactive installation. The compass represented a central point that attracts attention. However, when constructed from paint it became a flat object (despite the fluorescent paint). Perhaps the final version will be constructed from LED lights, making it both more multi-layered and more visible. Something similar applies to the LED strips.

The interventions can lead to brief disruptions in people's routine way of walking and lingering because they look at things differently for a moment, and because they are momentarily distracted and drawn out of their bubble.

We were able to adjust the colours remotely but the technology was not sophisticated enough to enable interaction with the movement of the users. Prototypes are not the equivalent of the final product; they are an interim product aimed at arriving at a multi-faceted solution in the design process that is evidence-based and has proven its worth.









Responsive installations and the public domain

People's perception of the prototypes can be seen as a lower limit or as the seed of a public domain experience. It was no more than an individual experience or an experience within a group of friends, colleagues or family members. So far, the prototypes did not lead to a temporary overlap in the worlds of different groups of visitors. Different people did not become more aware of one another and did not start looking at one another. If someone is surprised by a sound clip or a LED strip, that is an individual experience. We could term it a slight reinforcement of the public domain where there is playful interaction and an 'inside-outside' experience (the LED screens), an improved sense of place and with the atmosphere of different publics or parochial domains (soccer, music): in such cases, the public experience is indirect, via a certain atmosphere, and the responsive installation functions as an intermediary.

The interventions can lead to brief disruptions in people's routine way of walking and lingering because they look at things differently for a moment, and because they are momentarily distracted and drawn out of their bubble. This can be seen as the lightest form of a public domain experience that is somewhere between a passive experience to a slightly more active involvement. People progress through the public experience, as it were, from the slightest ripple to a larger effect. Elements of discursive walking can be added to purposive walking because of the brief disruption to people's routine and focused approach. Discursive walking and lingering can take various forms, from observing without slowing your pace, to disorientation and slowing down, adjusting your route and stopping.

A receptive attitude to responsive installations is not just something for tourists and children. People going out for the evening, expectant and waiting around, can also have an open stance. A receptive stance is associated with certain times of the day as well, such as the lunch break when office workers are more open. Openness can also be linked to certain parts of a space, such as the arrival points where people get their bearings as they emerge from a station or a multi-storey car park, which force people to be more spatially receptive.

There are two options for enhancing the public domain when conceiving and designing responsive installations. The first option sees the city as theatre. That means it is about making installations that invite active use and mainly target those groups of users who are most receptive to unexpected impressions and interactions. The second option is to have more subdued 'ambient' installations that focus on enhancing the individual experience of the public space — among diverse groups of visitors — so that people are momentarily drawn out of their bubble. That can result in actual interactions between different groups but that does not necessarily have to be the result.

The design can be used to enhance the public domain character, through variations in the elements, the degree of responsiveness and the mechanisms that are used to construct an interactive installation and through which users are urged to be more active or are confronted with the atmospheres of different publics or parochial domains. This can also be achieved by intervening at certain times of the day, on certain days of the week or in different seasons rather than the cold winter months. The big differences between the quiet periods demand separate solutions.

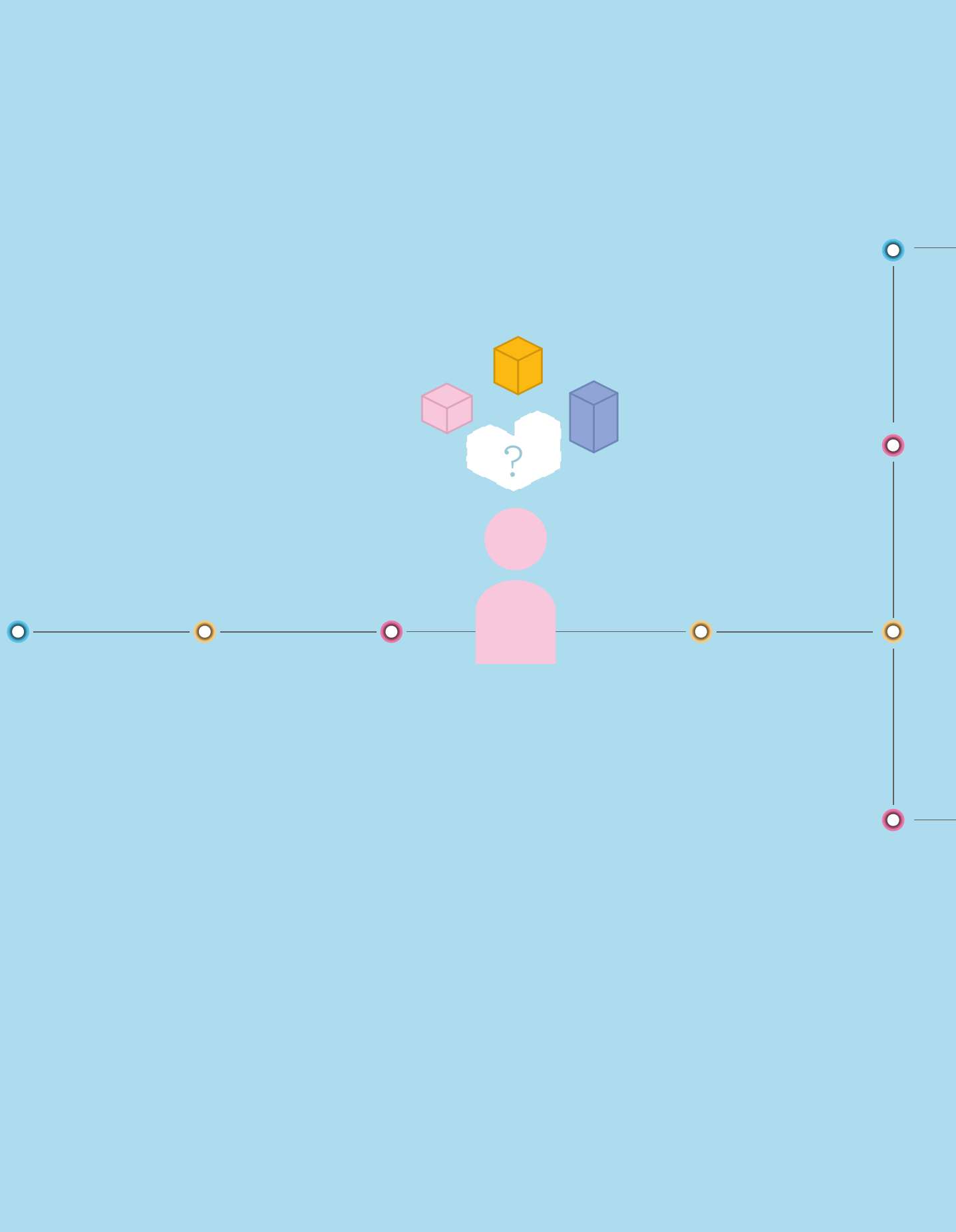
The time factor plays a role in another respect too. A choice can be made between a permanent setup and a setup that changes regularly.

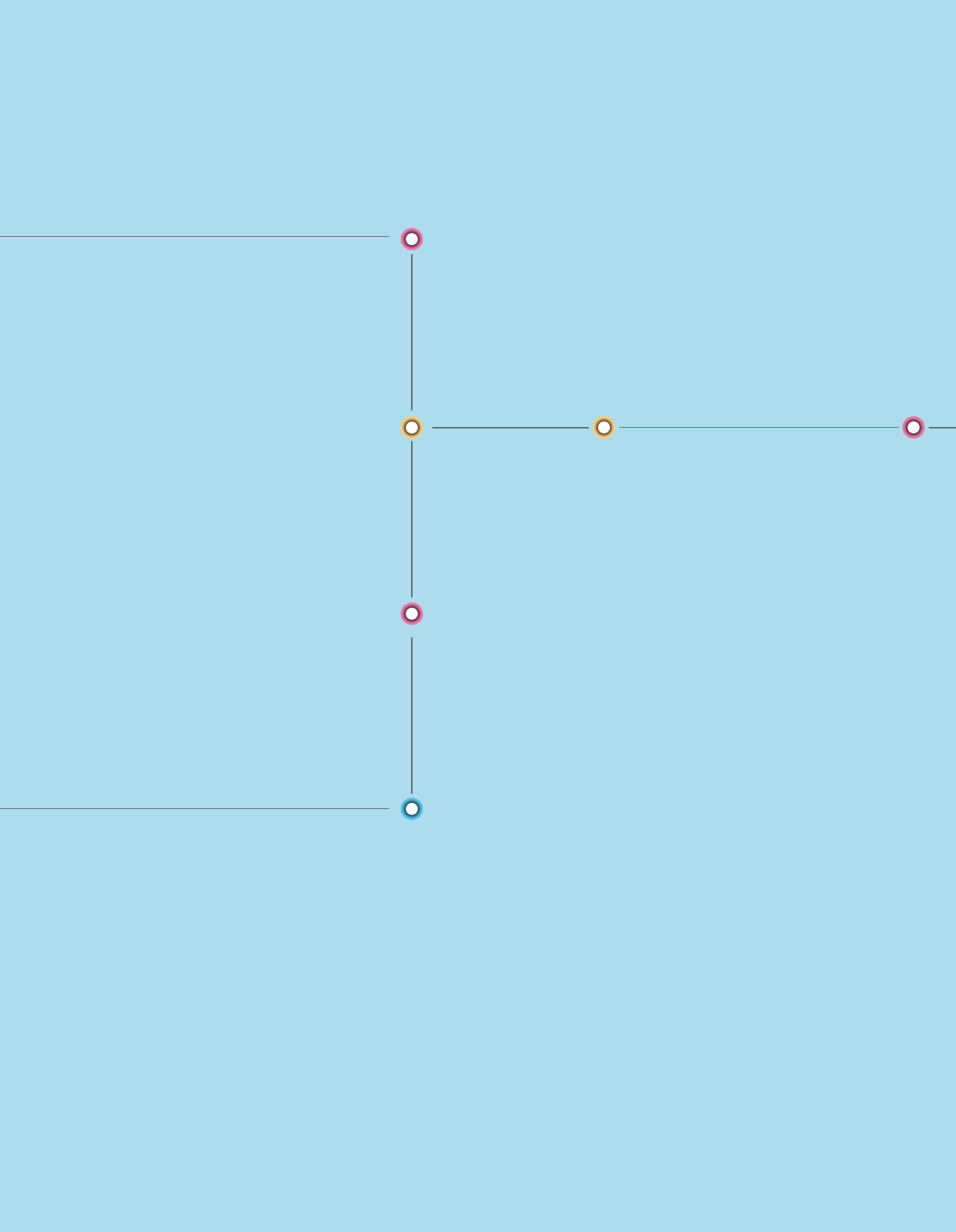
Finally, what do you want to do with the installation: make the public space comfortable or disrupt the behaviour there? And do you opt to strengthen the space's existing character and identity or do you go for alienation and illusion as a strategy? These are choices that the commissioning party, the spatial designer and the interaction designer have to make for each assignment.



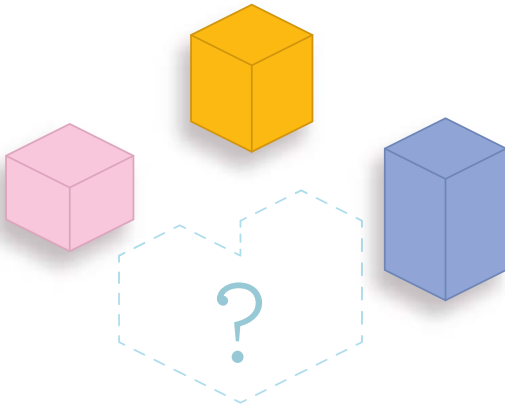
Road
map.







Road map.



Roadmap for the design assignment for responsive public spaces. We have collated the lessons from our action research to produce a roadmap for practical application.

The roadmap is subdivided below into four steps:

1. Considerations for a responsive design solution
2. Approach and setting up the process
3. The design process: from assignment to final design
4. Management and further development: it's there and now what?

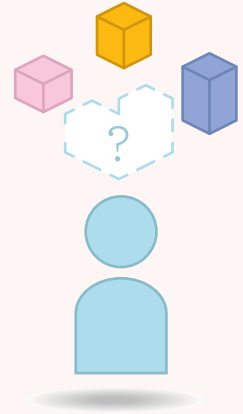
The knowledge is presented in the form of a Q&A setup, dealing with the key questions per step. In this way, the roadmap offers the commissioning parties for public spaces, stakeholders in public places, spatial designers and interaction designers a common lexicon for assignments and expectations.

1



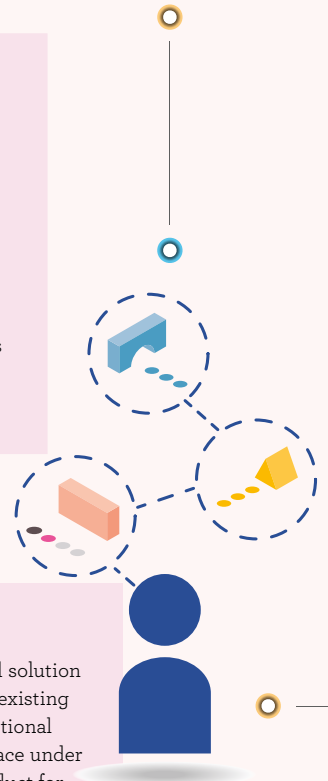
CONSIDERATIONS FOR A RESPONSIVE DESIGN SOLUTION

We assume there is a shared sense of urgency about the need to rejuvenate and enhance a certain public space. Perhaps the space does not function properly, does not really invite people to linger or has little atmosphere, is seen as unsafe or does not sufficiently bolster social cohesion among the parties and users concerned. What considerations play a role in the choice of a responsive design solution? The questions below offer a few pointers.



How can a responsive space enhance the public domain qualities?

The use of responsive design solutions can help reinforce the public domain qualities of public spaces. Interactive installations with their unusual features can make a space special, as landmarks that make places more recognisable and appealing. At the same time, the content of the responsive installations can add layers of meaning to a place, or give expression to shared meanings and forms of use. Responsive installations can also prompt interaction between visitors to a spot or introduce certain themes into the public space as a conversation piece or a conversation starter. They can help visitors to get their bearings in a place and help them to personalise the experience of a place. Finally, some installations can influence certain forms of behaviour or bolster supervision of the use of public spaces. In this regard, we speak of five mechanisms that can help activate public spaces in these ways: a sense of place, playful interaction, routing & legibility, personalisation, and control.



Is a responsive design also a spatial solution?

A responsive design solution in the sense used in this study is a spatial solution in which interactive installations are added as a new set of tools to the existing set of design solutions. The responsive design goes further where traditional spatial design stops. It is a partial implementation that changes the space under specific circumstances and for specific users. The standard design product for public spaces is a design that is able to accommodate different target groups in any (unforeseen) situation. Such a design for a public space can appear 'simple' but needs to be adaptive in its neutrality and easy to understand for all users. The design for a responsive public space offers the opportunity for a much more specific interpretation. As a result, public space becomes not just a facilitator but also an activator.

What public spaces are suitable for this?

Many examples of responsive installations have been created to date in city centres, station areas and nightlife districts. Such installations are suitable for giving character, meaning and structure to spaces that are seen as lacking in identity or confusing (known as non-places). On the other hand, they can serve as a unifying element in places that are visited by many different groups at the same time, or alternatively in places that take on a different character at different times because diverse users have different rhythms.

Responsive installations that invite active use are better suited to locations where visitors are receptive to unexpected encounters and impressions, such as nightlife districts, shopping centres and boulevards or city parks. Places you pass through such as stations, however, seem to be better suited to responsive installations that are somewhat more subdued in character.

How do users experience responsive spaces?

There are various kinds of responsive space. The more understated, ambient examples might use light projections to express the rhythm of a place or depict local meanings that can be observed without visitors immediately being called upon to actively participate in an installation. Such kinds of responsive space can be experienced on an individual basis. They mainly add to the atmosphere of a place and give it meaning and recognisable markers. More expressive forms of responsive installation invite visitors to contribute, to interact with the installation and with other visitors, or to observe them from a distance as spectators. These installations invite specific 'dramaturgies' and have a marked effect on the character of all or part of the public space.

What should the commissioning party take into account in the tender request?

When making a public space responsive, the determining factor should be that public space with its specific spatial and social issues rather than the interactive installation. The various mechanisms embodied in responsive spaces can be deployed to tackle these issues. It is important that the commissioning party safeguards the public domain qualities and embeds this in the tender request. Then third parties can be asked to come up with proposals in the tender specifically for a responsive installation that enhances those qualities. If the tenders are for new public spaces still to be designed, responsive installations can be included as an option for anchoring the desired public domain qualities. In both cases, the tender request needs to address two aspects. Firstly, there is the question of how the specific interaction design for the responsive installation helps activate the public space. Secondly, there needs to be a vision on how the installation is embedded in the broader spatial design, and the scenography of the place.

what should the commissioning party take into account

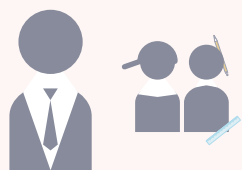


2 APPROACH AND SETTING UP THE PROCESS

Once the choice has been made to embark on a responsive spatial design process, various basic questions arise about the approach.

Who needs to be involved in the process?

The design of a responsive public space usually involves multiple parties: spatial designers, interaction designers, local stakeholders and the municipality. Local stakeholders know most about the location, spatial designers can help read and analyse the space and interaction designers can propose installation mechanisms and examples and help people to imagine them. The municipality can adopt various roles, but regardless of its roles it is responsible for the public space. A crucial challenge for the design process for responsive spaces concerns how to design a co-creation process. The design assignment requires its own new playing field in which the parties recognise and acknowledge one another's skills and added value, both for themselves and for others. To arrive at productive collaboration, a culture of collaboration is needed with mutual knowledge of one another's approach, working methods and products.



design process, from brief to final design

What does the design process look like?

Like any spatial design assignment, responsive technology should be designed, turned into a solution and embedded to suit a specific situation. Especially when redesigning existing locations, analysis in the form of 'research for design' is a key step in the design process. The analysis phase involves elaborating on the diagnosis for the specific location, and provides insight into starting points that can be developed further and into the mechanisms of the installations. In the analysis phase, the schedule of requirements is drawn up, refined and finalised. The process of 'tackling the analysis' also helps the different parties to really get to know one another and each other's skills. This means the analysis phase is also an important element in

building a culture of trust and cooperation. The design phase is then an iterative process in which you gradually progress from a concept to a detailed design. Prototyping is an important part of this process. In view of the many new elements in responsive spatial designs, it is essential to try out and test the ideas at an early stage with the intended users at the actual location. This provides many insights into technical, temporal and climate-related aspects in addition to the intended effects, as well as ideas about how the intervention might evolve.

How long does this process take?

As in any other design process, the duration and costs of the design process are largely determined by the goals, design requirements, tendering process and other relevant factors for the situation-specific assignment. And as in any other design process, sound professional commissioning practice plays an important role here.





THE DESIGN PROCESS: FROM ASSIGNMENT TO FINAL DESIGN

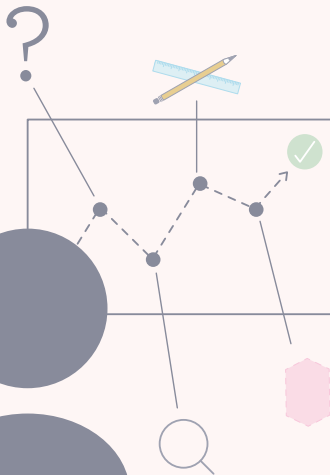
The design process has a research phase and a design part.

What does the research part look like in practice?

An extensive analysis was carried out of ArenA Boulevard. In most instances, the analyses will probably be less extensive because of time and money restrictions. It is important to conduct both a spatial analysis and a social analysis of the space. It is better for each analysis to be less detailed than to skip one of these analyses. It is precisely the combination of spatial and social analyses that gives a clear picture of the assignment for a specific public space. The analyses results provide insight into the diagnosis and building blocks for the design, and help generate a culture of collaboration between the various parties and professionals. What matters is not so much who does the research as what frame is used for the research. It is important that the research should not just result in a collection of facts; a form of design-related research is needed to get a feel for the place, utilisation, behaviours and possibilities. The acquisition of knowledge is for the purpose of the design assignment.

Why is a research phase important?

The existing situation has to be properly understood as it forms the basis for the design. It is important to conduct both a spatial analysis and a social analysis of the space. These analyses are not a list of facts or maps but rather a cohesive interpretation of that information. What kind of space do the building facades create? How do the buildings relate to one another? What programmes are involved and who uses them as a destination? What happens on the ground floor and what form does the transition from indoors to outside take? How does the space function as a place, what visitors come there, how do they behave and what meaning do they assign to the space? Such issues are investigated in the analysis phase of the design process. Such analyses are not aimed at producing generic academic knowledge and theories about how public spaces in general function; they are intended to reveal the story about the physical and social context of a specific location.



What possible reference images are there for a responsive design?

More even than with conventional design assignments, reference images of interactive installations and responsive public spaces can help give inspiration and get a feel for the options and their underlying operating principles. Reference images are also a crucial part of the co-creation process as they provide a common lexicon that helps make solutions imaginable, visible and open to discussion. We have collected a series of reference images in our book that we also used in our research-through-design process.

What are the design principles for a responsive design?

How do you position an interactive, responsive installation in the space in such a way that it contributes to the desired objectives? Or to turn the question around: how will the public experience the installation once it is there? An 'expanded scenography'-based framework, including the spatial design dimension, distinguishes five design elements:

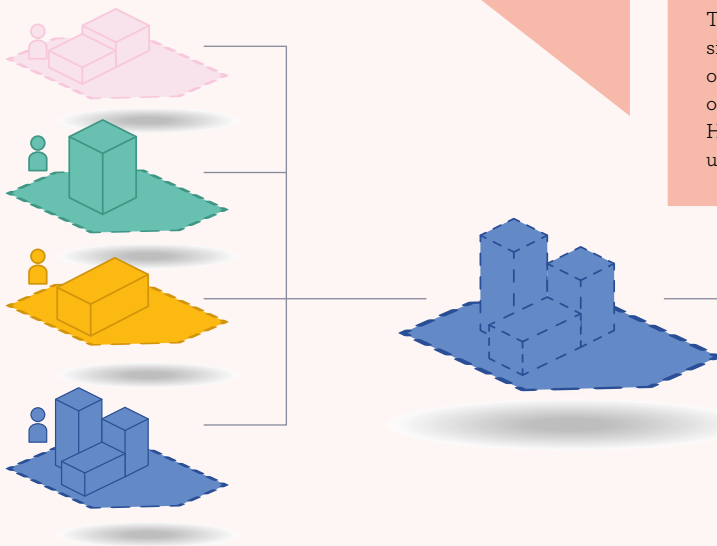
- **Spatial composition** concerns the spatial form and composition of the responsive design as a spatial intervention.
- **Affectivity** refers to the experience that an installation evokes among passers-by or users — how the installation speaks to them, and what sensory instruments (light, sound) play a role in this.
- **Materiality** involves the material embedding of the installation in the public space.
- **Relationality** refers to the way in which an installation facilitates encounters and makes new, brief relationships possible.
- **Time** concerns experiences with responsive installations over the course of time, unfolded over multiple layers.

Why is prototyping critical?

The design solution needs to function outdoors with the many factors and users that this involves. Prototyping on site creates a lens that brings out the characteristics of the space even more clearly. There can be big differences in how it appears in the light and in the dark, in the sun, rain, mist, wind, in daytime, in the morning and in the afternoon. Working with prototypes is therefore also a way of looking at the place afresh as professionals, stakeholders and users, free from the (unconscious) images and opinions that generally colour our observations. Furthermore, the construction process for the placement serves as a way of coming into contact with the end users. Prototyping clarifies how the installation works, but perhaps even more so what could be improved or done differently.

What kind of spatial object is it in public space?

The new repertoire for enhancing the public space emerges through the connection between 'place', 'space' and 'shape'. There is also the question of what the installation refers to. Is it simply a different form and material manifestation of utilitarian street furniture such as tiles, street lamps, roads and traffic lights? Or is it more akin in its function to fountains and statues, which are not so much utilitarian as intended to make the space distinctive and consequently give a place cohesiveness and an identity? In other words, is the interactive installation a new manifestation within an existing repertoire or is it an entirely new phenomenon that still needs to be pinned down and described in detail? The choices made here are related to the situation. However, account has to be taken of the form and meaning of the installation or intervention when it is not in operation. How does it then colour the space for its users at that time?



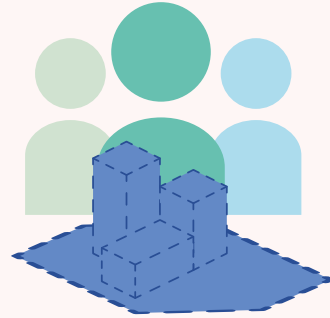


MANAGEMENT AND FURTHER DEVELOPMENT: IT'S THERE AND NOW WHAT?

The design assignment and objects require attention for the period after completion.

What is involved in the funding?

Unlike objects that are placed in controlled indoor environments such as museums, installations outdoors have to be robust. The outside air and potential for improper use mean an appropriate management and maintenance budget and regime are required. This needs to be taken into account when costing the project.



What should be taken into account when constructing the installation?

In the physical construction of interactive installations in a public space, the possible effects have to be considered of the weather, seasons, light, sound and vandalism. That requires consultation with the parties that have specific expertise and experience in this regard. The light intensity in the immediate vicinity also has to be taken into account. Another point for attention is how the object develops over time.



For how long will it stay interesting?

A responsive solution can be passive, reactive or proactive. Management is in part about the management of the physical materials: keeping the installation working by replacing parts or updating the software. On the other hand, attention needs to be paid to editorial management. With interactive solutions, checks may be required of the content. Other installations need a curator who can repeatedly commission new designers to refresh the installation's content.

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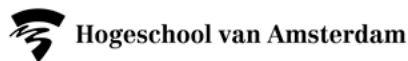
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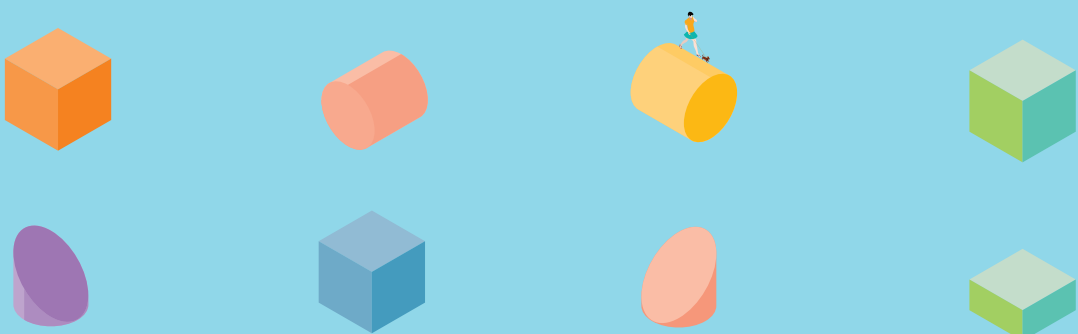
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Responsive Public Spaces.

Exploring the use of interactive technology in the design of public spaces.

Responsive public spaces use interactive technologies to adapt to users and situations. This enhances the quality of the space as a public realm. However, the application of responsive technologies in spatial design is still to be explored. What exactly are the options for incorporating responsive technologies in spatial designs to improve the quality of public spaces?

The book *Responsive Public Spaces* explores and disentangles this new assignment for designers, and presents inspiring examples. A consortium of spatial designers, interaction designers and local stakeholders, headed by the Chair of Spatial Urban Transformation of Amsterdam University of Applied Sciences, carried out a two-year practice-based study of responsive public spaces. This book draws on those insights to provide a practical approach and a roadmap for the new design process for responsive public spaces.

The study results are of significance for various professional fields. The book is intended for clients and stakeholders involved in planning and design of public spaces, spatial designers, interaction designers and students.

