

# GUIDELINES CATALOG

TO UNLOCK THE POTENTIALS OF  
**GREEN URBAN CEMETERIES**

REPORT

## TONGERSEWEG MEMORIAL PARK

Unlocking the potentials of green urban cemeteries

© Wageningen University

August 2021

Landscape Architecture Group

### Contact information:

Postbus 47

6700 AA Wageningen

The Netherlands

Phone: +31 317 484 056

Fax: +31 317 482 166

E-mail: office.lar@wur.nl

### Author:

© Dirco Kok

Phone: + 31 6 10808239

E-mail: dircokok@live.nl

Student nr.: 960413455040

### Supervisor:

dr. ir. Marlies Brinkhuijsen

### Second examiner:

dr. Homero Marconi Penteadó

### Examiner:

prof.dr. S (Sanda) Lenzholzer

All rights reserved. Nothing from this publication is allowed to be used without permission of the author or the Wageningen UR Landscape Architecture Chairgroup. This publication is written as a final master thesis report for the chairgroup of landscape architecture at Wageningen University.

## ABSTRACT

This thesis arises from the notion that there are yet to be unlocked potentials for urban cemeteries. Today, many urban cemeteries are monofunctional, secretive, and closed-off spaces. Initially established in the city's periphery, their regained position within the city forms one of the arguments to reconsider their relationship with the urban tissue.

With the concept of compact cities gaining in popularity, all green areas, including green cemeteries, might become more attractive as publicly accessible spaces. Combined with a general decline in burials, public use can mean the difference between succumbing to degradation or becoming a thriving part of the local community. Furthermore, urban cemeteries offer tremendous opportunities to improve their ecological performance, which is simply inevitable when planning and designing in the age of a climate and biodiversity crisis.

Therefore, this thesis looks for a better understanding of the current role of urban cemeteries and potential additional roles. It is profiled as a two-legged approach; grasping green urban cemeteries as a story on culture and nature, inherent to the landscape architectural discipline. It aims to redefine what a cemetery can become, thereby reinforcing its role in the urban green infrastructure.

Learning from three reference studies and transforming the findings into design guidelines formed the starting point for a research-based design for the Tongerseweg Cemetery, a monumental and actively used cemetery in Maastricht. A thorough analysis, theoretical research, and design guidelines formed the basis for the strategies and design interventions proposed for the cemetery. It offers an attractive perspective of the transformation into a biodiverse, climate-positive community space.

The work is published both in this academic report and as a catalog containing design approaches, strategies, and principles on various levels of abstractions. The catalog aims to serve as a reference work for the practice side of the landscape architectural discipline.

### Keywords:

Cemeteries, Green infrastructure, Urban green space, Memory sites, Urban ecology

# TABLE OF CONTENT

1. Introduction	6	8. Discussion & reflection	94
1.1. Problem context	6	9. Conclusion	96
1.2. Research framework	8	References	98
2. Methodological framework	12	Appendix 1: Guideline catalog	seperate in the back
2.1. Pragmatic knowledge claim	12	Appendix 2: Guidelines overview	seperate in the back
2.2. Research phases	12		
3. Exploration on public park functions for green urban cemeteries	16		
3.1. Why cemeteries as urban parks?	16		
3.2. Relationship between the living and cemetery over time	17		
3.3. A park of cultural significance and in need of change	17		
3.4. Contemporary discourse on urban parks	18		
3.5. Defining applicable park roles for the urban cemetery	19		
3.6. Conclusion	20		
Intermezzo: The 21st-century landscape of burial and memorialization	22		
4. Green urban cemeteries' role in the green infrastructure	24		
4.1. Why cemeteries & green infrastructure?	24		
4.2. Site scale	24		
4.3. Scaling up	29		
4.4. Conclusion	31		
5. Reference study: public joint usage of green urban cemeteries in practice	32		
5.1. Introduction	33		
5.2. Analytical framework	33		
5.3. Skogskyrkogården, Sweden	34		
5.4. Green Wood Cemetery, United States	36		
5.5. Melaten Cemetery, Germany	38		
5.6. Reference study overview	40		
5.7. Conclusion	41		
6. Case: the Tongerseweg cemetery of Maastricht	46		
6.1. Positioning the cemetery in Maastricht and the region	47		
6.2. Site analysis: Tongerseweg cemetery	55		
6.3. Design brief	68		
7. Synthesis: Maastricht memorial park	69		
7.1. Design aims	69		
7.2. Connection to guidelines	69		
7.3. Strategies	70		
7.4. Interventions	75		
7.5. Highlights	82		

# 1. INTRODUCTION

## 1.1. PROBLEM CONTEXT

My master thesis arises from the notion there are yet to be unlocked potentials for green urban cemeteries. World-wide, cities are in constant transformation in terms of demography, competing spatial claims and available public space. This also effects urban cemeteries, since the places for the dead are an integral part of any human settlement. World-wide, the concept of the compact city is gaining in popularity and urban areas experience densification, in The Netherlands stimulated amongst others by former state architect Frits van Dongen (Jim 2004; van Dongen 2015). This results in **intensification and competing claims** on the city's green open space system. In that context, the introduction of **new ways of using public green space** or **stacking functions** on top of existing ones becomes relevant. Haaland and van den Bosch (2015) then also argue for the importance of multifunctionality in green open spaces. This may have consequences on how urban cemeteries may shift from just being burial spaces to becoming performative in multiple ways. New ways of using public space may affect how urban cemeteries are utilized and valued as part of urban green infrastructure in the future (Skår, Nordh, and Swensen 2018; Nordh and Swensen 2018; Długozima and Kosiacka-Beck 2020).

### MULTIPLICITY IN GREEN URBAN CEMETERIES

Although the primary objective of cemeteries is to fulfil the need for burial space, green urban cemeteries encompass a **variety of qualities and functions related to cultural history, biodiversity and people's uses and preferences** (Nordh and Swensen 2018). Many green

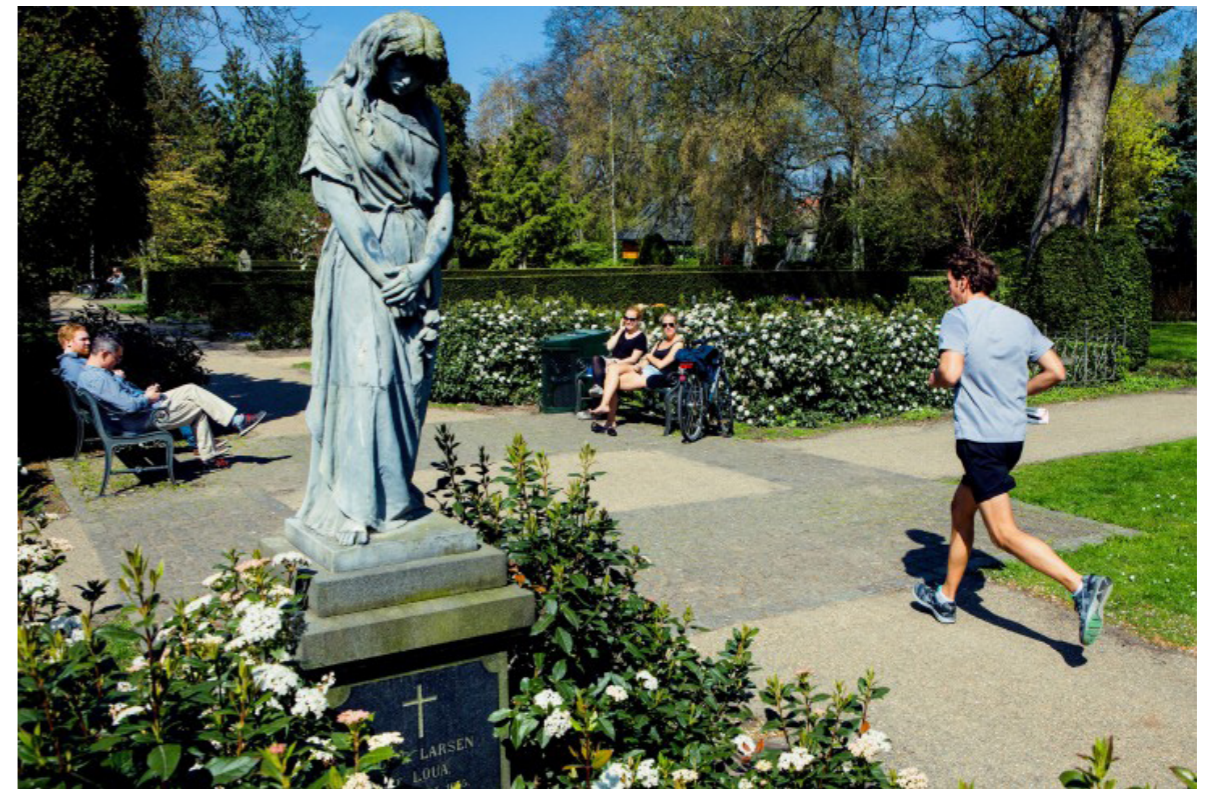
cemeteries in The Netherlands are quite large and in many ways park-like (Wille, Vijftigschild, and Nuvelstijn 2004). In municipal green plans (*groenstructuurplan*), they are often treated as private, mono-functional spaces, but we can see the emergence of new perspectives on urban cemeteries relating to their inherent qualities as green open space and habitat patch within the city. Cemeteries are part of the larger green structure in municipal green plans and thereby entail potentials on the one hand for green recreation and on the other hand for providing ecosystem services.

We can speak of a **multiplicity in green urban cemeteries: they can hold multiple identities and values in one space**. The concept of urban ecosystem services offers a strong lens to study existing and explore potential contributions they make to the city's open space system.

Therefore, this thesis reviews the role of the cemetery within the urban fabric and what they could become in the future. It looks for a better understanding of the role, functioning and successful design of urban cemeteries as green urban public space. It is profiled as a **story on both culture and nature**. Thereby I aim to **innovatively expand and redefine what a cemetery could become in the future**, reinforcing their role as green urban (public) space.

### DEFINING THE GREEN URBAN CEMETERY

This thesis revolves around green urban cemeteries, by which is referred to cemeteries with **various degree of vegetation**. Furthermore, a cemetery is different from a churchyard in that there is no consecrated building, such as a church, on-site.



Examples of multiplicity in green urban cemeteries;  
Fig. 1.1: Converted areas of traditional lawn cemetery into naturalistic prairie plantings at Green Wood Cemetery (Brooklyn, NY), source: Presson, 2020  
Fig. 1.2: Assistens Cemetery (Copenhagen) is used for jogging, biking and relaxing on a sunny day; source: Foreningen By&Natur, n.d.

The claim that cemeteries might become more attractive as publicly accessible parks is supported by changing societal perception towards the dead (Deunk 2016). Stigmas around the dead are vanishing, thereby lowering the threshold to visit a cemetery. Slowly and cautiously, cemeteries increasingly **embrace more public use** and become being seen as part of the city's park system, a trend that started to circulate in the Netherlands only very recently, but can be observed in the rest of Europe or coastal American cities already longer (Gemeente Amsterdam 2020; Grabalov 2018; Swensen 2018).

This context is the initial argument to start investigating the potentials of multifunctionality at cemeteries. Thus, this thesis explores **the accomodation of park and ecological functions** in green urban cemeteries, **and to which extent these can be accomodated**.

## 1.2. RESEARCH FRAMEWORK

### 1.2.1. PROBLEM STATEMENT & KNOWLEDGE GAP

Research on cemeteries covers topics such as cultural historical discourse on cemeteries (Rugg 2000; Kolnberger 2018), people's use and preferences (Evensen, Nordh, and Skaar 2017; Swensen 2018; Marriott 2018; Grabalov 2018), ecological and habitat performance (Clayden et al. 2018; Kowarik et al. 2016; Swensen 2018; Yilmaz, Ku ak, and Akkemik 2018), biological processes in the disposal of human remains (Santarsiero et al. 2000) or memorialisation (Treib 2005). Thus, as also Woodthorpe (2011) points out, the multidisciplinary interests in cemeteries means that **literature is fragmented** and publications are spread between various discipline-specific journals.

Within landscape architecture, research on the design of green urban cemeteries is merely concerned at planning and design rationales from a historical perspective, e.g. see Clayden et al. (2018), Kolnberger (2018) or Rugg (2000). **Research on the design for contemporary cemeteries and future trajectories for historical burial sites is scarcely available**. Furthermore, research focusing on cemeteries as urban public green spaces is limited (Kjøller 2012).

Even though landscape architects and urban planners are succesfully working on the re-design of green urban cemeteries, there is limited research on these design approaches, let alone comprehensive volumes bundling together relevant knowledge for the planning and design

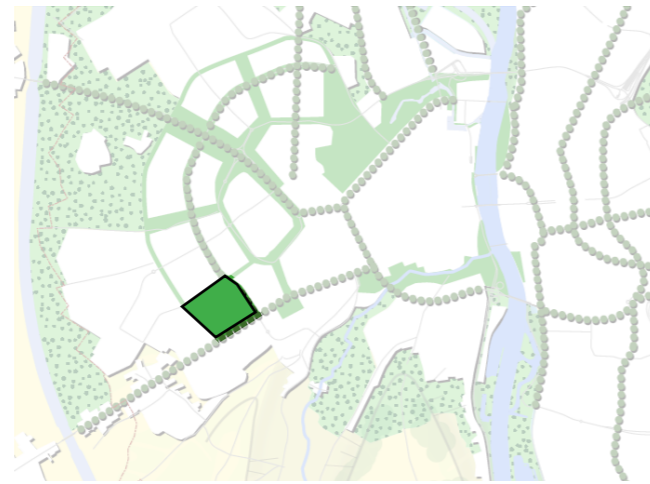


Fig. 1.3: Green urban cemeteries are often colored in on the map alongside the rest of the city's green infrastructure, but its specific role and potential often remains unaddressed. Pictured above, Tongerseweg Cemetery in Maastricht is part of the larger green structure in the municipal green plan (*groenstructuurplan*); source: Gemeente Maastricht, 2020

industry. Designers often search for precedents or best-practice examples. However, these are specific to their location and design brief and it can be complex to apply them to a new assignment which has its own specificities. Here, **the potential of generating design guidelines arises**, since they provide principles or strategies rather than one specific solution (Prominski 2017). **Existing cemetery designs and the rationales behind them are abstracted into generalized guidelines** (approaches, strategies and tools) for the practice side of the discipline to use in the design process.

To conclude, the problem thus is a fragmented field of knowledge on urban cemeteries and a academic knowledge gap on the planning and design of the contemporary green urban cemetery. This is even more persistent when narrowed down to the Dutch context.

### 1.2.3. CASE: TONGERSEWEG CEMETERY, MAASTRICHT

The case study site for this thesis is the Tongerseweg Cemetery, a tree-covered cemetery, in Maastricht, The Netherlands. This city-owned cemetery is one of the oldest urban cemeteries in the Netherlands and dates from the early 19th century times of hygienic reforms. The cemetery was established during the time of the French occupation and has since been gradually expanded to its current size of 12 hectares with more than 10.000 graves. Part of the cemetery has the status of a **protected monument**. In addition, the cemetery with more than a thousand trees

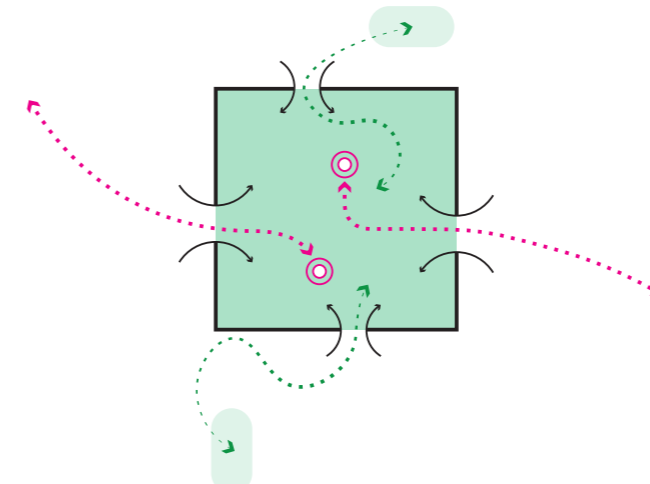


Fig. 1.4: The thesis objective visualized in a diagram: exploring urban green cemeteries' potential to embrace public use, engage with its surroundings and contribute to strengthening the existing, but fragmented, urban green infrastructure; source: author

also has a local ecological function. (Gemeente Maastricht 2017)

It's inner-city location and typical 19th century monumental character make it an exemplary case to generalize the design result as input for other Dutch and Northern European cemeteries as well. Furthermore, the location raises a set of site specific issues that this thesis could properly respond to given its scope, adding additional relevance for selecting this case. E.g., there is **overdue maintenance** in the hardscape and the **burial product offering is outdated**.

Recently, the city administration has coined the idea to transform the cemetery into a **'multifunctional mourning and memorial park'** that could host cultural events. Thereby they are stretching the idea of what a cemetery could be, but ambitions are made in moderate terms.

Furthermore, the city of Maastricht expresses **ambitious ecological objectives** for their urban green infrastructure, Tongerseweg Cemetery included, in their Strategy on Spatial Planning and the Environment (Omgevingsvisie) for 2040 (Gemeente Maastricht 2020). Nordh and Evensen (2018) discuss the disparity between cemeteries often being colored in on the map along with other green spaces as part of the green infrastructure, but neglected and treated as private green spaces in the actual green infrastructure planning and design, which partly is the case in Maastricht as well, see figure 1.3.

Given these site specific conditions and moderate ambitions made, this thesis aims to push for and further stretch the idea of the Tongerseweg Cemetery as a **multifunctional cemetery park** embedded in the city of

Maastricht. Thereby, the site is exposed to contemporary ideas around burial and memorial and its potential to become more porous, engage with its surroundings and contribute to strengthening the existing, but fragmented, urban green infrastructure.

### 1.2.2. THESIS STATEMENT

This thesis aims to contribute to the academic debate on the role of green cemeteries in the urban fabric. It does so by investigating to which extent and which interventions are needed to facilitate public joint usage and increase its ecological performance within the green infrastructure.

### 1.2.3. OBJECTIVE

The objective of this thesis is to stretch the idea of, and thereby explore the potential of the Tongerseweg cemetery to transform into a multifunctional public park that engages with its surroundings by embracing wider public use and contribute to the existing, but fragmented, green infrastructure, thereby giving input for the transformation of similar green urban cemeteries, see figure 1.4.

### 1.2.4. RELEVANCE

Thereby the **academic relevance** of this study is to contribute to the ongoing academic debate of the role of green cemeteries in the urban fabric, more specifically regarding their role as public park and green infrastructure. The research and design will be done at the intersection of contemporary burial culture, public park and green infrastructure, thereby interconnecting parts of the fragmented field of knowledge on cemeteries.

The academic relevance is also connected to its **landscape architectural relevance** that lies in investigating how, to which extent and by what design moves green urban cemeteries could increasingly engage with their surroundings by embracing wider public joint usage and contribute to the existing, but fragmented, urban green infrastructure. By generating and testing design guidelines based on insights from reference studies, the study contributes to both academia and the practical application of knowledge in design practice. As cemetery design is a common type of assignment for landscape architects, this is valuable new knowledge for the discipline.

The **societal relevance** of this study lies, as argued in the introduction, in the densifying city and how its

scarce green space could best be used. This thesis stretches the definition and concept of a cemetery. Thereby it offers new perspectives on how to use the green urban cemetery in a more multifunctional way.

Furthermore, this thesis embeds the design within a discourse of transitions in burial practices and rituals. Thereby one of the outcomes, the final design, could contribute a set of lay-out and design examples to consider in future cemetery commissions and design projects.

### 1.2.5. CONCEPTS

A set of core concepts regarding provides guidance and a lens to look at all the data gathered in this research. Furthermore, it helps in delimiting the research and structure some of the research chapters. The concepts are interlinked and figure 1.5 provides an overview how they relate to each other to avoid misunderstandings.

#### GREEN INFRASTRUCTURE

Green infrastructure is one of the overarching concept within this thesis that is often mentioned alongside urban biodiversity and ecosystem services. Therefore, these key terms are specified to consequentially and comprehensively structure the research.

Green infrastructure is an emerging concept in planning and design that is often employed to holistically assess and improve the functioning of a cities open space system (Ahern 2007). It revolves around a network approach to green space systems. Essential features to green infrastructure approaches are, first, to adopt a **multi-scale and multi-object** approach and, secondly, to focus on their role of **interconnecting habitats** (Van der Ryn and Cowan 1996) and aim for **multi-functionality** of these habitats and connections (Sandstrom 2002).

#### URBAN BIODIVERSITY

This brings us to urban biodiversity that is used as a generalized concept describing the diversity of ecosystems, populations and species and the genetic diversity within them. Urban biodiversity is used to describe the ecological quality of the green infrastructure or site. In urban settings, there is a **paradigm shift** towards a wider focus on all urban ecosystems, including native and non-native species (Grunewald et al. 2018). Through habitat destruction, fragmentation and the introduction of new (non-native) species, as well as indirectly changing the urban climate and day-and-night rhythms, human influences set urban biodiversity apart from biodiversity outside of urban areas

(Kowarik and Körner 2005).

All forms of urban biodiversity should be properly managed to secure its survival and let its human inhabitants benefit from its ecosystem services. Thus, it should be considered to what extent species of animals and plants can survive in these urban conditions, how to **foster and manage their habitats** and how to let people enjoy these natural amenities without destroying them.

#### ECOSYSTEM SERVICES

Here the concept of Ecosystem Services (ESS) is introduced as a theoretical lens to comprehend these functions and benefits. It most definitely is an anthropocentric concept stressing a range of provisional benefits of nature to human well-being (Haase et al. 2014). Thereby, I use a broad definition of the concept. For green urban cemeteries these may include **regulating services** (e.g. climate regulation and air quality), **supporting services** (e.g. providing habitat; maintain plant and animal diversity) and **cultural ecosystem services** related to recreation, wellbeing and health (Shanahan et al. 2015; Kowarik et al. 2016; Haase et al. 2014).

In literature, urban ecosystem services (UES) are sometimes set apart from ecosystem services (EES) stressing cities are dependent on ecosystems beyond the city boundaries, but also benefit from internal urban ecosystems: the UES (Bolund and Hunhammar 1999). This research uses the term ecosystem services (ESS), since the objective is not to generate a full metabolic analysis of the city.

### 1.2.6. RESEARCH QUESTIONS

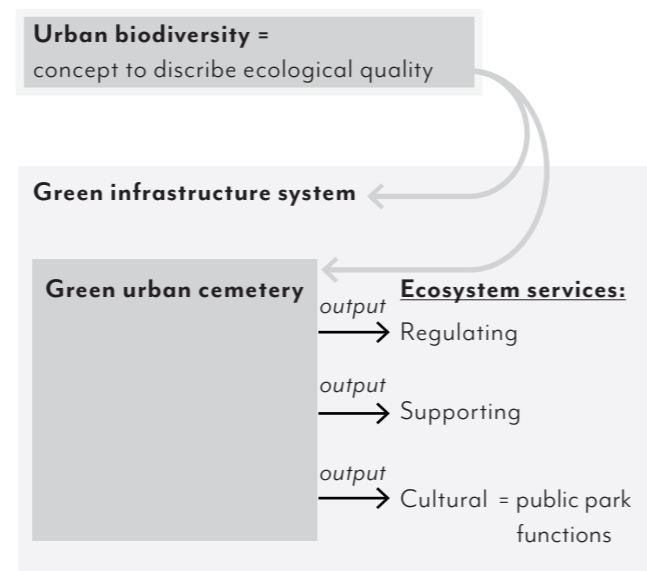


Fig. 1.5: overview of how the different concepts relate to each other; source: author

The main research question (MRQ) for this thesis is:

**What interventions are needed to accommodate public joint usage and increased ecological performance in green urban cemeteries, such as the Tongerseweg Cemetery?**

To answer the MRQ, three sub-research questions (SRQ) and one design question (DQ) have been formulated:

SRQ 1: What public park functions could a green urban cemetery serve?

SRQ 2: What role could a green urban cemetery play as green infrastructure within an open space system, using the concept of ecosystem services?

SRQ 3: What design guidelines can be generated from existing green urban cemeteries that serve park functions and that play a role as green infrastructure in city's the open space system?

DQ: How could the Tongerseweg Cemetery serve increased ecological and public park functions within its urban context?

## 2. METHODOLOGICAL FRAMEWORK

In this chapter, I will first touch upon the approach and type of knowledge claim this project adopts. Then, based on the sub-research questions and design question, three phases of inquiry are set up. A literature study phase on the respective topics of SRQ 1 & 2 and a reference study phase that culminates into a series of guidelines. These two phases plus the Maastricht site analysis will inform the case study phase. Here, the guidelines are tested and adjusted and a design for the Tongerseweg Cemetery is made. These three phases establish the knowledge base that will answer the main research question. See figure 2.1 for an overview of the research process.

### 2.1. PRAGMATIC KNOWLEDGE CLAIM

This research project adopts a pragmatic approach and knowledge claim, as defined by Lenzholzer, Duchhart, and Koh (2013). The research is set up as a two-legged approach; positioning green urban cemeteries at the intersection of public joint usage and ecological performance. Thereby it is posited as a story on culture and nature, inherent to the landscape architectural discipline. This is reflected in the research questions that concern natural and cultural aspects, as well as design procedures. Therefore, a careful integration of different methods is required to integrate this knowledge. The outcomes are both guidelines and unique contextual new knowledge for the Tongerseweg Cemetery case.

### 2.2. RESEARCH PHASES

#### 2.2.1. LITERATURE STUDY PHASE SRQ 1 & 2 (RESEARCH FOR DESIGN)

In SRQ 1 and SRQ 2 the theoretical framework is **set up to verify and build an argument**. First, on what could be adequate and applicable joint-usages for green urban cemeteries, and secondly, what roles a green urban cemetery could play as green infrastructure within an urban open space system. This is done by means of a literature study focussing on scientific literature and secondary reports that are relevant for the topic of green urban cemeteries regarding urban green infrastructure, urban ecology and park functions. During the pre-proposal phase of this thesis, it was identified there is enough relevant literature 'out there' to answer SRQ 1 & 2. Snowballing was used to find additional papers to secure an extensive and complete overview of relevant literature 'out there'.

The concepts of Green Infrastructure, Urban biodiversity and Ecosystem Services presented earlier make up the analytical framework. They are concepts to guide and streamline this literature study. They are not the research focus in themselves but offer a conceptual lens at the starting point of this literature study.

The resulting knowledge is not place specific. The literature study generates four results. First, the output of sub-research question one builds a framework for assessing adequate and applicable 'public park roles' for green urban cemeteries. Secondly, the output of sub-research question two results in a set of key points on the role and potentials of a cemetery within an urban green infrastructure system.

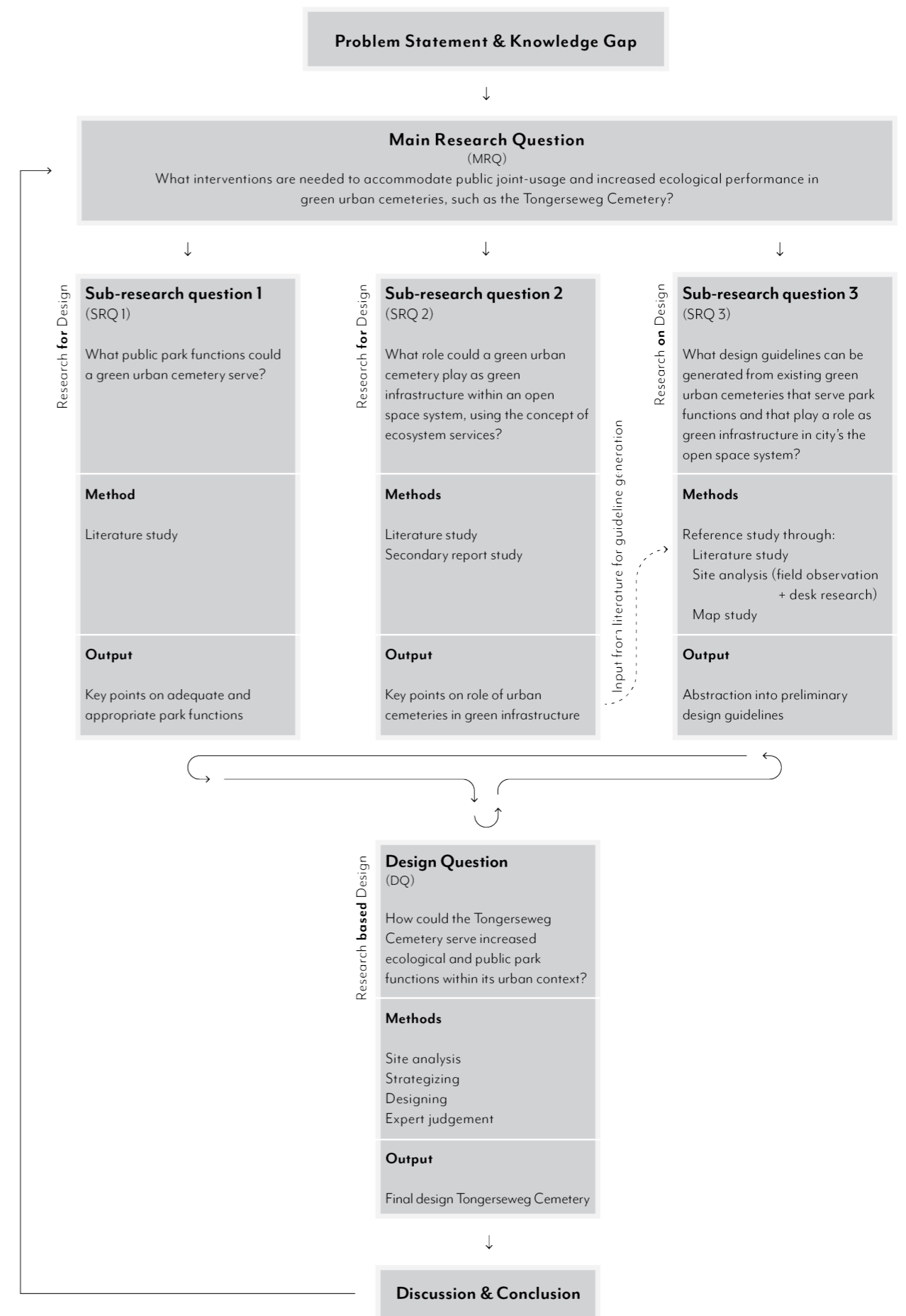


Fig. 2.1: The research process visualized in a diagram; source: author

Thirdly, the literature study produces a solid basis to act as theoretical lens when reviewing the case studies and assess and evaluate the observations in the cases. Fourthly, during the execution of the literature study, it has been decided to also generate design guidelines from information gathered on the contribution that green cemeteries can make to the urban green infrastructure.

### 2.2.2. REFERENCE STUDY PHASE SRQ 3 (RESEARCH ON DESIGN)

A reference study on exemplary multifunctional green urban cemeteries is **aimed to generate a set of design guidelines** reflecting what lay-out and design principles makes them successfully host additional roles for public joint usage and be integrated into the wider urban open space system. This research question thus answers what exactly it is in a cemetery design that makes them suitable for public joint usage and makes them contribute to the city's green infrastructure.

For the reference study of design approaches in existing green urban cemeteries an exploratory scan was carried out to find suitable 'best practice' cases.

The reference studies were selected on the following criteria:

- The cemetery offers a variety of burial options (coffin grave, urn internment, ash scattering, natural burial etc.)
- The cemetery is located in a city and surrounded by neighbourhoods.
- The cemetery is open to the public and the park management employs the site for joint usage as public park.
- The cemetery is a green cemetery, by which I refer to cemeteries with various degree of vegetation.

Three reference have been selected:

- Skogskyrkogården in Stockholm, Sweden
- Green Wood Cemetery in Brooklyn (NY), USA
- Melaten Cemetery in Cologne, Germany

The reference studies consist of multiple methods, to make a cross-over between data harvesting methods and increase the validity of the research outcome:

- **Literature study;** to explore the existing literature and secondary reports on design considerations, successes and complications of the respective cemetery.
- **Site analysis** (field observations and desk research); understand the urban characteristics, physical expressions, relationship with its adjacencies, historical context and lay-out and programming of the site. The field observations included both the cemetery and its adjacencies and were done by foot and bike. Desk research through historical/contemporary maps, geo-data sets, design plans and secondary reports.
- **Map study;** understand the adjacencies and connections within the urban context, historical growth and development, and topographical characteristics

For site analysis, it should be stated that due to the global COVID-19 pandemic, I was able to visit Green Wood Cemetery and Melaten Cemetery, but I have not been able to visit the Skogskyrkogården in Stockholm for field work. The full extent of the site is available in Google Street View, thus it was decided to substitute in person observation that way. Furthermore, given its renowned status, a lot has been published on this cemetery, which made it possible to work around obstacles imposed by COVID-19 restrictions.

The data (literature, observations, maps, photographs) was processed by a systemic analysis, focussing on the site's history, architectural composition, burial infrastructure, 'urban life' and its link to the wider urban green infrastructure and surroundings. Finally, all these results are evaluated and guidelines are derived from relevant data that lend itself to be abstracted into a guideline. In this process, the data from the literature study for SRQ 2, on green cemeteries and their contribution to the green infrastructure, was also included to abstract guidelines.

In appendix 1, the abstraction of information into design guidelines and their hierarchical organization is discussed in greater depth.

### 2.2.3. CASE STUDY PHASE DQ (RESEARCH BASED DESIGN)

The output of the three sub-research questions are the input for the design phase of this thesis. The design phase is set up as 'research based design', implying that the design is based on the preceding sub-research questions. Through the design process the preliminary

design guidelines that were generated before, are **tested and adjusted accordingly, as well as invent new ones** (Brink et al. 2017). Thereby both location-specific and generalizable knowledge is produced.

To make a design for the Tongerseweg Cemetery and answer the design question, three other methods were used. It should be stated beforehand the site analysis does not per se generate new knowledge but is important to let the design fall 'in place':

- **Site analysis** (field observations and desk research): to comprehend site-specific knowledge required for making a design. Field observations were made by during several site visits, spread over various seasons. They included both the site and its adjacencies (surrounding neighbourhoods, relevant parts of the city's green infrastructure) and were done by foot and bike. Desk research is executed through the study of maps, geo-data sets, secondary reports. In combination with field observations, it frames the urban characteristics, relationship with its adjacencies, historical context and current lay-out and programming of the site. Expected trends for the Maastricht burial market and legal and physical burial constraints were analysed as well.
- **Strategizing, modelling and designing:** to explore and test out new possible directions for the Tongerseweg Cemetery, using the results of SRQ 1, 2 and 3 as input for the design
- **Expert judgement:** to assess the feasibility of the strategies, program and design proposals, experts were consulted for their opinion and extra input on the design drafts.

Three experts were included in the design process for expert judgements:

- Erik Kaptein, senior landscape architect at the Municipality of Maastricht, who is actively involved in the Tongerseweg Cemetery.
- Erik ter Heide, project leader on Public Space for the municipality of Boxtel, who is actively engaged in the management and design of their cemeteries for over the past two decades and has plenty of 'hands on' experience with cemetery design, transformation and management.
- Friso van der Zee, a plant and forest ecologist from Wageningen Environmental Research that is part of the 'Limburgs Heuvelland' focus group at the OBN Knowledge Network for Nature Restoration and Management. He brings in knowledge on local ecology and forest management.

A **reciprocity between the design and research** questions was established once it turned out that more knowledge is required to successfully finish the design, thereby creating an iterative process. The 'research based design' results in the design synthesis: adjusted design guidelines and the final design.

### 2.2.4. EVALUATION

In the discussion and conclusion, the design guidelines will be evaluated on their applicability within the design in Maastricht and their applicability to other contexts. Furthermore, it will be evaluated how this thesis relates itself to the objective of setting out new future trajectories for green urban cemeteries more generally.



### 3. EXPLORATION ON PUBLIC PARK FUNCTIONS FOR GREEN URBAN CEMETERIES

As discussed before, cemeteries hold unique potentials for joint usage by the public besides their prime burial related activities. Thereby they can contribute to the urban landscape in new ways. This chapter discusses how green urban cemeteries could evolve from (solely) burial space to hybrid urban (memorial) parks.

The extensive literature study has shown that cemeteries are of a multi-faceted nature which is manifested in the complexity of roles imposed on these spaces. Every cemetery already contributes to the urban environment in its very own way. They are part of an already existing green infrastructure and serve the local communities. Given their primary role as a site for burial and relatives to visit their loved ones, there is a field of tension between the concept of a cemetery and public park. Thus, a nuanced positioning of the cemetery as public park and the park functions it could host is needed.

#### 3.1. WHY CEMETERIES AS URBAN PARKS?

As discussed in the introduction, in the context of the compact city, the importance of green areas increases. This has its consequences on how green urban cemeteries may **shift from just burial spaces to becoming spaces for recreation alike**.

In this context of increased urban interest and development, Grabalov (2018) argues a better understanding of the current role of green urban cemeteries and potential for the accommodation of more functions in

urban cemeteries appears highly relevant for urban planners.

Furthermore, **new attitudes towards the death** (Blanco & Vidal, 2014; Venbrux et al., 2009), increasingly diverse urban populations, and new ways of living in and using the city, could potentially lead to changes in use of the urban green open space network, such as green urban cemeteries (Franck & Stevens, 2006; Ivers, 2018; Östberg & Rae, 2018).

Like urban parks, cemeteries offer both natural and cultural qualities and have many similarities to well-established parks such as lawns, decorative planting and strolling paths. Those are sites with lots of potential that could be **opened-up and made accessible**, so a more **reciprocal relationship** with the rest of the city can grow.

Some cemeteries are well-established as a place for visitors, e.g. the UNESCO Skogskyrkogården in Stockholm, which welcomes an annual 400.000 visitors (Larsson, Schlyter, & Backlund, 2014). Also lesser known or smaller cemeteries, such as Gamlebyen cemetery in Oslo, Melaten Cemetery in Cologne or Green Wood Cemetery in Brooklyn (NY), welcome visitors and appear to be used for a variety of everyday activities, such as dog walking, socializing, cycling and hosting appropriate events (Cologne Trouist Board, 2020; Evensen, Nordh, & Skaar, 2017; Payson Coleman, 2019).

Many old cemeteries are still selling plots and burying the deceased but given **cremation and other arrangements are increasing in popularity**, their days as just a cemetery are numbered. Here, public use can mean the difference between succumbing to degradation or becoming a **thriving part of the local community**. In this context, cemeteries can have improved park functions.

#### 3.2. RELATIONSHIP BETWEEN THE LIVING AND CEMETERY OVER TIME

The relationship between the cemetery and city over time, has always been in transition. Situated next to the church or in public mass graves (e.g. Holy Innocents' Cemetery), until the nineteenth century, graveyards were at the heart of the community around the church; there was 'familiarity and spatial intimacy between the living and the dead' (Johnson, 2008, p. 780). **Hygienic reforms** and space becoming scarce led to the relocation of the dead to the city's periphery. The new cemeteries were situated as sole island in between agricultural land, their only relation with the outside sometimes being their border following the existing allotment pattern. Surrounded by ditches, hedges or walls, they imposed a strong separation from their surroundings, thereby sequestering the dead from the living



Two examples of cemeteries that increasingly embrace more public use:

Fig. 3.1: Main entrance at Green Wood Cemetery (New York) used for an open-air opera event; source: Patch, 2018

Fig. 3.2: Non-active part of St. Marien and St. Nikolai II Cemetery (Berlin) transformed into a park and playground; source: McMillan, 2016

(Rugg, 2000). This took cemeteries out of the heart of the community into 'other' spaces '**clearly differentiated from the everyday spaces of the living**' (Young & Light, 2016, p. 64).

Simultaneously, the Garden Cemetery movement gained popularity, also in the Netherlands (e.g. Nieuwe Ooster in Amsterdam and Crooswijk Cemetery both by L.A. Springer). These were new cemeteries typically founded outside the city in a landscaped park-like setting, adopting the Romantic style in fashion in landscape design at that moment (Tarlow, 2000). Intentionally designed this way, their winding paths lend themselves for strolling and their manicured greenery became a main recreational space and tourist attraction in the industrialized city (Al-Akl et al., 2018). Before the widespread development of public parks, the garden cemetery was intended and actively used as a place for the public to enjoy outdoor recreation amidst art and sculpture previously available only for the wealthy.

Now **incorporated by expanding cities**, urban cemeteries are 'increasingly **conceived as places to be visited and incorporated into everyday practice**' (Young & Light, 2016, p. 65). See figure 3.3 for examples.

Initially built in the periphery, their regained location within the urban fabric was not initially part of their lay-out and design. This regained position within the city forms one of the arguments to reconsider their role in and relationship with the city.

#### 3.3. PARK OF CULTURAL SIGNIFICANCE AND IN NEED OF CHANGE

Cemeteries are **mirrors of our society**. They represent the relation between the collective and the individual, the social system of that time, the developments in the field of architecture, design and landscape architecture, the transformation of a "culture of mourning", as well as the varieties of different religions and spirituality cemeteries currently reveal. It is deeply rooted in a particular place, revealing local narratives and culture. In every part of the world this is different, making it not only a mirror of society but also a catalogue of culture and anthropology. Therefore they are important places that provide civic identity and local place attachment amongst others (McClymont, 2016).

Large urban cemeteries often contain rich layers of history and contain memorials of all sorts that receive annual ceremonial tributes. This renders the place a particular status. With politicians and notables buried in the larger urban cemeteries, these places add to people's general knowledge of a city's history. In addition, cemeteries that

still actively bury, means relatives actively use the cemetery and have a personal relationship with, and memories attached to, the place where their relatives and friends are buried. Therefore, cemeteries function 'as **spatial vessels of civic identity**, telling diverse histories of the city and



Fig. 3.3: Three examples of cemeteries initially built in the periphery that have regained their location within the urban fabric. , top to bottom: De Nieuwe Ooster (Amsterdam), Green Wood Cemetery (Brooklyn, NY), Tongerseweg Cemetery (Maastricht); source: author

representing intangible notions of the character of a given place' (McClymont, 2016, p. 393).

The rituals surrounding death used to be defined by the religion of your community and rank in society. Now, society has become more equal but at the same time more diverse. Increasing **eco-consciousness and individualization** will also have their reflections on burial practices. Furthermore, the multicultural society we live in today has led to demands for burial sites tailored to specific societal groups. This signifies the **need for change** and opens the discussion on how cemeteries should adapt to and design for those societal changes, thereby completing the circle by adding a new contemporary layer to the cemetery.

### 3.4. CONTEMPORARY DISCOURSE ON URBAN PARKS: PARK ROLES

By conceiving green urban cemeteries as public parks, they need to be **positioned within the wider range of urban green spaces** present in the city. Since the industrial revolution, a manifold of parks has been developed in modern cities, ranging from city parks and commons to neighborhood green and allotment parks (Clark, 2006).

Public parks have long been recognized for the physical and aesthetical quality they give to urban neighborhoods. The traditional view that defines a good urban park is that they provide healthy environments and open space with ample recreational opportunities for urbanites (Walker, 2004; Zieleniec, 2010). Today public parks are demanded to accommodate a much wider range of objectives by local communities, politicians, and society more generally.

While the 'traditional' functions have not

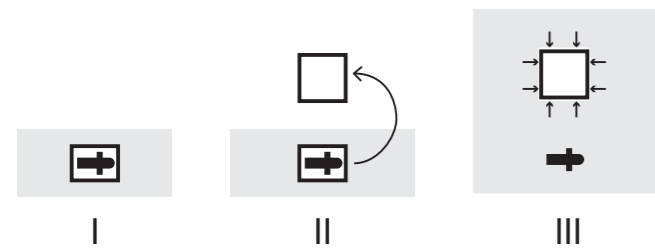


Fig. 3.4: Initially located around the church (I), 19th century hygienic reforms initiated the development of cemeteries in the city's periphery (II). Nowadays cemeteries have regained their location within the urban fabric again (III); source: author



Fig 3.5: Cemeteries adapt to changes in burial culture and changing relationships with the dead. At De Nieuwe Ooster Cemetery this meant a big redesign happened from 2005 onwards; pictured above are the new urn graves in a mirroring pond; source: NRC, 2007

disappeared, the set of **functions projected onto parks has only increased and broadened** since then (Lindholm et al., 2016). Every objective in the city is projected onto the park, from climate resilience and local food systems to social inclusion and solving the biodiversity crisis. The city park has become a container that has to be so many things at once, that **no univocal profile remains**.

Following to this, three main directions of public parks in the 21st century have been identified in the literature study that have been found relevant for this study.

Firstly, urban parks become more **hybrid**; offering a layering of functions and becoming 'productive' in a variety of ways, beyond providing recreational space or hygiene (Berrizbeitia, 2018). Berrizbeitia (2018) also stresses the rise of more hybrid forms of landscape design where **boundaries diminish** between landscape and nature, private and public, wasted and conserved, fallow and productive, and the human and the non-human.

As a space primarily serving as burial infrastructure, the cemetery is an infrastructural landscape in itself burying the deceased and accommodating commemoration and memorialization by the living. Adding park roles (and ecological functionalities as the second leg of the thesis) turns this spaces per definition into a **hybrid landscape**, following Berrizbeitia (2018).

Secondly, there is the tendency of '**activation, programmability, and exploitation of urban parks** for citizens in search for spectacle and events every time of the day and year. This relates to the increasing hegemony of neo-liberal economic models imposed on the shape of the city (Ivers, 2018).

Thirdly, as a follow up of the points discussed above, public parks are demanded to accommodate a wider range of qualities by local communities, politicians and society more generally. Potential interesting objectives the green urban cemetery could host include **public health** (offering ways to engage in healthy activities), **outdoor education** (providing nature education and interpretation) **climate change mitigation** (regulating local climate), contributors to **social inclusion and cohesion** (offering diverse & appropriate programming and events), and contributing to **city attractiveness** and competitiveness (place-making) (Konijnendijk et al., 2013; Walker, 2004).

As a quiet and tranquil gem in the city, the green urban cemetery seems the **antipole** to this tendency to 'activate', program and exploit urban parks. This gives it a **distinct identity** in a series of other green spaces.

Therefore, green cemeteries hold unique niche

potentials as quiet parks, where a layering of deliberately picked program overlaps with consideration and respect for the primary function of burial and memorial.

In this context where the city park has become a container that has to be so many things at once, **a clear profiling and positioning** of what functions it can and cannot host has to be made. Therefore, in the following paragraphs the existing function as a commemorative and active burial landscape are played off against park functions that have been found in literature, in reference cases and later in the design in Maastricht. That way, applicable and adequate park functions for urban cemeteries are defined since they simply cannot absorb all objectives given its prime function as burial infrastructure.

### 3.5. DEFINING APPLICABLE PARK ROLES FOR THE URBAN CEMETERY

Defining applicable park roles for the urban cemetery means **balancing potential park functions against the existing contribution cemeteries make to the city**. On the one hand, as a public space that should be open for all, the cemetery should welcome and meet the need of its various user-groups. On the other hand, since it is functionally different from a public park, it is important to carefully consider what types of activities a cemetery invites to, in order to maintain its role as a place for mourning and peace in the city (Evensen et al., 2017).

The research outcome, as found in literature or in an existing cemetery, are possible park roles that could be adequate and applicable for urban cemetery. These are presented in scheme 3.7 (opposite page). The outcome is twofold:

The existing functions relating to burial and memorialisation are summarized. For an active cemetery these are the prerequisite conditions for defining adequate and applicable park functions that could coexist next to the existing contribution related to their prime function as active burial space.

The second set of adequate park functions have been found in literature, in reference cases and later in the design in Maastricht. In literature, these park functions are typically discussed as positive activities that complement the cemetery, make it more multi-functional and that positively contributes to the city and its residents (Anna & Ewa, 2020; Evensen et al., 2017; Grabalov, 2018; Swensen, 2018).

To help define adequate and applicable park

functions, the municipality of Copenhagen addresses 'five tensions' (figure 3.6) when assessing long term development plans for their municipal cemeteries (Copenhagen Municipality, 2015):

- **Collective resource or private place:**  
The cemetery must be nice to visit for both the recreational users and for graveyard owners - although the two user groups have different behavioral patterns and needs.
- **Tribute to life or a place for grief:**  
The cemetery is a unique space because it is one of the few places in society where grief is legitimate and focussed on. The field of tension holds the dilemma that while the joy of life can ease the grief and make the cemetery experience less heavy, it is important that it never gets in the way of other people's mourning process.
- **Place for all or a place for certain activities:**  
In the cemetery everyone is welcome, but the deceased and their relatives must be respected. Therefore the recreation that takes place on cemeteries, be in alignment and calm.
- **Familiar place or a distant place:**  
For some cemeteries are familiar and safe, while for others feel distant and sometimes even scary. It is a field of tension that emphasizes that some citizens need help to get the cemetery demystified to enjoy the recreational opportunities.
- **Timeless place or a place in transformation:**  
This paradox is about developing cemeteries in harmony with societal change. Since we are dealing with a place with death at the center - there is also a special need for continuity and stability. Therefore, change must be introduced slow-paced and with great historical awareness.

These 'five tensions' are highly relevant when planning and designing future trajectories for green urban cemeteries and therefore added to this chapter. They summarize apparent contradictions, but they can also be perceived as a sliding scale. That way, it can help to decide on strategic goals and additional qualities that one wants to develop. When considering the direction in which to develop the qualities at a given cemetery, certain park functions may fall off or be added to the list.

### 3.6. CONCLUSION

This chapter explored potential park functions that could be accommodated at green urban cemeteries, and placed this in the context of increased urban interest and development. Their regained position within the city forms one of the arguments to reconsider their role in and relationship with the city.

The set of (possible) adequate park functions presented in figure 3.7 is very generic and differs for every green urban cemetery and its individual context. As mentioned before, Grabalov (2018) argues for a better understanding of the potential for the accommodation of more functions in urban cemeteries for urban planners. Thereby, range and extent to which new functions are accommodated is of course highly depending on the cemetery's context. The problems and questions at play in the surroundings determine in what way the cemetery could respond to its surroundings and what new functions could be adequate and applicable to add. The 'five tensions' presented in figure 3.6 can help to take position when planning and designing future trajectories for green urban cemeteries.



Fig. 3.6: 'five tensions' that can help to take position when planning and designing future trajectories for green urban cemeteries; source: adapted from Copenhagen Municipality, 2015, p. 18-19

#### Existing functions relating to burial & memorialisation

as found in literature

- place of memorial  
> memorizing the deceased  
(Östberg & Rae, 2018)
- sacred space  
> i.e. chapel, monument, also place reads as sacred  
(Östberg & Rae, 2018)
- place of burial  
> burial infrastructure & logistics  
(Östberg & Rae, 2018)
- intangible heritage  
> i.e. particular type of landscape atmosphere  
(Rugg, 2020)
- tranquility  
> protected from activities deemed disrespectful  
(Rugg, 2020)
- undistracted environment  
> focus for the pilgrimage of friends and family  
(Rugg, 2020)
- place for contemplation & reflection  
> to forget & remember, attend people & past times  
(Treib, 2005)

#### Possible additional park functions

as found in literature or in an existing cemetery

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>recreation</li> <li>strolling<br/>(Skår et al., 2018)</li> <li>dog walking<br/>(Skår et al., 2018)</li> <li>jogging<br/>(Grabalov, 2018)</li> <li>cycling<br/>(Evensen et al., 2017)</li> <li>crossing / throughfare<br/>(Evensen et al., 2017)</li> <li>playing<br/>(Skår et al., 2018)</li> <li>resting<br/>(Skår et al., 2018)</li> <li>picknicking<br/>(Harnik &amp; Merolli, 2010)</li> <li>public programming<br/>(Harnik &amp; Merolli, 2010)</li> <li>bird watching<br/>(Harnik &amp; Merolli, 2010)</li> </ul> | <ul style="list-style-type: none"> <li>community</li> <li>socializing<br/>(Skår et al., 2018)</li> <li>event space<br/>Green-Wood Cemetery, Brooklyn; Arnos Vale Cemetery, Bristol</li> <li>act of commemorating together as local community<br/>(Woodthorpe, 2011)</li> <li>outdoor education</li> <li>art classes<br/>(Harnik &amp; Merolli, 2010)</li> <li>exploring cultural heritage<br/>(Swensen, 2018)</li> <li>learn about nature and natural processes<br/>(Clayden et al., 2018; Kowarik et al., 2016)</li> <li>place for art exhibit<br/>(Melaten cemetery, Cologne)</li> <li>guided tours<br/>(Melaten cemetery, Cologne)</li> </ul> |
|--|--|

**LEGEND**  
function  
> example  
found in literature (source) OR at cemetery

Fig. 3.7: Summarizing the existing contribution to the urban environment and (possible) adequate and applicable park functions for the urban cemetery (encompassed in literature study or known reference case); source: author

# INTERMEZZO

## THE 21ST-CENTURY LANDSCAPE OF BURIAL AND MEMORIALIZATION

More and more people are making more deliberate choices concerning death: about places, practices, and settings in which to say goodbye, about the form their memorial takes, and about the part landscape can play in the process. More people are now cremated than buried in the Netherlands, and the demand for urn interment and ash scattering is still increasing. Meanwhile, the LOB (National Organization for Cemeteries) senses an overcapacity of conventional coffin graves available amongst its members and increasing demand for urn burials. Alternative forms, such as green burials, are growing exponentially as well (BRANA, 2020; LVC, 2020; Valentijn & Verhoeven, 2018).

Thereby, as a product of secularization and individualization, traditional religious rituals increasingly have fallen out of favor, resulting in a 'quest for new burial rituals' (Wouters, 2002, p. 1). In combination with the rise in new burial methods, new rites of passage and sacrosanct acts have emerged. Cook & Walter (2005) make a different distinction and argue that the most significant contrast is not between religious and secular but between the traditional and contemporary funeral rituals. The latter is characterized by 'reduced authority of the celebrant, greater personalization and choice, euphemistic reference to death, less poetic language, and diminished ritual movement' (p. 365). According to E. Venbrux, Peelen, & Altena (2009, as cited in H. J. M. Venbrux, Heessels, & Bolt, 2008) the experimentation and innovation in death rites are fostered and facilitated by an increasingly consumer-oriented undertaking business leading to more personalized burial rituals.

Thus, since burial practices and rituals are in transition, it should be considered what demands and needs this imposes on the design of cemeteries. This requires a new design language that welcomes these new methods and rituals. It is very relevant since with their physical arrangements and design decisions, combined with personal and communal memories, these landscapes move us and shape how we remember and memorialize.



Changing burial culture manifested through increasingly diverse funeral processions:  
 Fig. 3.8: by motor bike; source: CM Walkers, 2021  
 Fig. 3.9: by bicycle; source: Ode uitvaartbegeleiding, 2021

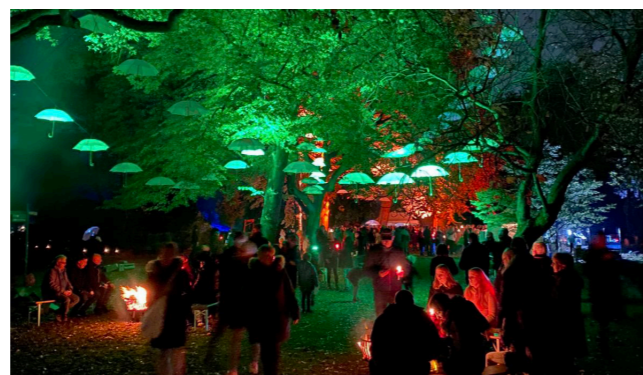


Fig 3.10: Herinnering Verlicht is an event at the Nieuwe Ooster Cemetery (Amsterdam) that centers around memorializing together with the community; source: Hehenkamp, 2019



Fig. 3.11: Burial trends in the Netherlands since 1950; source: author

## 4. GREEN URBAN CEMETERIES' ROLE IN THE GREEN INFRASTRUCTURE

Cemeteries are ubiquitous components of the urban green infrastructure that may stretch over large areas in cities (Kowarik et al., 2016). Nordh & Swensen (2018) argue cemeteries are the green urban spaces with both cultural and natural qualities and argue for integration into the green infrastructure planning system.

This chapter explores the potential of urban cemeteries as critical green infrastructure. It provides an overview of essential theories and debates on urban green infrastructure and problems and potentials for the integration of cemeteries into the urban green infrastructure. It is built up starting at the site scale, focusing on the existing qualities and potentials of green urban cemeteries. From there, it is assessed what the cemetery means in its bigger context of the city's open space system.

### 4.1. WHY CEMETERIES & GREEN INFRA?

Given their specific characteristics, almost all urban cemeteries have the potential to improve their ecological performance and integration in the larger urban green infrastructure. As discussed in the introduction, currently their specific role and potential often remains unaddressed. There is a set of urgent issues relating to the urban biodiversity crisis and changes in urban (micro) climate that green urban cemeteries could well respond to. Therefore this chapter challenges this status quo and aims to stretch the idea of green urban cemeteries and ways they could be better integrated and contribute to the urban green infrastructure. It does so by studying existing and potential contributions these places can make to the city's green infrastructure. The findings are divided in site scale and city scale and structured using the concept of ecosystem services. See figure 4.1 for an overview of the provided ecosystem services, expanded upon in the following paragraphs.

### 4.2. SITE SCALE

#### 4.2.1. SUPPORTING ECOSYSTEM SERVICES: CEMETERY AS HABITAT

There is growing recognition of the urban landscape and its role in conserving and fostering biodiversity. Habitat is fragmented and the functioning of urban land-use types as habitats for species is of growing importance for biodiversity conservation (McKinney, 2002). As mentioned before, there is a paradigm shift towards a wider, more holistic, focus on all urban ecosystems, **including native and non-native species and their contributions to species**

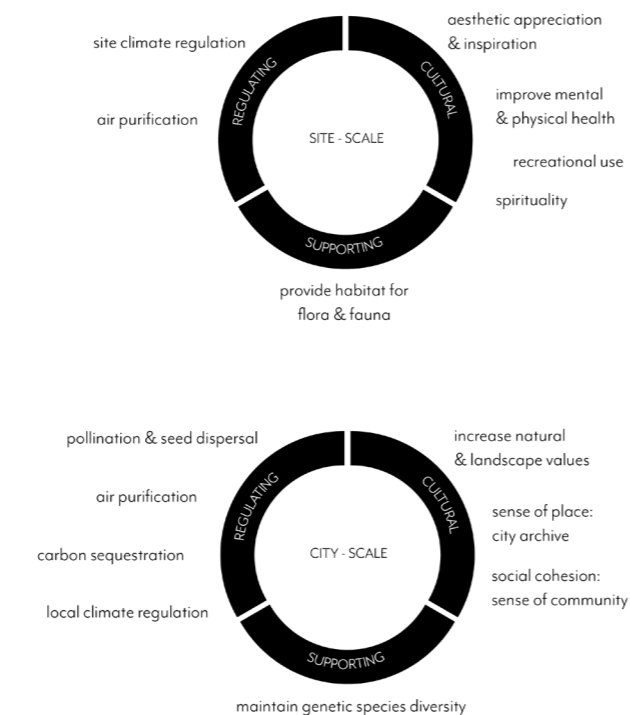


Fig. 4.1: Summary of provided ecosystem services by green urban cemeteries on the site scale and city-scale; source: author

**conservation** (Grunewald et al., 2018). This is relevant since many cemeteries contain non-native, decorative, plant species (Yilmaz et al., 2018).

Urban parks and green cemeteries, as one specific type of urban green space, constitute particularly important biodiversity hotspots in the cityscape (Nielsen, van den Bosch, Maruthaveeran, & Konijnendijk, 2014). Their large size and habitat diversity have been found to positively contribute to urban biodiversity (Prugh et al., 2008). Given most cemeteries occupy large chunks of land in the city underlines their role as habitat.

While parks and green cemeteries share common characteristics, differences exist in terms of lower recreational pressure, specific habitat features such as sepulchral architecture and sometimes less maintenance (Kowarik et al., 2016). These factors are known to positively influence species richness. Especially the lower visitor pressure makes green urban cemeteries **quiet and relatively undisturbed spaces** and thereby excellent habitats that support urban biodiversity (Kowarik et al., 2016; Politi Bertoncini et al., 2012).

The distinct quality as quiet and stable refuge makes it stand apart within the array of urban habitats.

For example, in their study on the Weißensee Jewish Cemetery in Berlin, Kowarik et al. (2016) found that old tree-covered cemeteries provide a great habitat for native species that are generally negatively affected by habitat loss and forest fragmentation in urban environments. **Birds** in Northern Europe are very sensitive to landscape composition and configuration, and many species can thrive well in cemeteries full of old trees (Ferenc et al., 2014). The same is true for **arthropods, such as insects and spiders**, (Magura et al., 2010) and **bats** (Gehrt & Chelvig, 2003).

For perennial plants, Kowarik et al., (2016) results show that **parts of cemeteries containing forest-floor understory** served can be excellent habitat islands for woodland species. Prerequisite are standing grave markers to leave space on the ground to have space to grow a thick and lush understory. Another emerging insight on cemetery groundcover lies within urban grasslands, which will be stressed under the subchapter of 'maintenance'.

Furthermore, cemeteries are full of **sepulchral structures (e.g. gravestones, tombs)** that, when time passes and the elements settle in, start functioning as habitat analogues for **species whose habitats are natural rocks, such as lichens and bryophytes** (Lundholm & Richardson, 2010). Often, some of these species are (critically) endangered. Furthermore, all sorts of wall vegetation, such as endangered ferns, could find



Fig 4.2: At Mount Auburn Cemetery, Cambridge, USA, the Maple Avenue was designed to provide 200 new burial areas in crypts along a curving path through groves of native trees and shrubs to improve habitat diversity. Meanwhile, the thicket also functions as site edge, screening off an adjacent road; source: Reed Hilderbrand, 2021



Fig 4.3: Barn owl using the cemetery as habitat to forage; source: NaturesLens, 2014



Fig 4.4: Diverse forest-floor understory designed with seasonal changes at Nordre kirkegård, Herning, Denmark. A semi-open canopy brings in a lot of light on the graves and enables a rich understory to develop and thereby defines the whole atmosphere of the visitor. Prerequisite are standing grave markers to leave space on the ground to have space to grow a thick and lush understory; source: Herning Kirkegårde, 2021

habitat in the gaps of walls and tombstones.

Derived from ecological theory on habitat heterogeneity, the importance of temporal and spatial **habitat heterogeneity** is stressed for the biodiversity richness of old urban cemeteries (Nielsen, van den Bosch, Maruthaveeran, & van den Bosch, 2014). Given most historic green urban cemeteries have grown organically over time, there is a difference in age, maturity, and usage intensity and sometimes even parts of neglect. This already makes for habitat heterogeneity and from a urban biodiversity perspective should be conserved, or enhanced, by allowing natural development in some parts of the cemetery, while keeping other parts more open, with different degrees of canopy closure (Kowarik et al., 2016).

#### 4.2.2. REGULATING ECOSYSTEM SERVICES

Green urban cemeteries are often mature landscapes that frequently pre-date municipal parks. That gives them a major capacity to deliver regulatory ecosystem



Fig 4.5: Trees that have had the space and time to grow into mature trees. Pictured above, at Weissensee Cemetery (DE), a dense canopy and beautifully dappled light; source: P. Adenis, 2016

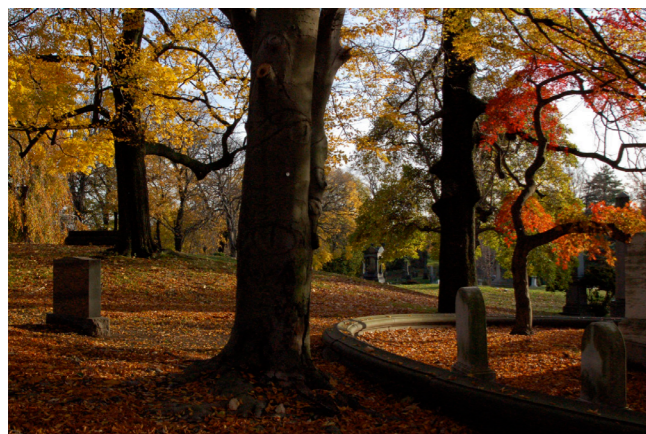


Fig 4.6: Variation and seasonal dynamics at Green Wood creates strong aesthetical experiences; source: Vige, 2009

services. Trees are the most prominent elements of most cemeteries' vegetation because of their size, shape, and seasonality. The large collection of trees in urban cemeteries, makes one could approach them as true arboreta.

At cemeteries, trees have the **space and time to grow into large mature trees**, giving them a big advantage to deliver regulatory ESs. This is a big advantage over most other urban trees in pavement, e.g. in street and plazas, that cope with little rooting space, poor soil and drainage, soil compaction from traffic, and disturbance from digging operations. Landscape architect Springer already knew this and in his cemetery designs actively separated trees in tree soil from areas active burial, characterized by poor sandy soil for drainage and aeration and that would be disturbed by grave digging (Wille et al., 2004). Therefore, when fully grown in all their grandeur, cemetery trees can maximally provide social, aesthetic, climatic and ecological benefits. Social, aesthetic, and climatic benefits will be discussed below, where ecological benefits have been discussed as part of the subchapter 'Cemetery as Habitat'.

Urban trees can play a major role in improving environmental conditions. The climatic benefits have been found to not only relate to areas of woodland, but smaller groups, lanes and solitary trees can equally improve environmental conditions in urban areas (Tyrväinen et al., 2005).

Firstly, cemeteries rich in tall mature trees both **provide shade and reduce the local temperature**. The latter fact is because the vegetation converts solar energy into latent heat energy through evaporation of water (Van Hove et al., 2011). Canopy rich cemeteries thus have lower air temperatures than their surroundings, which can have significant impacts on human health. After intercepting solar radiation, reducing air temperature is the second most effective way to reduce heat load on people and temper the consequences of the urban heat island (Brown et al., 2015).

During heat waves, these cooler cemeteries may provide citizens with shade and relief from high air temperatures, thereby increasing thermal comfort. Thus, in case the cemetery is the only park around in a neighborhood, opening these spaces to be used as parks allows them to act as cool zones where one can make a stroll or sit down in the shadow. Thereby they help the city protecting its citizens, particularly the elderly and those with a medical condition, from excessive heat.

Cemeteries also provide climatic benefits on the larger urban scale, but these are discussed later this chapter.

Secondly, trees and vegetation **reduce air pollution** by removing pollutants. Trees capture air

pollutants most efficiently when they are planted close to the source of emissions (Tyrväinen et al., 2005). In most cemeteries, this means the edge can help reduce air pollution by removing pollutants from, for example, adjacent roads.

#### 4.2.3. CULTURAL ECOSYSTEM SERVICES: CEMETERY AS MEMORIAL SITE AND COLLECTIVE RESOURCE

As discussed in chapter one, most cultural ecosystem services lie in their (potential) public park functions as discussed in chapter three. These are related to providing recreational opportunities, improving mental and physical health, and providing aesthetics and inspiration (Axelsson-Lindgren, 1995; Tyrväinen et al., 2005, p. 81; Tzoulas et al., 2007; Van den Berg et al., 2014).

What was missing, but is an essential cultural ecosystem service, is their capacity to **provide space for spirituality**.

#### 4.2.4. POTENTIALS

In literature, differentiated management, developing urban grasslands and naturalistic meadows and new forms of burial have been identified as potentials that can enhance the habitat function of green urban cemeteries. Hereby, tension lies in how to increase their ecological value, while harmonizing other aims, including allowing ongoing uses (visits, burials), conserving cultural heritage.

#### URBAN GRASSLANDS

Clayden et al. (2018) argue that by **reducing the use of clipped lawn grass and introducing rougher meadows**, cemeteries can contribute to creating habitats and spaces that are more complex, especially for insects and their predators, but that demand less management and fewer pesticides.

The approach of Dutch local authorities to management traditionally has been underpinned by the drive to maintain a more formal and manicured aesthetic of the cemetery by means of neatly clipped lawns. Intensive maintenance, such as frequent mowing and fertilization, is required to maintain the clipped lawn and are a significant contributor of greenhouse gasses (Milesi et al., 2005). Furthermore the ubiquity of clipped lawns is a principal barrier to biodiversity provision, since they are poor refuges for plant and animal communities due to their intensive management (Aronson et al., 2017).

There is a growing realization that alternative management regimes can be both cost effective and more

#### GEOGRAPHICAL DIFFERENCES IN CEMETERY DESIGN

There is a geographical limitation on the potential of green cemeteries as critical green infrastructure. In Europe, traditionally the Latin and Nordic burial tradition are the dominant ideas and each other's explicit opposites (Wille et al., 2004). Latin cemeteries in Southern-Europe are predominantly hardscape landscapes paved by individual tombstones and sparse greenery, see figure 4.6. In the Nordic burial tradition, the overall cemetery landscape reigns over the individual grave and the dead are buried in a green commemoration landscape, see figure 4.7.

Dutch cemeteries generally align with the Nordic tradition, being uniform green park-like landscapes, where the individual expression is subordinate to the larger cemetery landscape.

Thus, on-plan, many green urban cemeteries in the North-West of Europe can be seen as green islands in their neighborhood. Therefore, green urban cemeteries can be regarded as increasingly valuable entities for biodiversity conservation given their ubiquity within urban fabrics world-wide.



Variation in cemetery design in Latin versus Nordic burial tradition; Fig 4.7: Our Lady of Almodena Cemetery, Madrid (ES); source: Diaz, 2021 Fig 4.8: Assistens Cemetery, Copenhagen (DK); source: Qiujielblog, 2016

## URBAN GRASSLANDS AT GREEN WOOD CEMETERY

Green Wood Cemetery (New York) shows us successful examples of developing perennial meadows and rough urban grasslands in a cemetery. This was pioneered in collaboration with Cornell horticulturalists and designer Larry Weaner. They introduced new seed mixes to improve the traditional mix, adjusted the frequency and height of mowing, and found effective ways to manage soil disruption (Charap et al., 2020).

Lessons have been learned in the process, especially relating to public acceptance. While the public voiced strong enthusiasm for the transformation, aesthetic concerns were voiced by stakeholders and lot owners that saw the longer grass as a symbol of neglect. They learned to gradually implement such changes and balance mowing frequency with growth rate. In reverse, the initiators also see it as opportunity and educational project to shape the public's view of acceptable lawn management, thereby quietly planning to raise awareness (Charap et al., 2020).



Fig 4.9: In the fall, the windswept gold-colored grasslands give the cemetery a cinematic feel; source: T. Stoelker, 2021

Fig 4.10: Mausolea are nestled in among the wildflower meadow by Larry Weaner, an attractive solution that increases biodiversity and is an attractive maintenance solution for steep terrain; source: Art Presson, 2020

sustainable (Smetana & Crittenden, 2014). Chollet et al. (2018) show that a reduction of mowing frequency induces a dramatic increase in the plant community diversity and act as resource for animals such as pollinators and insect predators.

The decrease of in-ground burials, decommissioning of grave fields, and changing societal perception on natural aesthetics provide an opportunity to challenge the clipped lawn cemetery aesthetic by returning to a more complex and diverse vegetated landscape. In doing so, the cemetery could once again make a more substantive contribution to delivering a range regulatory ESs that help to mitigate the effects of urban heat islands, flooding, poor air quality and loss of biodiversity (Cameron et al., 2012; Clayden et al., 2018).

Developing urban grasslands within cemeteries gets the public engaged in the importance of pollinator habitat in the city and, on a symbolic level, will attract many forms of life to a place that memorializes the deceased.

## DIFFERENTIATED MANAGEMENT

Kowarik et al. (2016) argues for the use of differentiated management that includes cemetery sections that are maintained regularly and others where little maintenance occurs, and nature is allowed to develop., see figure 4.11. Thereby a **heterogeneity of habitats** can evolve in the cemetery, thereby supporting urban biodiversity. However, this would also require a careful consideration **balancing culture and nature** (or ideas on wilderness, naturalistic aesthetics, and neatness).

Kowarik's et al. (2016) study on the beforementioned on the Weißensee Jewish Cemetery in Berlin highlights the habitat value of old urban cemeteries for native plants and animals, and shows that less frequently managed parts of the cemetery where a forest-floor understory is allowed to develop, can be excellent habitat islands for woodland species. Since many old urban cemeteries are also important heritage sites, conflicts arise between biodiversity conservation and monument preservation. Their study argues that cultural and biological values can co-exist in old cemeteries but requires reconciling biodiversity and heritage conservation for it to work.

So, how to give shape to this? Ecological quality tends to look messy, and this poses problems when imagining and constructing new landscapes that enhance ecological quality. Recent studies point out the acceptance of 'wild' elements in urban green spaces by residents is often higher than expected (Weber et al., 2014), especially when **minor cultural interventions** make it look cared for and indicate natural succession as a wanted process (Bergman, 2020;

Hofmann et al., 2012). Mowing a narrow strip along the edge, maintaining verges of allées or paths in wilder parts of the cemetery enhances the acceptance of related natural processes by visitors (Bergman, 2020; Kowarik et al., 2016). In other words, 'it requires designing orderly frames for messy ecosystems' (Nassauer, 1995). See for example the work of Gilles Clement, Michel Desivigne or Georges Descombes wherein some parts of the design are fixed, and some are able to evolve and become 'messy'. This also creates new possibilities for landscape design, as it forces landscape designers to desert conceptions of gardens and landscapes as merely governed by human maintenance and needs (Lokman & Herrington, 2016).

From the perspective of monument preservation, it is important that the colonization of built structures by plants and animals not be negatively perceived as the destruction of important artifacts (Kowarik et al., 2016). As mentioned before, sepulchral structures may pose great potential for all sorts of lichen and wall vegetation, see figure 4.11. Thus, allowing the overgrowth of built structures such as walls or graves in some parts of the cemetery may appropriate, while constantly being in dialogue with heritage experts to prevent deterioration of graves of high cultural importance and keeping out excessive threats such as tree establishment which roots could tear apart the monument.

## NEW FORMS OF BURIAL

The shift from in-ground burial to cremation means decreasing pressure on space, since ash burial takes up less space than conventional coffin burials. Space saving burial options leaves more space available that could be designed in a more nature inclusive fashion. E.g. lush urn gardens, compacter burial clusters and memorial groves instead of conventional burial fields densely populated by individual headstones. See Fig. 4.12 and 4.13 for an example. Furthermore, natural burial also lends itself for more nature inclusive designs.

## 4.3. SCALING UP: CEMETERIES AS CRITICAL PART OF THE GREEN INFRASTRUCTURE

Tzoulas et al. (2007, p. 169) stress that green infrastructure are 'all natural, semi-natural and artificial networks of multifunctional ecological systems within, around and between urban areas, at all spatial scales'. When studying green urban cemeteries in relation to green infrastructure, this implies one should conceive the cemetery as **part of a wider green open space system**, implying a multi-scalar approach. Thus, in this subchapter we will zoom out, transcending the site scale.



Fig 4.11: Example of the colonization of built structures by plants of conservation concern: the ferns *Cystopteris fragilis*, *Asplenium trichomanes* at Weissensee Cemetery in Berlin, Germany; source: Kowarik et al., 2016

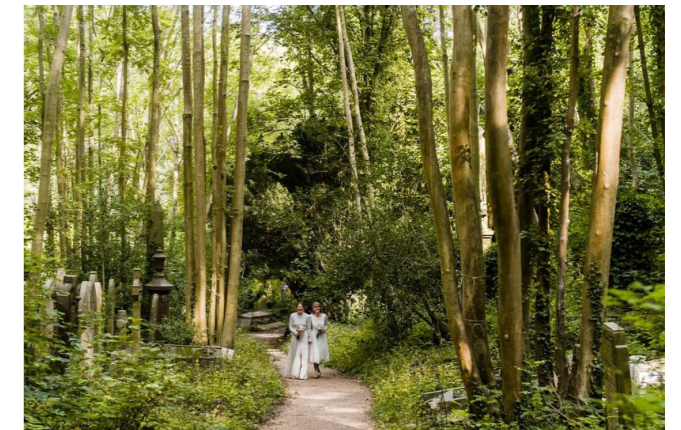


Fig 4.12: Less frequently managed parts of the cemetery where a forest-floor understory can develop, can be excellent habitat islands for woodland species, while at the same time still being appreciated by users; here a wedding at Arnos Vale cemetery in Bristol, UK.; source: Plotbox, 2019



Fig 4.13: Example of compact urn graves that leave plenty of room for landscaping: loosely placed urn internments in a birch grove at Berestein cemetery, Hilversum, The Netherlands; source: Holm, 2015

#### 4.3.1. POSITIONALITY IN THE CITY & BETWEEN HUMAN & NON-HUMAN

Green infrastructure relates to the complete set of green spaces and the connectivity between them. Furthermore, key literature suggests green infrastructure should aim for multi-functionality, which implies they should perform well ecologically, meanwhile being enjoyable for human visitors as well (J Ahern, 2002; Jack Ahern, 2013; Ryder, 1995; Walmsley, 2006). Weilacher (2015) points out it is risky to use the predicate green in spite of the long-established understanding that nature in the city is not only green but also grey; a “color-neutral” understanding.

Key point as a take away is that this implies green infrastructure is to be aimed and designed for all its inhabitants; **humans** (e.g. for recreation) and **non-humans** (e.g. habitat provision), which is the position taken in this thesis.

#### 4.3.2. SUPPORTING ECOSYSTEM SERVICES

Parks and alongside green cemeteries are one of the most important components of the urban green infrastructure (Bertram & Rehdanz, 2015; Bolund & Hunhammar, 1999; Chiesusra, 2004; Shanahan et al., 2015). The biggest supporting ecosystem service of cemeteries is in the **habitat they provide** and how they can act as **connector between other green spaces** at different scales. The provision of habitat has been discussed before, and here we focus on the integration of the cemetery in the city-wide green infrastructure.

Creating habitat and designing nature-inclusive is a broad issue in terms of scale and complexity. Here, most important is to see the interventions as holistic issues that make sense on both the site and relate to the wider territory. E.g. simply placing nesting boxes for bats only makes sense if the bat can forage, finds safety, and has routes to migrate outwards.

On an abstract level, the city’s green infrastructure can be seen as a system of **points (small habitats), surfaces (large habitats) and lines (migration routes)** (Vink et al., 2017). Points are specific micro habitats where individuals or sub-populations live, such as an amphibian pool or decaying tree. A large habitat patch forms a surface on the ecological city map, like a city park or cemetery. The lines are the ecological connections between habitats and between the city and countryside.

When designing habitat and aiming for contributing to the city’s green infrastructure, it is essential to first make an inventory of the existing situation and understand the way local species and (a)biotic factors relate to each other. Ecosystems are so complex that it is better to relate to existing conditions and built from there (Vink et al., 2017). That way the design is in conjunction with the overall system, fitting into the existing green infrastructure.

Thus, a cemetery with high ecological connectivity (the lines) is one in which organisms can move freely between suitable habitats (Bennett 2003, Crooks and Sanjayan 2006; Mitchell, Bennett, and Gonzalez 2013). This has all sorts of benefits, amongst others for pollination, seed dispersal, and maintaining genetic diversity. When working on connections, different species respond differently to the same physical environment, therefore requiring a variety of specific type connections (Rudnick et al. 2012; Bennett 2003). That being said, spatially disconnected green spaces can be functionally connected, e.g. while bats need trees or buildings to navigate, birds can fly out independently.

#### 4.3.3. REGULATING ECOSYSTEM SERVICES

As stated before, green urban cemeteries with a significant canopy (which is often the case) have a major role in **regulating local climate and mediate environmental extremes** such as temperature peaks. The cooling effects of urban parks, and cemeteries, is referred to as ‘Park Cool Island’ (Wang et al., 2018). The cooler air from parks often moves out into adjacent neighborhoods, providing cooling winds that greatly reduce heat stress during hot days (Nowak & Heisler, 2010).

Park size and tree coverage matters in providing climatic benefits. The cooling of surrounding areas has been found to increase with park size (Nowak & Heisler, 2010). Large parks, and thus large green cemeteries, are cooler than the smaller ones - Chang et al. (2007) found that parks over three hectares are usually cooler than their surrounding urban area, while temperature difference was more variable for parks smaller than three hectares.

Furthermore, green urban cemeteries are able to purify air and sequester carbon, be it these are generic attributes that green spaces share and air purification has been shown to mostly have local impacts, as mentioned before in subchapter 4.2.2.

#### 4.3.4. CULTURAL ECOSYSTEM SERVICES

As discussed in chapter one, most cultural ecosystem services lie in their (potential) public park functions as discussed in chapter three. To summarize, first, these are related to increasing the natural and landscape values of towns, thereby increasing the quality of resident’s lives (Millward & Sabir, 2011). Secondly, cemeteries are places where people with shared experiences and feelings can encounter each other, thereby providing a sense of community. Thirdly, the cemetery functions as a city archive and thereby gives a sense of belonging, rootedness, and sense of place in a particular way that other parks do not cater for (McClymont, 2016).

### 4.4. CONCLUSION

Many green urban cemeteries are blind spots in city’s green infrastructure planning, whereby their specific role and potential remain unaddressed. As stable, quiet and relatively undisturbed green space they provide a range of supporting, regulating and cultural ecosystem services, as presented in figure 4.1. This places us in a position to come up with a set of potentials as well.

The biggest potentials that were found are two-fold. First, potentials to improve on-site ecological performance through new management practices and the introduction and design of more sustainable burial options. Second, on the city-wide scale, potentials of connecting to the wider green infrastructure, aiming to unlock and integrate its ecological qualities of the cemetery into the larger green infrastructure.

Thereby, green urban cemeteries can be regarded as increasingly valuable entities in biodiversity conservation given their ubiquity within urban fabrics world-wide and are simply inevitable when planning and designing in the age of a climate and biodiversity crisis.

Thus, the tension lies in how to increase their green infrastructure value, while harmonizing different aims, including allowing ongoing uses (visits, burials), conserving cultural heritage and providing habitat. Concrete approaches, design strategies and tools on how to get this done are presented in chapter five and appendix 2.



## 5. REFERENCE STUDY: PUBLIC JOINT USAGE OF GREEN URBAN CEMETERIES IN PRACTICE



### 5.1. INTRODUCTION

As mentioned before, even though landscape architects and urban planners are successfully working on the (re)design of green urban cemeteries, there is limited research on these design approaches, let alone comprehensive volumes bundling together relevant knowledge for the planning and design industry. Designers often search for precedents or best-practice examples. However, these are specific to their location and design brief and it can be complex to apply them to a new assignment which has its own specificities. Here, the potential of generating design guidelines arises, since they provide principles or strategies rather than one specific solution (Prominski 2017).

Therefore, the reference study on exemplary multifunctional green urban cemeteries is aimed to generate a set of design guidelines reflecting what lay-out and design principles makes them successfully host additional roles for public joint usage and be integrated into the wider urban open space system. It zooms in on what exactly it is in a cemetery design that makes them suitable for public joint usage and makes them contribute to the city's green infrastructure. Furthermore, it is studied how these parks function in their urban context.

This chapter summarizes the results of the reference study on three existing urban cemeteries:

- Skogskyrkogården in Stockholm, Sweden
- Green Wood Cemetery in Brooklyn (NY), USA
- Melaten Cemetery in Cologne, Germany

Short descriptions and conclusions of the reference study are presented in this chapter. The extensive reference study can be found in appendix 1.










### 5.2. ANALYTICAL FRAMEWORK

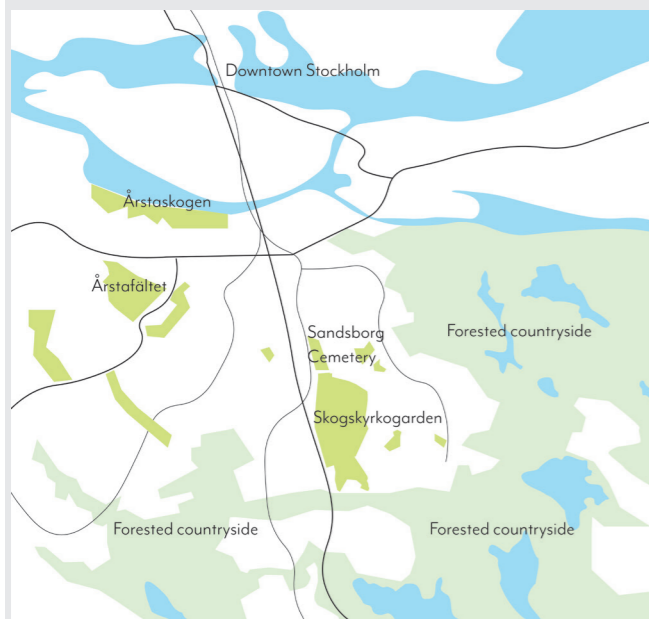
The results are summarized and evaluated through the analytical framework that consists of:

- **Architectural composition:** analysis of the lay-out, including the design of burial fields, and features that structure the site, including the edge condition.
- **The use of planting:** the way planting is used to structure and create certain atmospheres in the design. Furthermore, the design's ecological performance and relevance to the green infrastructure.
- **Circulation:** the way circulation is organised on-site and how it is integrated in the wider urban context
- **Urban life and multifunctional use:** the extent of public joint usage and the extent to which the cemetery is part of local urban life

### 5.3. SKOGSKYRKOĠÅRDEN

Location **Stockholm (SE)**  
 Owner **City of Stockholm - public ownership**  
 Year **1917**  
 Designers **Gunnar Asplund and Sigurd Lewerentz**  
 Size **102 hectares**  
 Graves **385.645**  
 Types **In-ground burial, urn field, ash scattering**  
 Hours **main entrance 24/7  
 other entrances 11 AM - 4 PM**

- Users
-  mourning relatives
  -  pedestrians / strollers
  -  cyclists
  -  playing kids
  -  sledgers
  -  dogwalkers
  -  joggers
  -  roller skaters
  -  visitors / tourists



59°16'11.3"N 18°06'15.5"E

Skogskyrkogården is an exceptional example of how architecture and landscape can be combined in a cemetery. Its design has greatly influenced the design of cemeteries around the world (Treib 2005). The German woodland cemetery movement (e.g. Ohlsdorf, Hamburg and Waldfriedhof, Munich) served as inspiration for the cemetery's design, as did Casper David Friedrich's paintings.

Between 1917 and 1920, this cemetery was built on a site covered with pine trees, where the existing forest was delicately tailored to its new function by blending plant and architectural components and altering and exaggerating existing topography. Thereby they skillfully manipulate views and scenery that provides in variation while moving around the cemetery.

The Skogskyrkogården is a strong example that shows there can be a multiplicity of landscapes within one site. This cemetery holds multiple identities and atmosphere in one space that is made possible by successional degrees of privateness. Transitions from the public areas to the more (semi) private areas create a continuity in the cemetery that is pleasant for visitors, mourners and local residents.

The park's entrance is structured along a modestly designed, ascending boulevard, with the sound of water from a nymphaeum. This brings about an interesting arrival without the usual clutter of gravestones directly 'in your face'. Instead, one arrives at a clean, serene scene, the purpose of which is contemplative and very powerful (Clayden & Woudstra, 2003).

The dense pine forest that was largely retained in the design makes the site, surrounded by suburban neighbourhoods, relevant as an 'urban forest' habitat within Stockholm's green infrastructure. It consists of large full-grown trees and, in areas where no burial occurs, a rich understory, resulting in a biodiverse environment that provides a habitat for local flora and fauna.



Fig. 5.1: overview plan; source: author



Fig. 5.2: Central clearing located after the main entrance, with the urn gardens on the left, meditation grove on the hill on the right; source: Landezine, 2010



Fig. 5.3: The open character of the woodland is maintained by a regime of gravemark expression; source: Landezine, 2010

## 5.4. GREEN WOOD CEMETERY

Location	<b>Brooklyn, New York (US)</b>
Owner	<b>Green Wood Historic Fund - charitable organization</b>
Year	<b>1938</b>
Designers	<b>Almerin Hotchkiss David Bates Douglass Quennell Rothschild &amp; Partners</b>
Size	<b>193 ha</b>
Graves	<b>570.000</b>
Types	<b>In-ground Burial, individual, and communal Mausoleum</b>
Hours	<b>daily 7 am - 7 pm</b>
Users	<ul style="list-style-type: none"> <li> mourning relatives</li> <li> pedestrians / strollers</li> <li> outdoor hangouts / picnics</li> <li> playing kids</li> <li> sledgers</li> <li> birders</li> <li> dogwalkers</li> <li> event visitors</li> <li> tourists</li> </ul>



40°39'25.9"N 73°59'35.2"W

Located in the middle of the dense and highly urban Brooklyn (New York), Green Wood Cemetery is a 193 hectares burial park of hills, valleys, glacial ponds, winding paths. Established in 1838 as a garden cemetery, it was 'Brooklyn's first public park, before Olmsted created Prospect Park' (White, Willensky, and Leadon 2000).

Parks are rare in Brooklyn, making the place stand out and be used as a true public park by locals. Despite its limited hours of operation, the cemetery plays an essential role for the surrounding communities. Since it's the only major green space in the area, many people come here to walk their dogs, meet with others, picnic, or escape the heat of the sun as the New York summers can be hot. The site's park-like design with winding walking paths and four seasons of beauty from century-and-a-half-old trees make it a peaceful oasis for mourners, visitors and the local communities alike.

Spread out over the site, there are features such as lawns, ponds and flower gardens that explicitly are not used for burial and have been appropriated by locals for informal activities. Furthermore, these areas allow the cemetery to host events such as an outdoor movie screening or the Nightfall light festival around Halloween that offer low-profile and interesting opportunities for locals for new ways to visit its grounds and generate additional income to support this monumental site.

The park is designed in 'gardenesque' style (Turner 1986) which makes it an attractive park for recreation, but the drawback here is the grave fields are very exposed and no retreat is really possible. Furthermore, there is also little variation between burial fields.

The site hosts an extremely diverse stand of trees and is recognised as an arboretum, which adds to its ecological significance of the site (e.g. diverse blooming period for insects). In recent years, the cemetery management ramped up the amount of projects that focussed on improving habitat. Thereby it has introduced perennial prairie meadows and transformed clipped lawns into urban grasslands, in order to introduce more native planting and boost habitat diversity.



Fig. 5.4: overview plan; source: author



Fig. 5.5: Historic depiction of Green Wood Cemetery; source: Green Wood Historic Fund, 2021



Fig. 5.6: Every summer, the cemetery organises outdoor cinema nights; source: Maïke Shultz, 2019

## 5.5. MELATEN CEMETERY

Location	<b>Cologne, Germany</b>
Owner	<b>City of Cologne</b> - publicly owned
Year	<b>1810</b>
Designers	<b>Ferdinand Franz Wallraf</b> (architect) <b>Maximilian Friedrich Weyhe</b> (Landscape architect)
Size	<b>43 hectares</b>
Graves	<b>55.500</b>
Types	<b>In-ground Burial, urn field, ash scattering</b>
Hours	<b>Summer 7 a.m. to 8 p.m.</b> <b>Autumn 8 a.m. to 7 p.m.</b> <b>Winter 8 a.m. to 5 p.m.</b>
Users	<ul style="list-style-type: none"> <li> mourning relatives</li> <li> pedestrians / strollers</li> <li> cyclists</li> <li> joggers</li> <li> visitors / tourists</li> </ul>



Melaten Cemetery was opened in 1810 during the Napoleonic era of hygienic reforms. Its lay-out can be considered as rational and efficient as other public works of hygienic reform. The Melaten Cemetery has a clear lay-out that is divided in a grid of burial fields or 'rooms' that are connected by rectangular paths.

While the cemetery was only sparsely planted at the beginning, in 1826 this changed with an extensive planting plan from the garden architect Maximilian Friedrich Weyhe. Now, all main axis are planted with large plane trees create airy cathedral-like avenues and the secondary paths with a mixed tree selection that offer year-round interest. This makes a pleasant landscape for a walk or a run for visitors, mourners and local residents alike.

Its easy navigable path system results in recognisable A to B avenues, which makes the cemetery naturally started to function as a slow traffic thoroughfare for local residents connecting adjacent neighbourhoods and missing links in the bike network. It attracts other user groups and significantly adds to the feeling of 'publicness' at this cemetery, as these main allees become like 'city streets'. In contrast, the burial fields are like garden rooms that provide privacy and seclusion. This brings various 'speeds' to the cemetery; the axis as spaces of movement and the burial fields as places to stop and memorialise.

This case offers the largest diversity of burial options in comparison to other cases; the grid is a strong patchwork that is able to implement diverse burial wishes. This overall layout is highly adaptable, as its structure (casco) has existed since its existence, but the programming of every burial field can change over time. Recently, several citizen initiatives resulted in the opening of three lush perennial urn gardens, and in the future it is likely changing burial demands will result in more burial fields to change. Since every burial fields is like its own world, there is an exciting juxtaposition of 'garden rooms' to explore.

Ecologically speaking, the diversity in burial rooms also is an interesting lay-out that adds to the biodiversity of the place, since it enables a diversity ranging from forested patches where wildshoots roam freely to lush perennial meadows.

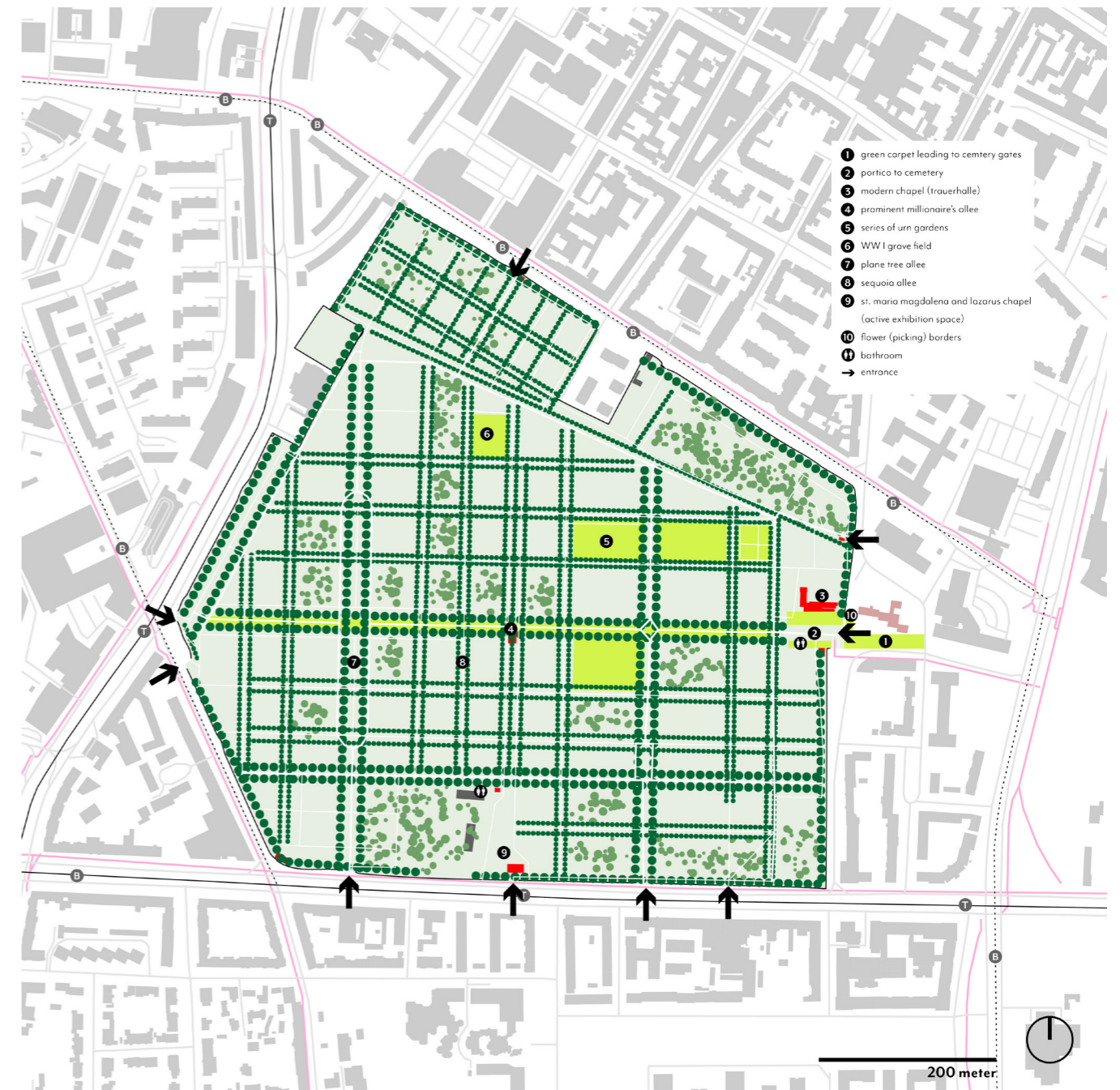


Fig. 5.7: overview plan; source: author



Fig. 5.8: Melaten Cemetery's primary axes are aligned by light and airy plane tree canopy. This planting choice creates a pleasant atmosphere, which takes away the hard and dark feeling of a cemetery; source: author



Fig. 5.9: Urban bike network connects well with the primary cemetery roads, therefore function as thoroughfare for slow traffic; source: author

## 5.6. REFERENCE STUDY OVERVIEW

The three reference studies show similarities and differences regarding their lay-out, connection to the city and the user groups they attract. The characteristic they share, and which can be concluded from this reference study, is that green urban cemeteries are indeed able to host park functions, allow for public joint usage and can positively contribute as green infrastructure to the city's open space system.

All three case studies offer generous green areas, space and tranquility, and are increasingly considered communal spaces that start functioning like public parks. This is most evident in Green Wood, since it's the only major green space in the area, many people come here to enjoy all sort of activities normally seen in 'normal' city parks. Contrastingly, Skogskyrkogården sees the least public joint usage of all three cases, given the availability of alternative green spaces in the green and spaciouly laid out neighbourhoods. Thus, we can speak of a negative correlation between the availability of 'other' nearby green spaces and the occurrence of public joint usage.

As seen in this reference study, cemeteries have the ability to truly become part of the urban fabric and urban life (= spatially and socially). Green Wood and Melaten Cemetery actively invite urban life through their gates. E.g. Melaten Cemetery does so by allowing slow-traffic connections between surrounding neighbourhoods, and Green Wood Cemetery is the best example as it offers a vast amount of year-round programming of events and community programs. In the lay-out and design of Green Wood Cemetery, there is also space kept free from burial and that leaves room for other program, following from the fact this garden cemetery back in the days was also explicitly aimed to be used for recreational activities such as picnicks and carriage rides. These two references break with the paradigm of the cemetery as introvert, closed-off spaces, and make it a rather porous and inviting space in the urban fabric. A sidenote here is that the Green Wood and Melaten Cemetery are closed at nighttime, but that can be the case for urban parks as well.

When it comes to flexibility of the design, the Melaten Cemetery showed the strongest framework to cope with change. It's gridded structure (casco) has existed since its existence, but the programming of every burial field can change over time. Since every burial fields here can be seen as a small world on its own, there is an exciting juxtaposition of different worlds in one site.

Regarding ecological and habitat qualities, the case study of ecological significance and habitat provision is something best dealt with on the large scale. Therefore, it is striking only Skogskyrkogården is dealt with in the city's green infrastructural plans. It is discussed in park plans at the local level and assigned ecological, recreational and social qualities, as well as included in ecological plans that aim to secure the habitat of species threatened by extinction (Nordh and Evensen 2018). Green Wood, in a context of little government intervention in urban planning and design, is managed by a trust that sets its own goals regarding ecology and habitat provision. Melaten Cemetery, being adjacent to the inner green belt, is not included in the city's 'grüngürtel' plans. This is striking, given its potential and the city has such a historically strong green belt planning tradition. Given their inherent qualities, green urban cemeteries already provide ecological, cultural and recreational functions, but including them in green infrastructure planning could add missing links and offer better integration into the overall open space system. Given these facts, urban cemeteries are simply inevitable when planning and designing in the age of a climate and biodiversity crisis.

In conclusion, even though different cultures and traditions influence the role of green urban cemeteries in different countries, the three reference cases show that green urban cemeteries hold unique opportunities to contribute with a wide range of qualities to the urban landscape and urban life. All three cemeteries show a wide array of design choices that improve the social, cultural and ecological significance of these landscape, beyond their primary function as active burial space. As a general conclusion, their success in dealing with joint usage, or even being used as a city park, lies in the combination of programming and design. Successful contribution to the wide urban green infrastructure, especially ecological performance, lies in their combination of maintenance and design.

## 5.7. CONCLUSION

Based on the three reference studies and preceding literature study, an overlap in approaches, strategies and design principles started to emerge that effect public joint usage and ecological performance of a given cemetery. From this, a set of guidelines has been derived that is not place-specific. This allows designers to easily transfer them in their own work (Etteger Ma R. 2016, 89–92; Prominski 2017). For a catalog with extensive specifications, see appendix 1.

The guidelines are structured following the work of (Prominski, 2017). Following from the research scope of this thesis two overarching approaches structure the guidelines at the most abstracted level: facilitating public (joint) usage and the provision of ecosystem services. Both approaches are further specified in a set of design guidelines.

First, both approaches are broken down into a set of design strategies that express strategic corridors of possible directions. The design strategy is still abstract and general in nature and shows the variety of directions to achieve the overall aim stated in the approach.

Most design strategies comprise a sub-layer of specific design tools. They are the most concrete suggestion for design, but still 'drawn in an abstracted way to allow for a creative transfer to the specific design case of the user' (Prominski, 2017, p. 198).

Figure 5.10 shows the organization and level of abstraction for all design guidelines. See figure 5.11 and 5.12 for an overview of all harvested guidelines.

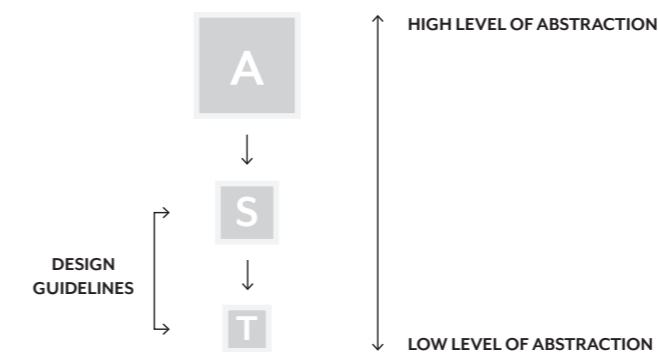


Fig. 5.10: Hierarchical organization of approach, design strategy and design tools in this research, following Prominski's (2017) theorizing on design guidelines; source: author

APPROACH

**FACILITATING PUBLIC USE: DESIGN & ACTIVITY**

STRATEGY

CREATE VARYING DEGREES OF PUBLIC AND PRIVATENESS

- Skogskyrkogården
- Melaten Cemetery

ENCOURAGE PUBLIC AND VOLUNTARY INVOLVEMENT

- Green Wood Cemetery

CONNECT THE CEMETERY TO ITS VICINITY

- Skogskyrkogården
- Green Wood Cemetery
- Melaten Cemetery

OFFER (FREQUENT) APPROPRIATE CULTURAL EVENTS

- Green Wood Cemetery

MAKE THE CEMETERY INTO A PLACE FOR LEARNING

- Green Wood Cemetery

MAKE THE CEMETERY VISIBLE WITHIN THE URBAN FABRIC

- Green Wood Cemetery
- Melaten Cemetery

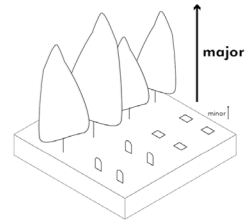
CREATE ATTRACTIVE SPATIAL QUALITIES THAT INVITES AND ALLOWS FOR PUBLIC JOINT-USAGE

- Skogskyrkogården
- Green Wood Cemetery
- Melaten Cemetery

TOOL

SCALE

XS  
individual grave

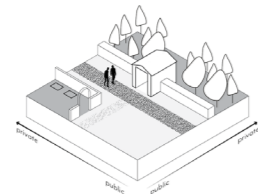


aim for subservient memorials and balance visual disturbance with a strong continuous green decor

- Skogskyrkogården
- Melaten Cemetery

S

burial field

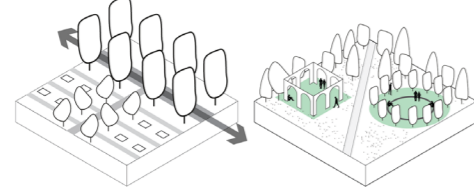


create thresholds that help transition between public and privateness

- Skogskyrkogården
- Melaten Cemetery

M

main structure

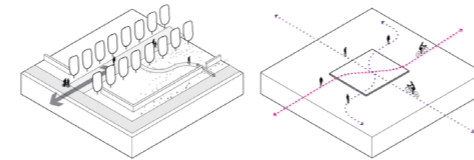


create a path hierarchy

- Skogskyrkogården
- Melaten Cemetery

provide spaces that provide and suggest seclusion and privacy

- Skogskyrkogården
- Melaten Cemetery

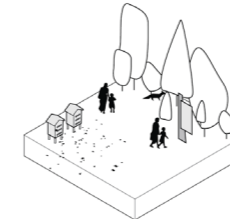


make a hierarchy of entrances; formal main entrance and informal back-entrances

- Skogskyrkogården
- Melaten Cemetery

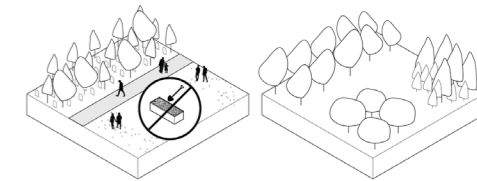
make accessible for all modes of slow-traffic and discourage the use of cars

- Skogskyrkogården
- Melaten Cemetery



include outdoor educational facilities

- Green Wood Cemetery



design spaces where no burrial occurs and that leave room for other program

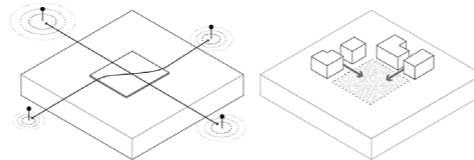
- Skogskyrkogården
- Green Wood Cemetery

use contemporary, light planting with seasonal interests that provides for spatial experience

- Green Wood Cemetery
- Melaten Cemetery

L

place in urban fabric

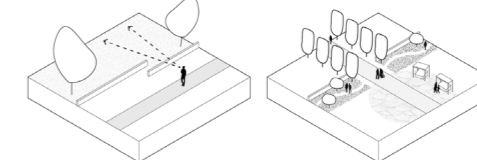


create clear A to B throughfares that make meaningful connections

- Skogskyrkogården
- Melaten Cemetery

align paths and entrances to existing urban grid

- Skogskyrkogården
- Green Wood Cemetery
- Melaten Cemetery



make transparent and permeable edge condition

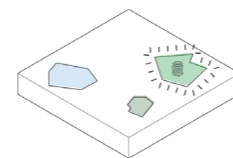
- Green Wood Cemetery

take along the design of the cemetery's vicinity

- Melaten Cemetery

XL

regional landscape



position the cemetery park in its surroundings as throughfare, destination or as both

- Skogskyrkogården
- Green Wood Cemetery
- Melaten Cemetery

Fig. 5.11: Guidelines for facilitating public joint usage; source: author

APPROACH

CONTRIBUTING TO THE URBAN GREEN INFRASTRUCTURE: DESIGN AND MAINTENANCE

STRATEGY

TRANSFORM THROUGH MAINTENANCE REGIME THAT AIMS FOR MORE ECOLOGICAL DIVERSITY

- Literature
- Green Wood Cemetery
- Melaten Cemetery

DESIGN IN CONNECTION WITH THE OVERARCHING LARGER SYSTEM

- Literature

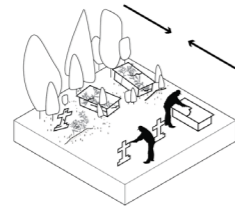
INTEGRATE ECOLOGICAL OBJECTIVES IN SITE LAY-OUT AND BURIAL DESIGN

- Literature
- Skogskyrkogården
- Melaten Cemetery

TOOL

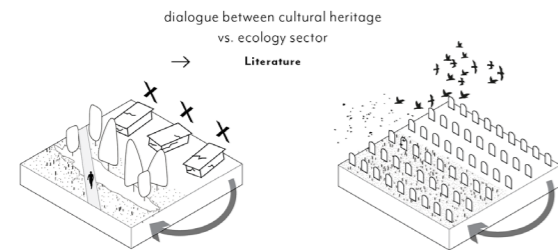
SCALE XS

individual grave

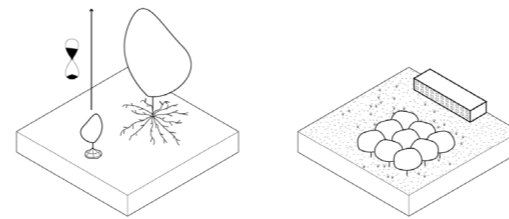


S

burial field



dialogue between cultural heritage vs. ecology sector  
→ Literature

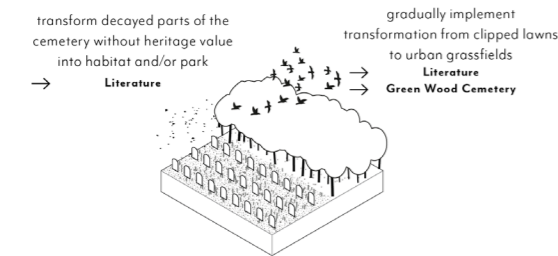


plant trees in a way they have the space and time to grow into large mature trees  
→ Literature

create clustered burial facilities, leaving space open for landscape development  
→ Literature  
→ Melaten Cemetery

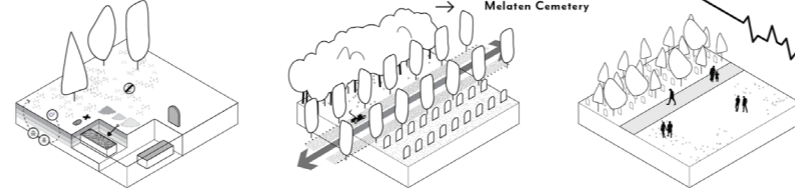
M

main structure



transform decayed parts of the cemetery without heritage value into habitat and/or park  
→ Literature

gradually implement transformation from clipped lawns to urban grassfields  
→ Literature  
→ Green Wood Cemetery



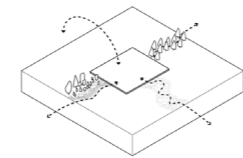
introduce sustainable burial practices  
→ Literature

messy ecosystems, orderly frames  
→ Literature

retain quiet and undisturbed places  
→ Literature  
→ Skogskyrkogården

L

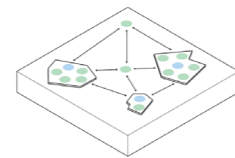
place in urban fabric



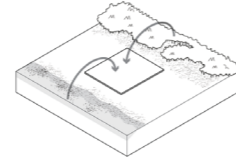
create a variety of connections specific to different target species  
→ Literature

XL

regional landscape



design with points, surfaces and lines in mind to create coherent ecosystem connectivity  
→ Literature



relate interventions to wider territory and built from existing (regional) conditions  
→ Literature

Fig. 5.12: Guidelines to improve contribution to the urban green infrastructure; source: author

## 6. CASE: THE TONGERSEWEG CEMETERY OF MAASTRICHT



The design part of this thesis explores the potentials of the Tongerseweg Cemetery in Maastricht as a contemporary multifunctional cemetery park. This chapter presents the results from the thorough multi-scalar site analysis.

First, subchapter 6.2 presents a macro-scale urban analysis that contextualizes Tongerseweg Cemetery within the broader Maastricht landscape. Furthermore, it discusses recent developments and issues that impact the cemetery's exploitation.

Then, subchapter 6.3 presents the results from a site scale analysis that served as the basis for the proposed strategies and design for the Tongerseweg Cemetery.

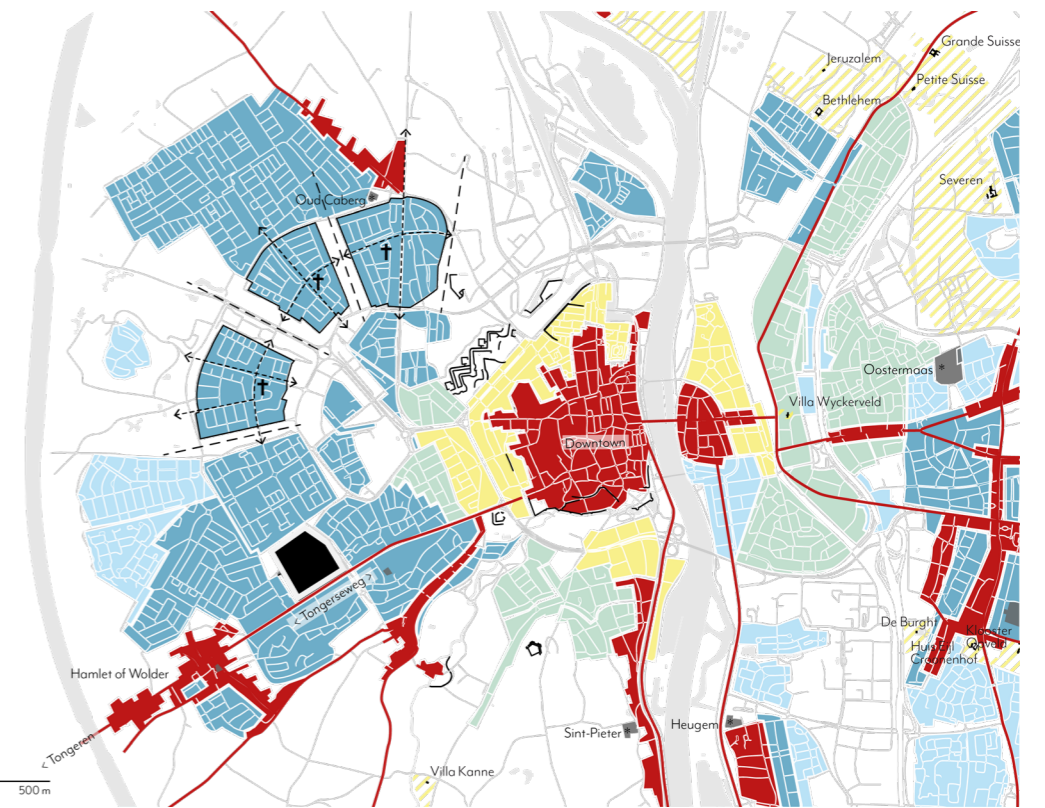
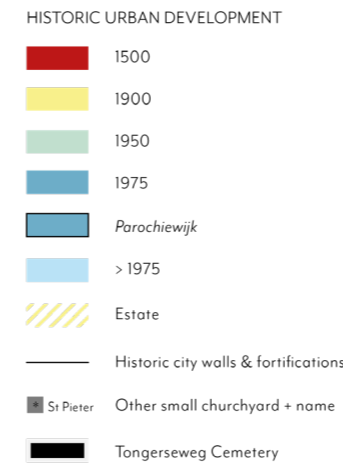


Fig. 6.1: map of historical urban development; source: author

### 6.1. POSITIONING THE CEMETERY IN MAASTRICHT AND THE REGION

#### 6.1.1. HISTORICAL CONTEXT: HOW THE CEMETERY AND CITY CAME INTO BEING

The Tongerseweg Cemetery is owned by the municipality of Maastricht and is one of the oldest public cemeteries in the Netherlands. First established in 1810, it has since been altered and extended into its current size of 12 hectares, with more than 10.000 graves being occupied. In the period of French dominance between 1795 and 1813, several studies were initiated on the future of Maastricht churchyards. These were attempts by the Napoleonic administrators for burial reforms, favoring medial theories and the involvement of technicians as the basis of new cemetery projects (Denton, 2003). This was part of a broader societal movement pushing for hygienic reforms at the time.

The unhygienic conditions at the old Maastricht graveyard between Bogaardenstraat and Capucijnenstraat in the city center were no longer deemed bearable. The terrain coped with stagnating water, causing rotting corpses and the chance of epidemiological outbreaks since houses surrounded it. This situation pressured the establishment of a modern general cemetery, a 'Cimetière Générale'. In 1809 1,2 hectares were bought along the Steenweg, a paved road

connecting Maastricht and Tongeren. Thereby, well situated outside the city, the site meanwhile was well connected to the city.

The first design, a square of hundred by hundred meters, was demarcated with a moat and a wall. A sober yet convincing design designed by the Maastricht's city architect Jean François Soiron (Eijkelenberg & Reinders, 2016).

Since then, the cemetery has grown increasingly over time by a series of expansions. Also, the cemetery's initial peripheral location has not held up, as post-war residential neighborhoods have slowly incorporated the site into the city (see figure 6.1).

Socio-culturally, the end of burial within the city walls marked a whole new period in funerary history. In 1827, Royal Decree determined that every municipality had to have a public cemetery available to be able to bury all residents. From that time onwards, all religious denominations were buried together in the same cemetery, while previously, they remained separated from each other in separate churchyards and graveyards. Because of this compartmentalization along socio-political lines, the different groups were still buried in separate sections within the new cemetery. However, it marks the first step in the cemeteries becoming a more pluriform place.



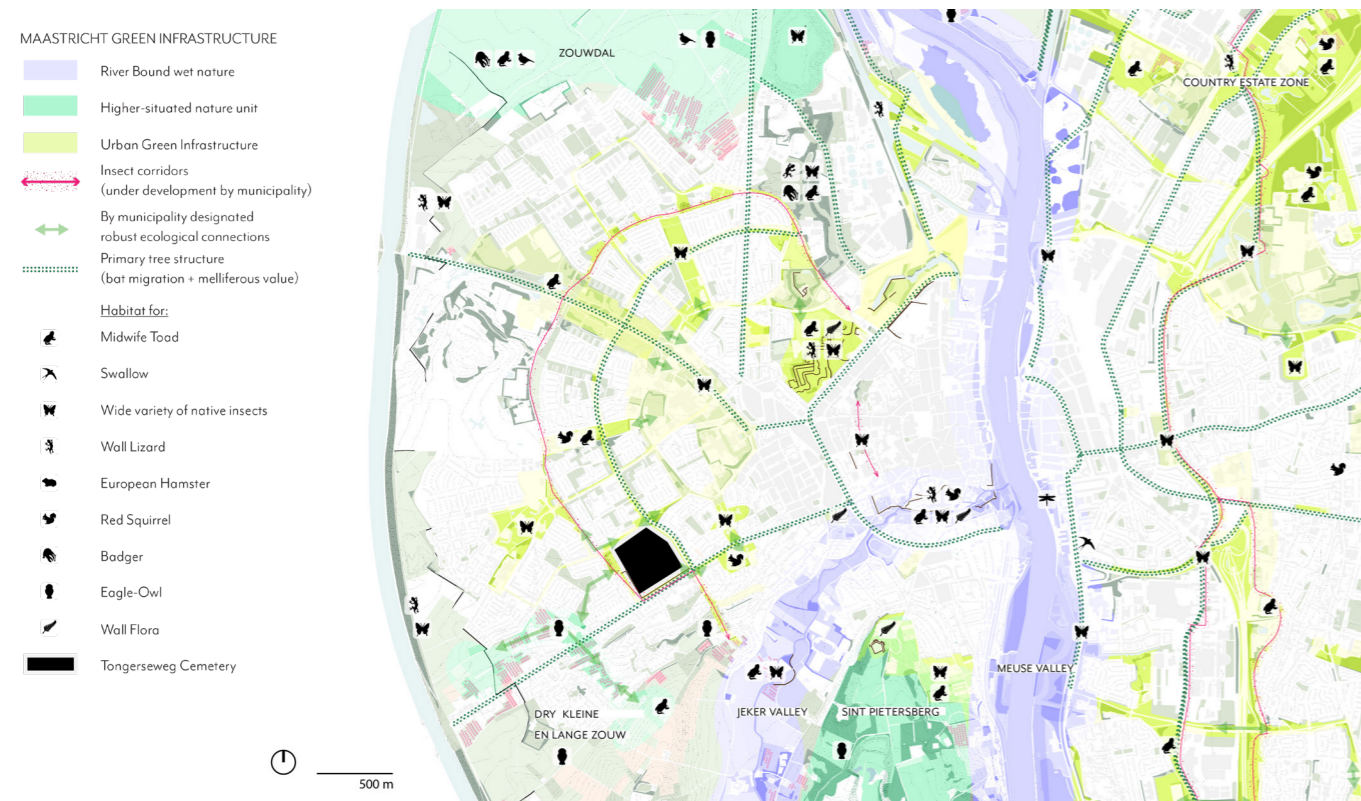


Fig. 6.2: map of Maastricht's green infrastructure; source: author

### 6.1.2. MAASTRICHT'S GREEN INFRASTRUCTURE

Although Maastricht is a city with a long history dating back to the Romans, it never experienced an era of extreme urbanization and therefore cannot be called a 'metropolitan city' nor is it 'rural'. The city had an early industrial development, like the region in which it is located, and, historically, an economy largely based on agriculture, minerals, raw materials, and its processing. Therefore, Maastricht is best characterized as a large provincial town, where the urban green infrastructure is strongly interlinked with the surrounding countryside next to the city.



Fig. 6.3: The Jeker valley that is close to the cemetery. In the back the St. Pietersberg with the regionally characteristic oak-hornbeam forest on the slope and oak-beach forest on the plateau; source: IVN, 2021

### REGIONAL LANDSCAPE CONTEXT

Maastricht has a unique (micro)climate in the valley of the Meuse and Jeker. Situated in the hills of Limburg, its geology and morphology make it distinctly different from the rest of the Netherlands. Here, the Tongerseweg Cemetery is situated on the löss-covered plateau at +92 meter NAP, where the Jeker valley is +50 meter NAP and the Meuse valley +45 meter NAP. The variation in topography and hydrology results in a large variation of habitat conditions and offers significant opportunities for flora and fauna.

The city has several valuable natural gems; the old fortifications (e.g. Hoge Fronten park), green courtyards, and large city parks such as the 'Stadspark', see figure 6.2 and 6.9. Furthermore, the city boasts unique habitats like limestone walls, lowland hay meadows, and alkaline grasslands, making particular plants, including orchids, flourish. The unique (micro)climate and southern location make 'southern species' like the wall lizard, specific solitary bees, and midwife toad thrive here.

The surrounding countryside next to the city is largely left intact and is dotted with protected nature reserves. For the Tongerseweg, the Jekerdal surrounded by the Pietersberg and Cannerberg and the dry valley (droogdal) of the Klein and Lange Zouw are relevant when considering green infrastructural connectivity.

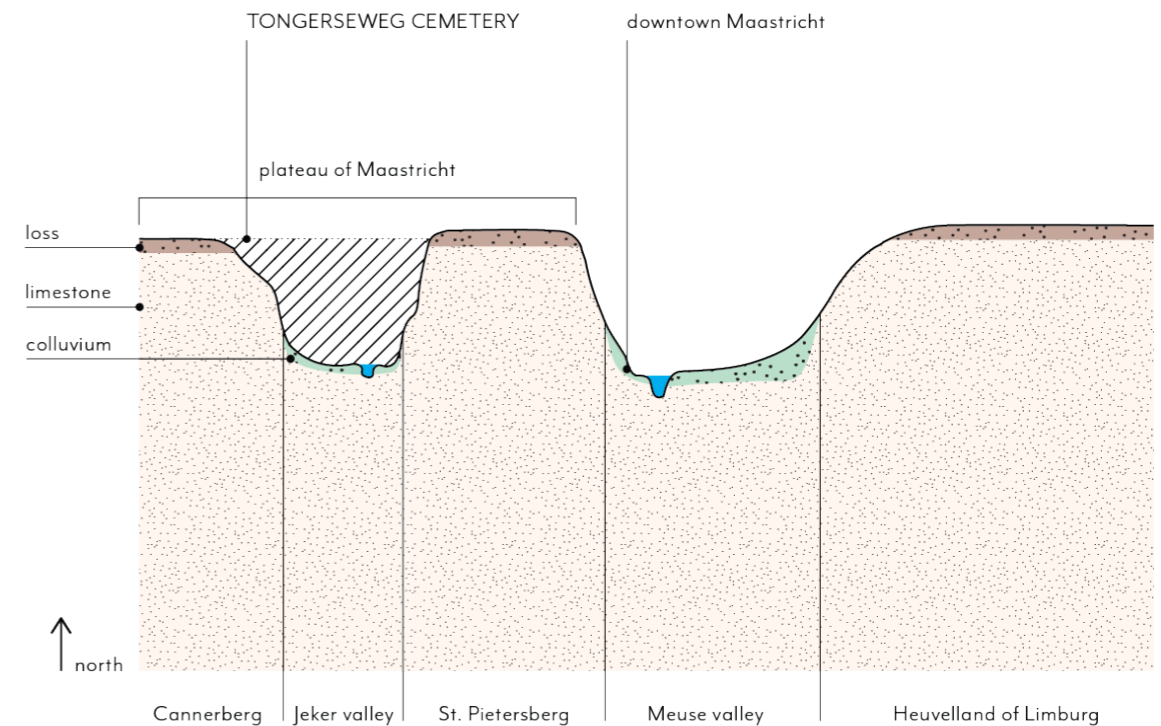


Fig. 6.4: geological positioning of the site in relation to the Jeker and Meuse valley; source: author

The Pietersberg and Cannerberg comprise thousands of marl pits that offer special shelter for many species of bats, and above ground, the quarries form a unique habitat for the eagle owl, two protected species that also call the Tongerseweg Cemetery their home. The importance of Maastricht's urban green infrastructure for biodiversity has increased in the past decades, primarily due to agricultural industrialization and eco-environmental degradation of the surrounding countryside.

### REGIONAL GREEN INFRASTRUCTURE

The municipality of Maastricht has already drawn up a green infrastructure plan, the most recent dating from 2020 in their Strategy on Spatial Planning and the Environment (omgevingsvisie). It describes the framework of different types of green areas in the city. Herein, the city of Maastricht expresses ambitious ecological objectives for its urban green infrastructure, but the Tongerseweg Cemetery is described in its status quo, and no ambitions are articulated (Gemeente Maastricht, 2020, p. 65). Thus, there is a disparity between the cemetery being included and colored in on the green infrastructure map along with other green spaces but neglected and treated as private green space that is not taken along in green space planning and design.

This subchapter discusses points of attention when aiming to better integrate the Tongerseweg Cemetery in the broader green infrastructure. Besides, it includes both analysis outcomes and critical considerations towards the city's plans.

→ In the past two decades, the city mainly worked on large projects that focused on large additions or big revamps of the green infrastructure. With the area development of De Groene Loper, Rivierpark Maasvallei, the ENCI quarry, the Frontenpark and the Tapijnkazerne, Maastricht has gained fantastic green areas. Now, the attention should shift to maintaining and strengthening the current green areas in the city, of which the Tongerseweg is one of them. Note that none of these large-area developments were in the east of Maastricht, which could be an argument to initiate a project in the east through the Tongerseweg Cemetery.

→ The cemetery has a large patch size (14 ha) in relation to other large parks, e.g. the Stadspark (11 ha) or Hoge Frontenpark (17 ha). Large patches are better suited to create a habitat with a real impact. Therefore, this potential should be cherished and exploited in the design.

→ There are missing links (corridors, and stepping stones) to the cemetery that could increase connectivity to make organisms move more freely between the cemetery and other suitable habitats. the ecological value of the cemetery and its functioning in the larger network. Without

policy changes, the natural gems in the city will remain (partially) isolated, and the vital connections between the urban nature patches themselves and the surrounding countryside will remain largely incomplete. The cemetery's current main ecological qualities, described in subchapter 6.2.6, guide what to connect to and what type of connections this should be for the Tongerseweg Cemetery. To generalize, we can focus on two types of connections:

First, species bound to old trees that could benefit from connections to the Jekerdal and adjacent hillside forests of the Cannerberg and Pietersberg. To a lesser extent, this also applies for connections to other areas with serious canopy, such as the Stadspark or dry valley of the Kleine and Lange Zouw.

Secondly, insects bound to the cemetery's spring flora and lowland hay meadows could benefit from improved connectivity to other forage locations and nesting sites (Liquete et al., 2015).

In considering connectivity with the rest of the green infrastructure, not only the municipality's territory should be considered, but private gardens also form interconnected habitat networks (Goddard et al., 2010). Especially the Mariaberg, Biesland, and Campagne neighborhoods contain relatively large and green gardens.

→ The cemetery has outstanding ecological qualities amidst the post-war green by which it is surrounded. These stretches of green are woven through the neighborhoods and predominantly consist of intensively managed lawns and compact stand of trees without understory. This is most clearly manifested in the neighborhoods Daalhof and Belfort northeast of the cemetery. This type of landscape is already widespread around Maastricht and is known to harbor only a limited number of plant and animal species (Sehrt et al., 2020). It should be noted that the radial and concentric main green structure of the parish districts of Pottenberg, Malpertius, and Caberg north of the cemetery are ecologically more diverse, e.g., as expanded upon by van Geest & Verhees (2015). Therefore, the current cemetery is an outstanding ecological island amidst the post-war green, which should be cherished and built upon.

→ An earlier study by Alterra (Bezemer & Visschedijk, 2003) and Stadsnatuur Maastricht (Bode & Jansen, 2017) showed that Maastricht has a relatively small amount of 'green' surface area (Bezemer & Visschedijk, 2003) compared to similar sized Dutch cities (Bode & Jansen, 2017, p. 46). That stresses the importance of squeezing more out of the existing green infrastructure, in other words, improve the Tongerseweg cemetery through new design measures and management changes.



Fig. 6.5, 6.6 and 6.7: The green open spaces in the surrounding neighborhoods of Daalhof (top two images), Belfort (bottom image), Mariaberg, Biesland, and Campagne all have little to no program to offer and are not designed to stay or retreat in the green. Ecologically, they are not the most biodiverse neighborhoods either; source for all 3: Google Earth Pro, 2021

### 6.1.3. SURVEY ON MAASTRICHT PUBLIC SPACE AND PARKS

Maastricht has a relatively young park tradition since it has been a dense city bound by its city walls until the late 19th century. The city then had just one park, 'de Boompjes', outside the city walls, that is now part of the 'Stadspark'. However, with the city's urban expansion beyond the city walls, parks and open green spaces have been part of the urban layout ever since (see Figures 6.2 and 6.9). Below is a description of the results from the park survey done, which sets us up to see missing gaps, and how the Tongerseweg could be positioned as a meaningful park addition.

The Maastricht park system consists on the one hand of city parks and other green open areas with their own atmospheres for different forms of recreation and user intensity. On the other hand, the park system consists of a network of connections, called 'slow-roads' for walking and cycling. This network allows residents to comfortably move around and reach other parts of the green recreational system. One of the city's objectives is a growing share of walking and cycling in the modal split, replacing urban car journeys by bike and foot (Gemeente Maastricht, 2020, p. 30). This is something to consider when designing the cemetery's circulation and embedding it in its context.

There is a large variation between the parks in terms of size, historical relevance, and program intensity, resulting in a wide range of park types. Encounters in and with the parks take place in various ways, and some locations are used more intensively than others. Therefore, the municipality has zoned the park system based on the type of green space and its user intensity, which is included in figure 6.9. This safeguards a good balance between user values and nature values between different green areas without losing the appeal of areas due to excessive user intensity and/or inappropriate activities. See figure 6.9 for an overview of the park scan and figure 6.10 for an overview of the current park offering compared on size, program and historical relevance.

This thesis conceives the cemetery as part of a connecting structure of parks and green corridors near the center of Maastricht. As seen in figure 6.9, there is a radial and concentric grid from the city center towards the northeast. The cemetery is embedded within this structure but is characterized as a closed-off and inward-focused space upon approach; see figure 6.38 and 6.39 for examples.

### BLAUWE LOPER

In Mariaberg, the province of Limburg, housing corporation Servatius and the municipality of Maastricht are working together on restructuring and renovating the neighborhood. The project is centered around a new urban axis: the 'Blauwe Loper'. It entails a renovation and new additions to the public space and creates improved accessibility for pedestrians and cyclists to the city center (see figure 6.9).

The plans are relevant for this design since the current Blauwe Loper axis stops at the Javastraat, where the cemetery starts. In the design, we can study a slow traffic route over the cemetery as an extension of the Blauwe Loper. This route will (as is the proposal) be in line with the Blauwe Loper, making it even longer.

In figure 6.10 we can see a good number of parks appointed for a high user intensity and host a lot of programming, such as the popular Stadspark and Griendpark that are programmed year-round and cater for hustle and bustle. Based on the 'gap' in the top left in figure 6.10, there is the potential to develop the Tongerseweg cemetery into a more quiet, slow-paced park with a high historical value. This perfectly combines with the vision to create an environment that offers a place for individual grieving as well as for collective action and encounters.

The green open spaces in the surrounding neighborhoods of Daalhof, Belfort, Mariaberg, Biesland, and Campagne all have little to no program to offer and are not designed to stay or retreat in the green. This partly lies in their design as open lawns with scattered (solitary) trees where one feels exposed, and no place for encounter is offered (see figures 6.5-6.7).

The cemetery has become a place of encounter for the entire Maastricht community, as so many inhabitants of the city have found their last place in this park. Program and activities related to increasing community encounters, collective action, memorialization, and modest and quiet programming could be accommodated in a new design for the cemetery.

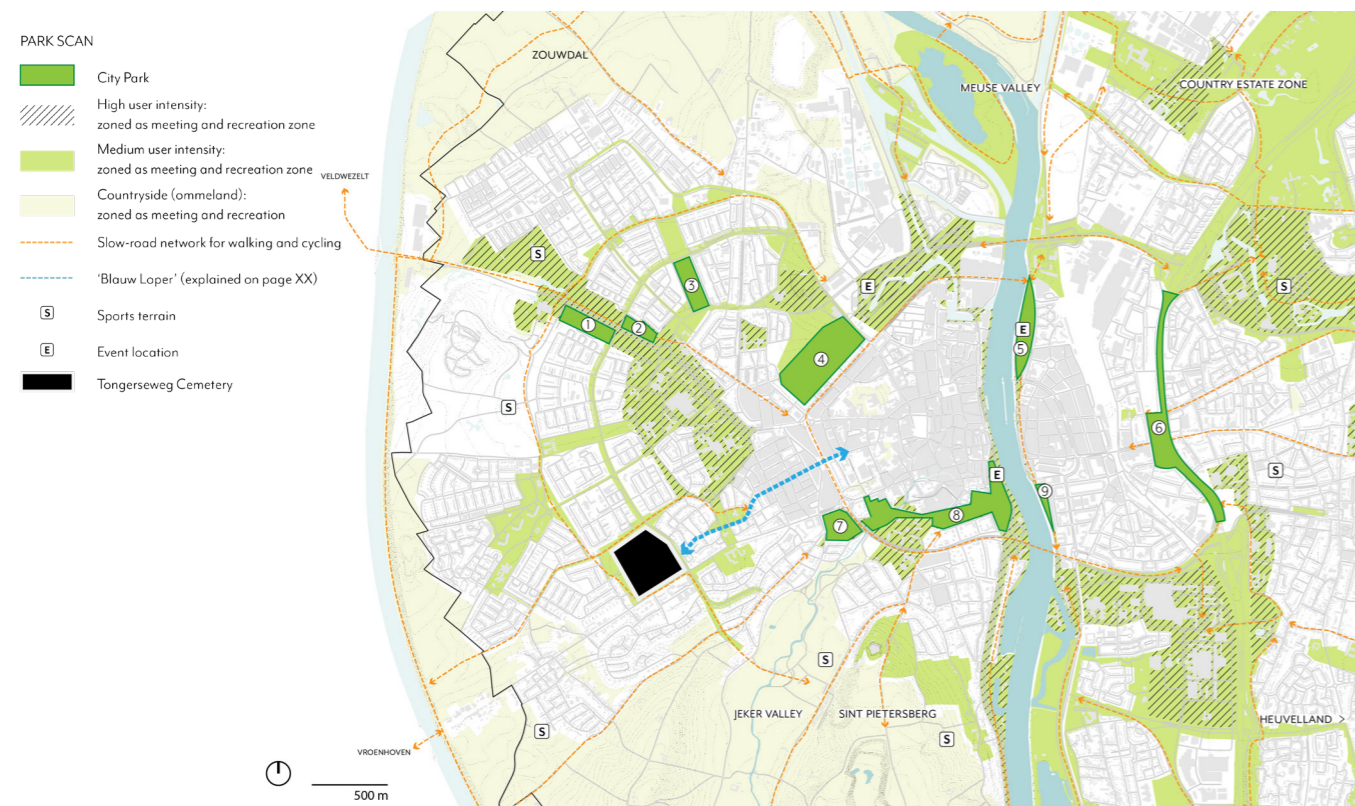


Fig. 6.9: scan of the Maastricht green open space system; source: author

**PARKS**

1 Van de Vennepark	4,9 ha
2 Viegenpark	2,2 ha
3 Parc Montagne	4,5 ha
4 Frontenpark	14,4 ha
5 Griendpark	5,8 ha
6 Groene Loper	14,1 ha
7 Waldeckpark	4,1 ha
8 Stadspark	11,5 ha
9 Charles Eyck	1,0 ha

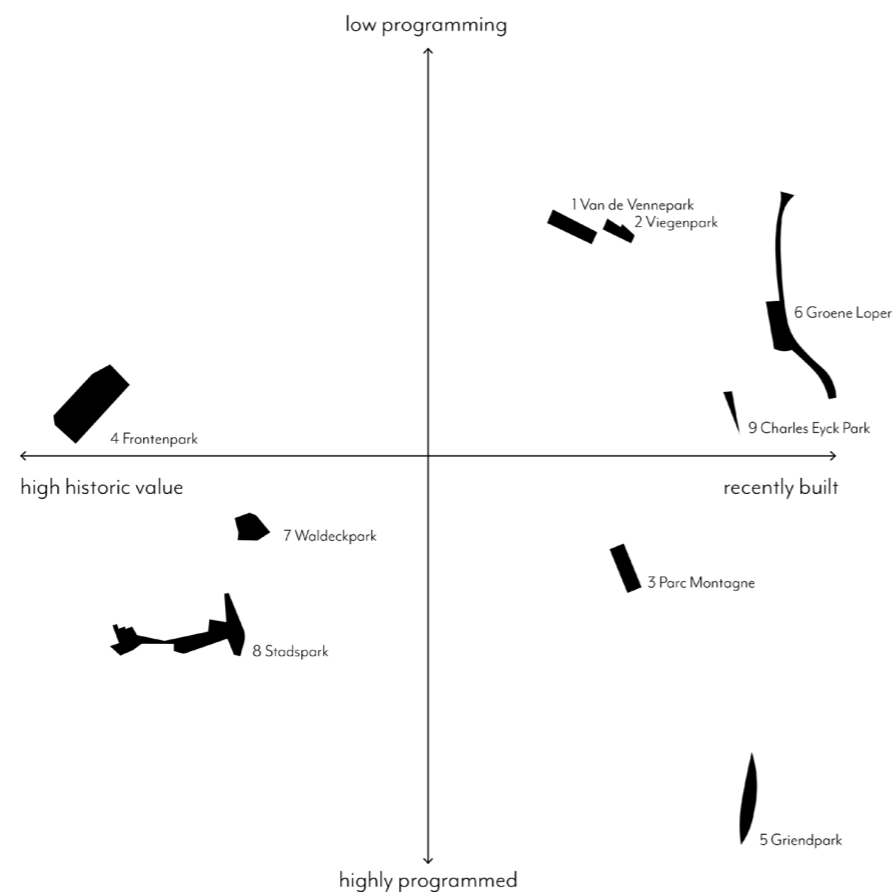


Fig. 6.10: survey of the existing Maastricht park system; source: author

**6.1.4. RECENT DEVELOPMENTS IMPACTING THE TONGERSEWEG CEMETERY**

As discussed in the intermezzo (pg. 22), the Dutch burial culture is changing. The Tongerseweg Cemetery is still selling plots and burying the deceased, but given that cremation and other arrangements increase in popularity, the cemetery cannot be sitting around doing nothing. Adapting to this new reality could mean the difference between succumbing to degradation or securing a sound exploitation and becoming a thriving part of the local community.

**DIFFICULTING EXPLOITATION**

In recent decades, and especially in recent years, there has been a decline in the number of funeral services, and the negative financial result of the cemetery budget is a recurring topic of discussion in the city council. The main cause is the decline in burials and secularization (Gemeente Maastricht, 2017). In addition, the historic core of the cemetery is protected as a national monument, which also pushes up the costs. Since the daily maintenance tasks put so much pressure on the operational costs, many large-scale maintenance tasks have been kept off in recent years. Further postponement of investment can lead to a severe loss of the unique spatial quality of the place.

**BURIAL MARKET ANALYSIS**

By order of the municipality, the future of the local burial market has been researched. The results are discussed below, which gives an overall picture of future trends to anticipate on.

The Tongerseweg Cemetery only offers limited and outdated burial products, while the wishes on the funeral market are becoming increasingly diverse. The current offering is:

- In-ground urn and coffin burial
- Ash scattering meadow
- Limited amount of columbarium niches below the chapel

The cemetery must prepare for an expansion of the range of burial products and services to meet citizens' wishes. A brief overview will be given:

→ At this moment, 75% of people in Maastricht choose for cremation, higher than the Dutch average,

and that percentage continues to increase (Gemeente Maastricht, 2017). From summer 2021 onwards, resomation (alkaline hydrolysis) will be legalized in The Netherlands, which is estimated to result in a further drop in people choosing for in-ground burial (NOS Nieuws, 2020).

One would expect the increasing number of cremations to be accompanied by an increase in the number of ash burials and interments, but this has remained forthcoming. This is most likely linked to the limit offering and quality of ash burial, interment or scattering. Expanding the options for cremation ash and a collaboration with the local crematorium will have a positive influence on the cemeteries exploitation and burial numbers (Gemeente Maastricht, 2017).

→ Natural burial options would be an interesting opportunity for the cemetery. Natural burials are on the rise in the Netherlands and abroad. In general, a natural burial is significantly cheaper than a traditional burial. No expensive grave markers are involved, and the management is maintenance-extensive (Gemeente Maastricht, 2017). The competition is located far away (Eygelshof (Sittard) 23 km; Bergerbos (St. Odiliënberg) 50 km; Maasbree (Venlo) 80 km), which makes natural burial interesting for Maastricht.

Maastricht is also close to the Belgian border. Since natural burial is not allowed in Flanders, there is no real competition from Belgium, which offers the opportunity to tap into a new market. It is known, for example, that many Germans have their cremation performed in the Netherlands. Thus, offering services in the form of natural burial would be a logical step.

→ The average number of burials in Maastricht is 250 per year, of which 125 are buried at the Tongerseweg Cemetery.

→ The section for Islamic burials is starting to get full. The expectation is that the new generation of Muslims will increasingly choose to be buried in the Netherlands, and this is expected to grow considerably in the coming years. Therefore, the municipality aims to add 1.600 m2 which should be sufficient for the coming 30 years (Gemeente Maastricht, 2017).

→ Other minority groups that frequently use the cemetery are members of the Armenian population, as there is a large group living in the South of Limburg, and the Armenian Apostolic Cathedral is located in Maastricht. In 2017 it was agreed that burial fields EE and FF are dedicated to Armenian burials.

These trends are putting pressure on the exploitation of the cemetery, also because its surface area

appears to be far too large. The market research has shown that in the near future, a reduction of 7.000 of the 14.000 traditional in-ground burial plots and half of the current surface area will be sufficient (Gemeente Maastricht, 2017). The cemetery management has taken the first step by discontinuing burials in the northern part of the site (see figure 6.18). The expectation is that a further reduction of traditional plots and replacing them with other types of burial plots will continue to happen in the future.

In 2020 the first crematorium, La Grande Suisse by DELA and Monuta, has opened its doors in the Maastricht estate zone. The municipality has allowed the construction in 2017 and since then pro-actively sought collaboration between the crematorium and the Tongerseweg Cemetery since it can be an excellent opportunity for the cemetery's exploitation. The municipality now has concluded a 'gentlemen's agreement' that seeks to inform and stimulate relatives to choose for ash internment at the Tongerseweg Cemetery (E. Kaptein, personal communication, October 26, 2020).

The crux of the story is that legally every Dutch municipality is under the obligation to have a public cemetery. Thus, the cemetery should prepare itself for the future: doing nothing is no option.



Fig. 6.11: La Grande Suisse, the first crematorium of Maastricht that opened in 2020; source: La Grande Suisse, 2021

#### CURRENT BUSINESS PLAN ON THE TABLE

Given the current problems in the exploitation of the cemetery, in 2017 the city council has decided to draw up a business plan that aims to realize a future-proof cemetery. The starting point of the business plan was the vision to transform the cemetery into a multifunctional mourning and memorial park. The essential points of the plan are (Gemeente Maastricht, 2017; Kaptein, 2020):

- Renovation of paths, transformation of the greenery and repairing overdue maintenance.
- Improving signage and signpostings.
- Adding additional ash internment options.
- Expanding the amount of Islamic and Armenian graves.

Thereby the municipality is stretching the idea of what a cemetery could be, but ambitions are made in moderate terms - potentially because of short-term political cycles and associated costs of big structural changes. The potentials, as discussed in chapters 3 and 4, and as seen in the reference study, are not taken advantage of. This leaves room for the design to push the idea of what could be possible at the Tongerseweg Cemetery and spark the conversation on the cemetery's future. See figure 6.12 for the plan.



Fig. 6.12: current strategic plan drawn up by the municipality. 1 = monumental core, 2 = traditional burial + new Armenian burial field, 3 = decommissioning of burial fields, 4 = cemetery extension. ▲ = current + added entrance; source: Kaptein, 2020

## 6.2. SITE ANALYSIS: TONGERSEWEG CEMETERY

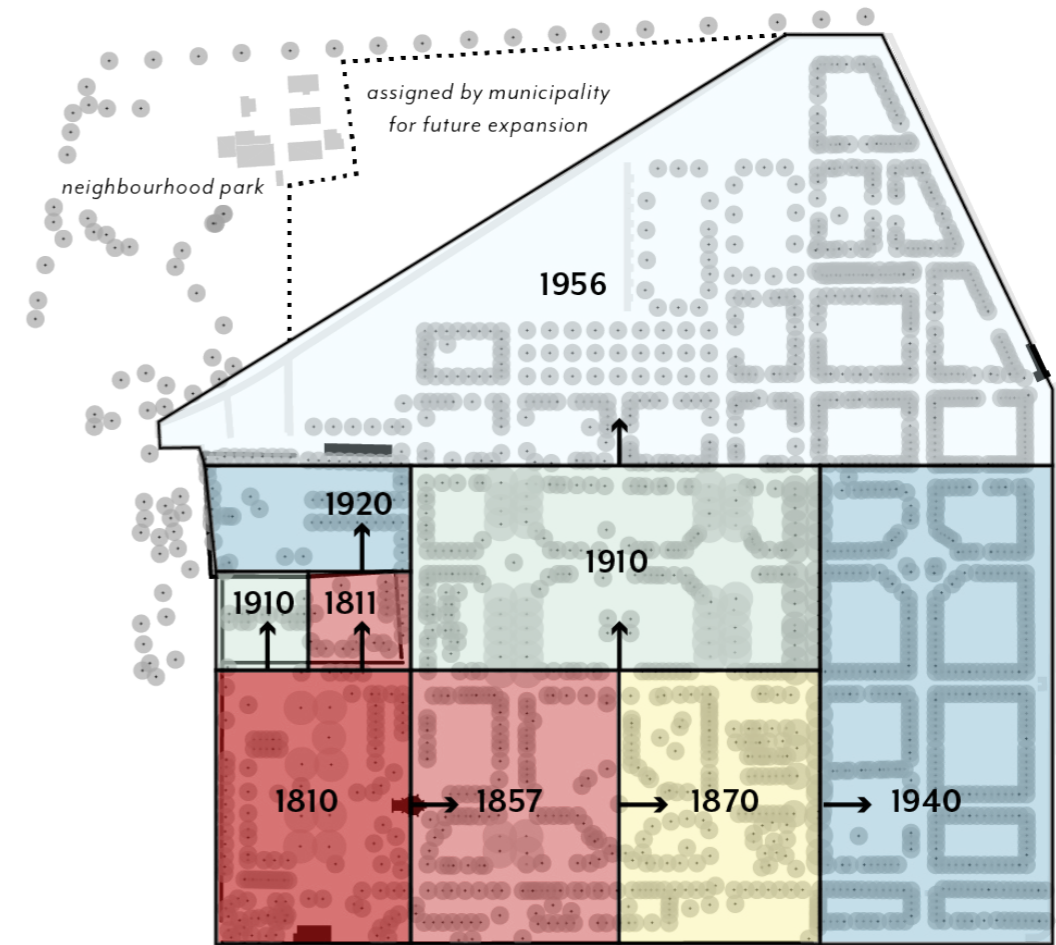


Fig. 6.13: historical growth of the cemetery and reserved space for future expansions; source: author

### 6.2.1. HISTORICAL DEVELOPMENT & CURRENT MONUMENTAL CONDITION

#### INITIAL ESTABLISHMENT AND DESIGN

The cemetery is characterized by an old, monumental core built in different phases from 1810 till 1910. City architect Jean François Soiron designed the oldest part as a squared hortus conclusus. A smaller version was first opened in 1810, and the entire design was realized by 1857. The site was demarcated with a moat and a wall of 2,70 meters high. In the heart of the wall along the Tongerseweg, a gatehouse was designed. This gate still is the iconic main entrance into the site and is used as an entrance for funerals.

As happened elsewhere in the context of mass industrialization and the emergence of a new bourgeoisie class, the principle was used whereby the most 'important' and wealthy inhabitants were buried in the most important places

along the lanes. In contrast, the working class and peasantry were buried in, sometimes anonymous, mass graves on the burial fields. The rise of the new rich was reflected in richly detailed, often bombastic grave monuments along the axis, see figure 6.17. Thereby the cemetery is a prominent historic place in telling the history of the city.

The anonymous graves and the burial fields are either empty or filled in again with new plots. However, the nineteenth-century grave monuments of the wealthy have been preserved and are all virtually intact. They have a high historical value as an ensemble and set the atmosphere when walking around in the historic core.

Initially, the cemetery also had a segregated parcellation for people of different faiths and ways of life which was related to social compartmentalization, which, to a lesser extent, is still present in the designated areas for Islamic and Armenian burial.

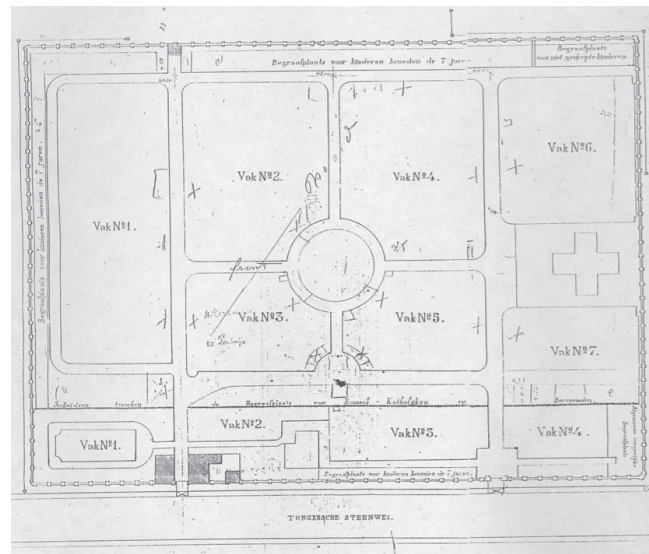


Fig. 6.14: Design for the extension of 1857, when Soiron's partially realized design from 1810 was finalized. Source: gemeentearchief Maastricht via Denessen & Bruijnesteijn, 2002

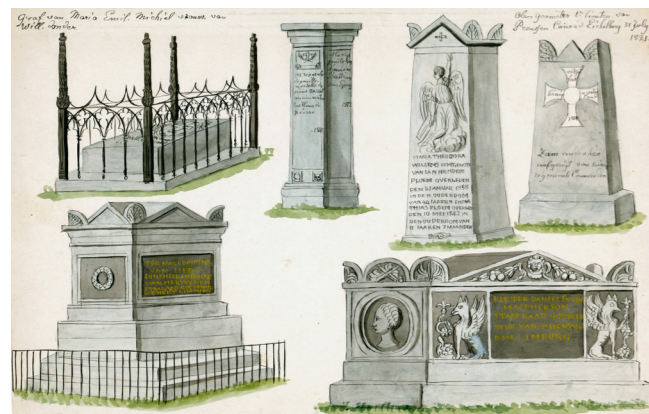


Fig. 6.16: Classical tombs and grave monuments from the first half of the nineteenth century give an impression of the monumentality of some parts of the historical area, as drawn by Philippus van Gulpen around 1850; Source: gemeentearchief Maastricht via Denessen & Bruijnesteijn, 2002



Fig. 6.15: The lane planted perpendicular to the main entrance gate. Source: gemeentearchief Maastricht via Denessen & Bruijnesteijn, 2002



Fig. 6.17: Photo taken around 1890 on the main axis towards Tongerseweg. Note the high density of monumental grave markers along the edges. The number of primary plots was limited: wealthy residents competed for the best location at the cemetery. source: gemeentearchief Maastricht via Denessen & Bruijnesteijn, 2002

- Area of (high) monumental value
- Indifferent monumental value
- Out of use for burials since 2015
- Out of use for burials since 2017
- Monumental wall
- Monumental entrance archway
- Monumental chapel with burial crypts underneath

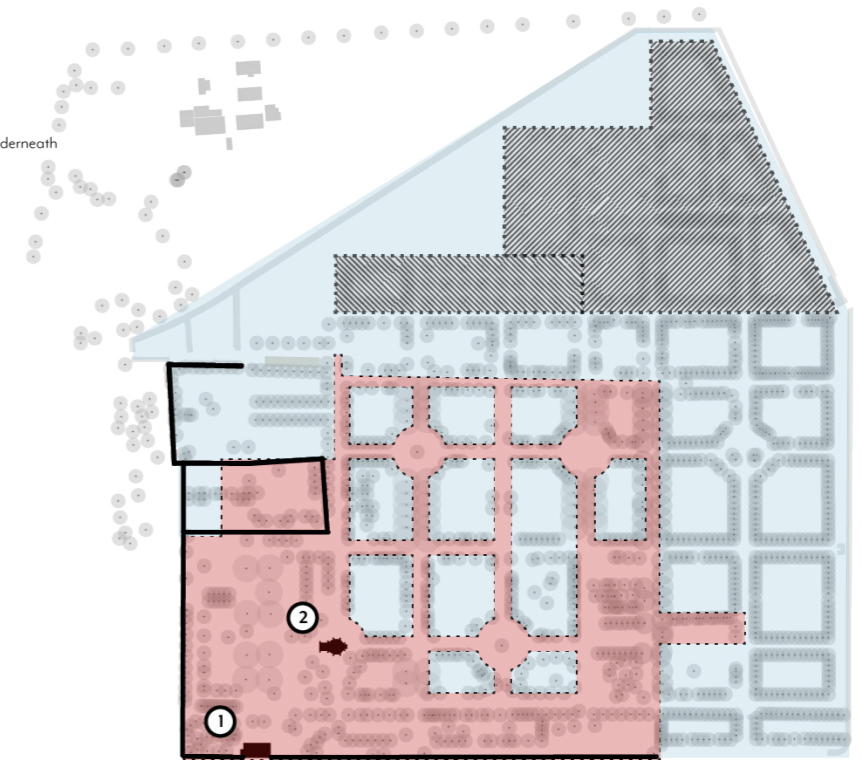


Fig. 6.18: current condition and monumental value, note the historical core in red and the large ring of monumentally indifferent space around it; source: author

#### GROWTH PROCESS AND CURRENT CODITION

A gradual growth process of the cemetery has happened since. Soiron's 1810 design had a clear layout based on a grid of burial fields or 'rooms' connected by rectangular planted lanes. This grid was the basis for later expansions and is since the structuring spatial principle of the entire cemetery; in basis comparable to what we have seen in the Melaten Cemetery reference study.

Even though the structuring principle of lanes and burial fields has been carried through in later additions and adjustments, they have compromised the initial design's clarity, quality, and diversity. The new additions, especially after 1910, seem to be a thoughtless continuation of Soiron's original grid structure that lacks final direction or an overarching idea. For example, Soiron's design was executed with various trees for each lane, where the later additions are planted with continuous rows of conifers that emphasize a dark and gloomy atmosphere (see subchapter 6.2.4). Also, there was a variation in the size and atmosphere of burial rooms, where expansions turned into repetition of monotonous burial rooms.

In the current condition, there is a monumental core that consists of the 19th and early 20th century parts. This area has a (high) monumental value, which is also endorsed by monument committees. Furthermore, there are large areas of burial fields and lanes that are monumentally indifferent. Therefore, the decommissioning of burial fields can take place in these parts.

Ad hoc extensions have been realized that lack a clear overall identity. They give the place an 'unfinished' feeling, especially on the side of the Planetenhof with the large empty space and undefined edge condition (Fig. 6.27). As a result, an area in strange condition appears, which offers insufficient attractiveness to merge into a meaningful part of the townscape.

The lanes of the recent additions are monotonously planted with cypress, in contrast to the more diverse, more transparent, and seasonally dynamic lanes in the oldest parts. Besides, it brings about a dark and mournful aesthetic.

The field north of the cemetery is currently reserved for future expansions in the zoning plan (see Fig. 6.18).



4



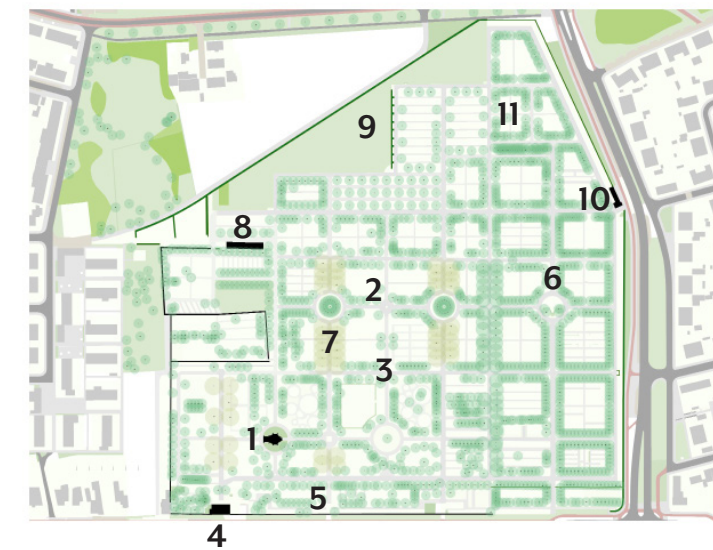
7



8



10



2



5



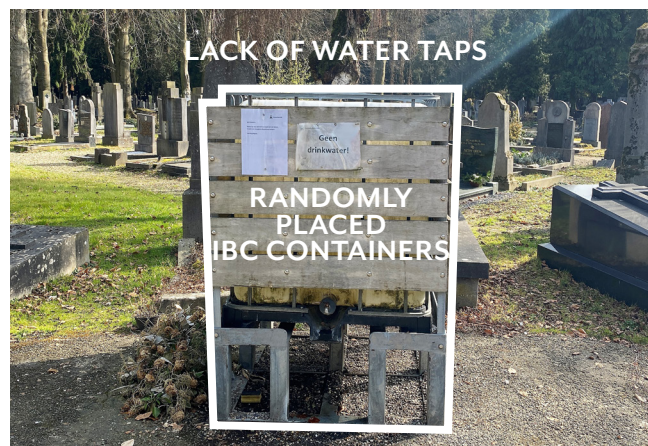
6



9



11



3

Fig. 6.19-6.29: site impressions + analysis; source: author

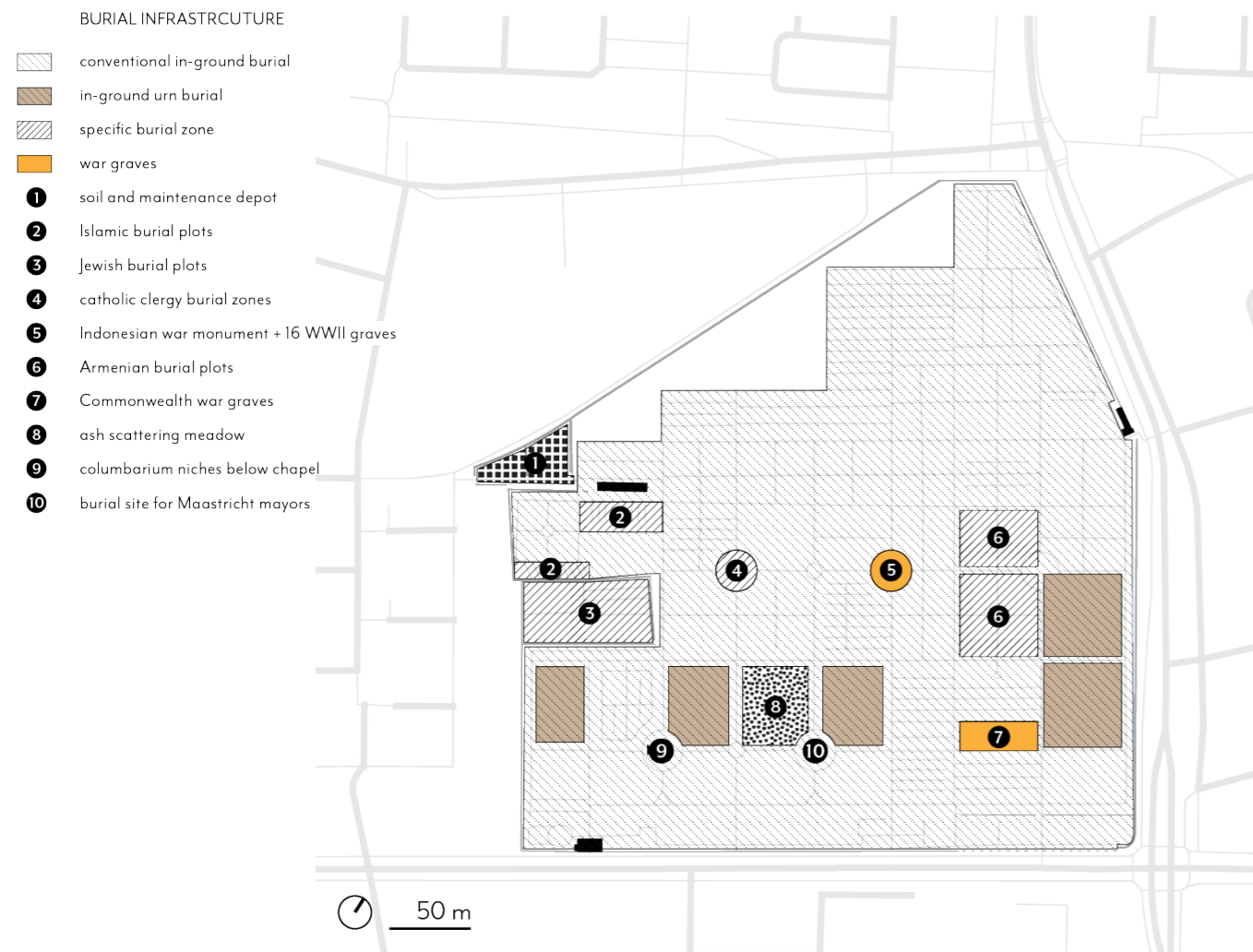


Fig. 6.30: burial infrastructure; source: author

### 6.2.2. CURRENT BURIAL PRODUCTS

The public cemetery has always aimed to offer a final resting place for all Maastricht residents of every faith and way of life. This is historically expressed in burial sections for Protestants and Catholics and nowadays in burial sections for Jews, Muslims, Armenians, and children and prematures at the so-called 'Angel field'. In addition, special sections are dedicated to war graves, the Catholic clergy, and the graves of Maastricht mayors.

Many burial fields lack spatial quality as a result of overdue maintenance or poor design and are in need for an upgrade, see figure 6.31 and 6.32 for examples. Some of the burial fields are too densely laid out, resulting in a cluttered and clogged aesthetic over time.

Chapter 6.5.2. gave an overview of the current burial products. See figure 6.30 for a spatial overview of the current burial products, decommissioned burial fields, and potential areas for transformation into new burial options.

The Cemetery works with grave rights of 20 year, after which extension is possible, on condition that the burial field has not been



Fig. 6.31: the ash scattering field; source: author



Fig. 6.32: many burial fields are underdesigned and some of them very crowded with gravemarkers; source: author

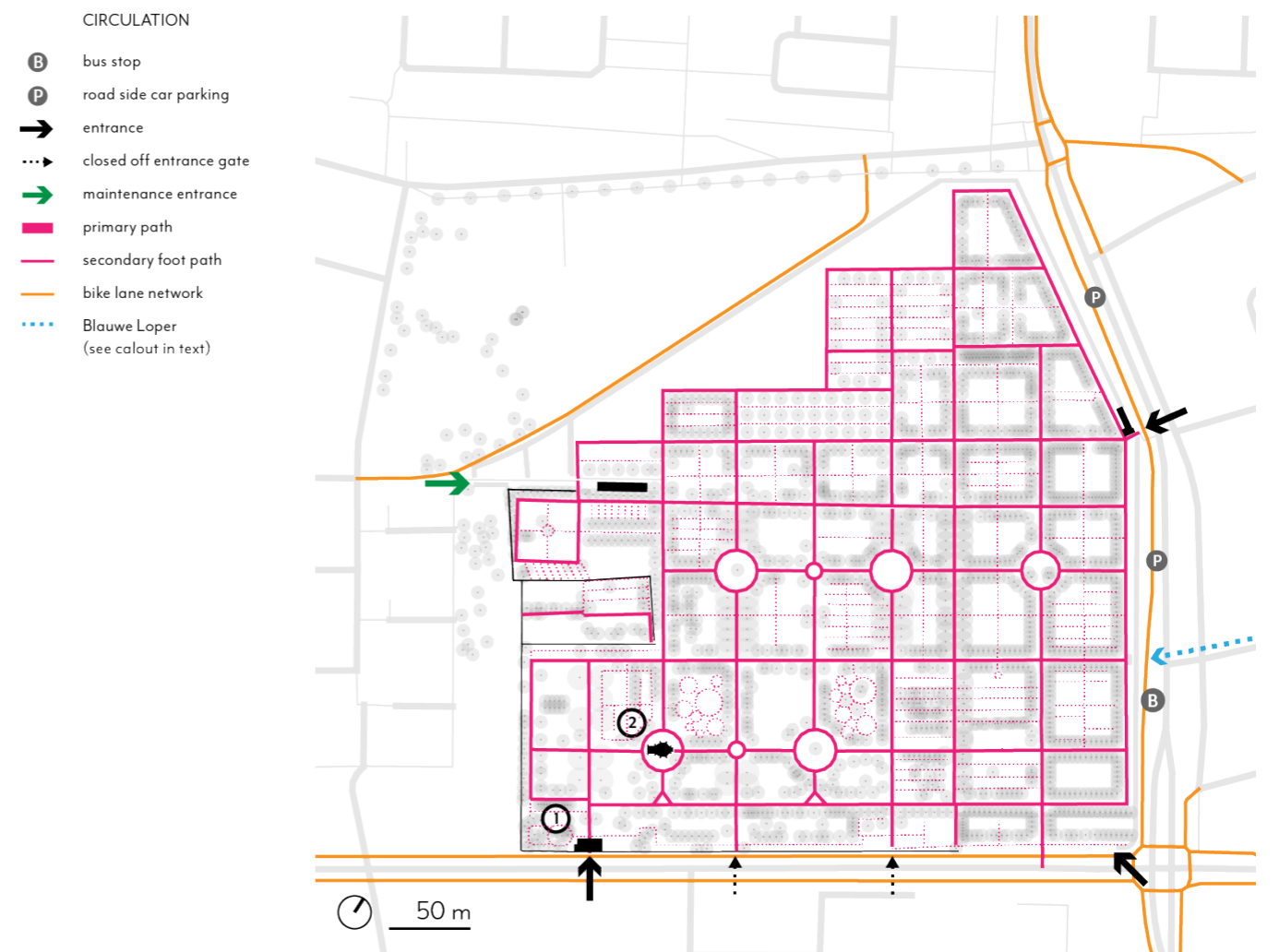


Fig. 6.33: circulation; source: author

### 6.2.3. CIRCULATION

Expressed in the tree lanes and path system, the site is characterized by its geometric system of axis and crossings. From a practical point of view, this helps visitors can quickly and effectively find their way. In addition, small secondary paths allow the visitor to move around the individual graves of the burial fields.

The cemetery has a limited number of three entrance points for its large perimeter of 1,4 kilometers. The northern side does not even have an entrance. On all sides, streets and bike lanes bump into the cemetery's edges, and the site has great potential to make new connections between the surrounding neighborhoods. New entrance points also hold the potential to create a more porous cemetery. Furthermore, existing entrances have been closed off. E.g. three monumental entrance gates in the wall along the Tongerseweg could potentially provide entrance to the cemetery, but two are closed, and only the one with the gatehouse is currently opened.

The entrance gate along the Tongerseweg serves a the main gate for funeral processions, something to be kept

giving its atmosphere and historical significance.

No clear path hierarchy exists; all axis have the same path width and materialization. The cemetery is only allowed to be accessed by foot: bikes are parked in the racks at the entrance points. Given the site's large size and the age of some relatives visiting their loved ones, it should be studied whether and how biking could introduced.



Fig. 6.34: one of the closed off entrances in the wall along the Tongerseweg that could provide new entrance points into the cemetery to open up and increase its permeability; source: author

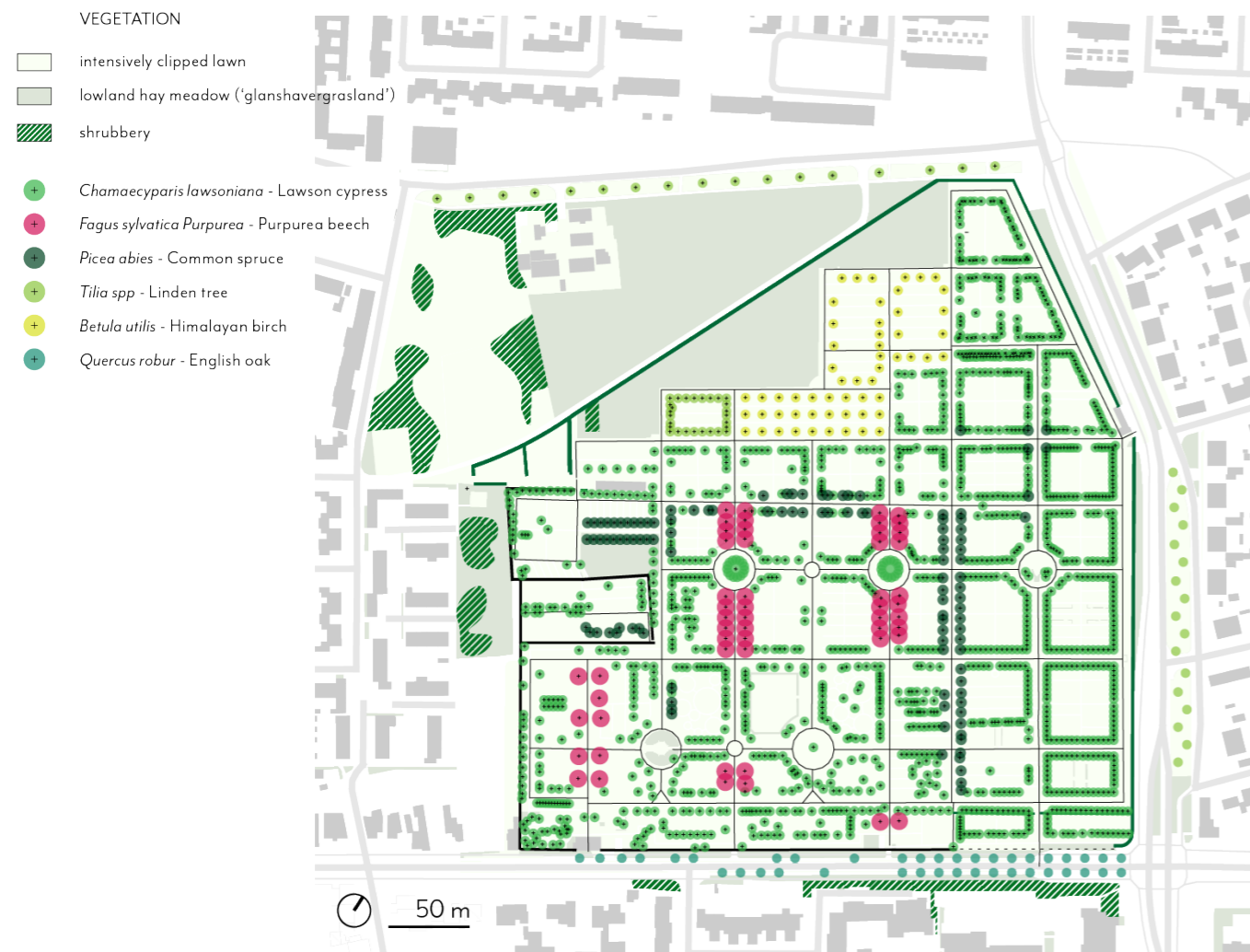


Fig. 6.35: vegetation; source: author

#### 6.2.4. VEGETATION

The cemetery is a small urban forest with over 1700 trees. In terms of dendrology, it is currently dominated by species that emphasize the character of the place of death with dark evergreen trees such as the cypresses (*Chamaecyparis lawsoniana*) and the spruces (*Picea abies*). It has little diversity and predominantly consists out of the 1600 cypresses. The palette of trees in the early designs had more variation, but during the extension of 1910, its designer, Rosseel, was not only concerned with the layout of the new section he designed, the existing sections were also redesigned by replacing most of the lanes with the dark evergreen cypresses (Denessen & Bruijnesteijn, 2002).

Furthermore, their dense way of planting prevents daylight from reaching the ground, dries out the soil, and their needles acidify the soil. This results in a bare and empty ground-level where nothings grow, see figure 6.36.

Currently, the *Chamaecyparis lawsoniana* and some *Fagus sylvatica* 'Purpurea' are getting at the end of their life span, and the replacement of these lanes should be considered (E. Kaptein, personal communication, October

26, 2020).

This offers the opportunity to rethink a more future-proof and diverse tree palette. The addition of more seasonality (cycles of life & dead), flowering moments, and bright and cheerful aesthetics should be considered.



Fig. 6.36: bare lawns and no understorey able to grow under the cypresses and spruces; source: author



Fig. 6.37: circulation; source: author

#### 6.2.5. BOUNDARY CONDITION

The Tongerseweg Cemetery currently is one of a kind that is very closed-off from its surroundings. It has intentionally been designed to be excluded and disconnected from its surroundings. Fences combined with thick evergreen hedges and a high brick wall in the historic part isolate the site from daily life. This makes the cemetery an otherworldly place and dead something invisible and extraordinary, while it is an intrinsic part of life (Kolnberger, 2018). Changing societal perception around the dead asks for a renegotiation of the cemetery landscape and its visibility in the city. Combining this objective with the objective to facilitate increased public use of green urban cemeteries makes a strong argument to open up and make cemeteries more visible within the urban tissue.

The little amount of three entrances for a perimeter of 1,4 kilometer increases the feeling of impermeability of the edge.

As discussed before, the undefined edge condition at the Planetenhof makes the cemetery turn its back to the city.



Fig. 6.38: the cemetery appears as a dark, closed off island in the streetscape, here the southeast corner upon approach from the Tongerseweg; source: Google Earth Pro, 2021



Fig. 6.39: the monumental wall with gate; source: Otter, 2010



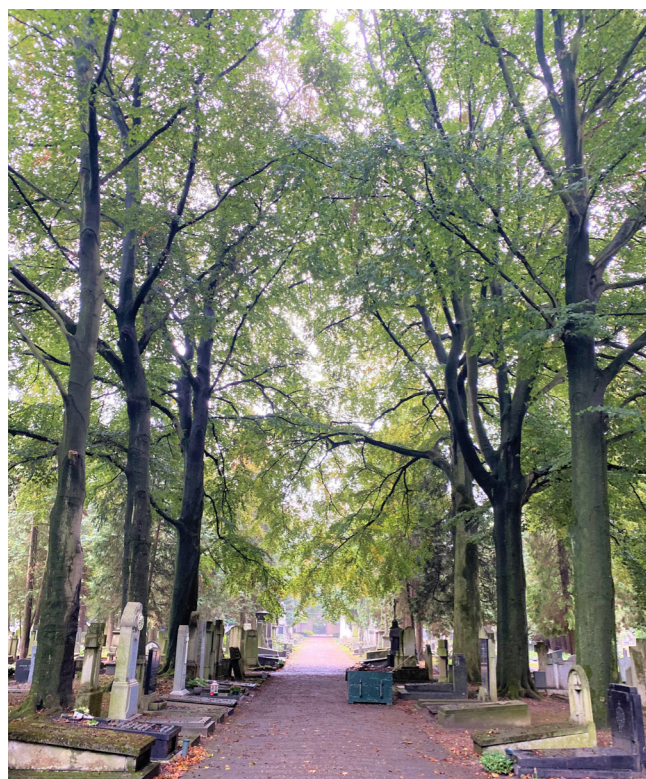


Fig. 6.40: beech lane with lots of ecological meaning for species bound to old trees; source: author

### 6.2.6. EXISTING ECOLOGICAL QUALITIES

The cemetery is a green oasis that forms an ecological island in the city where both people and animals find peace. The cemetery has a park-like character, with many trees and meadows on the northern side. The site's main ecological qualities are (Frissen et al., 2009):

→ **Species bound to old trees:** the ecological qualities of the cemetery mainly lie in the presence of the large number as well as the age of some trees. Birds breed here, particularly species tied to mixed coniferous-deciduous forests such as the tawny owl, sparrowhawk, and jay. The old trees also provide nesting opportunities for squirrels and the little bat. All common bird, mammal, and bat species present are protected. In the flora and fauna scan from 2009, ecologists see room for improvement in including more deciduous native trees in the stock of trees (Frissen et al., 2009).

→ **Spring flora:** the spring flora that occurs under the trees and between the graves is an important ecological feature for the cemetery, especially in providing the first nectar in early spring when insects start foraging.

→ **Lowland hay meadows:** lastly, the lowland hay meadows ('Glanshavergraslanden') are most interesting for their flora and insects. Butterflies such as the Icarus find host plants and nectar plants here. Essential in their management is to mow them maximum 1 or 2 times a year.

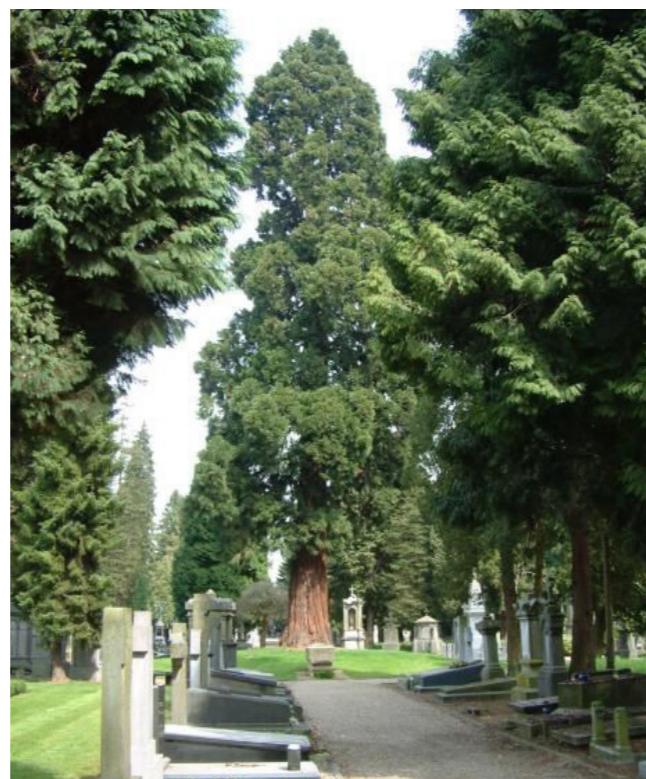


Fig. 6.41: Sequoiadendron giganteum, one of the biggest trees in the Netherlands; source: Monumentaltrees.com, 2021



Fig. 6.42: Spring flora is present in a couple of spots in the monumental core of the site. Shown here a carpet of Scilla; source: author

As discussed in chapter 6.2.4. the monotonic stand of 1600+ cypress trees leaves room for a more diverse urban forest. Furthermore, most of the burial fields consist of clipped lawn or have no planting at all, also leaving room for improvements.

When aiming to design in connection with the larger ecological system, it is crucial to focus on interventions that relate to the wider territory, as we have seen in chapter four. Therefore, the characteristic nature types of the

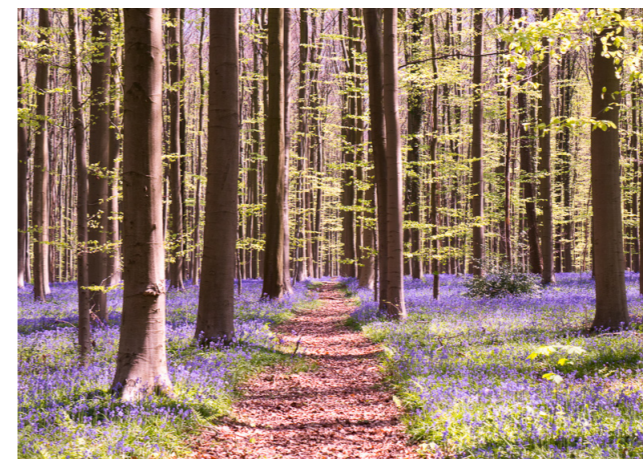


Fig. 6.43: abundant spring flora on the forest floor of an oak-beech forest; source: Frank den Hond, 2021

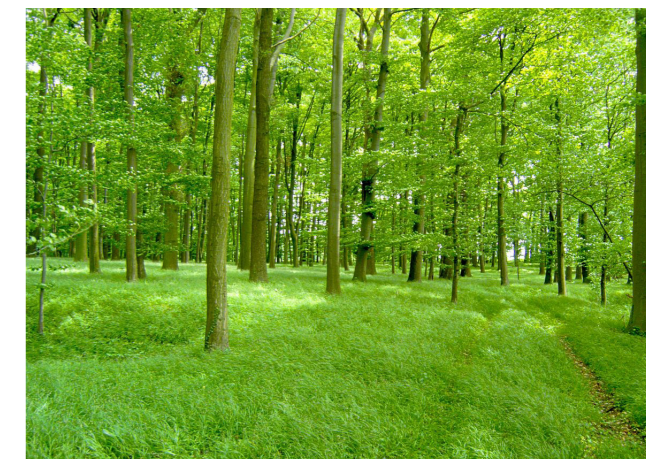


Fig. 6.44: oak-hornbeam forest; source: G. Gerding, 2006



Fig. 6.45: oak-hornbeam forest with common hazels in its understory; source: Ecopedia, 2021

Maastricht landscape are interesting to consider in the design phase of the thesis. That is to say, the **oak-beech forest** (Fago-Quercetum) and **oak-hornbeam forest** (Stellario-Carpinetum). Especially the oak-hornbeam forest is very characteristic of the hillsides of southern Limburg. Oak-Beech forest are rather common on the plateaus of southern Limburg. They both have a **rich understory** of common hazel (*Corylus avellana*) and abundant spring flora covering the entire forest floor in spring (e.g. snow drops, wild garlic, crocus, scilla).

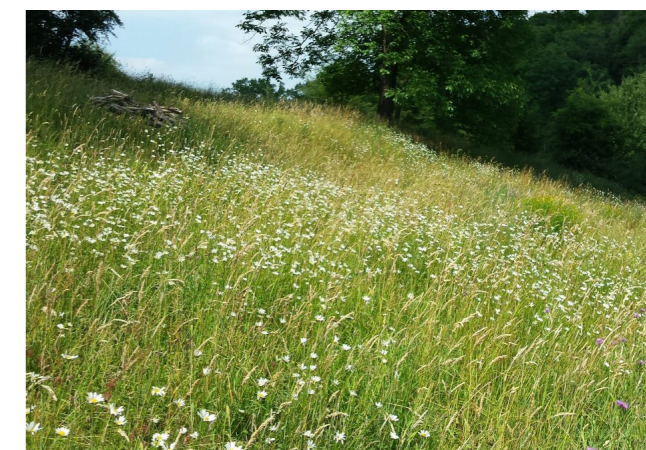


Fig. 6.46: lowland hay meadows; source: D. Frissen, 2017

## 6.3. DESIGN BRIEF

Based on the city and site scale analysis, key points have arisen that should be tackled in the design. Summarized the design should respond to:



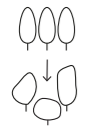
Diversification of the burial product offering



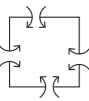
Making space for contemporary burial practices



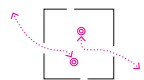
Catching up on overdue maintenance and seize it as an opportunity for a quality impulse



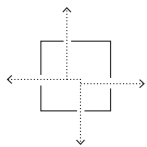
Replacing the large number of cypress trees at the end of their life span and diversify the stand of trees



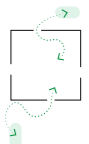
Moving from a closed-off island towards a welcoming memorial park with a recognizable face towards the city



Increased public use and making space for appropriate cultural activities



Improving accessibility by making new connections to the surrounding street grid and establishing new neighborhood and city-wide connections



Linking the cemetery with the wider Maastricht green infrastructure and the Jeker valley

## 7. SYNTHESIS: MAASTRICHT MEMORIAL PARK

### 7.1. DESIGN AIMS

This chapter presents the strategies and design interventions for the Tongerseweg Cemetery, which are based on the preceding research chapters. It answers the design question:

*How could the Tongerseweg cemetery serve a wider array of functions as public park and green infrastructure, besides burial?*

The overall design objective for the Tongerseweg Cemetery is to **embrace increased public use** and **improve its contribution to the green infrastructure** of Maastricht. Thereby it aims to transform the site from a closed off island into a recognizable memorial park in the middle of an urbanized environment. Making an (optically) open area with a clear and inviting atmosphere that appeals to wander around and relax, but also to contemplate, encounter other relatives or memorialise on one's own.

Furthermore, the design is influenced by contemporary and future-oriented ways of thinking about death and memorialisation. This is not the primary concern of the research, but is an important objective given the current outdated offering of the cemetery.

The proposed strategies and design are placed in a

time frame from now up to 25 years. As an active cemetery, burial plots are constantly sold and the management works with grave rights of twenty years. Therefore, leased burial plots influence when and where changing and redeveloping the landscape is possible. Expert judgement was part of the design process and Erik ter Heide, who manages the public cemetery of Boxtel, has shown me on-site that is possible to start a process of redevelopment in an active cemetery. In that case sticking to a long term strategic vision and plan is a necessity, to secure a coherent and consistent result.

#### BUILT UP OF THE CHAPTER

First, four strategies are presented that set out a direction and clear objectives for future developments. This is followed by a 'masterplan' that shows the long-term vision for the cemetery. The 'masterplan' is split out in different types of interventions. Lastly, five highlights are presented that concretize the interventions.

### 7.2. CONNECTION TO GUIDELINES

Appendix 2 is a catalog with all guidelines that were developed during the reference study and the design phase. The application of specific guidelines in this design is referred to by means of the angle bracket symbol (>).

## 7.3. STRATEGIES

### 7.3.1. STRATEGY 1: POSITION CEMETERY IN NOWADAYS

The cemetery adopts a **pluriform approach** and offers much **wider variety of burial options**. Therefore investments should be made in increasing the product range to improve operations. Existing products are upgraded and new products are added. The point of departure is that everybody is equal, thus there is no hierarchy between cheaper and more expensive burial plots. Furthermore, **contemporary funeral rituals** are embedded, such as an outdoor funeral ceremonies. Spatially, the monumental core (see 6.3.1.) is **renovated and upgraded** to offer the more traditional ways of burial, since its monumental status doesn't allow big changes. The areas of indifferent monumental value are **redevelopped** and adapted to offer newly introduced burial options.



Fig. 7.1: graphic depiction of the pluriform approach; source: author

### 7.3.2. STRATEGY 2: NATURE INCLUSIVE PLACE OF BURIAL

The cemetery becomes a more nature-inclusive place of burial, whereby the ecological value of the cemetery is significantly improved. This strategy is two-fold: providing **more sustainable burial options**, given that conventional practices come at a high environmental cost (Keijzer et al., 2014), and **improving the cemetery's ecological qualities in relation to the larger green infrastructure**.

More sustainable burial options are achieved through new sustainable burial options, e.g., natural burial, and through space-saving burial options that leave more room for landscape development, e.g. urn gardens.

Ecological improvements are mainly related to (1) the gradual transformation of the current cypress monoculture into a richer, more diverse evergreen-deciduous lanes and urban forest, (2) the transformation into more diverse burial rooms and urban meadows, and (3) newly proposed connections to the rest of the green infrastructure.



Fig. 7.2: the 'Living Cocoon', developed by TU Delft, as a sustainable burial option; source: TU Delft, 2021

Fig. 7.3: example of compact urn graves that leave room for forest development at Berestein Cemetery, Hilversum; source: Holm, 2015

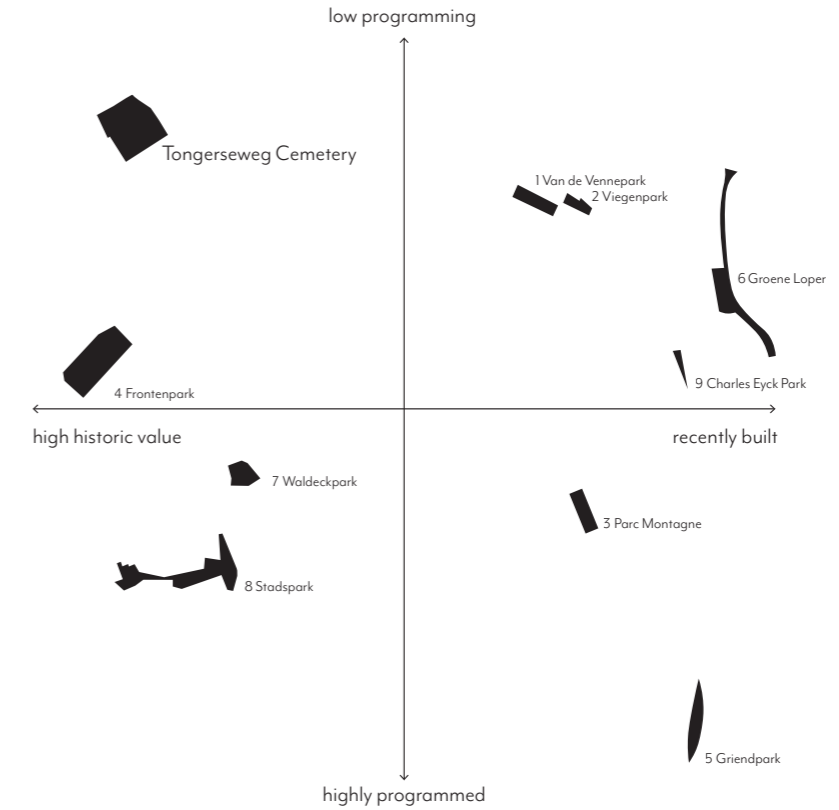


Fig. 7.4: the Tongerseweg Cemetery as a park positioned in relation to the other Maastricht parks; source: author

> TOOL POSITION: THE CEMETERY PARK IN ITS SURROUNDINGS AS THROUGHFARE AND DESTINATION

### 7.3.3. STRATEGY 3: NEW MEANINGFUL PARK ON ALL SCALES

The cemetery shifts from a closed off-island to a recognizable (memorial) park. The cemetery adds new qualities as a public park to the daily lives of surrounding inhabitants, becomes a new addition to the existing park spectrum as a **multifunctional memorial park for the entire city**. By offering burial facilities unique to the region, the Tongerseweg can regionally profile itself and increase its relevance.

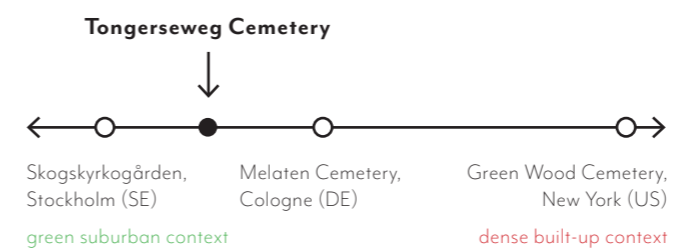


Fig. 7.5: as expanded upon in chapter three and in the reference study, the type of park functions depends on the cemetery's context and what other parks already have to offer. In relation to the reference study, the Tongerseweg is located between the Skogskyrkogården and Melaten Cemetery; source: author

#### REGIONAL SCALE

Regional profiling: Green burial, Armenian & Islamic burial facilities unique to the region (see chapter 6.1.4.)

#### MAASTRICHT SCALE

- Multifunctional memorial park for entire city
- Place for memory, mourning, reflection and healing, ceremony and collective action
- Appropriate cultural programming, e.g. classical chamber music
- 

#### NEIGHBOURHOOD SCALE

- Place of encounter for surrounding neighborhoods
- Quiet and contemplative space
- Cool(ing) zone during summer heat
- Improved connectivity between neighborhoods
- Extension of Blauwe Loper

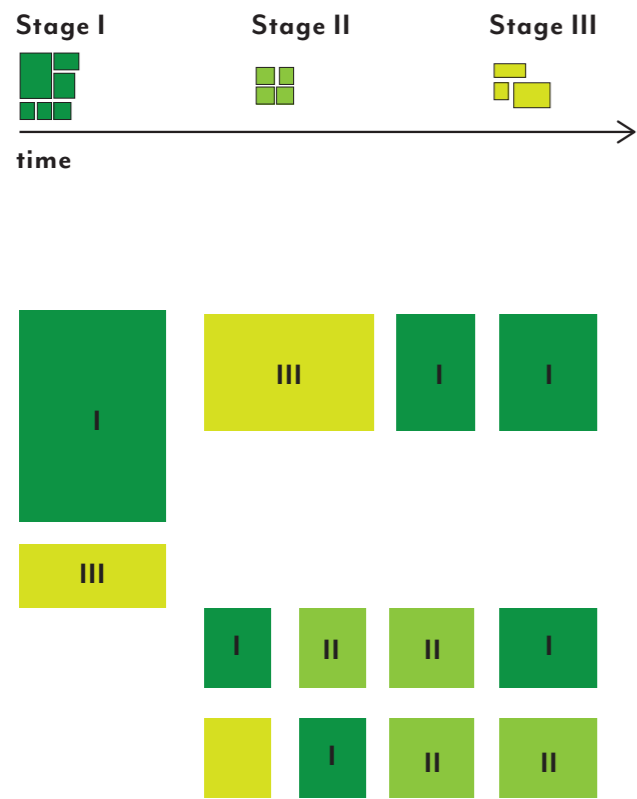


Fig. 7.6: graphic depiction of the phased transformation of burial fields into a variety of 'garden rooms'; source: author

### 7.3.4. STRATEGY 4: PHASING ITS REALIZATION

As an active cemetery where several burials take place every week, the masterplan's implementation is phased. It is a **process of (re)development rather than one single project**. Therefore, two typologies are introduced to phase the interventions gradually:

→ **Garden rooms:** the cemetery comprises plenty of burial fields that are developed separately from each other, when the time is right. The program and size of the burial fields differ. Thereby, every burial field becomes a world on its own, and an exciting juxtaposition of garden rooms and (forest) glades comes into existence. This perfectly matches the local landscape in the south of Limburg, with its various typologies of small enclosed spaces. The reference study on Melaten Cemetery is a good reference for this approach.

→ **Phased forest development:** The decommissioned burial fields and inactive parts are transformed into a natural burial and memorial forest. 1,5 hectares are immediately available for the development of a memorial forest. Other (to be) decommissioned fields are gradually transformed into a more wooded area. Here, the locally characteristic oak-hornbeam and oak-beech forests are used as archetypes.



Different typologies of small enclosed spaces that are characteristic of the local landscape in the south of Limburg.

Top to bottom:  
Fig. 7.7: Sint-Servaasbron, Jeker valley; source: author  
Fig. 7.8: 'Carrehoeve'; source: Klement, 2020  
Fig. 7.9: Cloister gardens in the St. Servaas basilica; source: Marcelmulder68, 2014  
Fig. 7.10: orchard landscape of the south of Limburg; source: Frans Voncken, 2019



Fig. 7.11: graphic depiction of the phased transformation of burial fields into the memorial forest; source: author

#### PHASE I NOW

Closed burial field - no new burials occur.

#### PHASE II 0 - 20 YEARS

Step-by-step burial plots become vacant when grave lease rights end. Gradually the plots are given out for natural burial.

#### PHASE III 20 YEARS

All conventional graves have expired and the contours of the new memorial forest appear.

#### PHASE IV > 20 YEARS

The memorial forest has become a mature urban forest in the middle of Maastricht. It is low maintenance compared to the conventional burial field that was here before.

#### PLANTING STRATEGY

Empty plots are planted with fast growing common hazels and large specimen oaks, beeches and hornbeam. Small woodland plants are planted as understory that will form significant and mature groups.

Inspired on 'the Nuttery' at Sissinghurst Gardens.

#### PLANTING STRATEGY

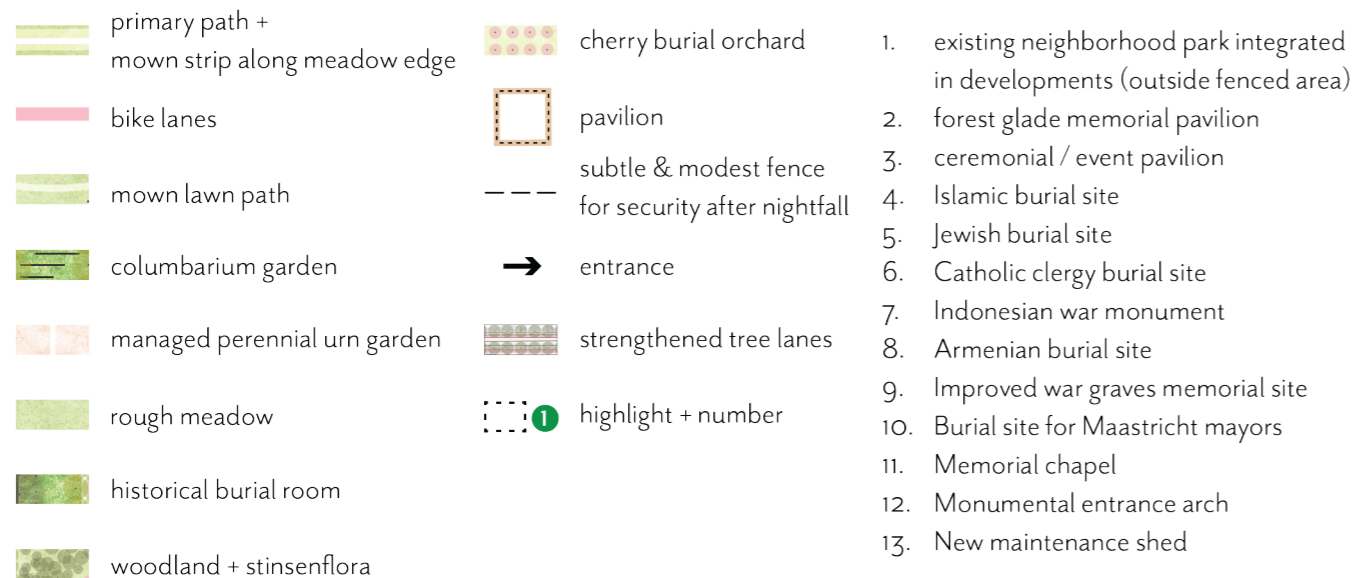
Natural burials and ash scatterings are marked by naturalising bulbs (stinsenmix) that expand over time, merging into a bold flower carpet in spring.

#### PLANTING STRATEGY

Initially densely planted to quickly establish a full-grown aesthetic, selected thinning can now be done to stimulate successive growth.



Fig. 7.12: masterplan - situation in > 25 years; source: author



## 7.4. INTERVENTIONS

### 7.4.1. MASTERPLAN

The masterplan was developed to steer the various interventions over time and secure their coherence, aiming to develop a multifunctional mourning and memorial park with room for appropriate public and cultural activities.

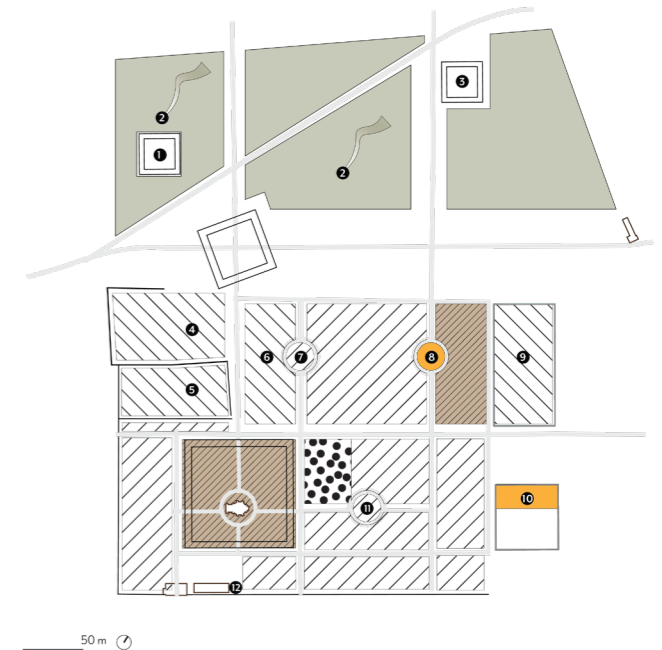
The cemetery regains its position in the urban fabric, with an optically more open and more inviting edge condition, where it previously had turned its back to the city. The cemetery's circulation is better integrated with the surrounding street grid, properly mingling private and public uses.

The cemetery itself is a rich and layered design with different atmospheres and a juxtaposition of open and closed, light and shaded, and public and private. It is all bound together by the grid structure that has steered the site's development since 1810, but more playfully and loosely, not as strict and monotonous as it always was. This development will also add a richer and more biodiverse patch to the city's green infrastructure than it is today.

Furthermore, regarding burial Maastricht will gain a memorial forest and natural cemetery (only the thirteenth so far in the Netherlands), and the burial offering will be better aligned with the nowadays and future burial market, securing a healthy and fruitful third century of the cemetery's life.

The plan combines a variety of elements and atmospheres that are broken down in the following paragraphs. In addition, five highlights have been worked out in more detail that elaborate on design details and the design's tactility on the small scale.

See figure 7.13 for the burial typologies embedded in the masterplan.



1. forest glade memorial pavilion
2. ash scattering in dedicated spots in the memorial forest
3. outdoor ceremonial pavilion
4. Islamic burial site
5. Jewish burial site
6. columbarium garden
7. Catholic clergy burial site
8. Indonesian war monument
9. Armenian burial site
10. Improved war graves memorial site
11. Burial site for Maastricht mayors
12. Soil and maintenance shed

Fig. 7.13: burial infrastructure embedded in masterplan; source: author

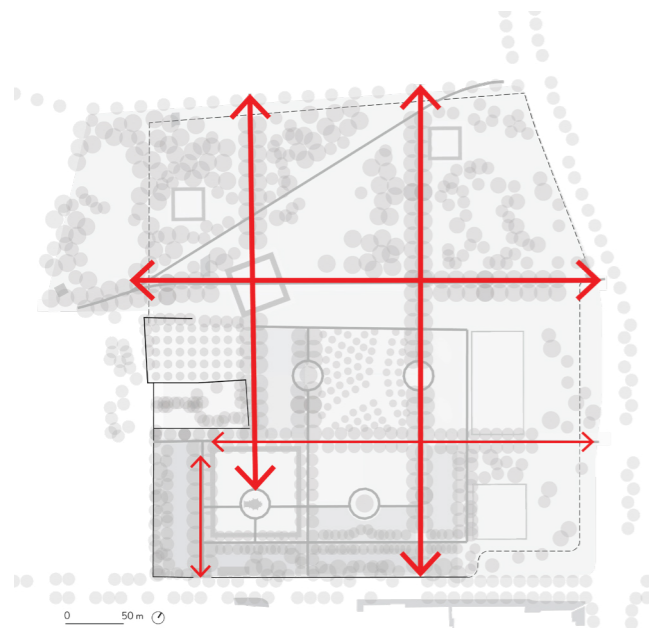


Fig. 7.14: diagram anchoring grid; source: author

#### 7.4.2. ANCHORING HISTORICAL GRID

Fragments of the historical grid are accentuated and extended into the new parts. Thereby it holds the entire design together and secures continuity and an easily navigable site.

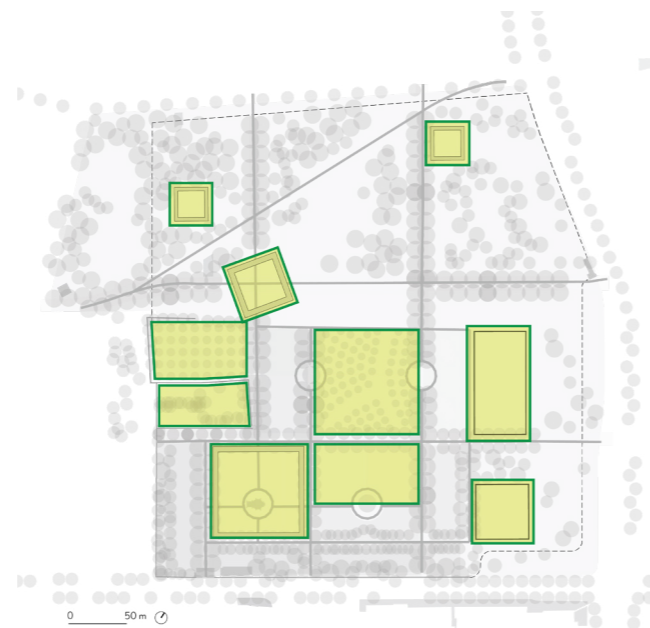


Fig. 7.15: diagram rooms and glades; source: author

#### 7.4.3. ROOMS & GLADES

A series of fields, garden rooms, and forest glades bring special moments and surprises while moving throughout the site. Furthermore, it breaks up the large site into comprehensible and intimate areas and offers a place to turn inwards upon oneself.

> TOOL PROVIDE SPACES THAT SUGGEST SECLUSION AND PRIVACY



Fig. 7.16: diagram of phasing; source: author

#### 7.4.5. PHASING

By studying the readily available space, which burial fields have been decommissioned and which could be in the future, a suggestion is given on how the plan could be executed in three phases: I. now, II. 0 – 10 years, and III. 10 – 25 years. See subchapter 7.3.4. for two main phasing tools.

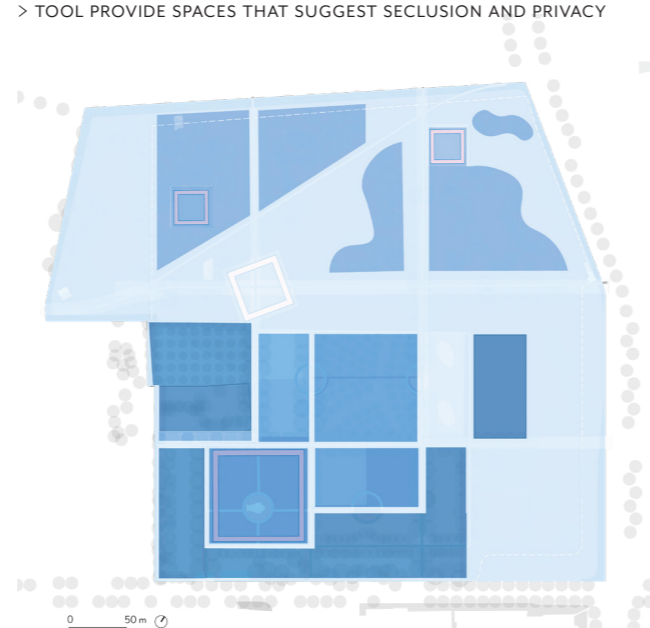


Fig. 7.17: diagram levels of privateness; source: author

#### 7.4.6. PUBLIC-SEMI-PUBLIC-PRIVATE

The masterplan holds areas with varying degrees of public and privateness. A clear path hierarchy, thresholds (planting and low walls), and the provision of secluded spaces balance the cemetery's use by both the bereaved and public joint usage.

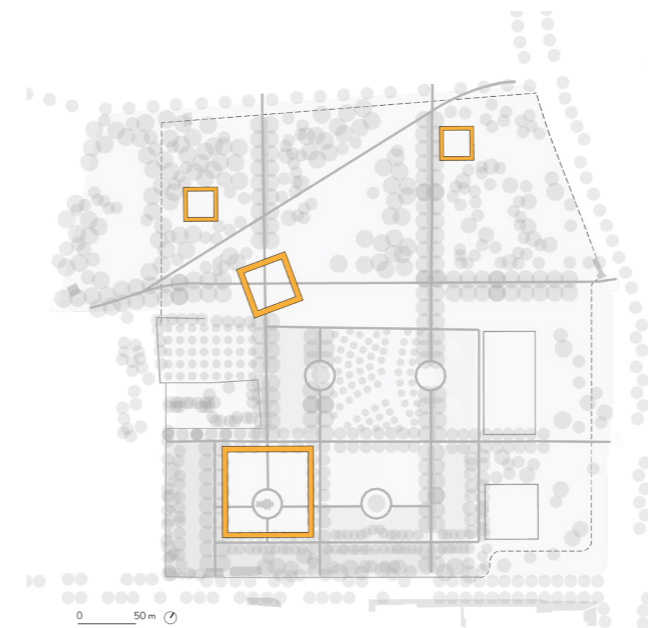
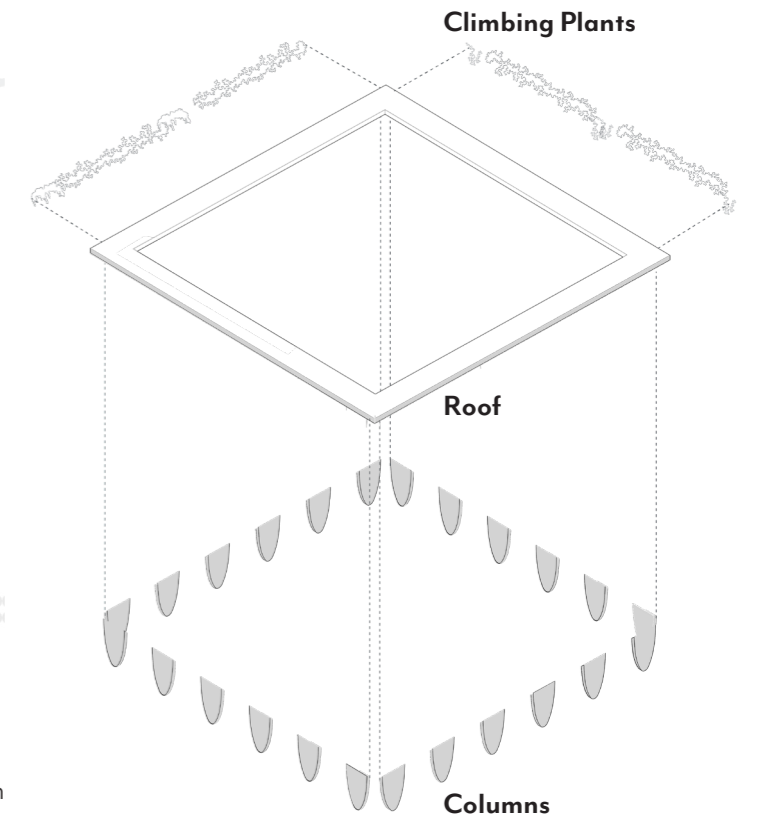


Fig. 7.18: diagram pavilions; source: author

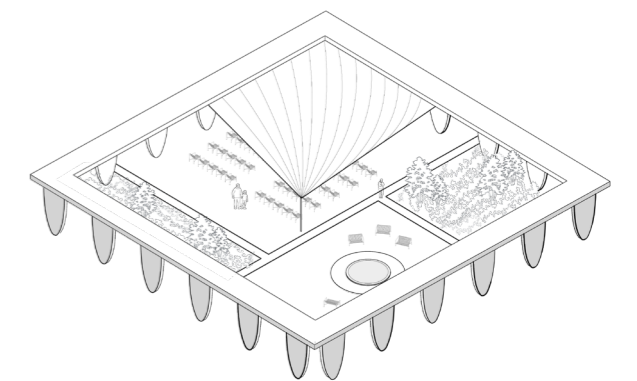
#### 7.4.4. PAVILIONS AS ANCHORING POINTS

A set of four pavilions is proposed that define an area and can be flexibly used for different programming. Furthermore, they offer anchor points while moving on-site and provide the area with an iconic identity. Designed as bold pergolas, their columns are inspired by Romanesque architecture that is so typical for Maastricht. They are built from beige rammed concrete, referring to local materiality.

> TOOL PROVIDE SPACES THAT SUGGEST SECLUSION AND PRIVACY



Ceremonial Pavilion



Forest Pavilion

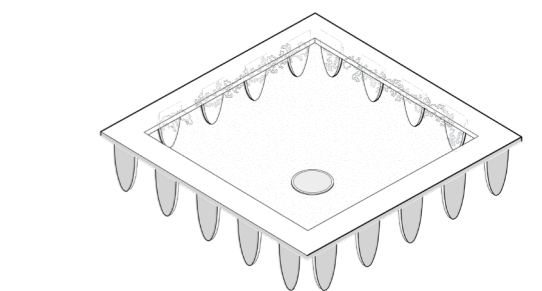
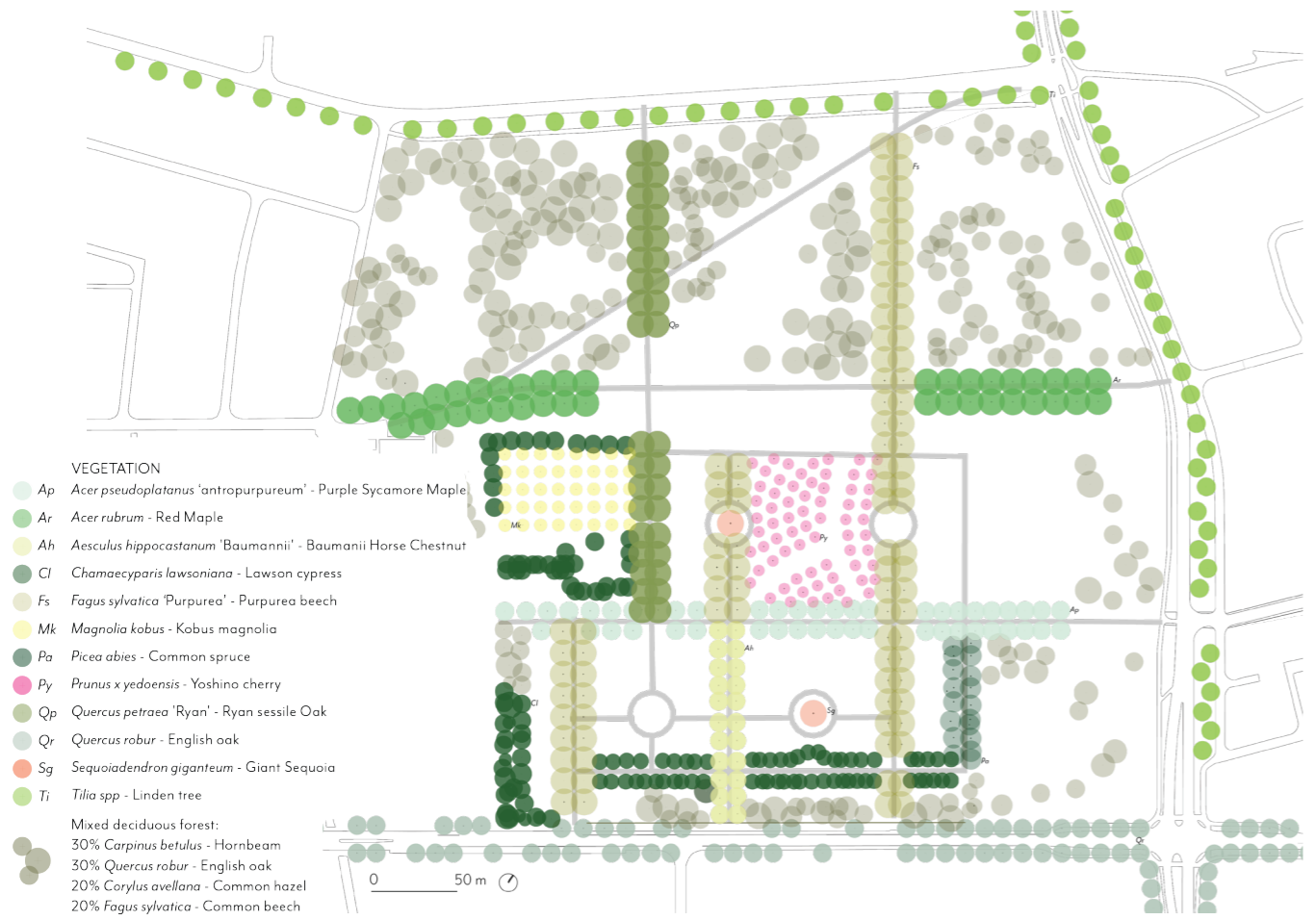


Fig. 7.19: basic principle of the pergola structure that comes back in different forms around the site; source: author



Top: Fig. 7.20: proposed tree plan; source: author

Bottom: Fig. 7.21: tree selection; source: author

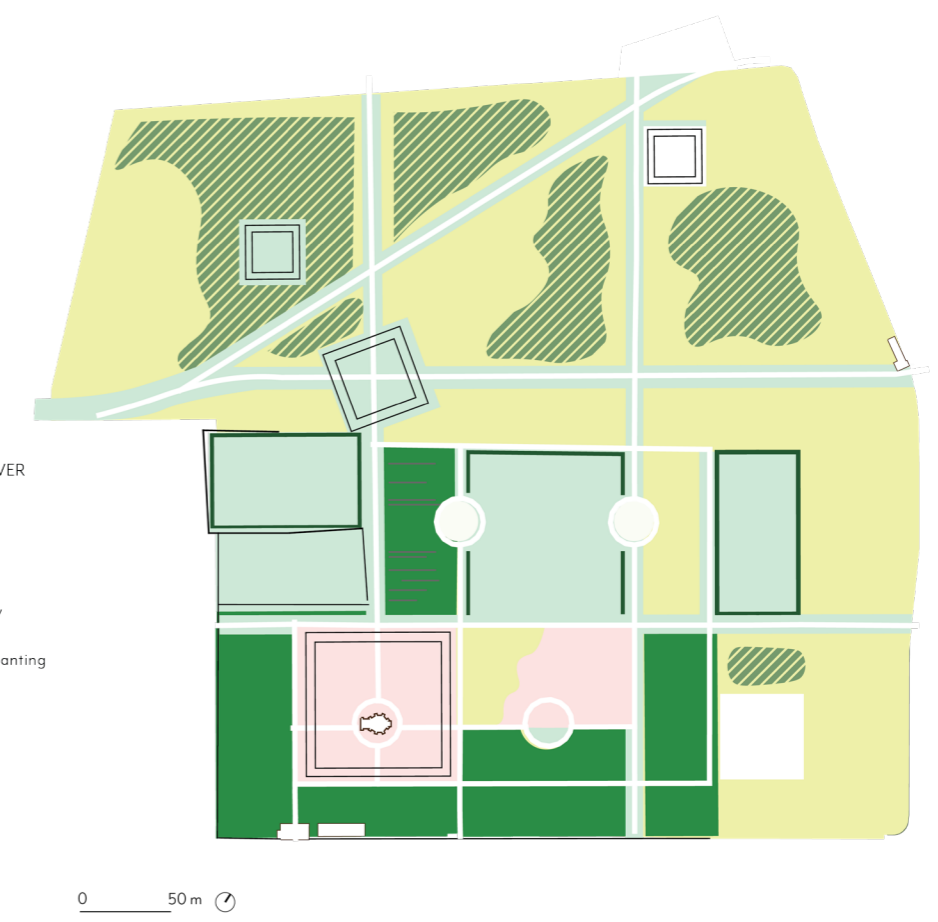
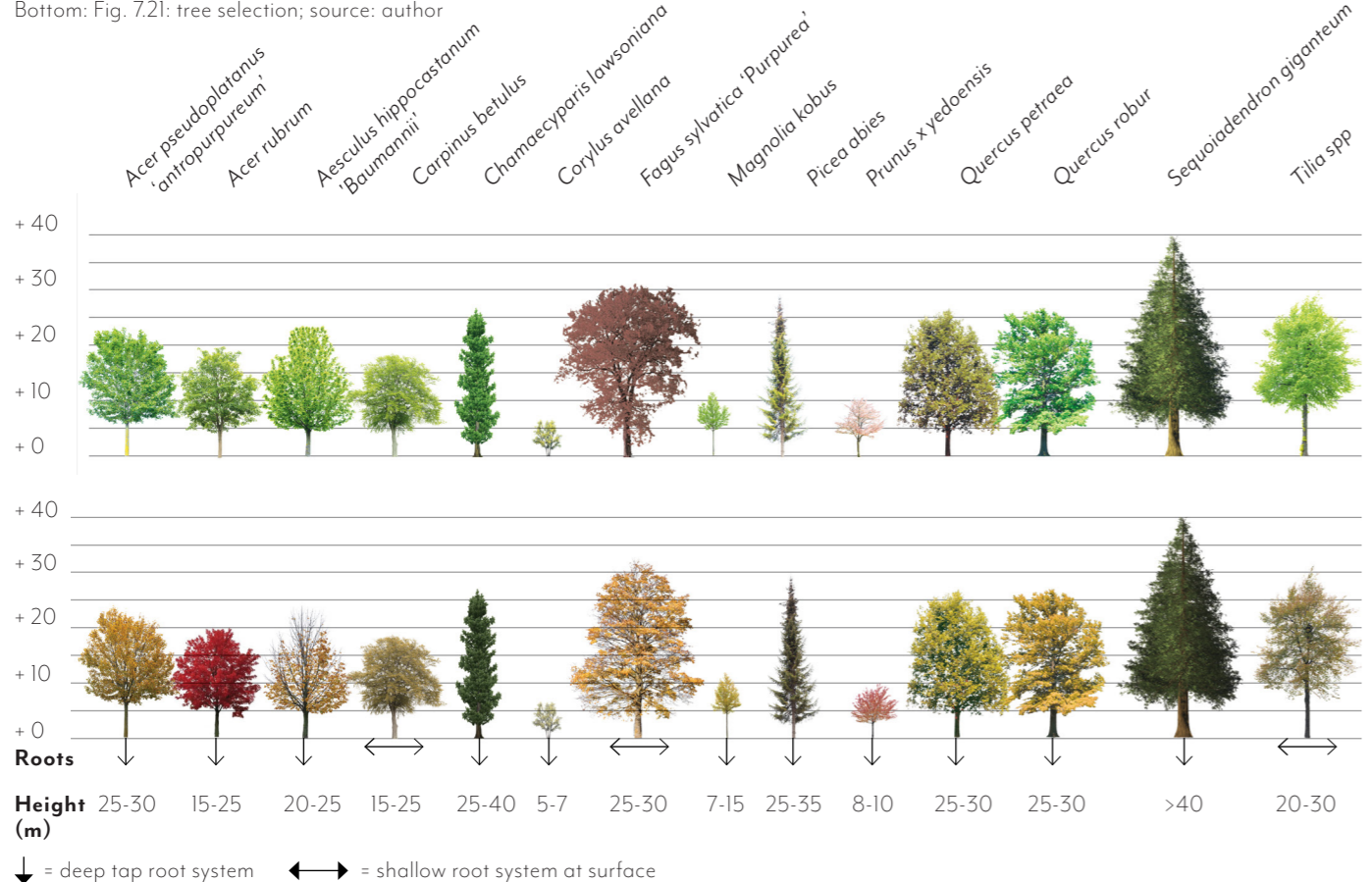


Fig. 7.22: proposed groundcover; source: author

### 7.4.7. PLANTING STRATEGY: AN URBAN ARBORETUM

A light and airy planting palette is used that brings about a more pleasant and relativizing atmosphere to the cemetery. By working with various forms, textures, colors, and seasonality, a park with year-round interest is created, also for those not visiting a grave. See scheme 7.20 for the variety of trees and the color spectacle of various reds and yellows in fall. The symbolic connotation, of course, relates to bringing the cycle of life into the site, starting in spring and traveling through periods of growth until death and decay.

The tree's root characteristics have been taken into account in the tree selection process and in their place on site, to avoid unwanted interference with burials and grave digging.

It is of importance to gradually replant the allees to prevent large clearings at once; which is also ecologically

undesirable. The urgency is there: the oldest cypresses at the end of their life span could be replaced first, from then gradually rolling out the new vegetation scheme step by step.

- > TOOL CREATE THRESHOLDS THAT HELP TRANSITION BETWEEN PUBLIC AND PRIVATENESS
- > TOOL CREATE HETEROGENITY OF HABITATS

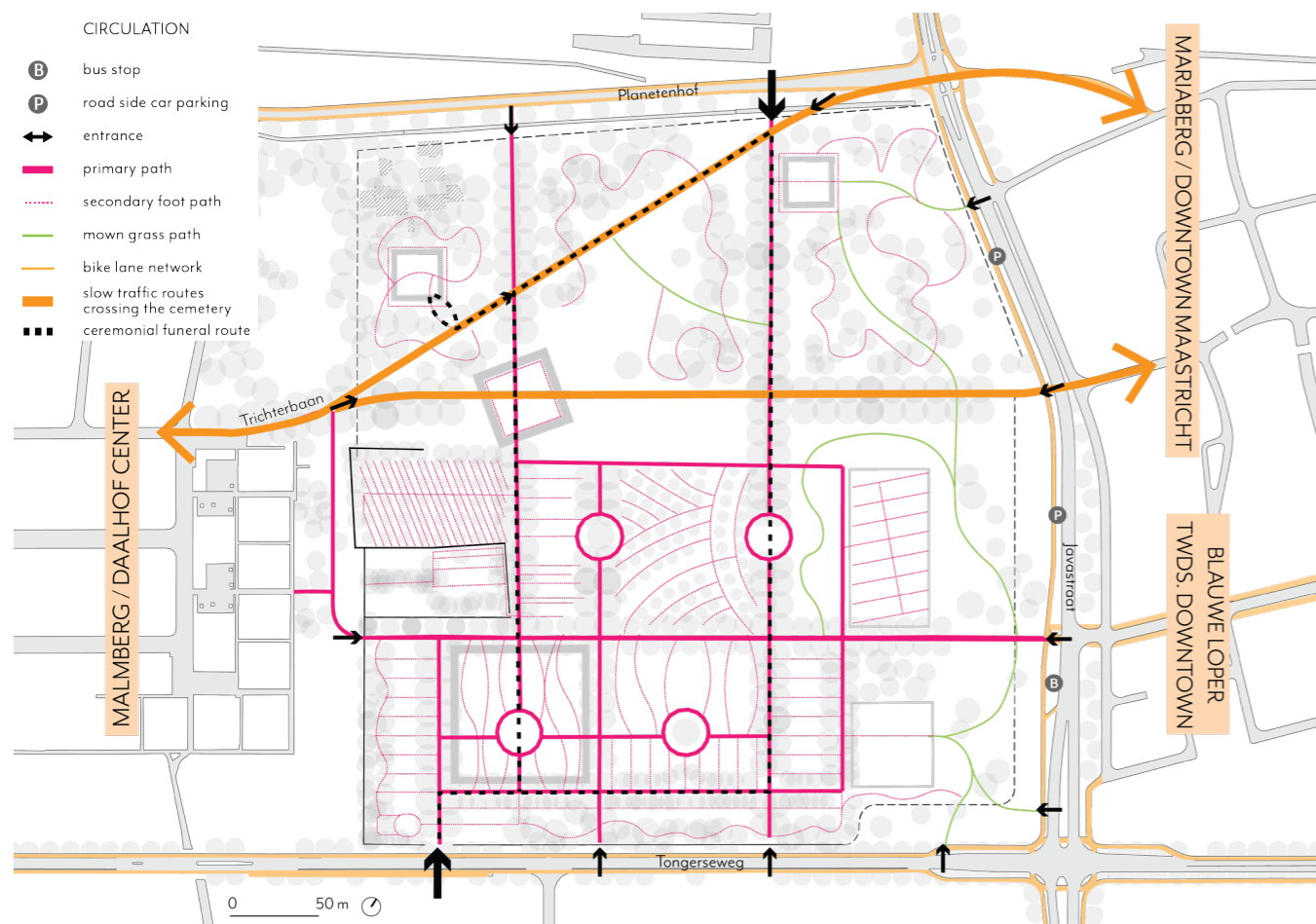


Fig. 7.23: proposed circulation; source: author

#### 7.4.8. CIRCULATION, PATH HIERARCHY & ENTRANCE HIERARCHY

The circulation scheme is closely linked to the integration of the cemetery and city. Public use of a cemetery increases when it becomes part of people's daily movement patterns, thus a generous amount of formal and informal entrances are made. They are aligned to the existing urban grid provides ample opportunities to enter the park.

The monumental entrance gate along the Tongerseweg and a new entrance close to the memorial pavilion are the formal main entrances that offer the grandeur for a funeral procession to enter. Eleven informal secondary entrances are more subtly designed and function as welcoming entrances for residents and relatives visiting the deceased alike.

Through this action, the cemetery goes from three entrances now to thirteen entrances in total, thereby generously increasing the site's porosity. In addition, new connections between the surrounding neighborhoods are made, and east-west thoroughfares from the suburbs towards downtown Maastricht are realized.

- > TOOL CREATE A PATH HIERARCHY
- > TOOL MAKE A HIERARCHY OF ENTRANCES
- > TOOL MAKE ACCESSIBLE FOR ALL MODES OF SLOW-TRAFFIC AND DISCOURAGE THE USE OF CARS
- > TOOL CREATE CLEAR A TO B THROUGHFARES
- > TOOL ALIGN PATHS AND ENTRANCES TO EXISTING URBAN GRID THAT MAKE MEANINGFUL CONNECTIONS

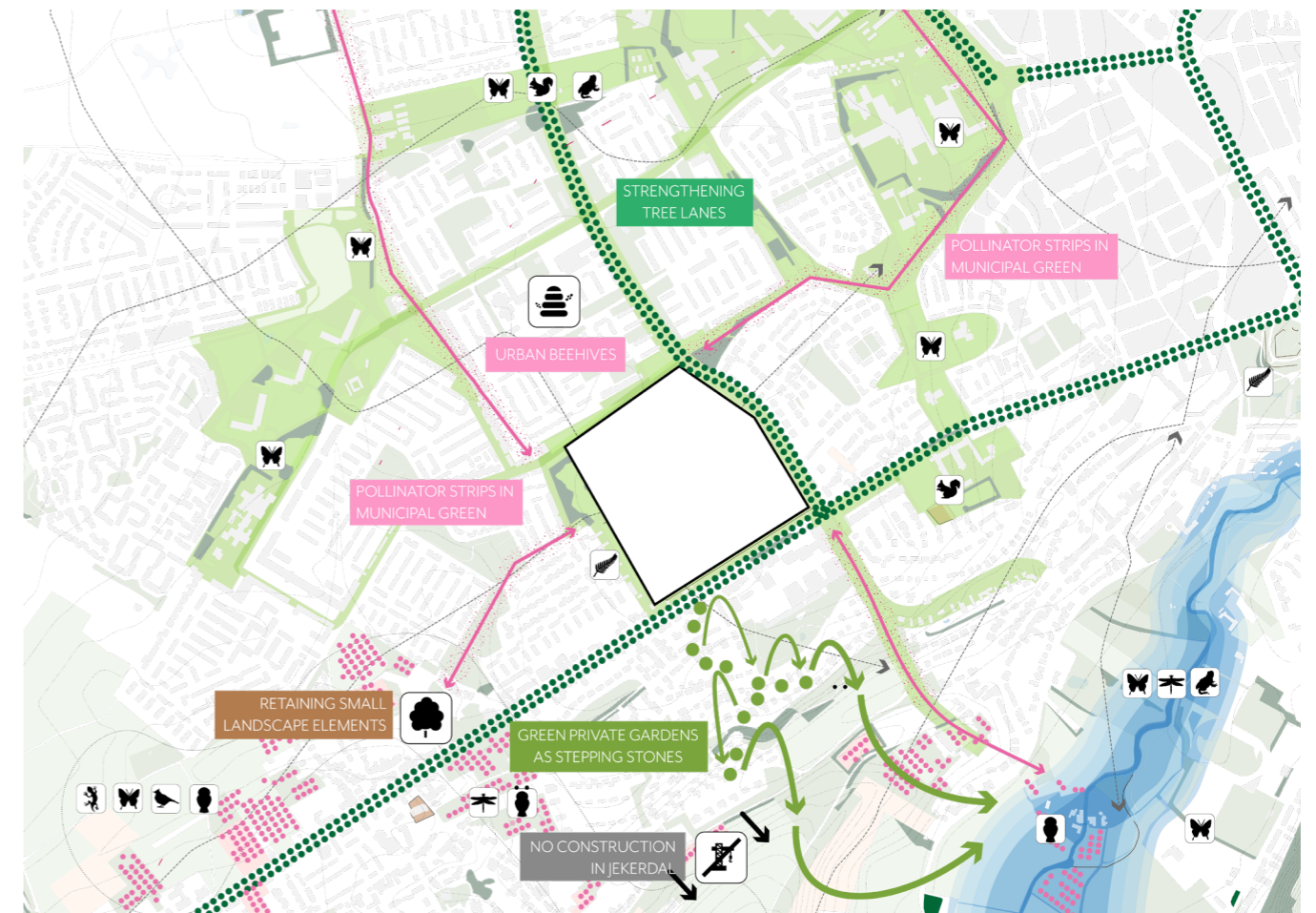


Fig. 7.24: proposed measures for better integration of the cemetery into the larger green infrastructure system; source: author

#### 7.4.9. EMBEDDING IN REGIONAL LANDSCAPE INFRA & ECOLOGY

A set of strategies and policy advises is provided in figure 7.24. They aim to better integrate the Tongerseweg cemetery in the wider Maastricht green infrastructure focussing on:

- Improving the connections to the concentric structure of neighborhood green and city and improve their ecological quality.
- Improving the connection towards the Jeker valley, the closest nature reserve to the cemetery.

- City park & neighbourhood green
  - Pollinator strips in municipal green
  - Strengthening tree lanes (pollinator value + bats & bird migration route)
  - Green private gardens as stepping stones
  - Tongerseweg Cemetery
- Habitat for:
- Midwife toad
  - Swallow
  - Wide variety of native insects
  - Wall lizard
  - European hamster
  - Red Squirrel
  - Badger
  - Tawny Owl
  - Wall Flora

- > TOOL CREATE A VARIETY OF CONNECTIONS SPECIFIC TO DIFFERENT TARGET SPECIES
- > TOOL RELATE INTERVENTIONS TO WIDER TERRITORY AND BUILT FROM EXISTING (REGIONAL) CONDITIONS
- > TOOL DESIGN WITH POINTS, SURFACES AND LINES IN MIND TO CREATE COHERENT ECOSYSTEM CONNECTIVITY



## 7.5. HIGHLIGHTS



Fig. 7.25: transformed allee - spring rendering; source: author



Fig. 7.26: transformed allee - summer rendering; source: author

### 7.5.1. HIGHLIGHT 1: TRANSFORMING THE ALLEES

The transformed allees are planted with deciduous species that bring seasonality, dramatic fall colors, and magical dappled sunlight to the lanes. Besides, a more transparent canopy allows more daylight to reach the ground and allows the development of a rich understory. A dense carpet of flowering spring bulbs kicks off the arrival of spring. Furthermore, the pavement is improved and seized as an opportunity to introduce sustainable water collection that is later re-used to water grave plants. Water throughs, as seen in subchapter 7.5.6., are located at crossing points of the allees to fill a watering can.

- > TOOL USE CONTEMPORARY, LIGHT PLANTING WITH SEASONAL INTERESTS THAT PROVIDES FOR SPATIAL EXPERIENCE
- > TOOL PLANT TREES IN A WAY THEY HAVE THE SPACE AND TIME TO GROW INTO MATURE TREES

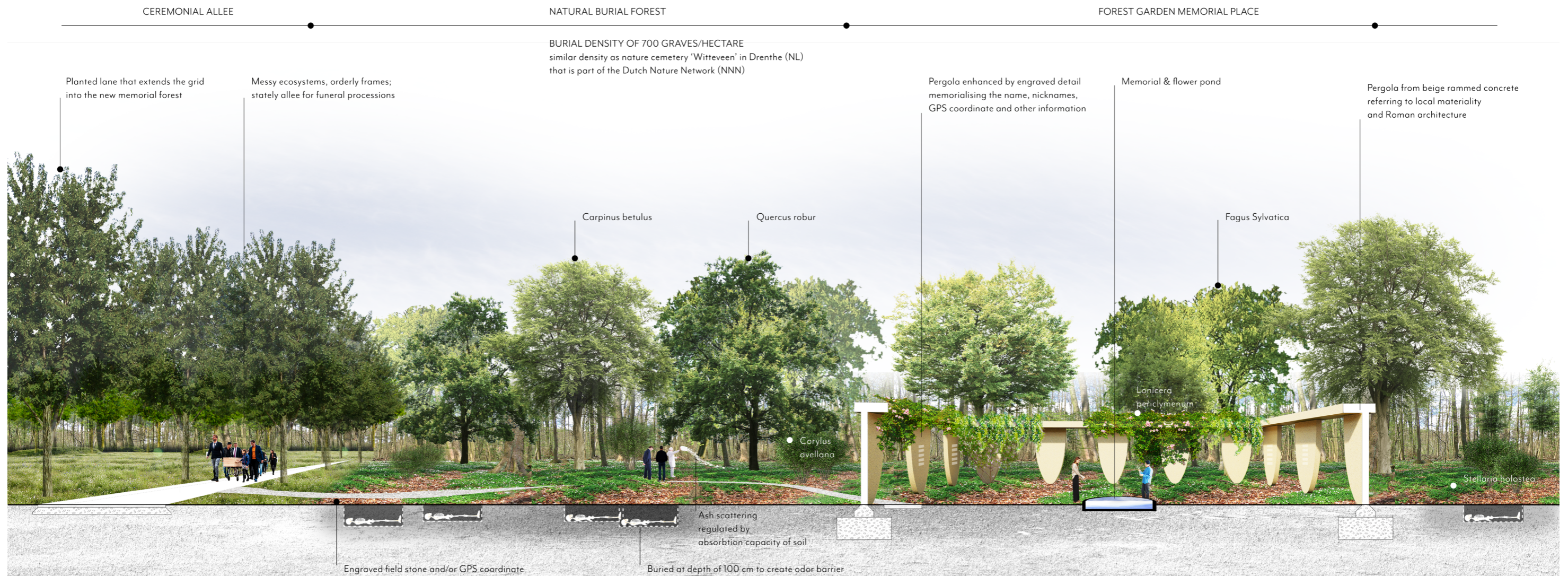


Fig. 7.27: section of the memorial forest looking south;  
source: author

## 7.5.2. HIGHLIGHT 2: MEMORIAL FOREST

The memorial forest caters to the lack of green burial options in the region. More than 1,5 hectares is instantly available to realize a burial forest and will keep growing following the transformation of closed burial fields into a memorial forest, as presented in strategy 4. In addition, the memorial forest itself is relatively low-maintenance, which compensates for increased maintenance obligations required for other parts of the design.

The proposed oak-beech-hornbeam forest is an eclectic mix of the local oak-beech and oak-hornbeam forest typologies in discussion with forest ecologist Friso van der Zee.

Given that a green burial or ash scattering has minimal grave markings, a forest glade with a pavilion is proposed that offers a physical place for memorialization and a place for inscribing the name of a deceased relative.

- > TOOL PROVIDE SPACES THAT SUGGEST SECLUSION AND PRIVACY
- > TOOL INTRODUCE SUSTAINABLE BURIAL PRACTICES
- > TOOL MESSY ECOSYSTEMS, ORDERLY FRAMES
- > TOOL RETAIN QUIET AND UNDISTURBED PLACES

### 7.5.3. HIGHLIGHT 3: BURIAL ORCHARD

Referring to the local fruit orchard in the hills of southern Limburg, a burial orchard is introduced that accommodate 'conventional' casket and urn burial. The paths and rows are designed slightly curving to prevent the feeling of an endless burial field. The burial orchard is planted with specimen *Prunus x yedoensis*, which are also planted in the famous cherry groves along Tidal Basin (Washington DC,US) and in the 'Amsterdamse Bos' (Amsterdam, Netherlands). They flower exuberantly.

- > TOOL CREATE THRESHOLDS THAT HELP TRANSITION BETWEEN PUBLIC AND PRIVATENESS
- > TOOL AIM FOR SUBSERVIENT MEMORIALS AND BALANCE VISUAL DISTURBANCE WITH A STRONG CONTINUOUS GREEN DECOR
- > TOOL CREATE COMPACT BURIAL FACILITIES, LEAVING SPACE OPEN FOR LANDSCAPE DEVELOPMENT

Fig. 7.28: burial orchard looking north; source: author





Fig. 7.29: ceremonial pavilion looking west; source: author

#### 7.5.4. HIGHLIGHT 4: CEREMONIAL PAVILION

A ceremonial pavilion arises in an already available area and thus can be added to the cemetery relatively quickly. It defines a multifunctional area that can be used for funeral rituals, memorial events such as All Saints Day, and side-programming that centers around art and

appropriate performances (e.g., classical music/exposition). Furthermore, it is a focal meeting point where one can encounter other people dealing with the same emotions.

- > TOOL DESIGN SPACES WHERE NO BURIAL OCCURS AND THAT LEAVE ROOM FOR OTHER PROGRAM
- > STRATEGY OFFER (FREQUENT) APPROPRIATE CULTURAL EVENTS



Fig. 7.30: looking towards the military memorial site; source: author

**7.5.5. HIGHLIGHT 5:  
OPENING UP & CLUSTERING  
MILITARY MEMORIAL SITE**

Large parts of the cemetery's edge condition are transformed into an optically open area that appeals to enter, such as here around the corner of the Javastraat and Tongerseweg. Given the low ecological value of the eastern edges, the transformation into these open lowland hay

meadows also brings a significant ecological improvement. In this corner, a military burial site has always been hidden between the trees. Through this design move, it is placed in the spotlight of society again and is given credit where credit is due. In addition, this new memorial location provides enough space to bundle all war-related memorial events. Up till now, the site always was short of space during these events.

- > STRATEGY MAKE THE CEMETERY VISIBLE WITHIN THE URBAN FABRIC
- > TOOL MAKE TRANSPARENT AND PERMEABLE EDGE CONDITION
- > TOOL GRADUALLY TRANSFORM CLIPPED LAWNS TO URBAN MEADOWS

7.5.6. DETAIL: STREET FURNITURE

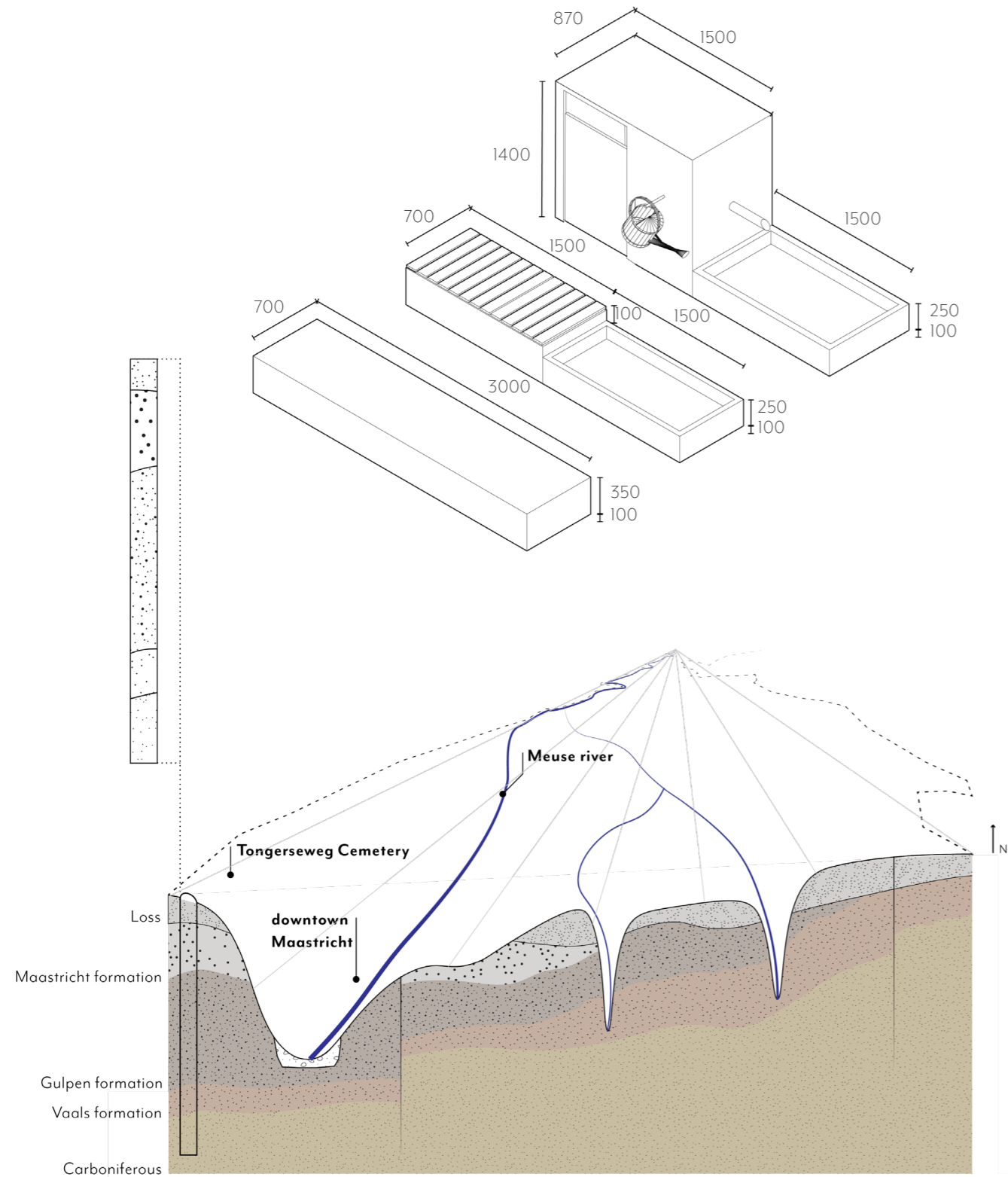


Fig. 7.31: The use of rammed concrete in furniture and the pavilions is a reference to the local geology, reflected by the subtle color and texture differences seen in rammed concrete. Units in millimeters; source: author

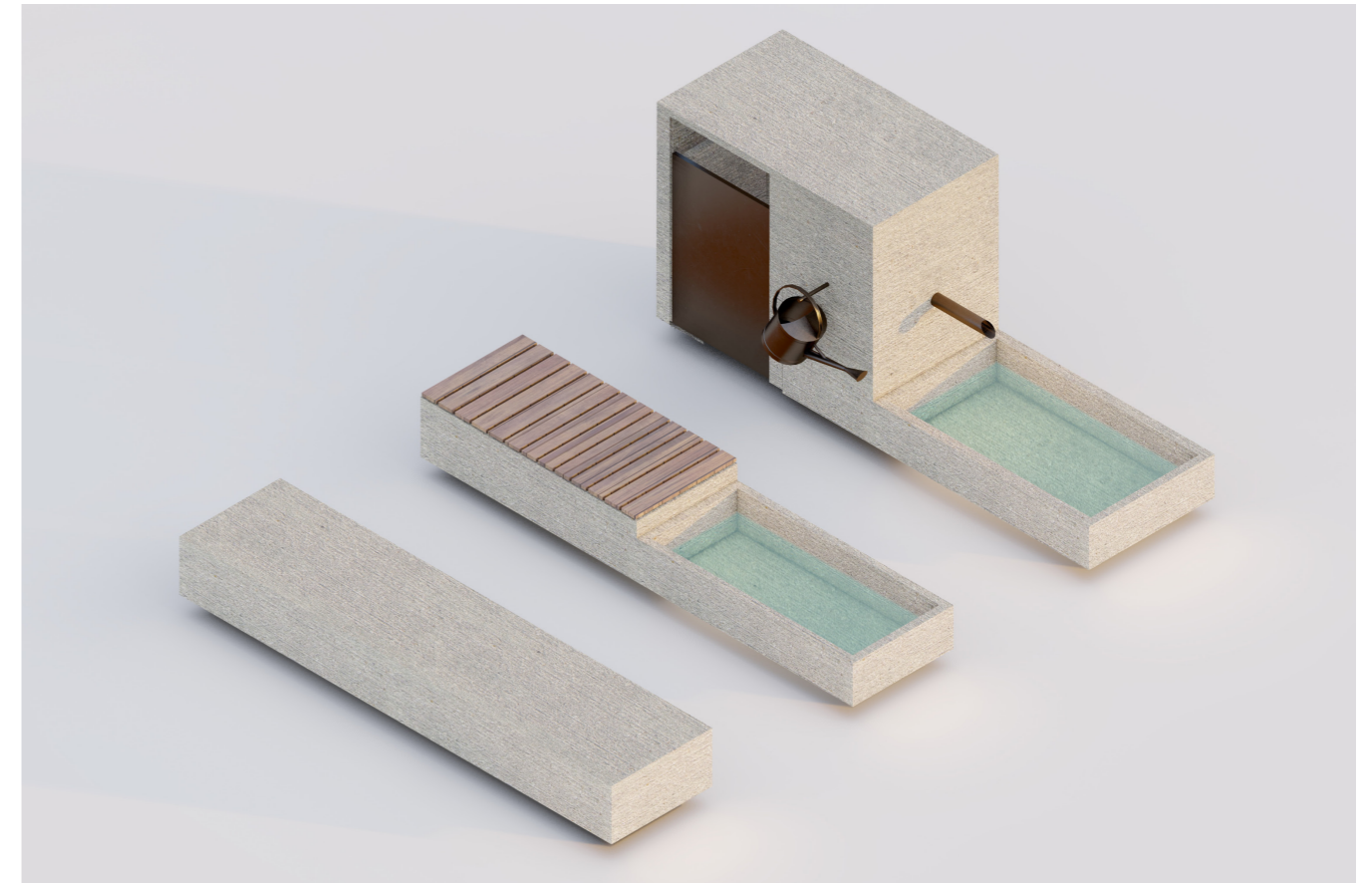


Fig. 7.32: render of proposed series of benches, water troughs and waste collection made with rammed concrete; source: author



Fig. 7.33: use of rammed concrete at the Bruder Klaus Kapelle by Peter Zumthor in Wachendorf, Germany; source: Willem-Jan Beeren, 2011

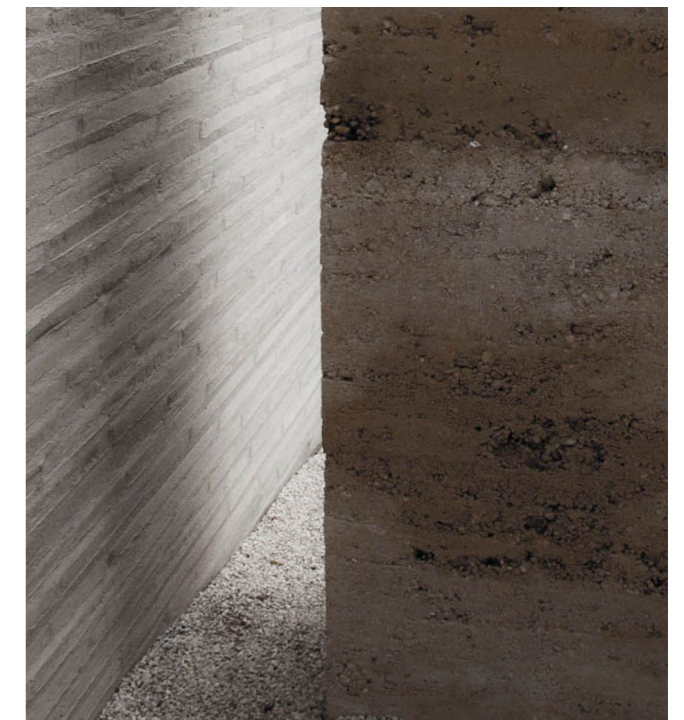


Fig. 7.34: use of rammed concrete at Kolumba Museum courtyard in Cologne by Vogt landscape architects; source: Danish Architecture Center, 2021

## 8. DISCUSSION & REFLECTION

This discussion interprets the thesis' results, which methods were used, and of what use these were, including shortcomings.

### GENERATION OF DESIGN GUIDELINES

The generation of an extensive set of guidelines is one of the two major outcomes of this thesis but has to be critically reviewed.

The research provides an extensive foundation for reflective practitioners that work on the (re-)design of green urban cemeteries. The catalog with design guidelines saves them the time of looking for relevant literature and best-practice examples and allows them to design more effectively.

Furthermore, the organizing system of different scales and levels of abstraction is its power. This was one of the most complex parts of the reference study. However, after a long iterative process, the introduction of the current ordering system has dramatically increased the usability of the tools in other design cases. Furthermore, the different levels of abstraction lead to an increase of the research's applicability since it makes the guidelines as specific as they need to be and at the same time have the necessary openness for the application in specific design cases (Prominski, 2017).

The reference study in itself is a normative way of doing research, as the interpretation of references and making correlations between the references is partially influenced by the person that executes the research (Swaffield & Deming, 2011). Neglect of theory would be misleading (Prominski, 2016) and therefore, the final set of guidelines is, more than planned before, supported by a mix of theories. It draws from the humanities and social and environmental sciences. This is specified under every guideline. Thereby sub-research questions 1 and 2 have had more influence on the reference study than planned before; the outcomes of sub-research question 2 even directly led to design tools.

During the first steps of formulating guidelines on green infrastructure and ecological performance, my ecological knowledge seemed insufficient to see patterns and similarities in the references as quickly as I did regarding the integration of public park functions. Therefore, the theory on green infrastructure and ecology from sub-

research question 2 was brought in to formulate additional guidelines that I did not find in the reference study. In addition, this use of contemporary ecological theory allowed the development of more progressive ecological guidelines since not all contemporary ways of dealing with green burial and ecological management were present in the selected references.

### TESTING OF THE GUIDELINES

During the design process, it became clear the preliminary design guidelines needed to be formulated more clearly and precisely, which is a standard procedure during guideline testing (Prominski, 2017). No new guidelines were invented during the design phase. More time than planned was spent on the reference studies and generation of design guidelines; Three iterative rounds of guideline generation and ordering followed after each other. This set us up with an already detailed and well-structured toolbox before kicking off the design phase. The most significant adjustments that were made during the design are as following:

- *Tool: position the cemetery park in its surroundings as thoroughfare, destination or both*  
A returning question during the design was what way to integrate the cemetery with the surrounding neighborhood and how it related to other green public spaces. The case studies position themselves as either a thoroughfare, a destination, or as both. Once this was clarified for the Tongerseweg Cemetery, the design process made big steps forward.
- *Tool: dialogue between cultural heritage vs. ecology sector*  
The field of tension between freezing monumental heritage or transforming it influenced this tool, since the design task at the Tongerseweg was closely related to the question of transforming a nationally protected monument. It shows us that cultural and biological values can co-exist in old cemeteries but requires reconciling biodiversity and heritage conservation for it to work.

- *Tool: retain quiet and undisturbed places + Strategy: create varying degrees of public and privateness*  
Before improvements were made in the structuring of design guidelines, many public park & ecological design tools were mixed together. The design in Maastricht made clear some tools work both ways. E.g., creating more intimate places with a higher feeling of 'privateness' almost automatically means a quiet and undisturbed spot is created. This also occurs between the tool: aim for subservient memorials and balance visual disturbance with a strong continuous green décor and the tool: create clustered burial facilities, leaving space open for landscape development. They come close in what they try to effect, but their aim and objective differ. Therefore these were separated and properly illustrated to offer a clear and accurate set of guidelines for both public park functions and ecological objectives.

### INTERFERING WITH CONFLICTING GUIDELINES

The wide array of guidelines automatically implies conflicting guidelines. Ambitions can be high, but every cemetery has a limited amount of space, and not everything is possible to be included.

In the case of Maastricht, the biggest conflicts encountered were:

- Freezing heritage vs. dynamic heritage management
- Existing cemetery functions vs. loading new park functions
- Ecology: considering nature development against other uses

On top of that, there is also friction between the three of them.

This implies that many design decisions have to be made to find the right balance when guidelines conflict with each other. Here, ecological objectives were always prioritized over the objectives to increase public joint usage. The idea behind this is that park programs can be designed 'nature-inclusively' where ecological objectives can still be

integrated, even be it for different target species.

Holding on to the earlier defined ecological core qualities of the site (chapter 6.2.6.) helped to make the design decisions as it was deemed okay to replace one ecological core quality with another ecological core quality. For example, the eastern edge condition changed from a closed-off area that was densely planted with a monoculture of cypress trees into an open meadow, see design highlight 5 (7.5.5.). This establishes an optically open edge condition that looks more inviting and makes the cemetery turns its face to the city. Here, a switch from one ecological quality, a stand of old trees, towards a lowland hay meadow is deemed a proper and desirable outcome.

### GREEN URBAN CEMETERIES IN THE WIDER DEBATE

In the beginning of this report, we have positioned green urban cemeteries in the context of the compact city. Urban land is getting scarcer with intensification and competing spatial claims as a result. At the same time, the global COVID-19 pandemic has shown us the need for improved open outdoor spaces. It has been striking to see how two of the reference cases, Skogskyrkogården and Green Wood Cemetery, have been in the news with their increased use as a public park when other parks started to overcrowd with people looking for their bit of outdoor space (Cotto, 2020; SVT, 2021). People vote with their feet, and this pandemic could have kicked off a new era in how green urban cemeteries are designed to be used.

Too many old urban cemeteries in the Netherlands are dull sites, with burial products that are slowly but steadily becoming obsolete and big ecological underperformance, e.g., see the dead ground level in the analysis on the Tongerseweg.

This research has shown the tremendous potential these places hold when they diversify their activities and are planned and designed for a wider user group. On the city scale, they are often a nonentity in green infrastructure planning, while cemeteries present the opportunity to be transformed into biodiverse, climate-positive community spaces. The catalog with guidelines provides an extensive toolbox for how to change that status quo and break the trend.

## 9. CONCLUSION

This thesis started by positioning green urban cemeteries at the intersection of green infrastructure and joint usage as a public park. In the context of intensification and competing spatial claims, green urban cemeteries are seen as closed-off islands in the urban fabric, which can make way larger contributions to the city's green open space system than they do today.

Sub-research question 1 explored public park functions for green urban cemeteries. It stressed the importance of studying potential park functions for green urban cemeteries in the context of the multifunctional use of green spaces. Furthermore, initially located in the periphery, they have regained their position within the city again, that asks for a renegotiation with their surroundings.

It appeared that the range and extent to which new public park functions can be accommodated is highly dependent on the cemetery's context. The amount of green space already available and local problems and questions at play determine how the cemetery can respond to its surroundings and what new functions could be adequate and applicable to add.

Sub-research question 2 explored the role green urban cemeteries play, or potentially could play, in the green infrastructure. Nowadays, many green urban cemeteries are blind spots in city's green infrastructure planning, whereby their specific role and potential remain unaddressed. However, as stable, quiet, and relatively undisturbed green spaces, they are an outstanding habitat feature compared to other, more dynamic urban landscapes. Through new management practices and the introduction and design of more sustainable burial options, on-site ecological performance could be improved. Furthermore, by better linking the cemetery with the wider green infrastructure, the site's ecological qualities are unlocked and integrated into the larger green infrastructure. Thereby, green urban cemeteries can be regarded as increasingly valuable entities in biodiversity conservation given their ubiquity within urban fabrics worldwide and are simply inevitable when planning and designing in the age of a climate and biodiversity crisis.

In the meantime, the practice side of the landscape architectural discipline hasn't been sitting around doing nothing. There are exemplary projects of green urban

cemeteries at the intersection of green infrastructure and joint usage as a public park. Three reference cases were selected and thoroughly studied. The reference studies and output of SRQ 2 supplied the process of generating design guidelines on facilitating joint public usage and increasing the ecological performance of a green urban cemetery. As mentioned before, the catalog with guidelines provides an extensive toolbox that helps to transform active cemeteries into more biodiverse, climate-positive community spaces.

To test out the toolbox full of guidelines, the Tongerseweg Cemetery in Maastricht was selected as a testbed. Its inner-city location, and typical 19th-century monumental character make it an exemplary case to generalize the design result as input for other Dutch and Northern European cemeteries as well. The inferior spatial quality and downward spiraling exploitation make it a relevant study object.

The proposed design aims to transform the site from a closed-off island into a recognizable memorial park in the middle of an urbanized environment. Making an (optically) open area with a clear and inviting atmosphere that appeals to wander around and relax, but also to contemplate, encounter other relatives or memorialize on one's own. Through the design, the site's habitat qualities are significantly transformed and improved. Thereby, the cemetery is also proposed to be better integrated into the wider Maastricht green infrastructure and the Jeker valley, so its habitat and ecological qualities are unlocked and become available for the larger green infrastructure.

Furthermore, the design is influenced by contemporary and future-oriented ways of thinking about death and memorialization. This is not the primary concern of the research but is an important objective given the current outdated offering of the cemetery.

Altogether the big majority of the generated design guidelines have informed the design of the Tongerseweg, which signifies that the toolbox comes close to providing a complete overview of the interventions needed to accommodate public joint-usage and increased ecological performance in green urban cemeteries, thereby answering the main research question of this thesis.

Thus the biggest outcome of this thesis is what the research and design question resulted in together.

The generic outcome is a catalog that contains all design guidelines: it has a high generalisability. This work is published both in this academic report and as a catalog containing design approaches, strategies, and principles on various levels of abstractions. Thereby, the catalog serves as a reference work for the practice side of the landscape architectural discipline. Thereby, I aim to bring the harvested knowledge 'out there' to be used in future planning and design exercises on green urban cemeteries.

The second outcome is the design for the Tongerseweg Cemetery, a location-specific outcome. The design has been positively received by Erik Kaptein, landscape architect and representative of the municipality of Maastricht, and the hope is that it will become a valuable guide in steering the cemetery's future.



## REFERENCES

- 123RF. (2021). AllSaintsNachtInSkogskyrkogården Begraafplaats, Stockholm, Zweden Royalty-Vrije Foto, Plaatjes, Beelden En Stock Fotografie. Image 23451674. [https://nl.123rf.com/photo\\_23451674\\_all-saints-nacht-in-skogskyrkogården-begraafplaats-stockholm-zweden.html](https://nl.123rf.com/photo_23451674_all-saints-nacht-in-skogskyrkogården-begraafplaats-stockholm-zweden.html)
- Aben, R. 1968-, Wit 1969-, S. de (Saskia I., & Jong 1974-, S. de (Sigrid D. (1998). De omsloten tuin : geschiedenis en ontwikkeling van de hortus conclusus en de herintroductie ervan in het hedendaagse stadslandschap LK - <https://wur.on.worldcat.org/oclc/905481280>. In TA - TT -. Uitgeverij 010.
- Adenis, P. (2016). Weissensee Cemetery. <https://www.nationalgeographic.com/science/article/bats-spiders-city-cemetery-weissensee-jewish-berlin-animals>
- Ahern, J. (2002). Greenways as strategic landscape planning: Theory and applications: Vol. PhD. Wageningen Universiteit. <http://library.wur.nl/WebQuery/wda/1643353>
- Ahern, Jack. (2007). Green infrastructure for cities: the spatial dimension. In *Cities of the Future: Towards Integrated Sustainable Water and Landscape Management*. IWA Publishing.
- Ahern, Jack. (2013). Urban landscape sustainability and resilience: the promise and challenges of integrating ecology with urban planning and design. *Landscape Ecology*, 28(6), 1203–1212. <https://doi.org/10.1007/s10980-012-9799-z>
- Al-Akl, N. M., Karaan, E. N., Al-Zein, M. S., & Assaad, S. (2018). The landscape of urban cemeteries in Beirut: Perceptions and preferences. *Urban Forestry & Urban Greening* TA - TT -, 33, 66–74. <https://doi.org/10.1016/j.ufug.2018.04.011> LK - <https://wur.on.worldcat.org/oclc/8149322568>
- Aman, D. D., & Aytac, G. (2018). Public green space and disaster relief: The scope for effective policies in Istanbul. *Journal of Environmental Protection and Ecology*, 19(3), 1047–1053. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85055731598&partnerID=40&md5=d43fd39f8b7da6bfe13a9e059a6a7bbe>
- Antrop, M. (2005). Why landscapes of the past are important for the future. *Landscape and Urban Planning*, 70(1–2), 21–34. <https://doi.org/10.1016/j.landurbplan.2003.10.002>
- Aronson, M. F. J., Lepczyk, C. A., Evans, K. L., Goddard, M. A., Lerman, S. B., MacIvor, J. S., Nilon, C. H., & Vargo, T. (2017). Biodiversity in the city: key challenges for urban green space management. *Frontiers in Ecology and the Environment*, 15(4), 189–196. <https://doi.org/10.1002/fee.1480>
- Axelsson-Lindgren, C. (1995). Forest aesthetics. *Multiple-Use Forestry in the Nordic Countries*. METLA, The Finnish Forest Research Institute, Helsinki, 279–294.
- Barrett, G. W., & Barrett, T. L. (2001). Cemeteries as repositories of natural and cultural diversity. *Conservation Biology*, 15(6), 1820–1824.
- Beeren, W.-J. (2011). Stampfbeton: Bauen mit Händen und Füßen - Beton/Campus. <https://www.beton-campus.de/2011/07/stampfbeton-bauen-mit-haenden-und-fuessen/>
- Bennett, A. F. (1999). Linkages in the landscape: the role of corridors and connectivity in wildlife conservation (Issue 1). *lu.cn*.
- Bergman, M. M. (2020, April 9). Born to rewild: why now is the perfect time to make your lawn an eco-paradise. *The Guardian*. <https://www.theguardian.com/lifeandstyle/2020/apr/09/how-to-rewild-lawn-garden>
- Berrizbeitia, A. (2018). Criticism in the age of global disruption. *Journal of Landscape Architecture*, 13(3), 24–27. <https://doi.org/10.1080/18626033.2018.1589131>
- Bertram, C., & Rehdanz, K. (2015). Preferences for cultural urban ecosystem services: Comparing attitudes, perception, and use. *Ecosystem Services*, 12, 187–199. <https://doi.org/https://doi.org/10.1016/j.ecoser.2014.12.011>
- Bezemer, V., & Visschedijk, P. A. M. T. A.-T. T.-. (2003). Groene meters deel II : analyse van het stedelijk groen in de G30 steden LK - <https://wur.on.worldcat.org/oclc/1019034749> (NV-). Alterra. <http://edepot.wur.nl/120555>
- Bien, J. R. (1891). *Narrows-Jamaica Bay, Brooklyn*. <https://www.davidrumsey.com/luna/servlet/detail/RUMSEY~8~1~25380~1020007:The-Narrows-to-Jamaica-Bay-Coney-Is#>
- Blanco, M.-J., & Vidal, R. (2014). The power of death: Contemporary reflections on death in Western society. Berghahn Books.
- Bode, L., & Jansen, R. (2017). *Stadsnatuurvisie Maastricht*.
- Bolund, P., & Hunhammar, S. (1999). Ecosystem services in urban areas LK - <https://wur.on.worldcat.org/oclc/208000483>. *ECOLOGICAL ECONOMICS* TA - TT -, 29(2), 293–301.
- Bolund, Per, & Hunhammar, S. (1999). Ecosystem services in urban areas. *Ecological Economics*, 29(2), 293–301. [https://doi.org/https://doi.org/10.1016/S0921-8009\(99\)00013-0](https://doi.org/https://doi.org/10.1016/S0921-8009(99)00013-0)
- BRANA. (2020). Feiten en cijfers over Natuurbegraven in Nederland – Brana. <https://www.brana.nu/wat-is-natuurbegraven/feiten-en-cijfers-over-natuurbegraven-in-nederland/>
- Brink, A. van den, Bruns, D., Tobi, H., & Bell, S. (2017). Research in landscape architecture: methods and methodology LK - <https://wur.on.worldcat.org/oclc/959698250>. In TA - TT -. Routledge, an imprint of the Taylor & Francis Group.
- Brinkhuijsen, M. (2015). Site visit photos Skogskyrkogården.
- Brown, R. D., Vanos, J., Kenny, N., & Lenzholzer, S. (2015). Designing urban parks that ameliorate the effects of climate change. *Landscape and Urban Planning*, 138, 118–131. <https://doi.org/https://doi.org/10.1016/j.landurbplan.2015.02.006>
- Cameron, R. W. F., Blanuša, T., Taylor, J. E., Salisbury, A., Halstead, A. J., Henricot, B., & Thompson, K. (2012). The domestic garden – Its contribution to urban green infrastructure. *Urban Forestry & Urban Greening*, 11(2), 129–137. <https://doi.org/https://doi.org/10.1016/j.ufug.2012.01.002>
- Chang, C.-R., Li, M.-H., & Chang, S.-D. (2007). A preliminary study on the local cool-island intensity of Taipei city parks. *Landscape and Urban Planning*, 80(4), 386–395.
- Charap, J., Evans, S., & Rossi, F. S. (2020). Confronting Climate Change at an Urban Grassland: Preserving and Restoring the Grasslands at Green-Wood. *Arnoldia*, 77(3), 26–31. <https://arboretum.harvard.edu/stories/confronting-climate-change-at-an-urban-grassland-preserving-and-restoring-the-grasslands-at-green-wood/>
- Chiesura, A. (2004). The role of urban parks for the sustainable city. *Landscape and Urban Planning*, 68(1), 129–138. <https://doi.org/https://doi.org/10.1016/j.landurbplan.2003.08.003>
- Chollet, S., Brabant, C., Tessier, S., & Jung, V. (2018). From urban lawns to urban meadows: Reduction of mowing frequency increases plant taxonomic, functional and phylogenetic diversity. *Landscape and Urban Planning*, 180, 121–124. <https://doi.org/https://doi.org/10.1016/j.landurbplan.2018.08.009>
- City Birder. (2018). The City Birder: Green-Wood Cemetery pre-Spring Walk. <http://citybirder.blogspot.com/2018/03/green-wood-cemetery-pre-spring-walk.html>
- Clark, P. (2006). The European city and green space: London, Stockholm, Helsinki and St. Petersburg, 1850-2000 LK - <https://wur.on.worldcat.org/oclc/58546047>. In *Historical urban studies*
- TA - TT -. Ashgate. <http://catdir.loc.gov/catdir/toc/ecip059/2005007480.html>
- Clayden, Andrew, & Woudstra, J. (2003). Some European approaches to twentieth-century cemetery design: continental solutions for British dilemmas. *Mortality*, 8(2), 189–208.
- Clayden, Andy, Green, T., Hockey, J., & Powell, M. (2018). Cutting the lawn – Natural burial and its contribution to the delivery of ecosystem services in urban cemeteries. *Urban Forestry & Urban Greening*, 33, 99–106. <https://doi.org/https://doi.org/10.1016/j.ufug.2017.08.012>
- CM Walkers. (2021). Horse and Carriage/Motorcycle. <http://www.cmwalkersfunerals.co.uk/burial-packages/horse-and-carriagemotorcycle>
- Cologne Trouist Board. (2020). Melaten Cemetery. <https://www.cologne-tourism.com/see-experience/poi/melaten-cemetery/>
- Copenhagen Municipality. (2015a). Copenhagen Municipal Plan 2015: The coherent city.
- Copenhagen Municipality. (2015b). Politik for udvikling af Københavns Kommunes Fem kirkegårde mod 2065. [https://kk.sites.itera.dk/apps/kk\\_pub2/index.asp?mode=detalje&id=1454](https://kk.sites.itera.dk/apps/kk_pub2/index.asp?mode=detalje&id=1454)
- Cotto, A. (2020, March 24). Parks Too Crowded? Meet You at the Cemetery Gates - The New York Times. *The New York Times*. <https://www.nytimes.com/2020/03/24/nyregion/coronavirus-greenwood-cemetery-nyc.html>
- Crooks, K. R., & Sanjayan, M. (2006). *Connectivity conservation* (Vol. 14). Cambridge University Press.
- Danish Architecture Center. (2021). Siden blev ikke fundet - Danish Architecture Center - DAC. <https://dac.dk/en/knowledgebase/architecture/atelier-peter-zumthor/kolumba-museum/>
- Dee, C. 1958-. (2001). Form and fabric in landscape architecture : a visual introduction LK - <https://wur.on.worldcat.org/oclc/192094991>. In TA - TT -. Spon.
- Denessen, R., & Bruijnesteijn, M. (2002). *Cultuurhistorische analyse met waardenstelling en advies Begraafplaats Tongerseweg Maastricht*.
- Dennis Frissen. (2017). Denis Frissen sur Twitter : “@kirsti\_zwaard @BosgroepZuidNL @Bosgroepen @BosgroepNON Zeker mooi maar voor beetje #Glanshaverhooiland hoeft je zo ver niet te gaan. #H6510 #HomeSweetHome @magnifikZL <https://t.co/kGEMlbH4mT>” / Twitter. <https://twitter.com/denisfrissen/status/877194639996051457?lang=fr>
- Denton, M. F. (2003). Death in French Arcady: Nicolas Poussin’s “The Arcadian Shepherds” and Burial Reform in France c. 1800. *Eighteenth-Century Studies*,

- 36(2), 195–216. <http://www.jstor.org/stable/30053360>
- Deunk, G. (2002). *Nederlandse tuin- en landschapsarchitectuur van de 20ste eeuw*. NAI Uitgevers.
- Deunk, Gerritjan. (2016). *Het groot gedenkboek : gedenkplaatsen toen, nu, straks : zoektocht door het ritueel landschap* LK - <https://wur.on.worldcat.org/oclc/956550121>. In TA - TT -. Eigen beheer ;
- Díaz, A. (2021). Una ruta por La Almudena, cementerio de personajes ilustres. EFE. <https://www.efetur.com/noticia/rutas-cementerios-la-almudena/>
- Długozima, A., & Kosiacka-Beck, E. (2020). How to Enhance the Environmental Values of Contemporary Cemeteries in an Urban Context. *Sustainability*, 12(6), 2374.
- Duncan Cargill. (2021). (238) Pinterest. [https://www.pinterest.co.uk/duncancargill/\\_created/](https://www.pinterest.co.uk/duncancargill/_created/)
- Ebru, A. (2018). Threshold Approaches to Architectural Design Studio. In SHS Web of Conferences (Vol. 48). <https://doi.org/10.1051/shsconf/20184801046> LK - <https://wur.on.worldcat.org/oclc/7812669273>
- Ecopedia. (2021). *Natuurstreefbeeld: Essen-EikenbossenzonderWildehyacint(9160)|Ecopedia*. <https://www.ecopedia.be/natuurstreefbeeld/natuurstreefbeeld-essen-eikenbossen-zonder-wilde-hyacint-9160>
- Eijkelenberg, J., & Reinders, B. (2016). *vita mutatur non tollitur*.
- Etteger Ma R., van. (2016). *Design Principles and Guidelines; Bridging the Gap Between Science and Design* LK - <https://wur.on.worldcat.org/oclc/8086952819>. In TA - TT -. University of applied sciences Rapperswil SE -.
- Evensen, K. H., Nordh, H., & Skaar, M. (2017). Everyday use of urban cemeteries: A Norwegian case study. *Landscape and Urban Planning*, 159, 76–84. <https://doi.org/https://doi.org/10.1016/j.landurbplan.2016.09.019>
- Ferenc, M., Sedlá ek, O., & Fuchs, R. (2014). How to improve urban greenspace for woodland birds: site and local-scale determinants of bird species richness. *Urban Ecosystems*, 17(2), 625–640.
- Foreningen By&Natur. (n.d.). *Assistens Cemetery*. Retrieved October 4, 2020, from <http://www.kobenhavnergron.dk/place/assistens-kirkegard/?lang=en>
- Franck, K., & Stevens, Q. (2006). *Loose space: possibility and diversity in urban life*. Routledge.
- Frank den Hond. (2021). *Hyacintenwandeling in het Hallerbos – Mooiste wandelingen*. <https://www.mooistewandelingen.nl/hyacintenwandeling-in-het-hallerbos/>
- Frans Voncken. (2019). *Bloesemtochten langs boomgaarden Camerig-Kuttingen - De Limburger*. [https://www.limburger.nl/cnt/dmf20190402\\_00099368](https://www.limburger.nl/cnt/dmf20190402_00099368)
- Frissen, C., Op den Kamp, L., & Kloosterboer, H. (2009). *Flora- en Faunaonderzoek en beheeradvies Gemeentelijke Begraafplaats aan de Tongerseweg te Maastricht, 2009*.
- Gehrt, S. D., & Chelsvig, J. E. (2003). *BAT ACTIVITY IN AN URBAN LANDSCAPE: PATTERNS AT THE LANDSCAPE AND MICROHABITAT SCALE*. *Ecological Applications*, 13(4), 939–950. <https://doi.org/10.1890/02-5188>
- Gemeente Amsterdam. (2020). *Groenvisie 2050: Een leefbare stad voor mens en dier*.
- Gemeente Maastricht. (2017). *Bedrijfsplan gemeentelijke begraafplaats Tongerseweg (Issue 01)*.
- Gemeente Maastricht. (2020). *Omgevingsvisie Maastricht*. [https://raad.gemeentemaastricht.nl/user/showdoc/action=view/id=87321/type=pdf/Bijlage\\_3\\_-\\_Omgevingsvisie\\_Maastricht\\_2040\\_-\\_deel2.pdf](https://raad.gemeentemaastricht.nl/user/showdoc/action=view/id=87321/type=pdf/Bijlage_3_-_Omgevingsvisie_Maastricht_2040_-_deel2.pdf)
- Gerding, G. (2006). *Eiken-beukenbos*. <https://www.wikiwand.com/nl/Parelgras-beukenbos>
- Goddard, M. A., Dougill, A. J., & Benton, T. G. (2010). Scaling up from gardens: biodiversity conservation in urban environments. *Trends in Ecology & Evolution*, 25(2), 90–98. <https://doi.org/https://doi.org/10.1016/j.tree.2009.07.016>
- Gómez-Baggethun, E., Gren, Å., Barton, D. N., Langemeyer, J., McPhearson, T., O'farrell, P., Andersson, E., Hamstead, Z., & Kremer, P. (2013). Urban ecosystem services. In *Urbanization, biodiversity and ecosystem services: Challenges and opportunities* (pp. 175–251). Springer, Dordrecht.
- Google Earth Pro, 7.3.3.7786. (2020). Amsterdam, Netherlands. <http://www.google.com/earth/index.html>
- Google Earth Pro 7.3.3.7786. (2021). Maastricht, Netherlands. <http://www.google.com/earth/index.html>
- Grabalov, P. (2018). Public life among the dead: Jogging in Malmö cemeteries. *Urban Forestry & Urban Greening*, 33, 75–79. <https://doi.org/https://doi.org/10.1016/j.ufug.2018.01.027>
- Green Wood Historic Fund. (2021a). *Events for September 17th – September 24th – Green-Wood*. <https://www.green-wood.com/calendar/photo/2021-04-29/>
- Green Wood Historic Fund. (2021b). *Green-Wood's History and Archives – Green-Wood*. <https://www.green-wood.com/green-woods-history-and-archives/>
- Grunewald, K., Li, J., Xie, G., & Kümper-Schlake, L. (2018). Introduction to an Urban Ecosystem Approach BT - *Towards Green Cities: Urban Biodiversity and Ecosystem Services in China and Germany* (K. Grunewald, J. Li, G. Xie, & L. Kümper-Schlake (eds.); pp. 1–14). Springer International Publishing. [https://doi.org/10.1007/978-3-319-58223-8\\_1](https://doi.org/10.1007/978-3-319-58223-8_1)
- Haaland, C., & van den Bosch, C. K. (2015). Challenges and strategies for urban green-space planning in cities undergoing densification: A review. *Urban Forestry & Urban Greening* TA - TT -, 14(4), 760–771. <https://doi.org/10.1016/j.ufug.2015.07.009> LK - <https://wur.on.worldcat.org/oclc/5942279787>
- Haase, D., Larondelle, N., Andersson, E., Artmann, M., Borgström, S., Breuste, J., Gomez-Baggethun, E., Gren, Å., Hamstead, Z., Hansen, R., Kabisch, N., Kremer, P., Langemeyer, J., Rall, E. L., McPhearson, T., Pauleit, S., Qureshi, S., Schwarz, N., Voigt, A., ... Elmqvist, T. (2014). A Quantitative Review of Urban Ecosystem Service Assessments: Concepts, Models, and Implementation. *AMBIO*, 43(4), 413–433. <https://doi.org/10.1007/s13280-014-0504-0>
- Harnik, P., & Merolli, A. (2010). *Cemeteries alive*. *Landscape Architecture*, 100(12), 44–50.
- Hehenkamp, K. (2019). Katja Hehenkamp op Twitter: "Begraafplaats de Nieuwe Ooster in Amsterdam zet vanavond de gewone wereld even stil en verandert in een bijzondere plek van licht, aandacht en verwondering. #herinneringverlicht #herdenken #nieuwewooster #prachtig <https://t.co/> <https://twitter.com/KHehenkamp/status/1189673693951250433>
- Herning Kirkegårde. (2021). *Herning Kirkegårde Home Page*. <https://www.herning-kirkegaarde.dk/>
- Hirschfeld, C. C. L. (1779). *No Title*. Weidmann. <https://doi.org/10.11588/diglit.1626>
- Hirschman, J. (1995). *Review Greenways: a guide to planning, design and development*. *Landscape and Urban Planning*, 33, 477–480.
- Hofmann, M., Westermann, J. R., Kowarik, I., & van der Meer, E. (2012). Perceptions of parks and urban derelict land by landscape planners and residents. *Urban Forestry & Urban Greening*, 11(3), 303–312. <https://doi.org/https://doi.org/10.1016/j.ufug.2012.04.001>
- Holm, R. S. (2015). *The Burial Area as Landscape Architecture Variation, Means, Possibilities*.
- loj , C. I., Gr dinaru, S. R., Onose, D. A., Vân u, G. O., & Tudor, A. C. (2014). The potential of school green areas to improve urban green connectivity and multifunctionality. *Urban Forestry & Urban Greening*, 13(4), 704–713. <https://doi.org/https://doi.org/10.1016/j.ufug.2014.07.002>
- Ivers, B. C. T. A.-T. T.-. (2018). *Staging Urban Landscapes: the Activation and Curation of Flexible Public Spaces* (NV-1 o). Birkhäuser. <https://doi.org/10.1515/9783035610468> LK - <https://wur.on.worldcat.org/oclc/1059253336>
- IVN. (2021). *img\_0886.jpg*. [https://www.ivn.nl/sites/ivnn/files/styles/header\\_image\\_l/public/uploads/img\\_0886.jpg?itok=HCYIVBcz&timestamp=1487234963](https://www.ivn.nl/sites/ivnn/files/styles/header_image_l/public/uploads/img_0886.jpg?itok=HCYIVBcz&timestamp=1487234963)
- James, P., Millward, A., Morrison, K., Bishop, O. J., & Dennis, M. (2013). Changing urban areas using landscape scale ecological processes and thinking. *Changing Urban Areas Using Landscape Scale Ecological Processes and Thinking: IALE European Congress - Changing European Landscapes: Landscape Ecology, Local to Global*, 29.
- Jim, C. Y. (2004). Green-space preservation and allocation for sustainable greening of compact cities. *Cities*, 21(4), 311–320. <https://doi.org/https://doi.org/10.1016/j.cities.2004.04.004>
- Jingbin Wu. (2019). *Jingbin Wu | Stuart Weitzman School of Design*. <https://www.design.upenn.edu/yes2020/jingbin-wu>
- Johnson, P. (2008). The modern cemetery: a design for life. *Social & Cultural Geography*, 9(7), 777–790. <https://doi.org/10.1080/14649360802383154>
- Jolly, G. (n.d.). *The management of historic cemeteries by friends groups: Local narratives and the sense of place* LK - <https://wur.on.worldcat.org/oclc/910806820>. [http://opus.bath.ac.uk/44077/1/Thesis\\_FINAL.pdf](http://opus.bath.ac.uk/44077/1/Thesis_FINAL.pdf)
- Jonathan Buckley. (2021). *The Nuttery in spring at Sissinghurst Castle Garden, near Cranbrook, Kent., at National Trust*. <https://www.ntprints.com/image/1056200/jonathan-buckley-the-nuttery-in-spring-at-sissinghurst-castle-garden-near-cranbrook-kent>
- Josselin de Jong, F. O. T. (2010). *Succes en falen van stadsparken: de betekenis van ruimtelijke structuurkenmerken voor het gebruik van stadsparken*. Groen Goed : Handreiking Kwaliteit Openbaar Groen. , 159–188.
- K., W. (2011). *Sustaining the contemporary cemetery: Implementing policy alongside conflicting perspectives and purpose*. *Mortality* TA - TT -, 16(3), 259–276. <https://doi.org/10.1080/13576275.2011.586125> LK - <https://wur.on.worldcat.org/oclc/785171472>
- Kadaster. (2020). *Topotijdreis*. <https://www.topotijdreis.nl/>
- Kaptein, E. (2020). *Begraafplaats Tongerseweg: Overleg bedrijfsvoering 8-9-2020*.
- Kazmierczak, A., Armitage, R., & James, P. (2010). *Urban green spaces: natural and accessible? The case of Greater Manchester, UK*. *Urban Biodiversity and Design*.

Oxford, UK: Blackwell Publishing Ltd, 383–405.

Kjøller, C. P. (2012). Managing green spaces of the deceased: Characteristics and dynamics of Danish cemetery administrations. *Urban Forestry & Urban Greening*, 11(3), 339–348. <https://doi.org/https://doi.org/10.1016/j.ufug.2012.02.002>

Klement. (2020). Klement Rentmeesters Aanbod reeds verkocht. <https://www.klement2.com/aanbod/reeds-verkocht>

Kolnberger, T. (2018a). Cemeteries and urban form: a historico-geographical approach LK - <https://wur.on.worldcat.org/oclc/1134795990>. <http://orbilu.uni.lu/handle/10993/38441>

Kolnberger, T. (2018b). Cemeteries and urban form: a historico-geographical approach LK - <https://wur.on.worldcat.org/oclc/1134795990> (p. 130). <http://orbilu.uni.lu/handle/10993/38441>

Konijnendijk, C. C., Annerstedt, M., Nielsen, A. B., & Maruthaveeran, S. (2013). Benefits of urban parks. A Systematic Review. A Report for IFPRA, Copenhagen & Alnarp.

Kowarik, I., Buchholz, S., von der Lippe, M., & Seitz, B. (2016). Biodiversity functions of urban cemeteries: Evidence from one of the largest Jewish cemeteries in Europe. *Urban Forestry & Urban Greening*, 19, 68–78. <https://doi.org/https://doi.org/10.1016/j.ufug.2016.06.023>

Kowarik, I., & Körner, S. T. A.-T. T.-. (2005). *Wild Urban Woodlands: New Perspectives for Urban Forestry (NV-1 o)*. Springer-Verlag Berlin Heidelberg. <https://doi.org/10.1007/b138211> LK - <https://wur.on.worldcat.org/oclc/228155455>

Krista Turner. (2014). In the Garden Cemetery: The Revival of America's First Urban Parks - *American Forests*. <https://www.americanforests.org/magazine/article/in-the-garden-cemetery-the-revival-of-americas-first-urban-parks/>

Kübler-Ross, E. 1926-2004., Kessler, D. 1959-, & Leistra, A. (2006). Over rouw: de zin van de vijf stadia van rouwverwerking LK - <https://wur.on.worldcat.org/oclc/150242204>. In TA - TT -. Ambo.

La Grande Suisse. (2021). Crematorium | La Grande Suisse. <https://www.la-grande-suisse.nl/crematorium/>

Landezine. (2010). Skogskyrkogården by Gunnar Asplund and Sigurd Lewerentz «Landscape Architecture Platform | Landezine. <http://landezine.com/index.php/2010/09/skogskyrkogarden/>

Larsson, M., Schlyter, L., & Backlund, A.-C. (2014). Management plan for the world heritage site the Woodland

cemetery (Förvaltningsplan världsarvet skogskyrkogården).

Les Snats. (2021). Les-Snats - Chêne-charmaie - <http://www.les-snats.com/fiches/chenaie-charmaie.html>

Lindholm, G. (2018). The Landscape Architecture of Richard Haag: From Modern Space to Urban Ecological Design. *Journal of Landscape Architecture*, 13(2), 86–87. <https://doi.org/10.1080/18626033.2018.1553398>

Lindholst, A. C., Konijnendijk van den Bosch, C. C., Kjøller, C. P., Sullivan, S., Kristoffersson, A., Fors, H., & Nilsson, K. (2016). Urban green space qualities reframed toward a public value management paradigm: The case of the Nordic Green Space Award. *Urban Forestry & Urban Greening TA - TT -*, 17, 166–176. <https://doi.org/10.1016/j.ufug.2016.04.007> LK - <https://wur.on.worldcat.org/oclc/602924414>

Liquete, C., Kleeschulte, S., Dige, G., Maes, J., Grizzetti, B., Olah, B., & Zulian, G. (2015). Mapping green infrastructure based on ecosystem services and ecological networks: A Pan-European case study. *Environmental Science & Policy*, 54, 268–280. <https://doi.org/10.1016/j.envsci.2015.07.009>

LM, A., KL, A., Shinn, C., Safranek, S., Buckner-Brown, J., & LK, K. (2015). Community coalition-driven interventions to reduce health disparities among racial and ethnic minority populations. *The Cochrane Database of Systematic Reviews TA - TT -*, 6, CD009905. <https://doi.org/10.1002/14651858.CD009905.pub2> LK - <https://wur.on.worldcat.org/oclc/5849475886>

Lokman, K., & Herrington, S. (2016). Gardens as Migratory Devices. *New Geographies Journal*, 8.

Lundholm, J. T., & Richardson, P. J. (2010). MINI REVIEW: Habitat analogues for reconciliation ecology in urban and industrial environments. *Journal of Applied Ecology*, 47(5), 966–975.

LVC. (n.d.). Aantallen. Cijfers. Retrieved October 7, 2020, from <https://lvc-online.nl/cremeren-in-nl/aantallen/>

LVC. (2020). Aantallen – LVC. <https://lvc-online.nl/cremeren-in-nl/aantallen/>

Lynch, A. J. (2018). Creating Effective Urban Greenways and Stepping-stones: Four Critical Gaps in Habitat Connectivity Planning Research. *Journal of Planning Literature*, 34(2), 131–155. <https://doi.org/10.1177/0885412218798334>

Magura, T., Horváth, R., & Tóthmérész, B. (2010). Effects of urbanization on ground-dwelling spiders in forest patches, in Hungary. *Landscape Ecology*, 25(4), 621–629. <https://doi.org/10.1007/s10980-009-9445-6>

Marcelmulder68. (2014). Bestand:St.

Servaasbasiliek Maastricht.JPG - Wikipedia. [https://nl.m.wikipedia.org/wiki/Bestand:St.\\_Servaasbasiliek\\_Maastricht.JPG](https://nl.m.wikipedia.org/wiki/Bestand:St._Servaasbasiliek_Maastricht.JPG)

Marriott, J. (2018). Colloquium Abstracts 2005-2018. In J. Rugg (Ed.), *A Victorian cemetery as a visitor space* (p. 1). [https://www.york.ac.uk/media/spsw/images/crg/Abstracts 2005-2018.pdf](https://www.york.ac.uk/media/spsw/images/crg/Abstracts%2005-2018.pdf)

McClymont, K. (2016). 'That eccentric use of land at the top of the hill': cemeteries and stories of the city. *Mortality*, 21(4), 378–396. <https://doi.org/10.1080/13576275.2016.1151865>

McKinney, M. L. (2002). Urbanization, Biodiversity, and Conservation: The impacts of urbanization on native species are poorly studied, but educating a highly urbanized human population about these impacts can greatly improve species conservation in all ecosystems. *BioScience*, 52(10), 883–890. [https://doi.org/10.1641/0006-3568\(2002\)052\[0883:UBAC\]2.0.CO;2](https://doi.org/10.1641/0006-3568(2002)052[0883:UBAC]2.0.CO;2)

McMillan, S. T. (2016). In Germany, some cemeteries are being turned into parks, playgrounds and gardens. <https://www.pri.org/stories/2016-08-05/germany-some-cemeteries-are-being-turned-parks-playgrounds-and-gardens>

Milesi, C., Running, S. W., Elvidge, C. D., Dietz, J. B., Tuttle, B. T., & Nemani, R. R. (2005). Mapping and Modeling the Biogeochemical Cycling of Turf Grasses in the United States. *Environmental Management*, 36(3), 426–438. <https://doi.org/10.1007/s00267-004-0316-2>

Millward, A. A., & Sabir, S. (2011). Benefits of a forested urban park: What is the value of Allan Gardens to the city of Toronto, Canada? *Landscape and Urban Planning*, 100(3), 177–188. <https://doi.org/https://doi.org/10.1016/j.landurbplan.2010.11.013>

Mitchell, M. G. E., Bennett, E. M., & Gonzalez, A. (2013). Linking landscape connectivity and ecosystem service provision: current knowledge and research gaps. *Ecosystems*, 16(5), 894–908.

Monumentaltrees.com. (2021). Giant sequoia along the Tongerseweg, Maastricht, Limburg, Netherlands. [https://www.monumentaltrees.com/en/nld/limburg/Maastricht/173\\_Tongerseweg/248/](https://www.monumentaltrees.com/en/nld/limburg/Maastricht/173_Tongerseweg/248/)

Nassauer, J. I. (1995). Messy Ecosystems, Orderly Frames LK - <https://wur.on.worldcat.org/oclc/7025533049>. *Landscape Journal TA - TT -*, 14(2), 161–170.

NaturesLens. (2014). Silent hunter in the cemetery. In Flickr. <https://www.flickr.com/photos/natureslensphotoworkshops/13415730943/in/>

photostream/

Nielsen, A. B., van den Bosch, M., Maruthaveeran, S., & van den Bosch, C. K. (2014). Species richness in urban parks and its drivers: A review of empirical evidence. *Urban Ecosystems*, 17(1), 305–327. <https://doi.org/10.1007/s11252-013-0316-1>

Nordh, H., & Swensen, G. (2018). Introduction to the special feature “The role of cemeteries as green urban spaces.” *Urban Forestry & Urban Greening TA - TT -*, 33, 56–57. <https://doi.org/10.1016/j.ufug.2018.04.014> LK - <https://wur.on.worldcat.org/oclc/7573037237>

NOS Nieuws. (2020, November 17). Resomeren, het oplossen van een lichaam, toegestaan als alternatieve “begravenis”. NOS. <https://nos.nl/artikel/2356904-resomeren-het-oplossen-van-een-lichaam-toegestaan-als-alternatieve-begravenis>

Nowak, D., & Heisler, G. (2010). Air quality effects of urban trees and parks. *Research Series Monograph*. Ashburn, VA: National Recreation and Parks Association Research Series Monograph. 44 P., 1–44.

NRC. (2007). Gouden asurnen, drijvend tussen de waterlelies - NRC. <https://www.nrc.nl/nieuws/2007/06/22/gouden-asurnen-drijvend-tussen-de-waterlelies-11346068-a927147>

Ode uitvaartbegeleiding. (2021). Je eigen fiets als rouwfiets. <https://ode-uitvaartbegeleiding.nl/uitvaart-regelen/rouwvervoer/je-eigen-fiets-als-rouwfiets>

Östberg, J., & Rae, R. A. (2018). Cemeteries as eternal green-spaces? Shifting uses in the United States and Sweden. SLU, NYU.

Otter. (2010). Poort en muren Tongerseweg. [https://commons.wikimedia.org/wiki/File:Maastricht\\_-\\_rijksmonument\\_506579\\_-\\_Tongerseweg\\_bij\\_292\\_20100731.jpg](https://commons.wikimedia.org/wiki/File:Maastricht_-_rijksmonument_506579_-_Tongerseweg_bij_292_20100731.jpg)

Patch. (2018). Gory Elf Love Subject Of Greenwood Cemetery Opera | Windsor Terrace, NY Patch. <https://patch.com/new-york/windsorterrace/gory-elf-love-subject-green-wood-cemetery-opera>

Payson Coleman, C. J. (2019). 2018 Green-Wood Annual Report | Chairman's Report. <https://report.green-wood.com/2018/chairmans-report/>

Percy-Smith, J. (2000). Policy responses to social exclusion: Towards inclusion? McGraw-Hill Education (UK). Plotbox. (2019). Hollywood Forever's Hozier Concert & 5 Other Fun Events to Host. <https://blog.plotbox.io/five-fun-events>

Politi Bertoncini, A., Machon, N., Pavoine, S., & Muratet, A. (2012). Local gardening practices shape urban lawn floristic communities. *Landscape and Urban Planning*,

105(1), 53–61. <https://doi.org/https://doi.org/10.1016/j.landurbplan.2011.11.017>

Presson, A. (2020). Cemetery as Habitat: Supporting our Ecosystem Green-Wood. <https://www.green-wood.com/event/cemetery-as-habitat-supporting-our-ecosystem/>

Prominski, M. (2016). Research and design in JoLA. *Journal of Landscape Architecture*, 11(2), 26–29. <https://doi.org/10.1080/18626033.2016.1188565>

Prominski, M. (2017). Design Guidelines. In A. van den Brink, D. Bruns, H. Tobi, & S. Bell (Eds.), *Research in landscape architecture: methods and methodology* (pp. 194–208). Routledge, an imprint of the Taylor & Francis Group.

Prugh, L. R., Hodges, K. E., Sinclair, A. R. E., & Brashares, J. S. (2008). Effect of habitat area and isolation on fragmented animal populations. *Proceedings of the National Academy of Sciences*, 105(52), 20770 LP – 20775. <https://doi.org/10.1073/pnas.0806080105>

Qiujielog. (2016). <https://qiujielog.wordpress.com/2016/05/06/>

Reed Hilderbrand. (2021, July 5). Mount Auburn Cemetery - Works - Reed Hilderbrand. [https://www.reedhilderbrand.com/works/mount\\_auburn\\_cemetery](https://www.reedhilderbrand.com/works/mount_auburn_cemetery)

Relais Landscape Architects. (n.d.). Luisenstädtischer Friedhof Berlin. Retrieved June 30, 2021, from <https://relaisla.de/de/projekte/luisenstaedtscherfriedhof-berlin>

Remmers, G., Aarts, N., Geldof, G. D., Haverkort, B., Hillebrand, H., Horlings, I., Huijgen, J., Oostindie, H., Strolenberg, F., de Vries, A., & Wieringa, H. (2007). *De Innerlijke Ruimte van de Nederlandse delta: Werkboek voor een nieuwe ruimtelijke inrichting*.

Reuters. (2020). Heatwave caused nearly 400 more deaths in Netherlands. <https://www.reuters.com/article/us-weather-netherlands-idUSKCN1UZoGA>

Roberts, A. R. (2020). Preservation without Representation: Making CLG Programs Vehicles for Inclusive Leadership, Historic Preservation, and Engagement. *Societies*, 10(3). <https://doi.org/10.3390/soc10030060>

Rugg, J. (2000). Defining the place of burial: What makes a cemetery a cemetery? *Mortality*, 5(3), 259–275. <https://doi.org/10.1080/713686011>

Rugg, J. (2020). Email contact cemetery as park.

Ryder, B. a. (1995). Greenway planning and growth management: partners in conservation? *Landscape and Urban Planning*, 33, 417–432. [https://doi.org/10.1016/0169-2046\(94\)02032-B](https://doi.org/10.1016/0169-2046(94)02032-B)

Sandström, U. (2002). Green Infrastructure Planning in Urban Sweden LK - <https://wur.on.worldcat.org/oclc/757852062>. *Planning Practice and Research TA - TT -*, 17(4), 373–385.

Santarsiero, A., Cutilli, D., Cappiello, G., & Minelli, L. (2000). Environmental and legislative aspects concerning existing and new cemetery planning. *Microchemical Journal*, 67(1), 141–145. [https://doi.org/https://doi.org/10.1016/S0026-265X\(00\)00110-7](https://doi.org/https://doi.org/10.1016/S0026-265X(00)00110-7)

Sehrt, M., Bossdorf, O., Freitag, M., & Bucharova, A. (2020). Less is more! Rapid increase in plant species richness after reduced mowing in urban grasslands. *Basic and Applied Ecology*, 42, 47–53. <https://doi.org/10.1016/j.BAAE.2019.10.008>

Shanahan, D. F., Lin, B. B., Bush, R., Gaston, K. J., Dean, J. H., Barber, E., & Fuller, R. A. (2015). Toward Improved Public Health Outcomes From Urban Nature. *American Journal of Public Health*, 105(3), 470–477. <https://doi.org/10.2105/AJPH.2014.302324>

Shultz, M. (2019). Rooftop Films' Closing Night at Green-Wood. <https://brooklynbased.com/2019/08/22/rooftop-films-closing-night-at-green-wood/>

Shwartz, A., Turbé, A., Julliard, R., Simon, L., & Prévot, A.-C. (2014). Outstanding challenges for urban conservation research and action. *Global Environmental Change*, 28, 39–49. <https://doi.org/https://doi.org/10.1016/j.gloenvcha.2014.06.002>

Skär, M., Nordh, H., & Swensen, G. (2018). Green urban cemeteries: more than just parks. *Journal of Urbanism*, 11(3), 362–382. <https://doi.org/10.1080/17549175.2018.1470104>

Smetana, S. M., & Crittenden, J. C. (2014). Sustainable plants in urban parks: A life cycle analysis of traditional and alternative lawns in Georgia, USA. *Landscape and Urban Planning*, 122, 140–151. <https://doi.org/https://doi.org/10.1016/j.landurbplan.2013.11.011>

Stoelker, T. (2021). LET THE GRAVEYARD GROW. *Landscape Architecture Magazine*, June, 48–56. <https://landscapearchitecturemagazine.org/2021/06/24/let-the-graveyard-grow/>

SVT. (2021). Criticism of more and more toboggans at Skogskyrkogården - Teller Report. <https://www.tellerreport.com/news/2021-01-16-%0A---criticism-of-more-and-more-toboggans-at-skogskyrkogarden%0A--rjZ8h-Yxid.html>

Swaffield, S., & Deming, M. (2011). Research strategies in landscape architecture: Mapping the terrain. *Journal of Landscape Architecture*, 6, 34–45. <https://doi.org/10.1080/18626033.2011.9723445>

Swensen, G. (2018). Between romantic historic landscapes, rational management models and obliterations – urban cemeteries as green memory sites. *Urban Forestry & Urban Greening*, 33, 58–65. <https://doi.org/https://doi.org/10.1016/j.ufug.2018.04.013>

Swensen, G., & Brendalmo, J. (2018). Churchyards and cemeteries throughout the centuries – praxis and legislation. *Landscape History*, 39(1), 87–102. <https://doi.org/10.1080/01433768.2018.1466551>

Tarlow, S. (2000). Landscapes of memory: The nineteenth-century garden cemetery. *European Journal of Archaeology*, 3(2), 217–239. <https://doi.org/10.1177/146195710000300204>

Tisma, A., & Jökövi, M. (2007). The new dutch parks: relation between form and use. *Journal of Landscape Architecture TA - TT -*, 2(2), 48–59. <https://doi.org/10.1080/18626033.2007.9723388> LK - <https://wur.on.worldcat.org/oclc/4902394812>

Treib, M. (2005). Attending. In R. Krinke (Ed.), *Contemporary landscapes of contemplation* (NV-1 onl, pp. 13–35). Routledge. <https://doi.org/10.4324/9780203462089> LK - <https://wur.on.worldcat.org/oclc/62326057>

TU Delft. (2021). TU Delft start-up develops “living coffin” - TU Delft Campus. <https://www.tudelftcampus.nl/blog/2020/09/14/tu-delft-start-up-develops-living-coffin/>

Turner, T. (1986). *English garden design: history and style since 1650*. Antique Collectors' Club Ltd.

Tyrväinen, L., Gustavsson, R., Konijnendijk, C., & Ode, Å. (2006). Visualization and landscape laboratories in planning, design and management of urban woodlands. *Forest Policy and Economics*, 8(8), 811–823. <https://doi.org/10.1016/j.forpol.2004.12.005>

Tyrväinen, L., Pauleit, S., Seeland, K., & de Vries, S. (2005). Benefits and Uses of Urban Forests and Trees BT - *Urban Forests and Trees: A Reference Book* (C. Konijnendijk, K. Nilsson, T. Randrup, & J. Schipperijn (eds.); pp. 81–114). Springer Berlin Heidelberg. [https://doi.org/10.1007/3-540-27684-X\\_5](https://doi.org/10.1007/3-540-27684-X_5)

Tzoulas, K., Korpela, K., Venn, S., Yli-Pelkonen, V., Ka miertzak, A., Niemela, J., & James, P. (2007). Promoting ecosystem and human health in urban areas using Green Infrastructure: A literature review. *Landscape and Urban Planning*, 81(3), 167–178. <https://doi.org/https://doi.org/10.1016/j.landurbplan.2007.02.001>

Valentijn, V., & Verhoeven, K. (2018). Goodbye architecture: de architectuur van crematoria in Europa LK - <https://wur.on.worldcat.org/oclc/1041866872>. In TA - TT -. nai010 uitgevers.

Van den Berg, A. E., Jorgensen, A., & Wilson, E. R. (2014). Evaluating restoration in urban green spaces: Does setting type make a difference? *Landscape and Urban Planning*, 127, 173–181.

Van der Ryn, S., & Cowan, S. (1996). *Ecological design LK - https://wur.on.worldcat.org/oclc/60298973*. In TA - TT -. Island Press.

van Dongen, F. (2015). De adaptieve stad vraagt om een Nieuwe Bouwcultuur.

Van Hove, L. W. A., Steeneveld, G. J., Jacobs, C. M. J., Heusinkveld, B. G., Elbers, J. A., Moors, E. J., & Holtslag, A. A. M. (2011). Exploring the urban heat island intensity of Dutch cities: assessment based on a literature review, recent meteorological observation and datasets provide by hobby meteorologists. *Alterra*.

Världsarvet Skogskyrkogården. (2021). History - Skogskyrkogården. [https://skogskyrkogarden.stockholm.se/om\\_platsen/historia/historia/](https://skogskyrkogarden.stockholm.se/om_platsen/historia/historia/)

Venbrux, E., Peelen, J., & Altena, M. (2009). Going Dutch: Individualisation, secularisation and changes in death rites LK - <https://wur.on.worldcat.org/oclc/362348648>. *Mortality TA - TT -*, 14(2), 97–101.

Venbrux, H. J. M., Heessels, M., & Bolt, S. H. (2008). Rituele creativiteit: Actuele veranderingen in de uitvaart-en rouwcultuur in Nederland.

Vige. (2009). Green Wood in fall. Flickr. <https://www.flickr.com/photos/vige/4131835179/in/photolist-6Ydtvg-6oZDPd-7petkj-7ibD67-5t4WkP-5AC35v-7i7JDz-5t9i27-5t9i5s-6e2gxc-6e6wVE-5t4WqX-5yrjqj-5t4Wp2-6e2kLa-6e2fxP-6e6x4y-6e6x7y-6e2e3B-6e7Lu7-6e6pqj-6e6x13-6e6xBs-6e2nHn-6e2nve-6e2iFF-6e2nzc-6e2j5z->

Vink, J., Vollaard, P., Zwarte, N. de, Tee, J., & Vink, J. (2017). Stads natuur maken = Making urban nature LK - <https://wur.on.worldcat.org/oclc/1001370374>. In TA - TT -. Nai010 uitgevers/publishers.

Walker, C. (2004). The public value of urban parks. Urban Institute.

Walmsley, A. (2006). Greenways: multiplying and diversifying in the 21st century. *Landscape and Urban Planning*, 76(1–4), 252–290. <https://doi.org/10.1016/j.landurbplan.2004.09.036>

Wang, X., Cheng, H., Xi, J., Yang, G., & Zhao, Y. (2018). Relationship between park composition, vegetation characteristics and cool island effect. *Sustainability*, 10(3), 587.

Weber, F., Kowarik, I., & Säumel, I. (2014). A walk on the wild side: Perceptions of roadside vegetation beyond trees. *Urban Forestry & Urban Greening*, 13(2), 205–212.

<https://doi.org/https://doi.org/10.1016/j.ufug.2013.10.010>

Weilacher, U. (2015). Grüne Infrastruktur und Landschaftsarchitektur/ Green Infrastructure and Landscape Architecture. *Garten + Landschaft*, 8–11.

White, N., Willensky, E., & Leadon, F. (2000). *AIA Guide to New York City*. Oxford University Press.

Wille, A., Mouwen, M., & Bos, T. (2013). Bomen op begraafplaatsen : informatie en inspiratie voor ontwerpers en beheerders LK - <https://wur.on.worldcat.org/oclc/861485764>. In TA - TT -. Boomkwekerij Ebben B.V.

Wille, A., Vijftigschild, J., & Nuvelstijn, R. H. (2004). De laatste tuin : informatie en inspiratie bij ontwerp en beheer van begraafplaatsen LK - <https://wur.on.worldcat.org/oclc/66605029>. In TA - TT -. Voorlichtingscentrum Natuursteen.

Wouters, C. (2002). The Quest for New Rituals in Dying and Mourning: Changes in the We-I Balance LK - <https://wur.on.worldcat.org/oclc/194680812>. BODY AND SOCIETY TA - TT -, 8(Part 1), 1–28.

Yilmaz, H., Ku ak, B., & Akkemik, Ü. (2018). The role of A iyan Cemetery ( stanbul) as a green urban space from an ecological perspective and its importance in urban plant diversity. *Urban Forestry & Urban Greening*, 33, 92–98.

Young, C., & Light, D. (2016). Interrogating spaces of and for the dead as 'alternative space': cemeteries, corpses and sites of Dark Tourism. *International Review of Social Research*, 6(2), 61–72.

Zhang, Q., Kobayashi, Y., Kadono, T., Crooks, R., & Ma, Z. (2008). Reviving Lakes and Wetlands: lessons learned from the People's Republic of China (Q. Zhang, Y. Kobayashi, T. Kadono, R. Crooks, & Z. Ma (eds.)). Asian Development Bank.

Zieleniec, A. J. L. (2010). Parks. In R. Hutchison (Ed.), *Encyclopedia of urban studies* (pp. 583–586). SAGE Publications. <https://doi.org/10.4135/9781412971973.n210>

Zwierzchowska, I., Hof, A., loj , I.-C., Mueller, C., Poni y, L., Breuste, J., & Mizgajski, A. (2018). Multi-scale assessment of cultural ecosystem services of parks in Central European cities. *Urban Forestry & Urban Greening*, 30, 84–97. <https://doi.org/https://doi.org/10.1016/j.ufug.2017.12.017>

