The place of cemeteries in the urban green infrastructure network and public expectations

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1. Abstract

The world's population, and with it the proportion of the total population living in cities and urban areas, has exploded in recent decades. It has long been researched and proven that "urban green" plays a major role in mitigating the so-called urban heat island effect, but during the pandemic the role of daily recreation has also come to the fore. Cemeteries are a lesser known part of urban green infrastructure but they possess high potential and play a dominant role in the urban structure due to their large area and, as a result of their function, to their typically high proportion of green surfaces. In addition to memorial function, cemeteries also represent a significant green space value, their conditioning green areas being a key element of an urban green space system. In our research we studied the role of cemeteries in terms of green infrastructure and the potentials for tourism and recreation. The use of cemeteries for green spaces and tourism can help to ensure their economic operation and thus the long-term preservation of their values. Our research compared the role in green infrastructure of the Zentralfriedhof in Vienna and the Fiumei street cemetery in Budapest. We conducted a questionnaire survey in September-November 2021 among the population of Budapest capital city with the intention to uncover their cemetery visiting habits. The results were compared with the existing uses and possibilities and suggestions were made to increase the use of the cemeteries.

2. Introduction

The role of urban green infrastructure or urban green areas is growing in cities as a result of population growth and urban intensification. In recent years, the COVID-19 pandemic has amplified the importance of open spaces for the local population, who spend more time in parks and other green spaces available in close proximity to their home. Cemeteries, similarly to urban parks, represent an important part of the urban ecosystem, being the remaining semi-natural habitat of many species of plants and animals. Green spaces in cemeteries provide a range of ecosystem services to the population, such as improving air quality, enhancing the local climate, and providing aesthetic and recreational value (Costanza et al. 1997, McClymont and Sinnett 2021). In addition to commemorative features, almost all cemeteries have valuable mature tree species, tree lines, and they are rich in urban flora and fauna, which makes cemeteries an important element for biodiversity conservation (Smith and Minor 2019, Konic et al. 2021, Kowari et al. 2016). However, there is no equivalence between cemeteries and public parks: even if their functions and uses are similar in many respects, specificities could be mentioned as well. (Quinton and Duinker 2019). Cemeteries and parks are similar in many ways: they can vary in size and shape, they are dominated by non-native species, managed according to available funds and ownership, and are not always adequately lighted, making them unsafe to use after dark. In the case of urban parks, the owner is nearly always the community, while in case of cemeteries there may also be a role for the Church. The main difference is the presence of cultural and artistic values: most parks (except public parks of historical importance) do not contain elements of cultural and historical value and there are fewer

works of art, while cemeteries always contain culturally valuable structures and graves. Recreational use is the primary function in public parks, while in cemeteries it is only a secondary function (Grabalov 2018).

In our research we investigated the role of cemeteries in the green infrastructure network of cities, conducted a questionnaire survey on the use of cemeteries and examined how our two sample sites (Vienna: Zentralfriedhof, Budapest: Fiumei street cemetery) meet the tourism and recreational needs of the public (Figure 1.) Of the two cemeteries, the Viennese cemetery was used as an example, while the Budapest cemetery was used as a model site. Based on the literature review, we identified the primary, secondary and tertiary functions of cemeteries, and then used a questionnaire survey to determine which of these functions are important to Hungarian cemetery users. We analysed the Zentralfriedhof in Vienna in order to identify which functions - based on the literature - are in practice there, in order to explore the potential for development of the Budapest model site. It was considered important to study the Vienna model area because there are significant similarities in the development and structure of Vienna and Budapest, but there are major differences in the tourism and recreational use of the cemeteries and the development of green infrastructure in the two cities due to historical differences in the post-WWII period. In many ways, Vienna serves as a model for Budapest in the development of cemeteries and green spaces. Conclusions are drawn on the basis of the questionnaire and a comparison of the two sample areas.

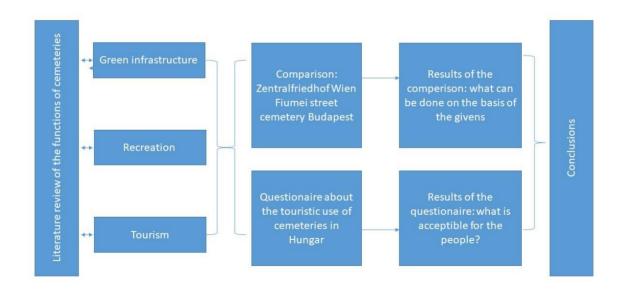


Figure 1. The structure of the article (by authors, 2022)

3. Background and Literature Review

Cemeteries are one of the oldest built green spaces, pre-dating urban parks and reflecting our

history and traditions (Nordh and Evensen 2018). They are dynamically changing green spaces, more dynamic than public parks as they gradually change with each new burial (Claydena et al. 2018). The cemeteries of modern times are typically established away from residential areas, on the periphery of settlements. With population growth and residential areas expansion, the extension of cemeteries has also changed to meet demand. The two types of land use - such as residential and funeral areas - are now converging in cities and cemeteries are embedded in the urban fabric. Urban cemeteries are interesting examples of the transformation of the use of public space in increasingly dense cities (Grabalov 2018).

Cemeteries, Recreation and Tourism

"Today, cemeteries are more than a place of reflection. They are a place of beauty and a place of history" (Prater 2022). A cemetery is a green open area (Quinton and Duinker 2019), a "garden" with architectural and sculptural elements. It performs an ecological function and it is a permanent element of the landscape. It offers a chance for survival to many species of plants and birds, especially in cities, and natural "monuments" are often found among the many trees (Tanaś 2004). Because of their characteristics and location, throughout history cemeteries have often had a secondary function in addition to their primary one (Skår et al. 2018, Deering 2014). In the Middle Ages, church graveyards were often the central points in cities, and were the sites of fairs and festivities as well as being used for local parliaments, trials, preaching, miracle play performances, folk rites, executions, and demonstrations; however, the cemetery has always been a place of solemnity.

The majority of historical cemetery complexes are park-type areas, and are endowed with recreational facilities: clean air, silence, limited urbanization, aesthetic landscape features, and favorable climatic and bioclimatic conditions (Tanaś 2004). Visiting cemeteries can therefore be an opportunity for recreation. "It can be a place to get one's thoughts rested and let them stretch themselves out. So, it is very good mentally. Yes, good to the eye and good for the head." (man in his 40s visiting the Old Town Cemetery) (Skår et al. 2018, p. 1). As cities become denser, green spaces are in danger of decreasing. (Evensen et al. 2017, p. 76) argue that "in densified parts of cities the cemetery may be the closest greenspace accessible for every-day use" (McClymont and Sinnett 2021, p. 2). This may have consequences for how urban cemeteries shift from being burial spaces to becoming spaces for recreation (Skår et al. 2018, Deering 2014).

Cemetery tourism (thanatourism) is a specific sub-section of dark tourism that is becoming increasingly popular (Millán et al. 2019). Tourists wander through burial grounds with the aim of discovering the artistic, architectural, historical, and scenic heritage that often abounds in cemeteries. The changing perception of cemeteries from a place for burial towards a cultural heritage space provides several opportunities for tourism. It enables the community to explore the development of products and services that help the destination to gain new income while preserving its heritage (Pliberšek and Vrban 2018).

Cemeteries are more than just resting places for the dead; they serve a practical purpose, serve as historical markers, reflect cultural values, and impress visitors with their gorgeous designs and much more. Many people find cemeteries particularly interesting for these and other various

reasons. Most cemeteries welcome the public free of charge, and many offer thematic maps, brochures, smartphone apps, audio tours, or guided tours that highlight notable graves, statues, monuments, chapels and other architectural structures of the site (Prater 2022). One of the 45 European Cultural Routes of the Council of Europe is the European Cemeteries Route, certified in 2010. The European Cemeteries Route refers to cemeteries as 'places of life', environments that, as urban spaces, are directly linked to the history and culture of the community to which they belong and where people can find many of their references.

Historical insight to Budapest and Vienna's green infrastructure

The development of green infrastructure in the two sample cities has followed a similar path. In the Middle Ages, the greenspace areas of Pest and Buda, and Vienna developed in a similar way to those of other European cities. In Buda within the castle walls and the city-enclosing walls, castle gardens, manorial gardens, and many small kitchen gardens were erected, while outside the walls the large meadow fields and forests enriched the landscape (Nagy 1997). Thanks to its favorable geographic location, Vienna already had extensive green spaces and gardens in the Middle Ages; thus, Antonio Bonfini formulated in 1480 that Vienna was "an immense, magnificent garden" (https://www.geschichtewiki.wien.gv.at/Gartenanlagen).

The development of the green infrastructure of the two cities chosen as model areas followed a similar path. The Turks conquered both cities, but in the case of Pest-Buda, the occupation of nearly 150 years set back development, while Vienna's development was more organic. From the 18th century onwards, both cities began to grow in population. At that time, few public spaces were created in the densely built-up urban areas. In Pest-Buda the city mayor proposed the creation of a new forestry zone, which later became the first public park in the capital (today's Városliget), as well as a promenade (Városligeti allee) connecting the urban areas to the new recreational zone (Nagy 1997, Balogh 2006). In the 18th century, a number of still important Viennese parks and gardens were created, e.g. Augarten, Prater. (1693) (https://www.geschichtewiki.wien.gv.at/Gartenanlagen).

The 19th century brought great changes in Vienna. First, the Emperor's Garden (1816-1819, created by Franz Antoine de Paula the Elder; Burggarten) and the People's Garden (1819-1823) were created in the course of a "small city expansion" in front of the castle bastion, which had been blown up by the French in 1809 and subsequently demolished; In the Ringstrasse zone, the City Park and the City Hall Park were created, as well as smaller gardens; the Ringstrasse itself was also landscaped (https://www.geschichtewiki.wien.gv.at/Gartenanlagen). In Hungary the Parliament of 1872 voted for the unification of Pest, Buda, Óbuda, and Margaret Island. The newly unified capital sacrificed for the development of its metropolitan character, following the European (Viennese and Parisien) models by removing its rural character by building new residential areas, representative axes, squares, and public institutions (Nagy 1997).

In the 20th century, after the break-up of the Austro-Hungarian Monarchy, the two cities' development diverged: In Vienna, the role and extent of urban green spaces gradually increased as a result of a growing bourgeoisie. Between the 1960s and the 1990s Vienna's green and open space development was especially shaped by four major projects, which have been among the most important recreation zones (Donaupark/WIG 1964, Kurpark Oberlaa/WIG 1974, Vienna's Danube Island/Wiener Donauinsel, Wienerberg) in Vienna ever since

(https://www.wien.gv.at/stadtentwicklung/studien/pdf/b008440.pdf).

In Budapest, the most significant green space developments since the 1950s have been the environment of housing estates and some new public parks. After the change of regime in 1989 the structure of the city became more dense and the role of green spaces, including cemeteries, became more important, mainly due to the loss of former industrial areas and their conversion into office buildings and housing estates.

In order to establish the basis for the green infrastructure and tourism development of the Fiumei Road cemetery, it was necessary to compare the situation, the characteristics and the tourism potential of the two cemeteries.

Results of the comparison of the two cemeteries

The Fiumei street cemetery in Budapest was opened in 1847 by the city council on the outskirts of the town. Due to the intensive urban development, the residential areas quickly grew around it, so that later expansion of the cemetery was no longer possible. In 1886, a much larger cemetery (New Public Cemetery) was opened on the outskirts of the town to meet the need for expansion. In Vienna, the Zentralfriedhof was also opened on the outskirts of the city in 1874, almost 30 years after the opening of the Fiumei street cemetery. Thanks to the later opening and its location further from the city center, the Zentralfriedhof was expanded several times, making it the 2nd largest cemetery in Europe. The layout of both cemeteries was designed in an architectural style. The regular, geometric arrangement of the plots is varied by small squares and diagonal and curved paths with a series of hedges. In the late 19th and early 20th centuries, both cemeteries were the burial places of many famous people, whose graves were surmounted by imposing mausoleums and statues. Both cemeteries are now protected as historical monuments because of their artistic and cultural-historical value.

From a green space point of view, the mature trees and the high plant cover are outstanding assets on both sites. In the case of the Zentralfriedhof, the larger surface area and the free, unpaved areas offer the opportunity for major green space improvements, such as the recent creation of the forest cemetery, the Naturgarten or the Park der Ruhe und Kraft. From a tourism point of view, both cemeteries have undergone improvements in recent years, such as the creation of information points and the organization of guided walks, but the Zentralfriedhof also offers visitors a wider range of facilities (guided tours with a bike or electric bicycle, audio-guided tours) than the Fiumei street cemetery. The operators of the Zentralfriedhof have also made a few other improvements (confectionery, gift shop) which are difficult to imagine in Budapest without a major change of approach (Table 1).

Table 1. Comparison of cemeteries: Fiumei street cemetery Budapest and Zentralfriedhof Vienna (by authors, 2022)

	Fiumei street cemetery (1847)	Zentralfriedhof (1874)
Size	56 hectares	240 hectares (2 nd largest in Europe)

Style	architectural cemetery	architectural cemetery
Proprietor	Hungarian State	Austrian State
Management	National Heritage Institute	Friedhöfe Wien GmbH
Status	functioning and closed parts	functioning, closed parts and reserve area
Protection	monument protection (whole territory)	monument protection (whole territory)
Location in the city	in the urban fabric (earlier at the time of creation, on the outskirts of the city)	on the outskirts of the city
Accessibility	public transport, vehicle access allowed, no separate parking	public transport, vehicle access allowed, several parking zones in the cemetery
Delimitation/entra nces	solid brick wall with several gates, but only the main entrance available; no representative reception area	solid brick wall with several gates, representative reception area at the central gate
Special parts of the cemetery	artists' plots, academic plots, heroes' plots, labor movement plots, Soviet military plots, military plots	children's graves, forest cemetery, Nature Garden, Garden of Serenity and Strength, military plots, religious plots
Religious denomination	non-denominational public cemetery and separately adjoining Jewish cemetery	public cemetery with Catholic, Lutheran, Jewish, Islamic, Buddhist, Orthodox parts
Green space elements	Significant vegetation: alleys, landscaped plots, but also overgrown plots	Significant vegetation: alleys, landscaped plots, overgrown plots and forest cemetery
Recreational areas	not specified	designated areas
Green surface	ca. 67%	ca. 75%
Buildings	cemetery office, museum; administration building; chapel; funeral parlor; mausoleums and arcades	cemetery office; museum; funeral parlors; cemetery chapel(s); arcades; operational buildings; solar park
Works of art	mausoleums, tombs, gravestones, statues	mausoleums, tombs, gravestones, statues
Significance	yes, national pantheon	yes, Vienna's most important cemetery
Touristic offers	thematic guided walks and mobile application	thematic guided walks on foot, horse-drawn carriage or e-bike; mobile application
Museum	Museum of National Remembrance	Funeral Museum, Vienna

Gift shop	no offer at the moment	yes + online shop
Catering	no offer at the moment	yes, cafeteria, pastry shop
Other infrastr.	toilets, flower shop, information point	toilets, flower shop, information point

The comparison shows that, although the Zentralfriedhof in Vienna and the Fiumei út cemetery in Budapest are similar in terms of their urban role and their basic facilities, the touristic role of the Zentralfriedhof is much more significant and the tourist infrastructure is more developed. In order to find out to what extent the Hungarian population would accept the touristic use of the cemeteries and the necessary improvements, a survey was carried out.

4. Method and Data

We conducted a questionnaire survey in September-November 2021 among the population of Hungary with the intention of uncovering their cemetery visiting habits (Sallay et al. 2022). In Hungary, the number of visits to cemeteries associated with All Saints' Day and Day of the Dead is high; therefore, the questionnaire was distributed during this period. We hoped this recent experience would increase the response rate and lead to more accurate answers. The questionnaire was completed in electronic form and was available online https://forms.gle/PaZcbcRFidn4G1wKA (accessed on 1 November 2021.). We wanted to know how often people visit cemeteries and for what reasons. We asked what activities not related to the basic memorial functions of cemeteries respondents considered to be acceptable.

The sampling was completely random. No attempt was made to limit or influence completion or to narrow down the pool of respondents. The sample was national in scope and not limited by area, as we wanted to know the opinions and attitudes of the Hungarian population. The aim was to obtain as wide a range of ages and interests as possible filling out the questionnaire and to determine the overall aspects of the typical visit. Due to the COVID-19 pandemic, we distributed the questionnaire online through professional and personal platforms, websites, and social media. (Face-to-face interviews would not have been safe at this time. We would also not have limited the sample if we had used face-to-face interviews.)So, internet access and the availability of online platforms were the only constraints in the survey. The survey was successful, as 213 people completed it. Our objective was achieved in that the respondents were diverse in terms of gender, age, place of residence, education, and employment background (Sallay et al. 2022). Results published in detail in 2022 in Sustainability, in the special issue "A Geography of Unconventional Tourist Mobility: New Approaches and Methodologies", available: https://www.mdpi.com/2071-1050/14/5/2918#cite.

Based on our previous research and our questionnaire survey (Sallay et al. 2022), we found that there are many similarities between the touristic role of the Fiumei street cemetery in Budapest and the Zentralfriedhof in Vienna, but their green space and recreational use differs greatly. Therefore, an evaluation table (see Table 1. in Results) was developed to compare the green space, recreational and touristic potential of the two cemeteries with the needs of the population as identified by the

questionnaire. We compared the central cemeteries in Budapest and one in Vienna, based on a number of criteria.

5. Results

Results of the questionnaire

The majority of the responders are between 25 and 60 years old (25-40 years 21.6%, 40-50 years 31.5%, 50-60 years 26.8%), female (83.6%), with a university/college degree (84%) and living in Budapest (54.9%) or in the Budapest agglomeration (14.6%). According to our survey, 37.1% of respondents visit a cemetery only once a year and 15.5% even less frequently. 29.1% visit quarterly and 13.6% monthly. 40.8% of respondents have visited a cemetery for recreational purposes. Besides walking (74%) and contemplation (74%), reading (5.2%) is the most common activity (multiple choice). Individual responses varied widely in their choice of activities: photography, sports (running, cycling), guided walks, birdwatching, concerts. 31.9% of the survey respondents have attended a cemetery-related event in a cemetery. Based on individual responses, this includes some kind of commemoration (national holiday, World War II, Day of the Dead), wreath-laying or guided walks. Only 10.8% participated in an event not related to the basic function of the cemetery. These included activities and programs such as photo courses, open-air drawing, nature walk, night of nightingales, book reading, exhibition and concerts.

The condition of cemeteries are important to visitors (92%), which also influences the time they spend there (65.7%). In terms of vegetation, the presence of trees/woods is considered the most important (93%, based on multiple choice), but shrubs (61.5%), grassed areas (60.6%) and flower beds (53.5%) also play a significant role (Sallay et al. 2022). We also asked respondents what conditions they thought essential for a cemetery to be suitable for recreation. Multiple answer choices and individual comment possibilities were also offered. Of the multiple choices, the first ranking was green space (79.3%), followed by good accessibility (57.3%), enough spaces between graves (57.3%) and enclosing of the cemetery (11.7%). Among the individual responses, several respondents (3%) said that they did not consider cemeteries suitable for recreation. However, there were also many constructive suggestions. Primarily, respondents feel the importance that recreational activities should not in any way interfere with the primary function of the cemetery. Several respondents mentioned different basic infrastructure elements such as water supply, toilets, lighting, benches, waste bins and security, as general conditions to be developed. They also emphasized the importance of being close to nature, the overall view, tidiness of graves and the existence of quality green spaces.

6. Discussion and Conclusion

Although traditional/classic urban green spaces (e.g. parks) and cemeteries share many features, they also differ in many ways. Cemeteries provide ecosystem services that benefit urban residents: recreation = cultural ecosystem services related to well-being and health, aesthetics, habitat, and a range of regulatory services (e.g. climate and stormwater regulation) that traditional urban green spaces do (Quinton and Duinker 2019, Kowari et al. 2016).

Cemeteries are areas of limited public use, covered with a variety of vegetation. As their primary function is burial, they have not been included in green space development planning in the past.

Urban growth and climate change will inevitably bring cemeteries increasingly to the attention of urban greenspace researchers and planners. This trend is supported by the recent increase in the number of books and articles on cemeteries as green spaces (Quinton and Duinker 2019). For example, the journal Urban Forestry and Urban Greening devoted a whole special issue to the topic in 2018.

The results of our questionnaire survey revealed a contradiction in attitudes towards cemeteries. While the respondents have participated in a number of different events where a cemetery has been the venue, they do not think that recreational activities are compatible with cemeteries. This is not a unique phenomenon. In the city of Malmö, Sweden, urban cemeteries are used for a variety of purposes, not only for commemoration. Yet the social acceptability of non-traditional activities in cemeteries is still controversial and disputed. According to an online survey of 149 respondents, 11% of respondents regularly choose to jog in a cemetery and 41% have run in a cemetery. 27% of those who run in a cemetery see cemeteries as a "normal" green park: because of their large size, proximity/accessibility and green space. Those who do not run in cemeteries, on the other hand, see cemeteries primarily as a place of remembrance, which is not compatible with jogging (Grabalov 2018).

The comparison of the central cemeteries in Budapest and Vienna clearly shows that large, easily accessible cemeteries can serve as a recreational space for the population, in addition to their memorial functions and touristic use. The extent to which this potential might be achieved depends largely on the ambition of the cemetery management to provide functions other than burial and conservation. The example of Vienna shows that cemetery visitors may be open to the potential of recreational activities taking place in the cemetery without disturbing the basic functions, especially with appropriate consultation and direct involvement. The current distance and aversion of the Hungarian population towards unconventional uses are clearly due to the lack of an open dialogue between the cemetery operator and the users. However, as soon as the population starts to treat cemeteries as recreational areas, the attitude of the management changes and necessary infrastructure is expected to be developed for a wider use.

As in the Vienna example, the Fiumei Road cemetery is already showing signs of tourism development, but further infrastructure development (e.g. opening a catering facility and gift shop) would provide even more opportunities for tourists. For other cemeteries in Budapest, it would also be important to explore the tourism potential and, where possible, to incorporate into future developments. For the recreation of local residents, the Fiumei street cemetery is less suitable than the Zentralfriedhof in Vienna due to its smaller size and higher density of inhumation, while the Rákoskeresztúr Újköztemető, the largest cemetery in Budapest (and Hungary), could be developed on this site. If the closed cemeteries were to be developed, it could also be a good idea to create a recreational green space for the residents of the area by incorporating the monuments of the former cemetery.

The development of cemeteries as green spaces with emphasized park character and/or a memorial garden as a recreational area could be an important aspect of cemetery planning in the future. But the first and most important goal to achieve in Hungary is to change the public's attitude.

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