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# **Accessibility and use of peri-urban green space for inner-city dwellers: a comparative study**

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## **Abstract**

Peri-urban landscape, space between the rural and urban setting, has generally been seen in planning practice as space in a transient state, likely to be developed in the future. However, research has shown that peri-urban green spaces have increasingly been used for recreational and leisure purposes by urban and rural dwellers.

This study aims to explore whether, if urban dwellers' preferred green spaces are large peri-urban semi-natural areas, they will nonetheless be used only infrequently if the accessibility of these spaces is not swift.

A questionnaire-based survey and focus groups were conducted to collect data from around 380 urban dwellers in two European cities of similar size but contrasting green space strategies, Ljubljana (green wedges strategy) and Edinburgh (green belt strategy). The results showed expected, strong cross-cultural preference for semi-natural landscapes (as opposed to formal parks and playing fields), such as woodlands, fields, waterways, etc. High appreciation and high use of green corridors was a more unexpected result. In addition, coastal landscapes appeared to be popular in Edinburgh and larger, peri-urban open spaces in Ljubljana. The frequency of visits to peri-urban spaces was considerably higher in Ljubljana, due to swift accessibility of the city's green wedges. In both cities, perceptions of distance to travel were the major barrier to frequent use of peri-urban green spaces. The findings suggest that green corridors enable enjoyable and easy access to semi-natural spaces in and around the city. This should be taken into account in future planning, as part of any wider green space strategies.

## **Highlights**

- We analysed the use and accessibility of peri-urban green spaces in two, European cities
- Cross-case preference for semi-natural landscapes and high use of green corridors
- Perceptions of distance to travel were the main reason for infrequent visits
- Green space strategies may affect the frequency of visits to peri-urban green spaces

## **1. Introduction**

Peri-urban areas (the space on the edge of the cities, which represents an interface between rural and urban and where urban and rural development processes meet, mix and interact (Cabello et al., 2012; Hall et al., 2004; Meeus and Gulinck, 2008; Phillips et al., 1999) have been recognised as an important milieu for leisure and recreation of urban and suburban dwellers (Cadieux, 2008; Jenks et al., 1996; Neuvonen et al., 2007; Palang et al., 2011; Semm and Palang, 2010; Tyrväinen et al., 2007). The European Environmental Agency (EEA, 2006) reports that, at the present time, extensive natural or semi-natural landscapes are still accessible to more than 70% of European urban dwellers. This information raises the question of how the accessibility (in terms of proximity and possibilities for using public and private transport to get there), and consequently the use, of these areas may change in the future, due to on-going urbanisation and sealing of land. Planned urbanisation usually includes a specific green space strategy, such as green belt, green wedge, etc.. To date, however, there has been little research about the role of green space strategies explicitly for the use of peri-urban landscapes by different groups of people. This study focuses on one such group – inner-city dwellers – since large, semi-natural open spaces are not usually located on their doorstep. The study assumes that urban dwellers would like access to large, semi-natural areas, but that they use them rather irregularly because the accessibility of these (usually peripheral) spaces is

not easy or quick. Hence, the aim of this paper is two-fold. First, it attempts to gather empirical information on inner-city dwellers' use of peri-urban space. Second, it explores how the patterns of peri-urban space use differ between two European cities with different green space strategies (green belt and green wedges) in order to provide new insights on the implications of such green space approaches for urban peripheries and the traditional rural-urban divide. Ultimately, the paper explores possibilities for translating this knowledge into policy guidelines.

## 2. Background

In recent years, academic interest in peri-urban space has been growing. In order to understand this topic better, studies have approached it from different angles. Discussion has included terminology (Simon et al., 2006), peri-urban characteristics stressing the eclectic character, low identity and recognisability of this space (in comparison with urban or rural space) (see Allen, 2006; McGregor et al., 2006; Nilsson et al., 2013; Phillips et al., 1999; Qviström and Saltzman, 2006; Qviström and Saltzman, 2007; Shoard, 2000) and the position of peri-urban space between the urban and the rural in policy and practice (Qviström and Saltzman, 2007; Scott et al., 2013; Shoard, 2000).

Furthermore, rural-urban relationships and characteristics of peri-urban space and its future development have been discussed at national and European levels. Considerable research into this topic is found in the UK, a country with spatial planning traditionally oriented towards a strong rural-urban division (see e.g. Gallent et al., 2006; Scott et al., 2013; Shoard, 2000), in the Netherlands and Belgium, which are countries with a high urbanisation rate (see e.g. Hornis and Ritsema van Eck, 2008; Palang et al., 2011; Tjallingii, 2000) and in certain other countries, particularly in Scandinavia (see e.g. Busck et al., 2008; Qviström, 2010; Qviström and Saltzman, 2008). Peri-urban challenges have become also a topic in a number of EU projects. The PURPLE network, for example, focused on the *everyday* peri-urban open space which is not protected via specific regulations such as Natura 2000.

The rising interest in the peri-urban landscape as a topic may be triggered by the urgent need to find better approaches for cities' transformation due to growing urbanisation. This study is focused on two traditional green space strategies: 'green belt' and 'green wedge' approaches. A green belt is used to protect areas of largely undeveloped, wild, or agricultural land surrounding an urban area. European cities that have adopted a green belt strategy include London, Vienna, Berlin, and Edinburgh. By contrast, green wedges are a strategic approach that inserts green space into an urban area instead of around it, while linking to larger areas of green space on the periphery. Examples of cities with this strategy are Copenhagen and Stockholm. A green wedges strategy, because of the partially linear form of the wedges, can operate in a similar way to a 'green corridor' strategy, which is more focused on linking open spaces *within* the urban structure. Green corridors achieve these links by means of tree belts, river and canal banks, road and rail corridors, cycling routes and pedestrian paths within towns and cities (Groome, 1990). The green corridor or 'greenway' concept has been repeatedly discussed in research; however, definitions of the concept vary, including whether or not accessible green space for human (as opposed to wildlife) use is associated with it (Ahern, 2005; Groome, 1990). For the purpose of this paper, green corridors which offer recreational use and green wedges are understood as having similar strategic effects within the urban environment. However, whilst green corridors function as linking elements which help to promote environmentally sustainable forms of transport (e.g. walking and cycling) and may also be an important part of an ecological network (e.g. for wildlife dispersal), green wedges have an additional role. Both green wedges and green belts are strategies aimed at controlling further urban growth, to prevent the merging of neighbouring cities, to preserve the rural-urban divide and to ensure and facilitate recreational access to large green spaces for city inhabitants. Although open spaces have been preserved for recreational use via these strategies, swift access to them was mostly not set as a priority (with the exception of Copenhagen's 'Finger Plan', which also aimed to enable

short travel distance to green spaces, even for the city-centre dwellers (Busck et al., 2008; Swaffield and Primdahl, 2006)).

Research on the frequency of open space use varies according to city; however, with particular reference to the green belt, some findings have stressed that people do not actually use it to any significant extent (Barker, 2006; Bramley et al., 2004; Kühn, 2003; Pennington, 2002). The search for reasons for this phenomenon have not, to date, produced any satisfactory explanation, although it seems possible that time taken to access these spaces may be a critical issue, as well as the desired activity once there (Bakhtiari et al., 2014). More research is therefore needed, to clarify the levels of use and activities performed in green spaces embedded in these strategies, to determine the push and pull factors affecting the green space use and, potentially, to compare how different green space strategies reflect responses to this issue.

Furthermore, the knowledge of how people use and access peri-urban areas is often overlooked in planning documents and development strategies, although this knowledge is essential for better future planning of these areas (Gallent et al., 2006; Qviström and Saltzman, 2006). The knowledge transfer from research to policy and practice seems to be lost in translation. Appropriate formats of information obtained through research, as well as effective tools and guidelines are needed to ease the communication between research and practice.

Some research studies have shown that people use peri-urban green open spaces for a variety of reasons, e.g. for outdoor recreation, for being close to nature, for relaxation from stress, and for aesthetic experiences (see Bonaiuto et al., 2003; Chiesura, 2004; Neuvonen et al., 2007). Interestingly, these studies found that people appreciate, for their recreation and leisure activities, semi-natural areas such as woodlands, fringe forests, country parks, etc., more than intensively maintained green areas. (Neuvonen et al., 2007; Swanwick, 2009; Tyrväinen et al., 2007). Moreover, it is suggested that urban green spaces do not satisfy diverse 'nature' and recreational needs (Rupprecht et al., 2015), which are important for people's wellbeing, especially for people that live in dense urban environments (Chiesura, 2004).

However, in research to date, there is no consensus on what the push and pull factors are that determine the use of peri-urban green space. Those reported for green space in general, but can be also applied to peri-urban green space, include: distance (e.g. Coombes et al., 2010; Neuvonen et al., 2007; Swanwick, 2009; Tyrväinen et al., 2007; Van Herzele et al., 2005); ease of access (e.g. Frumkin, 2001; Kaplan and Kaplan, 1989; Schroeder, 1988; Swanwick, 2009); attractiveness (Sugiyama et al., 2010) and the size of green space (Schipperijn et al., 2010; Van Herzele et al., 2005). Several studies have argued that the frequency of use depends on a combination of factors, especially on the combination of proximity, quality and quantity of green space (Cadieux, 2008; Tyrväinen et al., 2007). Moreover, the so-called compensation hypothesis suggests that people make longer but less frequent visits to a green space further away and more, but shorter visits if the green space is close by. The total time spent in each type of green space is thus equal. However, there have been relatively few studies to test this hypothesis (Maat and de Vries, 2003). Schipperijn et al. (2010) did not measure time spent in a green space but they reported that green spaces need to be at least 5 hectares in size and within a distance of 600 metres, to attract visitors to go past a smaller green space which was located within closer proximity. Accordingly, there appears to be a trade-off between quality, quantity and proximity that determines where people will go for recreation.

Apart from the travelling distance, there are further push and pull factors which could affect access to, and frequency of, green space use. It is these that are the focus of this paper, which is based on a PhD study completed in 2014. The aims of the study, as outlined in the introduction, are to understand inner-city dwellers' use of peri-urban space, since these are the populations with least

access to large areas of natural or semi-natural open space and potentially of greatest concern as urbanisation and urban densification grows. The specific objectives of this paper are to get a better understanding of the following factors: the type and quality of green space visited by such populations; why and how often they are visited; the characteristics of the routes to them; the manner in which people get there and their speed of travelling, which can be linked to different means of transport. The focus is on reasons behind people's choices, in terms of peri-urban green space visits, i.e. why they travel and choose where to go, rather than on a comprehensive study movement patterns per se, as is common in transport planning (Halden et al., 2000). Thus, the use of descriptive, statistical and qualitative approaches, building on the literature, presents an opportunity for gaining an understanding of the peri-urban places people like to visit and why they choose particular means of transportation to get there. The methods are fully described in the next section.

### **3. Materials and methods**

This study builds upon the descriptive case study as the main research strategy (Yin, 2009). In order to gain more reliable and relevant information and provide the possibility for comparison, two cities with broadly similar population levels but different green space strategies – Ljubljana and Edinburgh – have been used to provide comparative case studies. They offer the opportunity to understand the issues in depth while recognising that different green space strategies are likely to yield different insights in terms of landscape use.

#### *3.1 Study area*

Ljubljana and Edinburgh were primarily selected due to good accessibility of relevant databases and pragmatic reasons such as good knowledge of the cities' planning systems. Both cities belong to medium-sized European cities (i.e. with a population of between 100,000-500,000 inhabitants), which is the range in which most of the population of Europe lives (Giffinger et al., 2007). Figure 1 shows a comparison of the cities. Figures 2 and 3 show the municipal boundaries and peri-urban areas of each city. Ljubljana and Edinburgh are both growing cities, which most affects the development and change at the edges of each city. This also makes them interesting to compare.

	Ljubljana	Edinburgh
<b>Area</b>	163.8 km <sup>2</sup>	259 km <sup>2</sup>
<b>Population</b>	272,220	486,120
<b>Density</b>	1,662/km <sup>2</sup>	1,844/km <sup>2</sup>
<b>Urban structure</b>	 <p>Green wedges strategy</p>	 <p>Green belt strategy</p>
<b>Peri-urban area</b>	 <p>Problems with regard to peri-urban areas in Ljubljana pertain mainly to unmanaged green spaces and consumption of arable land due to sprawled development.</p>	 <p>Edinburgh's green belt is a composite of land uses which vary in quality. Lately, the focus has shifted from protection of land for agricultural use to use of land for recreation.</p>
<b>Access to land for recreational and leisure purposes</b>	General right to access public or privately owned land	General right to access public or privately owned land (Land Reform (Scotland) Act was passed in 2003)

Fig. 1. Similarities and differences of Ljubljana and Edinburgh.

Ljubljana has developed in a star-like form, shaped by the road infrastructure connecting the city centre with its outskirts, and the green wedges (two of which are hilly) in-between. In the early 1990s in Ljubljana, spatial development was neglected because of macro-economic reforms which were considered the priority. This led to the expansion of a dispersed or scattered residential and retail sprawl. In the year 2010, the city of Ljubljana adopted a new Municipal Spatial Plan (MOL, 2010) which set the vision for spatial development of the city in the next fifteen to twenty years. It is based on a concentric model of the city centre and a combination of radio-centric and 'star-shape' development concepts in the compact inner city (within the motorway ring road). Ljubljana never had an official 'green wedge' strategy, however, the 'star-shape' development envisioned in the Municipal Spatial Plan has enabled preservation of relatively extensive natural, especially forest areas which, in practice, act as Ljubljana's green wedges.

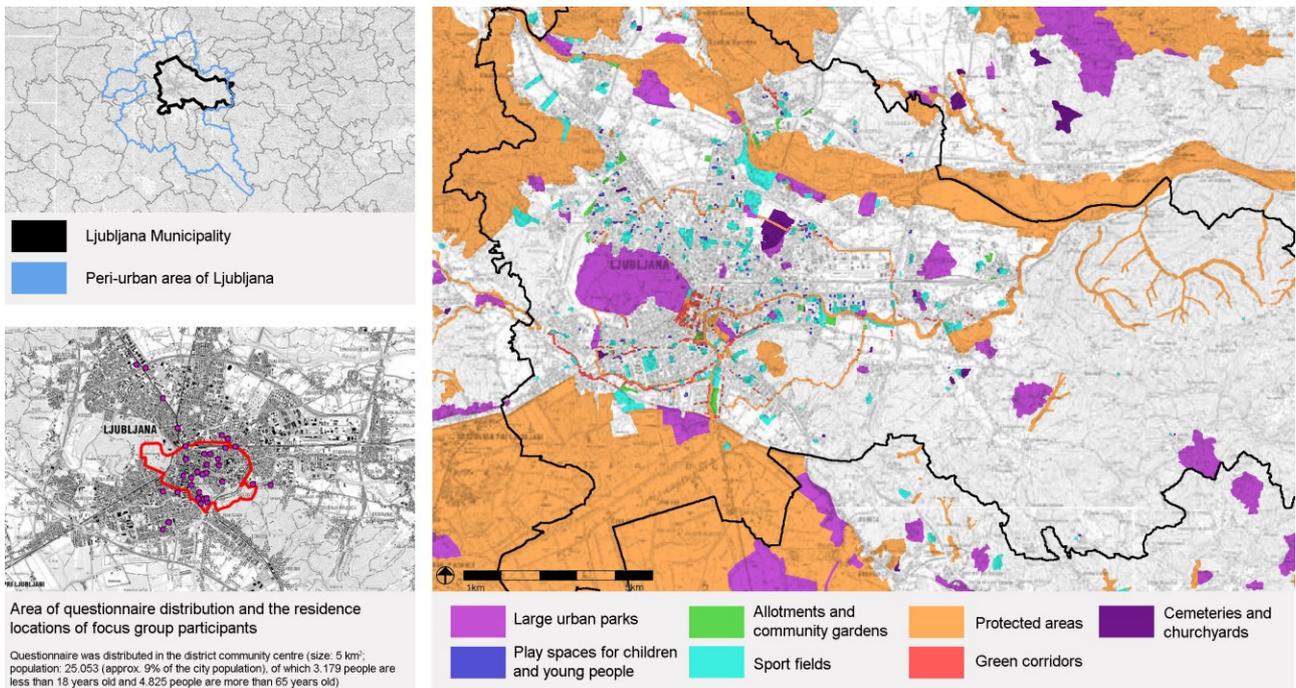


Fig. 2. Ljubljana maps: upper left, municipality and peri-urban area; lower left, locations of questionnaire and focus group participants; right, distribution of major green space types in Ljubljana.

Note: green space types which can only be found in peri-urban space are excluded, e.g. beach/lake/water, country parks, countryside settlements and their surrounding areas.

Edinburgh, conversely, is mostly compact and densely built and defined by the city bypass. The city is surrounded by green belt areas on its west, south and east side whereas, on the north side, the city is bounded by the sea. In the city itself, its green space comes in the form of large public parks, woodlands and semi-natural areas. Edinburgh introduced a green belt strategy in 1957, in order to constrain the extent of suburban development, protect agricultural land and to conserve the setting of the city. This policy proved to be effective in controlling urban sprawl, although Edinburgh's recent strong demand for land for further growth has put much greater pressure than previously on the green belt, particularly in the western part of the city. Because of such development pressures, planners and the city authorities have proposed suggestions to rethink the shape of the green belt.

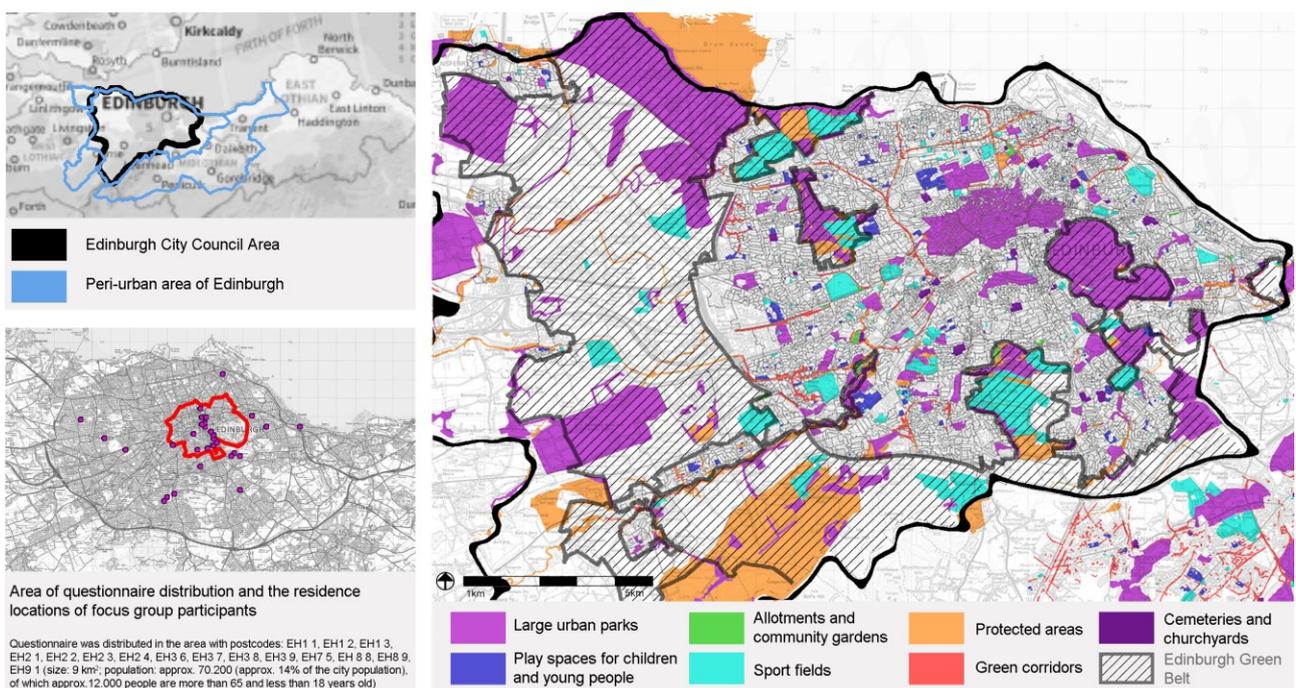


Fig. 3. Edinburgh maps: upper left, municipality and peri-urban area; lower left, locations of questionnaire and focus

*group participants; right, distribution of major green space types in Edinburgh.*

*Note: green space types which can only be found in peri-urban space are excluded, e.g. beach/lake/water, country parks, countryside settlements and their surrounding areas.*

The transport infrastructure network, which in each case is closely related to the city structure and development, is very different in Ljubljana and Edinburgh. The bus network in Edinburgh is extensive and thus caters not only for all parts of the city and its suburbs but also the surrounding city-region. In Ljubljana, the multi-modal integration of transport on a regional level has been discussed in recent years but not yet implemented. This may explain high car ownership in Ljubljana: in 2003, 90% of households owned a car (Guzelj and Košak, 2003). In Edinburgh, car ownership has remained relatively low over the last 10 years, despite the growth in wealth in the same period. In 2009/10, only 58% of households in Edinburgh had access to a car for private use (CEC, 2012).

Recent surveys on patterns of travel in general suggest that the main reasons for travel vary between the two cities (The Scottish Government, 2013; Guzelj and Košak, 2003). However, in neither city was work-related travel the most frequent reason for people's journeys. In Edinburgh, this was shopping; and in Ljubljana, it was leisure travel. Across Europe, leisure travel appears to be becoming more and more important, with leisure trips accounting for as much as one-third of all trips (EEA, 2009). Since the pattern of leisure trips is less predictable than commuter journeys, enabling sustainable accessibility to leisure destinations and promoting sustainable travel remains a main challenge for the future. Thus, it is important to understand the means of travel by which inner city populations access peri-urban areas for leisure purposes, as focused on in this study.

### *3.2 Data collection*

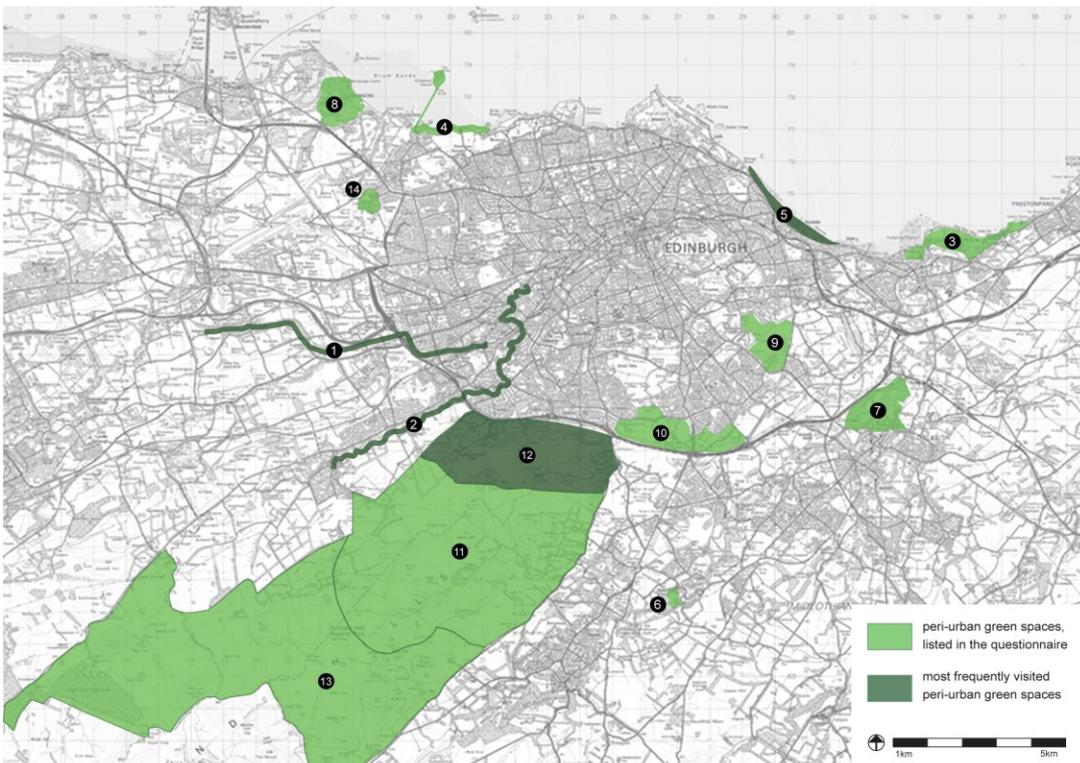
The study used two related methods, questionnaires and focus groups, with inner-city dwellers in each city, in order to collect the views of potential and actual users of peri-urban landscape. The methods were chosen in order to provide both a breadth of participation, via the questionnaire-based survey, and a depth of understanding, via the focus groups.

#### *(a) Questionnaire*

The questionnaire design encompassed four parts covering: (1) General use of, and access to, green spaces in and around the city; (2) The leisure and recreational behaviours of respondents, and their access to specific peri-urban green spaces; (3) The perceptions of, and attitudes to, most often visited green, peri-urban open space; (4) Socio-demographic information for the respondents. In line with the aim of this paper, the focus lies on presenting the most relevant findings from part (2), in particular. In this part, respondents were given a list of various peri-urban green open spaces around their city and were asked about their frequency of visits and means of transport to get to these places. The respondents were also asked to select, from the list, their preferred green space. All green spaces were later mapped and categorised into peri-urban green space types (Figure 4).



<b>Green corridors</b>	<ul style="list-style-type: none"> <li>1 Območje ob Savi (Tomačevo)</li> <li>2 Pot spominov in tovarištva</li> </ul>	<b>Large sized, open spaces on the edge of the city (e.g. hills, fields, semi-natural areas, etc.)</b> <ul style="list-style-type: none"> <li>5 Šmarna gora</li> <li>6 Rašica</li> <li>7 Toško Čelo</li> <li>8 Ljubijansko barje med Rakovo Ješjo in Tržaško cesto</li> <li>9 Rožnik in Šišenski hrib</li> <li>10 Golovec</li> <li>11 Krim</li> <li>12 Bizovik</li> </ul>	<b>Country parks, countryside settlements and their surrounding areas</b> <ul style="list-style-type: none"> <li>13 Janče in Orle</li> </ul>
<b>The beach/lake/water</b>	<ul style="list-style-type: none"> <li>3 Mali Rožnik in Mostec</li> <li>4 Podpeško jezero</li> </ul>		<b>Protected areas</b> <ul style="list-style-type: none"> <li>14 Ljubijansko barje med Črno vasjo in Igom</li> <li>15 Zajčja dobrava</li> </ul>



<b>Green corridors</b>	<ul style="list-style-type: none"> <li>1 Union Canal from the City Bypass towards Balerno</li> <li>2 Water of Leith from Balerno to Slateford</li> </ul>	<b>Country parks, countryside settlements and their surrounding areas</b> <ul style="list-style-type: none"> <li>6 Roslin Glen Country Park</li> <li>7 Dalkeith Country Park</li> </ul>	<b>Protected areas</b> <ul style="list-style-type: none"> <li>11 Balerno/Black Hill/Glencorse/Harlow/Flotterstone</li> <li>12 Bonaly/Swanston/Allemuir</li> <li>13 Nine Mile Burn/Monks Rigg/Braid Law</li> </ul>
<b>The beach/lake/water</b>	<ul style="list-style-type: none"> <li>3 Musselburgh (The links, River Esk area)</li> <li>4 Cramond Foreshore</li> <li>5 Portobello beach</li> </ul>		<b>Large sized, open spaces on the edge of the city (e.g. hills, fields, semi-natural areas, etc.)</b> <ul style="list-style-type: none"> <li>8 Dalmeny and surroundings</li> <li>9 Little France area</li> <li>10 Burdiehouse</li> </ul>

Fig. 4. Peri-urban green spaces in Ljubljana (top) and Edinburgh (bottom), listed in the questionnaire. Notes: the spaces are classified according to their predominant peri-urban green space types. The dark green colour indicates the four most frequently visited peri-urban green spaces in each city.

The questionnaire, in Slovenian and English as appropriate, was distributed among residents of the city centre area in each city, defined by the relevant administrative units. This area was chosen in accordance with the primary aim of this research study i.e. to focus on the inner-city dwellers' perspectives. Although the only condition for the respondents' eligibility to complete the questionnaire was their residence in the study area, the questionnaire aimed to collect a reasonably balanced sample of adult age and gender groups. The census data of the city and the area of questionnaire distribution were checked beforehand, in order to inform a sampling strategy that might attract responses proportionate with the census data.

The study data were collected using three different strategies. From the outset, the intention was to administer a paper-based questionnaire in both cities; however, due to the financial limitations of this research for collection by post, different means to collect questionnaire results were sought. In Ljubljana, 900 paper-based questionnaires were distributed individually to the randomly chosen household post boxes in the assigned area. Since most respondents were living in apartments rather than individual houses, the respondents were asked to return the completed samples, within 14 days from their receipt, to the collection boxes which were provided in the foyer area of each building. The returned samples were checked to ascertain the pattern of age in respondents, to determine whether this matched the distribution area census data. There was a shortage of older respondents (aged 60 years or more) in the data collected by this method and so responses were additionally collected via a snowball approach, inviting respondents in this age group to ask friends and neighbours also to complete a questionnaire. In total, 163 (an 18% response rate) of valid questionnaires were collected.

In Edinburgh, the same way of collecting completed questionnaires was not feasible because post boxes in most apartment buildings are common for all residents of a building, rather than for each individual apartment. For that reason, questionnaires were initially collected via an online survey and convenience sampling. The total number of valid questionnaires, collected via the online survey, was 77. However, the respondents' age profile for data collected in this way lay primarily in the age group 18-29 years old. For this reason, it was decided to return to a paper-based questionnaire approach. Questionnaires were distributed in a targeted approach, to try to achieve a balance of ages among respondents. Possible respondents were approached in public parks, children's playgrounds, community centre interest groups, voluntary organisations, etc., which are all environments popular with people aged 30-59 and 60+ years old. The number of questionnaires collected in this way was 88. Table 1 sums up the socio-demographic variables of questionnaire respondents in both cities.

**Table 1: Socio-demographic characteristics of questionnaire respondents and focus group participants.**

	Questionnaire (%, Ljubljana (N = 163); Edinburgh (N = 165))					Focus groups						
	Gender		Age group			Gender – older group		Gender – younger group		Average age – older group	Average age – younger group	Area of residence – older group
	Male	Female	18–29 (younger group)	30–59 (middle-aged group)	60+ (older group)	Male	Female	Male	Female			
<b>LJUBLJANA</b>	31	69	36	53	11	3	17	6	6	70.55	27.75	7 participants from outside the city centre area
<b>EDINBURGH</b>	28	72	25	46	29	4	16	3	23	69.3*	23	16 participants from outside the city centre area

\*Two of participants refused to tell their age and are therefore not included in the calculation.

### *(b) Focus groups*

The focus groups were implemented after the questionnaire results had been gathered and aimed to explore and explain, in-depth, the issues that had been raised by the questionnaire. However, there was also a focus on exploring the views of two age groups in particular, young adults under 30 years and people aged over 65, selected mainly because they belong to groups generally considered to have lower access to private means of transport and, accordingly, facing more restraints on reaching peri-urban open space. Specifically, the focus groups addressed the following points:

- what types of peri-urban landscapes inner-city inhabitants prefer to visit for their leisure activities, and why;
- their frequency of peri-urban landscape use;
- the distance people will travel and how they travel to the place (by which means of transport); the reasons for their choice; and their opinion on the nature of routes to and from spaces, in order to gain an understanding of the current condition and possibilities for more sustainable access to peri-urban areas.

The participants were recruited via various organisations (voluntary organisations, community centres, local recreational groups), acquaintances, e-mail invitations, in schools, universities, student organisations, daily centres for older people, etc. However, due to the low interest in participation, criteria had to be lowered and participants were also recruited that resided in other parts of the city, not just the city-centre area (this was the case in both of the younger adult focus groups in Ljubljana and both older adult groups in Edinburgh). Also, the gender balance was not ideal: with one exception, in all cases female participants were in the majority. In total, three focus groups with older people and two with younger people were conducted in Ljubljana. In Edinburgh, two sessions with each age group were carried out. The details are listed in Table 1.

The focus group discussions were based on an interview guide which touched on all the above-mentioned points, but participants were left to talk freely, allowing them to diverge from the topic at times. All focus group sessions were audio-recorded and then transcribed. The transcriptions were coded according to the major concepts and themes identified by participants and then compared with findings from the questionnaires.

### *3.3 Analysis and triangulation*

Figures 2 and 3 show data collection boundaries for both questionnaires and focus groups, and distribution of urban green space types, Figure 2 for Ljubljana and Figure 3 for Edinburgh.

The data were analysed separately for Ljubljana and Edinburgh and by techniques specific to each method used for data collection. Accordingly, for the analysis of the questionnaire, descriptive statistics and regression analysis (to assess which variables best predicted the frequency of use of peri-urban open spaces) were used, using SPSS software. Focus group analysis was based on open coding: first, key concepts with regard to people's use of, and access to, peri-urban open spaces, were identified for each case study and later grouped into categories. The findings gained from using the different methods were compared and contrasted to facilitate interpretation of results, adding depth and nuance to understandings and giving confidence where findings reinforce each other.

## **4. Results**

The results described in this section draw on both of the data collection methods, reporting on the patterns identified by questionnaire and providing more detailed insights obtained by focus group. They are divided into results on use and results on accessibility to peri-urban, green open spaces.

#### 4.1 Use of peri-urban green spaces

The types of places people visited, variety of activities undertaken there, frequency and barriers to visit were examined.

In Edinburgh, green corridors and the beach were preferred spaces for visiting, whilst in Ljubljana, large green spaces on the edge of the city and green corridors were preferred (see Figure 4). Such a high ranking for green corridors, in both cities, was a rather surprising result. The discussions in the focus groups reinforced people’s strong preference for this type of green space:

*LJ-M28: “For example, I cycle 13km to get to my work place, and often I prefer to chose to cycle on PST, because I really prefer to cycle under the rows of trees than on the Litijska road, which is full of cars.”*

*LJ-W60: “I am often drawn to walk along the rail road. When I am on the train, I am thinking: This or that path would be a nice place to walk.”*

*ED-W66: “Between the Union Canal and the Water of Leith there is another walkway, made from the old railway line. Although it’s not... Would you classify it as a green area? I mean, it’s covered with trees and ...”*

*ED-W66: “A green corridor, yeah! We can walk right through Edinburgh. And the other thing they have in Edinburgh, are bicycle tracks through the city. With greenery all around as well.”*

Fig. 7. Focus group responses on use of green corridors

Note: LJ = Ljubljana; ED = Edinburgh; W = woman; M = man; numbers indicate age.

The main reason for high use of green corridors was walking, which was the activity most pursued by all age groups, in both cities. Green corridors appeared to be a suitable asset where one can enjoy being outdoors, on a managed path and yet removed from the traffic and city’s noise. When the green corridors also had a river, they were valued even more highly.

A strong preference for natural environments, away from built structures, was confirmed by the questionnaire respondents’ frequency of visits to peri-urban spaces. Figure 5 shows that, in Ljubljana, more than 90% of respondents and, in Edinburgh, more than 70% of respondents visited one or more peri-urban green spaces at least every two months. However, Figure 5 also shows that the profile of frequency of visits was very different between Ljubljana and Edinburgh. Whilst in Ljubljana the majority of respondents visited at least one peri-urban green space 2 or 3 times a week, in Edinburgh the majority visited just once a month.

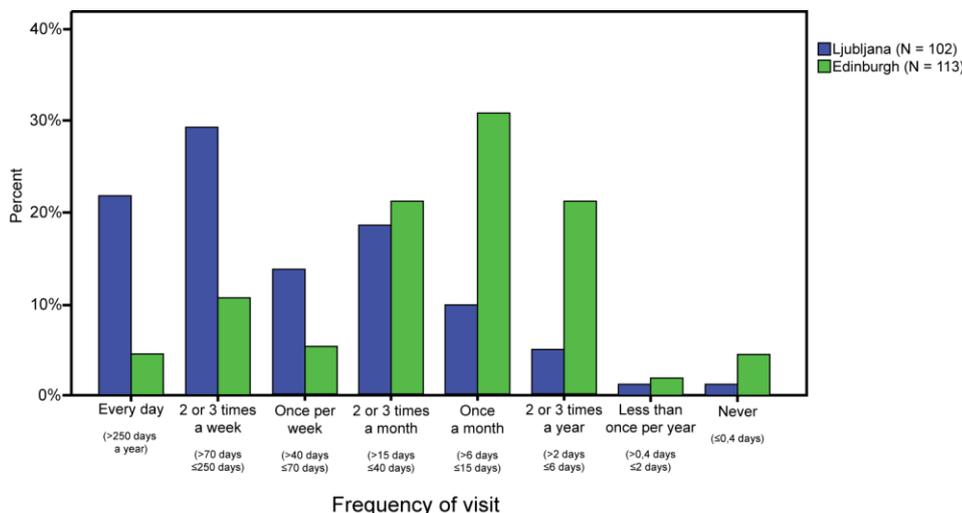


Fig. 5. Questionnaire responses: frequency of visits to peri-urban green spaces, Ljubljana and Edinburgh.

Walking was the main activity reported in both cities. However, questionnaire analysis showed

some significant differences between both sets of respondents in terms of how they engaged in the peri-urban green spaces in their respective cities (Table 2). Respondents from Ljubljana more frequently visited peri-urban green spaces to walk their dog there, and for active recreation, whereas in Edinburgh the reported activities were: to have a picnic or barbecue there, to learn about nature and for ‘other reasons’ which were mainly of a personal nature. Analysis of questionnaire results by age showed similarities in activities pursued by particular age groups. In both cities, the middle-aged group (30-59 years old) was especially interested in family related activities: for example, family outings, playing with children, learning about nature, and having a picnic or barbecue; whilst the older group (60+ years old) was most fond of walking. Participants in this group said walking enabled them to get fresh air, observe wildlife, search for forest fruits and mushrooms, and in general, enjoy being in nature.

**Table 2: Questionnaire responses on engagement with peri-urban green spaces in Ljubljana and Edinburgh.**

Ljubljana (N = 140)	It's a good place for a walk where I can enjoy nature	Observe the wildlife	Walk the dog	Enjoy some peace and relaxation	It's a good place for a family outing	Play with children	I come here for active recreation (e.g. jogging, hiking, cycling, mountain biking)	Play sport games with friends (e.g. football, badminton, Frisbee)	Have a picnic/ barbecue	It's a good place for learning about nature	Other
Edinburgh (N = 143)											
<b>p &lt; 0,05</b>											
$\chi^2$	5,448	1,416	18,685	3,689	2,124	1,712	19,139	0,772	8,995	7,828	8,275
p-value	0,020	0,234	0,000	0,055	0,145	0,191	0,000	0,380	0,003	0,005	0,004

Among the barriers to people’s use of green spaces, recorded through the questionnaire (Figure 6) and focus groups, more than 50% of participants of all age groups and in both cities stated lack of time. The second reason was the distance to these spaces being too great. Since peri-urban spaces are not located on their doorstep, people often do not have enough time to travel to a space and to spend some time there. Instead, they choose green spaces which are located close to their homes. The middle-aged group and, to some extent, also the older group, would occasionally go to peri-urban green spaces and spend a longer time there, whilst younger group visited peri-urban areas rather rarely.

## Why don't you visit green open spaces at the edge of the city more often?

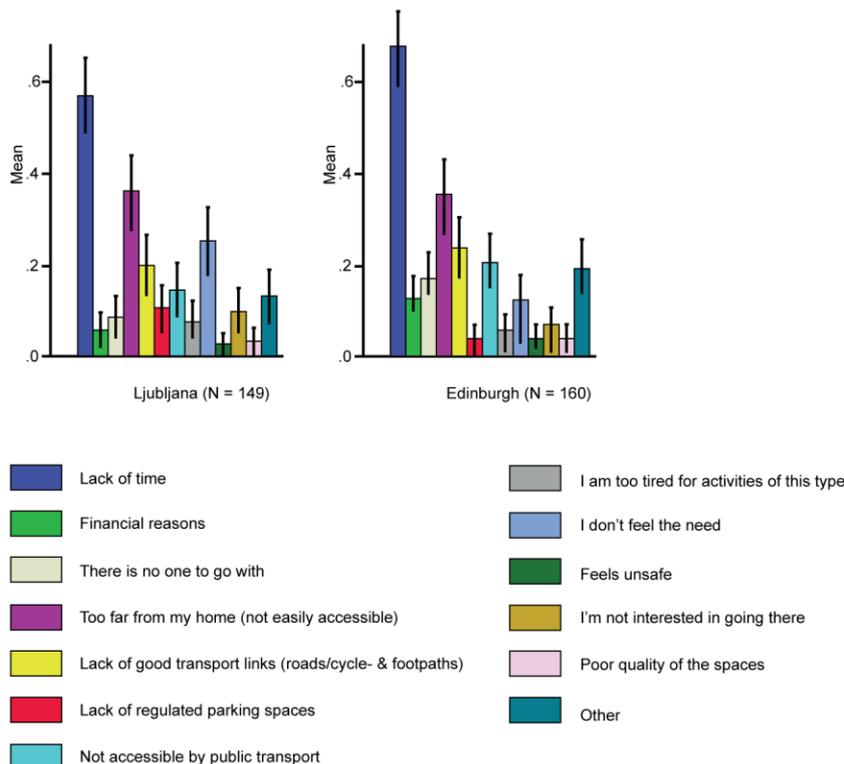


Fig. 6. Reasons for not visiting the peri-urban green open spaces more often, Ljubljana and Edinburgh.

### 4.2 Accessibility of peri-urban green spaces

The accessibility of peri-urban green spaces was evaluated via the following factors: distance, means of transport and ease of access to get there, the characteristics of the route to the green space and the characteristics of the green space (e.g. size, naturalness, facilities provided, etc.).

The joint results of the two methods showed that distance or, rather, swift access, was the most decisive in terms of whether or not, and also how frequently, people would visit a green space. Distance to the peri-urban green space was the major constraint on frequency of use. This may also explain the less frequent visits to peri-urban spaces by Edinburgh's questionnaire respondents, compared with Ljubljana, as reported in Figure 5. Focus group participants associated too great a distance with the amount of time they had to devote to travelling to peri-urban green spaces. They perceived peri-urban green spaces as spaces that are located far away, which may discourage them.

ED-W69: "When you are going out of the city, you have to plan. Because there are buses, but it's not like being in the city where if you miss one bus, oh what the heck, there is going to be another in 10 minutes! [...] so you have to plan it and have the timetable of what you are doing."

Fig. 8. Focus group response on use of public transport to access peri-urban green space.

Among the peri-urban green spaces considered in this study, one third of them were located within a 5 km radius from the centre of each city. This corresponds to around 15 min cycling or a 15-30 min bus ride. However, focus groups discussions showed that people would not consider going on regular basis to green spaces which were located further than walking distance from their homes (i.e. a 15 min walk). Moreover, the discussions showed clearly that the closeness of the green space would outweigh the other factors that might be important when choosing which green space to visit, such as, its appearance, landscape features, or facilities:

ED-W78: "Aye, closeness. It is 15 minute walk. And the Queen's Park is not particularly beautiful, but it is a nice

walk.”

Fig. 9. Focus group response on the importance of green space within walking distance.

With regard to ease of access, safety, connectivity and the continuity of paths was mentioned, especially when walking and cycling:

LJ-W69: “It would be good to build cycle paths to go outside the city, in suburban areas, so you can cycle from Ljubljana to the nature. We are missing that!”

LJ-W60: “There should be more cycle paths to go out of Ljubljana safely, not like now, when you have to cycle on the roads.” [...] “Towards Črna vas and around there... in more natural areas.”

ED-W21: “I go to Roslin Glen quite a lot, but it is a really nasty cycle. If you go to Loanhead, it is ok, but if you go to the other side, it is a really busy road, you don’t feel very safe.”

Fig. 10. Focus group responses on the use of cycling to access peri-urban green space.

Additional barriers appeared to be the weather, lack of signage as to where cycle paths are located, and on-street cycling, which, as the younger focus group participants noted, can be daunting. This points to the importance of perceived accessibility in terms of safety and easy access.

The choice of transport means varied between the cities and also by age. It was driven by a combination of several factors, including the quality and availability of transport alternatives, personal preference, the physical setting of the particular city and cultural characteristics. For example, in Ljubljana, cycling was pursued by 70% of the questionnaire respondents and it was also popular with the majority of the focus group participants, both younger and older. In Edinburgh, only 44% of respondents cycled, although focus group participants agreed that a good cycle network exists. To an extent, the low level of cycling to get to green spaces in Edinburgh can be explained by the city’s morphological characteristics, e.g. ‘cobbled’ (sett paved) and hilly streets, and its compact structure, which enables easy access to small, inner urban green spaces on foot.

With regard to characteristics of the route to green space, focus groups showed appreciation for environmental attributes such as greenery along the paths, dedicated paths for cyclists and pedestrians, signage, the quality of the path’s surface, and the general pleasant appearance of the walkway. They said that, if they can, they would rather walk through the park than on the street.

## 5. Discussion

### 5.1 Preferred green space types for inner-city dwellers

The combination of methods used showed that inner-city dwellers’ preferences for landscape attributes and the experiences they sought there are cross-cultural. Inner-city dwellers, across both cities and age groups, all preferred semi-natural green spaces, such as woodlands, fields, waterways, etc., and green corridors, especially for relaxation and to get away from their busy lives. A useful question, when gathering this information in focus groups, was to ask the participants to describe their ideal green space. By this means, the difference between green spaces visited in reality and participants’ wishes was revealed. The importance of natural environments has been stressed in the literature (Neuvonen et al., 2007; Swanwick, 2009; Tyrväinen et al., 2007) as being an asset which significantly contributes to people’s mental health. Hence, these kinds of environments serve people more for restorative reasons than for physically active recreation, which is usually pursued in urban parks or indoor and outdoor sport facilities.

### 5.2 Advantages and disadvantages of green belt and green wedges strategies

Although the findings of this study indicated cross-cultural preference of inner-city dwellers for

green space types, specific, long-established management strategies which have shaped both cities' structures (i.e. green wedges and green belt) appeared to be the most influential in terms of which places inner-city dwellers will access and use, and in what way. For example, Ljubljana's green wedges, reaching deep in to the city centre, have been shown to be convenient in terms of enabling inner-city dwellers fast access to semi-natural green spaces. However, such convenience may lead to their overuse (and the complete neglect of spaces located on the edge of the city), which has been happening to some parts of Ljubljana's most popular green wedges. The results of this study support this: more than 30% of the questionnaire respondents chose Rožnik and Šišenski hrib as their most frequently used green space. On the other hand, the Sava river area (located on the edge of the city beyond the city bypass) was used by less than 1% of respondents.

The open spaces of Edinburgh's green belt, on the other hand, have proven to be used very rarely for recreational and leisure purposes. Although, contrary to expectations, there are buses that serve the peri-urban spaces well and they provide good access, people generally perceive the time it will take to get there to be too long. This finding accords with the critique of keeping green belt land open per se (Bramley et al., 2004) and highlights the need to rethink the green belt land in terms of encouraging its use for leisure activities. It should be recognised, however, that Edinburgh offers a variety of green space types inside the city, many of which are large and semi-natural (see Figure 3), and so this mitigates to some extent the need to travel far to get a natural green space experience.

Drawing on empirical findings, it is possible to make some conclusions with regard to the green space strategies of the respective cities, as follows. Several recent studies have argued that a compact urban structure with distinctive urban edges is most successful in influencing people's travel behaviours and thus guiding them in a more sustainable direction (Pinho et al., 2010; Schrijnen, 2000). The aim of the green belt strategy is to preserve the compact structure of the city; however, a green belt cannot ensure that natural green spaces are within a short walking distance of most people's homes. In that sense, green wedges seem to better enable people fast access to natural green spaces whilst still living close to urban services. Nonetheless, introducing narrow linear green connection spaces such as tree belts, in combination with foot- and cycle paths, river banks, etc. which connect compact urban structures with open, green belt land, may compensate for lack of any green wedge strategy and sufficient provision of good quality green space within the urban structure. It may work even more successfully to mitigate the need to travel to the urban fringe for a positive recreational experience.

In terms of number and type of green spaces to consider, *having a choice* is this study's leading recommendation, meaning that people need to be offered different kinds of green spaces and then allowed to choose the one(s) they prefer the most for their activities. Proactive management is the answer to *allowing choice*. It is specifically important in the peri-urban context since this space is, by default, not distinctive and hence, its flexibility in responding to temporal and long-term needs is crucial. Any spatial strategy should be flexible enough to recognise the changing realities of lifestyles and everyday needs and respond accordingly, which is only possible with the active involvement of citizens in the planning and management of peri-urban areas.

With regard to frequency of use, the focus groups results highlighted the importance of perceived accessibility over the objective characteristics of the city's infrastructure and transport service. This accords with the findings of several studies which have shown that people's perceived distance to green spaces tends to be greater than the objectively measured one (see for example studies by Schipperijn et al., 2010; Sotoudehnia and Comber, 2011) and also that perceived accessibility depends on various factors, for example on the appearance of the green space, the number of facilities there, visibility, etc. (Carr et al., 1992). Schipperijn et al. (2010) found the perceived accessibility to be better predictor for the frequency of use than the objectively measured one, but they also observed that this fact makes it harder for city planners to allocate future land uses.

However, ease of access and characteristics of the routes to peri-urban green space may mitigate the barriers to frequency of use, as the focus group discussions showed. Focus group discussion pointed the way to the green space as extremely important when choosing where to go and how to get there. Moreover, people's strong affection for green corridors points to green corridors as having the potential for encouraging more sustainable access to peri-urban green space, which may not yet have been used to a sufficient extent.

Green corridors have previously been recognised as an asset beneficial to people and nature and a considerable number of strategies have proposed using green corridors to connect cities with their hinterland. Good examples that also show the successful transfer of research knowledge to practice are: the English 'Countryside in and around towns' programme (and the green infrastructure (GI) strategies that have followed it) (CA, 2005), 'Mardyke Greenway and Reedbeds' (Natural England, 2009), 'CGV Green Network Partnership' and 'Plymouth Eastern Corridor Urban Fringe' (Natural England, 2007). Such exemplars could be used to promote green network planning more widely. Accordingly, ease of access, together with the characteristics of the routes to peri-urban green space, could be a focus in future approaches to design and planning decisions in terms of which places to enable access to and which transport means should be prioritised to achieve this action (Schrijnen, 2000).

### *5.3 Strengths and limitations of methodological approach*

While this study was limited to an examination of only two cities, whose characteristics may not be typical of many other European cities, it nonetheless offers opportunities to understand better some of the major issues relating to peri-urban landscape use. A major strength of this study is the combination of methods which allowed issues to evolve, to become clearer and to challenge propositions, which has been crucial to understanding the diversity and complexity of peri-urban green space types and the activities undertaken there. The empirical knowledge, which was gleaned from direct interaction with those people who use and thus interact directly with these types of space, is at the heart of this study, as it depicts the 'real-life' views of, and opinions on, the issues under investigation. In addition, the utilisation of two case studies, and the implementation of identical methods on both of them, provided a comparable ground for the assessment of the topics that were investigated. It has proven to be useful in differentiating between common and case-specific preferences for, and characteristics of, peri-urban green space use. These two cases may also provide a valuable comparison for future explorations of peri-urban space, and/or may serve as a basis for those assessments.

For example, on the topic of preference of peri-urban open spaces, the concepts, generated from the focus groups discussions, reflected similar findings when compared with the questionnaire results. In addition, drawing on multiple data collection methods provided complementary data about the phenomenon explored. Finally, the use of different methods and triangulation of key findings were used to overcome the limitations of the questionnaire sample, to add confidence in the findings.

The 'real-life' views of the issues investigated is a strength of this paper, however it should still be interpreted with caution since it only investigated one fragment of society (i.e. views of inner-city dwellers) and thus demonstrated only their views on the topic. For more comprehensive findings, which could support the development of general policies, the perspectives, opinions and needs of other groups would need to be included (e.g. suburban dwellers, different age and social groups, etc.) and samples collected from a wider range of cities and contexts.

This research faced several practical problems with implementations of the questionnaire and focus groups that should be noted. Despite best efforts, a good balance of demographic characteristics

with regard to gender, education and ethnicity was not achieved in recruiting focus group participants and also when undertaking the questionnaire. In addition, the use of different methods to collect the questionnaire data in Ljubljana and Edinburgh might have influenced the sample characteristics. In general, conducting more focus groups or sampling a larger number of people for the questionnaire method would undoubtedly enhance the validity of the research findings. However, the limitations mentioned above, arguably, were mitigated by using the mixed method strategy since it enabled assessment and comparison of the findings of one method with another and, accordingly, strengthened the findings overall.

## 6. Conclusions

This paper investigated peri-urban open spaces of two cities, in order to understand factors that affect the use of and, accessibility to these spaces. Whilst the direct involvement with (potential) users of this space uncovered their perceptions of, preferences for, and use of, peri-urban green spaces, the comparison of the two cities with different green space strategies (Ljubljana – green wedges; Edinburgh – green belt) showed how the specific strategy of a city affects people's access to, and consequently, their use of, peri-urban green spaces. Whilst the green wedges of Ljubljana, reaching deep in the city-centre, tend to be overused, Edinburgh's green belt is used for recreational purposes much less than the green spaces within the city.

The results showed that inner-city dwellers, across both cities and age groups, preferred semi-natural green spaces (as opposed to formal parks and playing fields), such as woodlands, fields, waterways, etc., in general: green spaces that are natural-like, although modestly managed. This was a result that was generally expected but the considerable appreciation and high use of green corridors was a more unexpected result. People appreciated them for relaxation and to get away from their busy life. Green corridors were popular because of their proximity to people's homes and because they were good asset for walking in semi-natural environment, which was the activity most pursued by all age groups, in both cities. Further landscape features that people appreciated and largely used were sea-shore landscapes in Edinburgh and larger semi-natural open spaces on the edge of the city in Ljubljana.

The major barrier to peri-urban green space use was, in both cases, the lack of time. Peri-urban green spaces considered in this study were not located within walking distance (15 min) of people's homes. Although one third of green spaces were accessible within a 15 min cycle or a 15-30 min bus ride, people did not consider them as being swiftly accessible. This points to the difference between perceived and actual accessibility, which should be taken into account in future planning actions to enable swift and easy access to semi-natural spaces in and around the city, possibly as part of wider sustainability measures.

The findings of this study give a nuanced understanding of green space use by inner-city dwellers and help understand what should be planning priorities. This study underlines the value of green corridors and other, more natural types of green space close to city centre. It points to their potential for more sustainable accessibility (i.e. walking, cycling or the use of public transport, as opposed to the use of cars), which have not been used yet to a sufficient extent. Although biased by principally exploring the views of inner-city dwellers, the recommendation of this study is to include green corridors, as part of wider green space strategies, into future spatial planning policies. It also recommends a focus on ease of access, particularly in relation to speed of transport, together with enhancing the characteristics of the routes to peri-urban green space, in future approaches to design and planning decisions. This could be achieved via actions such as creating foot- and cycle paths, and restructuring public transport priorities to speed inner city access to green spaces at the urban edge.

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## List of Tables

### Table 1

Socio-demographic characteristics of questionnaire respondents and focus group participants.

**Table 2**

Questionnaire responses on engagement with peri-urban green spaces in Ljubljana and Edinburgh.

**Table 1: Socio-demographic characteristics of questionnaire respondents and focus group participants.**

	Questionnaire (%, Ljubljana (N = 163); Edinburgh (N = 165))					Focus groups						
	Gender		Age group			Gender – older group		Gender – younger group		Average age – older group	Average age – younger group	Area of residence – older group
	Male	Female	18 – 29 (younger group)	30 – 59 (middle-aged group)	60+ (older group)	Male	Female	Male	Female			
<b>LJUBLJANA</b>	31	69	36	53	11	3	17	6	6	70.55	27.75	7 participants from outside the city centre area
<b>EDINBURGH</b>	28	72	25	46	29	4	16	3	23	69.3*	23	16 participants from outside the city centre area
						*Two of participants refused to tell their age and are therefore not included in the calculation.						

**Table 2: Questionnaire responses on engagement with peri-urban green spaces in Ljubljana and Edinburgh.**

<b>Ljubljana (N = 140)</b> <b>Edinburgh (N = 143)</b> <b>p &lt; 0,05</b>	It's a good place for a walk where I can enjoy nature	Observe the wildlife	Walk the dog	Enjoy some peace and relaxation	It's a good place for a family outing	Play with children	I come here for active recreation (e.g. jogging, hiking, cycling, mountain biking)	Play sport games with friends (e.g. football, badminton, Frisbee)	Have a picnic/ barbecue	It's a good place for learning about nature	Other
<b><math>\chi^2</math></b>	5,448	1,416	18,685	3,689	2,124	1,712	19,139	0,772	8,995	7,828	8,275
<b>p-value</b>	0,020	0,234	0,000	0,055	0,145	0,191	0,000	0,380	0,003	0,005	0,004

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Note: green space types which can only be found in peri-urban space are excluded, e.g. beach/lake/water, country parks, countryside settlements and their surrounding areas.

**Fig. 3. Edinburgh maps: upper left, municipality and peri-urban area; lower left, locations of questionnaire and focus group participants; right, distribution of major green space types in Edinburgh.**

Note: green space types which can only be found in peri-urban space are excluded, e.g. beach/lake/water, country parks, countryside settlements and their surrounding areas.

**Fig. 4. Peri-urban green spaces in Ljubljana (top) and Edinburgh (bottom), listed in the questionnaire.**

Notes: the spaces are classified according to their predominant peri-urban green space types. The dark green colour indicates the four most frequently visited peri-urban green spaces in each city.

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