

06.05 Availability of Public, Near-residential Green Spaces (Edition 2013)

Overview

Densely built-up urban space is characterized by high structural exploitation of land and a low proportion of open space. In the inner city and in the densely built-up outskirts, only few open spaces are available for recreational purposes in green surroundings. The large near-urban recreational areas are located on the outskirts of town or further outside the city, and are difficult to reach for many recreation-seekers.

Within the densely built-up areas, **public green spaces**, i.e., generally accessible areas under the legal auspices of the Conservation and Green Space Agencies, are the places which offer regeneration and physical/emotional adjustment, and thus assume an important role for the recreation of the population. Green spaces should meet varying requirements with regard to attainability, size, equipment and design, in accordance with the different recreational needs of the population.

For instance, the footpath acceptable for reaching a green space (entrance area) is assumed to be no longer than 15 minutes. Good attainability of a green space is an important criterion for open-space leisure for less mobile sections of the population, such as senior citizens or children. Thus, near-residential green space is of great significance.

The demands of recreation seekers on the **size** of the open spaces and the multiplicity of its **equipment and design** increase with the length of time spent there. Thus, larger parks with an abundant array of use possibilities are much frequented on weekends. For instance, groups with children prefer non-regulated park areas, such as open green spaces, while senior citizens tend to prefer more orderly, generously equipped areas (cf. Gröning 1985).

A public survey on the quality and use of public green spaces in Berlin in 2000 showed that the need for green space, and also user behaviour, have remained unchanged, by comparison with the conclusions arrived at by planners during the '80s (konsalt GmbH / Ökologie & Planung 2000).

The continuing interest in near-residential public green space was also confirmed by an on-the-spot investigation in 2001, which concluded that 80% of the inhabitants of Berlin visit public green spaces often or at least occasionally, and that 600,000 children and young people enter the playgrounds and open spaces (konsalt GmbH / Ökologie & Planung 2001).

Regarding the existing situation, a distinction is made between near-residential open space and near-development open space, with assignment to one of these categories depending on area size.

The type **near-residential open space** is associated with the immediate residential area, its intake area being limited to 500 m. It can be reached in a short time (approx. 5-10 min. by foot), and with slight effort, and serves predominantly for short-term and after-work recreation. Because of its proximity to housing, this type of open space has a particular significance for less mobile sections of the population, such as children, senior citizens and handicapped persons. Near-residential open space is also of high value for employed persons, who can use their free time for a short stay outdoors. As a rule, green spaces of small size (as little as 0.5 ha) suffice for the demands of short-term and after-work recreation.

The type **near-development open space**, which includes all green spaces of over 10 ha, is also designed to serve the need for half-day and all-day recreation. Higher demands are associated with it, both in terms of size and of equipment diversity. Near-development green spaces of more than 50 ha in addition assume the function of superior-quality open spaces with multi-borough significance for the recreation of the Berlin population (e.g. the Great Tiergarten, Wuhlheide Public Park). The intake area of near-development open spaces ranges from 1,000 to 1,500 m, depending on the size of the facility. Fundamentally, a near-development open space should always also fulfil the function of a near-residential open space (for the breakdown, cf. Tab. 1).

In Berlin, the analysis of the **availability** of open spaces to the population is based on the following standard values:

- near-residential open space: 6 sq m per inhabitant (sq m/inh.),

- near-development open space: 7 sq m/inh.

Tab. 1: Breakdown of the Berlin Open and Green Spaces			
Type of open space	Near-residential open space	Near-development open space	
Minimum size	0.5 ha	10 ha (neighborhood park)	50 ha (borough park)
Guideline	6 sq m / inh.	7 sq m / inh.	7 sq m / inh.
Intake area	500 m	1,000 m	1,500 m

Tab. 1: Breakdown of the Berlin Open and Green Spaces

In ascertaining the availability of near-residential public green facilities, those facilities were considered usable which meet the respective minimum requirements with regard to area size, area shape, accessibility and noise/air pollution (cf. Methodology).

The degree of availability (in sq m/inh.) in a residential areas is calculated on the basis of spatially-defined intake areas, and derived from the size of the facility in relation to the number of inhabitants in the intake area. Residential areas outside the defined intake areas are considered as basically non-provided.

The **construction structure of the residential buildings** constitutes a further criterion for the evaluation of open space availability (cf. Methodology). If deficits exist in the availability of public green spaces, it can be assumed that private/ semi-public open space will compensate in part for the need for public areas. In fact, the availability of open spaces in single-family-dwelling developments with private yards is better than in densely-inhabited pre-war apartments. In imperial-era block developments, there is very little possibility for a private sojourn in open space, since that is limited to the courtyard. The building structure is thus an indicator for the available share for private open space and/or need for public open space. Only a combination of the calculated degree of availability and the existing building structure provides a differentiated picture of the actual situation.

The quality of the equipment of a green space was not considered in the availability analysis. The degree of provision with equipment is the essential factor determining the number of users, and which user groups, can use the facility. In areas in which green space is lacking, increased pressure is generated upon available facilities, which often involves major impairment of the quality of the public space, and limitation upon the usefulness of such green spaces.

Statistical Base

The information on the availability of near-residential public green facilities was ascertained with the aid of a GIS-based procedure of the Senate Department for Urban Development | E 1, under which the digitally available basic information is used in the calculation process as described below.

The basis for the analysis of the stock of facilities is provided by the entirety of green spaces in the area of the city with recreational potential. Information on **size and location** of each green space is taken from the [Green Space Directory](#) of Section IC of the Senate Department for Urban Development and the Environment, (as of April 2011), which includes all green space data from all the boroughs regarding all public green facilities of the use type "Parks and Green Spaces".

Since 2006, the daily-life oriented spaces, borough regions and planning areas based on the ISU5 Block Segment Map (current as of 2010) have been used for the ascertainment of logical **spatial units**. These daily-life oriented spaces have replaced the statistical areas which were previously used.

In order to be able to ascertain the availability of green space for the city's population, it was necessary to ascertain the number of residents of the city. The **number of inhabitants** of the blocks was obtained from the residents' file of the [Environmental Atlas 06.06, 2012 edition, current as of 2011](#).

The information on the respective **building structure types** of the residential blocks is based on [Map 06.07 Urban Structure, of the Environmental Atlas \(2011 Edition; information current as of 2010\)](#).

Methodology

The **analysis of the stock of green space** covered all green spaces in the area of the city with recreational potential.

In addition, the Britz Garden, the Marzahn Recreational Park, and facilities of the Foundation for the Prussian Palaces and Gardens in Berlin and in Brandenburg, the Charlottenburg Palace grounds and Glienicke Park have been included. The Botanical Garden and the two Zoos have not been included in the availability analysis.

The Britz Garden in Neukölln and the Recreational Park in Marzahn are two exceptional cases in the evaluation. Both green spaces have limited accessibility due to the fact that an entry fee is charged; moreover, they are not under the responsibility of the green space agencies. Due to their important recreational functions and the relatively low amount of their entry fees, they have nonetheless been assigned to the category of unrestrictedly usable green space.

The Berlin forest areas have been included, so as to ascertain the residential blocks in the intake areas near the forests and the edges of the forests.

The following criteria were used for the assessment:

- **Area size**

Open spaces for near-residential recreation must have a minimum size of 0.5 ha, to make type-specific use possible. For green spaces bisected by streets, the resulting segments are considered only if one of them is larger than 0.5 ha. However, smaller areas can also be included, provided that they border on green facilities directly, and are thus located in the context of the green network structure.

Moreover, it is assumed that green facilities which are greater than 10 ha and are assigned to the "Near-Development" category are needed and visited by residents living nearby, in the manner of near-residential use. Therefore, for the purposes of this analysis, these larger facilities have also been assigned intake areas, and calculated accordingly.

- **Accessibility**

Unhindered accessibility to the open space must be guaranteed. **Obstacles** include railway lines, large bodies of water, and motorways.

The classification of heavily-traveled streets with more than 15,000 motor vehicles/day as obstacles, and hence as barriers, has been changed since the 2009 Edition. The barrier effect of heavily traveled urban streets is now assessed as less limiting to recreational use, since the possibility of crossing at traffic lights is now evaluated as sufficient to assure accessibility.

Ascertainment of Intake Areas

Based on the map of Dedicated Public Green and Recreational Facilities (Senate Department for Urban Development I C 2, as of Dec. 31, 2011), all green spaces found to be usable were assigned an intake area (green facilities in adjacent areas in the state of Brandenburg were not taken into account). The intake areas were determined by means of a circle drawn automatically around the respective open space, with the distance determined as the crow flies. To compensate for the difference between this distance and the actual distance to the green space, approx. 10% was subtracted from the maximum distance. Thus, a radius of 450 m resulted for near-residential open spaces. Only complete blocs with residential use were used in the calculation.

For smaller facilities, the centre was chosen as the point of origin of the radius; for larger spaces, the entrance area was used (approx. 100 m inside the open space). The intake area calculated for near-residential green space, for a distance of between 300 and 500 m around that green space, took only complete blocks and block segments into account.

Since the accessibility of a green space can be reduced by psychological or physical barriers, these were addressed next. Barriers include e.g. rivers and canals, railroad lines, airports and motorways. If such barriers exist around a green space, the intake area was corrected.

Wooded areas were also assigned an intake area. It was assumed that the edges of forests can to some extent assume the functions of a near-residential open space. Forest edges were evaluated so highly as recreational areas that throughout Berlin, blocks in an intake area of 500 m from forest areas were categorized as having green space available.

The same was done in some cases even for well-structured farmland areas, or other high-quality open spaces (e.g., Gatow, Großglienicker Weg or Krugpfuhl Blankenfelde); these were likewise categorized as provided with green space, and were assigned an intake area.

Recreational use of agricultural areas is possible only to a limited degree, and only in some parts of the area; however, in the Berlin portion of the Barnim region, the areas accessible by footpath were

included in the assessment. For this developing near-urban recreational area, the agricultural segments of the planned park landscape are important.

Calculation of the Degree of Availability

According to the standard value applicable in Berlin, the availability of public green spaces to the population at a level of 6 sq m or more of near-residential open space per inhabitant is considered sufficient. As a result of the ascertainment of the sq m of green space per inhabitant in a defined intake area, the degree of availability of public green space per inhabitant is obtained. Based on this value, the degree of availability (sq m of green space/inh) was broken down into four levels. The categories are, first, Areas of availability, where near-residential green space is available at a level of more than 6 sq m/inh. (Category 1: **Availability provided**); Areas of non-availability, which have no useful green space (less than 0.1 sq m/inh., Category 4: **Availability not provided**); Areas of insufficient availability, including all residential areas with a degree of availability between 0.1 and 5.9 sq m/inh. Availability of less than 50 % of the standard value, i.e. less than 3 sq m/inh., is shown separately (Category 2: <6.0 sq m/inh.- 3.0 sq m: **Availability poorly provided**; Category 3: <3.0 - 0.1 sq m/inh.: **Availability minimally provided**).

For the calculation of the respective degree of availability, the number of inhabitants in the intake area of a green space was divided by the size (the calculated population by the sq m of green space).

For the block and segment-based calculation of the availability of green space, all blocks were included in which more than 10 inhabitants/ha live. This so-called **population threshold** was established for the planning process to ensure that the automated analysis also considered the population of areas with structure types with predominantly commercial, services, trades and industry, and those with "other uses", without however including building supervisors (caretakers) or security personnel in purely industrial areas. This established planning value has been halved since the 2009 Edition, from 20 inhabitants to 10. In this way, more inhabited blocks could be included, especially in inner-city locations with key metropolitan use types, or mixed-use areas (see Figure 2).

Provision with Private Green Space

The map with the matrix of the degree of availability of public green space was superimposed on a map of the building structure of residential areas, and thus provides further insight into the availability situation. It shows the relationship between public and private availability of open space.

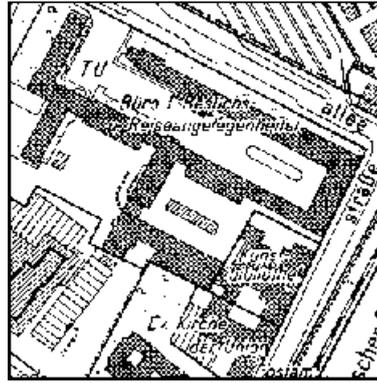
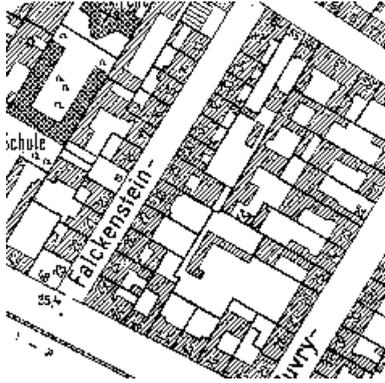
In order to ascertain not only the availability of public green areas to the population, but also that of private green space, the urban structure recorded in the Environmental Atlas was divided into three structure types with different proportions of private open space (see the gradations high – medium – low in the legend). Examples of these respective types include single-family home areas, row-house neighbourhoods, and the imperial-era residential blocks of the inner city.

Deduction of the Housing Type

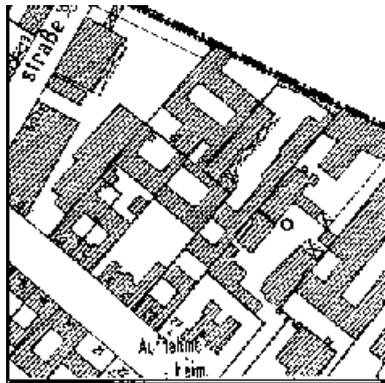
The building structure can be examined as an indicator for the available share of private open space. Areas with different building structures, but with comparable shares of private/semi-public open spaces, were lumped together, and classified into three categories (cf. Fig. 1):

- **Extremely slight share of private/ semi-public open spaces**
This involves predominantly areas of closed-block development (up to 1914), including all preservation-oriented reconstructed blocks integrated into this building structure. In addition, core and mixed areas are counted in this category.
- **Slight to medium share of private/ semi-public open spaces**
To this category belong all building structures which display large quadrangles or strips of green space (development from the '20s and '30s and/or from the '50s and '60s), and the high-rise apartment developments on the outskirts of town with generous green spaces (green separators) between the buildings. Furthermore, the redeveloped apartment blocks also include closed block development which was decored completely, and thus has larger open spaces. The compact, high-rise developments of the '90s are also included here.
- **Medium to high share of private/ semi-public open spaces**
This category includes all open development (for instance single-family or row-house development), and also the low density single-family housing developments of the '90s. to a large extent, the buildings have their own gardens, so that the share of private green space is very high.

1. Extremely slight share of private/ semi-public open spaces

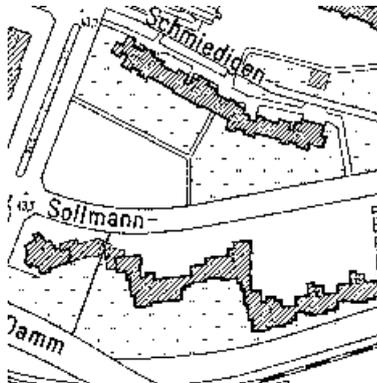
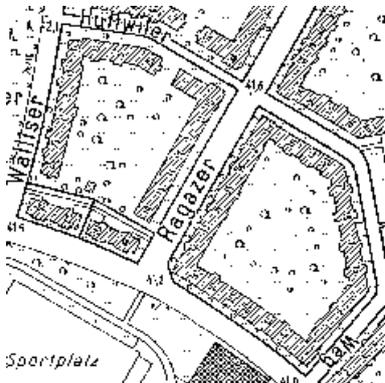


Closed block development (up to 1914), including integrated blocks with preservation-oriented rehabilitation



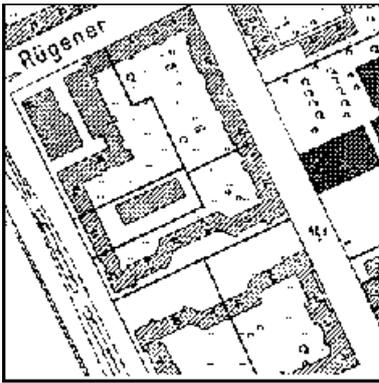
Mixed areas

2. Slight to medium share of private /semi-public open space



Large greened quadrangles or with loose rows (development of the '20s and '30s, or the '50s and '60s)

High-rise residential areas on the outskirts, with generously designed green fringes between the buildings



De-cored blocks of redevelopment areas with larger open spaces within the closed block development

3. Medium to high share of private / semi-public open space



Loose development with single-family or rowhouses

Fig. 1: Examples of various building structure types

For the block-referenced calculation of the supply of green spaces, all blocks were included in which more than twenty inhabitants/ ha lived. This so-called inhabitant threshold value has been established as part of the planning proces to also consider in the automated analysis those inhabitants in areas with structure types predominantly used by commercial, services, and industry, and structure types with other uses, without having to go so far as to count every single building superintendant in areas which are purely industrial.

Another unusual feature arises from the use of the Urban Structure Map 2001 (2005 Edition) with the simultaneous assignment of the inhabitant data from 2004: in some areas, considerable increases in population could be ascertained between 2001 and 2004 in areas which, on the Urban Structure map, are still classified as non-built-up or minimally built-up green and open areas; an example is the Spree Bend area north of Helmholtzstraße. These inhabitants, too, are incorporated into the analysis via the categorical analysis of all blocks with more than twenty inhabitants.

Map Description

The map shows the green spaces countable as usable (green), forests (pale green), and residential blocks, shaded to indicate their degree of supply with green space (see matrix in the legend). The bodies of water are shown merely for purposes of information.

The total area of usable near-residential green spaces with recreational potential still varies greatly among the Berlin boroughs. The smallest area is available in the borough of Friedrichshain-Kreuzberg, with 122 ha, followed by Charlottenburg-Wilmersdorf with 202 and Tempelhof-Schöneberg with 214 ha. By contrast, the borough of Spandau, with a total area of 659 ha of green space, has the best availability of green space of any Berlin borough, followed by Marzahn-Hellersdorf mit 614 ha.

Structure Types With Predominantly Residential Use	Share of private or semi-public open spaces		
<ul style="list-style-type: none">  Late 19th-century block development with wings and rear buildings  Late 19th-century block-edge development with few wings / rear buildings  Late 19th-century block-edge development with major changes 	low		
<ul style="list-style-type: none">  Twenties and thirties block-edge and row development  Fifties and later row development  Postwar high-rise development  Eighties and nineties block-edge and row development in East-Berlin  Compact high urban living development of the nineties 			
<ul style="list-style-type: none">  Urban living development with low density of the nineties  Low buildings with yards  Development with yards and semi-private re-greening  Villa development with park-like gardens  Village-like development 		medium	
<p data-bbox="229 1059 839 1122">Structure Types with Predominantly Commercial, Service Use, Small Business and Industrial Use</p> <ul style="list-style-type: none">  Development with predominantly commercial and service use  Low development with predominantly small business and industrial use  Heavily built-up with predominantly small business and industrial use 			Threshold value: 10 inh./ ha low
<p data-bbox="229 1335 643 1364">Structure Types with Special Use</p> <ul style="list-style-type: none">  Development with predominantly public facilities and special use, traffic areas without streets and building lots 			
<ul style="list-style-type: none">  Green and open spaces 		high	
<ul style="list-style-type: none">  Water 			

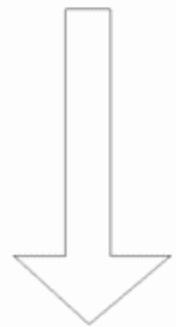


Fig. 2: Shares of Private and Semi-private Open Space of the Section Types from the Environmental Atlas

Tab. 2: Availability of near-residential green facilities, by borough

Borough	Population	Inh. not counted <10 Inh/ha	Inhabitants with good availability	Inhabitants without availability	Effective green space	Share of inh. without availability
Mitte	333	978	267	65	4,664,376	20%
Friedrichshain-Kreuzberg	265,082	467	187,441	77,174	1,219,109	29%
Pankow	363,652	2,967	246,434	114,251	5,605,955	32%
Charlottenburg-Wilmersdorf	314,896	1,687	196,326	116,883	2,019,845	37%
Spandau	220,379	1,926	193,801	24,652	6,595,949	11%
Steglitz-Zehlendorf	293,640	2,162	201,155	90,323	3,476,507	31%
Tempelhof-Schöneberg	329,371	1,641	198,786	128,944	2,739,735	39%
Neukölln	313,208	1,388	204,832	106,988	3,897,500	34%
Treptow-Köpenick	241,108	3,417	175,111	62,580	3,917,881	26%
Marzahn-Hellersdorf	248,875	899	202,261	45,715	6,148,647	18%
Lichtenberg	256,249	1,829	199,904	54,516	5,366,352	21%
Reinickendorf	244,677	1,723	188,442	54,512	4,887,213	22%
Berlin	3,424,030	21,084	2,461,142	941,804	50,539,069	28%

Tab. 2: Availability of near-residential green facilities, by borough

Source: Environmental Atlas, Map 06.06, Population Density (2012 Edition), current as of 2011

The table shows the populations of the boroughs of Berlin as used for the calculation process; their total populations; the residents not considered, i.e., in the blocks below the threshold of 10 inh./ha; those with good availability of green space; and those with no available green space.

In the borough of Spandau, only 11 % of the population have not no available near-residential green space, whereas 39 % of residents in the borough of Tempelhof-Schöneberg live outside the intake areas of any green spaces.

Inner City Areas

The map shows the detailed situation of availability of green space, by block. As is to be expected, an especially poor situation exists with respect of the availability of green space in the **inner city areas** with imperial-era block development.

Generally, closed block development prevails in these inner city neighbourhoods. Core areas characterized by a low level of private and/or semi-public open spaces also have high structural density. In these areas, serious **open-space deficits** exist, both in the private and in the public sector.

In the inner city, small green spaces isolated from one another prevail. They are often designed as city squares, and can thus come nowhere near to covering the need for near-residential green space caused by high population density.

The methodological change undertaken since the 2009 Edition to no longer classify major roads as impassable barriers, has led to an upgrading of many downtown areas close to large parks (examples: the residential area at the Hasenheide Public Park, the Treptow Park, the Viktoria Park or the Weissensee Park).

The shut-down of **Tempelhof Airport** and its transformation to a green facility for the adjacent residential blocks has provided an upgrade of green space availability in that area, compared to the 2009 Edition.

Outlying Boroughs

In the **outlying boroughs**, the situation is generally better. The available green spaces are frequently large; in some cases, forest areas are directly adjacent to residential areas. Due to the less dense development structure, the population density is obviously low.

As a rule, the level of private green space is relatively high in the outlying boroughs, because of the prevailing single-family and/or row house development, so that deficits in public open space are partially compensated.

The situation is different for the major residential estates at the **outskirts** of the city, which are characterized by tower high-rises or chains of high-rises. While in Marzahn and Hellersdorf, the open areas of the Wuhle valley and the Hönow chain of ponds largely provide availability of green space, considerable deficits exist in the Märkisches Viertel and Gropiusstadt areas. The shortage of public green spaces there means that an undersupply exists, despite large residential courtyards and connections to the Lübars Recreational Park and the Rudow Grove, respectively.

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