

## ANALYSIS OF THE UTILIZATION POSSIBILITIES FOR THE DEFENSE MILITARY CONSTRUCTIONS OF THE KAUNAS FORTRESS

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### Abstract

Military architecture is a unique phenomenon which presents today unique architectural-urban utilisation possibilities. Aim of the paper is to analyze architectural-urban potential of the 19<sup>th</sup> century fortifications within an urban context. The Kaunas Fortress is used as laboratory for investigation. Complexity of the above mentioned potential is taken into consideration and various cityscape models are used, including pattern language by N.A. Salingaros, City Image by K. Lynch, Nature and Urban Frames, etc. Objects of military architecture are analyzed from the perspectives of matterscape, mental-landscape and socioscape. At the end of investigation the following is concluded because of the unique spatial features the system of fortifications and the single fortified objects can act as an important nodes of both Nature and Urban Frame within the city; former fortifications can perform function of the landmarks of the city image; as a system of the cityscape-text objects former fortifications can be important natural, functional, iconic and conventional symbols and assure legibility, integrity, complexity of the cityscape.

### Streszczenie

Dzisiaj wojskowa architektura jest niezwykle zjawiskiem, stanowiącym unikalne możliwości wykorzystania w architekturze i urbanistyce. Celem artykułu jest analiza architektoniczno-urbanistycznego potencjału IX wiekowych fortyfikacji w miejskim kontekście. Forteca Kaunas służy jako laboratorium do badań. Złożoność powyższego wspomnianego potencjału stanowi cel rozważań i zawiera różnorodne modele budowy miast, uwzględniające wzorce przyjęte przez N.A. Salingarosa, Obraz Miasta przez K. Lynch, naturalne i urbanistyczne ukształtowania, etc. Obiekty wojskowej architektury są analizowane pod kątem badań: zainteresowania społecznego, preferencji odbiorcy i oddziaływania medialnego. Wnioski wynikające z badań potwierdzają, że system rzadkich cech przestrzennych fortyfikacji i pojedyncze umocnione obiekty mogą służyć jako węzły ważnych elementów zarówno naturalnych jak i urbanistycznych ukształtowań w mieście; były fortyfikacje mogą pełnić rolę symboli granicznych w krajobrazie miasta, kształtować jego oblicze. Obiekty fortyfikacji mogą być ważnymi, naturalnymi, funkcjonalnymi, ikonami i zapewniać identyfikację, integralność, kompleksowość panoramy miasta.

Keywords: Military architecture; Architectural-urban potential; Cityscape; City image; Nature frame; Urban frame; Symbols.

## 1. INTRODUCTION

The first fortifications appeared together with the first cities. The first walls that at the beginning surrounded the citadel and later on the settlement or the whole city, as well as the more complex forms of military

architecture developed within them were the essential generators of the designed and spatial urban structures up to as late as the 19<sup>th</sup> century. Here and further on in the paper the term “generator of an urban structure” is used in the understanding of *Kazimierz Wejchert* [14]. The fortifications of the second half of

the 19<sup>th</sup> century and the later ones were erected outside the city; yet their impact on the urbanized constructions had not been diminished – their forms had changed and the constructions had become not as obvious or dominant. It is well illustrated by the analysis of the impact of the Kaunas Fortress on the city of Kaunas carried out by Nijolė Steponaitytė [12, 13]. With the growth of the cities, similarly to the medieval fortifications, the rings of the fortresses or other fortifications that earlier surrounded them had become the direct generators of the urban structure. By their spatial characteristics, relation to the environment and architectural expression radically different from the objects of civil architecture the former fortifications in the context of the contemporary city have preserved a significant unique potential that due to its uniqueness, bureaucratic obstacles or other reasons often remains unexploited, or not fully exploited.

In the context of Lithuania, the utilization of the defense objects of the second half of the 19<sup>th</sup> century and the beginning of the 20<sup>th</sup> century for the demands of the city dwellers or guests – the two main groups of consumers of the urban structure, to put it in Bill Hillier's wording (Hillier 1984) – is most probably the most relevant for the city of Kaunas. Here a great part of the large defense system has been preserved that is rather evenly and consecutively distributed across the whole territory of the city; the objects are distributed in a varying urban context that practically represents the greater part of the morphotypes of the Kaunas cityscape. The remaining, or possible to be reconstructed without larger investments, functional and compositional relations between the objects that, in their turn, both during the time of the Kaunas Fortress' functioning and their present alteration of the purpose guaranteed, guarantee, or may guarantee the functioning of the general system, etc.

Much attention has been devoted to the analysis of military architecture all over the world. Among others, such outstanding scholars as *Bogdanowski* (2002), *Duffy* (2006), *Kaufman* (2002) and *Jakovlev* (1999) should be distinguished. It is interesting to note that by all the mentioned authors the analyzed object is treated as an architectural object, a reflection of the military or defense technologies, an engineering equipment, or an object representing the nation's historical memory.

As an architectural-urban construct; on the Kaunas Fortress with its forts has been explored by Steponaitytė (2001, 2003,). *Gintaras Česonis* focuses on its architectural art as a form of cognition (Česo-

nis 2007). Alongside the professional research some amateur attempts appeared next to the publication of the works related to the Kaunas Fortress (e. g. the atlases of the Kaunas Fortress) which do not have a scientific value, yet may be considered important if they attract the society's attention to a little known architectural object. Actually, the historical facts about the Kaunas Fortress are well known. The main problem which is typical not only of Lithuania is the absence of the proper estimation of the fortress' objects as single constructions and of the potential of their complex system in the context of the contemporary urban demands. Hence the paper is devoted to this purpose and offers the principal suggestions on how to utilize the defense objects. The research is based on the applied analysis carried out at Kaunas University of Technology.

The paper focuses on the following principles in the estimation of the objects of the Kaunas Fortress and the architectural-urban potential of their general system:

- systematic approach, i. e. when the objects of the former fortress make a uniform system and should be analyzed, estimated, represented and utilized exclusively as a system. One element of the system supplies another element, and thus the conditions are formed for the expression of the activity, form and function interaction;
- “geographical” approach claiming that the city is being formed according to certain objective regularities which serve as a necessary basis for the realization of the urban and architectural ideas. The essence of the mentioned regularities is revealed by the very fact that various activities when interacting with other activities and infrastructural or natural objects gain advantage and are functioning with more rational and lower expenditure than in case of their territorial division. In the paper, a certain foundation for the architectural-urban ideas worked out by such objective regularities is called the architectural-urban potential of the object;
- complex approach, i. e. when the system is treated as something more than a mere sum of objects, and therefore both the single objects and the potential of the entire system is estimated;
- the city environment perspective which is viewed as a multilayer formation consisting of three equivalent layers: the mental, the material and the social. The architectural-urbanistic potential of the object should be estimated on both levels of the city existence.

It should be noted that the paper mainly focuses on the first two aspects. The estimation of the architectural–urban potential of the defense objects of the Kaunas Fortress is based on the following distinguished urban theories: Kevin Lynch’s model of the city image (1960); N. A. Salingaros’ model of the optimal urban and architectural composition (2005); the concepts of the symbols used in cultural studies and their classification, [18].

Up to now 9 forts and 7 fort fragments of the Kaunas Fortress have remained, as well as the central and other fortifications, artillery stores, batteries, many shelters, some segments of the fortress’ roads extending along the territories of the picturesque landscape. Figure 1 presents the mentioned carried out analysis of the Kaunas Fortress (see Figure 1). Beside the above mentioned objects of the military purpose, the complex of the Kaunas Fortress also consisted of the dwelling, administrative, religious and other buildings. Due to their resemblance to the constructions of civil architecture the latter were rather easily incorporated into the urban filling of the city of Kaunas. However, the defense equipment and constructions

have remained the peculiar foreign bodies, or *terra incognita* islands in the physical, mental and social organism of the city.

## 2. THEORETICAL BACKGROUND

The city is an object produced not entirely on the basis of an architect’s creative imagination. Actually, it is an organism functioning according to certain objective regularities and principles which should be estimated and respected by each creator during the formation of an organic construction that functions due to the principles of evolution rather than revolution. The term “architectural-urbanistic potential of an object” points to the utilization possibilities for an object, territory, or the whole complex formed by the regularities operating exclusively within the urban area. Such possibilities should be creatively estimated by the architects and designers. The paper focuses on the following key aspects forming a rather complex view of the potential of the analyzed objects:

- the aspect of the natural carcass as the first of the two fundamental structures of the material body of

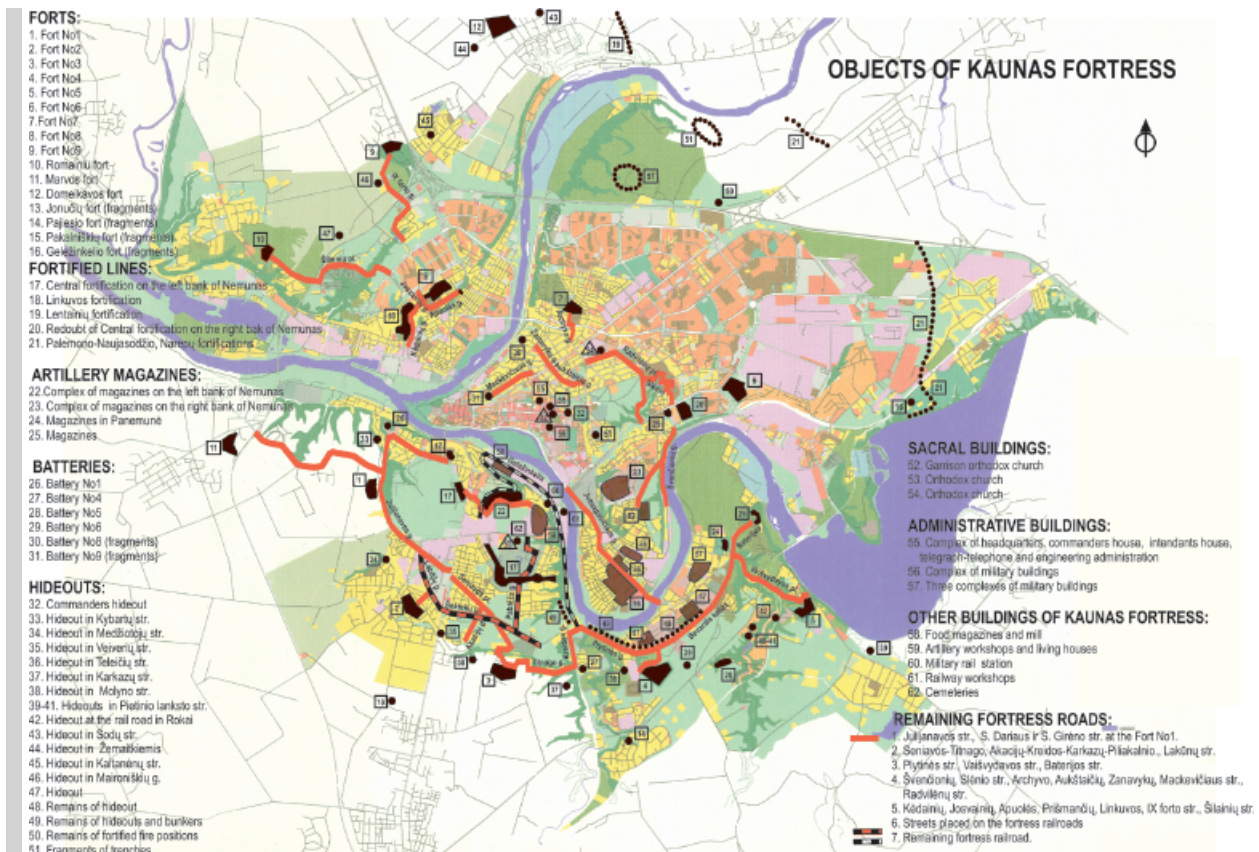


Figure 1.  
Objects of Kaunas Fortress

the city;

- the aspect of the urbanistic carcass as the second fundamental structure determining the functioning of the city's material body;
- the aspect of the mental image of the city as a little under-estimated, yet essential structure necessary for the city perception, good orientation within it and its acceptability, which has been rightly observed by the representatives of environmental psychology (De Joung 1999), video ecology [19] and a number of other world researchers;
- the aspect of the semantic potential of the objects that is being formed in the general context of the city as an inseparable reality of the homo semioticus, which finds expression in his/her environment and life.

### 3. THE SYSTEM OF THE DEFENSE CONSTRUCTIONS OF THE KAUNAS FORTRESS AS A PART OF THE CITY'S MENTAL IMAGE

#### 3.1. The conception of the city's mental image

From the perspective of an individual's direct visual perception the city is a gigantic and, most probably, practically imperceptible construct due to its abundance of detail. Nevertheless, due to his/her inborn demand to perceive the whole entity, the abilities to abstract and classify, the schemes of spatial perception in the collective unconscious and the perception of the entire environment as a collective activity, each city dweller or even a guest structures the mental image or map of the whole of the city, which, as environmental psychologists claim [3], during the formation of an individual's relations with a particular city often modifies an objective urban environment that is directly perceived visually or by other human senses. The main functions performed by the city's mental image are as follow: the presentation of the city dwellers and guests (this context is used during the conscious, or unconscious formation of all the types of the interaction with the urban environment – estimating its semantic load, psychological acceptability, etc.); the formation of adequate conditions for the orientation when traveling around the city and its suburbs; offering the possibilities for the reading of the cityscape as a more or less permanent and general text.

#### 3.2. The scheme of the mental image of the Kaunas city

The analysis carried out at the Institute of Architecture and Construction of Kaunas University of Technology on the basis of the mentioned supplement/negation principle [15] has determined the possible general scheme of the image of the city of Kaunas (to be more precise, of its essential components on the level of the entire city). The essential features of the scheme are the following ones: Kaunas is the city of a single dominant centre-region. The natural boundaries (marked by the two rivers – the Nemunas and the Neris) divide the massif of the city into four groups or districts that by their size and importance are non-equivalent within the city image. The largest among them is the group between the Nemunas and the Neris that extends around the Old City and the New City centre-district with a large part of the city image landmarks and very clear boundaries (i. e. the slopes of the river valleys). The centre is the district crossed by a pedestrian path joining the Old City with the Oak Wood and the Zoo (Laisvės Avenue is a part of this path; due to its size the Oak Wood may be treated as a small unit of the city image). Other most important paths in the city image that extend from the centre or contacting it are: the south-west – north-east axis extending by the Savanorių Avenue which crosses and joins the Centre, the Green Hill district and the massif of the Kalniečių, Eigulių and Dainavos districts. This path ends on the transport junction of the northern roundabout way and the Savanorių Avenue. Practically, all the rest general city landmarks (both existing and supposed) are concentrated near this axis, and thus a new district centre is being formed around the Čechėnijos Square and the Kalniečių Park (a natural island as one of very significant elements of the centre complex). From the junction on the corner of the southern centre that also serves as its mark (i.e. the transport junction near the Čiurlionio Bridge) one way leads to the Šančių district and on the junction near the bridge across the Neris joins the Centre with the Panemunės district. Another road extending by the Oak Wood district boundary (the Girstupio Valley and Tunelio street) across the junction near the 6<sup>th</sup> Fort joins the centre with the Petrašiūnų district and the district of the Pažaislio Forest that includes its distinct centre and landmark, i. e. the Pažaislio Monastery. The second group of the districts of the hierarchically lower level consists of the Vilijampolės, Kaniūkų and Šilainių districts that also have very distinct natural and anthropogenic bound-

aries (the river, the slopes of the Neris Valley, the Kamšos Valley, a western roundabout way that crosses the valley of the Nemunas). The group of those districts is united by two picturesque roads. The first one includes the route of the Raudondvario highway that begins in the centre of the Old City and is accentuated by the traffic junction and ends with the boundary of the Lampėdžių district on the traffic junction. Another road that has no distinct beginning consists of the Linkuvos street and Žemaičių highway ending at the traffic junction near the shopping and entertainment centre “Mega”. The Romainiai Forest may be distinguished as slightly autonomic (i.e. not connected by means of clear roads with other districts) – it is a small district on the border of the city. The third group of the districts that might compete with the second one in the future is the Aleksoto district which at the moment is uniform, rather amorphous and due to its size hardly comprehensible district with a district road – the Veiverių highway; rather clear boundaries (the slopes of the river and spring valleys) and new city landmarks and centres under formation near J. Bakanausko street (Technopolis, the buildings of the Freda town, etc.). The fourth group of districts encompasses the Panemunė district with the Panemunė Grove as a separate district. Still under the process of formation but with the distinct boundaries are the districts of the Rokai and Vaišvydava. The Vaišvydava highway is clear and memorable due to its environment (the Sėmenos Valley) and winding character. However, it does not have any clear beginning or end in the city image as yet (unless we took a clearly perceptible view boundary between the Panemunė district and the Panemunė Grove as its beginning).

### 3.3. The system of the defense objects as the formants of the mental image of the Kaunas city

On the basis of the above given scheme of the mental image of Kaunas and with respect to the possibilities for its evolution, the desired characteristics of the image components and the schemes of their interaction the possible role of the objects belonging to the system of the Kaunas Fortress’ defense constructions within the image of the Kaunas city has been estimated. It might be claimed that the system of the defense fortifications is indeed important for the formation of a uniform, readable and perceptible image of the Kaunas city. In this respect, not to utilize the potential of its objects would be inexpedient. The objects of the defense system might include the following (consider Figure 2):

- the general components, or even specific centres within the city centres and/or traffic junctions with so called “gate function”: the First Fort, the Fourth Fort (depending on the city’s expansion in the Rokai direction), the Fifth Fort and the Ninth Fort. This potential of the forts might be realized by affording them a socio–recreational function semantically related to the suburb, or natural environment, i.e. various specialized weekend recreational and cultural activities. From the point of view of composition these objects should be made distinct by increasing their contrast to the environment and other possible components of the centre of the city image; according to possibilities, their architectural–urbanistic image should be made closer to the original image of such a type of architecture; for instance, a monumental construction standing out in an open area and partially hidden in the ground;
- the general components of the city and district centres that are “inside” the city: the Sixth Fort and the Eighth Fort. To become fully valuable elements of the city image these objects should integrate the specific everyday cultural and recreational activities and communication forms reflecting the “inner side” of the city. From the point of view of composition, these objects should be made distinct by increasing their contrast to the environment and other possible components of the city image centre, if the possibilities allow, their architectural–urbanistic image should be made closer to the original image of such a type of architecture; for instance, a monumental construction standing out in an open area and partially hidden in the ground;
- the components of the district centres, or district emphatic points: the Second Fort, the Third Fort, the Seventh Fort, the Romainiai Fort, the central fortification in Aukštoji Freda (Aleksotas) and the Aukštieji Šančiai depots. These objects should integrate the non-specific everyday recreational and cultural activities and communication forms. From the point of view of composition these objects should be made distinct by their contrast to the environment and other possible components of the image centre. What concerns the Romainiai Fort as an object belonging to the district of the specific image (i. e. that of the recreational forest) is that it might perform a weekend specific recreation function;
- the boundary accents: Battery 4, Battery 5, depots near the Lakūnų Highway and, practically, all the

shelters. The mentioned objects might perform the function of the boundary accent at its best, if they are united by the track that most often does not become a part of the city image and does not compete with the real district boundary, e. g. the bicycle tracks or pedestrian paths. From the point of view of composition these objects standing out in the surrounding architectural–urbanistic background should also be its inseparable part;

- the road accents: Battery 5, a redoubt and depots in Breslaujos Street and the Panemunė depots. Their function should be related either with the road reconstruction or anything that should provoke stopping near this object, or have some semantic relation with a larger object or centre located at the end of the road. From the point of view of composition, these objects standing out in the surrounding architectural–urbanistic background (the specific “linear walls of the road”) should also be its inseparable part;
- the boundaries, or to be more precise, roads underlining the boundaries: along the Marvelė and the Šanaša valleys; along Piliakalnio and Kėdainių Streets; in Rokai, along the slope of the Nemunas Valley; along the segment of the former Railway in Aleksotas. The discussed objects may perform their function in the district image by remaining the peripheral unconventional tracks. From the perspective of composition, they are the neutral objects that do not make any contrast to the surrounding environment.

It is important to stress that similarly to the Central Place Theory (Christaller by Sendich 2006) the higher in rank components of the image centre may also perform all the functions of the lower in rank components. Hence the centre of the specific recreational/cultural activities may perform the functions typi-

cal of a nonspecific centre. However, an opposite variant is impossible, i. e. the centre of the nonspecific everyday recreational activities cannot perform the functions of the specific weekend recreation centre.

## 4. THE DEFENSE CONSTRUCTION SYSTEM OF THE KAUNAS FORTRESS AS A PART OF THE NATURAL FRAME

### 4.1. The conception of the natural frame

Generally, the natural frame (NF) may be understood as a network of the natural territories that serves as a balance to intensively anthropogenized territories. In the sphere of the territorial design and urban studies, the concept of the natural frame was first introduced by an urban designer and architect I.A. Jodo [17]. She claimed that the NF is one of the ways of urban spatial structure formation (alongside with zoning and zone filling with the architectural–urban objects). Using this term, Paulius Kavaliauskas has constructed the model of the territorial geo-ecological compensation focusing on the natural and semi-natural territories. The third model related to the NF is so called Ecological Network worked out by a number of Western European countries. Consider:

1. The essence of Jodo’s NF model [17] is as follows: the NF is formed of natural territories (existing or designed) and makes a peculiar compositional and functional (in most cases, recreational) frame of the urbanized territories that is related with the natural environment (i.e. on the level of the district or the entire city).
2. The essence of Kavaliauskas’ model [8] is as follows: when the surrounding, man-formed and satisfying the people’s requirements environment is treated as an anthropo-ecosystem. Territorially, it consists of three *metafunctional* elements: the urbanistic frame (UF), the natural frame (NF) and the agrarian background. In this model, the NF performs the function of neutralizing the nature – harmful results of human activities. According to their function and importance, the NF territories are divided into regional and district axes of stabilization (e.g. watersheds of the river-basins), the regional, district and local migration corridors (e.g. the river and spring valleys) and district or local stabilization junctions (e.g. watersheds of springs, the valuable natural territories near the river valleys). The main criterion that might be used to determine the boundaries of the NF territories is the relief structure forming the movement

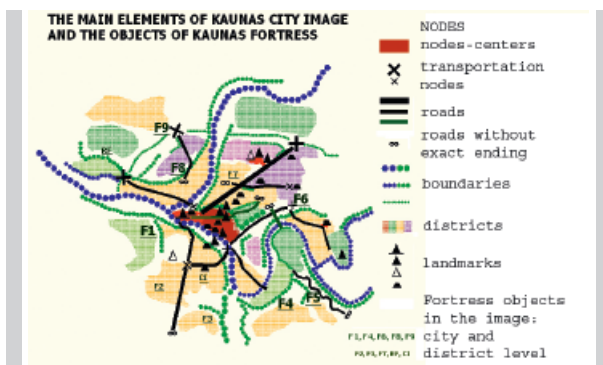


Figure 2. The main elements of Kaunas City Image and the objects of Kaunas Fortress

of the surface water. According to this model, the NF is first designed on a scale of whole Lithuania; then the district NF schemes are worked out with the use of the following scale – 1:50.000. If necessary, the local design is worked out. The research carried out at the Institute of Architecture and Construction of Kaunas University of Technology [4] showed that in the city, the NF may perform its geo-eco-compensational functions only partially. In fact, they are possible only within scanty territories that preserved the natural or semi-natural conditions of the surface water movement. It is so exclusively due to the existing contacts with the country NF (i. e. in this case, the small anthropogenized local migration corridors ensure such contacts). Beside the geo-compensational function, in the context of the city, the NF acquires a very important recreational purpose. It becomes a territorial system of everyday and weekend recreation areas located in the natural environment, i.e. the system whose elements are specified and supplement each other due to the existing territorial connections.

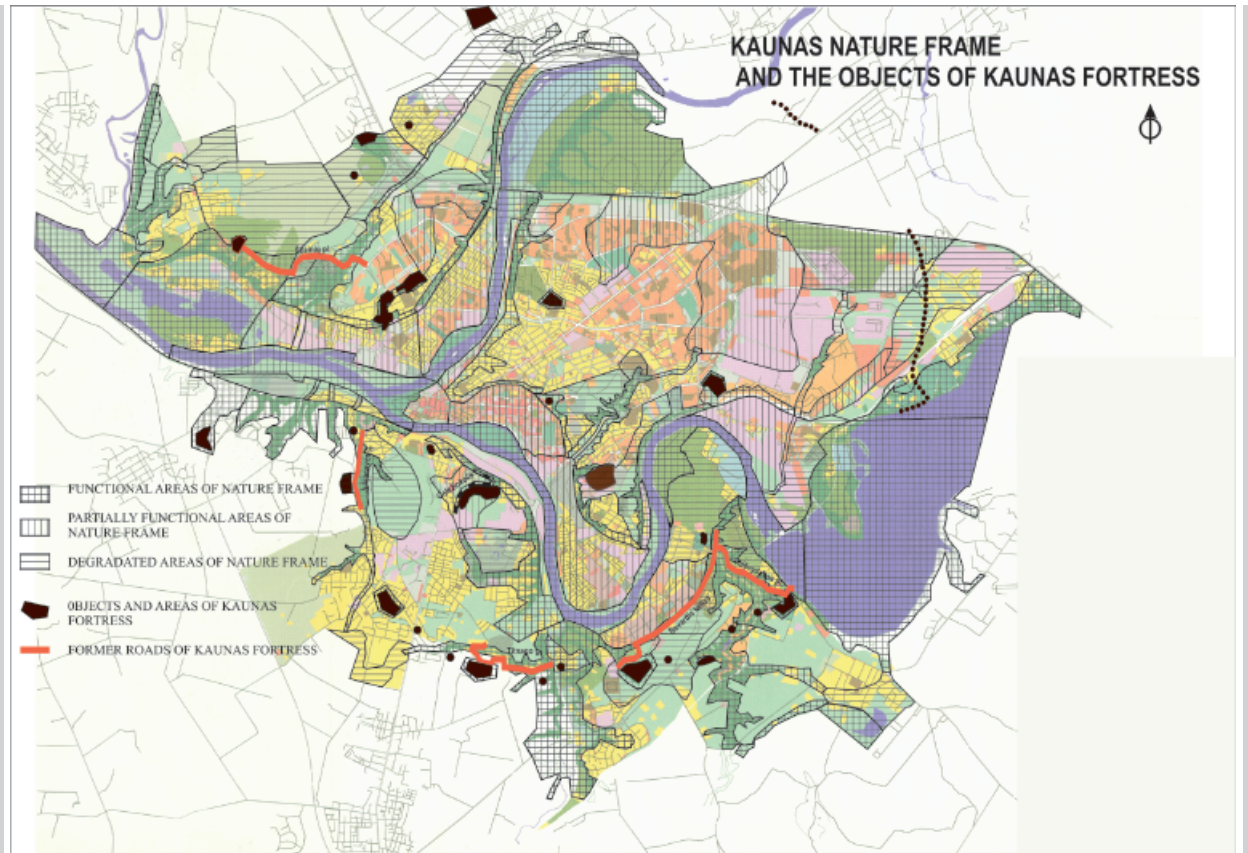
3. The Ecological Network is formed by considering the connections of various animal shelters and territorial connections.

To summarize, it might be claimed that within the city the NF performs these functions:

- the function of geo-eco-compensation (together with the neighbouring territories behind the boundaries of the city with which it is related by the principle of hierarchy and systematization applied during its formation);
- the creation of the Ecological Network;
- the creation of the proper conditions for everyday and weekend recreation in the natural and semi-natural territories and their integration into a uniform system on the basis of the territorial connections;
- the formation of the compositional frame of the physical and mental cityscape (to be more precise, one of its two parts). Due to the peculiarities of the perception of the city as a sum of its integral parts, this function of the defense construction system of the Kaunas Fortress as a possible part of the NF has been estimated by the exploration of the mental map of the city.

#### 4.2. The system of the defense objects of the Kaunas Fortress and the natural frame.

After having discussed the NF of the city of Kaunas it might be claimed that the system of the defense objects of the Kaunas Fortress makes a rather significant part of the NF: all the forts or their remains and central fortifications have become the stabilization junctions of local importance and the stabilization junctions of the Ecological Network both giving shelter to animals and serving as the potential recreational territories to the city dwellers (it is obvious in the informal utilization of the First, the Second, the Fifth and the Sixth Fort for the organized recreational activities). Many military shelters have been built in rather inconsiderably anthropogenized spring valleys, i.e. the migration corridors of the natural frame and the Ecological Network, or have become the animal shelters (i.e. the terriological reservations). They may also become attractive points for the bike or pedestrian tracks along the spring valleys. Some fragments of the fortress' authentic paths have also been built along the mentioned local migration corridors. They create the conditions for the realization of their potential as the present and future recreational junctions. The distribution of the defense objects of the Kaunas Fortress and other constructions directly related with them is given in Figure 3.



**Figure 3.**  
Kaunas Nature Frame and the objects of Kaunas Fortress

To summarize, it might be claimed that within the NF of the Kaunas city the defense objects of the Kaunas Fortress perform a complex role. Consider:

- forts, parts of fortifications, depots, the redoubt in K. Baršausko Street and Battery 5 are turned into the local stabilization junctions that perform or may perform the geo-eco-compensational function as well as the function of the Ecological Network of junctions and the functions of the recreational natural territories. With respect to the size of the objects serving as the natural recreational territories, it should be noted that, most probably, they might satisfy the demands of the district or of the group of quarters. Certain exceptions might be found with the Fifth Fort as a neighbouring area to the city's general recreational territory;
- many smaller objects (e.g. Battery 4, shelters, depots) may perform the functions of various single recreational objects located near the recreational tracks or other territories suitable for recreation as well as the junctions of the Ecological Network;
- the former fragments of the paths of the fortress go across the important NF territories and may perform the function of the recreational junctions;
- when arranging all the discussed objects and giving the priority to the protection of the NF potential, it is necessary to preserve their specificity and the natural character of the surrounding territories.

## 5. THE SYSTEM OF THE DEFENSE CONSTRUCTIONS OF THE KAUNAS FORTRESS AS A PART OF THE URBAN FRAME

The concept of the urban frame (UF) is used inseparably from the concept of the natural frame (NF) as the latter's opposition. Both Jodo [17] and Kavaliauskas [8] maintain that it is a network of the territories and connections vital for the functioning of the urbanized territories that consists of the infrastructural objects, administrative, industrial buildings and the buildings of cultural purposes. Hence the UF performs two essential functions vital for the life of



the society: the communicative function and that of rallying for common activities in certain concentrated territories. From the perspective of the geo-eco-compensational NF model and having in mind the research results of the previous section, it is obvious that, as a part of the NF, the defense object system of the Kaunas Fortress cannot coincide with the UF. However, if the UF is treated as a method of design that unites the existing and the potential social centres, communication tracks and industrial centres into a uniform network, some objects of the mentioned system dependent on their urban context might be considered as the potential centres for the cultural and social activities. The possibility for such a perspective has been confirmed by the concept of the sociotopes used in the general plan of the city of Stockholm (the term coined analogically to the term “biotopes”), which concerns the social and cultural integration of the public and green spaces. Due to the dominant recreational potential of the former objects of the fortress they will be estimated exclusively as the UF junctions of the general city or district level having the priorities of social integration and cultural activities, which most often do not eliminate the recreational natural functions.

The possibility for performing the above mentioned role is determined by the following factors:

- the size of the object should be such that it might contain a considerable number of people at a time on the scale of the city or district and might be used for various cultural activities;
- the neighbourhood and reachability of the object;
- the presence of the similar competing public spaces in the same district;
- the near presence of the objects of general urban importance that might supplement the potential centre;
- the sufficient level of the construction’s survival.

After having analyzed the list of the objects in the defense system of the Kaunas Fortress according to the given four criteria, there remain only the discussed forts (except the Marvelé Fort whose constructions practically either have not remained, or the degree of their survival has not been precisely determined), the central fortification near the Botanic Gardens, the depots in Aukštieji Šančiai, Panemunė, Aleksotas and the depot with a redoubt in K. Baršausko Street. Due to their reachability, position within the city and important neighbouring areas, the following constructions should be considered the centres of the cultural and social activities of

general urban importance:

- the First Fort located near the Via Baltica Highway, separated from the city’s Marvelé Valley (i.e. it is unreachable for the dwelling district community as an everyday centre). On the other side of the spring valley another attractive object of the general urban purpose is located, i.e. the historical airfield named after Steponas Darius ir Stasys Girėnas;
- partially, the Fourth Fort, which at present is a bit detached from the dwelling quarters, located near the potential general urban recreational tracks (Piliakalnio Street, the Jiesia Valley, the sub-valley of the Nemunas Valley above Panemunė) and rather well-reachable from any part of the city (by the southern roundabout road);
- the Fifth Fort located near the Kaunas Sea Regional Park;
- the Sixth Fort located near the city centre, which is easily approached by the public transport;
- partially, the Eighth Fort with the Linkuva fortifications: they are located between the two districts – the Šilainiai and Vilijampolė; on the slope of the Nemunas Valley, near the general city highway. However, today the situation is a bit complicated because the approaches to the fortifications have been intensively built around with the single family houses;
- the Ninth Fort, as the only museum among the forts. With the change of the museum conception from the boring lifeless expositions of the historical artifacts toward the centre of the cultural, social and educational functions, it has got the possibility to expand the spectrum of its activities.

The community centers that might perform the functions of cultural and social integration of the people living in the neighbouring areas might be formed in:

- the Second Fort that is thickly surrounded by the dwelling buildings and forms the compositional centre of the surrounding quarters (i.e. the compositional centre, which according to the unofficial paradigm of architectural and urban design, usually means one or another functional centre of the dominant territory);
- the Third Fort, which is already surrounded by the dwelling house filling and with the expansion of new building activities may become the compositional centre;
- partially, the Fourth Fort, alongside with the general urban functions, and only after the expansion

- of the dwelling building constructions in Rokai;
- the Seventh Fort surrounded by the dwelling house filling massif near the complex of the Kaunas Academic Clinics;
- partially, the Eighth Fort with the Linkuva fortifications that from the urbanistic point of view are closely related to the Šilainiai dwelling district and may become a nice Šilainiai recreational zone performing the function of cultural and social integration;
- partially, the depots in Aleksotas near the Lakūnų Highway depending on the forms of the city centre expansion toward the left bank of the Nemunas might become the part of a new dwelling district;
- the central fortifications near and within the Botanical Gardens are located in the neighbourhood of an attractive general urban object. However, they are not sufficiently communicative and architecturally not as attractive as the forts;
- the depots in Aukštieji Šančiai are distributed in a territory hardly reachable from the city. Nevertheless, they are easily approachable from the thickly inhabited block quarters;
- the depots in Panemunė forming a specific transitional zone between the Panemunė Grove, with the general urban importance of which they cannot compete, and the Panemunė dwelling quarters. They are located near the church.

Due to their a bit unrewarding situation (the absence of the neighbouring territories with their social area, whose centre of attraction the object might become because of its exceptional architectural forms) and the lack of attractiveness allowing to join the general functions of the city in comparison with the similar objects, other analyzed objects are the following ones:

- the Romainiai Fort located in the heart of the forest and detached from the dwelling districts;
- the depot with a redoubt in K. Baršauskas Street located on the junction of several districts or quarters;
- the Domeikava Fort that might perform exclusively the function of the natural recreational territory.

To sum up, it might be claimed that beside their natural recreational potential the forts also have a considerable general urban and local potential of the functions of social integration. Here a certain concurrence between the NF and the UF functions should be noted. These functions might be per-

formed by the former defense objects preserving their hierarchical significance: the object having the potential of the general urban recreational natural complex also has the potential of the function of the cultural and educational community centre of adequate significance.

This concurrence achieved in two different ways only confirms the correctness of the estimation of the object's potential.

## 6. THE SYSTEM OF THE DEFENSE CONSTRUCTIONS OF THE KAUNAS FORTRESS AS THE SYMBOLS OF THE CITYSCAPE-TEXT

The perspective of cultural studies takes all the artifacts created by man as symbols, and the cultural space filled with these artifacts is viewed as a text, or a specific form of external consciousness and memory that is vitally important for the existence and survival of a particular cultural community. The cityscape is a specific type of such a cultural text "written" in an architectural-urbanistic language. The essential feature of such cultural texts is that they are continuously written and corrected, and their symbols are being formed during a long period of history. Similar to writers, both architects and urban designers should create new texts by employing the existing symbols or in other words, the semantic potential of the objects. Such texts should be perceptible by the members of the society that utilize their works and act as readers.

As the cultural theoreticians maintain [18], the symbols of the cultural texts might be divided into four groups. Consider:

- natural symbols – these are the symbols related to nature and natural forms. Here it would be reasonable to remind that the system of the semantic symbols is a closed system where the meanings of the symbols are understood only by relating them to each other and which operates on the basis of so-called dichotomies: white/ black, high/ low, light/ heavy, etc. In this case, the natural symbols form an essential nature/city dichotomy typical of the culture of the Western Europe from the Middle Ages that undoubtedly exists in the society's collective unconscious. It encompasses a number of deep autonomic meanings: pagan/Christian; chaotic/orderly; dangerous/safe; mysterious/rational, etc. Actually, any green massif in the cityscape, if it is large enough and concen-

trated, might become a symbol. Another necessary condition is its ability to operate as a functional, or compositional accent of a neighbouring territory and a part of the image of the district, or city (the above discussed city image is meant here), or an object visually regularly perceptible in a rather large territory (e.g. the green wall of the forest seen from the inner spaces of the residential districts, or the hill line seen from various parts of the city). The natural, or semi-natural concentrated territories may become the natural symbols, if they form associations with one of the parts of the mentioned nature/city dichotomy, e.g. with the mysterious and imperceptible chaotic character opposite to the regularly built and easily perceptible urbanized territory;

- functional symbols – these are the symbols whose external form distinctly reflects the present or the former function. For instance, a labour instrument becomes the symbol of a labourer of a particular sphere of the labour process. In case of the cityscape, the objects distinguished by their expressive architecture showing the stylistic elements related to the functions performed by the constructions may turn into symbols. Today, when architecture becomes more and more semantic, practically, a great number of the single objects of the old architecture grow into such functional symbols. Among the new examples of such symbols we may name the glass towers shooting upward in each “self-respective” city – the office buildings that have become the symbols of economical prosperity and power;
- iconic symbols – these are the symbols that by their form are related with the iconic signs typical of culture. They mark one or another content and are practically perceptible by all the representatives of one or another culture. It might be claimed that they grew out of the functional symbols, whose forms have become simpler, and they finally turned into hieroglyphs or abstract signs. For instance, a tower is the symbol of the Medieval castle; the portico with a colonnade is the symbol of the museum; the Gothic window is the symbol of the Middle Ages, etc. In a particular cityscape, the constructions well known all over the country, that to many people are undoubtedly associated with a particular city or locality may turn into such symbols, e.g. the Eiffel Tower in Paris; the Tower Bridge in London, the Twin Towers of the World Trade Centre in New York, etc.;
- conventional symbols – these are the symbols

formed by a social agreement, e.g. in one country, the convention is accepted that a triangle marks the ladies’ lavatory; in another country, the agreement is to use the sign of a circle. Since language and other semantic systems are formed on the basis of so called spontaneous social agreement and cannot be changed by a single act of will, in the cityscape, an informal and rather intensive general usage of one or another territory or object might be considered a form of such an agreement, for instance, a small “square” near the Merkurius Shopping Centre in Kaunas has become a meeting place for many inhabitants of the city and at the same time, despite its small size, a part of the city image and an object of the cityscape-text.

After having discussed the peculiarities of the cityscape perception with regard to the forts and other objects of the fortress as the formants of the city image, it might be claimed that such objects, which intensively form the image of the city and become a part of the mental cityscape have a greater possibility to turn into the symbols of the cityscape-text. Therefore, when analyzing the semantic potential of the objects of the defense construction system and discussing the necessary means for its thorough disclosure, attention is given only to such objects that most probably do form or may form the image of the Kaunas city or its districts, rejecting the small and relatively insignificant objects, although the latter under welcoming conditions might become the conventional symbols of the cityscape. However, nearly every object of the cityscape has such a theoretical possibility. The following objects have been analyzed: all the remaining forts of Kaunas; a part of the central fortification near and within the Botanical Gardens; the Linkuva fortifications, the depots in Breslaujos Street; Aukštieji Šančiai, Panemunė, near the Lakūnų Highway and some fragments of the roads in Kėdainių Street, Piliakalnio Street, Julijanavos Street, Vaišvydavos Highway, Šilainių Highway, Titnago Street and the railway line in Aukštoji Freda. It has been agreed that other defense objects remain the parts of the general architectural-urbanistic symbolic background of the city of Kaunas.

During the estimation of the semantic potential of the defense objects, first of all the potential of the object itself is considered. During the second stage the context of the potential symbol in the city district or in the whole city is evaluated. Since, as it has been discussed above, a human being perceives the city by creating its mental image, yet the volume of attention (both external and internal) is limited to no more

than 7-9 objects that may be visually embraced at a time). Therefore not all the objects even though they have a good potential may become the semantic symbols of the cityscape. The symbols of the cityscape-text as parts of a single uniform architectural-urbanistic text may collaborate or deny each other. It is probable that turning or not turning into a real symbol depends on the type of this relationship. Thus, during the estimation of the context the mentioned strengthening/denying relations with other familiar symbols of the district or city will be estimated. To determine the strengthening/denying relations the principles of the uniform architectural composition worked out by Nicos Salingaros (Salingaros 2005) will be applied that claim the following: on the lowest compositional level, where the objects are directly in contact with each other (in case of the cityscape, they are the objects of a single city district often having a visually perceived contact), the uniformity of composition is guaranteed by the dichotomy; meanwhile, from the perspective of an entire entity, the uniformity of composition is based on the similarity of form, function, colour, etc. Hence it will be considered that on the district level, the symbols that may have an opposite or different semantic load support each other; meanwhile the symbols that have an equal load deny each other. Respectively, on the level of the entire city, the symbols conveying similar contents support each other by creating a harmonious whole; the symbols that convey the opposite contents destroy the uniform composition. Since from the perspective of the whole complex of the city that during the process of perception is not uniform and identical to all the inhabitants of the city, as it is in case of the city district to all its dwellers, the oppositional dichotomies may not be very clearly defined. Therefore during the analysis of the context of the entire urban complex of the city the focus will be on the similarity. Having in mind the aspiration of the human psyche and the need to unite all the single objects into one whole, it is logical to claim that the objects entering into contrast to the whole mode of the already formed symbols will not be able to realize their semantic potential (it is especially important when discussing the level of the city district that is perceived as a sufficiently concrete and uniform object by all the inhabitants).

The estimation of the semantic potential of the defense objects is as follows:

- a part of the objects of the Kaunas Fortress' system with regularly distributed objects within the city especially contributes to the formation of the cityscape's semantic uniformity on the level of the entire city and dominates in the cityscape as strong natural and functional semantic signs having good possibilities to become the iconic symbols of the city – both separately and all together as a system. These objects are the following ones: from the First to the Ninth Fort and the Romainiai Fort. As the corner-stones of this structure guaranteeing the semantic uniformity of the cityscape the First, the Fourth, the Fifth and the Eighth Fort might be distinguished together with their fortification ramparts and redoubts, i.e. the Ninth and the Sixth Forts. The Second, the Third and the Seventh Fort are important as the part of the system and as very distinct semantic objects of their districts imparting and able to impart in the future the specific exceptionality in the surrounding territory;
- the mentioned objects adequately adapted to the social demands may also become the conventional symbols of the districts they belong to; some of them may become the symbols of the city;
- the depot complexes, the remains of the Domeikava Fort and the Central Fortification are rather important semantic objects that supplement the uniformity of their districts. They also have the natural and functional semantic loads although lower, if compared to those of the forts. Nevertheless, they should be integrated into the district cityscape;
- the natural semantic load of the objects would be best preserved and utilized by the preservation of their natural character and contrast to everyday urbanized environment. In this case, a more important role than that of the green plantation areas (e.g. in an urbanized territory, the defense constructions of the 19<sup>th</sup> century look natural enough without the green plantation) is performed by the strengthening of the object's impression of an island within the corpus of the city that might accumulate other territories of natural character;
- the functional semantic load is preserved and strengthened by preserving and exposing the features of the defense object architecture;
- the iconic semantic load may appear with time by integrating an entire system into an organism of the contemporary city in corpore, or by affording the social, cultural and recreational functions significant on the city level. Having in mind the lack of the iconic symbols in the contemporary Lithuanian cities, it would be meaningful to increase this semantic potential in adequate objects;

- the conventional semantic load of the mentioned objects will increase on its own, when the objects are adapted to the social needs;
- the remains of the Marva forts have no distinguished semantic load neither in the district nor in the city.

## 7. THE PRINCIPAL STANDPOINTS FOR THE UTILIZATION OF THE KAUNAS FORTRESS' DEFENSE OBJECT SYSTEM

There are five chief aims:

- preservation and utilization of the natural frame potential (geo-eco-compensational, recreational and ecological);
- disclosure of an although inconsiderable, yet important for the integration into the corpus of the city potential of the urbanistic frame (i.e. the place of the community integration);
- formation and distinction of the potential objects of the city image;
- exposure of the semantic objects of the cityscape;
- heritage protectional and educational purposes related to the protection and utilization of the unique objects for contemporary needs.

These aims might be realized in the following ways:

- by forming a system with regard to some similarity of utilization (e.g. the crematorium and the park will not make a uniform system). As it is clear from the carried out estimation, recreational, cultural and communal functions should be dominant in the system;
- by creating a variety of functions – all the objects cannot perform a single function, but should rather supplement each other, or in other words, they should be specialized. Depending upon an object's potential, a different degree of expression, even for the typologically similar functions, should be determined: the recreational and cultural specific weekend and everyday activities require special spaces; inconsiderably specialized cultural and recreational everyday activities essentially require the spaces of universal purpose;
- through relations between the elements of the system: the associative ones that are formed due to the similarities of the architectural forms, details and the neighbouring environment modifications; the territorial ones, for instance, the bicycle recreational tracks uniting the elements into the whole entity and the mentioned functional ones, when

the programme of a single object supplements the programme of another object's activity.

With respect to the discussed aims and the means of their realization, the conception has been realized in two stages:

- the principal methodical landmarks for the conception of the fortress' defense construction utilization have been presented, the priority given to ecology, heritage protection, recreation and cultural activities. The particular functions of the separate objects may be determined or suggested only when preparing the general or specific plans for the Kaunas city or its parts;
- the principal suggestions for the formation of the recreational bicycle track system have been extended as a supplement for the bicycle track system designed in the general plan of the Kaunas city.

## 8. THE SYSTEM OF THE RECREATIONAL, CULTURAL AND SOCIAL OBJECTS

On the basis of the results of the carried out analysis, the working out of the detailed architectural-urbanistic conceptions for the utilization of the system of the remaining defense constructions of the Kaunas Fortress and its separate elements, the following methodical landmarks should be considered:

- the First Fort: the specific weekend recreational or cultural activity satisfying the needs of the city inhabitants and its guests; a recreational natural territory of the city district;
- the Second Fort: the non-specific everyday recreational or cultural activity satisfying the needs of the inhabitants of a neighboring territory; a recreational natural territory of the quarter groups;
- the Third Fort: the non-specific everyday recreational cultural activity satisfying the needs of the inhabitants of the neighboring territories; a recreational natural territory of quarter groups;
- the Fourth Fort: the specific weekend recreational cultural activities satisfying the needs of the city dwellers and its visitors or non-specific everyday recreational cultural activities satisfying the needs of the inhabitants of the neighboring territories; a recreational natural territory of the district;
- the Fifth Fort: the specific weekend recreational cultural activities satisfying the needs of the city dwellers and its visitors; a recreational natural common territory of the city (together with the

- neighbouring territories);
- the Sixth Fort: the specific everyday cultural recreational activities satisfying the needs of the city inhabitants; a recreational natural territory of the district;
  - the Seventh Fort: the non-specific everyday recreational cultural activities satisfying the needs of the inhabitants of the neighboring territories; a recreational natural territory of the quarter groups;
  - the Eighth Fort and the Linkuva Fortifications: the specific everyday cultural recreational activities satisfying the needs of the inhabitants of the neighbouring territories and the city visitors; the non-specific everyday cultural recreational activities satisfying the needs of the city dwellers; a recreational natural territory of the district;
  - the Ninth Fort: the specific weekend cultural recreational activities and specific everyday cultural recreational activities satisfying the needs of the city dwellers and its visitors; a recreational natural territory of the district;
  - the remains of the Romainiai Fort: the specific weekend recreational activities and specific everyday cultural recreational activities satisfying the needs of the city inhabitants and its visitors; a recreational natural territory of the district (together with the Romainiai Forest);
  - the remains of the Domeikava Fort: a recreational natural territory of the quarter group;
  - the remains of the Marva Fort: a recreational natural territory of the quarter group or a single quarter;
  - the Central Fortification in Aleksotas: the non-specific everyday recreational activities satisfying the needs of the inhabitants of the neighbouring territories; a recreational natural territory of the district;
  - Battery 4: the point of the recreational tracks' maintenance;
  - Battery 5: the point of the recreational tracks' maintenance;
  - Shelters: the attractive points of the recreational tracks;
  - the depot in Breslaujos Street: the non-specific everyday recreational activities satisfying the needs of the inhabitants of the neighbouring quarters; a recreational natural territory of the district importance;
  - the depots near the Lakūnų Highway: the non-spe-

cific everyday recreational activities satisfying the needs of the inhabitants of the future neighbouring quarter; a complex of the objects of recreational purposes located near the recreational tracks;

- the depots in Aukštieji Šančiai: the non-specific everyday recreational activities satisfying the needs of the dwellers of Aukštieji Šančiai; a recreational natural territory of the district or quarter group;
- the depots of Panemunė: an object of recreational purposes located near the general recreational tracks of the city;
- the fragments of the Kaunas Fortress' paths: the fragments of the pedestrian or bicycle recreational tracks.

## CONCLUSIONS

1. After having carried out the discussed analysis it might be claimed that the defense objects of the Kaunas Fortress have remained as a potentially uniform urban system or subsystem.
2. Depending on their location the remaining single objects have a potential to become the generators of the material or mental structure of one or another part of the city (together with the existing generators).
3. As a system, the defense objects of the Kaunas Fortress have a potential to become:
  - an inseparable part of the city;
  - the nodes of natural and urban frames;
  - the significant elements of the city's mental image;
  - the natural, functional and iconic symbols of the cityscape-text.
4. The variety of the remaining elements (from the relatively large forts to the shelters or road fragments), their even distribution within the city territory and the preserved urbanistic– architectural potential make encourage the discussion of the utilization of the entire remaining system as a whole entity.
5. The offered principal suggestions illustrate the possibility for such utilization. All the essential characteristics of an urban system have been found in the discussed system: the distribution of the functions, hierarchy, the variety of objects and territorial connections.

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