

Fortresses - Heritage in the new functions ***Preservation of heritage, identity and environment***

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Abstract

The Fortresses in Slavonski Brod and Stara Gradiska, with their border positions, represent remarkable monuments of baroque architecture. They were built as a part of system of the fortresses on the frontier towards Ottoman Empire.

The aim of this work is to present informations about fortresses in Slavonia, to restore and improve architecture that was meant for the war into the architecture of peace - to reconcile the past and future and to applicate knowledge of energy management. Nowadays we have to care about our cultural heritage and preserve it in optimal form by implementing suitable new functions like: educational and cultural institutions, galleries, museums, tourist and information centers, hotels ...

Also in this time of crisis in the field of construction and investment it is the best time for analyzing the current situation and planning activities to create the pre-conditions for stable development and growth in the future by implementing efficient technologies, especially those which will be better, the best possible for our environment.

Keywords: cultural heritage, new functions and tourist destinations, energy efficiency

Figure 1: Plan for the Fortress Stara Gradiska from 1791.

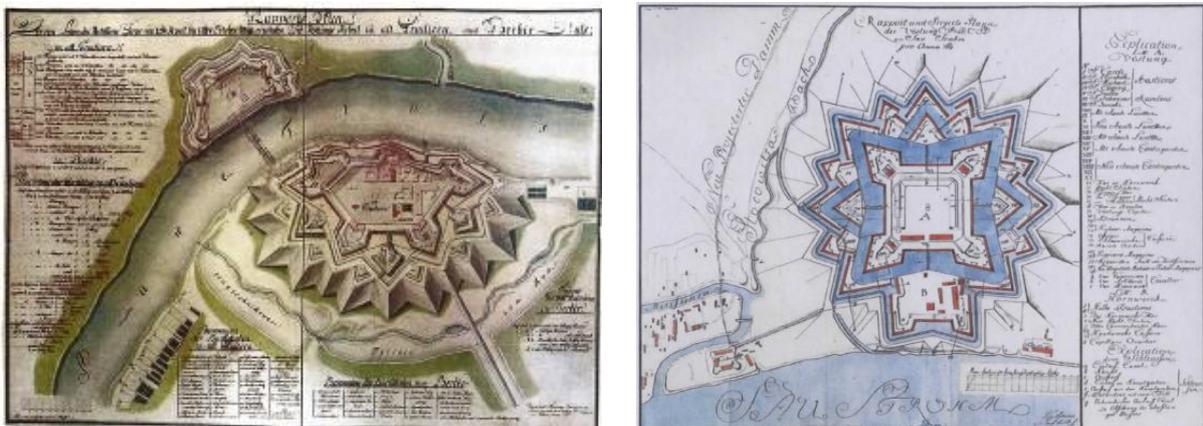


Figure 2 : Project plan for the Fortress Brod from 1767./68.

1. Introduction

Croatia as a country and Slavonski Brod (known as Marsonia in the Roman Empire and the Brod on the Sava River from the 1244th to 1934th as a city) and Stara Gradiska were, in geo-political position between East and West, always on the border of civilization. They are located in Slavonia, where they were developed on the strategically important crossing over the river Sava to Bosnia and Herzegovina. Slavonski Brod and Stara Gradiska were strategic and the traffic place which controlled the border crossing with Turkey and connected the main trade routes at that time. Today, they are still an important sites in crossroads of the Posavina highway and border crossing towards Bosnia and Herzegovina. These are settlements of Brod-Posavina, while Brod is also a river port on the river Sava. Although the "Brod" has the meaning of the word "ship / boat" in contemporary Croatian, the name of the city is based on older name which means "river crossing". Because of position of these fortresses, in history we have had advantages, but we also suffered damage in the wars in the past. Our latest generation witnessed the Homeland war.

Fortresses of Brod and Stara Gradiska are important monuments of Baroque architecture from the 18th century. They are also monuments for our nation, our memorial and cultural heritage. Interdisciplinary character of the preservation of cultural heritage enables connection of past and present on site, so the value that we inherited from our ancestors would not be lost.

By signing the World Heritage Convention, each country agreed to implement policies and strategies for ensuring the preservation of heritage. According to that, fortresses presented in this paper will also be preserved for future generations and protected through cooperation among nations. It is particularly important, besides individual protection of immovable cultural property, to protect the landscape (cultural and natural environment) in which the monument is located, by rational use of selected materials and techniques that will be energetic efficient and good for the environment in their function.

2. Protecting cultural heritage

Conscience about the value of heritage was developed in the 19th century. Principles of preservation were developed in 20th century through the appropriate international institutions which produce important conventions, resolutions, recommendations for effective protection and integration into life. In 21st century we continue with implementation of principles, methods and forms of preservation by expanding their interest in the definition of heritage. Unfortunately years and centuries brought wars and destruction, which destroyed our heritage consisting of our work and cumulous work of previous civilizations that together shaped our ambient. That is why our greatest attention should be focused on the appreciation and conservation of the landscape (both, natural and cultural) and heritage, which become the most vulnerable categories.

3. Heritage in Croatia

Legally protected architectural heritage in the Republic of Croatia consists of individual immovable cultural property and historical complexes. Cultural heritage also includes other monuments of importance for the European and world heritage, which are testament of the continuity and variety of Croatian culture and other foreign cultures in the area of Croatia. Initialization of protection of the building as immovable cultural property is the starting point from which all efforts should be focused on extending the lifetime of protected buildings. Methods of economic evaluation applied

to monuments today exist, but they will probably be even more improved over time, to include architectural heritage as well as its relevant potential in process of strategic development planning.

Systematic approach applied in planning of development of the Croatian economy should also observe potentials that exist in the successful preservation of architectural heritage. Croatian future development and growth are focused towards European and other developed countries and this country's future depends on this orientation. With preservation and revitalisation of our national heritage, based on knowledge, competence and talent of Croatian citizens, together with application of already proven successful methods and foreign help, we can ensure our national identity and prosperity.



Figure 3: Plan of the Fortress Stara Gradiska

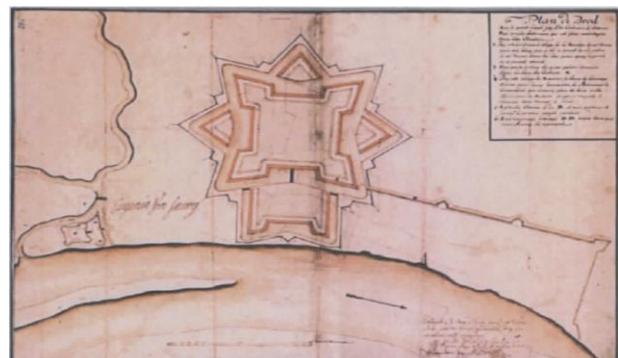


Figure 4: Plan of the Fortress Brod from 1715.
(verify by Prince Eugene of Savoy)

4. Fortress of Brod and Stara Gradiska - History

In the Baroque period of European history of fortification, the Fortress Brod and Stara Gradiska had an important role as part of the fortified towns on the border of the Ottoman Empire. The Military Frontier was established during the conflict and Ottoman incursions from the east in the 15th century, until the peace agreement in Srijemski Karlovci in the 1699. It divided and ensured the status quo between the Habsburg and the Ottoman Empire in the area along the river Sava. The border has been organized to separate the conflicting parties with a series of fortifications, guard and observation towers. For this purpose, Habsburg strategist, Prince Eugene of Savoy in 1715 predicts the west wing, the line of defense against the Turks as a series of border forts and castles in Stara Gradiska, Slavonski Brod and Osijek in Croatia, which extends through other eastern countries, all the way to the Far East.

Slavonski Brod became a part of the Military Frontier in the 1702nd and Habsburg engineers began building the fort at the beginning of 18th Century, in 1715. Although the fortress has unique architecture style, it was built in three different phases of construction over the centuries. The original shape was a square like the Vauban-type fortification, built by a design engineer Willer Peretti in 1715th. The final shape of the complex, in the shape of star, was designed by the chief designer of the Military Frontier, Swiss engineer educated in the tradition of Dutch school of fortifications, Nicholas de Doxat Demoret. Fortress Brod occupies about 33 hectares. Building a fortress Brod was completed at the time of Empress Maria Theresa in the seventies of the 18th century, when most of buildings inside the fortress were finished - the barracks, powder magazine and the unique structure of the Cavalier, the largest building of its type in fortification architecture in general. Cavalier is a massive U-shaped (or horseshoe-shaped) structure. In the two storey brick masonry buildings were located rooms for soldiers, workshops and storage

spaces. Cavalier surrounds the central square of the whole fort on three sides and gives the appearance of a fortified structure "bastion". Final Fortress accent is the central chapel, a characteristic vertical structure is a clock tower, both located in the central axis of the complex. The fort was designed primarily to defend against artillery, to accommodate about 4000 soldiers, who were supposed to defend the walls of 2150 feet and also 1573 former residents of the city of Brod.

The Fortress had three rings of defense: internal, external and south which were strongly articulated with the substructure of the fixed earth terraced platforms that perfectly intersects surrounding landscape and create a link between the natural shape of the bend of the river and architecture.

Four bastions connected with ravelins in the east, north and west and back moats were high enough to control the area. Area defense from the river on the south side was called the "hornwerk" because of its looks like a horn "(German: Horn-Horn).

In the historical sources Stara Gradiska was named "Vodum Gradysche". In place of old castles and Ottoman fortresses in the second half of the 18th century Austrian authorities built a strong fortress called "Festung Alt Gradicca" or "Festung Gradisca", which was conceived by the system of similar fortresses, such as Slavonski Brod, Osijek, Karlovac and others. Around the settlements were designed and partially constructed outer parts of fortress with strong earthen mounds, bastions that surrounded the deep moats full of water.

Stara Gradiska fortress was later converted into the prison. For requests of the prison the bastions were destroyed, moats were buried, old buildings were renovated and new structures were built. Because of that the entire complex has lost the characteristics of the old fortress. Among the remaining buildings of the fortress in Stara Gradiska, dominates the imposing volume called "The Tower" built in the second half of the 18th century, which has preserved its original architectural concept and value as part of the curtain wall on the eastern gate, main entrance of the complex.

Fortresses in Stara Gradiska and Slavonski Brod show the similarity with the Roman military camps that were adapted to modern use of artillery of the new era. According to its monumental buildings, the Brod Fortress in Slavonia is a significant cultural heritage and can be compared with the Diocletian Palace in Split, Dalmatia.

Despite their impressive dimensions, the function of defense of fortresses Slavonski Brod and Stara Gradiska against the Ottoman Empire was never completed or tested in practice.

They have never had a chance to prove and demonstrate their combat power, due to weakening of the Turkish forces and the collapse of the Ottoman Empire.

5.The concept of integral reconstruction

- Architectural restoration project -

Long-term was the effort of local government to include fortress which was destroyed and ignored and which lies in the center of the city with new uses in everyday life.

Fortress Brod after the war becomes the property of the city of Slavonski Brod and the concept of integral restoration was accepted and supported because of the well-preserved original documentation and practices in other European countries. The concept is that „only through the restoration of the fortress in its original form, Slavonski Brod can return its full townscape, urban and historical value“

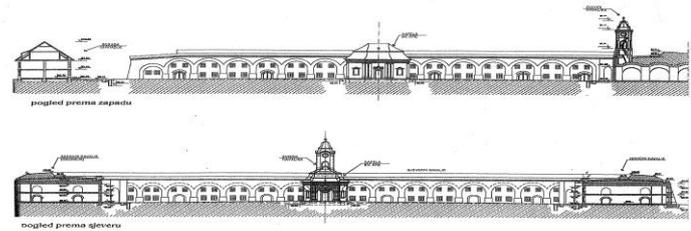
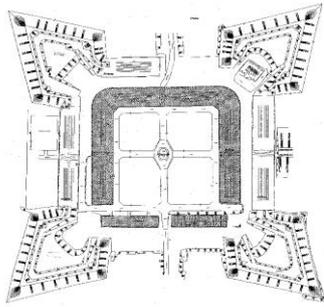


Figure 5: Details from Restauration Plan for Fortress central square, Cavalier, chapel and clock tower

Fortress Brod

Today Fortress Brod lies in the heart of the city of Slavonski Brod and presents the possibility for the future. So far the complex has been cleared of layers of soil deposited over the centuries. Attention is given to restoration work and have so far carried out archaeological investigations and cleaning the moat.

In the past twenty years, some new functions entered in this historic complex. As individual buildings barracks Slavonska has been renovated for high school in classic, Franciscan program which was the first suitable for a new purpose because it leads children as a new generation and gives new life to old walls. City Gallery with a donation of the sculptor Branko Ruzic takes place in the southwestern part of the Cavalier on the gross area of 1800 m².

Officers' pavilion today houses the City Administration and Military Club has become a music school. These new features and reconstructed ramparts, bastions and tunnels promote tourism and cultural activities. For further renewal remains about 20000m² of space. In plans are Barutana as multimedia center and the building remains symmetrical to the high school can be rebuilt as a hotel. One of the projects in the northwestern part of the area of Brod fortress may be the sports ground and congress center. Part of the area in the Cavalier can be used for universitie, librarie, lifelong learning, artists' studios, or for a new museum exhibition.

The remaining free space can become green gardens and parks.



Figure 6:Original shape of destroyed structure (entrance to "The Tower")

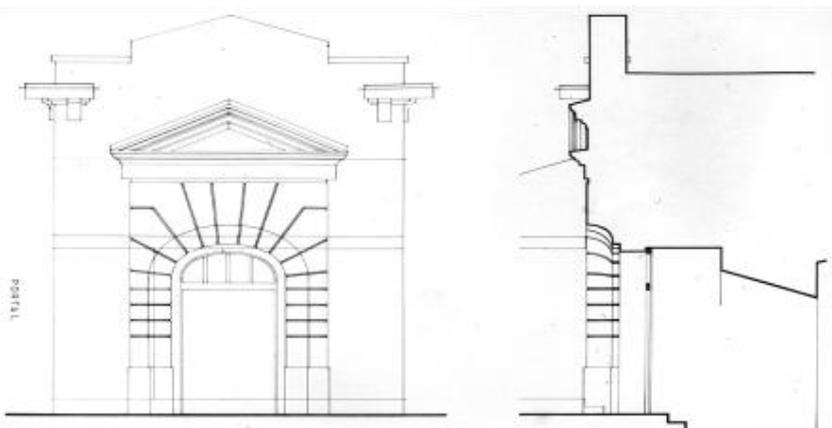


Figure 7:Details from restauration Plan for Fortress (part of the wall with the eastern gate)

Fortress Stara Gradiska

Throughout the time, Fortress Stara Gradiska changed its original shape. Poor and negligent maintenance, as well as the influence of moisture from the terrain and weather conditions have led to a situation that has lost originality and largely

destroyed the structure. Within the complex Stara Gradiska The Tower and other buildings, roofs and walls were further destroyed in the war. This condition imposes an obligation to take urgent measures to protect and rescue of cultural heritage from further destruction. Besides the historical value of this cultural heritage, Fortress is a reminder of the time in which many citizens of our country lost lives in this place. Because of the urgency and scope of necessary protection works the same can be performed in phases. Preliminary actions needs to be a detailed survey of the current state of the buildings, conservation documents, studies (the historical files and documents from existing file in the Conservation Department in Slavonski Brod), which can be used as a base for reconstruction . First phase should be the action that directly protects cultural property, namely the protection and reconstruction of structural, construction parts of the building and reconstruction of imploded part of the roof and walls of the Cavalier, protection against weather conditions and moisture from the ground. Second phase should be all construction-craft work that protects the building and leads to its original state and a final, third phase should bring new functions in the buildings which will be determined after the analysis.

6. Lifelong learning and applying of new knowledge

Knowledge has become one of the most important resources. The strategic objective should be: become competitive and develop knowledge - based economy, capable of sustainable economic growth with improved attitudes and respects for nature and the environment. The concept of lifelong learning has become not just a modern concept, but necessity. Lifelong learning is defined as an activity of learning throughout life, with the aim of improving knowledge, skills and competencies within personal, civic, social and business perspective. Lifelong learning involves acquiring and updating all kinds of skills, qualifications, interests, knowledge.

Globalization is present in all parts of life and it affects the whole world. That is the reason to learn whole life and to set new standards in the ways restoration of cultural property by applying new technologies that protects and respects the natural environment to the fullest extent.

This paper aims: focus attention on the reconstruction of cultural heritage that has been present here for centuries, to point to its architectural value, to find a new ways of solving technical problems to induce economic activity, preserving valuable natural features and attributes for the future and contribute to energy efficiency.

7. Energy efficiency

Due to the high energy consumption in buildings, and the maximum potential energy and environmental savings, energy efficiency and low energy construction has become the priorities of modern architecture and energy. Buildings are recognized as the greatest potential for reducing total energy consumption, which directly affects the quality and comfortable stay in the building, the longer the life of the building and contributes to environmental protection.

Croatia now faces three major problems related to energy: lack of energy and uncertainty in energy supply (imports over 50 percent of energy needs) a steady increase in energy prices and increase in the consumption of thermal energy for heating and cooling energy, especially the massive introduction of air conditioning in buildings. Excessive and irrational consumption of energy causes environmental pollution and climate changes.

Croatia ratified the Kyoto Protocol on 27th April 2007. according to which the obligation to reduce greenhouse gas emissions from anthropogenic sources by 5

percent in the period since 2008.- 2012. in relation to the reference 1990th year. Energy efficiency involves efficient use of energy in all sectors of final energy consumption: industry, transport, agriculture, construction, and residential and nonresidential buildings. Energy efficiency in buildings aims to: reduce energy consumption, with financial savings for the end users increasing standards of living and staying in the area, reducing maintenance costs and extends the lifespan of buildings, contribute to the protection of the environment and reducing harmful emissions into the environment and global climate change . Due to the long lifetime of buildings, which are the immovable cultural property, their impact on the environment in which we live a long and continuous can not be ignored. Existing buildings are now the biggest energy problem because of low standards and they spend enormous energy and pollute the environment and therefore there is a need for systematic renewal. Buildings are the single largest energy consumer with the greatest potential for energy and environmental savings. Energy efficiency and low energy buildings should be a challenge to achieve a new level of architectural quality, and not a limiting factor. Projects to increase energy efficiency and sustainable renovation of existing buildings can now act as a kind of urban and architectural incentives, as well as a field for the application of innovative technical and technological solutions: to improve the living comfort, increase the flexibility of space, reduce energy consumption, and thus the cost of living and maintenance , increased use of natural materials and renewable energy sources, and cost-effective solutions for construction and maintenance.

Architecture must include the consideration of renewal of cultural property with a range of measures to increase energy efficiency, use of renewable energy, district heating and cooling, reducing fossil fuel use and pollution of the environment in which we live. The important role of planners, their task, is to consider and resolve the optimal energy concept of the building: 3E - form - energy, economy, ecology. Profession is now in a position to respond to the challenges posed to have a positive impact on alleviating the energy and environmental crises, and contribute to sustainable development. Wider implementation of energy efficiency measures has a number of barriers: lack of data on energy consumption, costs and potential savings in buildings, lack of experts in the field of energy efficiency, particularly architects and engineers, lack of knowledge and awareness about the benefits of energy efficiency, insufficient knowledge and awareness investors, builders and all participants in construction, low energy prices, lack of funding, high cost of modern energy systems, lack of initiative by the investors and builders, confusion in the financial interests and opportunities. Removing barriers and implementing energy efficiency in architecture can help: encouraging designers and interdependence of all participants in the project, an integrated approach to design, review and design concept of the energy in the initial design phase. We have to impact at projects to change attitudes through education and promotion and establish stricter legislative for environment, with the introduction of incentives for energy-efficient and low energy construction.

8. Applications in practice in the reconstruction of cultural heritage

Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings (Official Journal L 001,04/01/2003) provides for establishing a general framework for the methodology of calculation of energy performances of buildings, the application of minimum energy efficiency requirements for new buildings, the application of minimum energy efficiency requirements for existing buildings, energy certification of buildings, regular

inspection of boilers and air-conditioning systems in buildings. To achieve the effect we have to analyze the possibility for improving the thermal performance of building, replacement or improvement of heating systems and increase efficiency, improve or replace the air conditioning and increased efficiency, replacement or improvement of hot water, changing the fuel where it is economically and environmentally viable, introduction of renewable energy sources (solar, geothermal, biomass ...), improving the efficiency of electrical and household appliances, rational water use, energy-management in general. Depending on the level and accuracy of information collected for the energy state of the building we differ preliminary and detailed energy audit of the building. Preliminary energy audit (WALK THROUGH AUDIT) provides basic information and determines the need for conducting a detailed energy audit and Feasibility Study. Restauration project for Forteress Brod, with principles and standards for cultural heritage protections was fully implemented. It was the challenge to harmonize requirements of cultural heritage protection with a demands for an increase in energy efficiency and the influence on enviroment. Modifications on the buildings have been kept to a minimum in order to preserve their historic value. Improvements that were used enable pleasant living, increase the flexibility of space and reduce energy consumption.

For restoration of cultural heritage is recommendation increased use of natural materials and renewable energy sources, and cost-effective solutions for construction and maintenance. New green roof on Cavalier looks like historic originals but with use of modern materials (waterproofing). Traditional material (old bricks) was used for walls and floors. New window looks the same as old ones but with a thermal insulation glass. Here we have an improvement of conditions, thermal comfort in buildings with a successful compromise, new instalations of heating, ventilating and air conditioning system. In this way we promote cultural heritage protection and energy efficiency as a method of economic development, also prepare guidelines for future restoration projects. Slavonska barracks have been renovated for high school in classic, Franciscan program. City Gallery with a donation of the sculptor Branko Ruzic takes place in the southwestern part of the Cavalier. Officers' pavilion today houses the City Administration and Military Club has become a Music school. These new functions promote Fortress as touristic attraction. For further renewal remains about 20000 m2 of space in Fortress Brod.

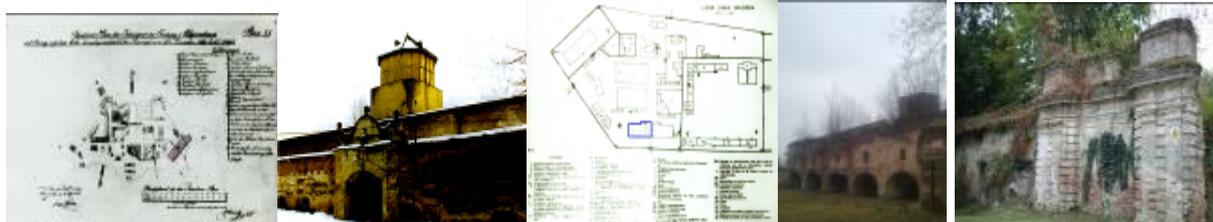
Fortress Brod photo gallery:

Panorama..... Cavalier..... Music school..... Chapel..... Galery.....



Fortress Stara Gradisca photo gallery:

Plan from 19 th century....The Tower in 1941....Plan from 1945.... The Tower.... and Gate today....



9. Conclusion

Our cultural heritage includes monuments of importance for the European and world heritage, which are testament of continuity, identity and variety of Croatian culture. In the Baroque period of European history of fortification, the Fortress Brod and Stara Gradiska had an important role. Today we have to implement policies and strategies for ensuring the preservation of heritage. Old buildings are the single largest energy consumer with the greatest potential energy savings. Before any reconstruction of existing buildings, cultural heritage we should conduct an overview of the energy situation in order to determine potential energy savings. Contemporary architecture and construction must properly optimize the energy needs of buildings and allow users rational management of energy consumption. The project will be able to affirm optimal use of modern energy efficiency measures, selection of materials, energy, choice of heating, ventilation, air conditioning and the possibility of using renewable energy sources, etc. Education and training of energy experts in the various target groups, is one of the most important ways to remove barriers. Implementation of energy efficiency should lead to an increase in construction activity and development of the entire construction industry, as well as national and international incentive mechanisms. The role of the profession is extremely important. In today's context, designers must become aware of their responsibility both for what they do and for what they could do, but did not do. Now is also the best time for starting new restoration project for Fortress Stara Gradiska using all new knowledge and solutions.

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Figure 8: Fortress central square with chapel

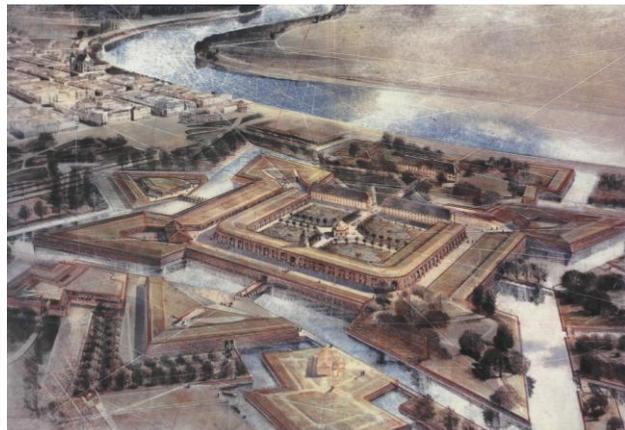


Figure 9: Fortress Brod, artistic vision for the future
(Drawing: Branka Kaminski, architect)

For help on this work I have to thank my two daughters:

Darija, mag. ing. landscape architect and Dinka, geography student

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