

Educational Campus as a Paradigm for a Global Innovation – University of Nis Case Study

Ljiljana Jevremovic, Petar Vranic, Dusan Zdravkovic

(MArch Ljiljana Jevremovic, Faculty of Civil Engineering and Architecture Nis, Serbia, Aleksandra Medvedeva14, jevremovicljiljana@gmail.com)

(MArch Petar Vranic, Royal Institute of Technology, Stockholm, Sweden, pvranic@yahoo.com)

(MArch Dusan Zdravkovic, Freelance Architect, Nis, Serbia, dusko04@yahoo.com)

1 ABSTRACT

This paper deals with contemporary discourse regarding urban revival, elaborating the Educational Campus as a paradigm for global innovation. The objective is to examine the significance and capacity of education and its spatial articulation for social incubation and overall urban development. Furthermore through case of the city of Nis it was demonstrated the possibilities for connecting capacities and priorities in order to build a theoretical 'platform' for systematic urban design package in respect to the local resource. The new needed identity for the city of Nis in the time of transition from former industrial into the modern competitive city, can take many forms. Here was argued that, while there is the absence of a formal response to neoliberal governance regarding the strategic urban development, new Educational Campus paradigm might be solution for urban revival. This paper has examined possibilities of formation of the University Campus within the city core as a plausible model for prosper urban transformation of the city. Particularly concerning positive outcomes for the city and the university, the revival and redevelopment of historically important but neglected urban area including city's Fortress in the center of the city is given proposal that was used for model analysis through which some important issues was examined.

2 INTRODUCTION

The city and the university have extremely strong relations that have been proven through the history and some historians (e.g. Thomas Bender) here pointed out their "mutual medieval origins". Likewise Herman van der Wusten (1998) focuses on the contemporary importance of universities to cities, and vice versa, as well emphasizing the cultural significance of urban universities as physical features of the urban morphology and as institutional partners and, in some cases, agencies of the modern state. Beside these stands in fact the relations between the university and the city are often more complex and sometimes conflictive, particularly in the case of US where the university campus was persistently kept out of the urban environment. On the other hand, European universities are traditionally strongly connected with the city, and in very few examples are out of the urban areas.¹

European universities are obligated to adapt and achieve the academic requirements of the European Higher Education Area (EHEA), but they need to face a quality shift as regards of spatial quality (architecture and urbanism). In response to this challenge, Spanish architect and professor at Sao Paolo University in Madrid, Pablo Campos has conceived an innovative concept of the "Educational Campus", based on the ten principles. Its aim is to foster the transformation of mere physical spaces into quality educational spaces, and in this way contribute to the intellectual, affective and social development of the university student within the urban and social context. Education and its spatial context are connected by the interaction that facilitates the exchange of knowledge that takes place in a particular physical environment. The concept of Educational Campus is built on this idea. It aims to provide a range of theoretical and practical reflections that could be of use to universities which intend to remodel their environments.² This paper explores application of this concept of the University of Nis in the city of Nis (Serbia).

Large cities, university and regional centers in the country are usually attracting a large number of people. In the recent history the city of Nis did not faced that much of popularity expressed though increased number of population, workers, families, etc., but steady growth was always present owing to University activity. The

¹ David C. Perry and Wim Wiewel, *The Centrality of the University and the City in the Twenty-first Century, in Global Universities and Urban Development, Lincoln Institute of Land Policy, 2008, Cambridge, Massachusetts*

² Pablo Campos Calvo-Sotelo, "The concept of "Educational Campus" and its application in Spanish universities, *CELE Exchange* 2010/8, OECD 2010, ISSN 2072-7925

university in the city is present since the end of Second World War, and after years of developing activities, there is a need to be reconsidered especially in terms of space, its spatial distribution within the city and capacities of existing facilities. The priority of this project is to introduce integrated planning proposal for new campus and promote strategic framework for further development of the university and the city itself.

3 THEORETICAL FRAMEWORK

Education is, *inter alia*, a spatial act. This belief lies on the fact that the human contact that feeds it, necessarily must be developed within a physical ambit. Consequently, the built environment plays a transcendental role in the integral formation of the person, which is the true mission of the University. For this reason it is necessary to design the places devoted to Education with an aim for a quality that contributes to the intellectual, affective, and social construction of the university student. The European University is being adapted academically to the European Higher Education Area (EHEA), but it must face a quality leap in the matter of space, both in the Architecture of its precinct and its integration in the City. The concept of “Education Campus”, which Pablo Campos enunciated for the first time in 2005, creates a universal philosophy capable of evoking in all Universities a process of modernization towards a new excellence. A Campus will be “educational” if it incorporates and testifies to the values addressed in the following 10 principles:

1. ***Utopia and integral planning.*** Encouraged by Utopia as a transformative energy, the design of a University environment must be developed using integral planning strategies which translate into tangible form the necessary utopian principles, defining an evolution governed by a sound degree of freedom and flexibility in space-time. This occurs under the premise that the proper conception of a University precinct is not the formulation of an urban-architectural object but the definition of a whole process.
2. ***Learning community.*** Stimulation of personal contact and functional integrity, fostering the consolidation of an entire learning community where human scale prevails in its spaces, inside which a “feeling of belonging” is generated in the University member. Through an intentional design, the physical scene must set up empathies with the human being who inhabits it, in such a way that Urbanism and Architecture act as incentives for him to develop with motivation his activities of study, research, relation and general living.
3. ***Spatial harmony.*** Crystallization of a global aesthetic for composing urban and architectural spaces, so that it becomes a part of the collective memory of society. The University physical implantation must transcend the mere supply of available built areas, getting involved in the visual education by means of designs which generate coherent arrangements where attention is paid in similar way to build volumes and open areas. The Campus, as embodiment and material reality of the University, will turn to be the first lesson that a student receives, a “three dimensional textbook” with an architectural corporeity.
4. ***Affective & intellectual embracement.*** Performance of a spatial metaphor of the “affective & intellectual embracement”, through an arrangement of the precinct, the conception of which intentionally activates affective impacts, awaking empathies in the community. The layout, volume, shape, and texture of the different architectural pieces within the Campus will have the mission to endeavor the psychological wellness of the University inhabitant.
5. ***Nature and Art.*** Incorporation of Nature as a cultural value, integrating it in a global assembly ruled by the premise of “unity within diversity”, in which the different components, buildings and open spaces, build up a physical scene where its purpose as a cultural product can be expressed, namely its academic content as a locus for study and research. In addition, artistic works can be exhibited either on exterior or interior, to complement through their contemplation the formative quality of the environment.
6. ***Image and accessibility.*** External projection of a sound University image, consistent with its transcendental missions of teaching, research and social commitment, fosters values related to conceptual and physical accessibility and exerts sensitivity towards the culture and traditions of the place. It thereby enhances expression of its full social, geographic, cultural and architectural meanings.
7. ***Adaptation to the environment and sustainability.*** Adequate response of urbanism and architecture to geographical and climate conditions, promotes exemplary solutions in environmental, bioclimatic, and sustainability issues. This goal is achieved through the choice of materials, technical & constructive solutions, and the incorporation of mechanisms that foster the use of renewal energies.

8. **Memory and avant-garde.** The urban-architectural paradigms of memory, inherited from the history of spaces, serve as an intellectual resource for design. Accordingly, new plant projects, generated with a high degree of formal freedom, as well as the adaptations of pre-existing buildings and uses (testifying to positive change of former functions), must contribute to a sense of contemporaneity and the cutting edge. Their presence invigorates and reinforces the intellectual identity of the University.

9. **Relation University-City.** Generation of synergies between University and City, reinforcing the active presence of University people and spaces within social and urban contexts (as well as in a reciprocal sense). It fosters innovation, and invites other Institutions to share the global University project for the achievement of such a goal.

10. **Innovative teaching & learning modalities.** Design of spaces which host and foster the application of innovative teaching and learning modalities, housed under a global pedagogic project. This should be done in such a way that the physical spaces that are alternative to the conventional classroom abandon their obsolete role in teaching issues. They are thereby transformed into intelligent places, stimulating a positive change in the attitudes of the relation professor-student.³

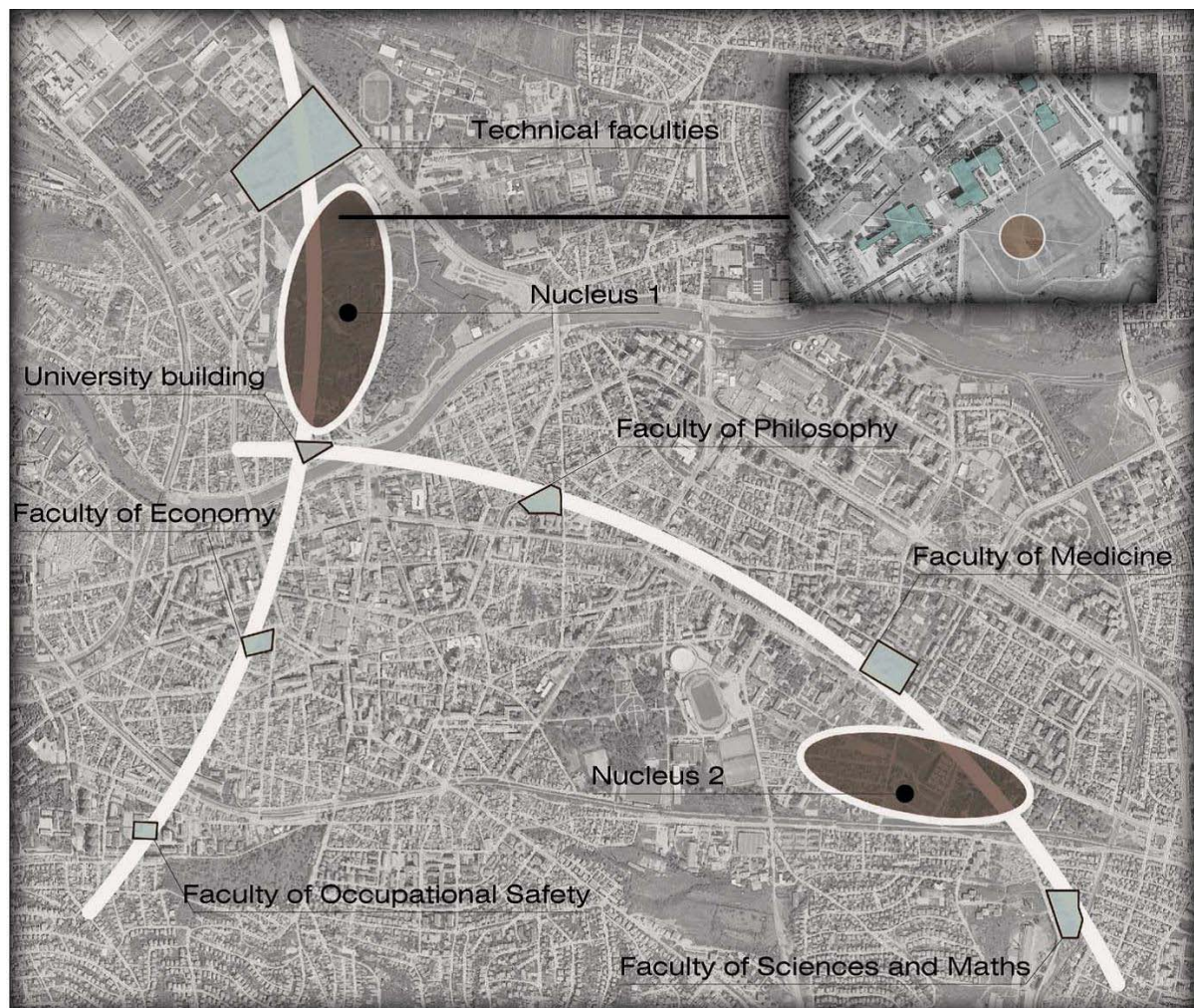


Fig. 1: University locations on the city map

4 ANALYSIS AND EVALUATION OF UNIVERSITY IN NIS. SPATIAL CONTEXT

The University buildings in Nis along with accompanying open spaces and facilities are spread in several locations within the city. This is not certainly an isolated case, but within the concept Educational Campus, here, it can be considered as unfavorable situation. At the Figure 1 is visible spatial distribution of the university properties in the city. It is clear that most of the Faculties are scattered as a single objects in the

³ Pablo Campos Calvo-Sotelo, An innovative concept for the transformation of Universities and their relation to Cities: the "Educational Campus", OECE – Riga, December 6-7, 2009

urban city matrix, thus having difficulties to be recognized as a part of a university's unity. This also entails the internal problem of mutual affiliation and identification between the faculties, both students and scientific community (employees). Furthermore, in the case of this university and its faculties, there is a problem with the use of inadequate buildings due to the fact that some of the buildings are not primarily designed for this purpose; some of them are used by several faculties without having proper treatment of special needs of each discipline. Table 1 is giving us an important comparison between the spatial capacities of the current buildings and spatial needs of current number of students.

Thus here was stated that it is justified to put most of the faculties together, so to cluster the university members. This should be feasible by formation of two nucleuses within the city area. Regarding to the spatial capacities and other functional requirements and conveniences, the Nucleus 1 (see Figure 1) it was proposed to be formed in the area at Technical faculties while the Nucleus 2 should be formed near the area of Medical faculty. Here bio-medical sciences should be concentrated due to closeness of the Clinical Centre of Nis which is an institution of regional significances, but serves also as educational polygon for students of medicine and other related fields.

Faculties	Current area in m ²	Numbers of students (No.S.)	Needed in m ² (No.S.x4m ²)	Available area in m ² for transformation
Faculty of Philosophy	6480	3000	12000	-
Faculty of Occupational Safety	9670	~1200	8900	-
Faculty of Physical Education and Sport		~1025	4100	
Faculty of Science and Mathematics	10000	1522	6088	-
Faculty of Economy	10200	~3000	~12000	-
Faculty of Law		~3000	~12000	
Faculty of Arts	-	472	~2000	-
Faculty of Electronics	14700	2000	8000 *no demand for expansion	-
Faculty of Civil Engineering and Architecture	13000	1200	4800 *no demand for expansion	-
Faculty of Mechanical Engineering		615	2460 *no demand for Expansion	
		Σ~13247	Σ~31500	
Dormitories *	12290	13247	~30000	
Hinterland **	105416	-	-	105416
Communal company **	3700	-	-	3700
Pavilions **	1770	-	-	1770
Abandoned Heritage **	680	-	-	680
				Σ~111566
Occupational index <60%				
Available land for new building ***				~60 693
* Calculation for accommodation capacity is based on current demand which is approximately (unofficially) 3 applicants for one vacancy place. Current capacity is 916 places. http://www.scnis.rs				
** Existing building capacities within the City Fortress				
*** According to the Comprehensive plan for the city of Nis for 2010-2025, Version No 4, p. 137, occupational index for building site is for Educational buildings up to 60% of the building parcel				

Table 1: List of faculties and their building capacities

Second stage of examining the “Educational Campus” concept in the area of the University of Nis, was designing a proposal for the Nucleus 1, which was conceived as a crucial and most significant part of the University, a heart of the University. By the focus on the single area it was possible to follow the ideas of EC concept, at to be detail in the solution criteria.

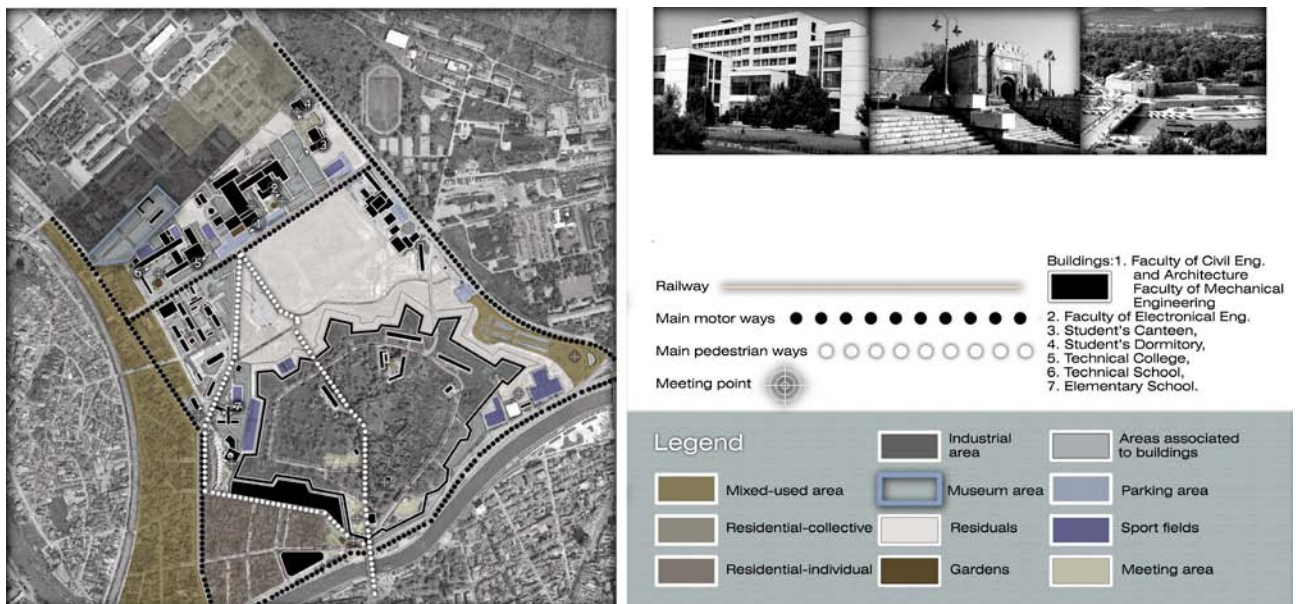


Fig. 2: Nucleus 1- Technical Faculties Campus – current situation

4.1 Analysis of Current Social Environment

Area of Nucleus 1 suffers from cognitive and geographical exclusion. Consequently in the urban matrix of the city it is recognized as segregated area despite the closeness to the city centre. (approx. 1km) There is no platform for social interaction with the rest of the faculties because it is physically disconnected with the other University facilities. Furthermore there are no supplementary programs that can support area to function as self-sufficient unit. Also meeting places are more spontaneously occupied spaces then designed area for the purpose. As for consequence there is no sense of community life in the observed area. The complex is not inviting and attractive for the surrounding neighbourhood's architecture and function. So it doesn't serve as integral part of wider area but rather stand as programmatically isolated island. Accordingly, area doesn't have any benefits from it. The conclusion is that the area so far does not have quality and physical performance to be a university campus.

4.2 Analysis of Current Accessibility

1. Pedestrian access. Because of the huge buffer zone that lay in between the Technical faculties and the Fortress, the university complex has poor and very punctual accessibility. Two existing pedestrian accesses are not supported with any following programs and protected from the winds. Consequently they are not pleasant for walking during the night and in the winter. East and West roads (Boulevards '12th February' and 'Nikola Tesla') are no real pedestrian accesses, rather leftover sidewalks along industrial and military areas. From the North direction access does not exist. This is one of the factors that enhance the cognitive exclusion even more. Furthermore these pedestrian accesses are cut in front of the Faculty's building, before the entrance patio by heavily-occupied Street A. Medvedeva and the parking area. So existing solution with zebra crossing can be considered as problematic point according to functional and security reasons (there have been accidents with casualties).

2. Vehicle, traffic and infrastructure. Only street that serve as access for motor vehicles is St. Aleksandra Medvedeva. Besides the fact that it provides good enough accessibility to the area (access for private cars and public transportation – single bus-line exist), it creates problems as well. Namely, street is one of two connectors among two main boulevards mentioned above, that are major city entrances. Accordingly, Street A. Medvedeva is loaded with intense and speed up traffic all day long. Additionally here has never been built

pedestrian sidewalks on the street. Thus this street and accessing point to the faculties totally undermines pedestrians and cyclists, and represents main physical barrier within the area, especially because it faces main entrances to the faculty buildings and directly cut the pedestrian paths that go from the city centre through the Fortress and from main Bus station. (see Figure 2.)

3. Buffer zones. “City field” (residual are between the Fortress and the Faculties – see Figure 2.) represent the biggest buffer zone that separate faculties from the city centre (here we considered fortress as part of extended city centre). Because of its underground archaeological layer that is waiting to be excavated, it exists as a plan-less and extremely poorly maintained and exploited area. Without any built structure or high-trees, it is always exposed to the strong north winds. Besides the physical side, it represent noticeable mental barrier without any wind- and sun-protection along the pedestrian paths passing through. Another buffer zone is the Fortress itself. Problem is because of polarized activities and functions. Compared to southern part, northern part, including abandoned water canal and facilities along the northern wall, stays as underdeveloped and useless for public activity. On the one hand it doesn't contribute to the Fortress life as a whole and regarding its condition, it enforces even more cognitive distance between the faculties and the city centre.

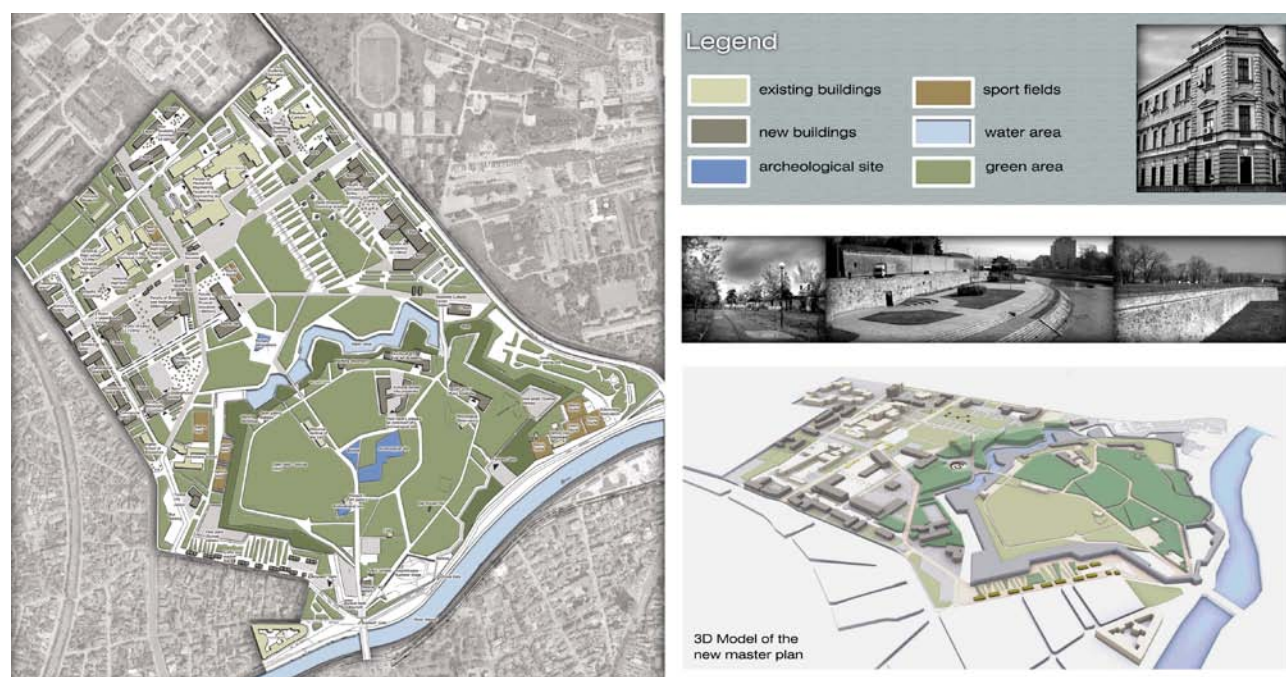


Fig. 3: Master plan proposal for Nucleus 2 –Technical faculties' campus

5 THE PROPOSAL

Summarizing all above-mentioned, the new Master plan for the Nucleus 1 – Technical faculties' campus was introduced as a result of the research project. The area considers the area, now under the cluster of Technical faculties, including wider north-west and south-east areas framed by following streets: Boulevard 12. February, St. Djuke Dinic, Mike Paligorica Quay, St. Jadranska, Boulevard Nikola Tesla and Access to 12. February. According to the official plans, beside the university facilities, observed area that is mainly consists of military complexes, is planned to be relocated. Rest of the area is occupied by light industry and temporary services that are also planned to be relocated away from central city zone or renewed by giving them new uses. That justifies authors' tendencies for establishing new University campus utilizing this particular area.

5.1 Sense of Community

Future campus area, regarding mentioned on-going plans for recycling the military camps and the industrial areas into the mix developed neighborhoods, has capacity to serve as social generator for urban revival of the northern part of the city, the municipality Crveni Krst, and linking it with the city. While municipality at the moment does not have any recognizable meeting point, municipality center, park or square; does not have

even any livable places that could be used as identity of the whole community; it has many industrial and former military sites ready to be redeveloped, and one of the main is relying on the Northern boundaries of Technical faculties' campus. Master plan will take advantage of it to establish diffuse boundaries and melt into the neighborhoods, locating major part of student accommodations in that area.

Another direction for widening the university area is toward south-east, toward the city center. The Fortress and the locality of the ancient site (not yet excavated), which are of the major importance for the city, are the areas that are in this master plan proposal considered as university public spaces that can be used by multiple users – university and the city: students, scientists, artists, citizens, tourists etc., but where the university with its capacity is serving as leader in the activities (activator) that are supposed to revive this area in social and educational sense. To clarify, there are no intentions for creation of competitive city center in the university campus but rather to form complementary extension and enrich the city core with diversity of activities.

5.2 University Facilities Re-clustering

To establish university-city relation, and create atmosphere where students and citizens can develop the sense of belonging, the new campus has to reach certain programmatic and spatial harmony. Regarding that, some of the faculty in new Master plan are relocated from the current location and clustered in the northern campus – Nucleus 1. Planning new buildings for faculties that should be relocated from current locations is even more justified by the fact that some of the faculties are using buildings that are rented (Faculty of Fine Arts) or given for the use (Faculty of Sciences and Faculty of Physical Education...).

In the proposal, the campus should occupy whole width of the area between the Boulevards, so that the campus can incorporate the mixed used area along the 12. February Boulevard. (see Figure 3.) This area is planned to be redeveloped into the university commercial space housing different services necessary for the University campus such as: markets, restaurants, bookstores, copy-houses, rent-a-car or sharing bike companies, hostels etc. Similarly, here should be nested companies that have an interest to establish their work close to the university such as: research laboratories, innovative companies etc. This will be area with secondary activity closely related to university, but not with the basic university functions.

By the proposal, it is planned to existing Street Belgrade be converted into “integrated street” with controlled vehicle access. This access is important due to proposed positions of the new faculty buildings that are placed at the current military area close to the “city field”. Another location for placing the new faculty buildings is along Boulevard Nikole Tesle, so whole campus will get “U” shape considering the disposition of the its buildings, i.e. “an cloister” considering the Fortress as fourth closing side, while “city field” will be used as internal yard, open space inside the campus area.

In order to make a new campus from this particular space, the whole functional area will be supplied with programs that are lacking so far such as: medical / supporting center, kindergarten, apartments for visiting professors or researchers, etc. New sports facilities are planned for students and other users in the campus that should contribute to better sense of community among the students of the whole University. New sport facilities are intentionally spread through the whole campus to provide opportunity for social interaction with surrounding neighborhoods to take a place at the sport ‘battle fields’.

The site of the city's main bus station in the proposal, since according to the official plans it should be relocated, will be turn into main tourist accessing point into the city, with parking for the buses, cars and bikes, taxi station, tourist info-center etc. Idea is to rethink city's image and make transition from industrial into the city of knowledge, culture and tradition, make the University campus as departure point for the tourists visiting the city(attached to the site and easy to access). Furthermore, open market area along St. Djuke Dinic is also displaced and replaced with small-size pavilions with traditional market goods and craft workshops. In this way memory of the citizens on the old bus station and green market in this way will remain but it will be interpreted by contemporary architectural vocabulary.

In order to create diffuse boundary toward the city center master plan proposes establishing some of the University facilities inside the Fortress. Precisely, pavilions along the northern fortress wall are conceived to be transformed into Art and Music Academy, with following contents related to them such as painting showroom and workshop, artwork plateau, open gallery, exhibition spaces etc. Finally, master plan introduce new, joined University-City library merged within the New Cultural House. It will replace area currently in use by city's communal company ‘Mediana’. Furthermore, open spaces in front of the fortress are organized

as student-city park (plateau below the restaurant ‘Gusar’, park in front the City Hall) will host new educational pavilion as 24/7 showroom of the educational activities in the city. This will allow university activities to be more transparent and to utilize the Fortress capacity to the fullest and to enrich the City center with new amenities. Moreover, the Fortress itself will remain as a knowledge flagship building and strengthened the presence of the University in the city. In that way, education will become not just more accessible from the physical point of view, but what is more important from the cognitive too.

5.3 Accessibility, Traffic and Infrastructure

Traffic proposal has for its agenda to introduce car-free campus with internal restricted vehicle traffic (logistic needs) and to promote environmentally friendly transportation mode and healthy way of living suitable for students and scientists. Proposed cycling and pedestrian paths with full length of 10km have for it purpose:

- to improve connection between the city and the University campus
- to connect two university’s nucleuses (Nucleus 1 and Nucleus 2) – see Figure 4.
- to enhance and to promote environmentally friendly transportation mode

Current road infrastructure allows such concept. Namely, the campus, framed by following streets: Boul. 12. Februar, St. Djuke Dinic, Mike Paligorica quay, St. Jadranska, Boul. Nikola Tesla and Access to Boulevard 12. February; will be supported with efficient car access, that further leaves space for traffic alternations within the internal area. Intervention has been made by displacement of vehicle traffic from existing St. A. Medvedeva that right now serves as accessing road, to the north, “behind” the current faculty buildings, in the newly proposed street, giving so the vehicle access and followed parking lots from the back side. (see Figure 3.) St. A. Medvedeva will become pedestrian/cycling avenue with restricted vehicle traffic for the logistic and emergency purpose only. In this way front side of the faculties will remain directly connected with front open area – the ‘city field’ creating capacity for natural merging of the two entities, opening more pedestrian accesses and enhancing pedestrian flow. Public transport (bus lines) will be supported with the stops at the both ends of the newly formed pedestrian avenue where it meets two boulevards: 12. February and Nikola Tesla. Third one is located at newly proposed street, creating the closest access to the existing buildings by public transport. Bus stops at the extremes of the pedestrian avenue will be supplied with taxi and sharing car / bike station.

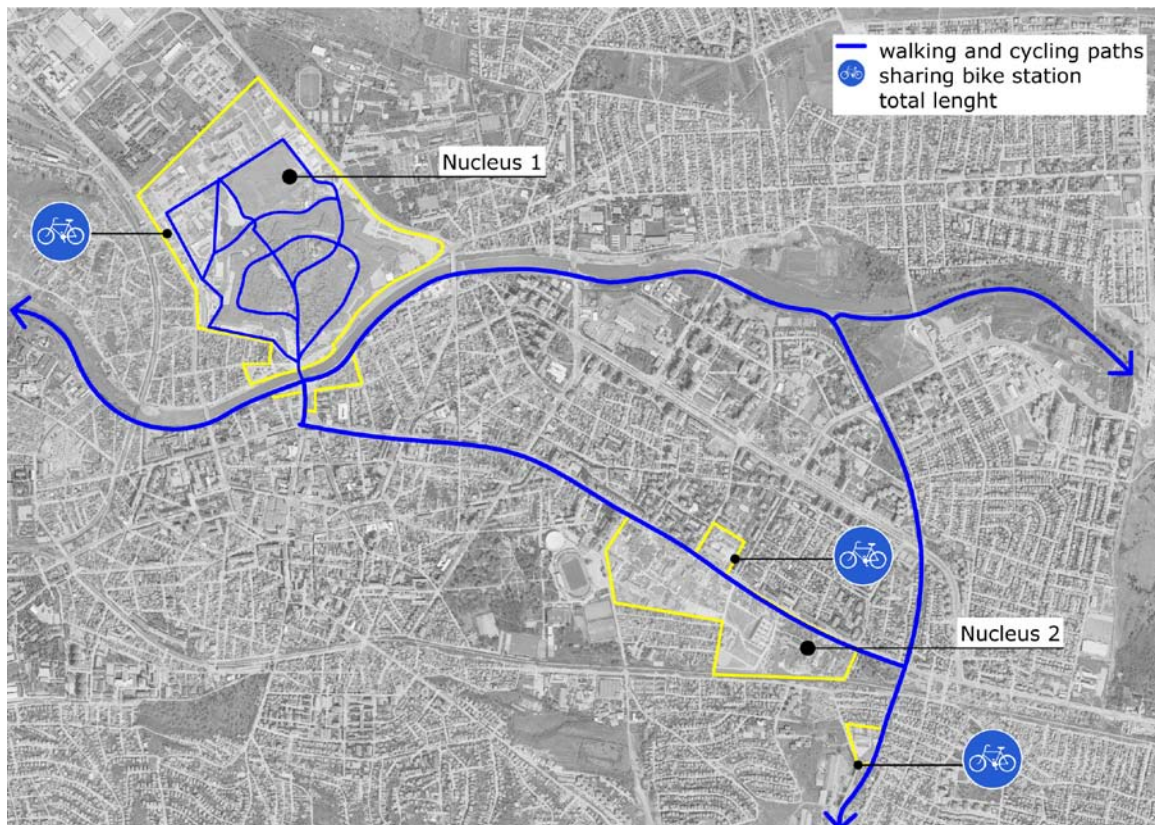


Fig. 4: Bike lines in the City – proposal

5.4 Nature & History

Whole spatial concept of the Master plan is actually lead by the idea of utilizing cultural, historical and natural resource that already exist but its capacity was undermine so far. Mentioned cycling rout (see Figure 4.) has additional purpose beside functional one, to connect two campuses, but as well as to bring the city's nature into the campuses and to form integral green-blue (greenery-river) structure that will foster University-City relation. Moreover this corridor will allow spreading out the university life and create capacity for social interaction between students and citizens and mobilize waterfront as a new learning and social interface.

Furthermore former buffer zone, 'city field', will be turned into diverse and livable campus quad. It is planned as open museum consisted of: thematic greenery woods with species from all over the Serbia, revived water canal as silent pocket for leisure and gathering and traditional Serbian houses exhibition plateau. In addition to the planned open museum will be archaeological site after excavation. It will form a compact whole with archaeological site within the Fortress. Consequently, it will provide platform where history meets future and gives opportunity for reading local cultural, historical and natural layer of the city. Including both university campuses it can aim for constitutional element for further development and foster central city urban tissue.

6 CONCLUSION

In respect to awareness of the complexity of the proposed master plan, here is suggested to be developed in phases, regarding priorities and accessibility to the available capacities for expansion. The Campus is considered as an exemplary city entity that has to serve as trigger for social innovation. The example how the city can use its own resources as catalysts for urban transformation and with a long-term vision create one compact identity in respect to the local but aware of the global context. With contemporary urban management, new University campus could create capacity to re-born city of Nis as 'A City of Knowledge in the 21st Century', increasing its competitive economic value but creating the place worth caring about. Place that talk to its people who they are and where they do belong. Place that become pride of its citizens.

This project had for its aim to contribute to contemporary discourse regarding urban revival, elaborating the Educational Campus as a paradigm for global innovation. Objective was to increase knowledge regarding the importance of Education and its spatial articulation as crucial social incubator for coming generation. Furthermore through case of the city of Nis we tried to show how is it possible to link capacity and priorities to build a theoretical 'platform' for systematic urban design package in respect to the local resource. There are a number of different points of departure in purchase for new identity for the city of Nis in the time of transition from former industrial into the modern competitive city. We argue that now when there is absence of a formal response to neo liberal governance regarding strategic urban development, new Educational Campus paradigm might be solution for urban revival.

Moreover proposal related to the Master Plan for the new Educational Campus in the city of Nis goes beyond the case itself. It is of great importance for us involved in Urban Studies to keep this issues open and tensions between University and City alive, and in that way tries to rethink contemporary methods for urban regeneration, bringing back Education into definitional core of it.

Acknowledgments

We would like to acknowledge the advice and guidance of Dr Pablo Campos with whom we had in Nis an exceptional opportunity to collaborate during the work on presented master plan proposal.

7 REFERENCES

***: Spatial Plan for Administrative Area of the City of Nis 2021. Nis, 2008.

***: Development Strategy, Review of the City of Nis Development Strategy for the period 2009-2020. Nis, 2009.

CAMPOS, Pablo Calvo-Sotelo: The concept of “Educational Campus” and its application in Spanish universities, In: CELE Exchange 2010/8, OECD, 2010.

CAMPOS, Pablo Calvo-Sotelo: An innovative concept for the transformation of Universities and their relation to Cities: the “Educational Campus”, OECE – Riga, 2009.

PERRY, David C., WIEWEL, Wim: The Centrality of the University and the City in the Twenty-first Century. In: Global Universities and Urban Development, pp. 3-6. Massachusetts, 2008.

PERRY, David C., WIEWEL, Wim: University As Urban Developer: Case Studies and Analysis, New York, 2006.