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Soft Mobility as an Urban Design Solution for Water Fronts

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Abstract. Soft mobility is on the top of the agenda as a strategy for cities liveability. It refers to non-motorized transportation solutions in order to promote the human mobility. In this domain pedestrian and bicycle paths have a pivotal interest on behalf of urban design solutions. This paper presents an urban design project focused on soft mobility solutions having as case study a Portuguese city. The area called Train Station surroundings in São Pedro do Sul, makes the link in between the urban fabric and the Vouga river banks. This city is very well-known because of its thermal baths, known since the Roman times. The presented urban design project is a result of the agreement in between the University team, on behalf of the Urban Planning Unit of the Master Degree in Architecture at the University of Beira Interior in Covilhã and the Municipal authority of São Pedro do Sul. The students were organized in several international groups (including people from Portugal, Greece, Brazil, Slovakia, Lithuania and Poland) in order to propose their urban design projects, ensuring the continuity of the urban fabric with the water front. The city hall has organized a competition and has offered four prizes (1st, 2nd and 2 honour awards) for the best projects, which was an extra motivation for students. Regarding the presented solution, the conclusions show that the main strategy was to propose an urban system of soft mobility pathways for pedestrians and bicycles, in order to connect the main natural element in the case study area which is the river with the city. This soft mobility system is connecting places such as the existing low density housing neighbourhoods or the most relevant historical and cultural landmark, the nineteen-century train station building.

1. Introduction

São Pedro do Sul is a city in the central part of Portugal very well-known since the Roman times because of its thermal baths. It is the main city of the Municipality with the same name. The case study area for the academic year of 2017/2018 at the Unit of Urban Planning, in the Master Degree in Architecture at the University of Beira Interior in Covilhã, Portugal was proposed by the São Pedro do Sul municipality. It refers to the Strain station surroundings of São Pedro do Sul comprising part of its urban fabric and the Vouga river banks. It is a very bucolic place where the majority of the public space is empty with no use, waiting for an opportunity to be developed and to be used again as a landmark in terms of contact with nature by locals and visitors (Figure 1). The present project was the winner of the 1st prize of the competition organized by the Municipality of São Pedro do Sul according to the agreement with the scholar responsible for the Urban Planning Unit. In Portugal the Municipalities are the main responsible for the urban design process and for the spatial planning project regarding aspects such as the land uses or the urban spaces (cities, towns or villages) development [1] [2].





Figure 1. Localization of the case study area: Train station surroundings in São Pedro do Sul, Portugal

2. The train station surroundings in São Pedro do Sul

2.1. Main features

The presented urban design solution, was the result of a team work of polish students, coming from the Cracow University of Technology, at the Master Degree in Architecture on behalf of the Urban Planning Unit in year 4 of the course during their ERASMUS exchange programme experience along to one academic semester time at the University of Beira Interior in Covilhã, Portugal. Its focus is on the idea of proposing a project capable to answer to the following issue: how can the urban design proposal create a qualified public space around a historical and cultural landmark, which is the nineteenth-century train station building, using the most important and useful elements of the urban space composition?

In order to find an answer to the previous question, the students' team work has considered from the beginning that while planning these kind of places, the major aspect is to focus on the parts of the territory in particular which could be used and adapted for a better performance. Consequently, the main idea of this project was the attempt to have a coherent urban space connecting the urban fabric with the main natural element, the Vouga river and with the most important historical and cultural landmark, the train station, considering the city of São Pedro do Sul as a whole. On the one hand, apparently, this was not the most difficult part of the urban designing process, but it was the most time-consuming step. On the other hand, it was not an easy job to do, for a group of Urban Planning students, comprising its international background, facing the challenge of finding and developing every important detail, required at an urban design project, for an existing case study area. In fact, every feature of the proposal developed for the place brings interesting and always surprising solutions. The place has potential regarding the water front, however there was a lack of improvements during the last decades. Therefore, the strongest idea is to prepare the area in order to be used by everybody in the future times, given that nowadays it is a forgotten space waiting for an opportunity of rehabilitation and requalification, especially of the public spaces (Figure 2 and Figure 3).

An urban diagnosis of the case study area was done as a result of a visit *in loco* to the site (Figure 4, Figure 8 and Figure 11) and the rules coming from the Municipal Master Plan of São Pedro do Sul were known [3].

This visit has revealed that the area includes the following main important features:

- The train station building, from the nineteenth-century, is the most relevant landmark in historical and cultural terms;
- The existent retaining granite stone wall produces a gap in the area continuity as a result of the existence of two different platforms of the terrain, linked by a granite stone stairs;
- The Vouga water front is the most important natural element;
- The view of the green and idyllic mountains on the opposite side of the Vouga river banks, brings to the users a sense of tranquillity and close contact with nature;
- There is a lack of infrastructures regarding the public spaces, such as parking for cars which are nowadays parked in wrong places provoking conflicts with pedestrians and in between cars;
- Part of the old train track line was transformed into a cycling path and the former train line bridge is nowadays a cycling way over the Vouga river, which is a lovely place linking both banks of the river, with a wonderful view over the landscape; However, this cycling path stops near to the facade of the train station with no continuity to the city (Figure 6);
- Even though the huge greenery of the place, there are no green spaces designed to be used as proper public spaces, gardens, parks or camping areas (Figure 10);
- The surrounding neighbourhoods are composed by low density urban fabrics, where the majority of the residential typologies are single-houses; The existent buildings comprise cases with one, two and three floors which is the maximum number of floors at the place (Figure 7 and Figure 9).
- Shortage of connection in between the existent network of roads, sidewalks and bike paths.

In terms of activities there is only few commercial spots and services belonging to the Municipality (Figure 5). In general, the case study area includes several different spaces for diverse activities including housing, commercial activities and services (Table 1). The area for housing comprises about 3136 m², the area for commerce is about 243 m² and the space for services is about 1068 m². Among to the previously referred features of the case study area, is important to highlight the natural element, which is Vouga river and the most relevant historical and cultural, which is the nineteenth-century train station building.

Therefore, the Urban Project solution should be able to enhance their roles at the case study area, as landmarks and strongest elements linking the city with the water front. According to the Portuguese spatial planning system framework [4] there are requirements for public spaces measurements that the urban design solution as to follow. These requirements include green spaces and streets such as the wide of the car lanes and the sidewalks or the number of car parking places.

Table 1. Case study area: Surfaces for different activities (m²).

| | |
|-----------------------|--------|
| Housing | 3136.4 |
| Commercial activities | 243.7 |
| Services | 1068.4 |



Figure 2. Cycling path and the nineteenth-century train station building in São Pedro do Sul, Portugal



Figure 3. Case study area: two levels of the terrain and the granite retaining wall - Train station surroundings in São Pedro do Sul, Portugal

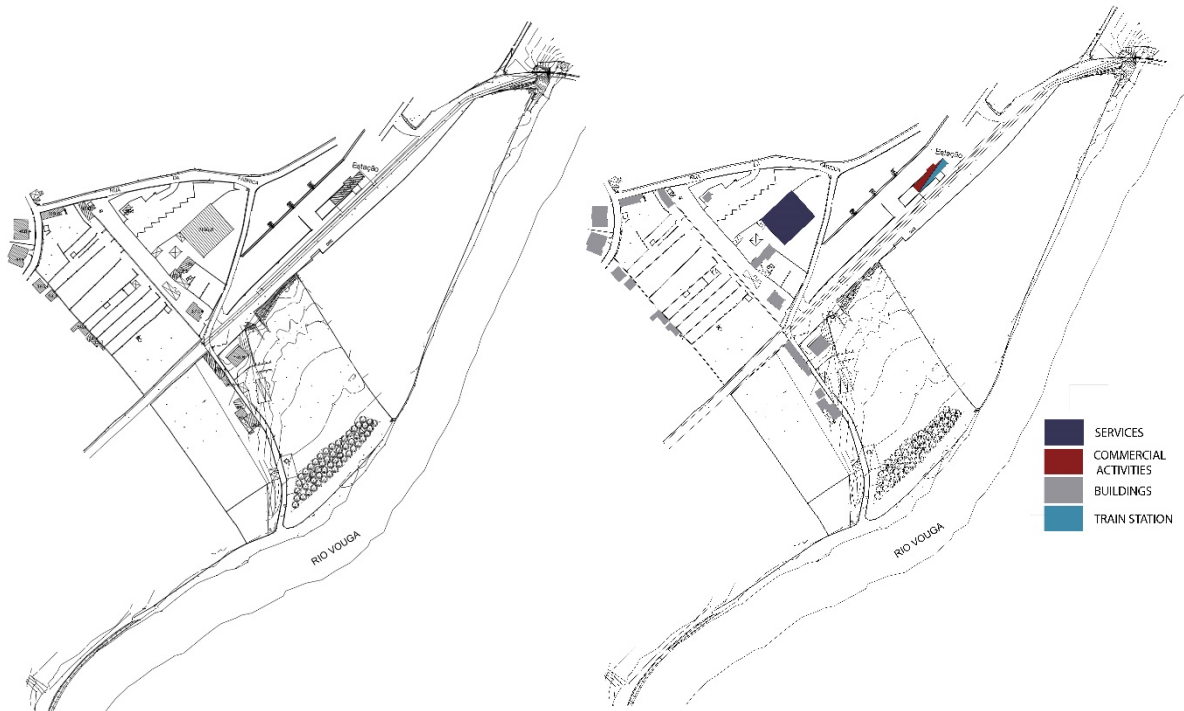


Figure 4. Global features of case study area.

Figure 5. Map of activities per floor.



Figure 6. Map of streets surface with the bike path.

Figure 7. Map of existing buildings.

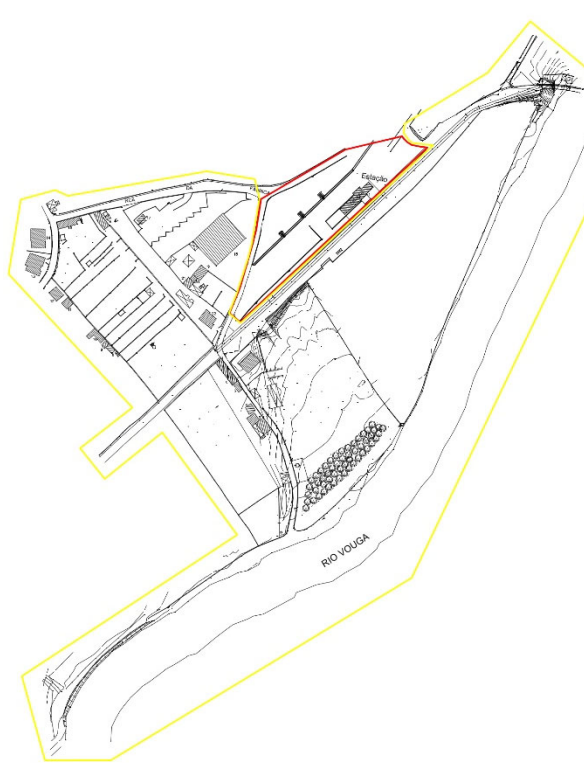


Figure 8. Map of global surface.



Figure 9. Map of number of floors of existent buildings.



Figure 10. Green spaces.

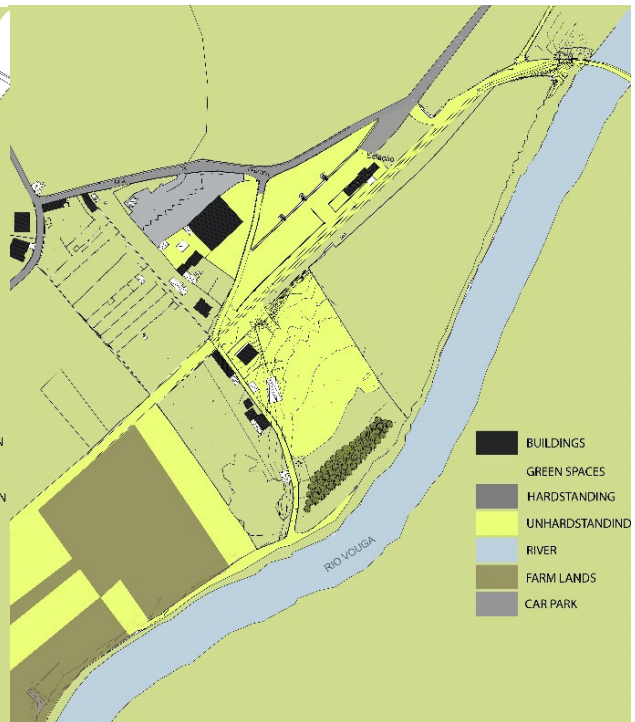


Figure 11. Global map – Train station surroundings.

2.2. Challenges regarding public spaces and facilities

Analysing the geometry of the existent roads, sidewalks and other characteristic points of the public areas, there was the need of creating a logical and strategically coherent network comprising the public spaces as a whole. During this process, there was the identification of a set of several good aspects of the case study area, which could be promoted, developed and enhanced with the urban design proposal. These aspects are essentially the attractive landscape of the place, the direct access of the urban fabric to the river water front, the existence of a huge presence of greenery, or the fact that this place is close to the city centre, at a walkable distance. Part of the area is included in the reserve for agriculture purposes, where is not allowed to have buildings unless they are not permanent constructions [5].

3. The urban project solution

3.1. General proposals

The Urban Project solution is focused on the main landmarks of the place, such as the train station and it aims to planning and to designing the urban spaces around, in order to create two main areas with a wide range of different activities. In this sense, the proposal aims to create and to adapt the places for the following activities:

- A restaurant is proposed for the train station building, which should be adapted in order to include this activity;
- Is created a network system comprising several common public spaces, able to be used by everybody, people from different ages;
- There is a new architectonic icon to be built in order to host a conference room and an information point for tourists and users of this place;
- A gym is proposed in order to support other river activities, such as punting or boating;
- Children play an important role at this urban design solution, therefore there is the proposal of creating places for them.

3.2. Soft mobility and sports activities

The new architectonic icon is a building which is supported on the existing retaining granite wall. This building comprises a walkable green roof where visitors can go in order to view the nice landscape and to have a wonderful panoramic view of the water front. The greenery is a very important aspect considered in this project and that is why this building is covered with a green surface. People can walk on the roof of this building, from where there is a beautiful view of the mountains on the other site of the Vouga river (Figure 12 and Figure 13). In fact, this project as to follow the Portuguese rules in terms of public spaces such as the green areas, which have special requirements in terms of measurements [4]. Near to the main proposed building with the green roof on the top, there is the train station which will be used as a restaurant and a set of rent housing. Also, the project proposes a bike and kayak rental shop by the river. In front of the iconic building the solution proposes a new square as a main public space, designed to be scene for some cultural events. Part of the main road which crosses the case study area is going underground trough the green roof building. Thanks to this choice, the case study area includes only soft mobility system for transportation (Figure 14). A lot of walking and cycle paths are running along the place as a whole. Regarding this soft mobility network, the project contains as well a new bridge for pedestrians and cyclists crossing the Vouga river (Figure 15). The streets were organized and there are new car parking spaces all over the strain station surroundings. In this sense, the idea of having outdoor activities near to the river was one of the main goals of this project, in order to bring the river closer to the city. In fact, some proposals from other groups of students, such as the ERASMUS students coming from Lithuania [6], were absolutely focused on river sport activities such as kayaking or several other boats events. Among to the main results of this urban design project there is the fact that all presented assumptions lead to keep a natural environment and to improve the soft mobility in the city. The results show how the proposed changes can improve the lives of residents in this city and how much mobility affects the quality of life. This project, may have a positive impact on making the case study

area more attractive not only for local community and residents but also for visitors, including those who every year are coming to visit the thermal baths of the city.

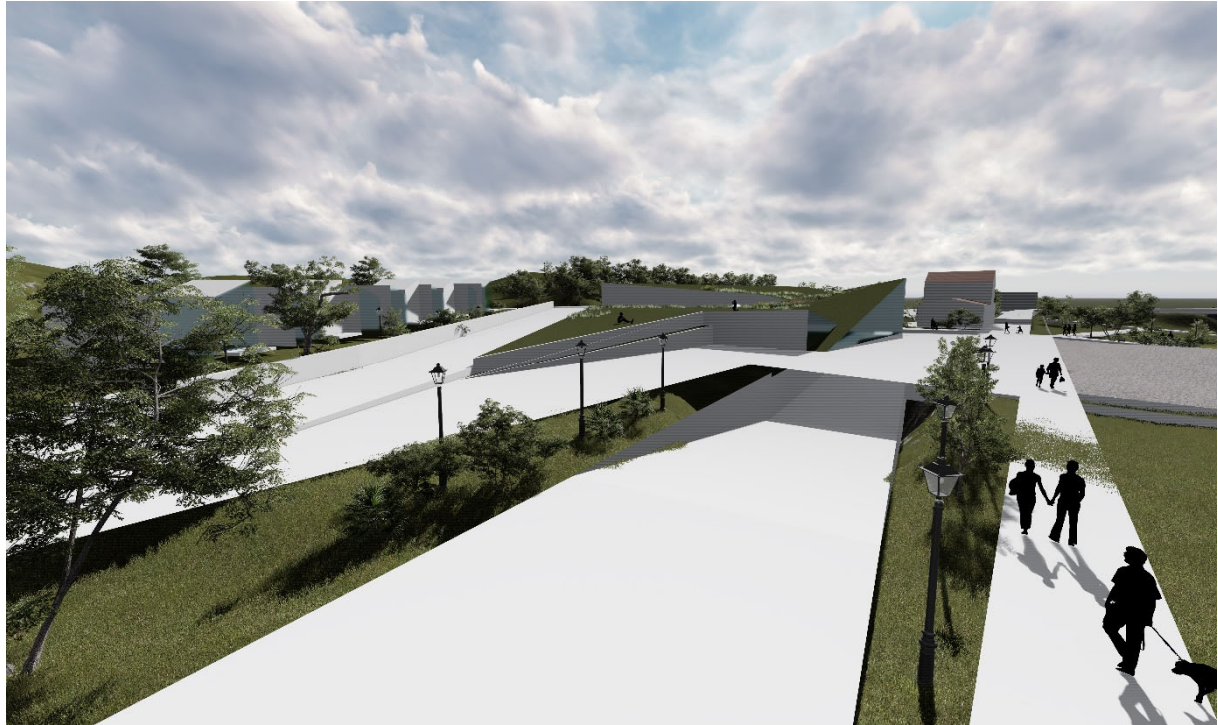


Figure 12. General view of the green roof building and the walkable system network

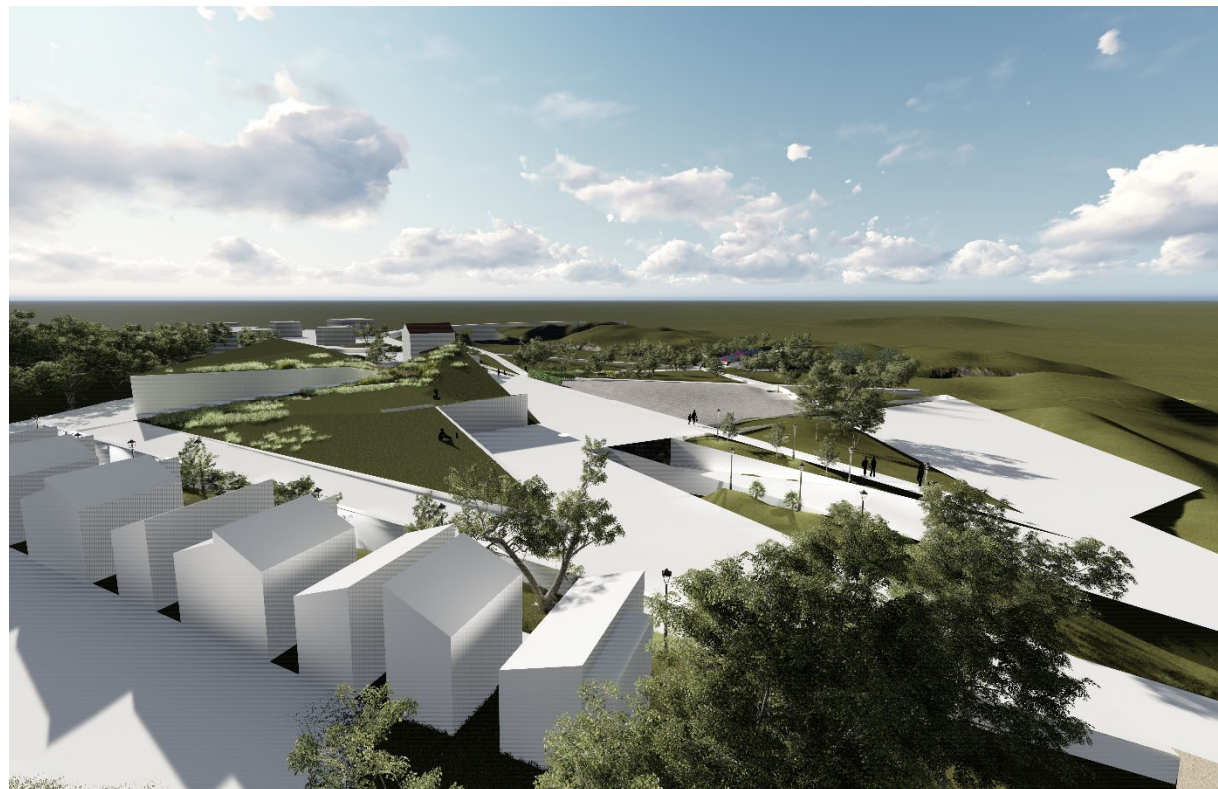


Figure 13. Perspective from the bird's eye view of the green roof building and main pavilions

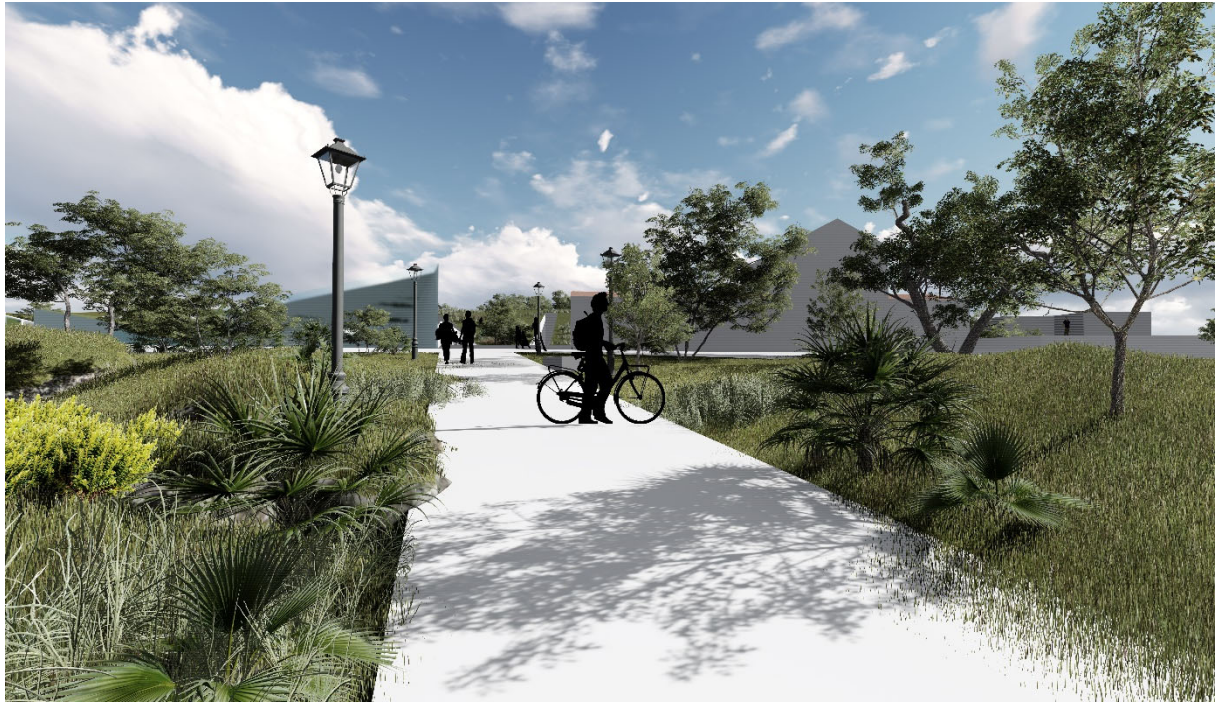


Figure 14. View from the path taken on the case study area with part of the soft mobility system

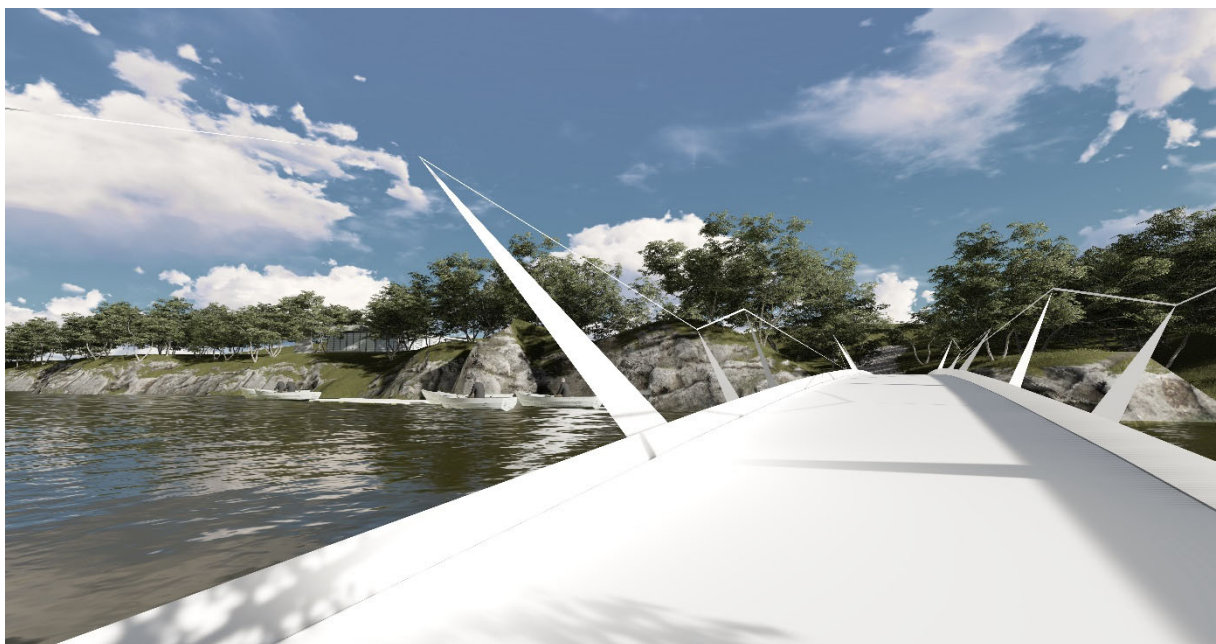


Figure 15. The pedestrian and cycling bridge over the Vouga river: Urban project

The new pathways for pedestrians and bicycles provide an easy and direct network of connections between every place of the train station surroundings, including the opportunity for crossing the river to the opposite side. It also provides a good connection with the river water front and the nineteenth-century train station building. This building was kept intact in the urban project proposal because of its historical and architectonic aspects. Finally, there is a message of this urban design solution which is the importance to be able to design new spaces with the existing context of the place, having the ability to

connect the urban fabric with nature. Even though this project was focused on the soft mobility aspects the nature coming from the presence of the Vouga river was a pivotal element. In fact, some other projects from other groups of students were mainly focused on the idea of improving the ecological features [7] of the São Pedro do Sul train station surroundings.

4. Conclusions

The train station's surrounding in São Pedro do Sul is a place which needs a deep action of urban improvements and requalification. This place with roads in disorder and forgotten plots has a really large potential regarding the Vouga river, the historical building of the train station or the cycling path. This is a small city with a good environment for living and also for therapy of skin diseases, given the existence of thermal waters with sulphur. It lets people healing their skin. There are also historic ruins, the water front and the mountains. It is an attractive place for tourists and the presented urban design solutions aims to improve this advantage. The project main goal is to be an answer for the needs of inhabitants and visitors. The first step is to organize the existing features of the case study area and giving it new functions with respect to the train station building. Thus, the whole space was organized in different elements with a crucial focus on the public spaces. The projected different parts were designed in a coherent way thanks to simple shapes and to the ecological character. The architecture should be a useful way of improving the quality of life of local communities. That's why the project aims to be a synthesis for the found problems and needs. With this solution, the train station surroundings will be a place that invites businessman, managers of local companies, families, lonely elderly people, friends, tourists and many others. Finally, the main motives for this project were the interactivity in between the place and the community. Such as Winston Churchill uses to say "We shape our buildings; thereafter they shape us". In this sense architecture and urban planning affects the lives of people. That is why it is so important to create good places for living able to improve the quality of lives!

Acknowledgments

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References

- [1] Law-Regime of the Portuguese Policy of Land Uses, Spatial Planning and Urbanism, D.L. no.80/2015, 14 May.
- [2] Law-Regime of the Portuguese Spatial Planning System, D.L. no. 380/99, 22 September.
- [3] Municipal Master Plan of São Pedro do Sul, D.R. no. 237, 13 October 1995.
- [4] Law-Regime of Portuguese Requirements for Public Spaces Measurements, Portaria no. 218-B/2008.
- [5] Law-Regime of the Portuguese National Reserve for Agriculture Purposes, D.L. no. 73/2009, 31 March.
- [6] Virtudes, A., Palaitytè, G., Liaudnskaitè, M., Svarauskaitè, D., Carriço, A. (2018) "An urban design project focused on river sports", in WMESS 18, 4th World Multidisciplinary Earth Sciences Symposium, 3-7 September, Prague, Czech Republic.
- [7] Virtudes, A., Azevedo, H., Abbara, A., Sá, J. Soft Mobility as a Smart Condition in a Mountain City, 2017 IOP Conference Series: Materials Science and Engineering 245(5),052095