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TRANSITION OF THE CITY TO MORE SUSTAINABLE ENVIRONMENT

THE CASE STUDY OF TIENEN (BELGIUM)

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ABSTRACT

Currently, the concept of sustainable cities is getting more attention in both academic and practical aspects. Sustainable cities development helps in solving many urban issues, considering social, ecological and economic aspects towards the desired future. In this regard, this thesis presents the results of research to answer the question; "*How can we transform Tienen city in order to achieve a more sustainable environment?*

This thesis is developed as an *internship project* in an architecture office, called *AST77*[1], in the city of *Tienen* which is the case study of this research. The analyses have been divided into two scales, the *City Scale* and the *Block Scales*. In *City Scale*, the aim is targeting the critical spots of the city that are disorganizing the circumstance of the city and they can be solved in a short time horizon by minor transformations. Therefore, eleven points from different part of the city are selected consisting of area and buildings. At the *Block Scale*, the idea is adapting the city with new settlement of buildings starting by smaller scale, which leads to obtain the sustainable city's standards. Both of these analyses are following the main objectives of the thesis which are *Environment, Economy and Sociology*, the bases of the Sustainable Development, and in beside of them, applying some Ecological designs to the case studies. Hence, there are some new sustainable solutions have proposed by using specific methodologies. The proposed methodologies consist of different steps: interviews and questionnaire, SWOT analyses, seminars and exhibitions, literature review and past researches. The new proposals for each case study illustrate the possibility of each point to transform in the way of sustainable development. The parallel progress of the development in both scales of case studies brings more mobility to the city such as construction, social interaction, infrastructure improvement, economic development and so on. As the most important matter, it causes the city to adapt itself with the newest methods in different period of construction.

[1] http://www.ast77.be/

ACKNOWLEDGMENT

The completion of this thesis would not have been possible without the support and encouragement of several special people. Hence, I would like to take this opportunity to show my gratitude to those who have assisted me in a myriad of ways.

Firstly, I would like to express my sincere gratitude to my advisor *Prof. Patrizia Lombardi* for the continuous support of my MSc Thesis, for her patience, motivation, and immense knowledge. Her guidance helped me in all the time of research and writing of this thesis. I could not have imagined having a better advisor for my study.

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My sincere thanks also go to *Peter Van Impe* and *Office AST77* work group, who provided for me an opportunity to join their team as an intern, and who have access to the laboratory and research facilities. Without their precious support, it would not be possible to conduct this research.

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"A beautiful soul is never forgotten, rest in peace, my father".

DECLARATION

The data presented in this thesis was obtained in a workgroup in an architecture-engineer office called "*AST77 Architecten- en Ingenieursbureau*[2]" located in Tienen City, Belgium. I played a major role in the preparation and execution of the information, and the data analysis and clarification and finalizing are entirely have done on my own. Any contributions from colleagues in the collaboration, such as photography, illustration and gathering data are explicitly referenced in the text or captions. I am aware of the university's policy on plagiarism, and I certify that this thesis is my own work, except where indicated by reference. The work presented in it has not been submitted in support of another degree or qualification from this or any other university or institute of learning.

[2] http://www.ast77.be/

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Chapter 1 **INTRODUCTION**

1.1 BACKGROUND OF THE STUDY

"*Following the fact that half of the population of the world are living in urban territories, and day by day more people joining them, cities demonstrate huge concentration of pollution, consumption and production. The very fact that they are so concentrated, makes them both major contributors to environmental damage, as well as important places for intervention. For this reason, efforts to make cities sustainable are emerging throughout the world."* (Rees, 1999) For instance, during past decades there were many programs and declaration came out by different international meetings or NGOs in order to know how to keep the world out of risk or at least break down any danger of loses and in the same time keep the right of the future generations to meet their own needs. For more important ones which are signed and agreed with most of the countries can refer to Protocols of United Nations Conference on Environment and Development (UNCED, 1992) such as Agenda 21[3] or United Nations Development Program (UNDP, 2016) which led to the Sustainable Development Goals[4](SDG). In 1987, Brundtland Report[5] highlighted the Economy, Ecology and Social Equity as important matters and by adding the Cultural Diversity in 2001 by UNESCO to sustainable development goals, it became the main reference for worldwide environmental organizations to follow those four bases. *"Sociology is the scientific study of society, consisting of the patterns of social relationships, social interaction, and culture."* (Calhoun, 2002). As a matter of fact that mankind is in the center of attention for all the programs, therefore sociology is the first priority of proposed subjects. *"Architecture is not only the reflection of the current situation but it became an instrument in process of creating yet unexciting – but carefully planned in marketing strategies – economic potential of a space."* (Piatkowska, 2012). Each program or principle which comes out from meetings with their unique features and procedures for becoming real need a financial endowment, this requires to evaluate how affordable they are for inhabitants to accept and follow. Imagine a solar panel which they became a rule to put in the building in some countries, now if it costs a lot or there was no support by the government to provide and install them, how will people be able to obey these rules!? So this put Economy in the second place of attention for us. Our existence is strongly chained to the world which we call it environment, without the environment there is no place to live. The environment is a complex of many elements which has surrounded mankind as well as the living organisms. Environment involves water, air and land and the interrelationships which exist among

[3] Is a non-binding action plan of the United Nations with regard to Sustainable Development.
[4] A collection of 17 global goals set by the United Nations General Assembly in 2015.
[5] Formerly known as the World Commission on Environment and Development (WCED), the mission of the Brundtland Commission is to unite countries to pursue sustainable development together.

and between water, air and land and human beings and other living creatures such as plants, animals and micro-organisms. By placing ecology in the foreground of design, it provides specific and different ways of minimizing energy and material use, reducing pollution, preserving habitat, promote community, health and beauty. It enables a new way of thinking about design.

In this thesis, the above-mentioned subjects are the main bases for studying, evaluating and proposing ideas on the case study which is an historical old part of the Tienen City and for further studying in detail, three different parts of the city has chosen by considering different options which will be discussed in next chapters. The city of Tienen is a case study which is located in the 50km far from the capital of Belgium. Nowadays, due to the high rental cost of the capital cities, most of the middle-income families prefer to live in nearby cities in order to pay less money on housing. Tienen city thanks to its location nearby to the capital and also to the Leuven City, which is called students city in Belgium, is hosting a lot of non-native people. This mater of immigration causes some problems for such a city which is growing slowly and has restricted rules for construction. Studios for students, residential buildings for families are on the tangible side of the discussion, but this range of growing needs to think about the infrastructure and facilities which they seek for. Fortunately, the city has a vast unused plan in surrounding which is capable of constructing new buildings and they are already studied by the local governments for future uses. But before thinking to the growing of the city, it is necessary to think about the unused building, the current condition of the buildings, population density, green spaces and so on which the society is facing with them. "*According to the numerical statistic, more than 30 percent of the buildings are empty and without inhabitants, there is only 5 percent of green public spaces and so on"*. (AST77, 2015).

Office AST77 is one of the architecture and engineering studios in the Tienen city which has started his studying about the city since 2013. I was selected as an intern by the office to participate in the project that they were following about the city in a period of 6 months. While the project is divided into 2 parts, first focusing on the City scale in order to identify the weaknesses of the city and give some proposals as a solution and secondly studying the three City Blocks of the city to analyze and propose them a new urban fabric.

1.2 LITERATURE REVIEW

"Many countries are looking at their cities as engines for advancing national growth. Cities alone account for approximately 80 percent of GDP generated worldwide. As the world continues to urbanize, the highest concentration of growth is

expected to be in the regions that are home to some of the poorest countries in the world. Inequality is more important in urban areas – one out of three urban residents in the developing world lives in a slum. Cities are the highest consumers of energy and responsible for 70 percent of greenhouse gas emissions. Shocks and stresses such as natural disasters and economic crises tend to hit cities the hardest, as the concentration of people and assets makes them particularly vulnerable". (WBG, 2015). *"The urban environment includes a dynamic interaction between a population and its growth, the system of governance and city management, as well as the natural environment or ecological system in which the built environment and urban area is developed and located. Urbanization can thus represent a level of urban relative to the total population or area, or the rate at which the urban proportion is increasing".* (Neuman & Hall). *"Urban design occurs across all parts of a city, from the inner city to the suburbs and outer metropolitan fringe. Urban design is relevant to developments, whatever their nature and size. City-wide transport and infrastructure networks, urban infill projects, regional towns, new suburban developments, shopping malls, streets, office blocks, university campuses and hospitals are all the result of urban design. High-quality urban design becomes even more important as we increase the density of our cities and cater to a growing and changing the population. It requires excellent planning, design and management of our built environment and the supporting social and economic infrastructure".* (Rayner, 2011)

1.2.1 Sustainable Development

"The concept of sustainable development formed the basis of the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992. The summit marked the first international attempt to draw up action plans and strategies for moving towards a more sustainable pattern of development. It was attended by over 100 Heads of State and representatives from 178 national governments. The Summit was also attended by representatives from a range of other organizations representing civil society". (SDC). Sustainable development was the solution to the problems of environmental degradation discussed by the Brundtland Commission in the 1987 report Our Common Future.

"Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs". (WCED, 1987).

Sustainable development is based on the three pillars of sustainability: economic, environmental and social sustainability. It is only achieved when there is a balance or a trade-off between these three aspects (Figure 1.1). "*Economic interests*

dene the framework for making decisions, the flow of financial capital, and the facilitation of commerce, including the knowledge, skills, competencies and other attributes embodied in individuals that are relevant to the economic activity. Environmental aspects recognize the diversity and interdependence within living systems, the goods and services produced by the world's ecosystems, and the impacts of human wastes. Socio-political refers to interactions between institutions/firms and people, functions expressive of human values, aspirations and well-being, ethical issues, and decision-making that depends upon collective action". (Theis & Tomkin, 2012).

Figure 1.1 Relationships in sustainable development. Source: (Slisu@UT)

"In September 2015, the United Nations Sustainable Development Summit adopted a new framework to guide development efforts between 2015 and 2030, entitled "Transforming our world: the 2030 Agenda for sustainable development". The 2030 Agenda contains 17 Sustainable Development Goals (SDGs) and 169 targets. The SDGs address, in an integrated manner, the social, economic and environmental dimensions of development, their interrelations, aspects related to peaceful societies and effective institutions, as well as means of implementation". (SDG11, 2015)**. "***By 2050, the world's urban population is expected to nearly double, making urbanization one of the twenty-first century's most transformative trends. Populations, economic activities, social and cultural interactions, as well as environmental and humanitarian impacts, are increasingly concentrated in cities, and this poses massive sustainability challenges in terms of housing, infrastructure, basic services, food security, health, education, decent jobs, safety and natural resources, among others".* (UN, New Urban Agenda, Habitat III, 2017).

1.2.2 Society and Socialization in the Sustainable Development

"Society in urban term is a kind of organization resulting from the way that people in cities act and interact with one another or with their physical environment. Sociology is a method of inquiry that requires the systematic testing of beliefs against evidence. Socialization is the process by which people learn the characteristics of their group's norms, values, attitudes, and behaviors". (Hammond, 2010). *"The word social in architecture is generally understood through its use in ordinary language. At the smallest scale, it denotes two or more people who meet and interact. At a wider scale, "social" refers to what is communal and collective, pointing as well to companionships, living in communities, and to public life. At the largest scale, the term denotes society and its organization"*. (Harboe, 2012). Sociology consists of studying aging, economy, culture, education, health, leisure and so on. "*Social movement can be viewed as a collective enterprise seeking to establish a new order of life and have their inception in a condition of unrest, and derive their motive power on the one hand from dissatisfaction with the current from life, and on the other hand, from wishes and hopes for a new system of living. The career of a social movement depicts the emergence of a new order of life".* (Ilhan, 2009).

1.2.3 Economy, Ecology and Environment in Sustainable Development

"Economic definitions of sustainability have been developed within environmental and ecological economics, which provide an additional dimension to economic theory to deal with exhaustible and renewable natural resources". (Daly & Cobb, 1997). *"A typical economic definition of sustainability is "non-declining utility of a representative member of society" for some long time period into the future which in turn requires that each generation should leave the next generation a stock of capital no less than it started with"*. (Trisoglio, 1996). *"Several techniques exist to assign monetary values to natural resources, for example in order to use these values in cost-benefit analysis or to 'correct' estimates of GNP and GDP in national accounts. Apart from ethical and moral objections to this reduction of values, needs and welfare to monetary aggregates, such valuation exercises say nothing about the complex behavior of the biogeochemical systems that comprise the environment".* (Adams, 1995). An alternative approach to economic thinking is provided by 'green' or ecological economics*. "Green economics is less an attempt to describe economic behavior than it is to propose a vision of what would constitute a more human-oriented, spiritual and ecologically harmonious economic system, which it would argue is the basis of a sustainable world"*. (Trisoglio, 1996).

The word ecology derived from the Greek word 'Oikos' meaning habitation, and 'logos' meaning discourse or study, implies a study of the habitations of organisms. *"Notwithstanding, there are two distinct meanings of ecology in literature from the planning perspective. One is a scientific definition, and the other emerges from urban planning. In ecology, the term urban ecology refers to studies of the distribution and abundance of organisms in and around cities, and on the biogeochemical budgets of urban areas. In planning, urban ecology has focused on designing the environmental amenities of cities for people, and on reducing the environmental impacts of urban regions."* (Abdulai, 2015). Ecologically Sustainable Development (ESD) is an important concept in environmental law and its concept has been affirmed by the 2002 World Summit for Sustainable Development. *"Conservation of biological diversity and ecological integrity should be a fundamental consideration in environmental planning and decision-making processes. Biodiversity refers to the variety of all life. Environmental and species impact statements are one way that this principle is enacted"*. (WCED, 1987). "*Ecological planning refers to "strategies and techniques that combine urbanism and nature to create healthy, civilizing, and enriching places to live". This implies "a living area governed more by nature than legislature; and a sustainable human settlement based on ecological balance, community self-reliance, and participatory democracy*". (Abdulai, 2015).

The word Environment is derived from the French word "Environ" which means "surrounding". Our surrounding includes biotic factors like human beings, Plants, animals, microbes and abiotic factors such as light, air, water, soil, etc. "*Environmental planning is a process of identifying, assessing and coming up with solutions to environmental issues. The goal of environmental planning is to improve the quality of the environment and the health and welfare of organisms or people. Environmental planning can be approached in a number of different ways".* (Abdulai, 2015).

1.3 PROBLEM STATEMENT

By looking at the historical timeline of the city development, we can learn how a city has changed and how it dealt with the circumstance. Certainly, every city has some conditions which if they are managed in a good way they will turn to opportunities and if not they will turn to threats in the future. By having a deep look in Tienen city's infrastructure, the hidden problems will become visible. *The old age and low quality of the buildings*, *noticeable number of immigrants due to the low cost of living*, *lack of green spaces, abandoned buildings and fields* are all the reasons make the city to think about its future destination. Most of the cities are now challenging to

reach the sustainability insignia and each of them according to their possibilities are adopting their cities for a more sustainable environment and so the Tienen city does too.

1.4 RESEARCH QUESTIONS AND OBJECTIVES

According to the problems, the city of Tienen is in need of an action to enter the sustainability challenge. All the matters which has an effect on the city are kind of opportunities or threats. A transition is a process which can lead the city to have a more sustainable environment but the way of this transition is more important than its result. So the main question this study is going to answer is:

How can we transform Tienen city in order to achieve a more sustainable environment?

By attention to this question and the subject of the thesis which is based on sustainable development, this thesis has 3 objectives to obtain. The first and the *Macro Objective* of this thesis is following the bases of the sustainable development which are *environment, economy* and the *sociology* and set them in the main base of city transformation. These subjects will be the main factors in researching case studies. The other two objectives, as *Micro Objectives*, are defined as;

1. *Eliminating the urban development stagnation and inactivity.* The city is frozen from the development point of view and there is no tangible evolution. The projects along the city are long term period projects and progressing very slowly and also most of them are in the suburb and they have nothing with the inner city. Therefore it brought the barrenness and inanition circumstance in the city. This inactivity in the city turns the city to a frozen with no changes. So the idea is to bring out the city from this situation with small scale and fast construction projects.

2. *Defining the new urban fabric.* The aim is re-designing the inner city. So the procedure starts from the Block Scale in order to step by step adopt the city view new settlement. This action will start from the dysfunctional blocks and will continue to the others. This stage of action doesn't mean to completely re-constructing the site, but in some cases it can be only renovating, changi9ng the function and demolishing some of the buildings.

The progress of both Micro Objectives at the same time will help the city to obtain a sustainable city in the long term period and an active city due to the small scale projects

1.5 THESIS OUTLINE

The first chapter of this thesis describes the approach that I used to develop and validate the multidimensional methodologies have been used for analyzing the project. It gives a general background of the study in which subjects are based on and how and where the thesis has developed in Section (1.1). Section (1.2) provides a review of literature in three areas related to the study: 1st the definition and general background and also the use of the Sustainable development in urbanism and architecture fields, 2nd the importance of the sociology and socialization in designing and 3rd part is talking about the economy, ecology and environment and their relation with each other and with architecture. Section (1.3) is referring to the problems in general that cities are facing and the problems that our case study is dealing with. The research question and the goals of the thesis are explained in the Sections (1.4). Section (1.5) is giving the brief summary of the each chapter of the thesis.

The second chapter is totally allocated for the methodologies which have been used during the thesis progress. This chapter has divided with respect to the methods and explains each method's use in the thesis. 1st part is related to the use of existed information or the book or studied which had done before. 2nd section is about using the Questionnaire and Interview methods and the explanation of the specific way that has been used to get the needed information. Section 3 was based on the seminars and the lectures by other architecture offices that were based on the similar case studies of our thesis case study which led us to have a debate between the locals and the professionals and following that, the result and conclusions of these lectures were highlighting our red lines for the project progress. Using the SWOT analyses were the last method which is used to finalize the disadvantages and advantages of the selected target.

The third and the fourth chapters are leading us to the final results and the proposals based on the two case studies that we have. It has divided to the three sections which two firsts sections are providing the general backgrounds and the functional master plan of the city while third sections are presenting the new proposals. The third section points out the implementation of the result which came out through the methodologies on the City Scale. In section three, as the chapter is talking generally about the city problems, it is divided to eleven sections which refer to eleven points of the city that are selected to adapt them with the new proposal. In chapter four, our studies are based on the Block Scale and three blocks of the city are chosen and analyzed through the interview SWOT analyses. So this chapter is divided to three sections and in each of them there are three subsets which two firsts

of them are providing the implementation of methodologies on the area and the third part is presenting the new proposal for the site.

And the 5th chapter is summarizing the thesis results as Conclusions chapter. In this final chapter, the general overview of the thesis and the recommendations for use of this research are discussed.

Chapter 2 **METHODOLOGY**

The research stage of the project has been started by the office AST77 in the city since 2013. The thesis is based on studying and proposing solutions and in some cases, the proposal is presented by graphical methods. The theoretical part is covering the studying phase which brings the sustainable programs to the project and practical part is consisting of designing or renovation. During the research, there were different methods of collecting data which will be explained in the next pages. Explaining the project phases from starting to finishing, it consists: perusing the references in related to the title of the thesis, studying the existing situation and indicating the issues which should be solved by attention to the references and entering to the designing phase in the city scale with considering the researches.

The methods which have used to gather the information and reach the final goal is showed blew.

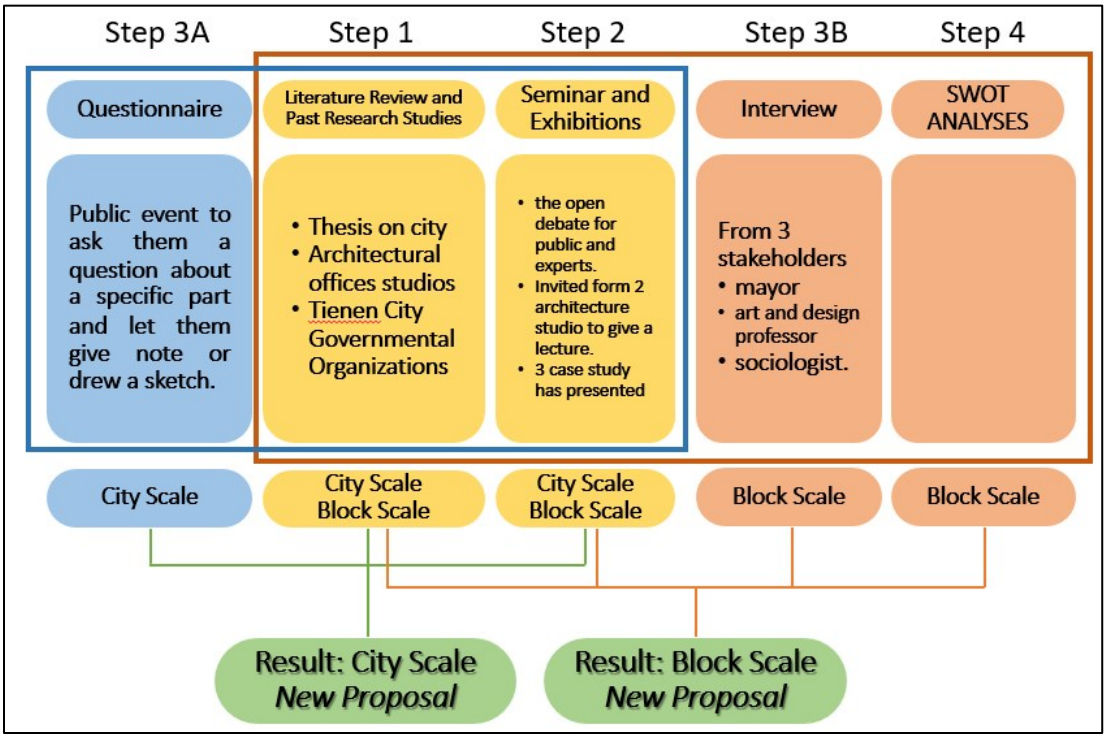

Figure 2.1 Methodology Steps.

2.1 LITERATURE REVIEW AND PAST RESEARCH STUDIES

Using the information obtained from past researches which have done by different studios, students, academic experts and local governments about the city was the way to understand the existed situation such as the buildings functions, city infrastructure, population and so on. This information will help to perceive the structure of the city and know how has it developed and what were its difficulties and

disadvantages of the past plans. The achieved information from this method can be quantitative and qualitative. This procedure will help us in both the city scale and city block studying. The factors which the information achieved from them are mentioned blew.

2.1.1 Academic Researches (Thesis Based On Tienen)

Thesis titled is "*TIENEN CITY* "[6]. In this thesis, there was general information such as the history of the city and its development during the centuries. It has also discussed the transportation quality inside the city and its access to the other cities which are useful to consider in future planning. Most of the data was based on the qualitative method achieved by analyses in the city scale by the researcher.

2.1.2 City Forum

A small group of the experts known as "*Stadsforum*" has gathered round of the table and put their effort to help the society in all the aspects of life. This community help all the organizations whether governmental or private and also those who need information or working in the city. Due to their policy, most of their activities are based on social and anything which influences people's life. So this city forum helps the research progress in the social background of the city. Explain the weaknesses of the city and the advantages of each area of the urban territory with respect to the social interaction and their effect on city development.

2.1.3 Local Governments

Definitely, each city has a comprehensive plan for its future by local governments and knowing this is the first step to know what possibilities are available to do in the city. Following our project goal, we needed to know how far we can retouch the city. Some blocks of the city were already replanned and some of them were under the researching stage by other studios. Therefore this kind of information was necessary to see how much we are able to go on and what rules we have to put in our priority to consider.

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[6] Thesis about the TIENEN CITY, written by Stijn Creten at Provinciale Hogeschool Limburg.

2.1.4 Architecture Studios

Office AST77 as my host studio, to do my thesis there, had played the important and was so useful in gathering data, getting aware of the construction and urbanization rules, introducing to needed expert and organizations to get the information and so on. This office as it has started its research about the city from 2013, had a good archive of useful information in both quantitative and qualitative. The 3 blocks which we will discuss them in the next chapters are chosen by the office by considering their past researches.

2.2 QUESTIONNAIRES AND INTERVIEWS

"Questionnaires are frequently used in quantitative marketing research and social research. A questionnaire is a series of questions asked to individuals to obtain statistically useful information about the given topic. The questionnaire should always have a definite purpose that is related to the objectives of the research, and it needs to be clear from the outset how the findings will be used. There is about four type of questionnaire designing for the survey; Contingency questions, Matrix questions, Closed-ended questions and Open-ended questions". (Roopa & Rani, 2012).

But the method used in this section is not exactly the questionnaire but using it in an innovative way. The method was combined with some pictures from the city. Through the photography survey which has done by the office from the city, some parts which were important and known in the city has selected to try out a new studying and gathering information. The idea was to invite the locals to write a note or, if they can, drawing a sketch about the given picture. Therefore there was a card postal for each selected building or area with a question of *"what would you like to do in this place?"(Figure 2.2).* This was a clever idea to understand what is the majority of the local's idea about the transformation of that part? By this method, we would know the reflection of the user before designing. This event has taken place in 3 different calls on different locations. One call was for *GETE* (River) and after presenting general background about the area, the participants were asked to give their note on a selected part of the river in the card postal. For this river, there is 23 notes and sketches has gathered. For Grote Market (Big market) 15 suggestions have received by participants and for the Train Station, 19 participants shared their futuristic ideas about the place. All the data has gathered and archived in the office AST77 and some of them will be presented in chapter 3 in order to show the procedure.

Figure 2.2 Sample of Questionnaire on Card Postal. Source: (AST77, 2015)

"Interviews can be defined as a qualitative research technique which involves conducting intensive individual interviews with a small number of respondents to explore their perspectives on a particular idea, program or situation. There are three different formats of interviews: Structured interviews consist of a series of pre-determined questions that all interviewees answer in the same order. Unstructured interviews are usually the least reliable from the research viewpoint because no questions are prepared prior to the interview and data collection is conducted in an informal manner. Semi-structured interviews contain the components of both, structured and unstructured interviews. In semi-structured interviews, interviewer prepares a set of same questions to be answered by all interviewees". (Boyce & Naele, 2006)

After selecting the blocks, three interviews have done with three stakeholders; Mayor of city, Art university professor and a Sociologist. The interviews were based on five questions, so the interview was a structured interview. One question was about their general view about the city by attention to their profession, two questions were about the existed problems and situation of the city, one question was about the future of the city and the last one was describing the city in one sentences or giving keywords to use in designing stage.

2.3 SEMINARS AND EXHIBITIONS

Maybe it is somehow out of mind that we can call this title as a method of collecting data, but the main idea was to have the reflection of the people about the project in the different stage of the progress. It was helping to realize the weaknesses and strength of the project proposal. Seminars by different studios about similar cases from other cities were holding in the same time as the exhibition. This caused the audience of the lecture and participant can make the connection between our project and the case study of the lectures. They could find out what is the goal of the project and give a comment on the project progress. Different seminars have come about with explaining the case study from different cities. The first lecture took place in the

Pand10[7] on 21st of April and the event was called *"Buurtdrink stationsomgeving en infomoment Toren vol stellingen*[8]*".* It was based on the debate about the station surrounding and the tower project which I will talk about it in chapter 3. The second lecture by "*Ontwerpbureau Pauwels*[9]" was about the transformation of the riverside behind the student residence in the Leuven city, it is named "*STUDENTENRESIDENTIE REGA*". (Figure 2.3). The project designed in 2015 and it won the "*Outstanding Precast*[10]" in 2016. The second case study was in Veoren city, Belgium. It was again about the transition of the riverside of Veor River in 2014. (Figure 2.4). And the third presentation was about improving the infrastructure of the area between two residential-commercial buildings in Hasselt city, Belgium in 2017 named as "*Two Torenwijk*" (Figure 2.6). This lecture was held in the Old College of Tienen on 4th of May and the event was named as "*water in de stad*[11]". The third lecture about citizen's role in the architecture was in the 31st of May and called "*Lezing Participatie maakt Architectuur*[12]". This lecture held by the "*Baupiloten Architektur*[13]" which is placed in Berlin. The next lecture was by *Atelier-X* about working with earth and using it as a green material in our constructions. It held in their office in 7th of September by the name of *"Vernissage Terra Award tentoonstelling*[14]*".* It was based on the information about the earth material and the importance of it and the exhibition of the project which won the *Terra Award*[15]*.* (Figure2.5).The last lecture was by *BC-Architects*[16] office in 21st of September at the old college of Tienen. It was called "*Lezing Materials*[17]*"* on the converting the raw-soil from city yards into circular clay construction material in a process of urban mining. It has no CO2 emission, it ensures the indoor healthy circumstance and after its deconstruction, it can go back to the soil and recycled. (Figure 2.7).

[7] Is an open house for civic initiatives in the former station buffet of Tienen.

[8] *"Station environment and Tower".* (https://www.facebook.com/events/135328993954034)

[9] Is placed in Leuven and consists of 10 landscape architects and urban planners whom work is based on green architecture. (pauwelsontwerp.be)

[10] By British Precast association located at Leicestershire, UK. (britishprecast.org)

[11] *"Water in the city".* (https://www.facebook.com/events/349467698900909)

[12] *"Participation makes architecture".* (https://www.facebook.com/events/209754039818341)

[13] Is an architectural office that was founded by Susanne Hofmann in Berlin in 2001. (baupiloten.com)

[14] *"Terra Award Exhibition".* (https://www.facebook.com/events/511011599319976)

[15] First international prize for contemporary earthen architectures. (http://terra-award.org)

[16] An architectural studio located in Brussels, Belgium. (bc-as.org)

[17] *"Lecture on Materials".* (https://www.facebook.com/events/228075991235605)

Figure 2.3 RAGA Project.
Source: (pauwelsontwerp.be)

Figure 2.4 VEOR Project.
Source: (pauwelsontwerp.be)

Figure 2.6 Two Torenwijk Project.
Source: (pauwelsontwerp.be)

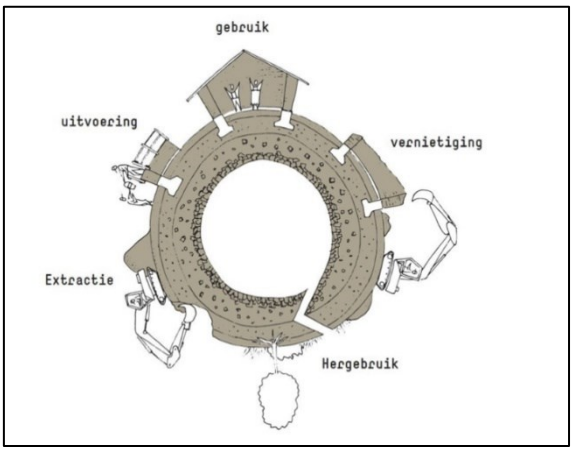

Figure 2.7 Recycle Procedure of Rammed Earth Construction. Source: (Office_AST77)

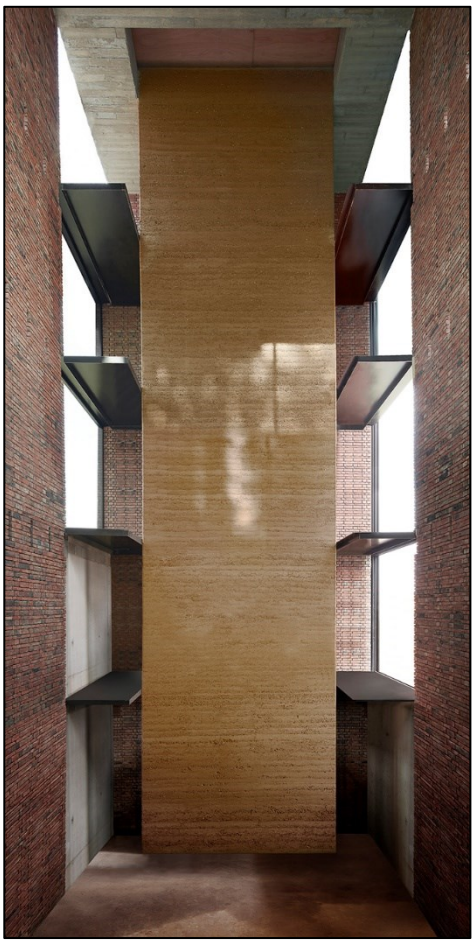

Figure 2.5 Rammed Earth Wall.
Source: (Office_AST77)

2.4 SWOT ANALYSES

"The SWOT analysis is a qualitative method used for the strategic planning of a certain company, market, sector or an entire industry. SWOT is the acronym of the words: Strengths, Weaknesses, Opportunities and Threats. The SWOT analysis is a

standard methodology for providing a general characterization of the current state of the organization and defining an internal and external environment as an important part of the strategic planning process. The basic goal of the SWOT analysis is to identify and evaluate the strengths and weaknesses in the internal environment and opportunities and threats in the external environment of the system. The analysis is based upon the comparison of the internal features of the system which can be controlled within the system with those coming from the external environment, upon which the system does not have control". (Afuah, 2009) (Figure 2.8)

This analysis is used on city blocks scale after having all the needed information about the city and the region.

Figure 2.8 SWOT Analyses. Source: (Afuah, 2009)

2.5 CASE STUDY

The project is divided into 2 scales: 1) **City Scale** 2) **Block Scale**.

In **city scale,** the goal is to identify the critical points of the city through the methodologies, which will be explained in the second chapter, and try to improve their current situation or redesign them in a sustainable way. These points can be an area or a building. In the **block scale**, the idea was to work on a smaller scale in order to obtain more detailed information. For this reason, three city blocks have selected to be analyzed and apply the new proposals on them. In both scales, the transformation is based on an *environmental, economic, social and ecological* aspect of sustainable development. The small scale projects consist of eleven points of the city were studied by the office in group work and a new scheme has presented for each spot. In the same time, three city blocks have selected as the long term time projects to analyze the detail deeply and propose them a new scheme which has done individually by me

Chapter 3 **APPLICATION AT CITY SCALE**

3.1 DIAGNOSES

The city of Tienen is selected as a case study in urban scale analyzing. “It is located 40km far from the capital of Belgium with a population of around 35,000 persons and with 72km² area”. (Creten, 2008). Tienen has placed in the central position between other cities which make it important. This is clearly noticeable in the motorway layout that Tienen is the central point of rectangle shaped of nearby cities. Leuven, Aarschot, Diest, Hannuit, Sint Truiden and Wavre are the cities which can be reached in a maximum 30 minutes. Within five minutes of driving, you can reach the E40 Brussels-Liege highway from Tienen. Public transport is the second way to move to other cities. Tienen is connected directly to the Hasselt and Liege by the train while all other cities can be reached by going to Brussels from Tienen.

Figure 3.1. Map of Belgium, Tienen city Location. Source: (www.istockphoto.com)

In the early 19th century, the railway line between Brussels-Liege and the city of Tienen gave the opportunity to promote the city to future development as a central city of the region and to become a strong industrial city. Big known sugar refinery factory (*Tiense Suikerraffinaderij - Raffinerie Tirlemontoise*[18]*), a* citric acid factory known as *Citrique Belge*[19] and energy saving lamps factory named *Havells-Sylvania* [20]are three important industrial factors that help the economy of the city and locals. Nowadays there is a noticeable number of immigrants are interested to get the house

[18] The Sugar refinery in Tienen which was founded in 1836.

[19] Located in Tienen and was founded in 1929. It is one of the biggest producers of citric acid.

[20] Located in Tienen, Belgium, where the world's first GU10 halogen lamp was invented in 1996.

in small and low rental cost cities rather than in metropolises. So due to the location and the affordable house rentals of Tienen, there is a significant number of immigrants. Good transportation access and industrial factories help the city from an economic point of view. This matter with the number of immigrants coming to the city bring the city an opportunity to develop fast. Many ways are in the hand to develop the city, in the world they are many cities which are defined with their prefix such as; New York which is known for its financial, technology, education, politics, tourism, art, fashion, and sports and mostly known as the media capital of the world. Therefore an under-developing city like Tienen can concentrate on one subject as a major aim or can go upon different goals as cities future plan. By attention to the current most important concern about the global threats, the sustainable cities are at the top of the list to any kind of future planning for any development of cities. Here we are going to see how can we transfer a city to get close and closer to a sustainable city?

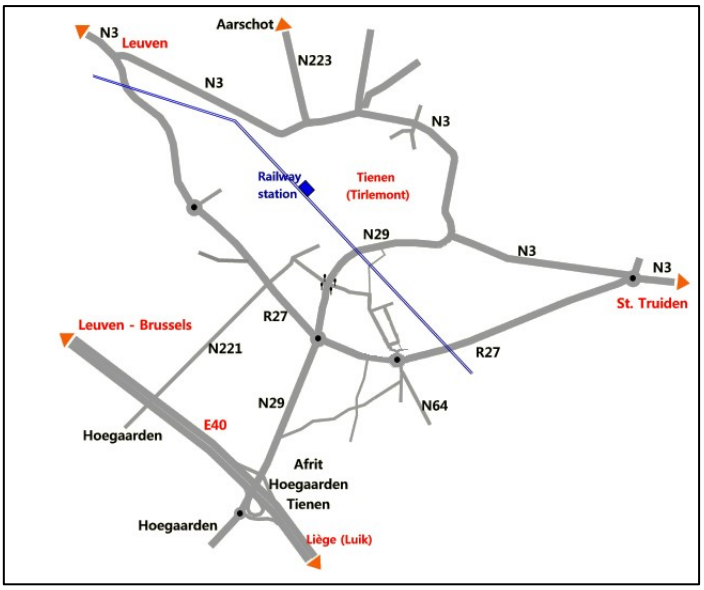

Figure 3.2.Map of City connection to other cities.

3.1.1 Historical Timeline

Every city creation has a starting point and a reason to grow and get larger. River, mining, seaside, strategic location and so many other facts can be examples of some cities starting point. To understand and find out those reasons, we have to go back to the history of the cities. History will show the real identity of the city and its extension during past centuries. *"Tienen city has an old history which returns to the 10th century. It has created on the hill, the highest point of the region, with the church in the center. The economic growth caused the city to enlarge its borders at the end of the 12th*

century which created the Grote Markt[21], which still exists. In the 14th century the city walls has faced by a large extension, the roads to the other nearby cities such as; 1) Leuven, 2) Aarschot, 3) Diest, 4) Oplinter, 5) Sint-Truiden and 6) Jodoigne (Wallomie) and the buildings in their sides caused this enlargement as shown in the map (Figure 3.3)". (Creten, 2008). This border has defined the current state of the city borders with having this in mind which there is no direct connection to the Leuven anymore. After this extension city was growing slowly in borders and through this six century it was developing by attention to the needs of the city in each period by constructing the hospital, educational buildings, residential buildings and commercials. In the late 19th railway creation in the west and after that, the sugar factory in the south blocked the growth of the city in that two directions, and the city was growing to the east more than the north side. The historical overview has explained the basis of the possibilities to grow and its urban fabric which has grown over the centuries. This growth has not always happened with a clear goal in the mind and it was not harmonized with the development of the city.

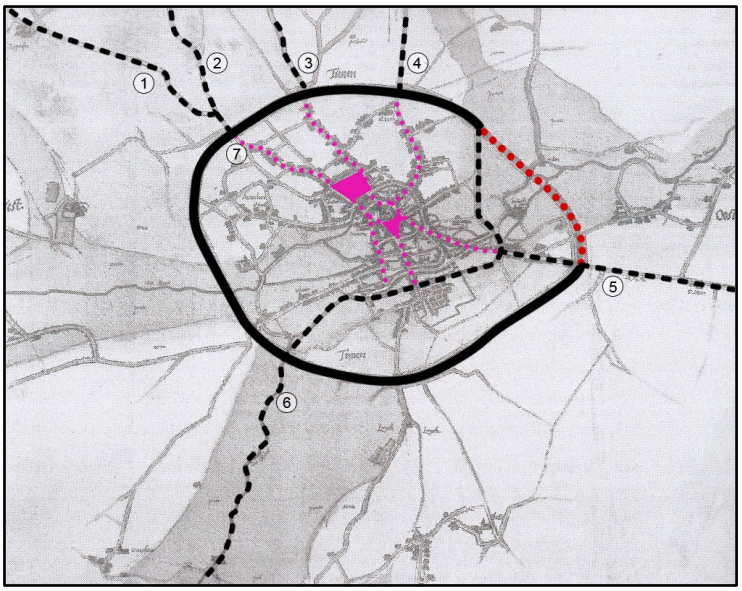

Figure 3.3. Tienen City Growing Map in 1560. Source: (Creten, 2008)

3.1.2 Building Functions, Green Spaces and Land Usage

Places must have a reason for giving access to them, if any point of the city or even a small building has no use to offer then there is no need to have accessibility. Places in a city are defined according to their use, they can be buildings or lands which they also can categorize to the public or private. In an inner-city area what makes the region interesting is its diversity of functions and their relation with each

[21] A Dutch word which means Big Market and was the name of the market.

other. This possibility of function combinations provides a different meaning for the people for using them. This combination sometimes makes the plot rich sometimes poor from a different point of view, it makes some disadvantages and some advantages. The well and organized layout of different functions besides each other make flexible mobility and regular interaction and activities in the spot. These activities will support and complete each other. Time is an important factor in this story. The mixed-use of primary functions can contribute to the possibility of using the area for other function in a different time. *"In order to maintain the potential of an area, three elements must be taken into account; Function, Politics and Economy. The function in the area must be compatible with each other, otherwise, conflicts may cause a serious effect on the area's functional success. So the potential benefits of mixed functions in an area must be examined carefully before making any decision. The political aspect means that the function of a site or element should not be contrary to the needs of the neighborhood. There must be a demand for putting any kind of use in the site by the neighborhoods. Economically, the project should not be underestimated with respect to its function's benefits and future proceeds."* (Creten, 2008).

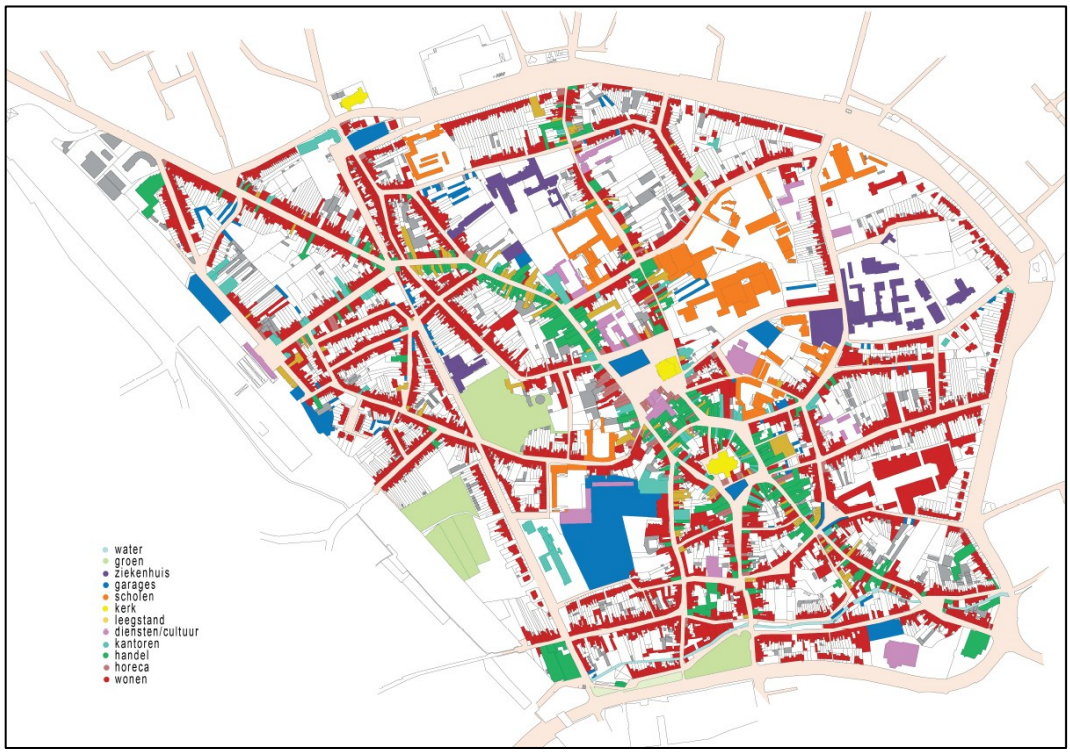

Figure 3.4 Function-Plan. Source: (Office_AST77)

3.1.2.1 Residential

By looking at the map (Figure 3.5), it makes clear where the big cluster of the city is located. Two large residential areas can be found in the southeast part if the city and the other one is in the station area. The prototype of the buildings in these tow area which they have a backyard and also the smaller city blocks in comparison with other parts, entice the local's attraction to settle in these two-part more than others and it causes the high construction dens. There is a historical explanation for the size of these blocks which is due to the oldest area of the city. Grote Markt [22]as the big market in the past had caused to have high dens of buildings in its surrounding but with small blocks in order to have circulation and easy transportation. So after these years, the functions of that buildings have changed and still is under construction to offer to the locals an apartment or social housing.

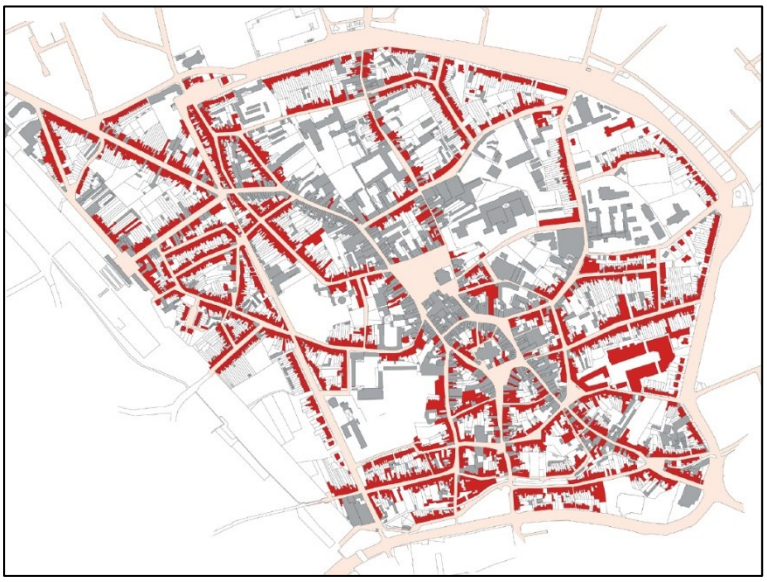

Figure 3.5 Function-Plan, Residential. Source: (Office_AST77)

3.1.2.2 Restaurant and Food Services

These functions have an extensive range of different functions such as coffee bars, coffee restaurant and restaurant. The main and most significant cluster of these functions are in the city center and in another part of the city there are some which can be found. The train station square is disappointing with only one coffee bar. This is very strange that in an important place and maybe most crowded and visited the area of the city there is no attraction for passengers.

[22] A Dutch word which means Big Market and is the name of the market.

Figure 3.6 Function-Plan, Restaurants and Food Services. Source: (Office_AST77)

3.1.1.1 Commercial

There is a clear trade ribbon that divides Tienen into two equal parts. The Grote Markt cuts and divides this ribbon to the northern and southern part. The northern part with linear shape occupied the first floor of the buildings in the street. While the southern part is scattered is not linear. It is necessary to say that the northern part has developed more than the southern part. The southern part has hosted a big mall which is a positive point but the narrow streets, not suitable access for cars and no parking spot are the weaknesses of the area. The northern part with nearly renewed paved streets for both pedestrians and vehicles, parking lots and public facilities along the streets attract the people more.

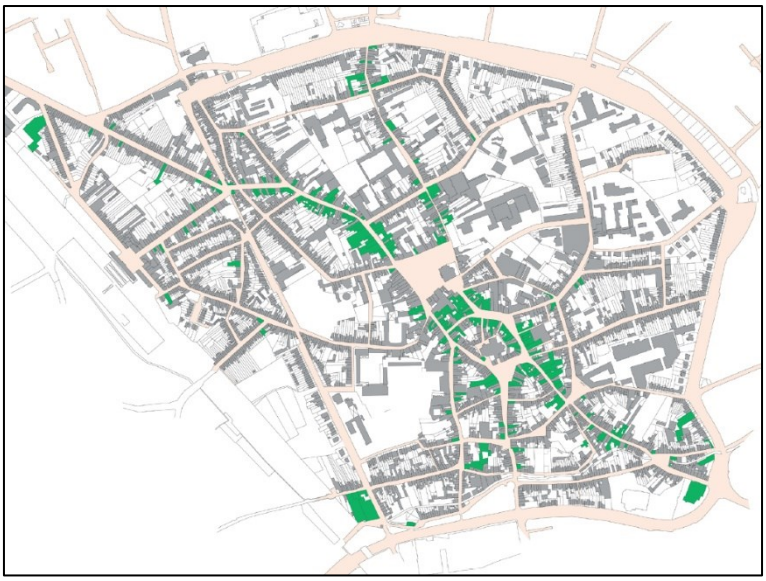

Figure 3.7 Function-Plan, Commercial. Source: (Office_AST77)

3.1.2.3 Offices

This part includes Offices, Banks, Doctor's offices, Lawyer's offices, Physiotherapist and so on. This function is very limited in order to the population. The private offices are mostly placed in residential areas and sometimes inside their private residence.

Figure 3.8 Function-Plan, Offices. Source: (Office_AST77)

3.1.2.4 Cultural and Governmental and Sport Facilities

The main important elements of this category which are the city hall, police office and museum are located in the center and on the street side. The other elements such as sports facilities, post offices, theater the library and so on, are scattered in a different part of the city.

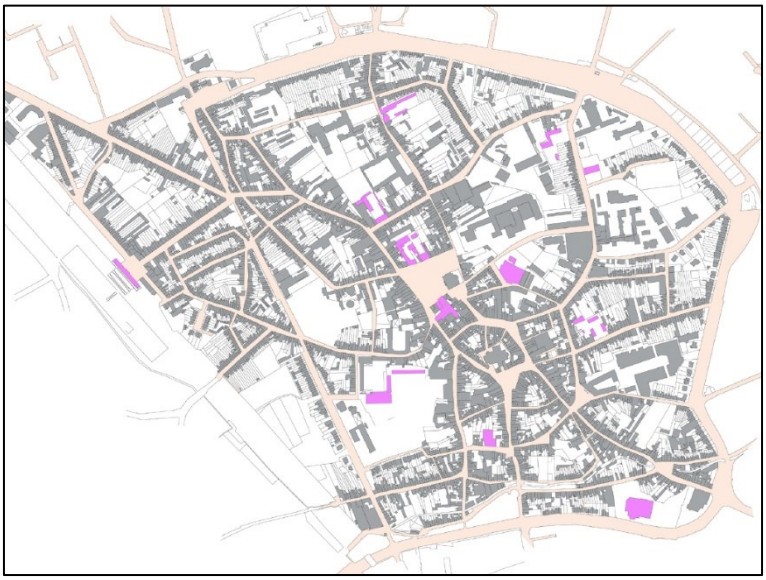

Figure 3.9 Function-Plan, Sports Facilities and Culture. Source: (Office_AST77)

3.1.2.5 Abandoned Buildings

The vacant buildings one of the biggest problem in the city. Most of the vacant buildings in the city have the commercial function and they are abandoned probably due to the settlement of the shops out of the center in the last decades. According to the high rent of the stores, people chose other places to start their trade. It is reasonable that a well-organized shopping street has high rents, but high prices will also have negative effects.

Figure 3.10 Function-Plan, Abandoned Buildings. Source: (Office_AST77)

3.1.2.6 Churches

Despite the nearby known churches around the city, there are only two main churches. These are located in the city center which one of them is faced to the Grot Markt and the other one is surrounded by the commercial and residential buildings.

Figure 3.11 Function-Plan, Churches. Source: (Office_AST77)

3.1.2.7 Schools

A large part of the city center is occupied by the schools and are located in the northern part of the city. All the schools are for the youth that supports the primary and secondary schools educations except one which is Art collage exactly located in the center. This caused to have a lack of science atmosphere in the city.

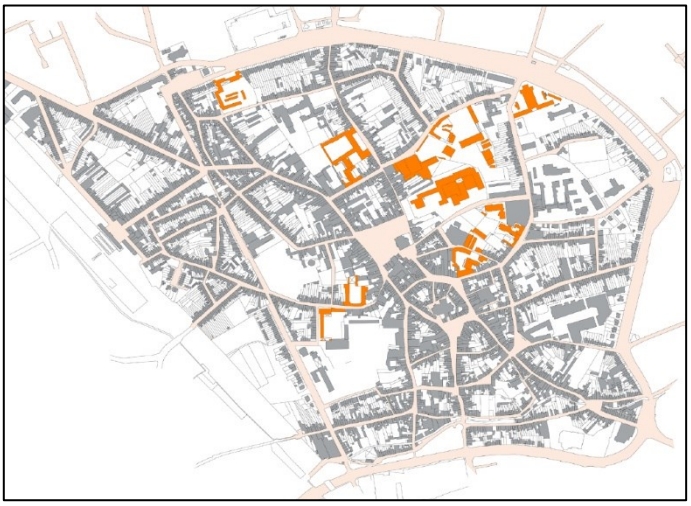

Figure 3.12 Function-Plan, Schools. Source: (Office_AST77)

3.1.2.8 Parking Spots

Tienen city has allocated a parking zone for a single car along the streets. Meanwhile, there are some areas which dedicated specifically to parking usage. The large ones are the one beside the station which let the train passengers park their vehicle in the train station, a big one inside the city which closes to the Art college and neighborhood of the most used and crowded street of the city. However, there is an urgent need of parking areas in the city because the existed ones are most of the time full and are not easy to find a free spot to park the vehicle.

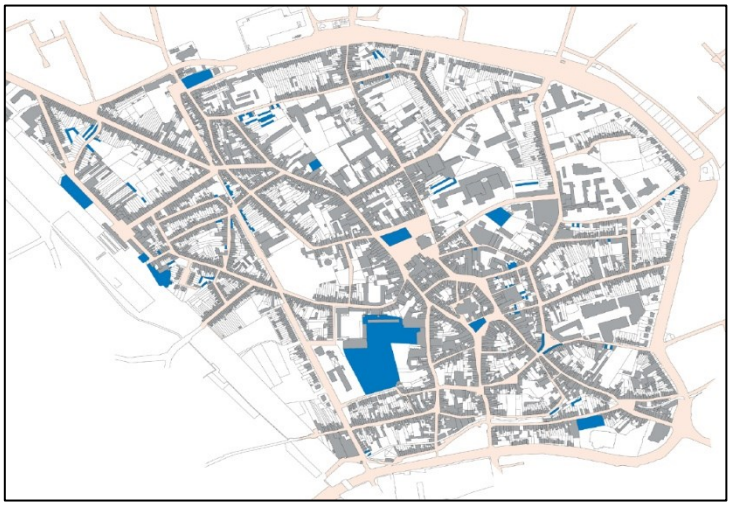

Figure 3.13 Function-Plans, Parking Lots. Source: (Office_AST77)

3.1.2.9 Hospitals

In addition to the schools, a huge and important part of the city is filled in by the healthcare infrastructure. This category is divided in the city to three parts which located in east, north and beside the city park. This extension is enough in a city like Tienen for people to reach the facility in no time.

Figure 3.14 Function-Plan, Hospitals. Source: (Office_AST77)

3.1.2.10 Green Spaces and Land Usage

The only green public space as a city park is located along the main street and besides the only hotel in the city. In general, the city of Tienen has 0.39km² green spaces which cover 26 percent of the city. From this 26 percent there is only 5 percent allocated for the public and the rest of the areas are private and imprisoned inside the city blocks. 0.45km² out of 1.5km² of the city area is constructed and occupied with different functions which cover 30 percent the city.

Figure 3.15 Function-Plan, Green and Land Use. Source: (Office_AST77)

3.2 NEW PROPOSALS FOR SELECTED SPOTS

Through the analyses and the studying methods, the process was based on following the current city situation and find any possible occasion to renovate, redesign or even demolishing in the city. Following the four main goals of this thesis for adopting the city with attention to them which are social, economy, environment and ecology and their role in the city and daily life of the people. The aim of the procedure was to show that we don't need to wait for the year 2030[23] to have a sustainable city. Besides the comprehensive plan of the city based on whatever it is following, we can start to make changes, the scale of the changes doesn't matter. Every small scale project even just adopting a façade of a building with green materials can be part of an urban scale project. Therefor office AST77 itself has selected the different part of the city including buildings, free unused land, facades and even streets to propose a new function or new design on the spots in respect to the mentioned goals. Here we are going to describe the existed situation of each spot and with its features.

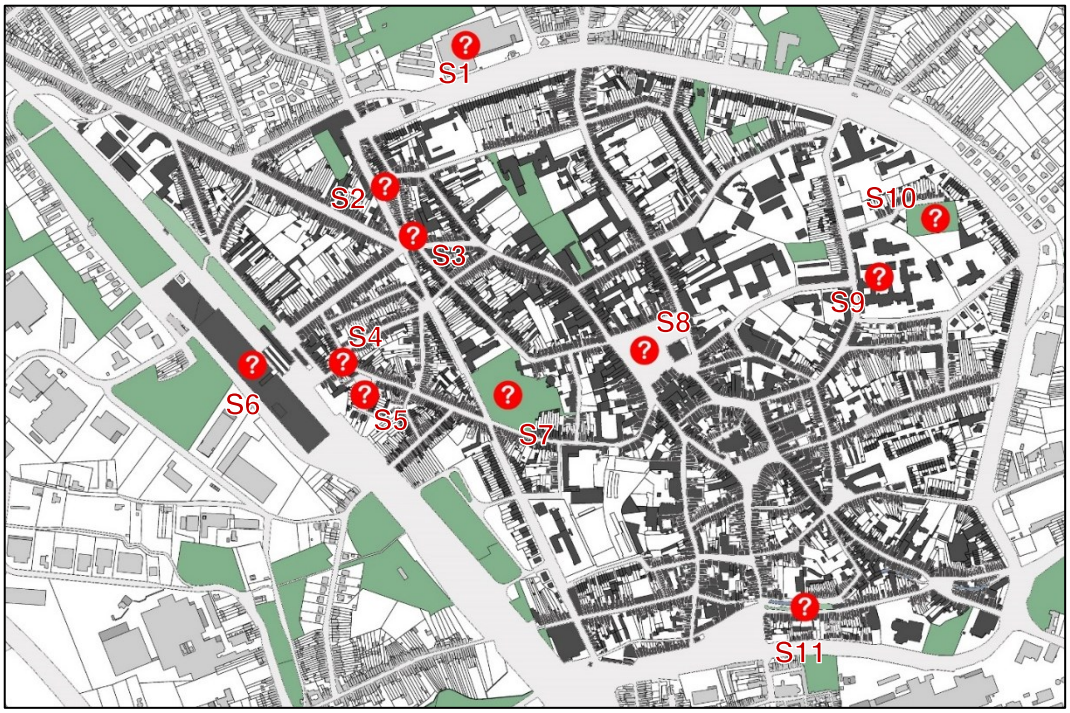

Figure 3.16.City Plan, Targets Locations.

[23] Referring to the specified year for every country to adopt their cities with SDGs.

3.2.1 S1. Carrefour Building

The Largest Vegetable Roof in Europe

The building is the biggest shopping mall in the city consists of a bar, clothes stores and two parking lots in front and back side of the building. It is located in the border of the historical center of the city in the vicinity of the main ring road. The building with around 11000m² is constructed in 2 floors. The selected spot is chosen due to its unused and big flatten roof with 6000m². The building was surrounded by a residential complex in the west and some dwellings in its north. The east and south are faced to the streets and has an open view.

Figure 3.17. Satellite View of the Carrefour Building.

Urban agriculture is one of the main topics in the world which attracts many designers, urbanist and people who are working in sustainable matters attention to itself. In many cities, the innovative ideas have taken place in order first of all to provide healthy, affordable and sustainable food, which is everyone right, then help the environment to survive. The idea was to put the Tienen city in this challenge. Therefore the Carrefour Building roof has selected to grow organic vegetables on the surface of around 4000m² from spring and see the result in the summer. This can make the project largest roof in Europe and put it in the first line before the project Zuidpark [24]in Amsterdam In the same time the idea was to leave the room for individual vegetable gardens. The farmers can train the volunteers and teach them how the farming works and at the same time the group activities and social interaction will increase in the city. For describing more in detail, the procedure was to grow the needs in the vegetable boxes made from woods and create a number of small-scale

[24] Is the largest vegetable roof in the Europe with 3000m² area in the Amsterdam, Netherlands.

greenhouses and the seating area in between. The easily accessible location of the Carrefour building on the city outskirts was the reason to be selected.

Figure 3.18 Carrefour Building, Before Design. Source: (Office_AST77)

Figure 3.19 Carrefour Building, After Design. Source: (Office_AST77)

Figure 3.21 Carrefour Building, Before Design. Source: (Office_AST77)

Figure 3.20 Carrefour Building, After Design. Source: (Office_AST77)

Figure 3.22 Carrefour Building, Before Design. Source: (Office_AST77)

Figure 3.23 Carrefour Building, After Design. Source: (Office_AST77)

3.2.2 S2.Building Facades (Raeymaeckersvest Street)

Garages Transformation

The target is the façade of the buildings in the street view of *Raeymeckersvest* Street which is located in the north of the city and in the neighborhood of a crowded street which is the entrance pathway for the vehicles into the city. The living space of this city block is located on the back side, and on the front side, there are garages or the courtyard for the buildings. So most of the street side view is created with big doors for car access. The wide size of walk side without any green and any other use is only using for giving the private and separated access for the locals to access to their buildings. These matters and the possibility of the garages to adapt with new functions was the reason to select the spot.

Figure 3.24. Satellite View of the Reamaeckersvest Street.

Private parking lots in this city are one of the subjects which they talk about its functions too often in the city. The usage of its area nowadays, up to the owners, has different meanings. The buildings with courtyard or backyard are using the garages as it has to be, but the houses without yards or small yards have changed the garages to warehouses or even a terrace for the house. In the matter of fact, front view of the houses are where must present the type of the house. In architecture, it is not well designed to have garages as an entrance. The idea was to bring more action and social interaction between locals in the city block which is the more needed matter for people rather than garages. Therefore the project was to change these parking lots which they are not functional to the small tea houses or coffee bars or even an office that put some activity in the area. This idea had come in mind when we noticed about the dimension of the pedestrian pathway which was wide enough to have some activity or define other functions in the area. The missing green elements are the other disadvantages of the part. The 2nd aim is to put more green on the city block. Because the houses have courtyards, there was only one way to adopt the block with green subjects which was a green roof. It brought another idea in mind that we can even use the roofs as functional space which can be a terrace for houses or a roof yard. This idea is presented very schematically but for more detailed designing for this city block, we will discuss in the next part of this essay.

Figure 3.25 Street View of Reaymaeckersvest Street. Source: (Office_AST77)

Figure 3.26 Street View of Reyemaeckersvest Street. Source: (Office_AST77)

3.2.3 S3. Ruined Building's Site (Leuvensestraat)

Shared Greenhouse

The plot is the 80m² area of the demolished building in the corner of the city block and intersection of *Ketelmakersstraat* and *Leuvensestraat* streets and facing to square created by four small streets. Due to the city comprehensive plan and improvement of transportation infrastructure, the square is supposed to get larger in the extension plan of the area. Therefore the selected field in the neighborhood of this square is left built and is waiting for future actions. This caused the area gets no attention and day by day it is turning to a place to accumulate the garbage. So the idea was to try to find a temporary function for the area instead of leaving it to this unpleasant condition for the neighborhood.

Figure 3.27. Satellite View of the Leuvensestraat.

City analyses are showing that there are different parts of the city which they have left and abandoned consist of buildings and unbuilt fields. This is a common problem for every city or even small society or a group which if they have these kinds of disordered and anarchy in their neighborhood it will be for the area an unpleasant and decrease the satisfaction of the locals about the circumstance. The main problem of this kind of places returns to their owners or sometimes the government. Sometimes the owner has no willing to construct and leave it as it is and sometimes the rules or the future plan of the city by governments doesn't let the owner do any construction in the site. The question is that, should we leave these kinds of situation to grow in the city? The answer is definitely no. The easiest way is just to not leave the area ruined, we can repair or at least by some kind of painting or artistic way to keep the concinnity of the area. The idea by the Office AST77 was to go beyond that just the view of the area. They wanted to keep the city going toward the green maters, social interaction and activities in the city. Therefore the idea was to define a temporary function at the area. First of all the procedure was based on the visual basics of the current condition by renovating and cleaning the façade of the walls. 2nd step was to put a function related to social interaction and the green and environmental movement. So the number of flower boxes have put on the site and the duty of their conservation has given to some volunteers of local people and this duty was changing from one volunteer to another. This was increasing the responsibility of the locals about their living circumstance and could make the interaction between people.

Figure 3.28 Ruined Building's Site. Before Design. Source: (Office_AST77)

Figure 3.29 Ruined Building's Site. Before Design. Source: (Office_AST77)

3.2.4 S4. Street View (Avendorenstraat)

Pedestrian walk side of the city

The selected part is part of the *Avendorenstraat* and IJzerenwegstraat Street. It is the closest way to reach the city center for pedestrians from the train station, so it considered as the main walk side to the center from the train station. It was not well designed for the pedestrian pathway and there is no green element and no public facilities in the area. As those two streets, which we named them in the first of paragraph, are the main streets to the city, therefore they are the first observation and experience which every visitor of the city will face with it and. So they have to be well designed and have order and organized system in order to give a good looking background for visitors.

Figure 3.30. Satellite View of the Avendorenstraat Street.

As the matter of fact, urban transportation and circulation for both vehicles and pedestrians are the most important matter in urban designing. Each area must have easy access and connection to each part of it. Actually, the identity of a city block or even a single building in the city which has a very strong attraction without suitable access has no meaning. The selected part is the most used pathway for pedestrians to reach the train station. This street gives to both pedestrians and vehicles to access the train station but as experience and studying shows, the pedestrians are using it more than vehicles because it is the nearest way for reaching the city center. So the procedure was to highlight the weaknesses for pedestrians and try to propose a solution for them. As you know different conditions which run the rules in the site lead the project to the final goal. The reason of this transformation is not only to make the path more attractive and make the people have an easy going time during their short journey in the way by giving a good vision and background for passengers and visitors of the before entering the city. The idea was to put green objects, seating areas and renew the paving in order to give more attraction and beauty to the pathway. In this case, we could show the inner city situation, or it can be a way to demonstrate how the city will be in following transformations. The other option was that we could add to this procedure was to change the first floor of each building to the commercial or food services in order to make the route stronger, but as most people are using the pathway only in the morning to go to work or university and came back late evening, it was not a good idea and would not be a functional and affordable solution.

Figure 3.31 Street View of Walk Side, Before Design. Source: (Office_AST77)

Figure 3.32 Street View of Walk Side, After Design. Source: (Office_AST77)

3.2.5 S5. Berkenhof City Block

Courtyard Transition

The area is the middle court of the city block which is located on the west side of the city in the neighborhood of the railway and *Avendorenstraat* Street. The block consists of residential houses around the central court. This area is selected due to its possibility of having more activity and opportunity to put more green space. The construction of this block returns to the 60s. It was the first city block which was designed with respect to social interaction and well-organized housing. The city block consists of sixteen dwellings face to face around a shared yard. Each house has a private backyard but not connected to the others. In meanwhile that the shared yard cases to have a connection between neighbors but the designing of it is not working as it has to do so. Actually, it was only working for car access and parking. It had turned the yard to a private and closed parking space rather than an alley.

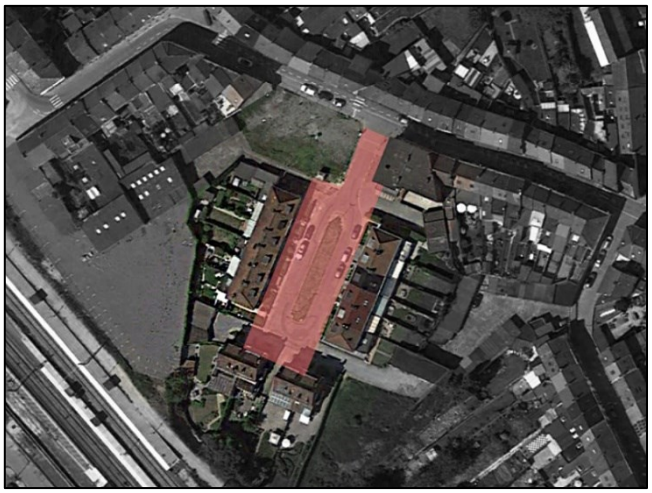

Figure 3.33. Satellite View of the Berkenhof city block.

In a society with cars and trucks, the common land which can play an effective social role in knitting people together no longer happens automatically. Those streets which carry cars and trucks at more than crawling speeds, definitely do not function as common land; and many buildings find themselves entirely isolated from the social fabric because they are not joined to one another by land they hold in common.in this way it is better to think to makes it possible for people to feel comfortable outside the same as their buildings. Therefore it allows people to feel connected to larger social and it works as a meeting place for people. So the idea was to create a circumstance to have more interaction between locals and also a place to have different activities. It would help the place to play a more role rather than only a parking space and a closed alley.

Figure 3.34 Berkenhof City Block. Before Design. Source: (Office_AST77)

Figure 3.35 Berkenhof City Block, After Design. Source: (Office_AST77)

3.2.6 S6. Train Station

Train Station Tower

Tran station is the oldest train station in Belgium which is still working. It is located in the west of the city and neighborhood of *Vierde Lansierslaan* Street. The left side of the station building is the bus terminal and on the right side of it, there is a parking lot. The surrounding of the station is a wide free land to support the number of passengers using the train for transportation every day. By attention to the important role of the station's surrounding, it is not working very functional and doesn't create a suitable atmosphere. It is not well organized and not the infrastructure for public use is not well designed. And due to the face that it is the first place which every passenger will face with it when they are arriving in the city, therefore it has to induce the people to be interested to visit the inner city. So the place has selected to improve the infrastructure and turn the place with more hospitality.

Figure 3.36. Satellite View of the Train Station.

All cities have their own identities and historical backgrounds. The train station in Tienen is the oldest city station in Belgium which has not demolished since it has built. So it is counted as one of the main identities of the city. As we are talking about identity and history which has an old rout in the city, we need to consider many things in its transition. People are important stakeholders in this case. For these reasons our transformation based on the locals and in order to know their idea about the future looking of the station, the Office AST77 has held a meeting in the place and called locals to participate in the future use of the train station. The idea of holding the meeting was to give some structural and architectural information about the place and then get the review and the ideas of the locals about the site (this method is explained in the section *1.6.2*). As we call the participants, the real designers of the project, here, there is a sample of the participant's view for the station.

Figure 3.37 A Sketch by a Participant. Source: (Office_AST77)

This was one of the perspectives which the locals proposed. By reviewing the history of the station, we found that there was a tower behind the station (Figure 3.38) which was working as a bell tower for the train station to notify the train arriving. Office *AST77* by considering all the review of the locals and the historical background of the station has decided to reconstruct the tower that works as a watchtower for the city and in the same time will be a reminder of the history of the station. Besides these, there was an idea to put the green and cover the structure of the tower by plants and make the tower a symbol of the city which present the green city. Peter, the head of the designer group says: *"The best description for the tower is calling it a belfry for the people of the city. A watchtower symbolizing urban context and dignity. A watchtower that embodies local union. Along the tower, we design a lower second volume in the same material. Due to the openness of this structure, the square does not lose its dynamism and its permeability. It can also be a possibility to specify it for*

a certain activity. In the first floor, the tower will have an information screen which the citizens can get informed about activities in the area. External parts can also be used as a fashion show, festivals, cinema or children's playground. The flexibility of the structure for changing offers enough opportunities to the whole element. Also, the paving of the area has taken place. Large white painted circles (which present the sugar molecules which it refers the important role of the sugar factory in the city) makes the distinction between street and sidewalk, so the pedestrian can find themselves separated from. On the other hand, the paintings will attract pedestrians to the tower". (Office_AST77). This tower is already under construction and it is estimated to be ready to use till spring 2019.

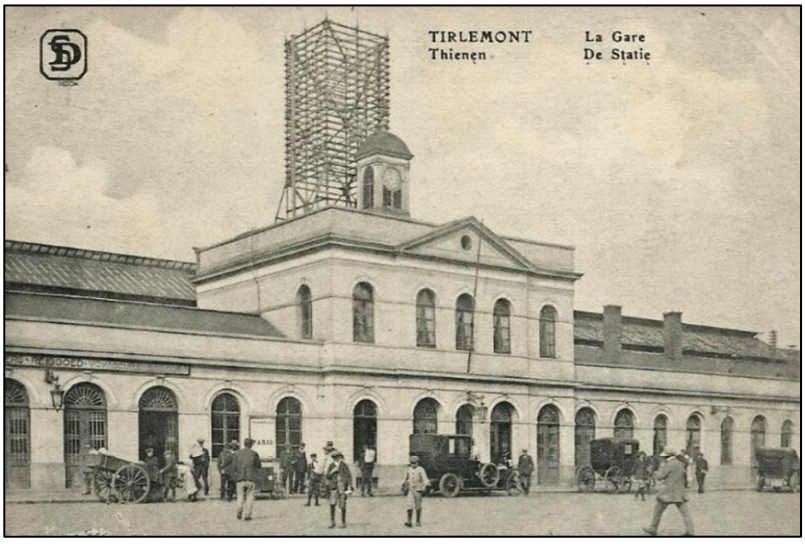

Figure 3.38 Old Station of Tienen. Source: (bloggen.be)

Figure 3.39 New Proposal for Train Station. Source: (Office_AST77)

3.2.7 S7. City Park

Park Life

City Park is the only public green space for the locals. The site is located beside the hotel of Tienen and the dormitory for old disable people in the center of the city. It is surrounded by the *Astridvest, Broekstraat* and *Delportestraat* Streets. This place was totally abandoned and the condition was not suitable for using a public space for families for pleasure or resting time. This was the reason which was causing the green elements in the park get in danger. Inside the park, there is a pool which has turned to a marsh and in its consequences, the place was smelling and disturbing the neighborhoods. Generally talking, It was making an unpleasant circumstance for the neighborhood. The idea was to survive the only green public park of the city and replanting the area with more green elements and finally making the place suitable for all generations.

Figure 3.40. Satellite View of the CITYPARK.

Cities are like human bodies, they need to breathe and for this reason, they need lung. Green spaces work as a lung for cities to refresh and decrease pollution. Despite the single green elements in all round of the city, City Parks is the main factor of this procedure. City parks are important not only for the environmental matters but also as the place for locals to walk, play and meet. Tienen city has only one City park which unfortunately has no attention upon it. This matter got the office AST77 attention and they decided to bring back the green and social life to the City Park. The park was in the neighborhood of a hotel and a dormitory for disabled people with a pool in the center of it. The idea was to conserve the existed greens, replanting and equip the area by seating and playing equipment. Then hold different events in order to bring back the people to the site or in a word bring peace between people and nature.

Figure 3.41 City Park, Before Design. Source: (Office_AST77)

Figure 3.42 City Park, After Design. Source: (Office_AST77)

3.2.8 S8. Grote Markt

City Terrace

The area is related to the big market of the city which is a wide open area with facing one of the main churches of the city *Onze-Lieve-Vrouw-ten-Poel*. The city hall and the museum of the city *Suikermuseum* are placed in this area. This square is surrounded mostly by the restaurant and bars and is the center of the city. a big portion of the site during the day is working as the public parking but the rest of the square is paved for the pedestrian use. it is the place that each year hosts a big national mainstream music festival which is known as *SUIKERROCK*[25]. The idea in this spot was to bring more activity.

[25] "Sugar Rock" is a mainstream music festival in Tienen City on July 26-28. .

Figure 3.43.Satellite View of the Grote Market.

Grote Merkt or Big Market is another place with historical ident like the train station. Every city has a center which is more under attention in comparison by other parts of the city. In Tienen city, Grote Markt is the square consists of the City hall building, museum, one of the man churches of the city and surrounded by many restaurant and bars. This place is important due to its old history and the role which it has the city. It is the place to hold many big events, open market and also the main core of the city. For this reason, as the train station, there was a call for locals to participate and share their view about the area to design and make it more functional. One of the sketches by the participants is presented blew. (Figure 3.44)

Figure 3.44 A Sketch by a Participant. Source: (Office_AST77)

There is an important matter that makes the place so sensitive and it is the function of the square itself. This square hosts different uses which they are working properly such as when it is using as an open market or hosting a big national event. But in the rest of the time, it is out of function and doesn't work as a city center. So

the aim was to bring the activity and people in the background of the square but having this mentality that we should not change the context. With considering all of these matters, this came in mind that we can extend the restaurant and coffee bars inside the square and with putting the seating spaces turn the area to more lively and dynamic circumstance.

Figure 3.45 Grote Markt, Before Design. Source: (Office_AST77)

Figure 3.46 Grote Markt, After Design. Source: (Office_AST77)

3.2.9 S9. Old school

School to Residential Transformation

The place is part of the old technical school in the city. This part is left unused and abandoned due to its old and unusable condition of the building. The school is located in the vicinity of the *Donystraat*, *Kapelstraat* and *Veldbornstraat* Street. The spot is chosen to improve the quality of the building and turn it to livable space. The

main idea was to reusing the abandoned building instead of constructing new buildings.

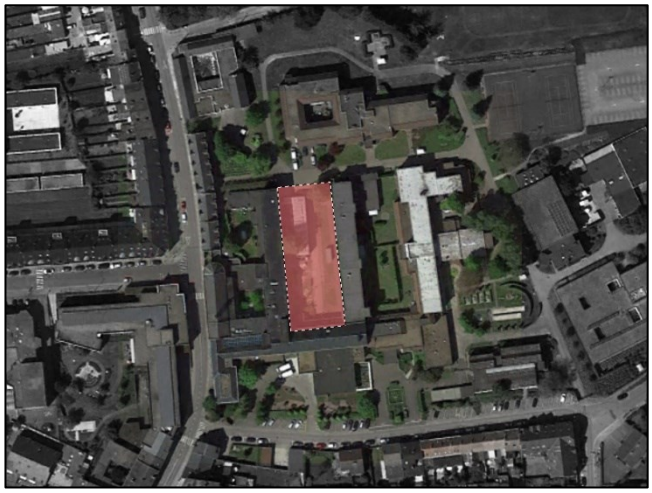

Figure 3.47. Satellite View of Old Hospital.

The need for the residential buildings and sufficient available schools in the area caused the government to think about the transition of the school to the residential building. The idea was to transform the school into a residential building for around 50 families and considering the green spaces. The project was based on renovating and adding new constriction. The renovation was elated to the facades, surrounding and the interior of the school and the new construction was related to underground parking beside the building. The green spaces were also one of the goals of this project. The green zone for relaxation and well connected to the street.

Figure 3.48 Old School After Renovation. Source: (Office_AST77)

Figure 3.49 Old School After Renovation. Source: (Office_AST77)

3.2.10 S10. Ark van Noëstraat Field

Shared Farming and Green Houses

This area is a vacant filed placed in the east of the city in the neighborhood of *Ark Van Noestraat* Street. It is around 5000m² and surrounded by houses from its north and the playing fields for youth from the south. After 2016 the area has turned for jogging and a field for hubby. The openness and wideness of the area give the advantage to it in order to be capable of transforming and accepting a public functional use.

Figure 3.50. Satellite View of Ark van Noestraat.

According to what we discussed before which city is following the green and environmental movement, is area was the best place to add another lung to the city. So the aim was creating a green space but during the studying phase, this idea came in mind that maybe we can do more than only a green context to the city. The idea

was to create a possibility of kind of activity for locals again they can interact with each other. So the idea was to put the ecological approaches in the field which will be the green context for the city and at the same time a positive movement forward the sustainability. It will improve the economy of locals and survive the perished environment too.

Figure 3.51 Ark van Noestraat, Before Design. Source: (Office_AST77)

Figure 3.52 Ark van Noestraat, After Design. Source: (Office_AST77)

3.2.11 S11. Riverside (GETE)

Bench on the riverside

River in the city is a kind of identity for the history of Tienen. It is located in the southern part of the city in between the *Beggaardenstraat* and *Reizigersstraat* Streets. The river which nowadays has no attention to it and is facing some problems such as bad smell, rubbish gathered in the way and also the amount of water which is decreasing year by year. The idea was to bring back the attention to the river which might be a solution at least to save its identity in the city.

Figure 3.53. Satellite View of GETE.

The river is the other identity of the city which is very important for the city. It is one of the reasons for city creation. Again, in this case, the office AST77 has decided to get assist from locals and ask them to share their knowledge and view about the use of the river in the future of the city. Because the river is inside the city locals of the regions have been facing with the real daily problems of the river. So they had more perspectives with respect to other similar cases. An example of the participants' design is presented blew. (Figure 3.57). After studying all the data, the result was just trying to make the area more active and put more effort to attract the people to use the river as hobby, meeting, jogging and holding some festivals as it was doing so. In the next parts will discuss the river and its effect on the neighborhood more in detail.

Figure 3.54 A Sketch By a Participant. Source: (Office_AST77)

Figure 3.55 GETE, Before Design. Source: (Office_AST77)

Figure 3.56 GETE, After Design. Source: (Office_AST77)

Chapter 4 **APPLICATION AT BLOCK SCALE**

4.1 CITY BLOCK A (REAYMAEKERVEST)

This city block is located in the north of the city. From the east, it is facing with *Raeymaeckersvest* Street, from south to *Leuvensetraat, Ketelmakersstraat Streets and* from west and north facing with *Oude Leuvensestraat Street*. (Figure 4.1). This city block with 5400m² area consists of 53 buildings and hosts only residential and commercial usage. Totally there are 178 inhabitants living in the plot in the area of around 6700m². The block has a linear shape and the buildings are mostly two floors. There are no green spaces in the plot and it is considered as a high constructed density block.

Figure 4.1. City Block A Plan. (CADGIS, 2019)

4.1.1 Outcomes from Interview methodology

Among the inhabitants living in the block, there was an art university professor and I did an interview with him in order to get information on March 30, 2018, at his office. The interview has five questions which are defined by the assist of the office AST77.

Interviewee: *Jo Foulon* is a 47 years old art academy professor. He is a broad-minded and futuristic person who has abstract thoughts about the objects and materials in his surroundings. He has got his degree in 2003 from KVAB [26]University and since 1997 till now he has got 45 exhibitions in his resume in art fields. In 2014 he has chosen as the director of the *Academie Regio Tienen*. (http://hisk.edu, n.d.). His way of seeing the substance is not superficiality and substantive, but intimate and introspectively.

Question1: As a person whose activities are about the culture and art, which essence and identity can you mention about the Tienen?

As an artist, he sees the soil as one of the most important factors in the city which is nowadays got buried under the huge dens of the constructions. *"The soil is material, while it has been used by our ancestors in varied ways and has many advantages in comparison with its same category materials, it is in the edge of oblivion, so it needs to be adopted by nowadays and future life methods."* (Foulon, 2018)

Question 2: How the linear structure of the selected block can be transformed in the next 10 to 30 years?

Considering Jo's profession, he sees the city blocks not only some buildings constructed in it, but also as a part of the city context, which are in relation to each other. The selected block in his idea has the most disordered structure and is out of function for that surroundings. He proposed, "*what if in the city a war or a disaster cause to destroy all the buildings, expect old ancient buildings, and give the chance to the citizens, like the past times, to create the city in their own way, how they will organize it?"* (Foulon, 2018). He was clearly saying that we have to be respectful to the past and he was proposing a new approach for the city "*re-creation of life environment"*. Considering his proposal for the city, in the re-creation of the city, he says *"It is better to put the green space in the block without any building instead of re-*

[26] Royal Flemish Academy of Belgium for Science and the Arts founded 1772.

constructing or renovating and reusing them, in that case, we may bring more fresh air and free space for local's pastime". (Foulon, 2018)

Question 3: Considering the two different streets beside the block (*Oude Leuvensestraat, Ketelmakersstraat* and *Raeymaeckersvest*), what are the advantages and disadvantages of them? Which one is most consonant with the city context?

"For sure the Raeymaekervest is more functional than the others but it also needs to be considered that why there is no green in the street sides while there is the possibility of it." (Foulon, 2018)

Question 4: Do you think private parking lots are necessary for each house or shared and public lots can work better?

In his idea, finding the way to decrease the car usage in the city is better than every other solution, but he proposed that; *"put the streets underground as a tunnel, as much as it is possible, to have more space for activities. And specifically about the block, it is better to allocate a portion of the site as underground parking which will cause to have more free space such as co-gardens and following that we will be able to design more ecological and sociological. Therefore we can say we reach the optimal usage of land considering the current construction density and at the same time we have saved the soil from annihilation".* (Foulon, 2018)

Question 5: Describe the city (this city block) in one phrase.

"*Most possible un-harmonized situation that a city block could have".* (Foulon, 2018)

As a conclusion we can say *Jo Foulon* wants the city block to adapt itself with people social life rather than adopting people to the existed or future state of the circumstance. His idea is to put people in charge to create their own environment but considering the underground parking, more green spaces and less construction. He believes that as the building is working and completing the city block, the city block is creating the city. Therefore starting with small scales always is the easiest way to solve the big scale problems.

4.1.2 Outcomes from SWOT Analyses methodology:

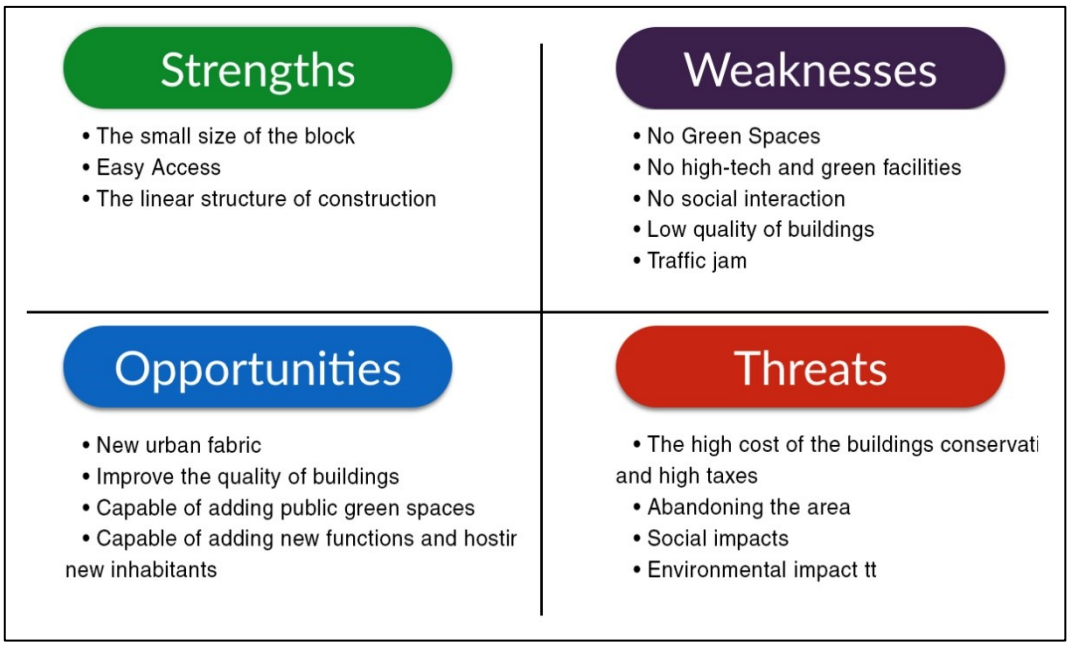

Figure 4.2 SWOT Analyses Scheme for Block A.

Strengths:

- The small size of the block:
  Due to the small size of the city block and the few numbers of the buildings in the plot, there is a possibility to define and apply new typology of urban fabric which can be economically affordable and reasonable.
- Easy Access:
  Well connected of the city block to the city facilities such as shopping mall (Carrefour market in six minutes by walk), train station (four minutes by walk), hospital (three minutes by walk), school (five minutes by walk) and the city center (six minutes by walk).
- The linear structure of construction
  The structure of the block is linear and the buildings have the minimum possible common part. This is an advantage for the city block which can give the possibility to makes changes in the area.

Weaknesses:

- No Green Spaces
  The block has no green spaces neither public nor private. Most of the field is constructed and buildings have the most percentage of land use. The

buildings used to have a yard but most of them have changed to garages by owners and the rest of them are free of green elements.

- No high-tech and green facilities
  Due to the high cost of the green high-tech facilities, the owners of houses are not eager to use them.
- No social interaction
  Due to the structure of the city block and missing of the public, there is no interaction between residents of the area. The other reason is that of the residential function of the buildings, there is no other use such as a market or playground for children.
- Low quality of buildings
  According to the analyses, the quality of most buildings by attention to their structure is not suitable. The buildings need to do renovation or reconstruction.
- Traffic jam
  This block is in the neighborhood of the Raemaekersvest Street which is the entrance to the city from the north and in the early morning at noon and late evening has a traffic jam in the one side of the block that blocks the transportation.

Opportunities:

- New urban fabric
  The small size of the chosen block causes to be able to redesign the block totally and create a new urban fabric which can be a reference or basepoint for other surrounding city blocks.
- Improve the quality of buildings
  Cause the building low quality their need to do renovation, this renovation can be a possibility to equip the buildings with green high-tech facilities and upgrade the materials.
- Capable of adding public green spaces
  With demolishing the abandoned or low-quality building which we can't do the restoration on them and turn them to the green spaces, we can bring the shared green area for residents.
- Capable of adding new functions and hosting new inhabitants
  The transformation of the abandoned building to the commercial, food-based services and so on, we can have a balance between the functions. Or the restoration of these abandoned buildings can give more space to host the new inhabitants.

Threats:

- The high cost of the buildings conservation and high taxes
  Low quality of the building is counted as a kind of disadvantages for the construction and too often they need to do the conservation and repairing which has a high cost for the owner. The missing of the green high-tech facilities causes to have the high cost of the monthly bill while it can decrease easily by modern technologies.
- Abandoning the area
  The low quality of the life situation in the city block can cause to abandon the houses by owners and in long term can bring the city block to the brink of desolation.
- Social impacts
  In long term, when there is no activity and interaction with people, it causes sadness and isolated society and following that it causes depression for the locals.
- Environmental impact
  The pollution made by traffic, lack of green spaces, high density of construction and low quality of the buildings are the reason to destroy the environment and have a bad effect on it.

4.1.3 Final conclusion and new proposal:

According to the analyses have done on the plot, there few steps in order to solve the problems. 1st, we need to conserve the newly renovated or constructed buildings as a reference. 2nd, do the restoration on the building which they can be livable which renovation. 3rd, demolish the old and low-quality buildings and turn them to the public green spaces. 4th, construct the new building or increase the number of the floors of the existed buildings in order to keep the population density. 5th, define the new functions such as food based services. 6th equip the buildings with high-tech green facilities. 7th, upgrade the transportation and pedestrian ways such as bicycle line and seating areas. 8th, use the maximum possible spaces to have a green area such as green roofs, green facades and so on. 9th, put the portion of the site to have an underground parking lot. The proposed idea has tried to be presented in a very simple schematic way. (Figure 4.3)

Figure 4.3. Existed Situation before designing, Block A. Source: (Office_AST77)

Figure 4.4. New Proposed Scheme. Block A. Source: (Office_AST77)

4.2 CITY BLOCK B (VERLATSRAEET)

This block has a triangular shape located in the east of Tienen close to the train station. It is surrounded by three streets named, *Sint-Martiusstraat, Avendorenstraat* and *Verlatstraat*. (Figure 4.4). All the buildings are placed in the edge of the block and inside the block is free land which consists of the private yards of the houses. It covers around 13300m² of the city area which 6500 m² of that is green spaces that created by private backyard of the houses. This block with hosting 257 inhabitants in 10600m² area at 59 residential building is considered as a low dense construction city block. The topology of the buildings is mostly two floors while they are some residential with 4-floor construction.

Figure 4.5. City Block B Plan. Source: (CADGIS, 2019)

4.2.1 Outcomes from Interview methodology

For this city block, the interview has done with the Mayor of the city. The five questions with the assist of the office AST77 are defined and the interview has happened in the city hall on April 25, 2018.

Interviewee: *Katrien Patryka* was born in 1973 in Tienen city. She graduated in 1997 as a graduate in modern history and in 1999 a degree in criminology at the Catholic University of Leuven. At the local elections of 2000, *Katrien* was elected as local councilor of Tienen. On 25 May 2014 she got a seat in the parliament as a Flemish Member and in 2015 she has chosen as the mayor of the Tienen city till now. From 2011 to 2014 she was climate counselor at the cabinet of Flemish minister for the environment and took part at the climate conference in South African Durban in November 2011.

Question 1: As a representative person of the city, which essence and identity can you mention about the Tienen?

She makes it clear from the beginning that the city still needs many efforts to be an idealistic city. She said; “City is under development and we all as a team trying to bring the improvement to the city as fast as we can. There isn’t only one identity in the city for me to mention it as the most important matter. All the matters are important and have to be planned for future use or conservation but the only thing which is matter is their priority. Sometimes environmental matters, sometimes social or even sometimes a small playground for children. It’s only the matter of our need in the city timeline.” (Patryka, 2018)

Question 2: Considering the high mass of green and unconstructed fields (private) imprisoned by the surrounding buildings, how can it be transferred for public uses?

She was completely aware of the situation of each block in the city. She tried to explain it very briefly and make it simple. She described that; *“what we are facing in the city has two types of dimensions, first the things that people and locals are realizing and seeing and the 2nd is the government’s observation which comes out by studying. Therefore when you say private imprisoned gardens it is not what it looks like. We saw them as the fields are under the private investor contract to protect them. We have law and every owner are well informed about this matter when they are buying such these kind of houses, but unfortunately the owners for some personal reasons they don’t pay attention to them. There are some work groups in the, which*

the Office AST77 is one of them, are doing researches in the secret gardens and Co-gardens which we can bring back these spaces for public use and protect them." (Patryka, 2018)

Question 3: By attention to the morphology of the buildings and facades, how can you explain these disorder and the disharmonious situation in the Flemish cities?

These disordered facades are sometimes called ugly Flemish buildings. This has a long history and there is a policy behind this which governments have left the hands of owners free to design their buildings. There are some general rules to follow such as the height of buildings, windows, the number of floors or the material that they are allowed to use, but there is no restriction in designing and using the colors or the shape of the elements used in the buildings. "*The Flemish prototypes, however, they are and whatever they are called are part of the culture of this country and we respect to the people to choose their style".* (Patryka, 2018).

Question 4: What is the possibility of the block to change to a better neighborhood in the next 10 to 30 years?

The city is created by many different factors, from the architectural point of view it starts with a single building and its relation with other buildings and it grows with this hierarchy to reach the city scale and even bigger than urban scale to create our world. With this view, she thinks: *"we have to start from building scale, to see what we can improve on them then we can go to the next step which is city block and so far. One of the serious problems of the city is abandoned buildings which they don't have good conditions and the owners are not available or they are not eager to invest in their renovation. The other problem is the construction with the owners of the house doing without any permission and regulation which is dangerous. So the only thing we need to find a way to have the interest of the locals to cooperate with the government, it is the only case that we can develop the city.*" (Patryka, 2018). The possibility of creating the public green spaces inside the block is an opportunity for this block as she mentioned in the last question.

Question 5: Describe the city (city block) in one phrase.

"In few years, Tienen city will be the greenest city in Belgium".

What we can realize from this interview is that the mayor sees the people as the main stakeholders in any program implementation. She considers the city as a

complex which all its subsets must be taken on the account in the development. The green and the environmental movement is the priority in his future plan for the city and she believes in a few years the city will reach the greenest city title in Belgium. She believes that people have the right of choosing their own environment to live and their activity in the city is more important than the high-level transformation programming. For this reason, she tries with many policies to attract people and make them interested to participate in city development.

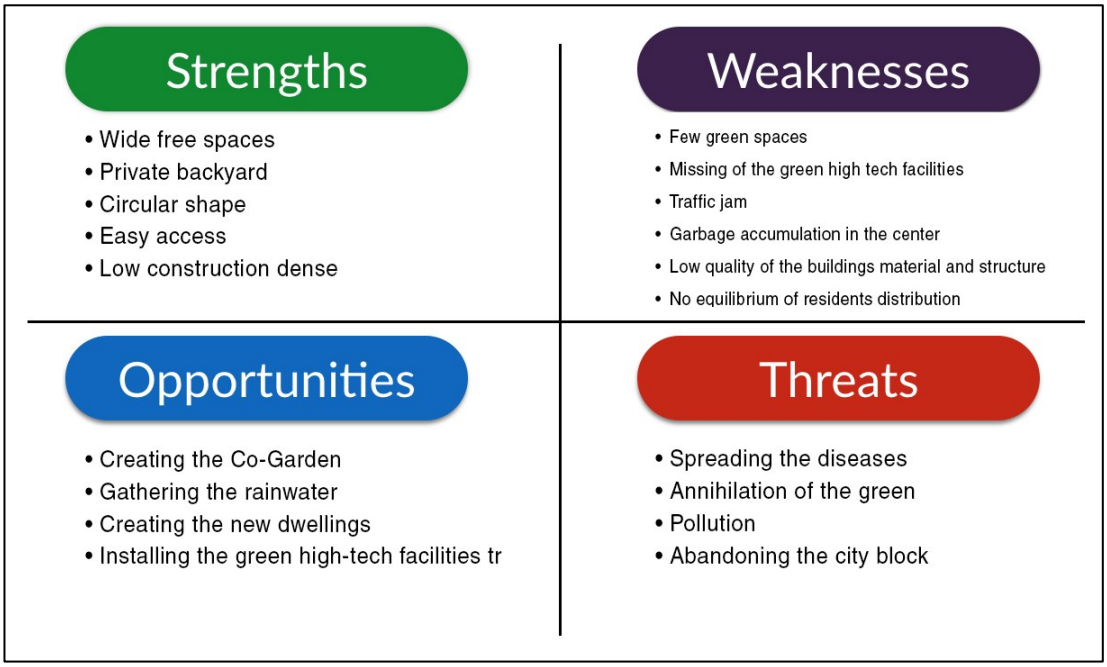

Figure 4.6 SWOT Analyses Scheme for Block B.

Strengths:

- Wide free spaces
  As the block has the circular shape and the buildings are placed in the edge of it, there is vast free space inside the block with some warehouses or greenhouses.
- Private backyard
  Each house in this block has the private backyard which all creating a wide unbuilt center for a city block and causes the buildings has the green spaces.
- Circular shape
  The access to the different part of the block is easier than the linear shape, a public function can be placed in the center and all the surrounding buildings can access to it simply.
- Easy access

It is well connected to the city facilities such as train station (in 2 minutes by walk), City Park (less than 2 minutes b walk), shopping mall (in 8 minutes by walk), city center (less than 10 minutes by walk).

- Low construction dense
  Approximately 50 percent of the area is constructed and the rest is free and it causes to have low construction density.

Weaknesses:

- Few green spaces
  The city block despite having a wide free space in the center of it. It is because of no interest of the owners and also the long but narrow shape of the yards which make the endpoint useless.
- Missing of the green high tech facilities
  Due to the high cost of the green high-tech facilities, the owners of houses are not eager to use them.
- Traffic jam
  The Avendorenstraat and Verletstraat are 2 streets that have a traffic jam at the pick time of the city which is at noon and afternoon. One of these streets is the way to reach the train station and the other one is the connection way of the city to the exit of the city to the Leuven city.
- Garbage accumulation in the center
  Narrow and long backyards shape makes the end of the invisible and out of sight. Therefore the end of the yards which end up to the block center is used to be unused old stuff and the hill of cut grasses and broken branches of the trees.
- Low quality of the buildings material and structure
  According to the analyses and the survey which has done, this block includes some old buildings which they need to be renovated and due to the unauthorized construction in the backside of the buildings by the owners, the structure of them are not approved and the materials are not in good quality.
- No equilibrium of residents distribution
  Some houses in this block despite its size and scale has hosted the residents more than its capacity and on the other hand, some of them have only one inhabitant. This makes the city block out of balance.

Opportunities:

- Creating the Co-Garden
  The existed wide free space in the center of the block bring this possibility for it to change the private usage of the unused parts to the public and share it with all the neighborhood. It can be a playground for children, a place for resting, meeting or even fishing by constructing a pool.
- Gathering the rainwater
  The typology of the buildings makes it possible to create the underground storage to gather the rainwater separately for each house and use it after filtering. It is also possible to create a pool in the center of the block for public use which can be made by the rainwater.
- Creating the new dwellings
  The old buildings and abandoned ones and also existed free fields nearby each building, causes to have this chance of mixing the existed houses with others and bring the balance between the scale of the building and the inhabitants of it.
- Installing the green high-tech facilities
  The shape of the block and the free wide fields in the center give us the possibility to equip the city block with green facilities. The other option is installing them on the roof of each building separately.

Threats:

- Spreading the diseases
  The condition created in the center of the block by the accumulation of the wastes causes to spread the unhealthy and unsuitable circumstance for local of the block.
- Annihilation of the green
  The unacceptable attention to the existing green by the owners of the houses in their gardens, the existed green will be in the brink of extinction
- Pollution
  2 busy streets in the neighborhood of the city block in the traffic pick time of the city create noise and air pollution.
- Abandoning the city block
  In long term time, if the existed situation continues, it will cause the inhabitants to leave the block and other city locals will not be eager to settle in that place.

4.2.3 Final conclusion and new proposal:

According to the analyses which have done on the area, this instruction has suggested in order to solve the problems. 1st, renovate the building with low quality, from both structural points of view and the material used in them. 2nd, demolish the unauthorized constructed parts by owners. 3rd, mixing the buildings to have a suitable scale for inhabitants in order to their numbers. 4th, turn the unused portion of the private green gardens to the public use. 5th, constructing the underground water storage to gather the rainwater. 6th, equip the buildings with new high-tech facilities. 7th, demolish some of the old and unusable buildings to give the entrance to inside the block for the public. This proposal is tried to present in a graphical scheme. (Figure 4.6).

Figure 4.7. Existed Situation before designing, Block B. Source: (Office_AST77)

Figure 4.8. New Proposed Scheme, Block B. Source: (Office_AST77)

4.3 CITY BLOCK C (GETE)

The Gete block is located in the south of the city in the neighborhood of the city ring road. The name of the Block is taken from the river which is inside the city block. *Paardenbrugstraat* and *Beauduinstraat* are the streets which surround the block from three sides and the Bergevest is the ring road which is in the neighborhood of the block from the west side. The block consists of 32 residential with hosting 146 inhabitants and three commercial which includes a drugstore, an antique store and a grocery shop. This block covers the 5400m² surface of the city with having 6100m² for residential use. The block has a historical identity thanks to the River (Gete). In the past, it was used to transfer the passengers from the river and it was the station named "*T Schip*" which nowadays is turned to a square. (Figure 4.9).

Figure 4.9. City Block C Plan. Source: (CADGIS, 2019)

4.3.1 Outcomes from Interview methodology

For this city block, the interview has done with the *Philippe liesenborghs* who is a sociologist and it is more than twelve years that he set his activity's based on Tienen and Flemish cities and culture. The five questions with the assist of the office AST77 are defined and the interview has happened in the cultural center of the city on April 5, 2018.

Interviewee: *Philippe* was born in Tienen in 1971. His activity is based on social matters and culture. He introduces himself; *"Co-founder of the citizen's movement in the Tienen City. Through several projects, our more than 100 volunteers are participating to make the city and its villages a more social, sustainable and pleasant place. Over the years we have succeeded in building up a broad network and developing into a local movement".* (Philippe_liesenborghs). He is also part of the different comminutes and groups such as RISO[27], city council, city forum.

Question 1: As a person who is more in contact with sociological subjects, which essence and identity can you mention about the Tienen?

"As a person who is working on the city more than 10 years I strongly can say that Out of many important subjects related to designing in architecture, the social life aspects, from the studying stage before designing to the reflection of people after built work, are always in the top of the list." (Liesenborghs, 2018). More than this, he mentioned to the river, soil, agriculture, railway sugar factory and acid citric factory which they have played a dominant role in the creation and development of the city.

Question 2: In your opinion, how is the river working in the city and this block? How we can use it for the next 10 to 30 years?

"River beside the fertile soil area as a matter of creation of a small society which during centuries is developed and enlarged enough to call it, Tienen City are counted as a precious heritage for us". (Liesenborghs, 2018). His projection of the block is based on the river which is more than only an old heritage or a symbol in the city for him. He looks for its invisible visage and the way to reconcile the people with the river but with attention to people's social life requirement in the region. Philippe believes that; *"The best way to have the people's satisfaction from their environment is not only*

[27] Is a non-profit organization in that organizes social works at various locations in the Flemish Brabant.

related to inside the region which they live, but also to the factors which have effects on their daily life". (Liesenborghs, 2018).

Question 3: How we can combine the social life with the river to have more active and mobility in the zone?

He feels; "*The city is in need of an equivalence solution for people who are living in very frozen circumstance with no connection with neighbors and the people who are living in very big yards but again with no connection with the rest of the people."* (Liesenborghs, 2018) The river is the opportunity in the block in his view and he thinks if we can hold different events like the dinner table[28], we can make the activities besides the river and make a peace between people and river again as a pastime. It can be done by green spaces in Riverside, seating areas, holding different festivals, events and so on.

Question 4: What are the possibilities of the block to change?

He explained this question with an example; *"…after banning the farming in the center of the city, the farming fields changed to the private gardens but most of the people are not interested to use it as it has to be used. Looking back to the history of the river shows that it happened to the river too when they stopped using it as transportation was."* (Liesenborghs, 2018). He was clearly saying that we need sometimes to give the old meaning of an object back. Not the transportation way in that meaning but kind of touristic attraction or local's pastime way like the river in Bruges City[29].

Question 5: Describe the city (city block) in one phrase.

A city that he wishes to see it; *"…as one family, which each member is responsible to his/her own duties, they can be in different social status, ages, stages and direction, but they are from one united family that celebrate with each other, work together and respect to each other's senses to progress".* (Liesenborghs, 2018).

As the conclusion of the interview what is clear is that Philippe is seeing the people participating as the solution of most of the problems in the city. The river is the key to changing the circumstance of the block. He sees social equality in breaking down the borders and in people interaction. This block can be more than a living space

[28] A traditional event happens every year on 19th of May.

[29] Is the capital and largest city of the province of West Flanders in the Flemish Region of Belgium.

if we can change the vision of the people to the river and it will happen when the river gets strong function, a function more than a water passageway.

4.3.2 Outcomes from SWOT Analyses methodology:

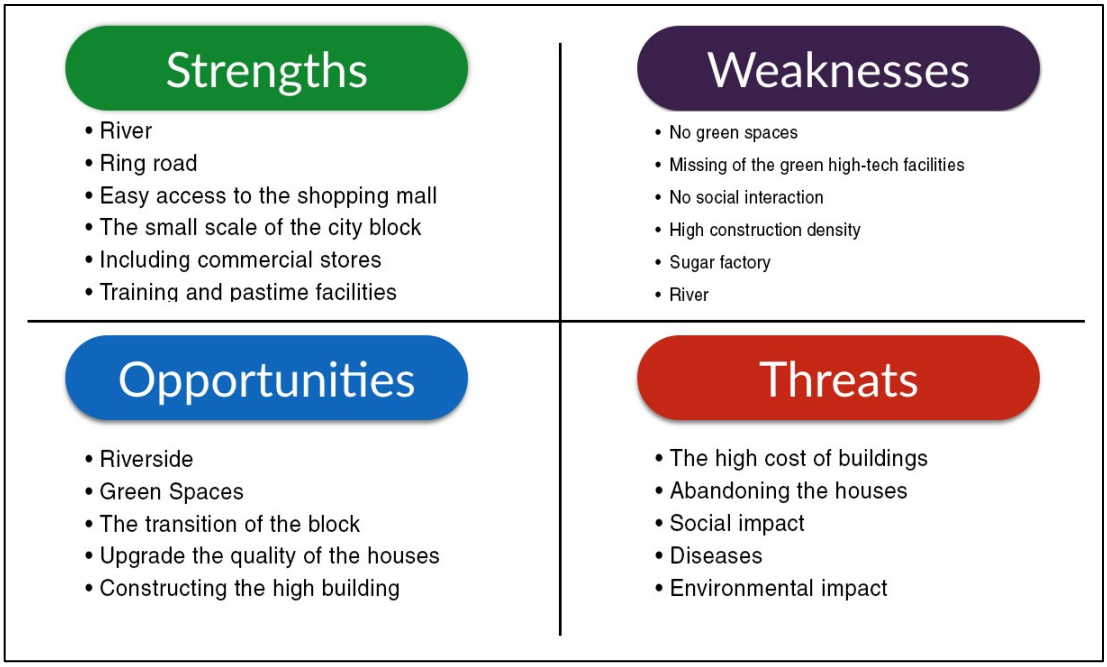

Figure 4.10 SWOT Analyses Scheme for Block C.

Strengths:

- River
  The river is a strong identity for the area which can bring different opportunities for the city block.
- Ring road
  It makes access to a different part of the city easy.
- Easy access to the shopping mall
  There is a shopping mall in the vicinity of the plot (4minutes walk to ALDI shopping mall).
- The small scale of the city block
  This feature is a possibility to organize the area easily.
- Including commercial stores
  This makes the area to improve the quality of the city block and make it easy for inhabitants to provide their needs easily.
- Training and pastime facilities
  The '*T Schip'* square is equipped with the sport training facilities which makes the local of the city block and other blocks to spend their pastime there.

Weaknesses:

- No green spaces
  The high constructed density has left no land to have green spaces.
- Missing of the green high-tech facilities
  The high cost of these instruments makes the people not interested to apply them on their buildings.
- No social interaction
  No relation and connection between the houses make the people meet very rarely.
- High construction density
  The small size of the block and the high demand for residential houses caused to overbuild the block.
- Sugar factory
  Is the reason to make the pollution in its surrounding.
- River
  It includes a lot of garbage which the water has brought it with itself and due to the hard accessing to the river and being out of sight, they accumulate in the area.
- Building quality
  According to the survey of the city block, there are some old buildings which they are not in good condition.
- Blocked view to the river by the buildings
  Most of the riverside in the area is blocked by the houses and there is no access to the river.
- Ring road
  The highway in the neighborhood of the city block causes noise pollution.

Opportunities:

- Riverside
  It has the possibility to be an attraction factor and change the typology of the city block.
- Green Spaces
  Riverside has the possibility to create a green area.
- The transition of the block
  The small scale of the city block is economically affordable to propose a new type of urban fabric to the area.
- Upgrade the quality of the houses

The buildings which have the possibility of adopting new high technologies can be transformed and upgraded in order to consume less energy.

- Constructing the high building
  The ring road noise pollution and the capability of the city block to get the new urban fabric to bring the chance to build the high buildings in order to keep the population density and have a free field to put green spaces instead.

Threats:

- The high cost of buildings
  The low quality of the building in ling term causes to spend to their conservation by owners.
- Abandoning the houses
  In the long term period, the local of the block will leave the area if they don't find the desired environment.
- Social impact
  Day by the day the relationship between people will decrease due to the rare interaction that they have with each other.
- Diseases
  The accumulated garbage in the river will cause different illnesses.
- Environmental impact
  No attention on the river will destroy its surrounding nature and as a result, the environment will be put in danger.

4.3.3 Final conclusion and new proposal:

Through studying the selected area, the following steps are proposed in order to solve the problems. 1st put the river as the key and main reference for our design. 2nd, deconstructing the building around the river. 3rd, reconstructing the west side of the block, faced to the ring road, by high buildings to be able to host the inhabitants of the other buildings which are demolished. 4th, keep the recently renovated building or the newly constructed on the other side. 5th, design the green area beside the river and. 6th, adopt the houses with green elements. This procedure has tried to be presented by graphical editing on the existed situation of the block. (Figure 3.68).

Figure 4.11. Existed Situation before designing, Block C. Source: (Office_AST77)

Figure 4.12. New Proposed Scheme, Block C. Source: (Office_AST77)

Chapter 5 **CONCLUSION**

In this chapter, the main findings according to the research question are summarized. Moreover, general conclusions based on the findings of the studies presented in this thesis are described. Finally, the strengths and limitations of this thesis are identified in order to suggest new future developments proposals into higher education.

This thesis is developed as an internship project in an architectural office of AST77[30] in the city of Tienen, Belgium. The project has followed the sustainable aspects: economy, environment and social with considering also ecological designing. Through the proposed methodologies, the city is studied and divided into two scales of analysis, City Scale and Block Scale. The thesis tried to analyze the capability of the transformation of the city through the implementation of the small scale projects development. It is discussed that instead of waiting for the big scale projects happen in the city, we can start to reshape or re-design the critical points of the city or even improve the low-quality part of the city in order to make the city ready for big steps forward the sustainable development. Moreover, the thesis illustrated how the participative approach can significantly help in improving and designing the desired circumstance.

Following the research question of the thesis which is*: "How can we transform Tienen city in order to achieve a more sustainable environment?"* it is possible to understand that there are two matters which has to be discussed here. The ways that lead us to transformation and the maters which has to be considered in a sustainable environment. The term transformation means changing the condition from a state to another state of form or condition. In this way, this thesis, as the final proposals, is proposing the procedure of transformation theoretically by some conceptual schemes. Therefore, the new proposals are presenting the way of the transformation without entering the implementation stage. As the discussion is about the sustainable environment, the main objectives of this thesis are based on the sustainable goals which are Economy, Environment and Sociology and the Ecological design in addition to them. Hence, the presented new proposals are strongly showing the way of transition forward the sustainable cities. So, these new proposals have conducted the city to adapt to the objectives and following that, they answer the research question of the thesis. Summing up the results some important points are emerged as following:

[30] http://www.ast77.be/

- The sustainable development can be applied at any scale and any state. It is better to develop the sustainability issues from small projects and the collection of those projects can bring the entire city sustainable development.
- Every single area can be improved without having a relationship with another area, but all of them together are conducting the project to a unique common goal.
- Ecology aspects can be part of the sustainable development in the way that our designing with the concept of ecology helps the city to have more green and social environment.
- The local stakeholders are the main actors of any development in the city and to increase the successfulness of the project.
- The city development will increase the attraction of the investors in the city which causes to help the local economy.

As with any research study, there is a possibility of a flaw in data, design and interpretation. In this research, one consideration that needs to be taken into account is the fact that the study was designed to investigate in a specific city which has some special features and particularities. The scale of the city, population, culture and other matters have to be considered when it is chosen a reference to other projects. The methodology used in this thesis is flexible and known methods except for the one which was contributed to the locals in the process of the research and designing. However, the questions of the interview are defined specifically for the specific condition of each case study and they should be modified for other specific case studies. This thesis proposes the general actions for each case study and further research can be done in order to reach more secure and operational results. This research can be a starting point of the city development and further actions which lead it to reach sustainable development. For this reason, there is an idea to use and expand this thesis for future developments. The suggested idea is to combine this thesis with other researches thesis on the Low-Tech constructions and green materials. This will be a way to get one step closer to the real meaning of sustainable designing. There is also a supplemental suggestion for implementation of the idea with programming software based on the new pre-designed constructions for each block of the city. This application will let the people chose and build their own desired environment through the green buildings which have designed by green organizations or architecture offices.

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