TULKARM AS A WALKABLE CITY

Graduation Project

An Najah National University
Engineering Faculty
Urban-Planning Department

Submitted By

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under supervision of
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Acknowledgment

As I complete this graduation project, I realize and recognize the numerous hands that have help me in such many ways, and I thank them all with my whole heart.

I'm highly indebted to my family mom, dad and brothers. In addition to the Urban planning department specially "Dr. Ali Abdelhamid", "Dr. Zahra Zawawi" and "Dr. Fida Yaseen" for guiding me through the process. My heartfelt thanks to Almighty God. I also thank my friends and well-wishers for their support and prayers.

With a heart full of gratitude, I submit this report.

Ward Amin Al-Hamshari.

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1. Introduction

Communities nowadays are more aware about their health and livability that are affected lately by the unmanaged growth. Walkability is a measure of the effectiveness of the urban form and the design of the community. Walkability means enhancing walking, cycling to replace the use of cars for shopping, going to school and public spaces. Moreover, walkability enhances sustainability of design, promote fitness and combat obesity.

Nowadays, walkable communities are the main concern of urban planners. Issues related to walkability have received considerable attention in developed countries; few studies exist in developing countries. In Palestine walkability is a new topic in urban planning and there is lack of studies concerning it. However, Palestinian people used to walk in different Palestinian cities for different reasons basically reasons related to socio-economic conditions.

In my project I will take Tulkarm city as a study area for designing a walkable environment mainly a walkable CBD. My work consists of theoretical study and ended by a schematic design.

1.2 The Importance of project

As I mentioned before in the introduction, this project "Walkable City" has the main concern of urban planners nowadays mainly because of its importance. After increasing the rate of urban sprawl, the city becomes bigger and the people used to travel outside the limits of the city, streets become taller and the people depends mainly on their cars to travel with, which contributed in air pollution. In addition to that, a large proportion of family income spent on transportation costs. So, by applying the walkability concept, the city will become more economically reasonable, healthier, and more environmentally sustainable. And applying this to a

Palestinian city is a very important thing specially in facing the rapid urbanization growth.

1.3 Motivation "Why Walkable city?"

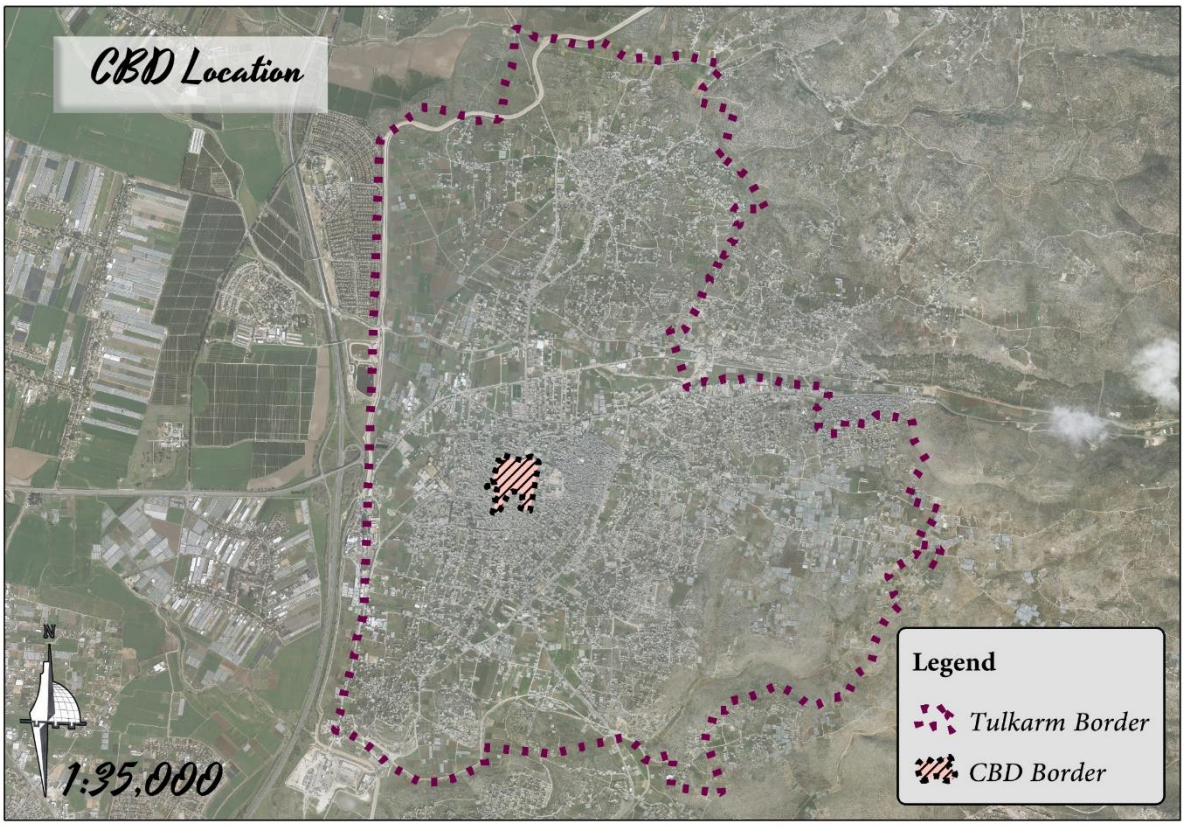
The reason behind choosing this project resulted from its importance. As we all know that the Palestinian economic situation is very critical, Palestinian environment/ urban form is threatened by transition to a huge block of stone, by applying walkability and its design principles we can improve those two important sectors.

1.4 Objectives

The main objectives of this project are:

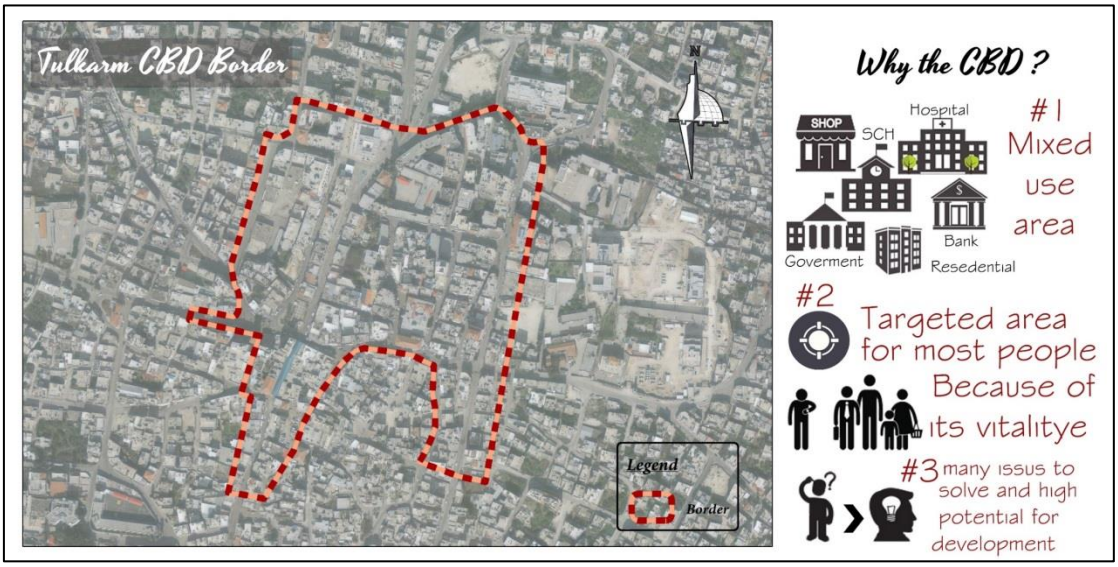
1. To reach daily needs in easy, enjoyable way: one of the walkability objectives that encourage people to walk is achieving their basic needs easily.
2. To increase the health rate in general: especially to lose weight, researches said that "the average residents of a walkable neighborhood weighs 6 to 10 pounds less than someone who lives in a car-dependent neighborhood".
3. To save money: the statistics said that "transportation is the second largest expense for households, costing more than food, clothing, and health".
4. To connect: studies show that for every 10 minutes a person spends in a daily car commute. Time spent in community activities falls by 10%.

2. Site Selection



After identifying the Walkability variables, criteria and characteristics I found that these variables much fitted to Tulkarm CBD. So, the starting point in this stage is "Tulkarm CBD", the first reason of choosing the CBD because its considered as a mixed used area that has the most daily uses people need, and because of its mixed uses it's the most targeted area in the city by most people inside or outside the city, old or young which make it a vital area. The third one is that the CBD has a high potential for development in addition to have many issues that needed to be solved.

The next two maps show the location of the CBD in Tulkarm city.

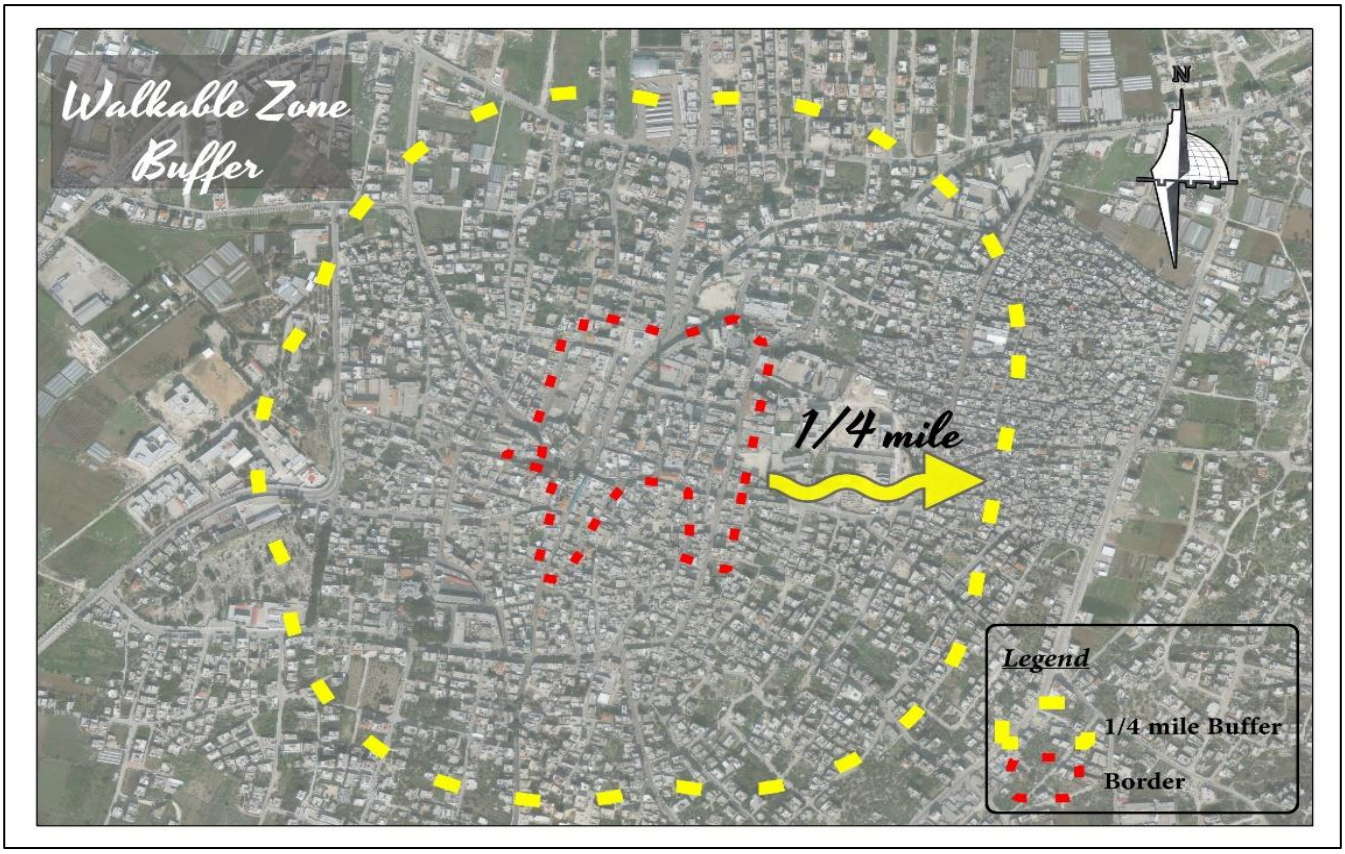


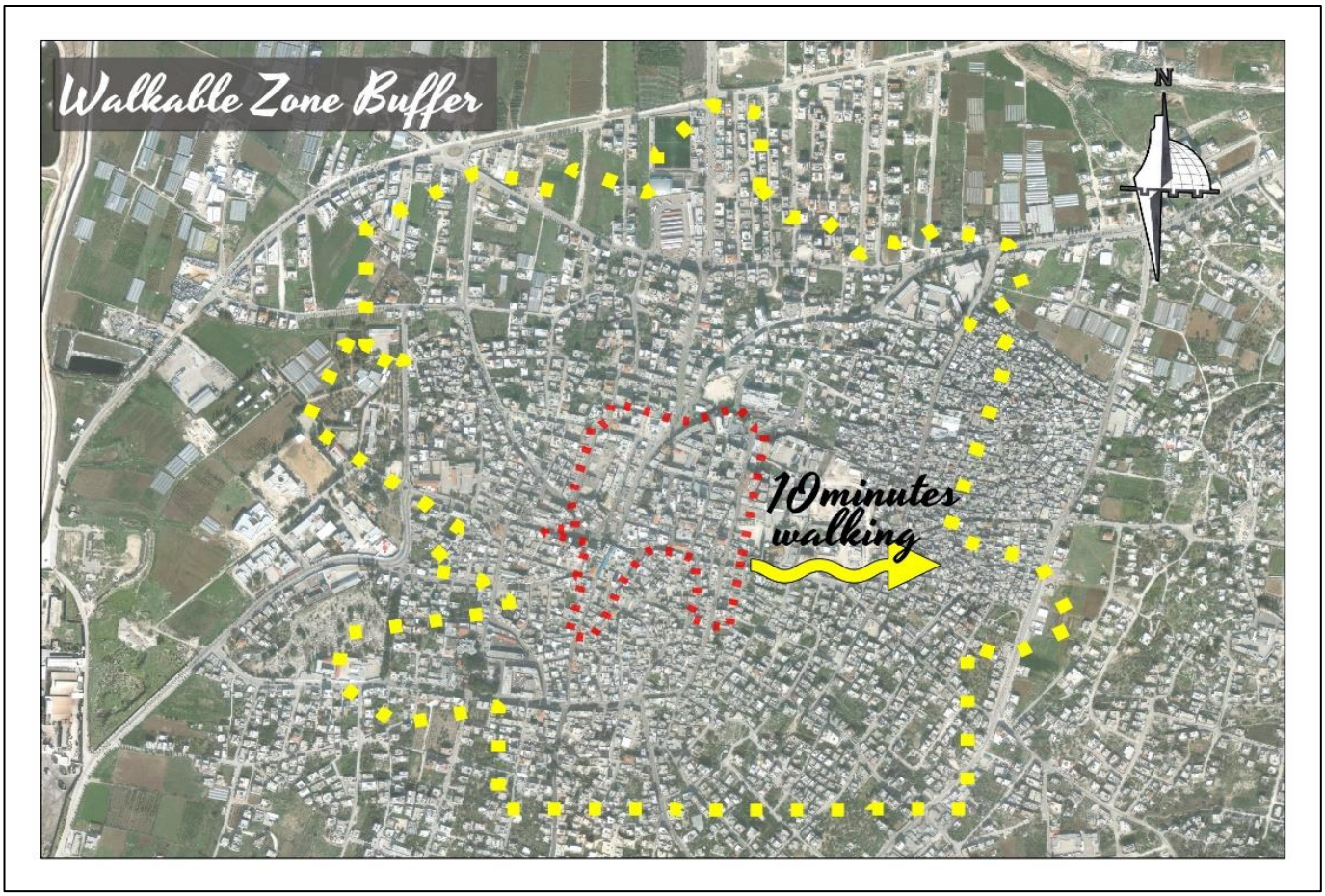
2.1 Criteria of choosing Walkability border

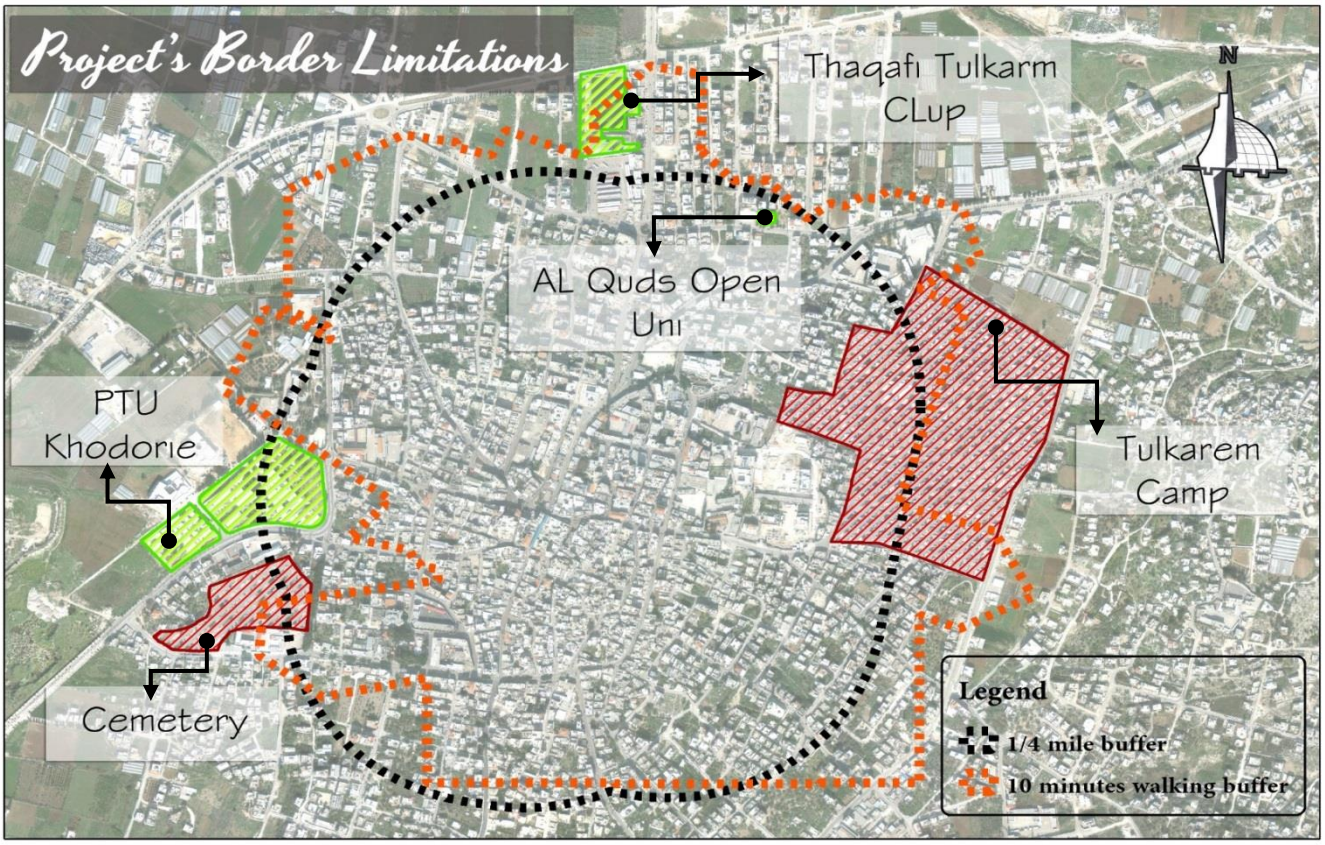
To apply the walkability, we need to apply on a large area, larger than the CBD. to do so, I take into consideration the most two important criteria which are: "residents of an area typically have a **walking threshold of ¼ mile, or 5-10 minutes**, radius from their homes, meaning anything outside of this area is not within comfortable walking distance". So, considering the residential area locates on the limits of the CBD border, I apply these two criteria and get two borders. Then the two resulted borders overlapped to get only one border. The following maps show what said above.

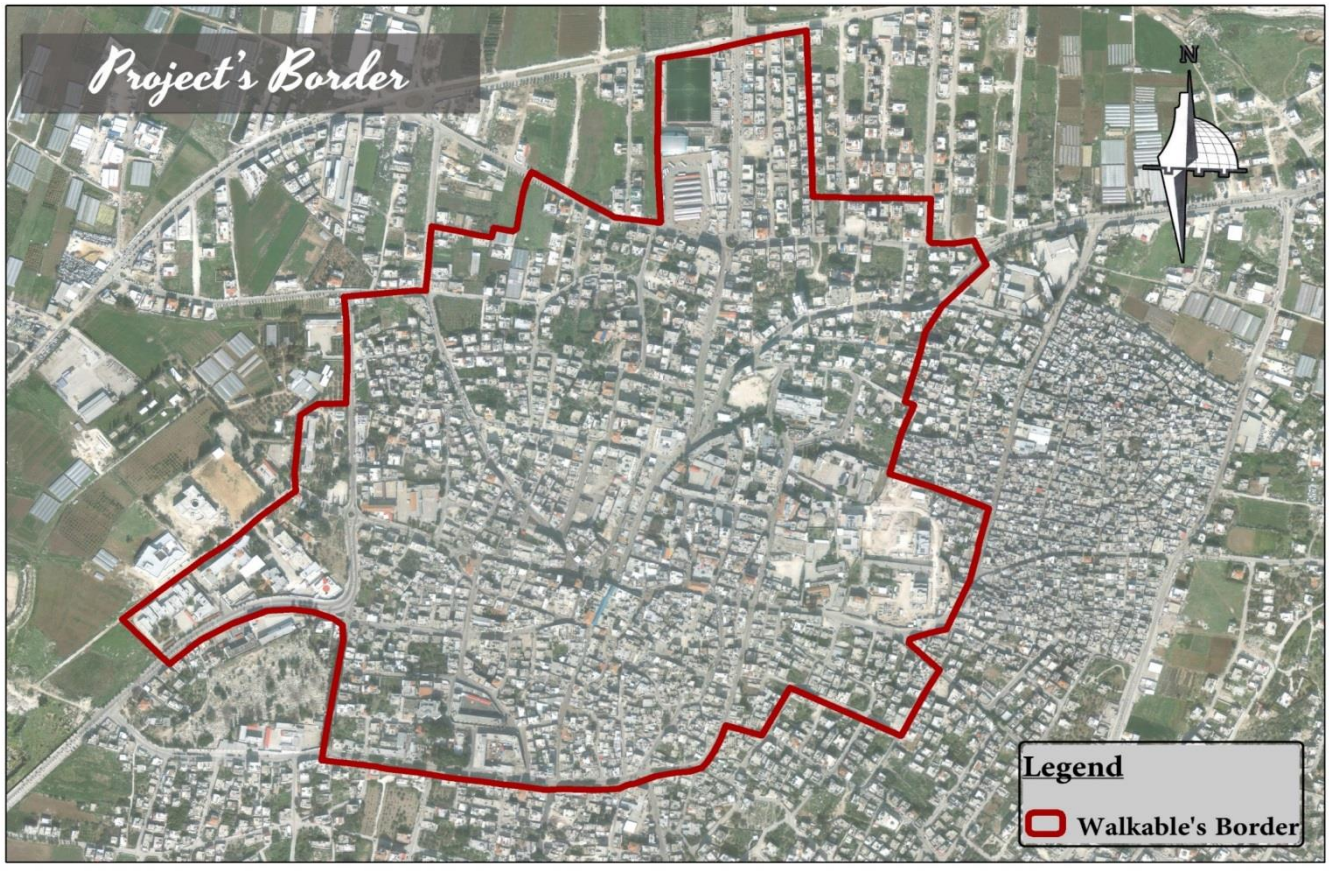
But these two borders have limitations represented in attraction and repulsion points. The attraction one is that function that attracts people to walk to such as New Garage, PTU and AL Quds Open University. on the other hand, the repulsion one is that functions or places that people don't like to walk to such as the cemetery, or for its different physical characteristics such as Tulkarm Camp.

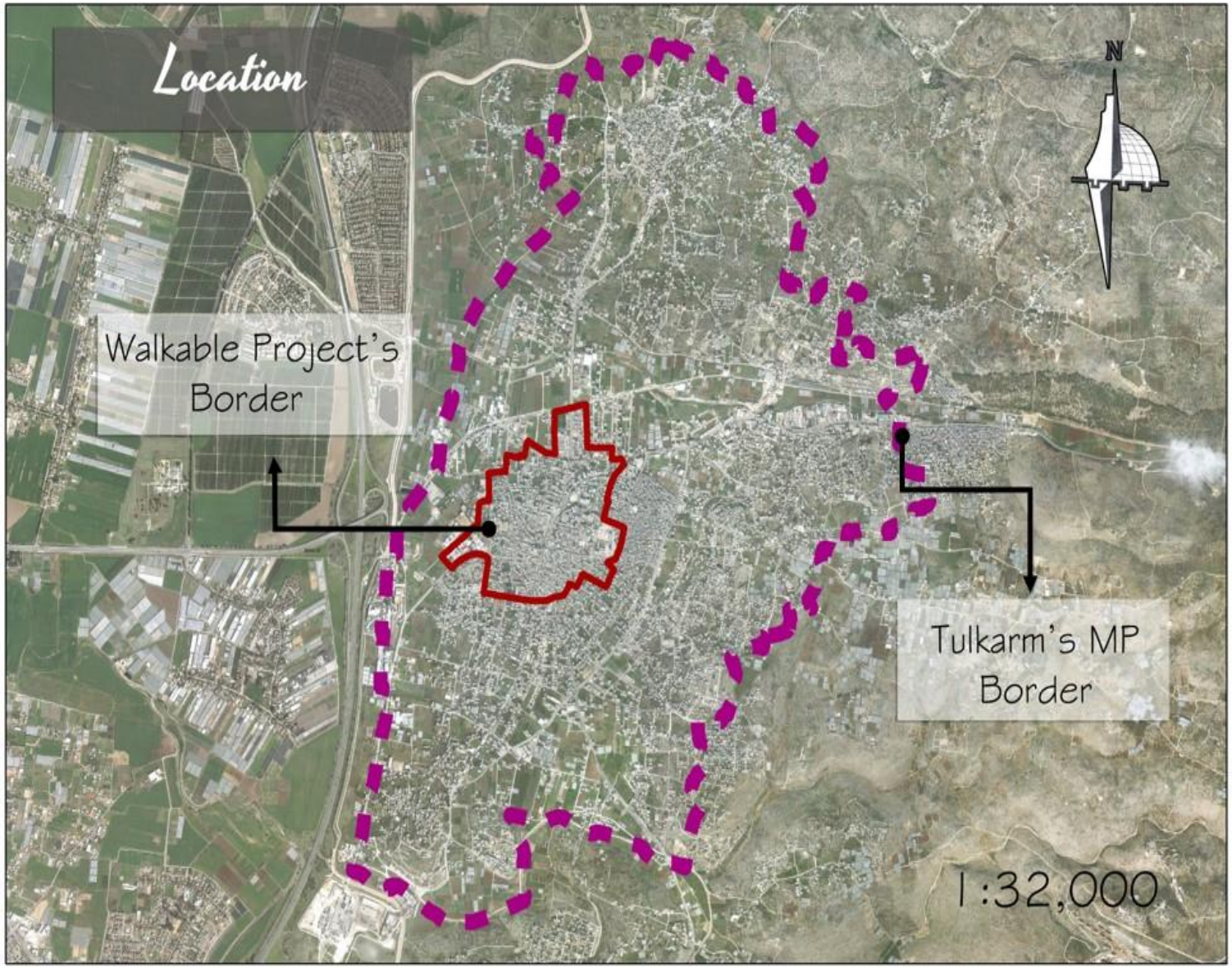
Finally, we get the final border of the walkability border.


Walkable Zone Buffer
N
1/4 mile
Legend
1/4 mile Buffer
Border


Walkable Zone Buffer
N
10minutes walking


Project's Border Limitations
Thaqafi Tulkarm CLup
AL Quds Open Uni
PTU Khodorie
Tulkarem Camp
Cemetery
N
Legend
1/4 mile buffer
10 minutes walking buffer


Project's Border
N
Legend
Walkable's Border


Location
N
Walkable Project's Border
Tulkarm's MP Border
1:32,000

3. Site analysis

This analysis is consisting of two types, the first one is manmade environment which contain buildings and streets and the other one is natural environment.

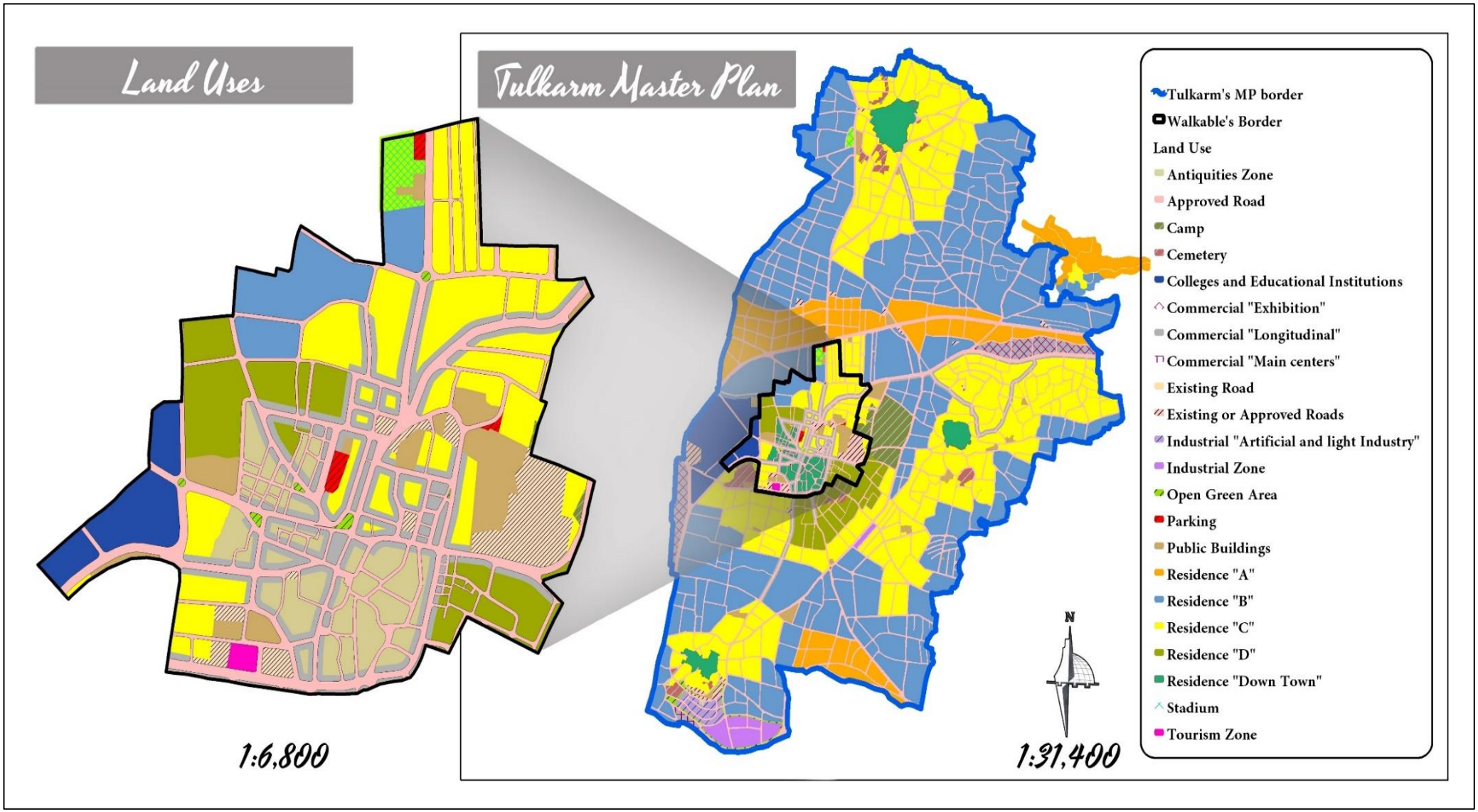
3.1 Manmade environments

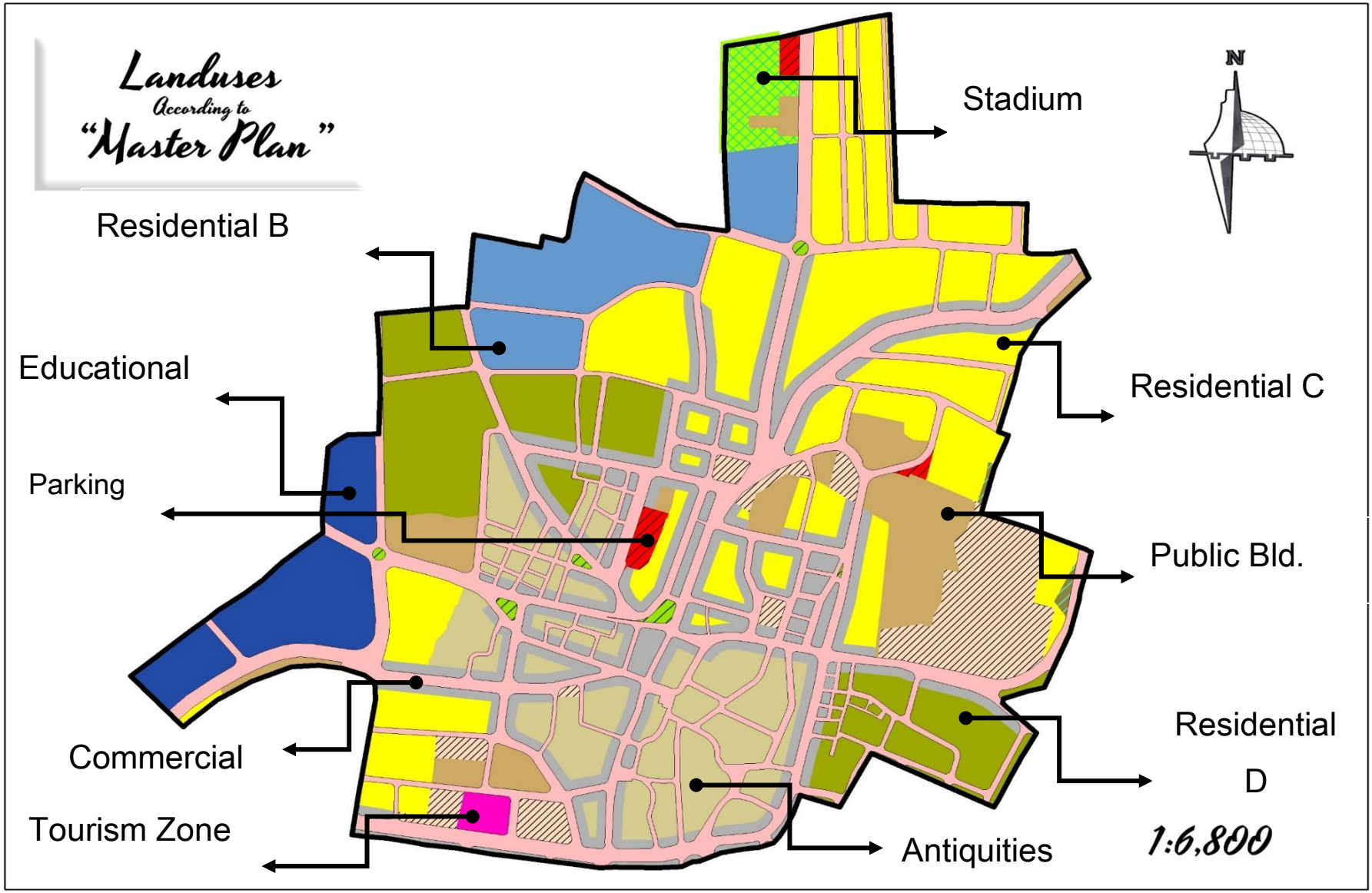
3.1.1Buildings analysis "from the master plan"

3.1.1.1 Buildings analysis "from the master plan"

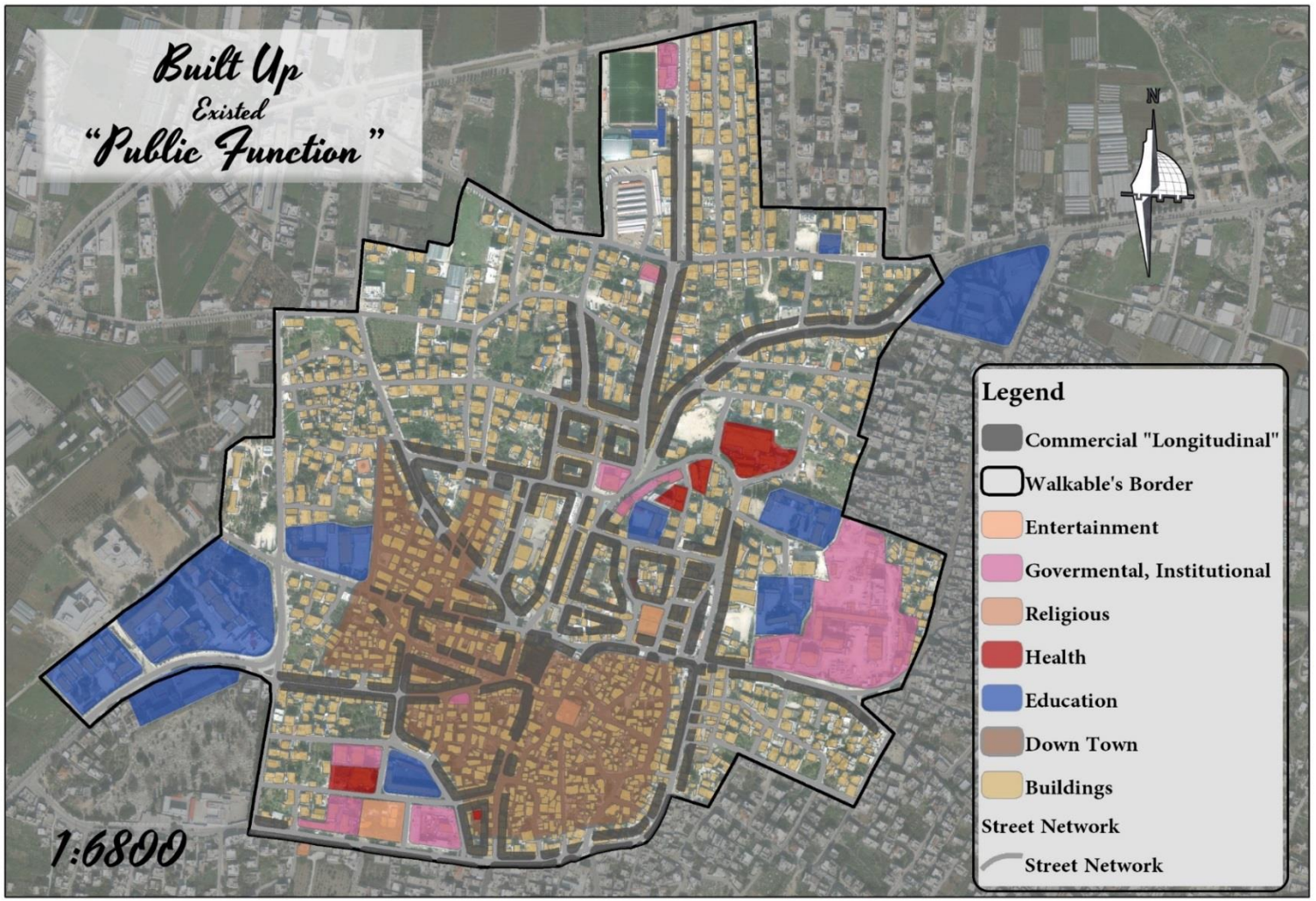
To check if the area within the borders is contain the daily use, or in other word its mixed use area, I have to find this from the MP of the city, and the following map showed the uses within the border.

BUT, we can't make sure if these uses applied on the reality or not unless we go and check that.


Land Uses
Tulkarm Master Plan
Tulkarm's MP border
Walkable's Border
Land Use
Antiquities Zone
Approved Road
Camp
Cemetery
Colleges and Educational Institutions
Commercial "Exhibition"
Commercial "Longitudinal"
Commercial "Main centers"
Existing Road
Existing or Approved Roads
Industrial "Artificial and light Industry"
Industrial Zone
Open Green Area
Parking
Public Buildings
Residence "A"
Residence "B"
Residence "C"
Residence "D"
Residence "Down Town"
Stadium
Tourism Zone
N
1:6,800
1:31,400

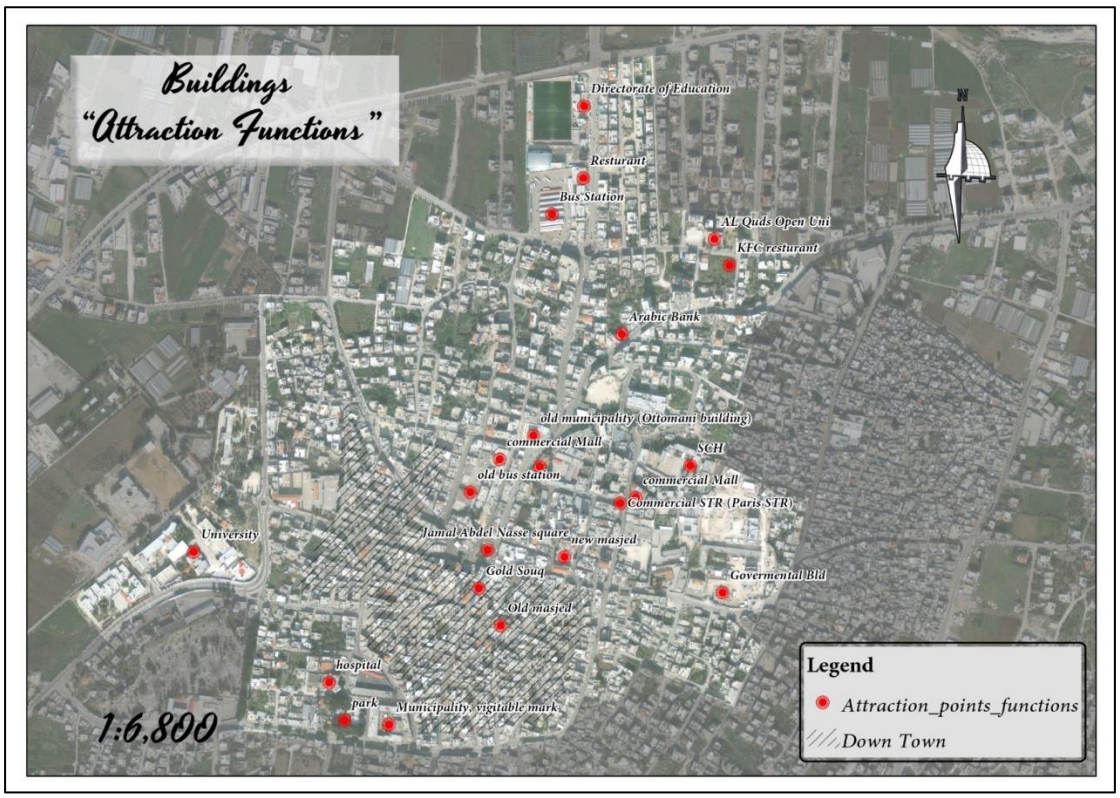

Landuses
According to
"Master Plan"
N
Stadium
Residential B
Educational
Residential C
Parking
Public Bld.
Commercial
Residential
D
Tourism Zone
Antiquities
1:6,800

- In the next map, I checked the existed public functions, and realized that it's almost the same functions in the MP.



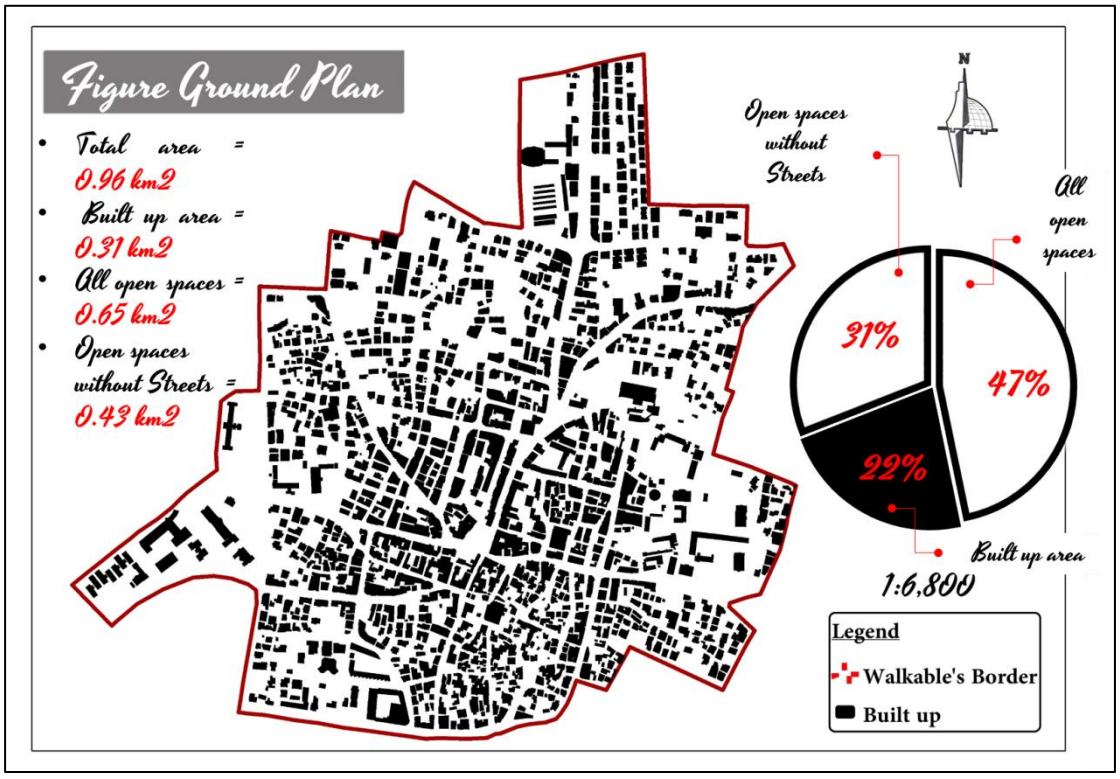
3.1.1.2 Attraction function

One of aspects that is important to study and to know in a site analysis especially that this type of projects focus and depend on the social aspect, it is good to know the functions that is most attractive one on the region, despite of its classification such as governmental, educational, entertainment, finance or commercial, the next map shows those functions.



3.1.1.3 Figure ground map

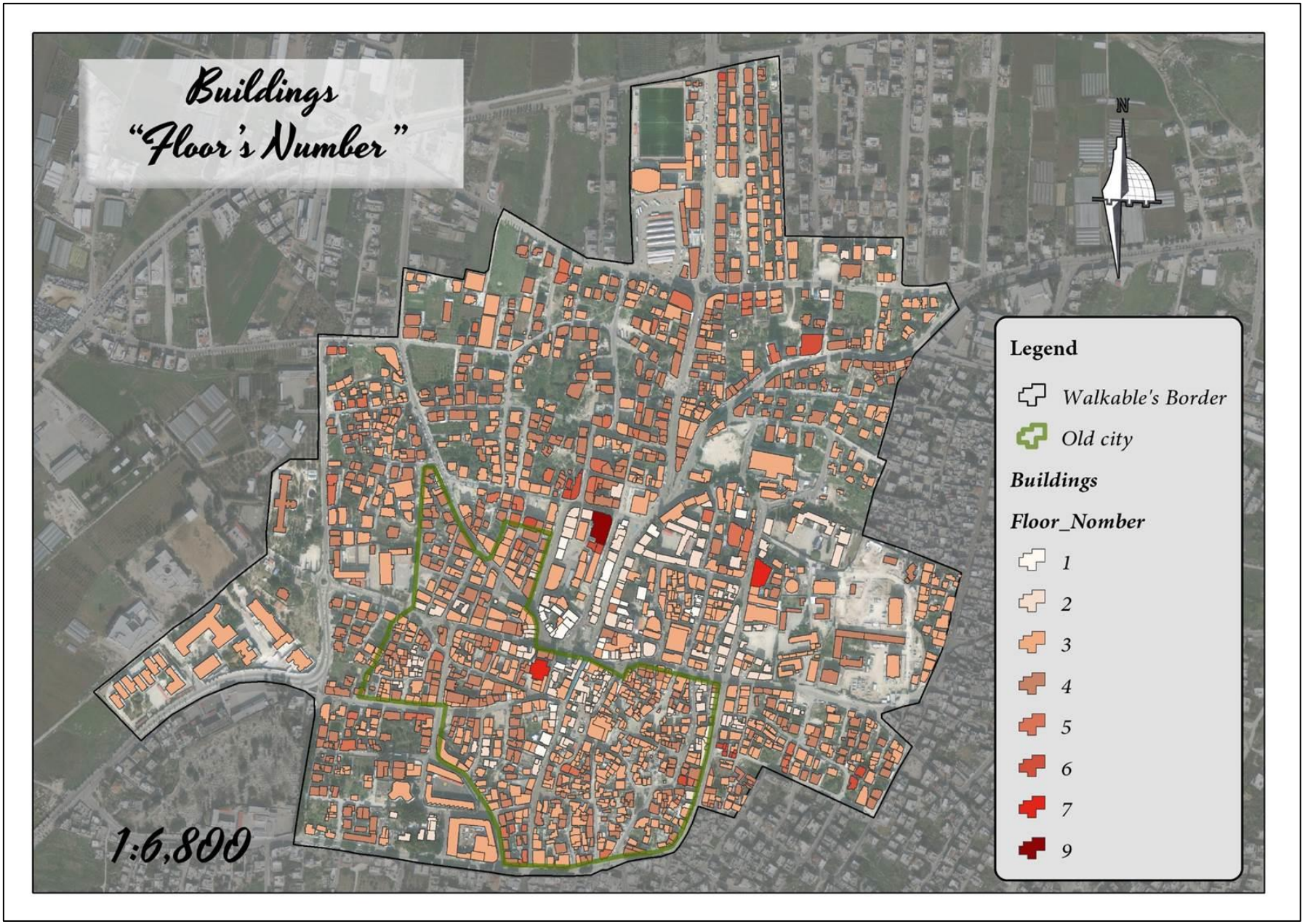
From this figure we can find the percentage of built up area to open spaces excluding the street network, so that is can notice how much open spaces I have in this area and how can I develop them to improve the walkability.



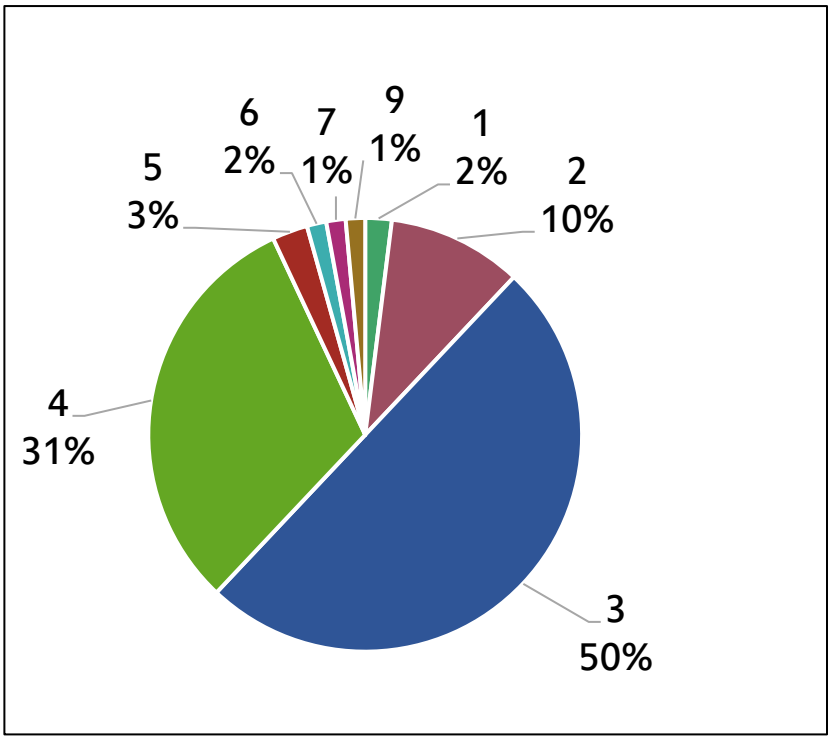
3.1.1.4 Building Heights

In order to recognize the shadow that resulted from the buildings height, I should know each building how many floors it have above the ground.

We can see from the next map that the 3 and 4 floors are with a percentage of 51%, 32% respectively, and that can be considered as a strength point because the majority of building didn't reach their allowed height and have potential to the vertical spread.


Buildings
"Floor's Number"
N
Legend
Walkable's Border
Old city
Buildings
Floor_Nomber
1
2
3
4
5
6
7
9
1:6,800

- ***Figure 1: Ratio of buildings depending on their floor number***

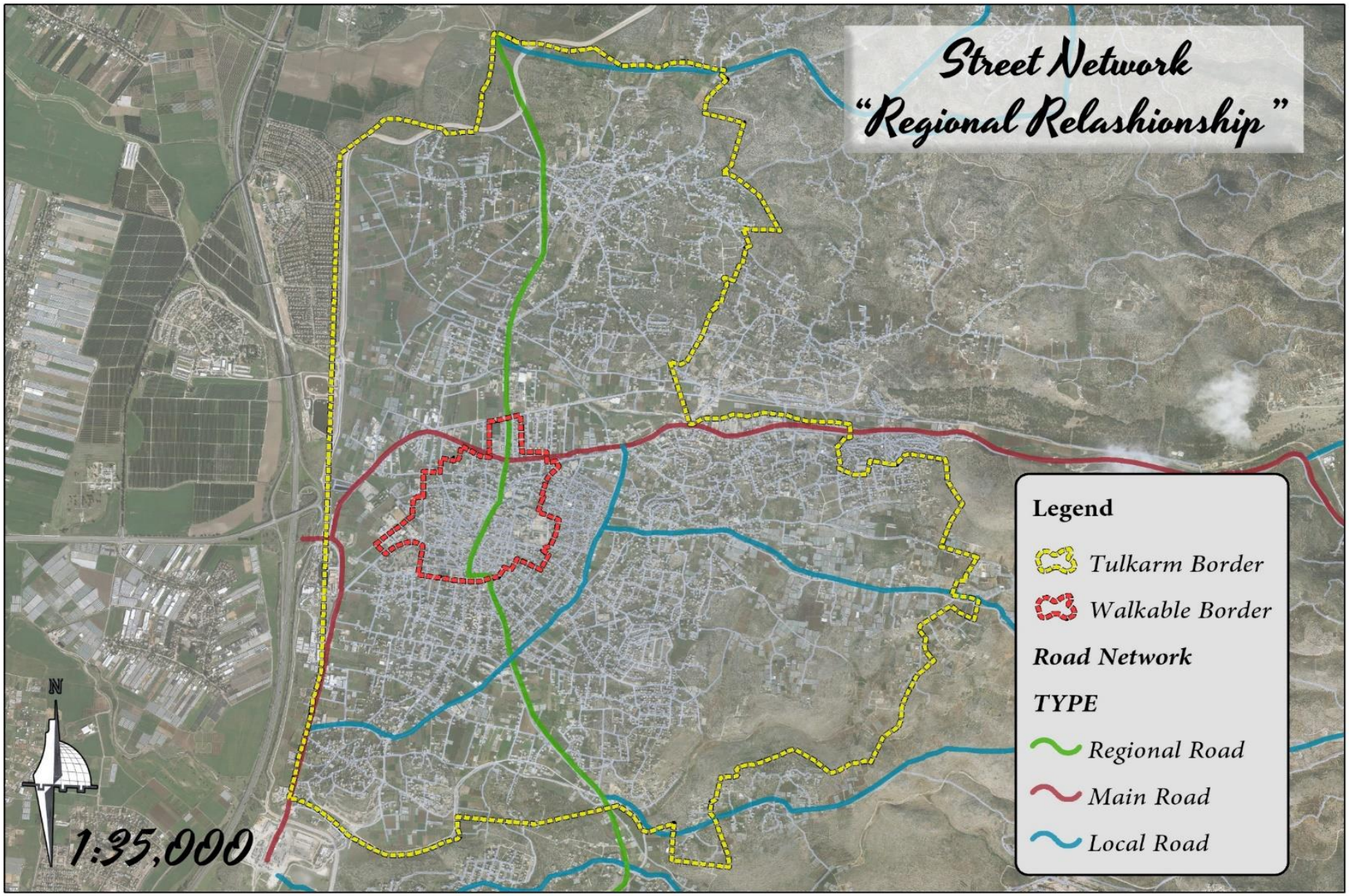


- SWOT Analysis

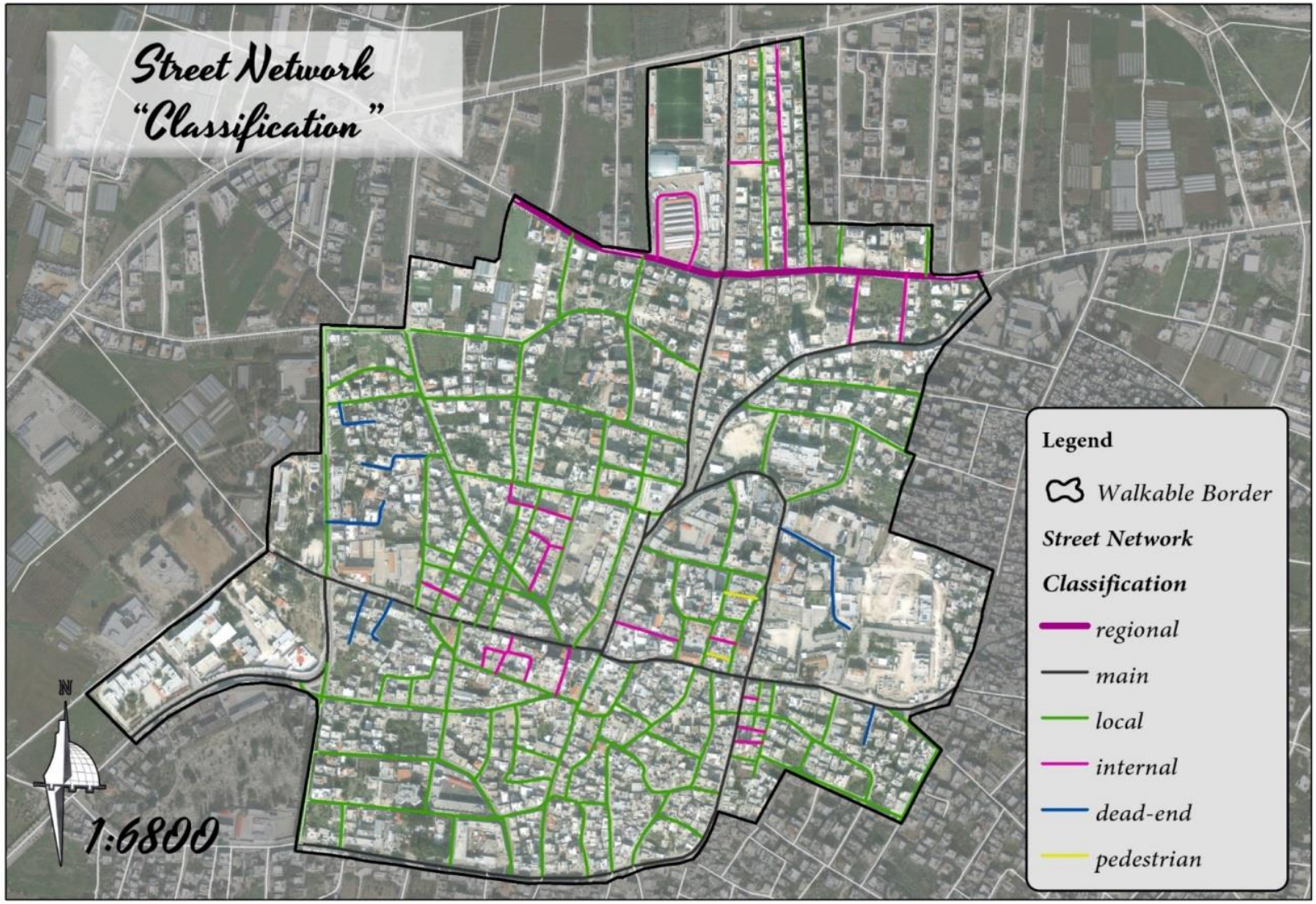
The highest ratio of floors number goes to 3 and 4 floors, this considered to be as a weakness point because it will not offer the required shadow for the streets so that the sunlight will annoy walking people, but it can be considered as an opportunity point in the same time, because these short buildings have a high potential to vertically expand

3.1.2 Street network analysis

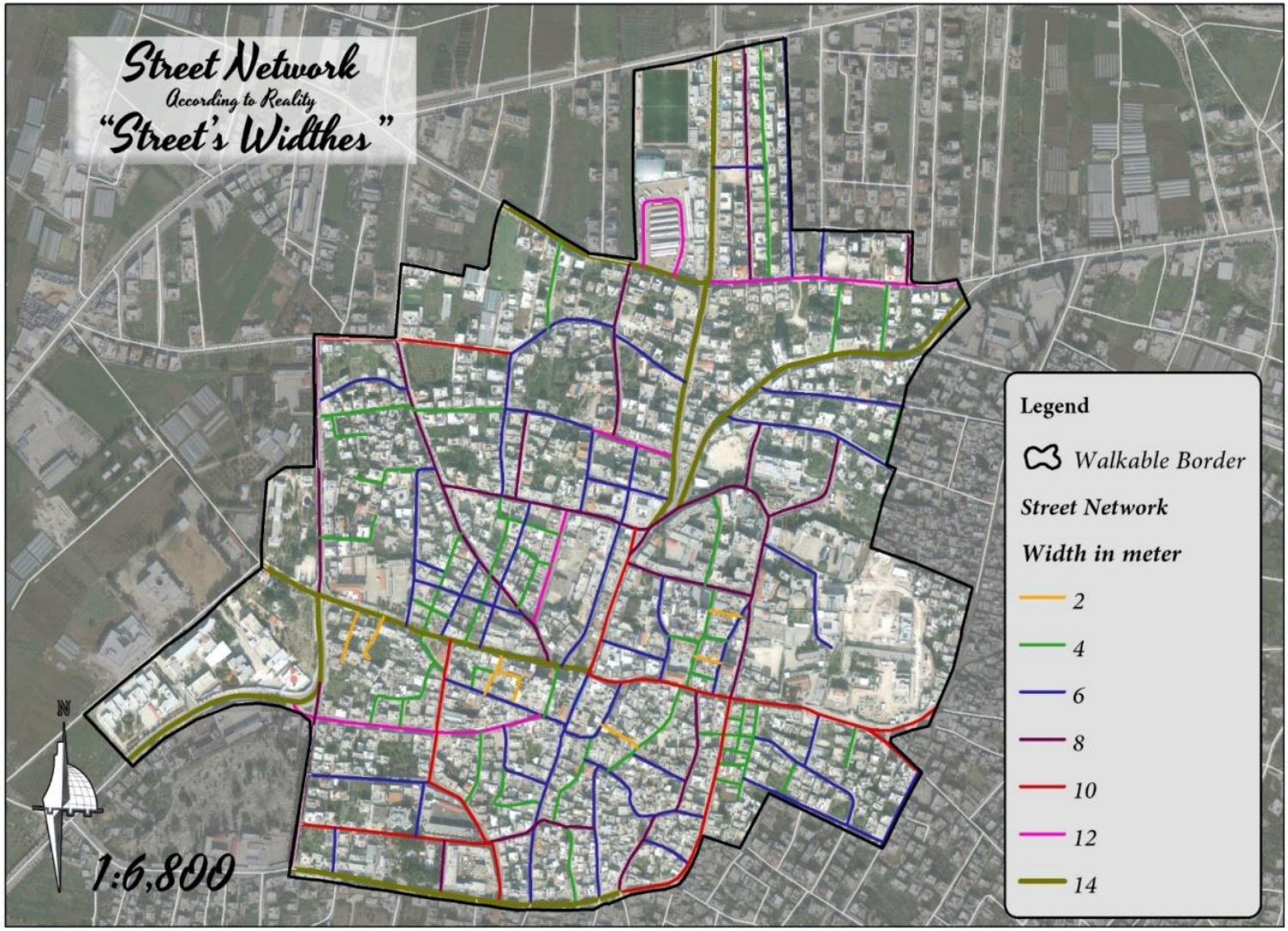
3.1.2.1 Regional relationship


Street Network
"Regional Relashionship"
Legend
Tulkarm Border
Walkable Border
Road Network
TYPE
Regional Road
Main Road
Local Road
N
1:35,000

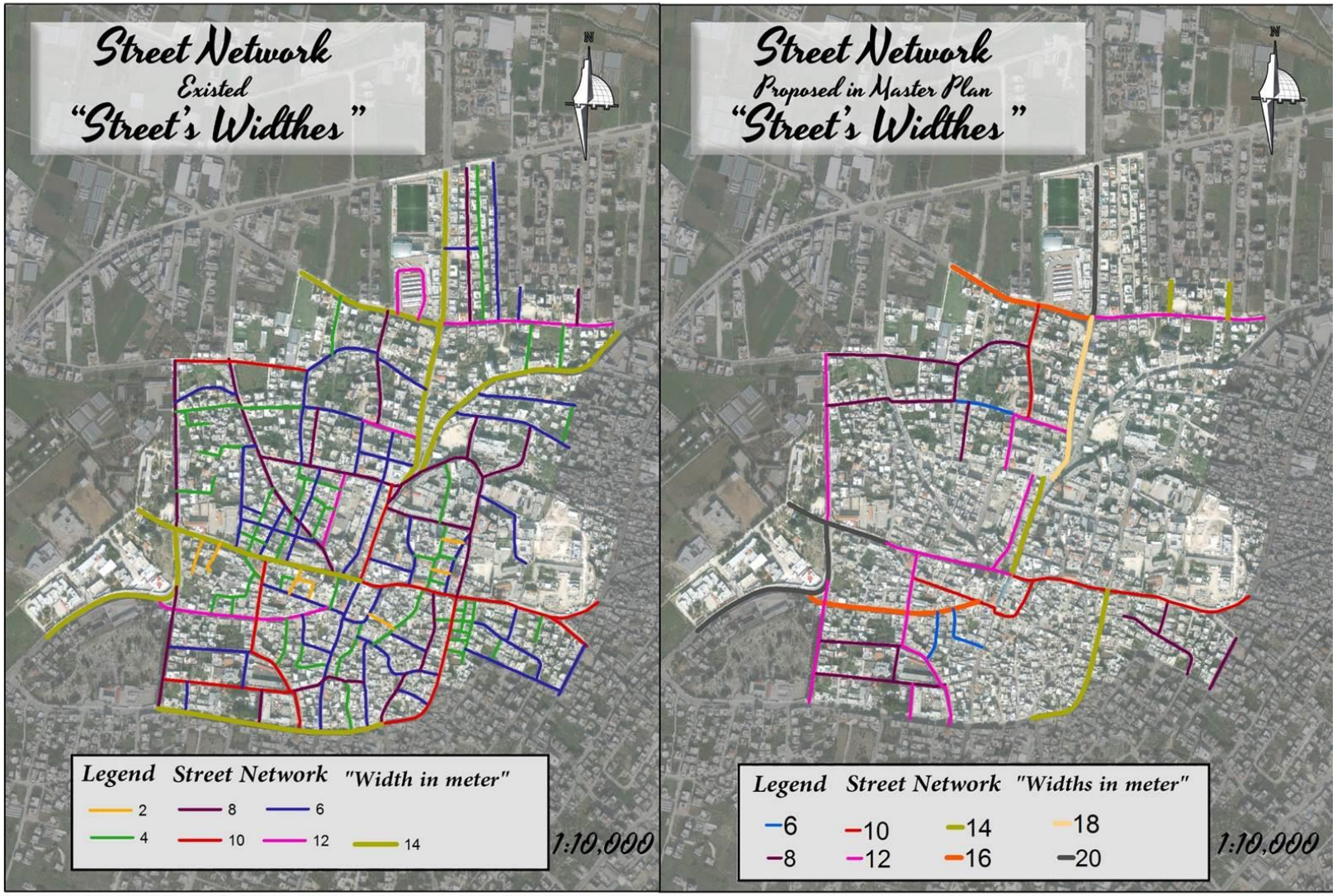
3.1.2.2 Street's classification



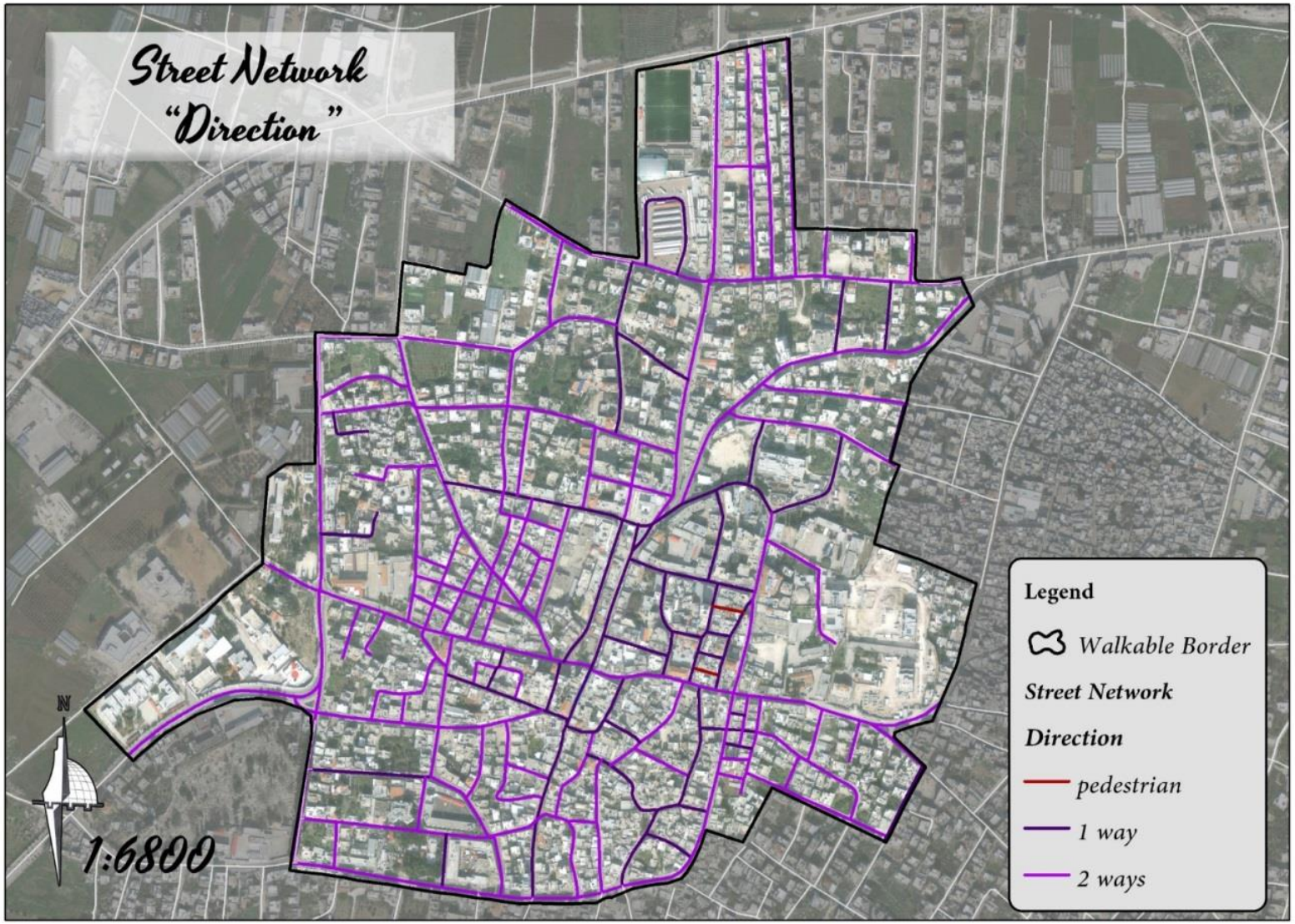
3.1.2.3 Street's widths "existing widths"



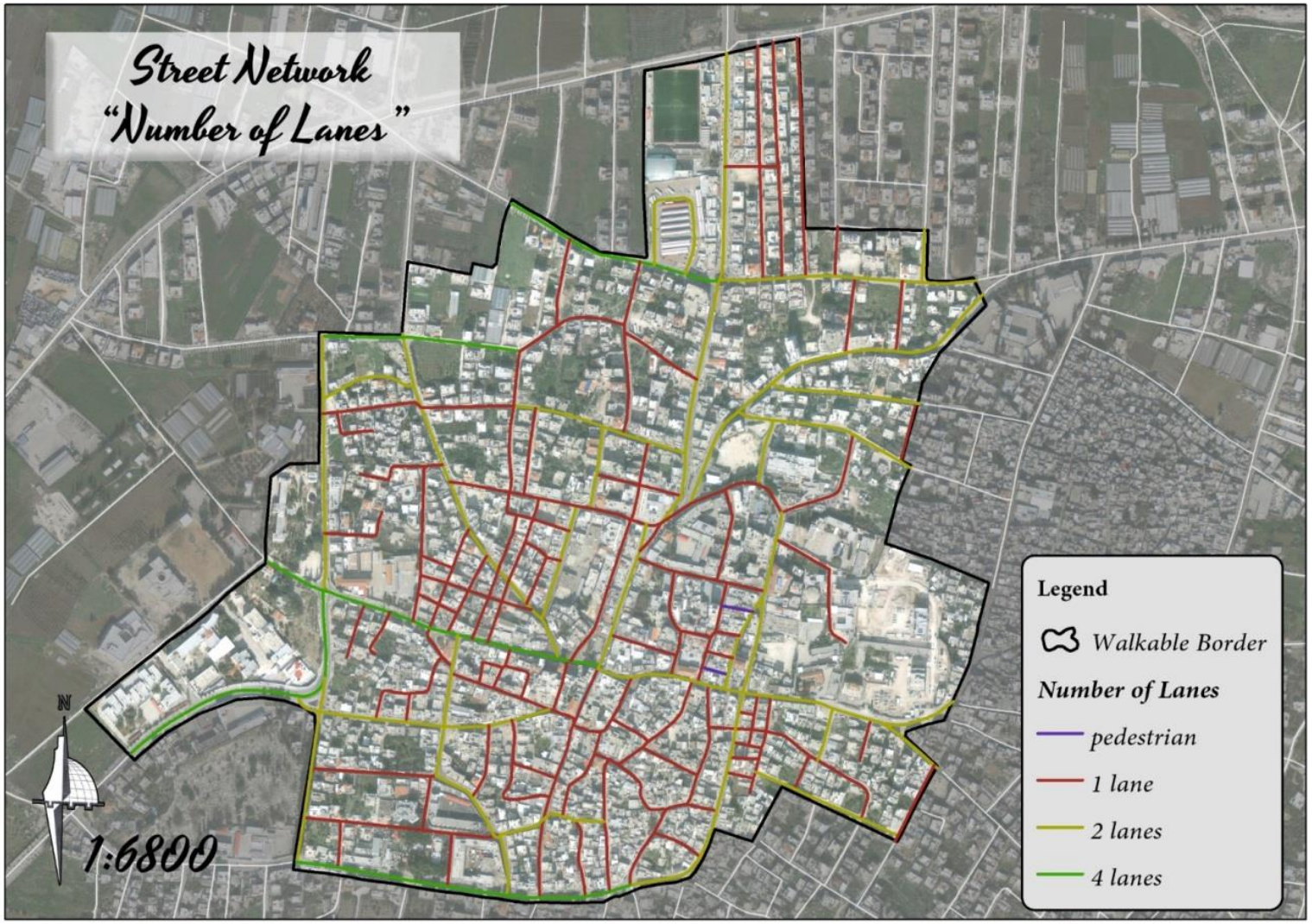
3.1.2.4 Street's widths "according to Tulkarm master plan"



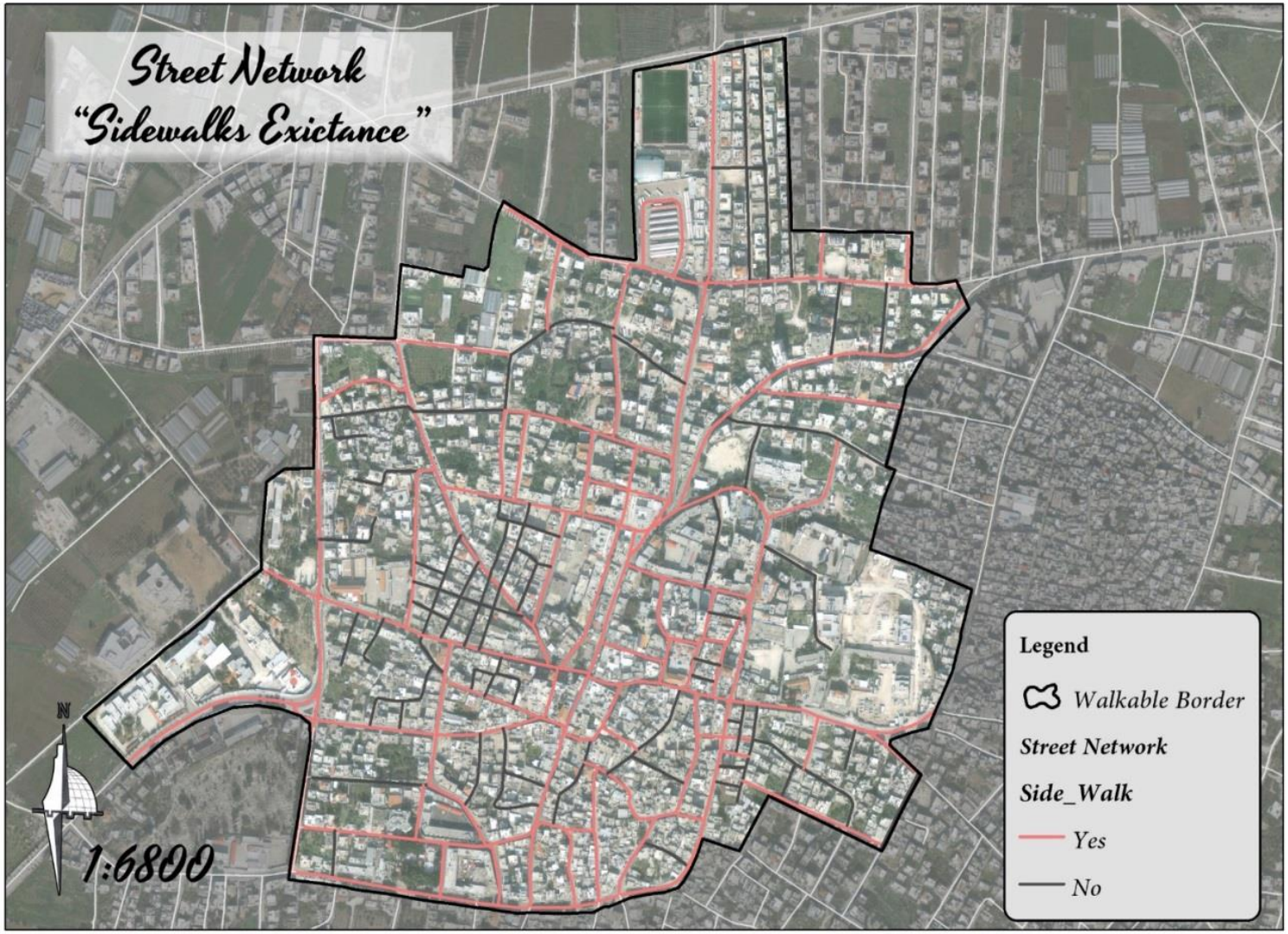
3.1.2.5 Street's direction



3.1.2.6 Number of lanes

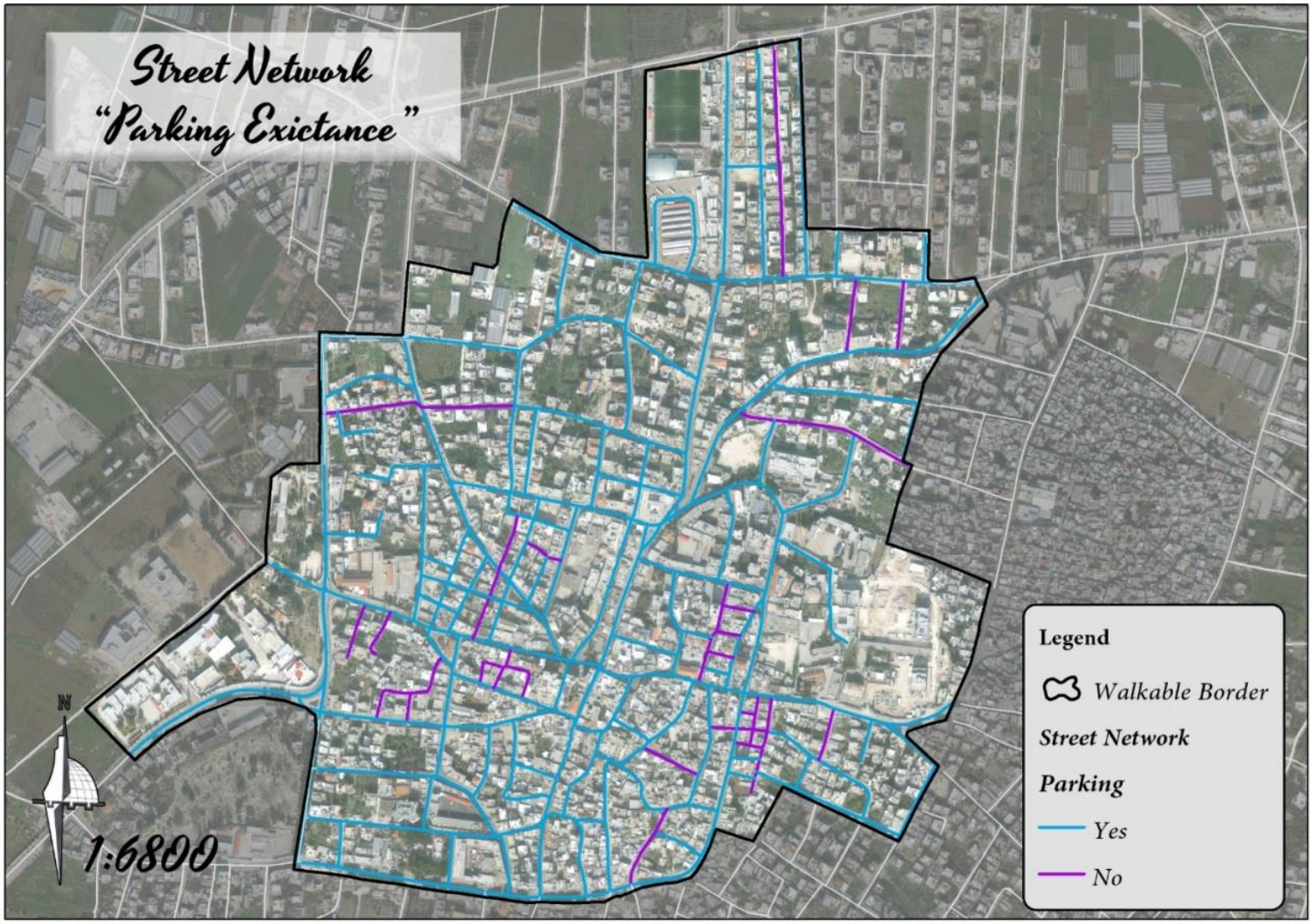


3.1.2.7 Sidewalk existence

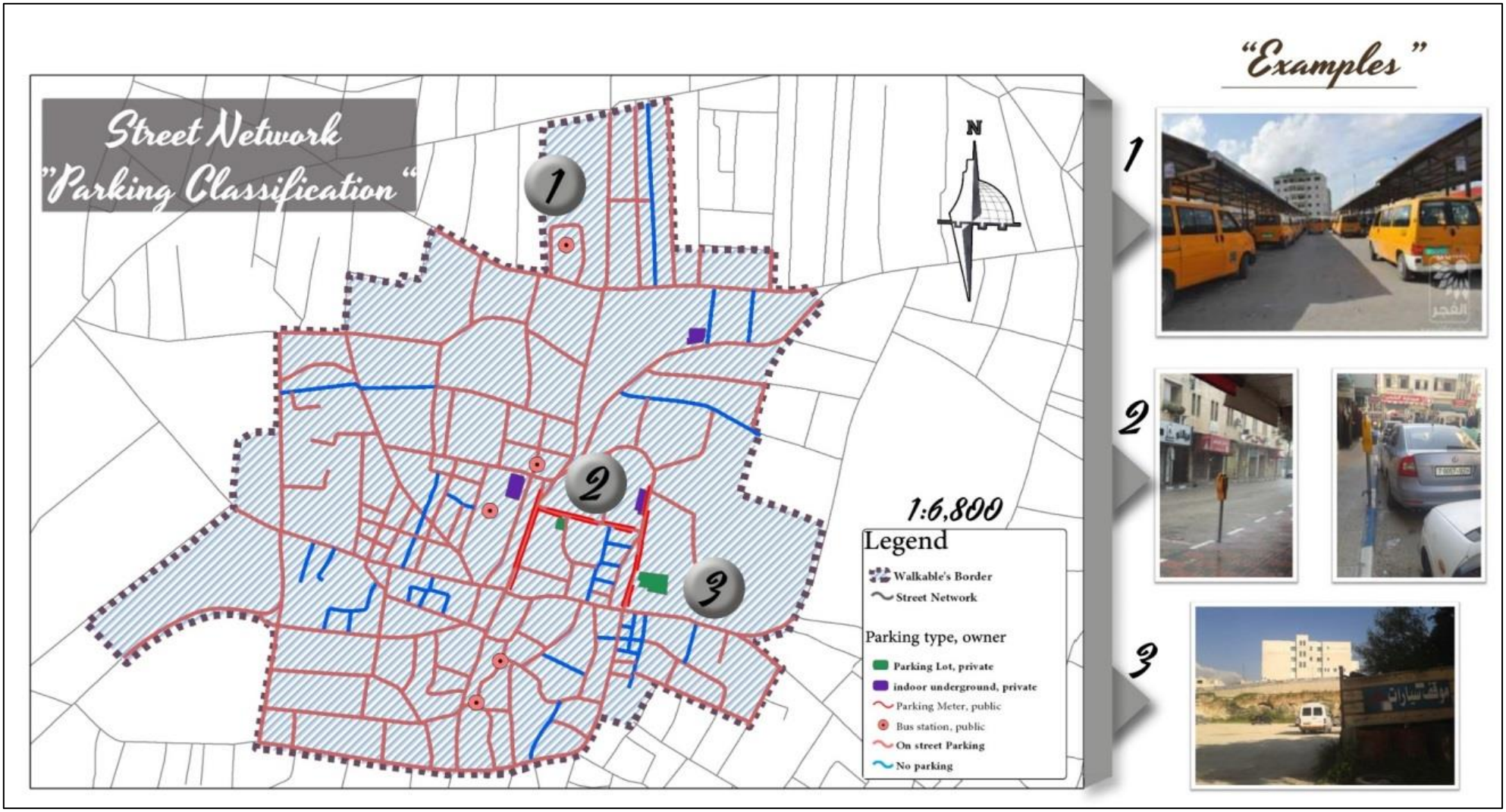



Street Network
"Existed Constraints"
N
1
2
1:6,800
"Examples"
1
2

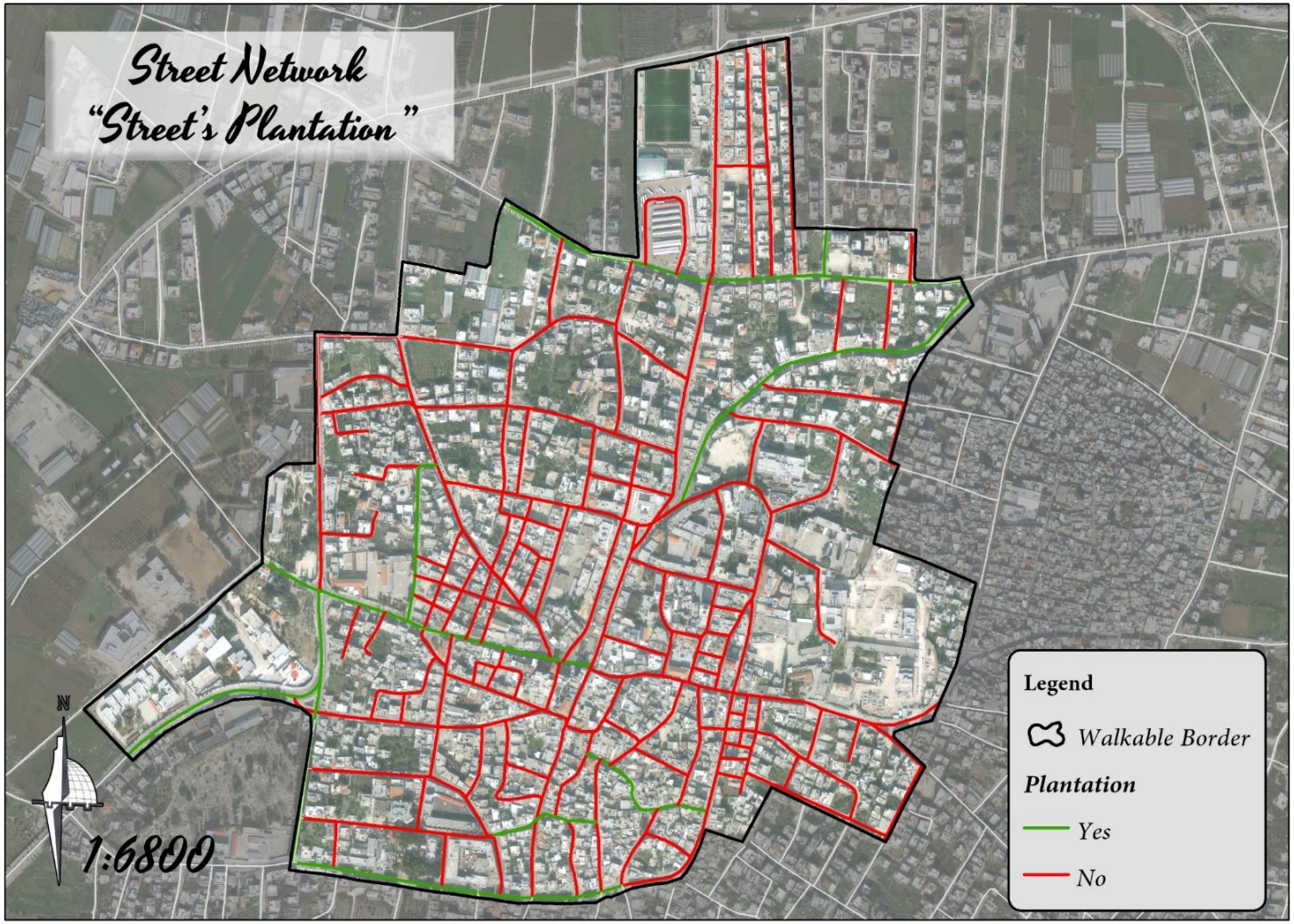
3.1.2.8 Parking existence



3.1.2.9 Parking type and ownership



3.1.2.10 Streets' plantation



"Examples"

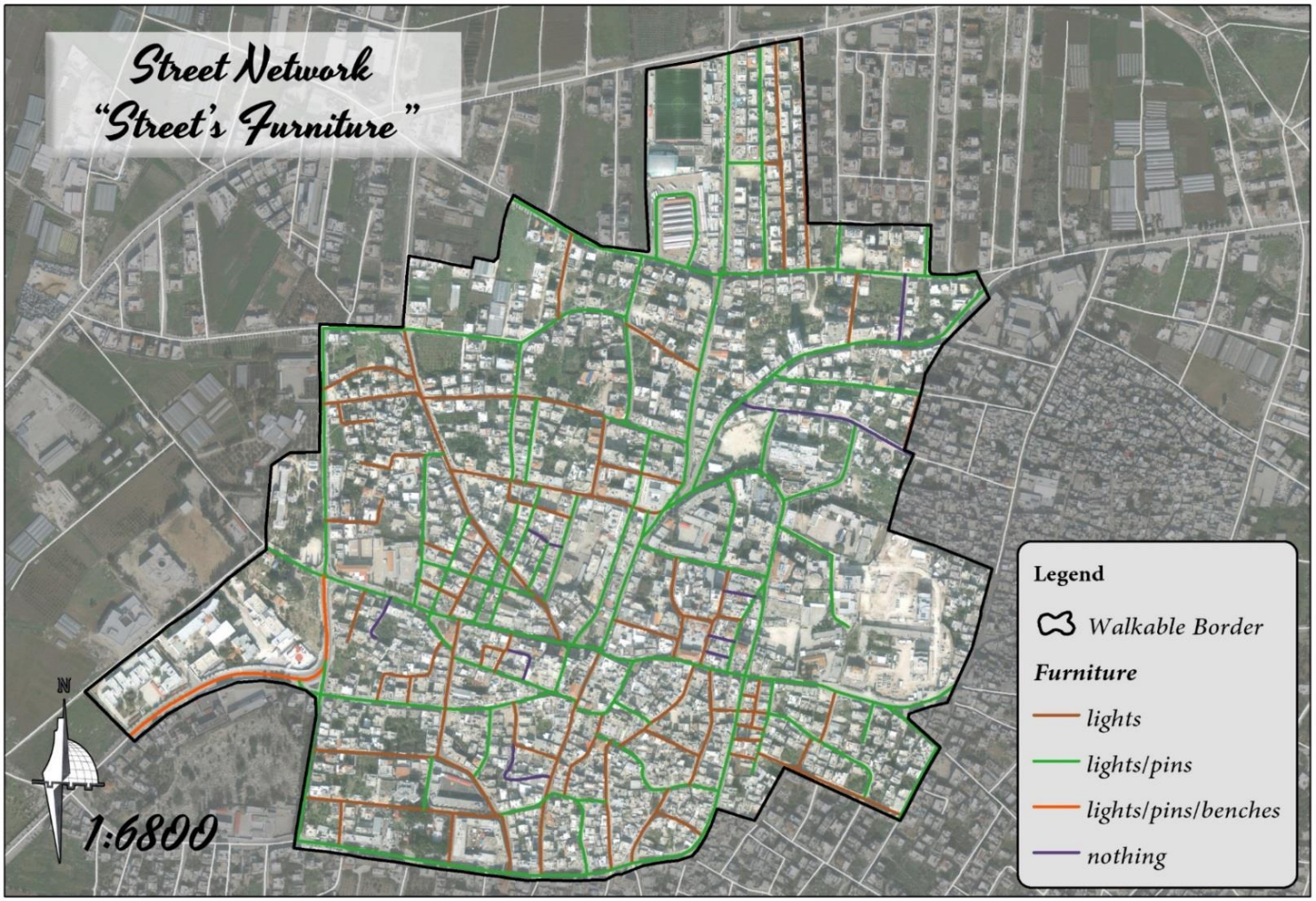
1

2

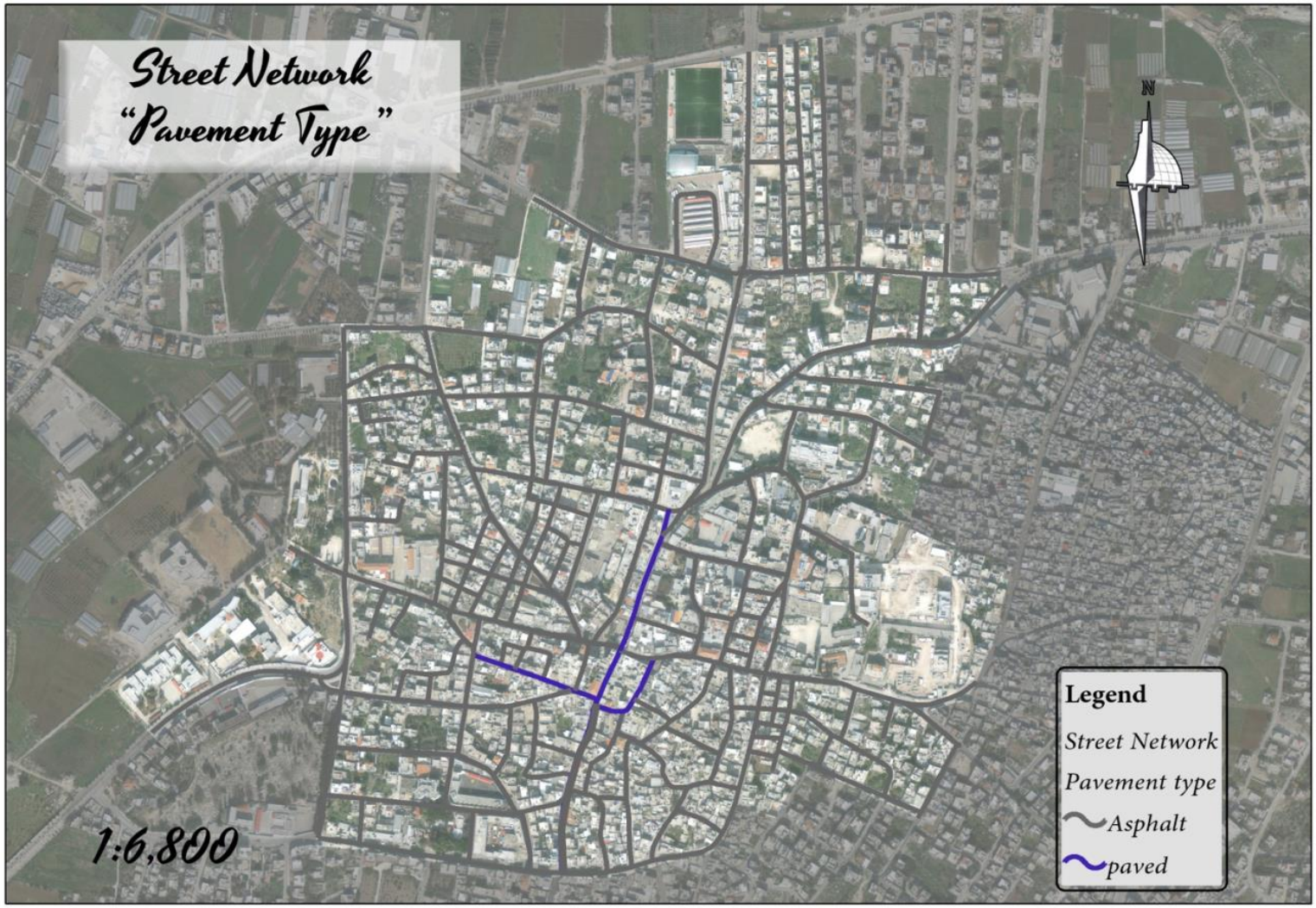
3

4

3.1.2.11 Street's Furniture

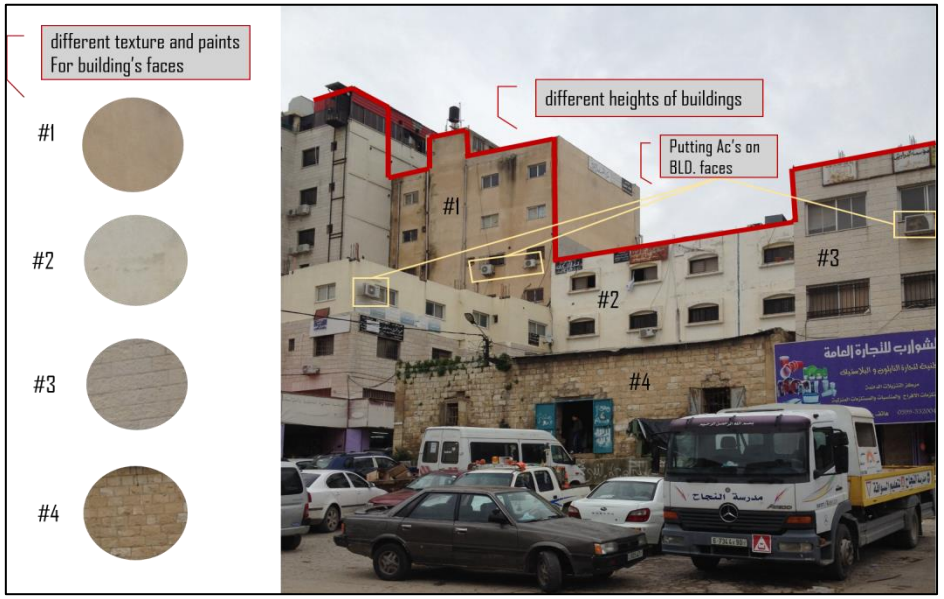


3.1.2.12 Pavement type



3.1.2.13 Visual disturbance

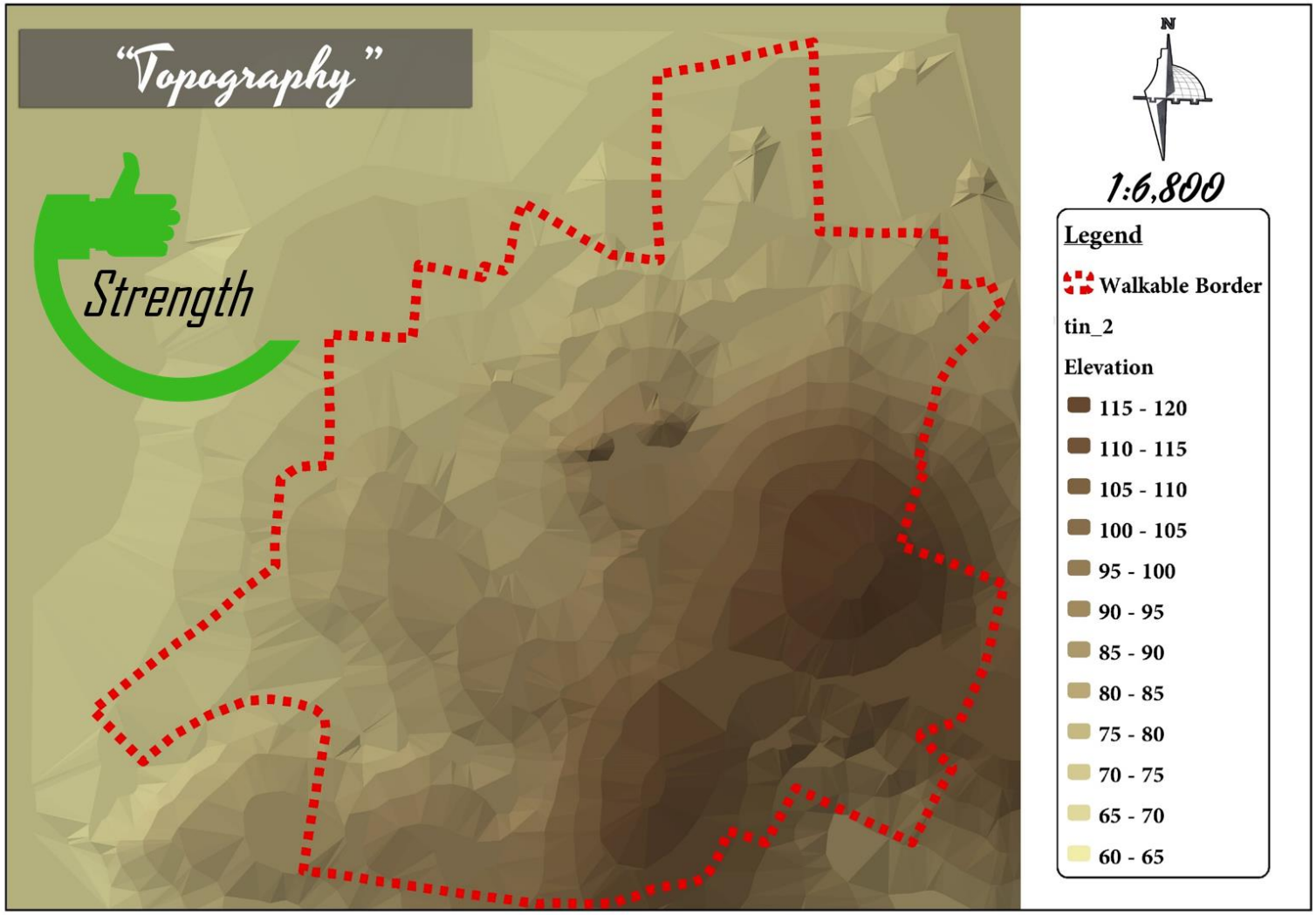
The area suffer from some common visual disturbance as we can see from the next photos, such as the distribution of air condition on the building's front, but the biggest suffer existing in the commercial shops because its suffer from the differences in shop's styles, colors sizes in a missy way



3.2 Natural environment

3.2.1 Topography

In these types of projects, the first thing crossed walker's mined is the topography of the area is it easy or hard. And one of the reasons to choose Tulkarm city to apply the walkability is its easy topography which shown in the next map. This point considered to be as a strength point.



4. Strategic planning

4.1 Vision

The vision communicates what I'm believe that are the ideal conditions for my project, so my vision will be "Tulkarm a walkable, attractive, vital city".

4.2 approaches

In order to achieve this vision is set three approaches that are environmental, economic and healthy one, which we can reach them by sitting a number of objectives for each.

4.3 objectives

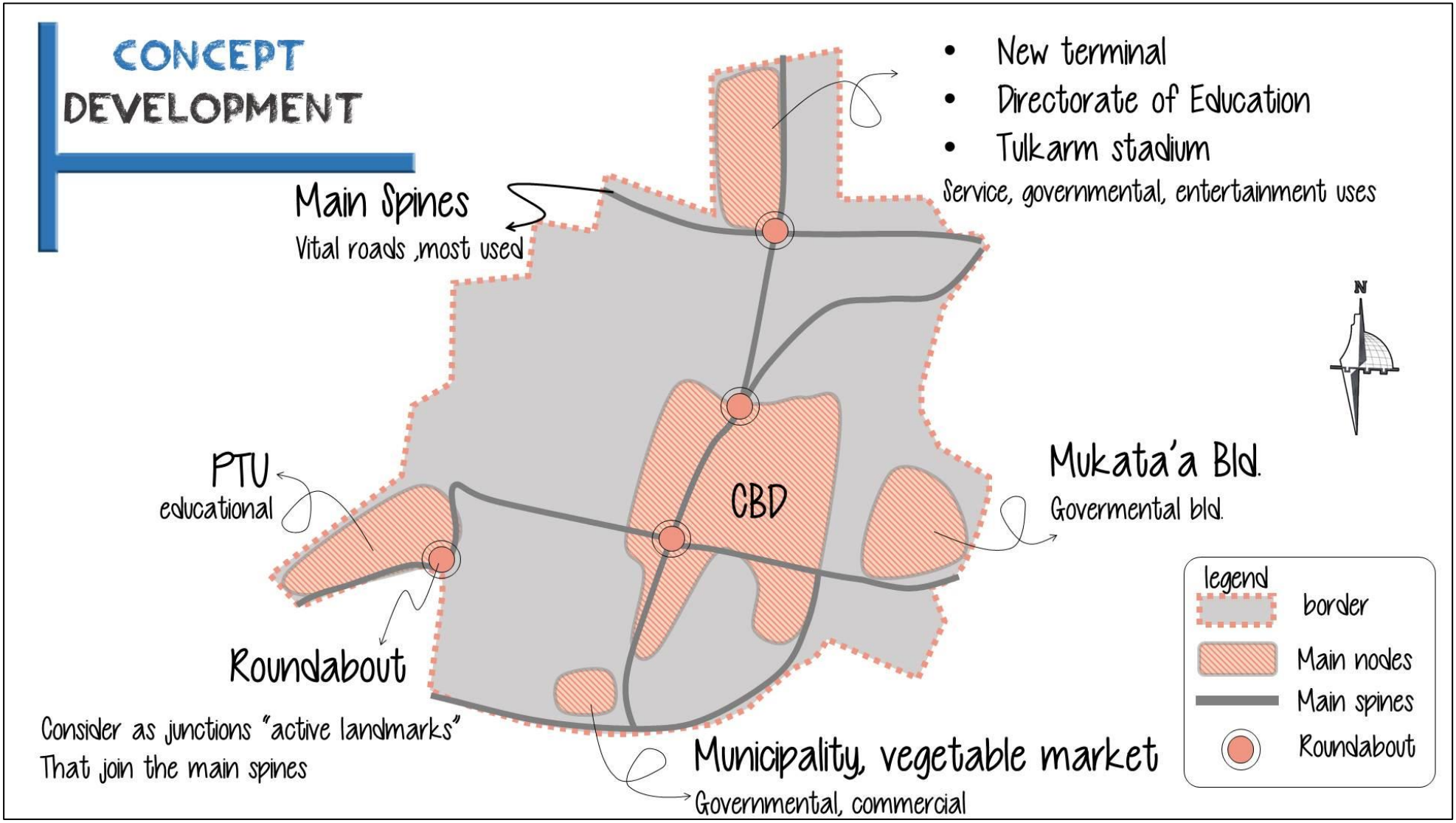
The main objectives listed under the tree approaches are:

1. Make the pedestrian environment safe and much more usable
2. Improve the pedestrian network to make it accessible to all users
3. Provide good places for pedestrians
4. Improve the pedestrian movement or environment which is encourages economical activities.

4.4 concept development

The concept to apply the walkability within the border I choose in Tulkarm city is focused on some main roads in these borders "main spines", these spines take their importance from the functions connected by these spines, so people in Tulkarm citizens or even visitors usually use these spines to reach what they need mainly because these function are not all the same type, they are various so we have governmental, educational, entertainment and commercial.

The design ideas will be applied primarily on those spines then to other street network.


CONCEPT DEVELOPMENT
New terminal
Directorate of Education
Tulkarm stadium
Service, governmental, entertainment uses
Main Spines
Vital roads ,most used
N
PTU
educational
CBD
Mukata'a Bld.
Govermental bld.
legend
border
Main nodes
Main spines
Roundabout
Roundabout
Consider as junctions "active landmarks"
That join the main spines
Municipality, vegetable market
Governmental, commercial

5. Implementation and Design

5.1 Tulkarm walkable master plan

This master plan was designed and created in planning studio with passion of sustainability "considering a walkability as a feature of sustainability" and creativeness taking into consideration social and economic aspects.

As we can see in the nest master plan, the whole road network is categorized under a three conditions, the first one is the road network as it is and as we all know its specified for different traffic modes (cars, trucks, public transit, pedestrians), the second one is for the roads that have a bicycle lane with it and the third is for the pedestrian area which is not allowed for cars to enter except in emergencies like the ambulance and others. The first two types need facilities such as a parking so the master plan consist also of these parking which is specified for cars and bicycles each separately. Next I will be speaking in detail about the design of each category of them.

A3الماستر بلان على

5.1.1 Space Syntax Theory analysis

Besides the previous advanced analysis, I made it before, I also make a space syntax analysis which help me in defining the roads that can be more for pedestrian and the one that can be more for cars and bicycles. From all the features this theory analyses upon them basically I depend on two features which are integration and depth, those tow features are antagonism.

Depth distance explains the linear distance from the center point of each street segment to the center points of all the other segments. The streets with lowest Depth Distance values are said to be nearest to all the other streets. Which means that the streets with high depth distance are hard to reach in other word it has a difficult access. So, the one with a high depth proposed to be with a bicycle lane to ease the movement.

Integration measures how many turns have to be made from a street segment to reach all other street segments in the network, using shortest paths. The first intersecting segment requires only one turn, the second two turns and so on. The street segments that require the fewest turns to reach all other streets are called 'most integrated' and are usually represented with hotter colors, such as red or yellow. Streets with highest integration are said to be easy to reach and accessible more than others. So, the one with a high integration proposed to be for pedestrian movement.

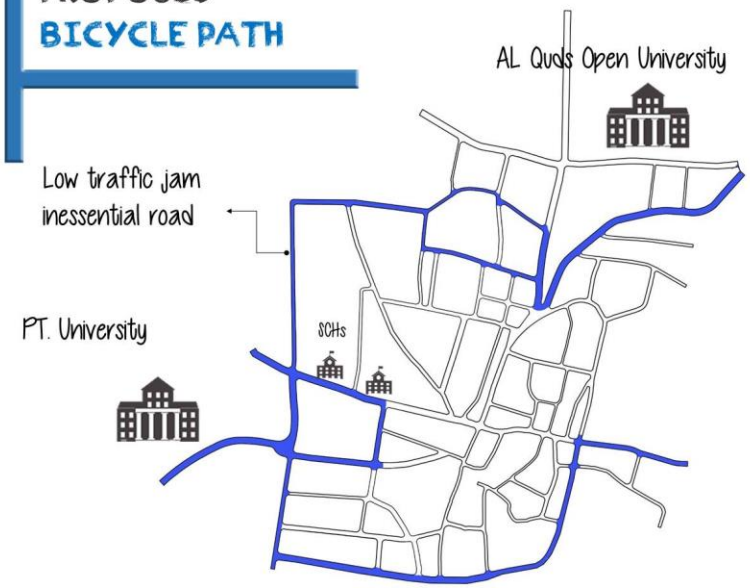
5.1.2 The bicycle proposed path.

This path is proposed in the high depth street as I mentioned before. Each lane of them is two ways with a width of 2 meter. Permanent and temporary parking proposed for this path, the permanent one distributed along the path which will be designed for rent and sale the bicycle in addition to provide the parking for those bicycles, the temporary parking will be located between the permanent one for permanent stops. Bicycle path is a path that connect the two universities (PTU & Al Quds Open University) in a loop way, that means it's basically targeted the young users.

5.1.3 The proposed pedestrian area.

This area was chosen on the high integration roads because it's considered as an accessible one more than others, in addition to that it's the roads that have a high potential to be closed in special occasions and celebrations or demonstrations of support and opposition. It will be designed to improve the walkability by providing the element needed for this purpose like pergolas to provide the shadow in hot days, plantation to beautify the area and make it more attractive, special tile made from stones or concrete not asphalt one to isolate the heat and reflect it rather than absorb it, as well as providing places to rest and set as possible, as for the movement it will be easy to be walked but it will be proposed to specify a special mini car for whom need them. A special hour will be determined in order to download and upload goods and for cleaning the area.

PROPOSED BICYCLE PATH



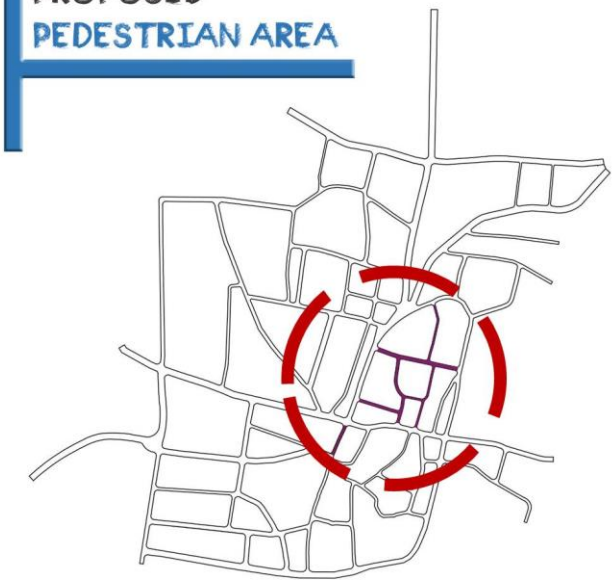
properties

- Connect the two universities

PTU — AL Quds Open

- Low depth road
- targeting young users
- 2 ways bath with 2 meter width
- Permanent & temporary parings

PROPOSED PEDESTRIAN AREA



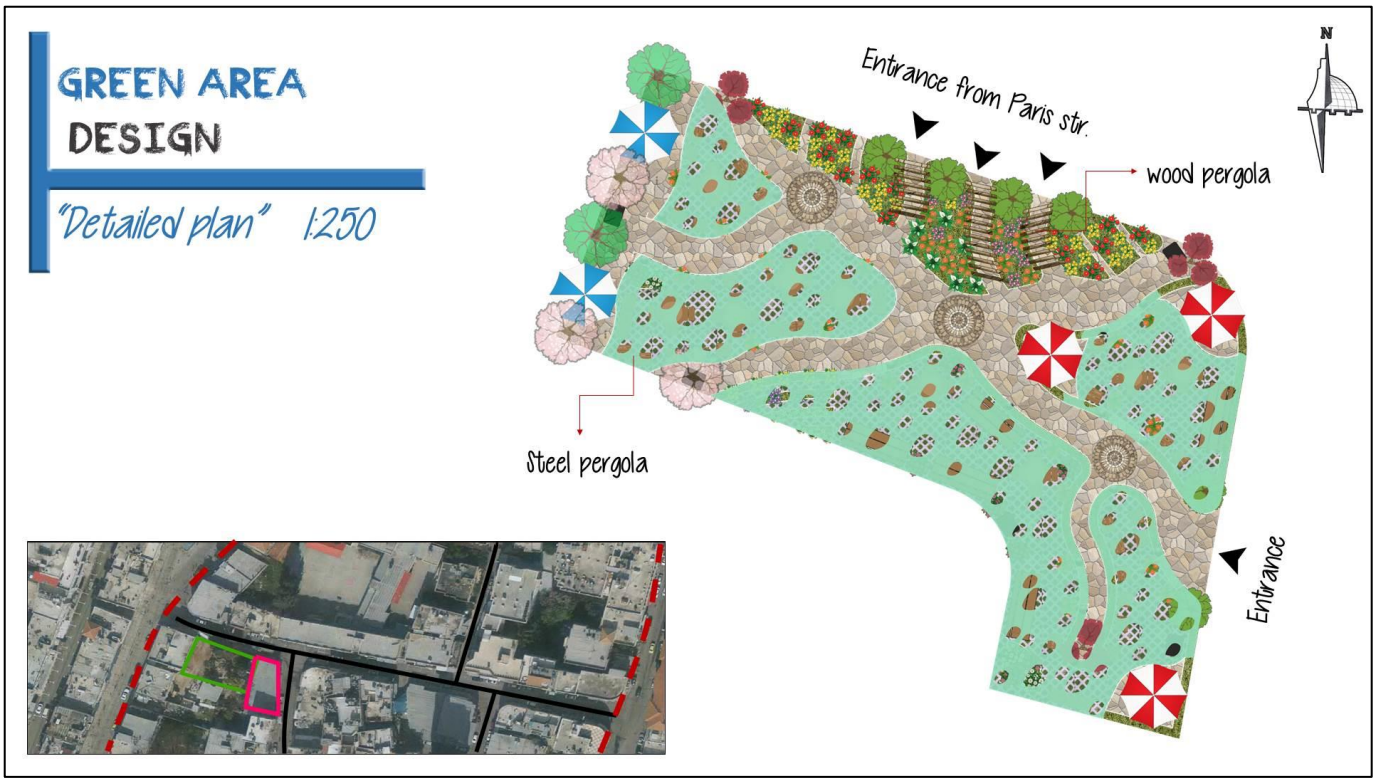
properties

- The roads that have a high traffic jam.
- The roads that have a high potential to Be closed in special occasions.
- Small cars can be only used in this area if the Users had to.
- Specify hours to upload, download goods.
- Provide pergolas to make shadow for users

In addition to all elements improve pedestrian movement

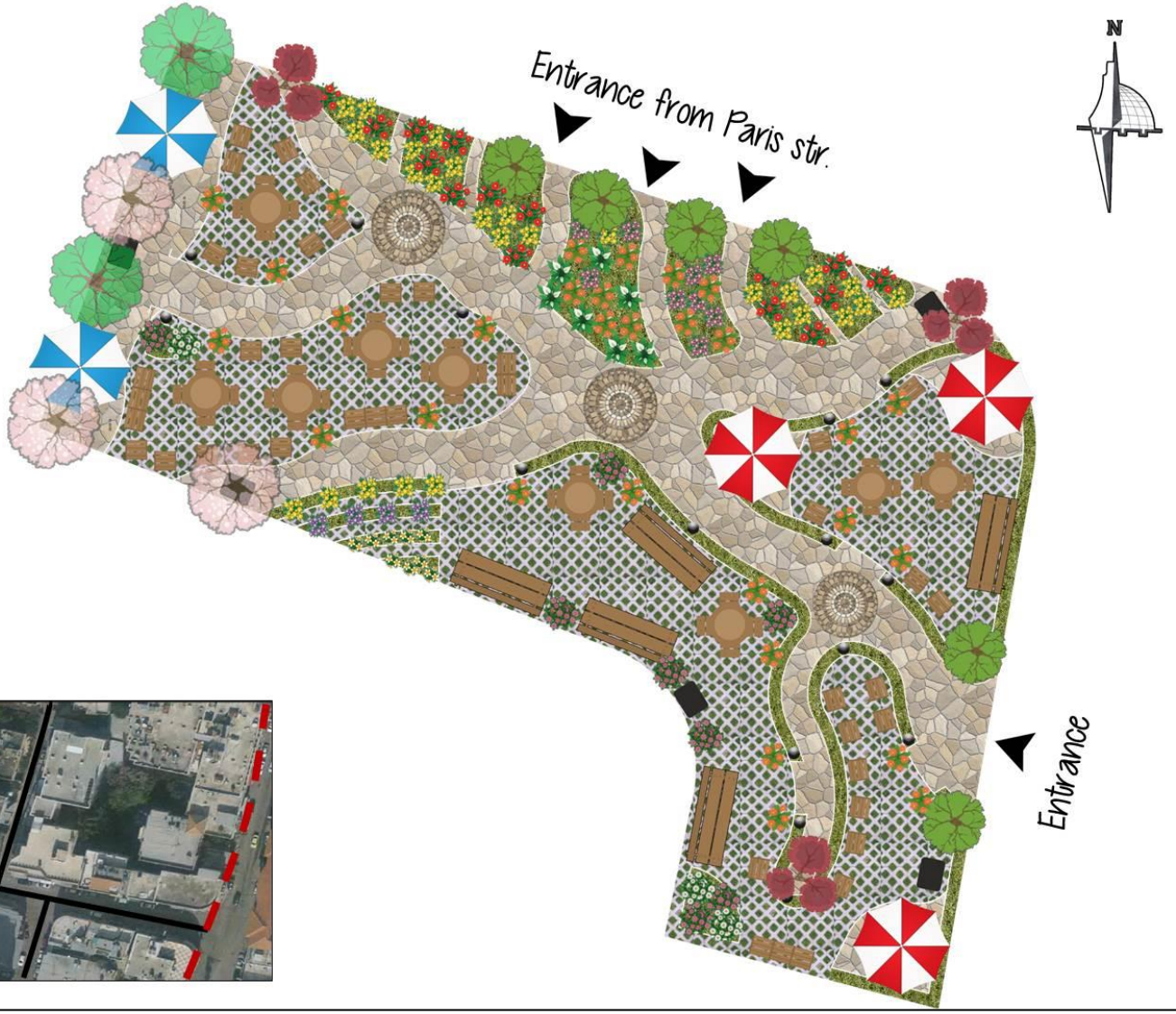
5.1.3.1 Proposed green area

A green area, plaza or square is needed to be proposed to complete the walkability concept. This green area is located in Paris Street; it was used as a coffee shop but now it's closed in addition to the parking locating beside it, so its total area is about 700 m². Its design mainly for set and rest so the design contains of four places for that purpose, the others is allocated for vendors and corridors in addition to the soft landscape. This is in addition to the most important element which is the pergolas used to get the shadow and made from the steel material with a modern design.



GREEN AREA DESIGN

"Detailed plan" 1:250

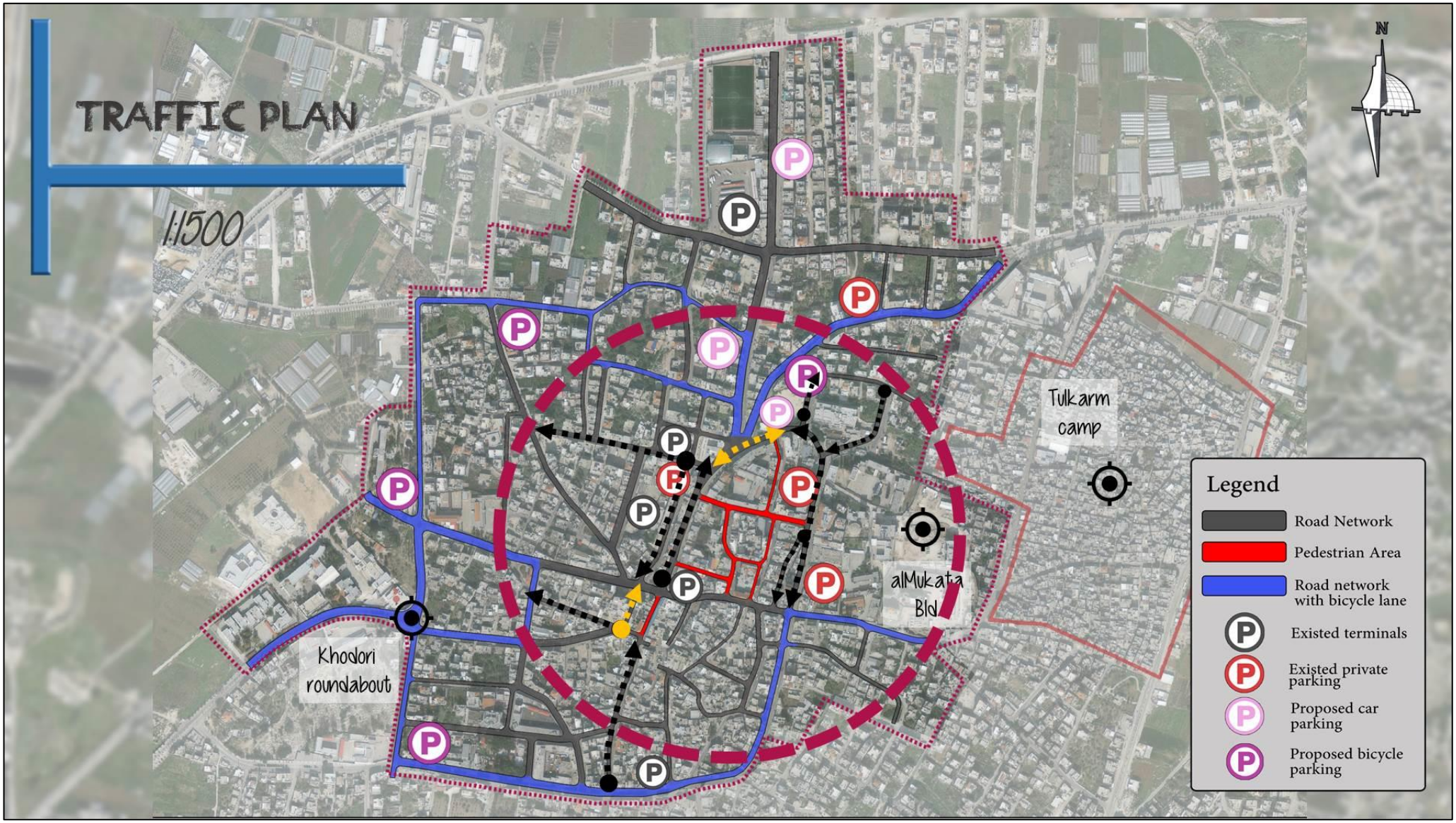


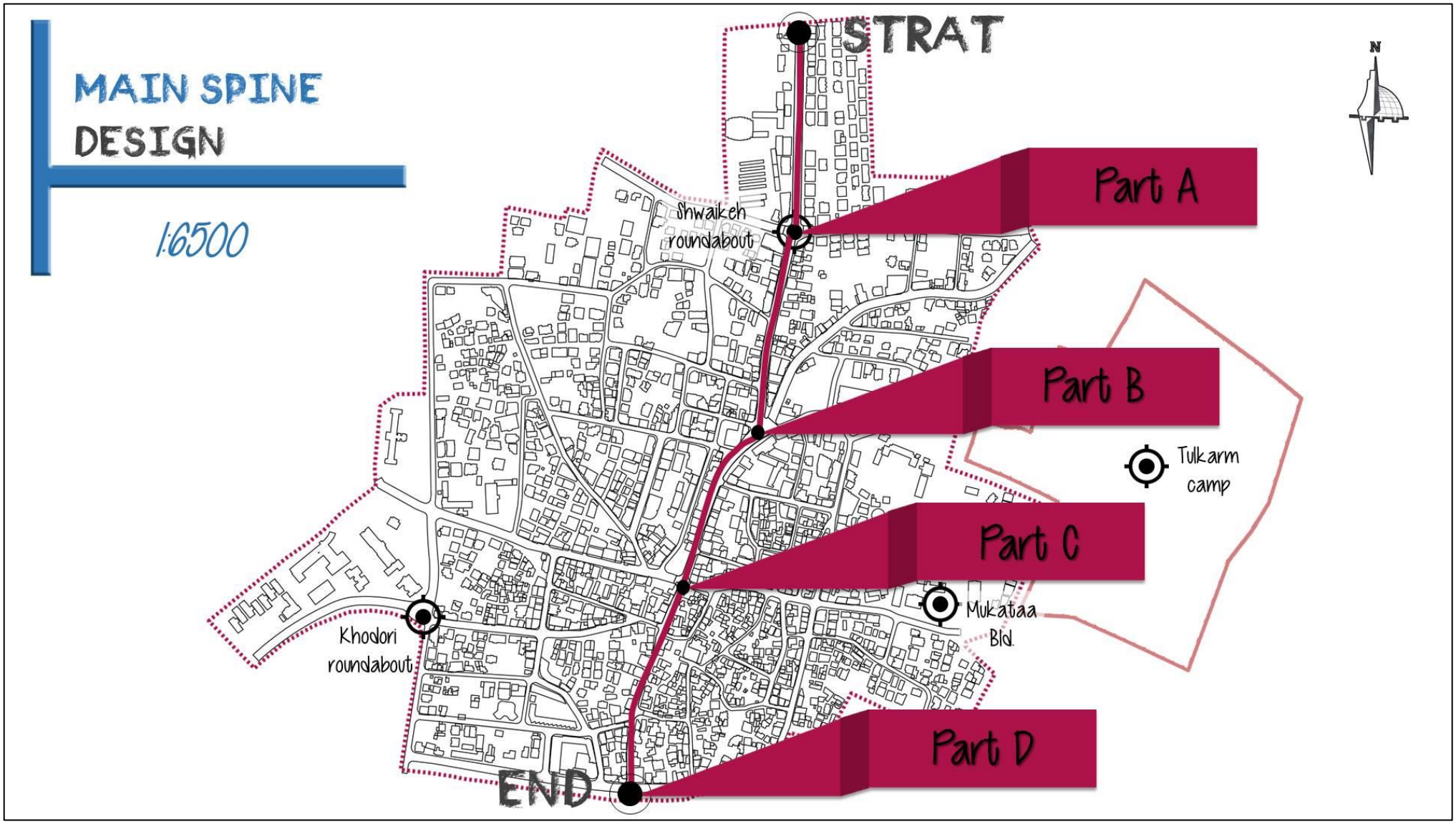
5.1.4 Traffic Plan

This plan will consist of the existed and proposed parking for both cars and bicycles, in addition to streets direction. My intervention in changing the street's direction was so little - although I propose a closed are for the pedestrian - because the majority of streets in Tulkarm have two directions so it's easy for the new traffic. the first road is "Al Huwari road", which I propose to change its one direction to the north instead the south, the second one is "Thbet Thabet hospital road" which I proposed to make it two directional road, this proposal may be causing a traffic jam because the ambulance parked on this street so it reduces the street width as well as the lanes, to solve this problem I propose to park the ambulances "seven cars" in a proposed parking near it.

5.2 implementation sample "main spine design"

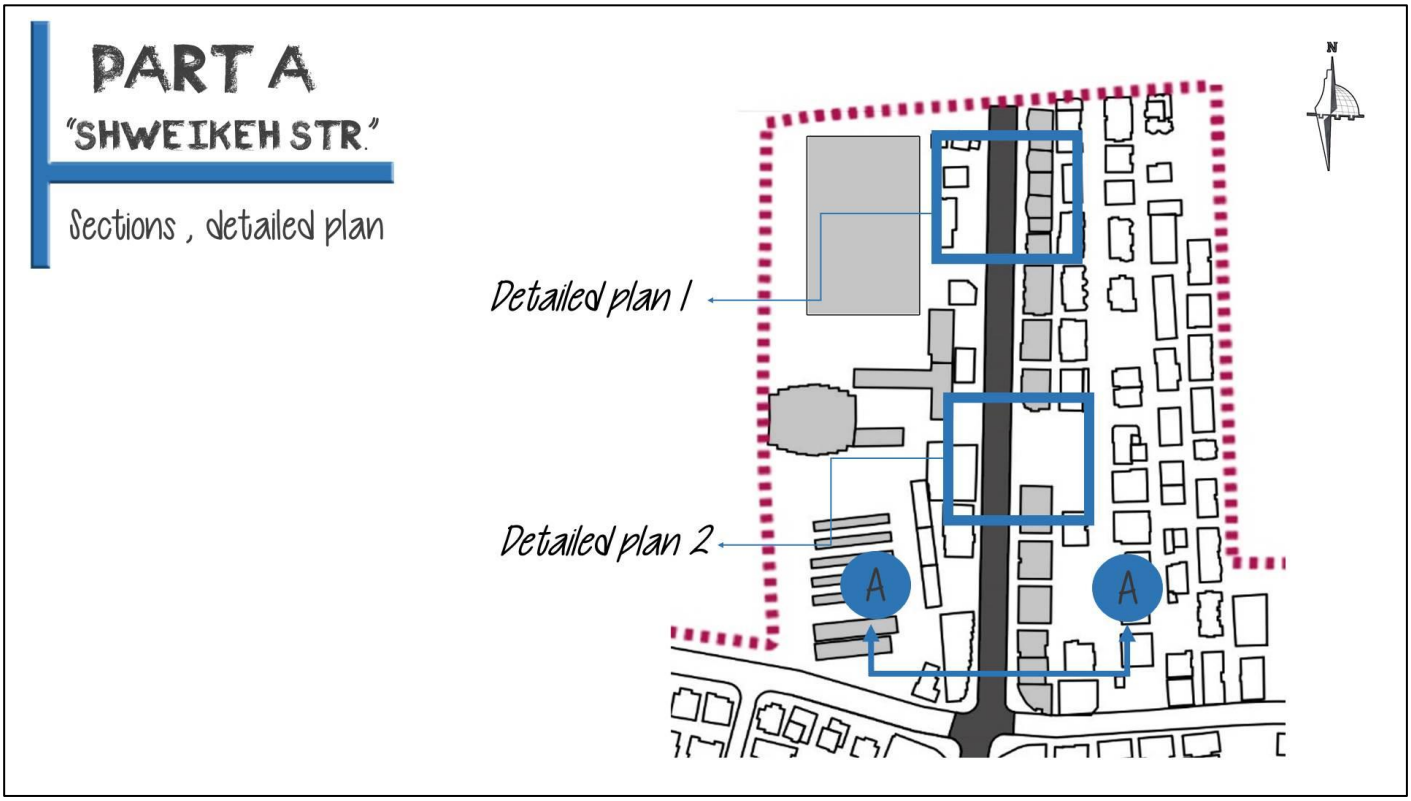
In order to apply the walkability idea, I will design a whole main spine from north "Shwekeh Street." To south "Gold souk Street". This design with contain sections, plans and elevation for both the existed condition and the development one. To do so, I divided this plan into four parts as it is shown in the attached map.


TRAFFIC PLAN
1:1500
N
Tulkarm camp
alMukata Bld
Khodori roundabout
Legend
Road Network
Pedestrian Area
Road network with bicycle lane
Existed terminals
Existed private parking
Proposed car parking
Proposed bicycle parking


MAIN SPINE
DESIGN
1:6500
STRAT
N
Part A
Part B
Part C
Part D
Shwaikeh
roundabout
Tulkarm
camp
Mukataa
Bld.
Khodori
roundabout
END

5.2.1 Part A "Shwekeh Street"

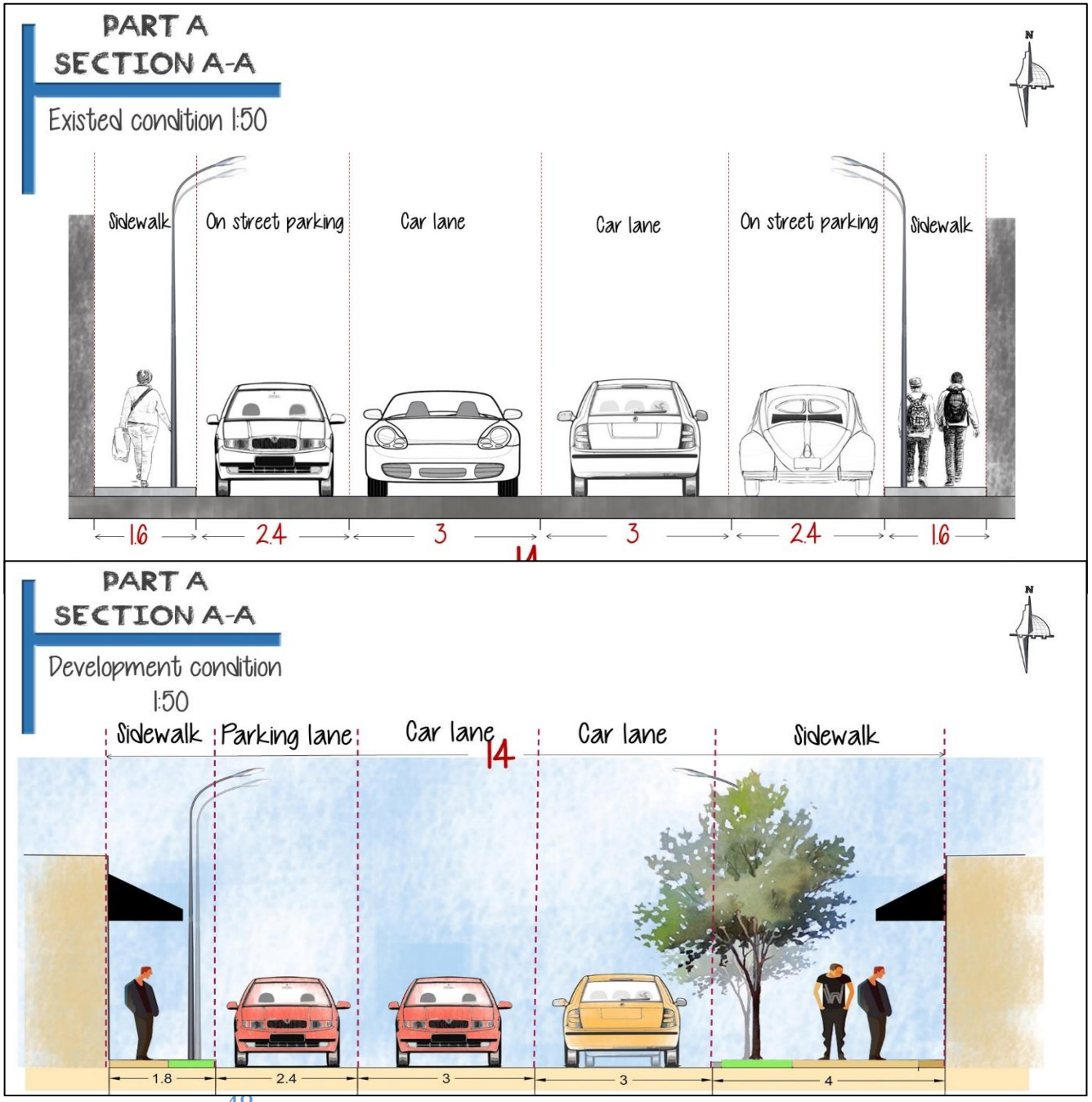
This street is classified as a longitudinal commercial in Tulkarm city master plan. In addition to commercial uses in it there is a governmental one such as the Directorate of education, it also contains an entertainment one like city stadium and restaurants plus the services like the new terminal.



5.2.1.1 Sections and plans

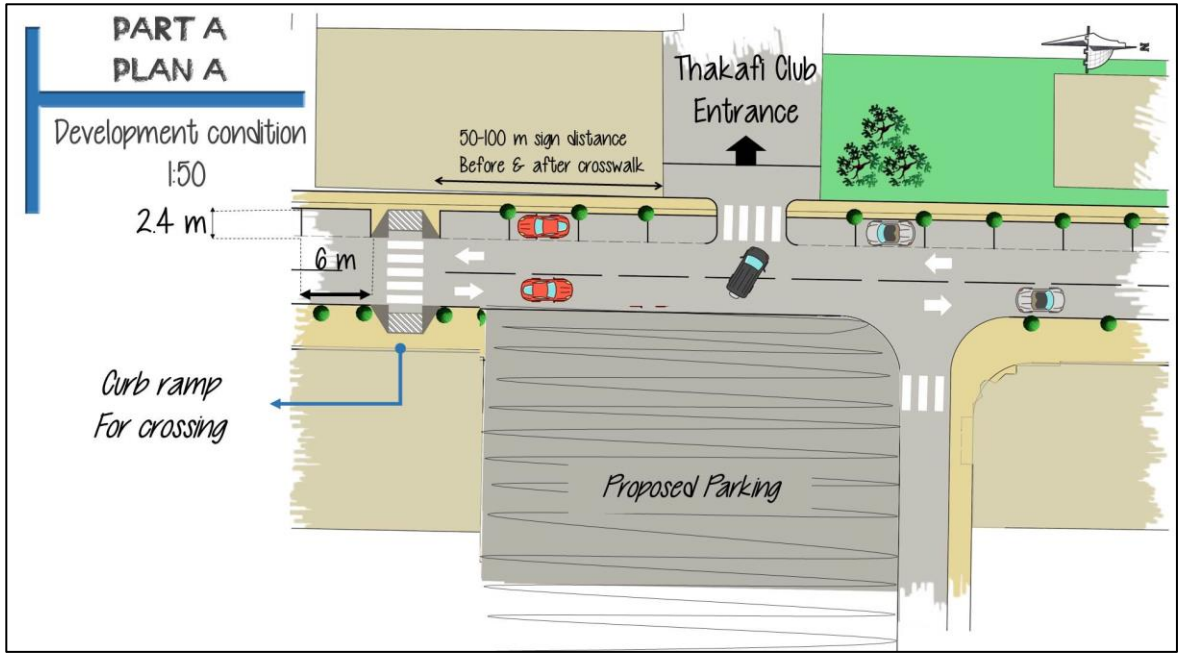
In the existed condition we can see that the share of pedestrian is too little because it all goes to cars moving or parked, so in order to improve the pedestrian movement and the walkability idea, I propose to remove the on street parking on the right side and to have a parking lot instead of it, so that the share of the pedestrian sidewalk will become larger from the two sides differently on the right one it becomes 4 meters and from the left it will be 1.8. The furniture zone will at least be 1 meter and it will have a tree in it to provide shadow. It's good to mention that the pedestrian sidewalk will be tiling with a concrete bricks or stones in order to reduce the heat that is absorbed so we don't use the asphalt

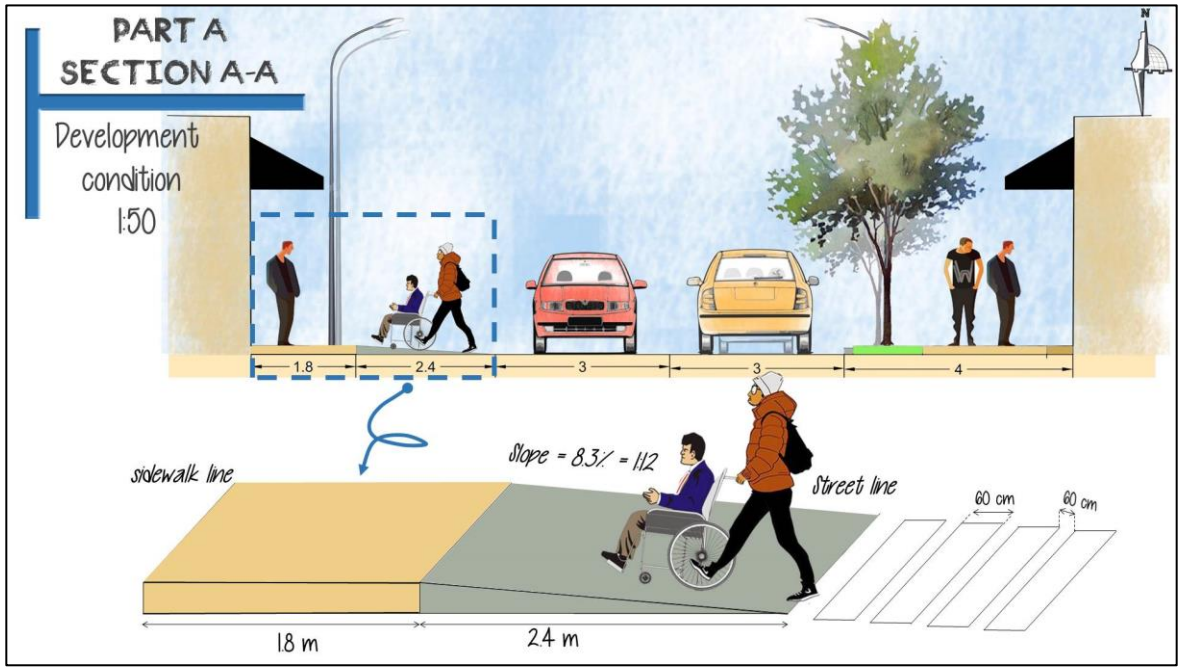
One.



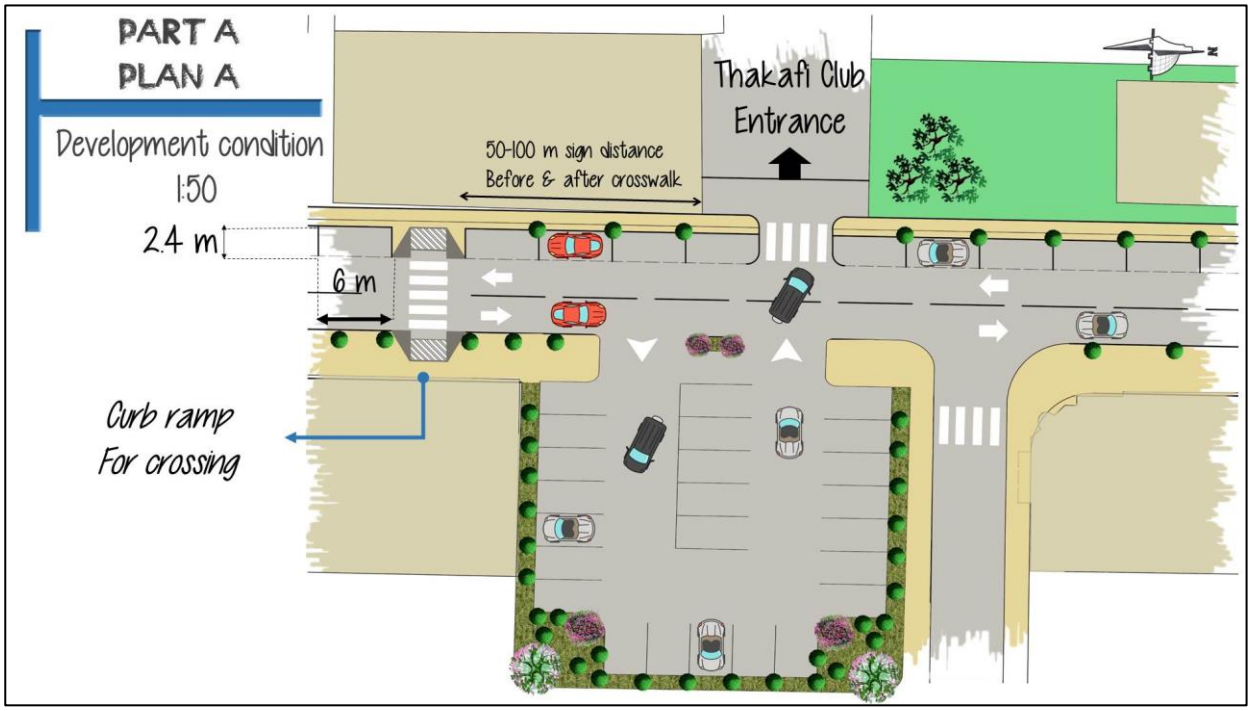
This curb ramp is designed for crossing, the ramp design is

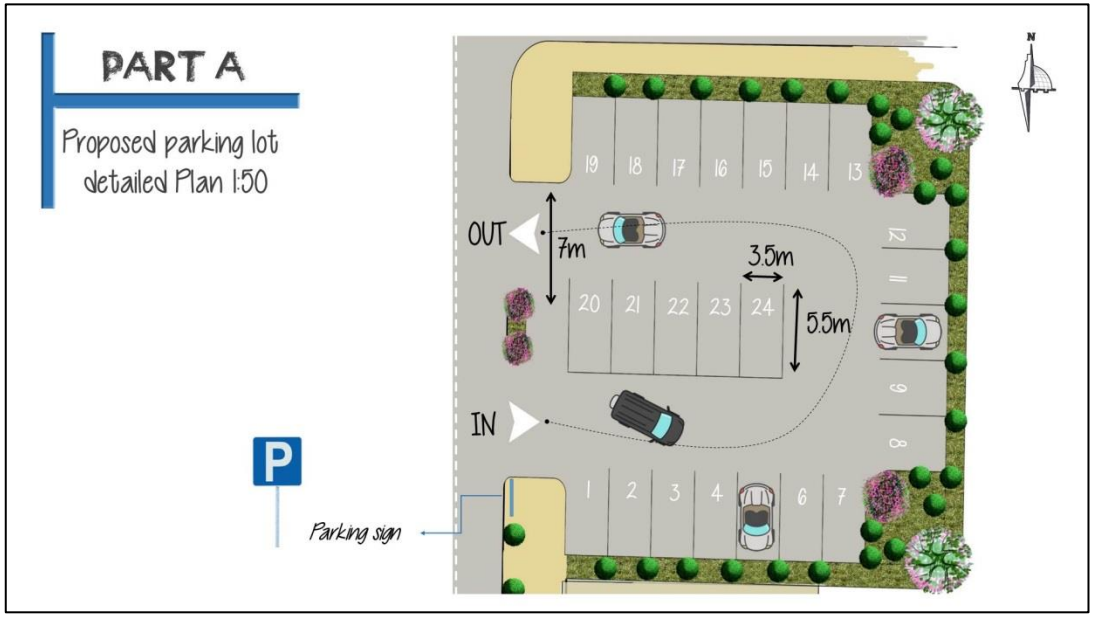
Designed to help the handicaps people with a slope of 83%. A warning sign will be applied before and after 50-100m distance from the crosswalk





And this proposed parking lot is with an area of 900m² designs for 24 spaces for car parking each space is 3.5*5.5m and a one way parking that means one space for entrance and the other is for the exit.



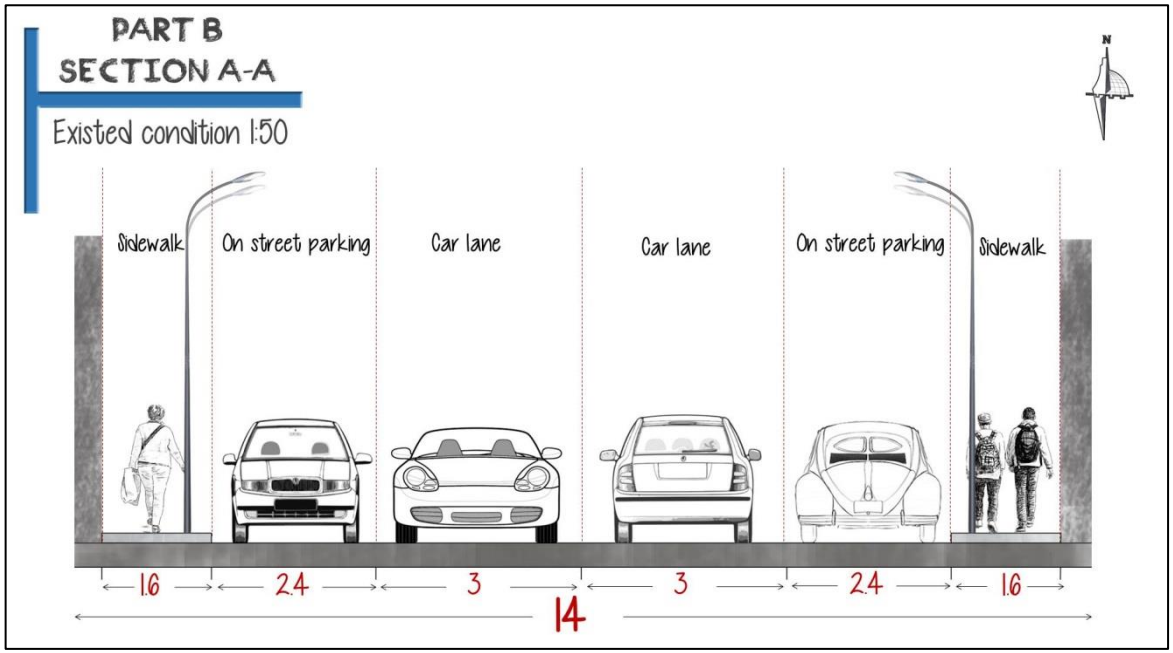


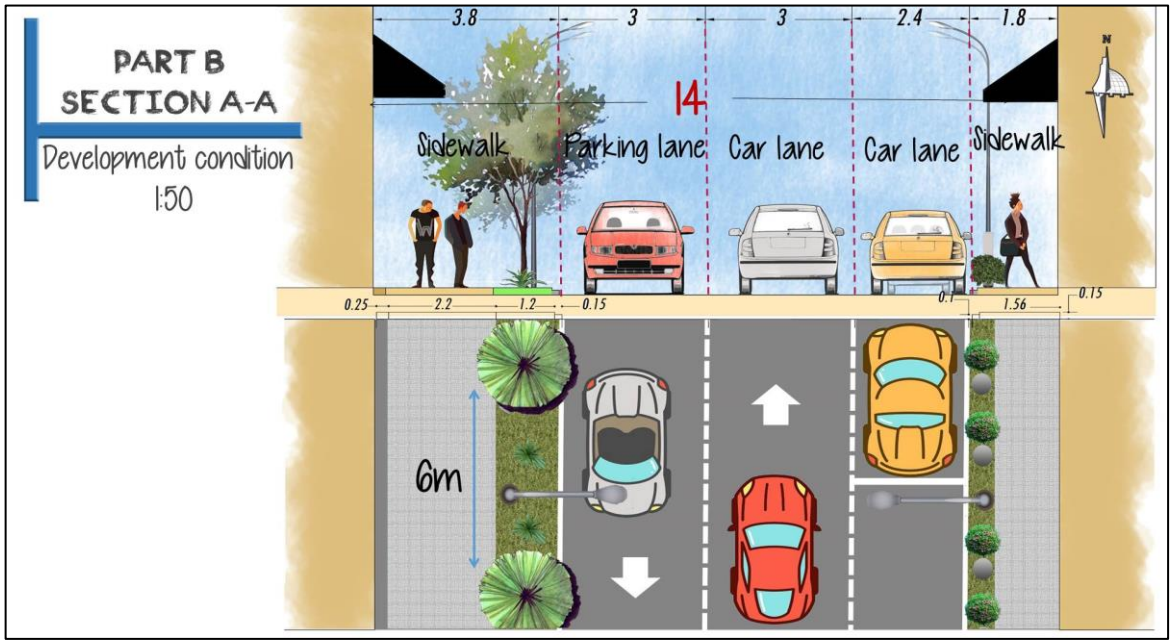
5.2.2 Part B "Jaffa Street"

This street is classified as a longitudinal commercial in Tulkarm city master plan. In addition to commercial uses in it there is an artificial one which I propose to be moved to the industry area that allocated in the master plan of the city.

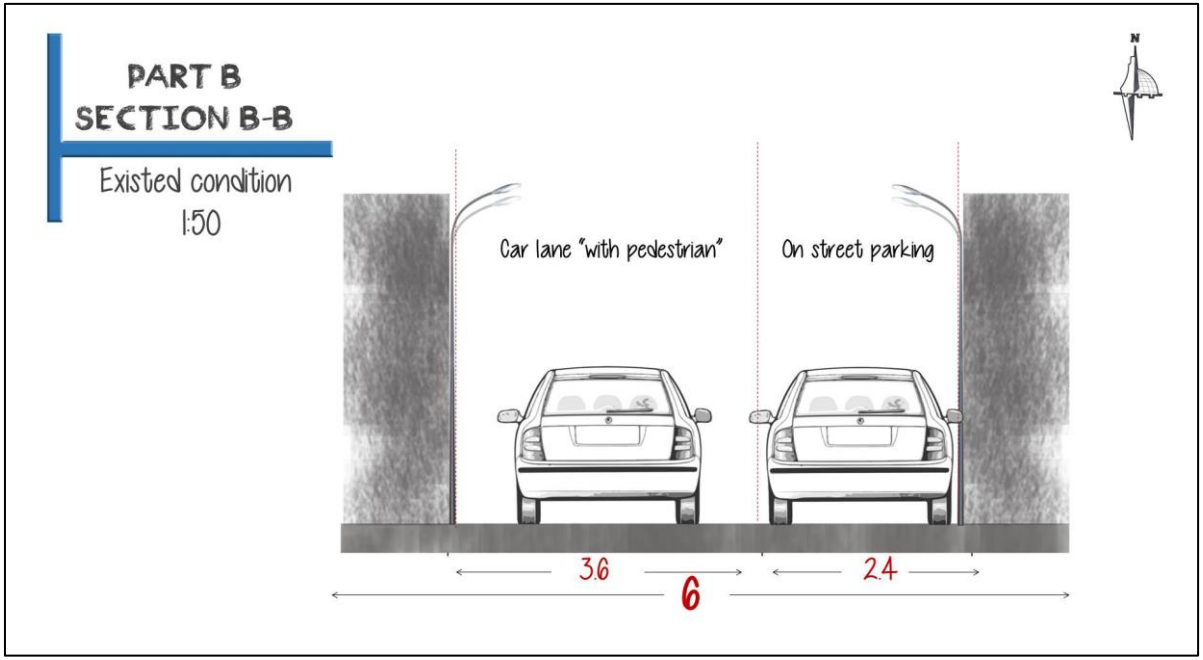
Because my idea was to keep the new terminal for ((((__))))

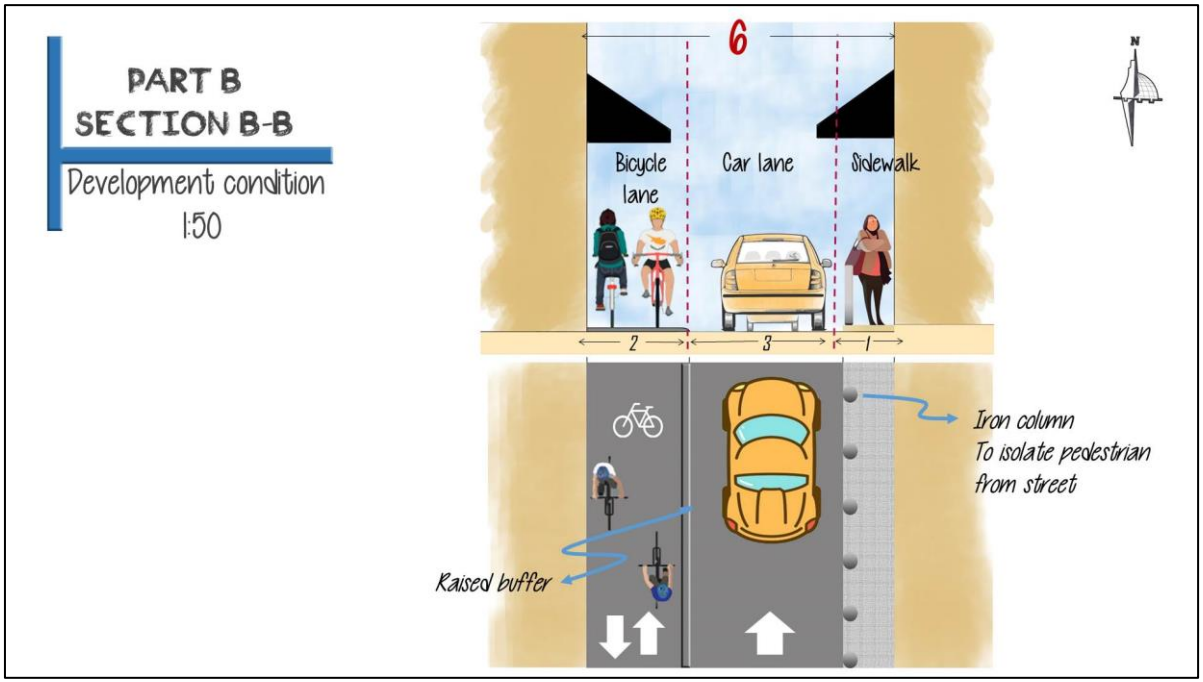
so I need to make the sidewalk wider in order to accomplish that objective, also these sidewalks will be provided by a green element "trees" in order to have shadow. If there is enough space to put trees like what happened in the right sidewalk, I suppose to put bushes in addition to the iron column to isolate pedestrian movement from the street so that I can accomplish the safety.



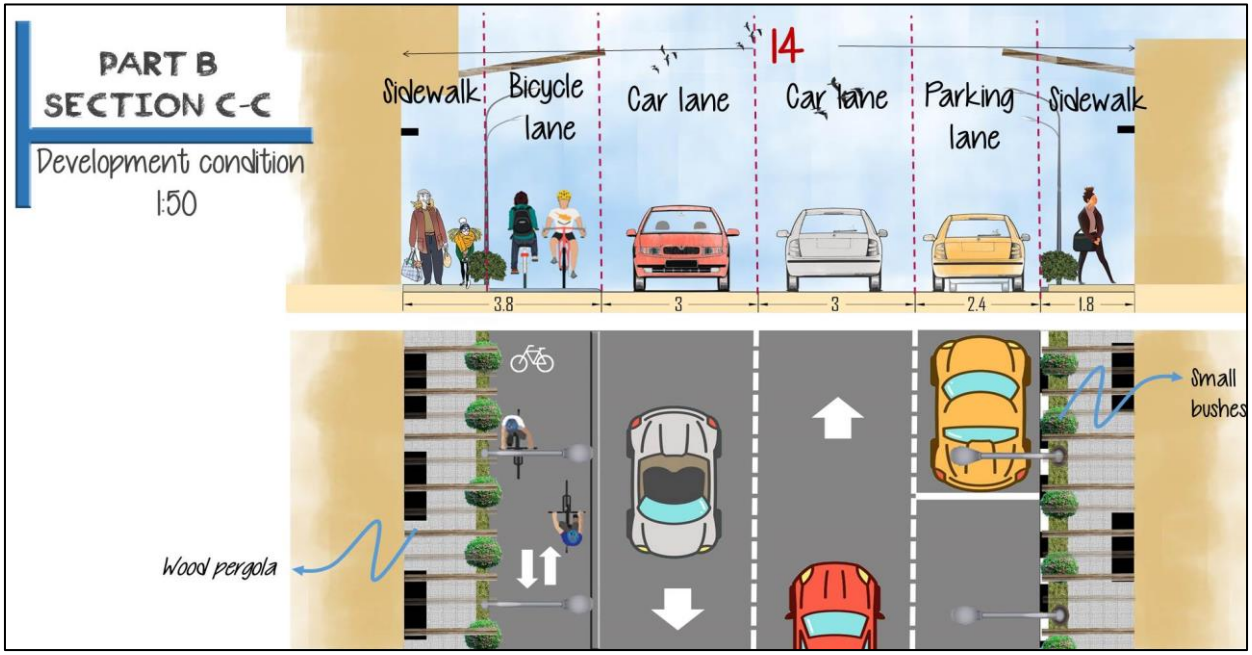


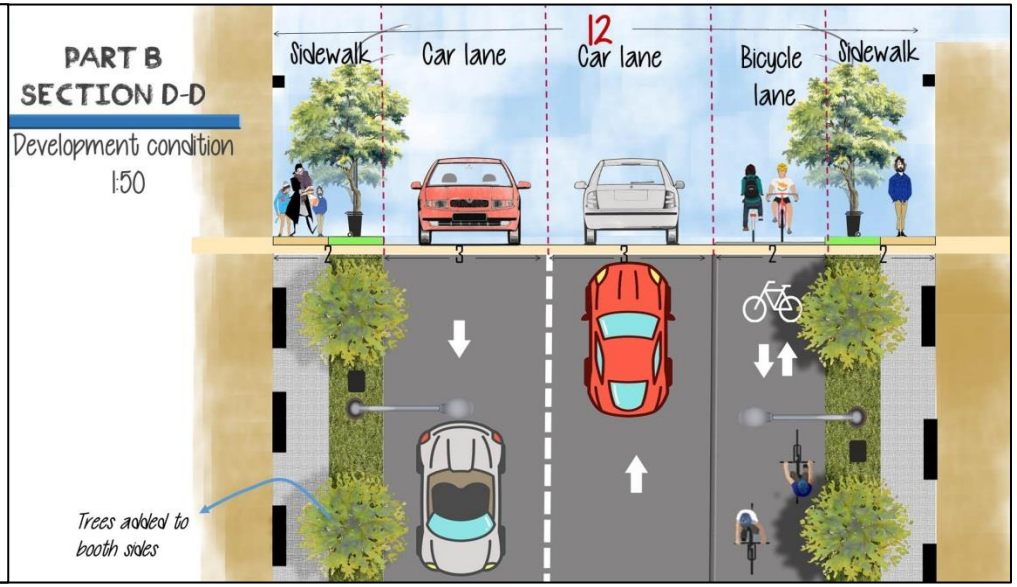
in these two sections before and after we can notice that the street width is very narrow and it's too hard to make it wider, which make a challenge to develop this section of street, to make the change I propose to remove the on street parking in order to have a chance to add the bicycle lane with 2 meters width and on a raised buffer in order to. And to accomplish the safety objective I apply the iron column to isolate the pedestrian movement.





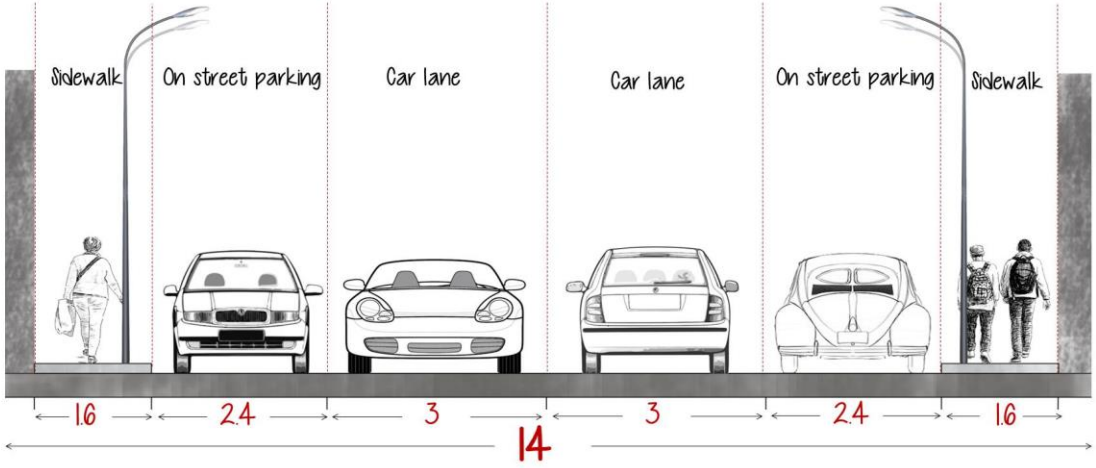
because there is no enough space to apply the trees to get shadow from them I propose to have a wooden pergolas along this section in the steer in addition to have bushes to make it more attractive, but in the next section I have a wider sidewalk so I can put trees in addition to the benches for pedestrian area.





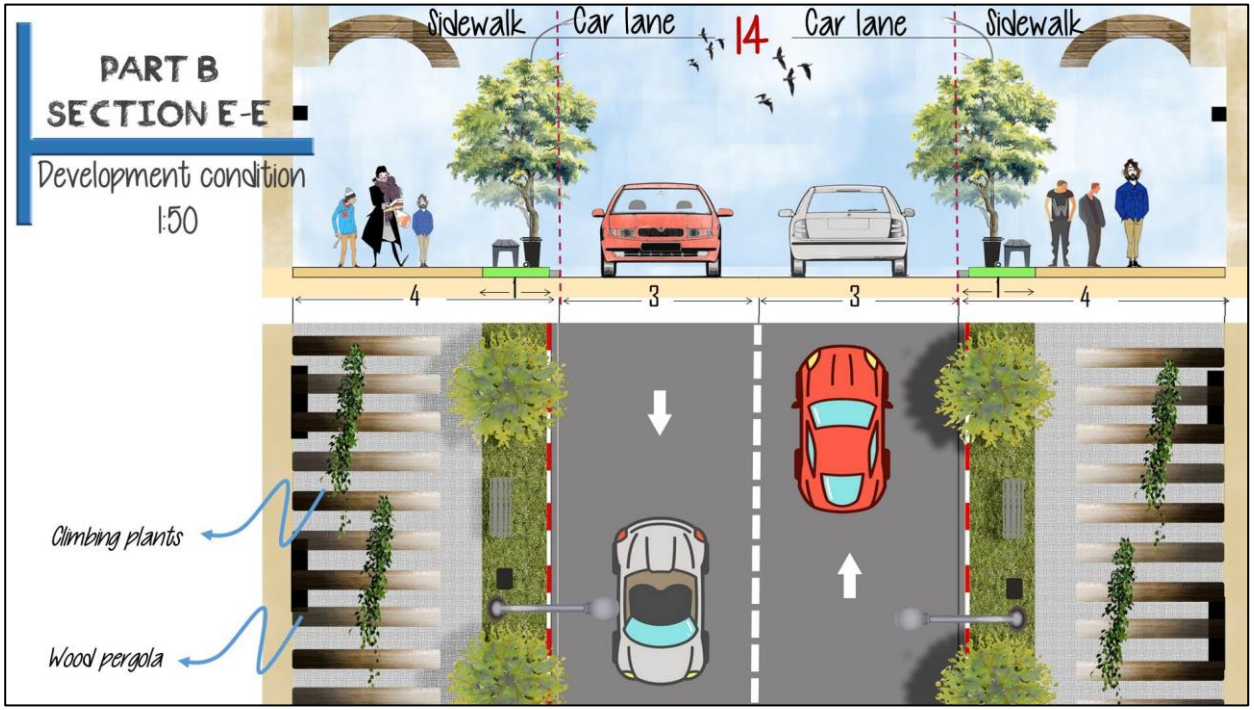
PART B
SECTION E-E

Existed condition 1:50



PART B
SECTION E-E

Development condition 1:50



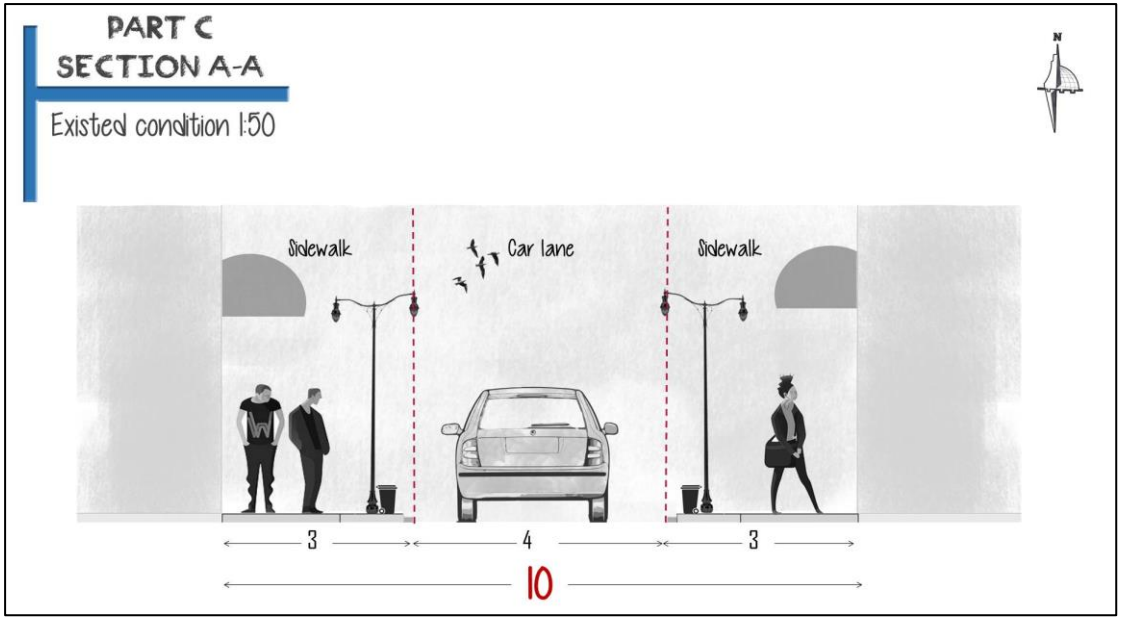
PART B
ELEVATION E

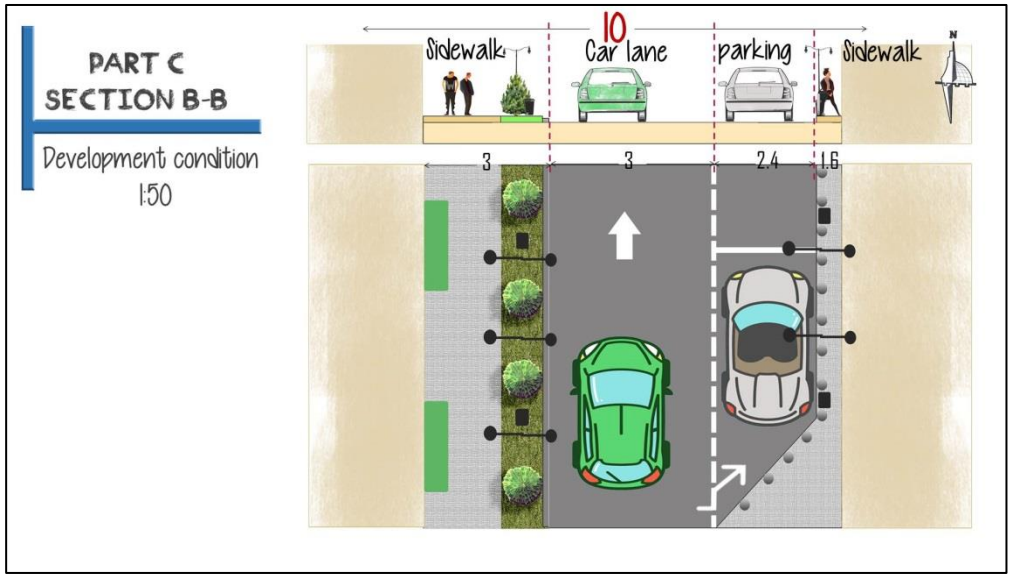
1:50

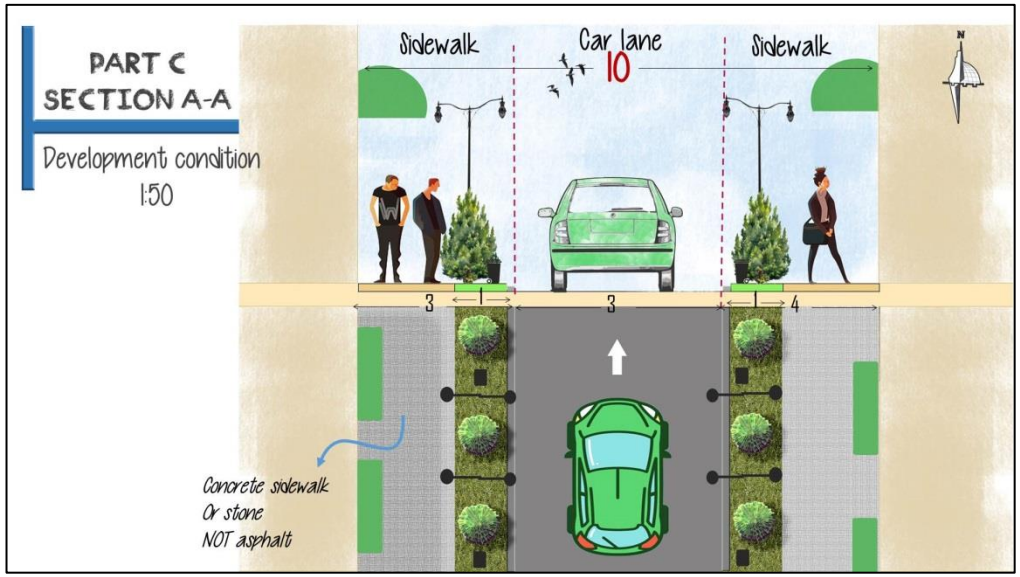
5.2.3 Part C “king Hussein Street”

This street is classified as a commercial street “main center” in Tulkarm city master plan.

In this street my intervention was almost little, but I added a green element "small bushes" to beatify the street and make it more attractive.

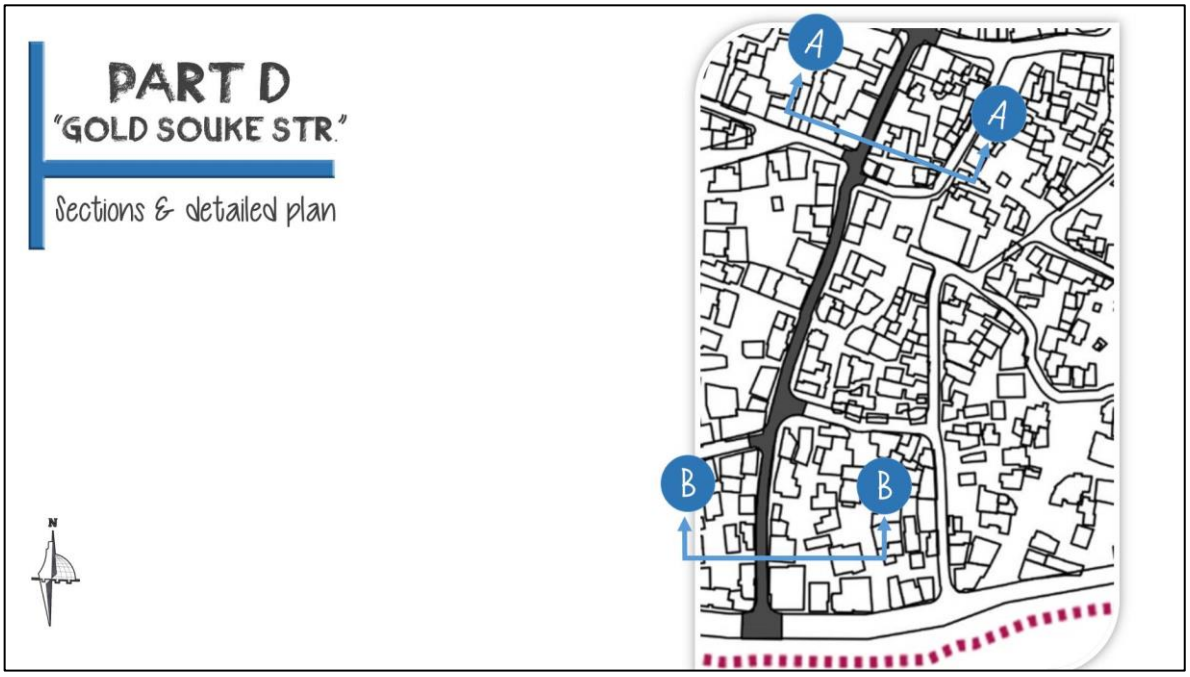




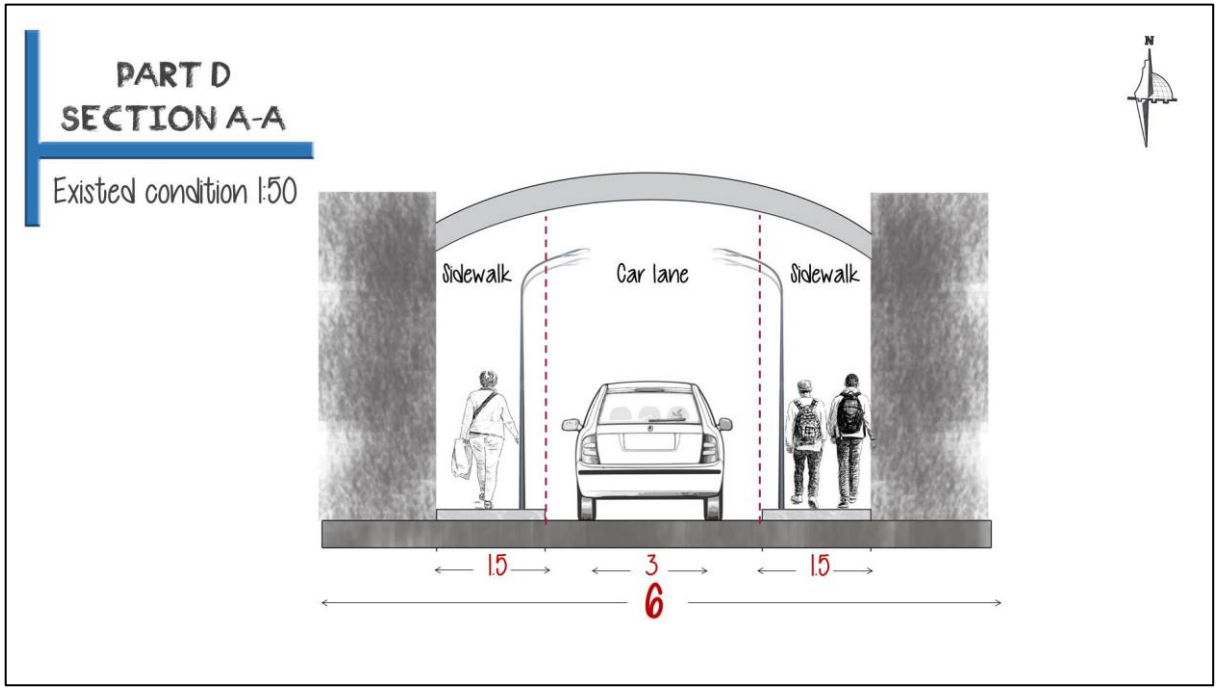


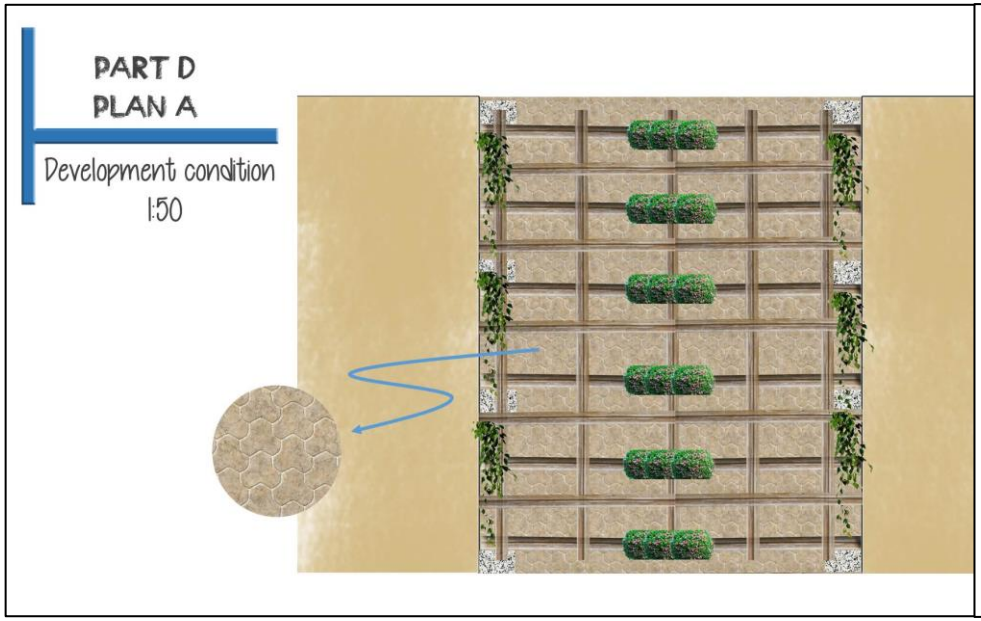
5.2.3 Part D “Gold souk Street”

This street is classified as a longitudinal commercial in Tulkarm city master plan. In addition to commercial uses in it there is residential one "old town".

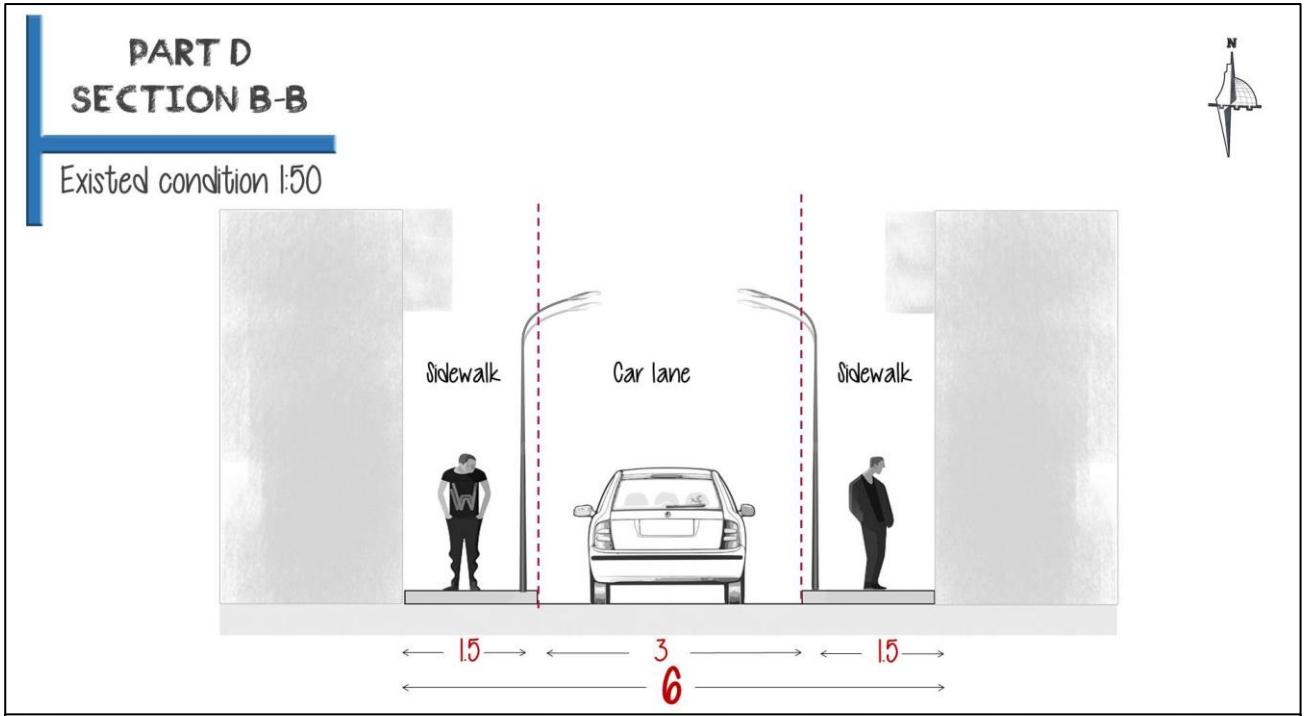


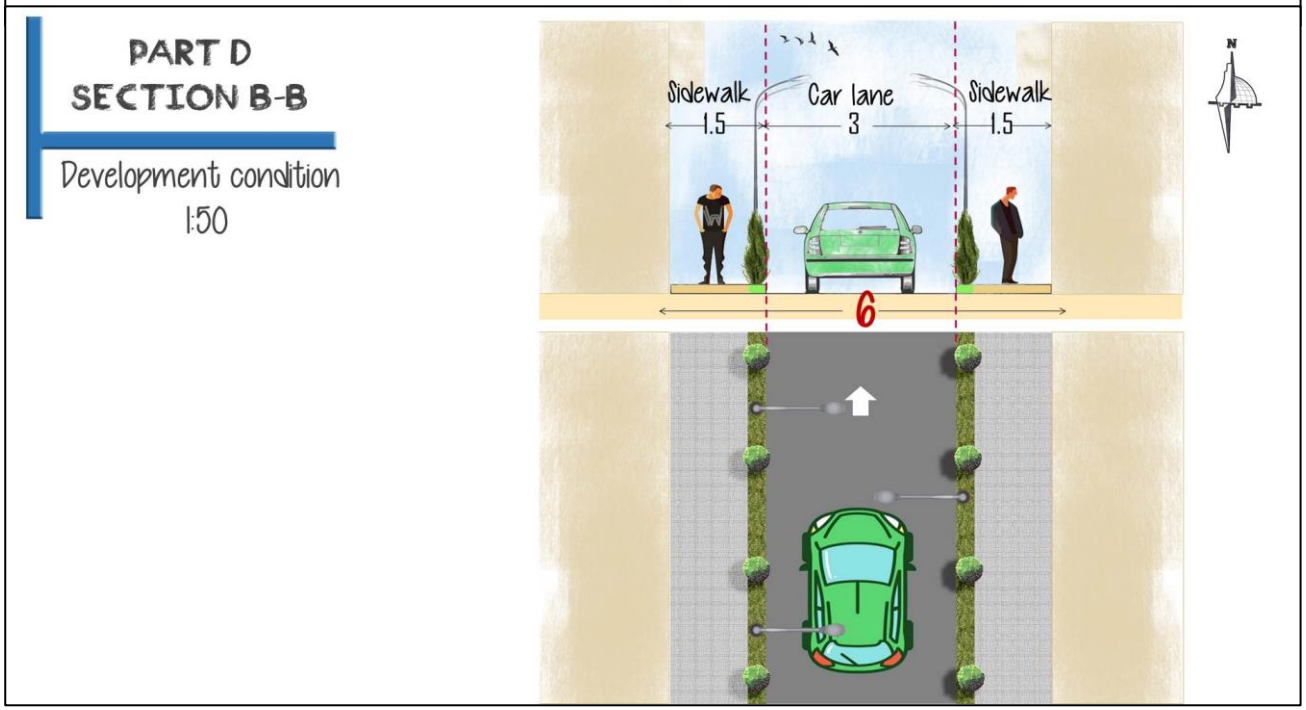
The gold souk street is a covered street, but it has a defect because it's all closed without any opens in it which is doesn't match Tulkarm's weather because its high humidity, so in order to correct this defect I propose to change the pergola type to wooden one, and to have the green element "climbing plant" above this pergolas, in a grid style so that it can provide shadow and let the wind pass through it.





In this street too my intervention was almost little because the street width is too narrow and there is no potential to make it wider, but I added a green element "small bushes" to beatify the street and make it more attractive for pedestrians.





6. Regulations

As a planner my turn didn't stop in just making and creating the master plan and proposing some changings in the city, its go far for the regulation part, because without these regulations the master plan will be pointless. The regulation I put related to pedestrian movement and approving it as we can see in the following points.

1. Adoption of the arcade buildings approach
2. Impose fees for the wrong use of sidewalks
3. Impose fees for wrong crossing
4. Allowing the use of graffiti art on building front *"under supervision"* to beautify the view
5. Adoption of special arrangement to rearrange the shops look

APPENDIX