An-Najah National University

Faculty of Engineering & Information Technology

Urban Planning Department

"Urban Transportation Planning for Jenin City"

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الإهداء

بسم الله الرحمن الرحيم

(قل اعملوا فسيرى الله عملكم ورسوله والمؤمنون)

صدق الله العظيم

إلى مثلي الأعلى بالحياة، قدوتي، إلى من كلله الله بالهيبة والوقار، إلى من علمني العطاء دون انتظار، إلى من علمني الاخلاق واحترام الناس، إلى من أحمل اسمه بكل افتخار

"والدي"
السيد نواف جمال عبد الهادي

إلى روحي بالحياة وسر نجاحي، صديقتي، رفيقة دربي، الى من الجنة تحت أقدامها، إلى جنتي على الأرض

"والدتي"
السيدة علا زهير خلف

إلى سندي بالحياة، قوتي وملاذي بعد الله، إلى من تحلو الحياة بوجودهم، إلى رفقائي ومصدر فرحي

"أخوتي"

عبلة نواف عبد الهادي

رباب نواف عبد الهادي

محمد نواف عبد الهادي

إلى من وقف بجانبي ودعمني في كل لحظة ضعفٍ، الى من كان سنداً لي بعيداً عن اهلي

"أصدقائي وأخوتي"

عميد عمد

دانا طوباسي

الشكر والتقدير

لا بد لنا ونحن نخطو خطواتنا الأخيرة في الحياة الجامعية من وقفة نعود إلى أعوام قضيناها في رحاب الجامعة مع أساتذتنا الكرام الذين قدموا لنا الكثير باذلين بذلك جهوداً كبيرة في بناء جيل الغد لتبعث الأمة من جديد

أقدم أسمى آيات الشكر والامتنان والتقدير والمحبة إلى الذين حملوا أقدس رسالة في الحياة

إلى الذين مهدوا لنا طريق العلم والمعرفة

إلى جميع أساتذتنا الأفاضل وأخص بالتقدير والشكر:

الدكتور علي عبد الحميد

الدكتور زهراء زواوي

الدكتور عماد دواس

الدكتور إيهاب حجازي

الدكتور فداء ياسين

وكذلك أشكر كل من ساعد على إتمام هذا البحث وقدم لنا العون ومد لنا يد المساعدة وزودنا بالمعلومات اللازمة

كما اشكر جميع زملائي وزميلاتي على جميع النصائح والمساعدات العلمية والعملية وأخُص بالذكر "زميلي المعطاء"

محمد بسام إعطير

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Chapter One: Introduction

Overview

The transport and communication sector is one of the main structures of the economy. While directly or indirectly influencing the social life of individuals through the process of communication and change in social and cultural behavior. Transport contributes greatly to social change among members of society in general. Through facilitating the process of social communication between the city and the countryside. Between postponing the country on one hand. In addition, between it and the other countries on the other. Which contributes effectively to increase the achievement of social development as the backward societies are closed on themselves. Because of the difficulty of contact with the communities living in the primitive human level. In addition, perhaps the reason to see the lack of communication between these isolated human groups and other communities. In the above. We can say that any economic development is related mainly to the availability of facilities and possibilities of appropriate transport systems. The impact of the transport crisis on education and the disruption of the educational movement and other impact on staff and the role of the crisis in the creation of many of the traffic problems.

The Israeli occupation of the most important factors and causes that contributed to the destruction of Palestinian roads and transportation because of the barbaric policies that it is taking against the Palestinian people The policy of invasions and wars and the policy of curfew has destroyed about 54% of the infrastructure of the Palestinian roads and the wars it carried out on Gaza destroyed nearly 76% Of the infrastructure in Gaza. All these policies affected the Palestinian roads and had a negative impact on various aspects of life.

Public Transportation in Palestine

In Palestine, the transport sector is a monolithic system. All movements, people and goods depend on land transportation inside and outside the West Bank.

This current infrastructure makes it in need of significant improvement.

The road network is divided into major, regional and local roads and bypass roads. The Ministry of Transport is responsible for the organization of internal transport. Traffic control regulations are issued for 6874 km of main roads, 782 km roads, 4150 local roads and 974 km bypass roads. Number of vehicles used by the Ministry of Transport to 9939. The average rate of private cars is 67.0%, of which commercial cars constitute 17.8%, then public cars (common taxis or private taxis) which are 7.4%. This sector suffers a lot of problems. For example, there is no rail or air transport in the Palestinian areas, in the past, there was a railway line. The first airport is Kalandia Airport and the other (Rima 2011).

Study Area (Jenin City)

Jenin is a Palestinian city, the center of Jenin governorate and the largest of its communities, located in the northern West Bank of the Palestinian Authority. Historically, it is one of the triangle towns in the north of Palestine, and is 75 kilometers from Jerusalem. Jenin overlooks the Jordan Valley to the east and Marj bin Amer to the north.

Despite the fact that its population is small until the date of the Nakba, compared with other Palestinian cities, it has a much larger economic burden than its population. The city has a population of 39,000, while the governorate has a population of about 256,000.

The Jenin area alone is 21,000 dunums, making it the third largest Palestinian city in the West Bank after Hebron and Nablus, while Jenin is 583 square kilometers, or 9.7 percent of the total West Bank. The city is followed by the Jenin refugee camp, which is located to the west and has 16,000 refugees. The city rises above sea level at 175 meters.

Jenin was known by a number of names over time. The name of the city was mentioned in the sources and traces of the ancient Egyptians, the Babylonians and the Assyrians. According to archaeologists, the Canaanites founded it in the year 2450 BC, thus it is one of the oldest cities in the world that is still inhabited. The name of the city was known as Marj ibn Amer, which is considered the most fertile land of historic Palestine. During the Roman era, it had a village called "Jinnai" from the villages of Sebastia.

Jenin was dominated by many forces, sometimes rising and sometimes retreating, but the city flourished in late Ottoman rule and the first town council was founded in 1886. Life in Jenin accelerated over the century as the number of refugees increased, The task among the major cities of the West Bank in modern times.

Since the beginning of the Palestinian-Israeli conflict, the city of Jenin has been a major concern in the Palestinian national struggle and has remained a concern for Israel because of its proximity to the cities of the interior and the participation of a large number of its children in armed action against Israel, especially after the second intifada.

The site of Jenin has had the greatest impact on the city's history and its history, and its importance as a transport complex between the mountains of the central Palestine (Nablus-Jerusalem-Hebron) and the cities of Palestine. There are also roads leading to Haifa and Acre. The city of Jenin received great attention in terms of transportation, where roads were paved before the coastal roads, which were considered the most important roads for the colonists during the British Mandate over Palestine. The importance of the city did not stop on the roads, but its importance extended to the railway lines, passing through the line up to Afula and then Bisan Vtbria.

The city of Jenin is one of the Palestinian cities that grew out of old and developed as a result of population growth. However, the transportation network did not develop

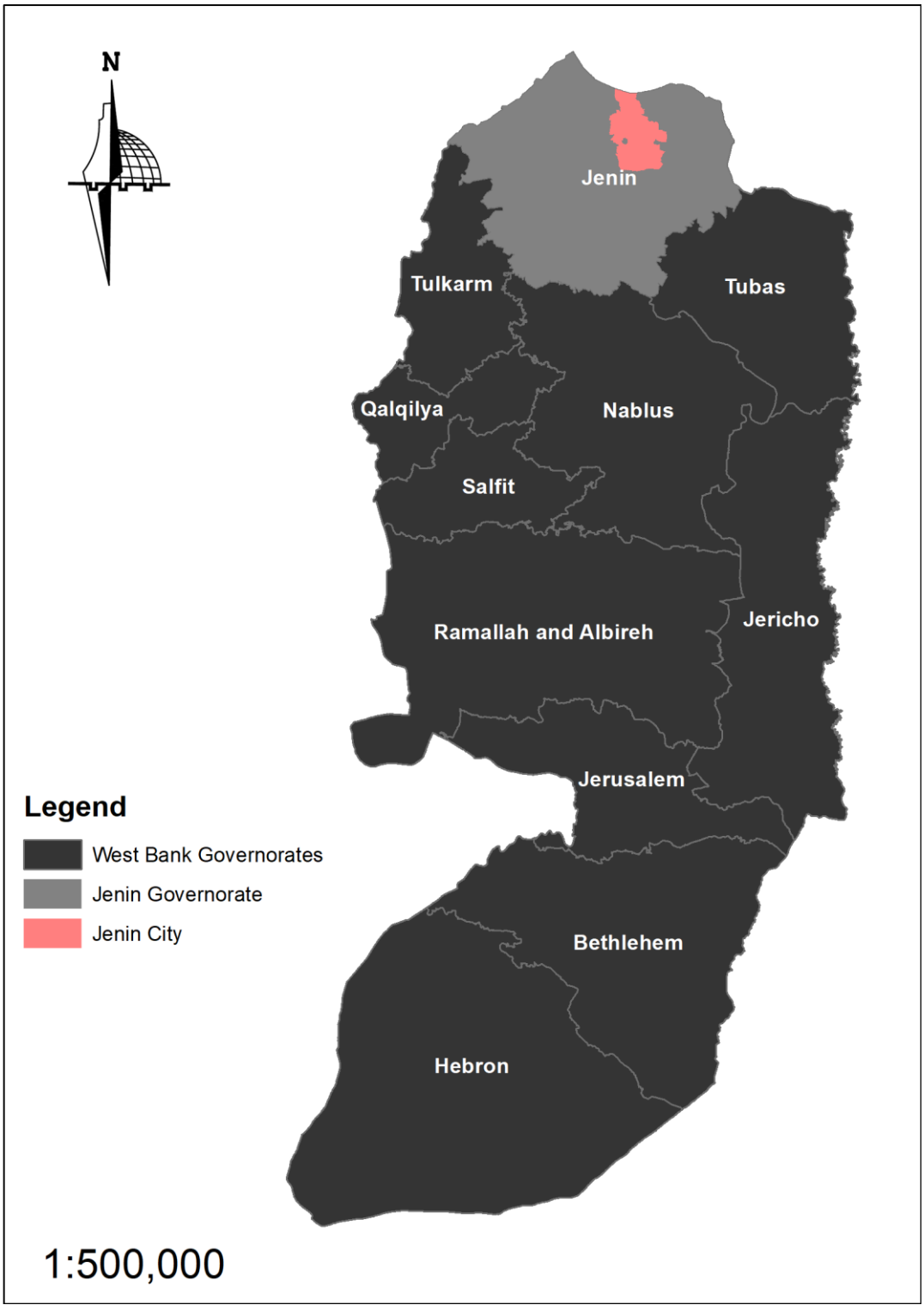
parallel to the successive periods of occupation and the resulting economic and social conditions, which caused many problems in the transportation system Both at the level of planning and organization of roads and streets, or on the level of construction of roads.

The importance of the city of Jenin in terms of the type of services provided by the institutions, which include government offices and schools, hospitals, banks, markets, shops and industrial area, which provides services to villages and towns in the province. In addition, the importance of the city is due to the regional roads planned by the Ministry of Planning and passing through the city of Jenin. The first road from the Jordan Valley to Nazareth, the other connects Hebron to Haifa and passes through the cities of Nablus and Ramallah. The phantom green that separates the 1948 areas from the areas occupied in 1967, as a shopping center for Palestinians inside the Green Line.

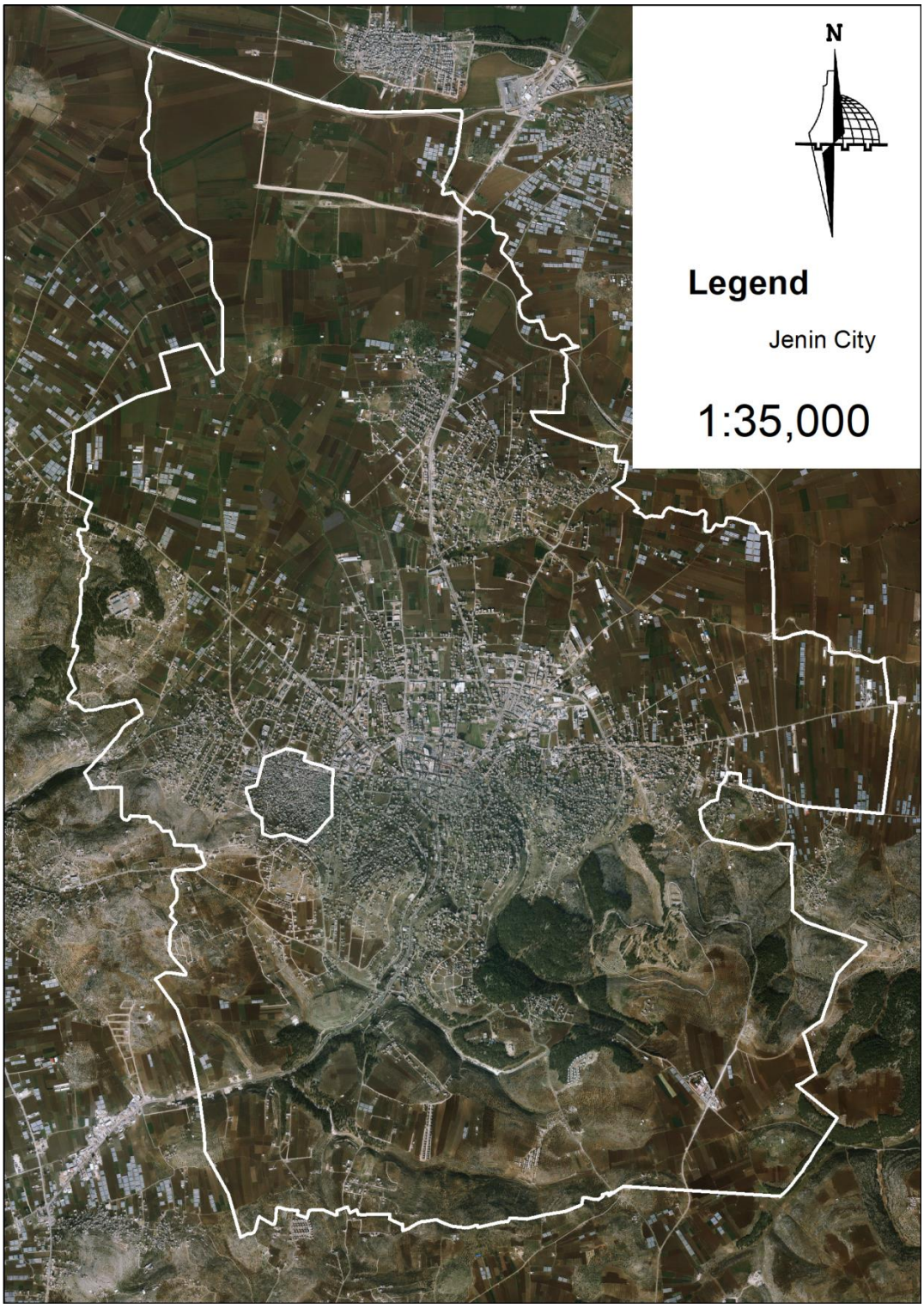
Transport is becoming increasingly important in the city of Jenin as a result of the city's expansion and rapid growth. Residents of the city, while traveling within the city, use different means of transportation. However, according to the 2007 survey, there was a decrease in the use of private cars in the city, where the percentage of families owning a private car was 13.8% of the total number of households in the city. On the other hand, there is an increase in the use of taxis, especially for traffic between the city center and its different areas. The percentage of users of this vehicle was 43.9% and a lower percentage of buses with 25.3% of the total population.

The current network of roads in the city of Jenin consists of a series of main lanes, which are four to two lanes, connecting the city's parts to each other, as well as other Palestinian towns, in addition to the villages of Jenin.

- Nablus Street
- Nazareth Street
- Haifa Street
- Jamal Abdel Nasser Street and the station
- Abdul Qader Al Husseini Street
- Palestine street
- Abu Jihad Street
- Sweets Street
- Al Jabriat Street



Map 1: Jenin for the West Bank Governorates



Map 2: Study Area (Jenin City)

Problem & Importance of The Study

The city of Jenin is characterized by an agricultural character, simple local trade and limited infrastructure. However, after the end of the war in Gaza and the rule of political stability, Jenin became a destination for the Arabs of the occupied homeland (the Arabs of 1948). Thousands of cars and buses (Arab American University), it became inevitable to develop a public transport network capable of absorbing the large numbers of arrivals to the city of Jenin.

Research Objectives

Project Search Questions:

- What is the transit city? What are the landmarks of the transit city?
- What are the most important factors that formed a shock to the transportation in the city of Jenin? What is the importance of the city of Jenin?
- What are the main planning and design changes for transportation in the city of Jenin?

Goals and Motivations:

The main objective of this study is to develop a systematic framework for Palestinian cities to improve the quality of life by building a model of sustainable cities based on transient development.

Other objectives:

- Solve the problem of traffic congestion, which was a shock to the streets of the city of Jenin.
- To minimize traffic problems when visitors arrive in Jenin.
- To minimize environmental impacts in the city of Jenin.
- To gain more knowledge about transport planning and smart growth.

Study Plan & Methodology

To achieve the desired objectives, the study methodology is based on three main axes, which are summarized in each of the following:

✓ General and theoretical framework, which deals mainly with:
- Review concepts and theories related to the planning
- Organization of land use and transport systems
- Study of some cases and similar experiments

✓ Information framework:
- Historical, geographical, economic and planning background of the study area.

- Study the reality of land division in the city in terms of the development and distribution of uses and classification.

Analytical Framework

- Identify a region in the city that will be studied in the field and forwarded, and solutions and recommendations for the city can be suggested.
- A critical study and evaluation of the reality of the division and use of land and transportation through the development of the study area, both urban and planning.
- Identify the problems experienced by the reality of land use and transportation through various means such as questionnaires.
- Development of proposals and scenarios for land use in light of urban development.

Source of Information

The study draws its information from a number of sources, the most important of which are:

- Office resources: through research in books, references, studies, periodicals and the Internet in the topics of urban planning, land use, urban transport ... and other related topics.
- Official sources: which includes studies, reports, publications and statistics issued by the relevant ministries and official institutions such as the municipality, ministries and the Central Bureau of Statistics.
- Personal sources: Includes survey, field study, questionnaire, interviews, observations and analysis of the study area in all its aspects, in addition to the researcher's experience as an architect of urban planning.

Study Contents

The study consists of seven chapters, covering each of the following:

1. Chapter 1 is an introduction to the study and addresses its importance, objectives and methodology.
2. Chapter 2 includes the general and theoretical framework, including concepts and theories related to the subject of the study such as the cities and their planning, and the concept of land use and urban transport. In addition to some case studies.
3. Chapter 3 deals with case studies.
4. Chapter 4 discusses the diagnosis of the motives for planning urban transport and land use.
5. Chapter 5 deals with the analysis of land and transportation uses and the identification of problems for transportation and land use.
6. Chapter 6 includes proposals for the planning and development of urban transportation network and land use.

7. Chapter 7 Conclusions and Recommendations.

Chapter Two: Conceptual & Theoretical Framework

Transportation & Urban Form – Historical Overview

The history of the American metropolis within the framework of four transportation related eras: · Walking – Horsecar Era (1800 – 1890) · Electric Streetcar Era (1890 – 1920) · Recreational Automobile Era (1920 – 1945) · Freeway Era (1945 – present).(MULLER, PETER O., TRANSPORTATION AND URBAN FORM). As evident from the names, each of these era's were characterized by breakthroughs in transportation technology, which pushed the outer edge of the metropolis into a new outer zone. During the Walking Horsecar and Electric Streetcar era, the cities were compact centers of development built around railroads and ports. With the arrival of the automobile, the city size exploded as more people started moving to the fringes in search of cheaper land and housing. In the years after World War II, as the auto came within the economic reach of more citizens, jobs followed people to the suburbs creating today's multi-nucleated and dispersed metropolitan areas.(LUTRAQ) The biggest catalyst to suburban growth was the construction of the freeway system, which reached its peak during the 1960s and 1970s. The history of the Interstate Highway System shows that it was conceived by the federal and state governments without giving adequate thought to its external implications. While the transit system had already started declining, the advent of the freeways accelerated its deterioration.

the connection between transportation and land use disintegrated to such an extent that even a massive investment in the transportation system would initiate only a minor change in urban form. the main reason for this is the highly developed stage of the transportation network in the US.(THE WEAKENING TRANSPORTATION LAND USE CONNECTION) Moreover, the existing built environment cannot be expected to change over the next twenty years. people no longer consider "commute" a vital ingredient in the location of their houses or firms. They are willing to pay higher commute costs in return for larger, newer homes in the suburbs.

Due to this weakening transportation – land use connection, there is a need for local and state governing agencies to implement policies that abandon short-term mobility measures and plan for long-range accessibility measures.

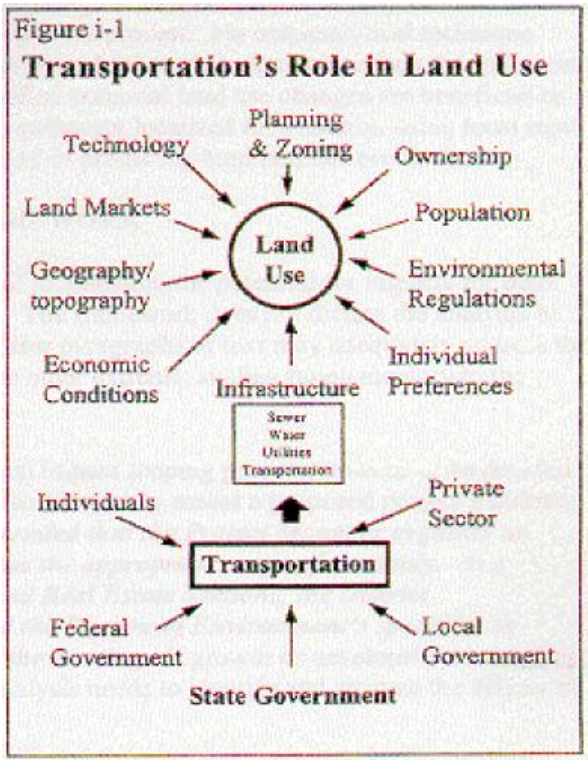


Figure 1: Transportation's Role in Land Use

Land use for transport purposes

Mobility, especially in the form of motorized transport requires an increasing share of land, both within cities and in rural areas. Cities in highly motorized countries dedicated much of their urban area for roads(LUTRAQ).
Living and transport conditions vary sharply between cities. Transport solutions have to be adapted to local conditions and needs. (Picture 1) might just as well have been taken in a US city, in which broad arteries provide space for large cars. But this type of road does not reflect the needs of the people living without a car in a non-car environment (Picture 2). What conclusion can be drawn for the priorities in urban transport policy?

Picture 1: Jakarta, Main Road Vs. Jakarta, Local Road

The simple comparisons of average road space between cities do not in themselves justify additional road infrastructure investments. Car ownership rates differ signifi- cantly, as does trip demand and travel distances. A car-oriented life-style is out of reach of most people in developing countries. It is true that private car ownership increases at high rates, as well as the demand for other motorised transport services. This leads to overload of existing roads, congestion, and environmental degradation of urban space. But international experience clearly shows that comprehensive construction programs will not be .able to cope with the automobiles' demand for road space. (Transport Policy Advice).

Planners all around the world know that car-based urban transport is not a sustainable development path – neither with respect to urban functions nor to the environment. Only public transport can assure mobility in large cit- ies. And only by preserving good conditions for walking and cycling it is possible to maintain a satisfactory level of urban quality. (Transport Policy Advice).

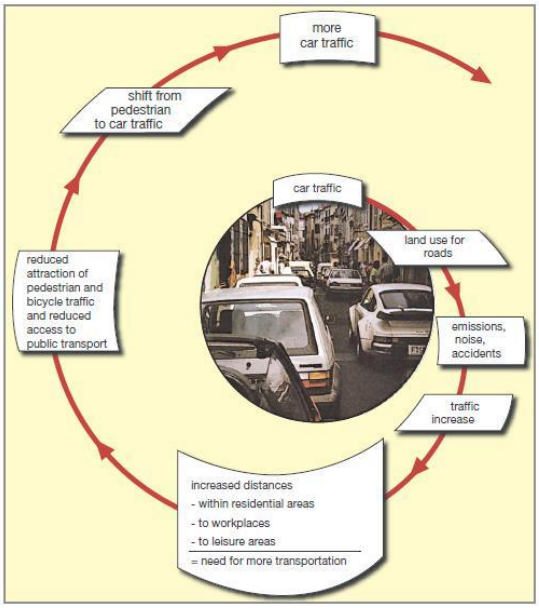
What kind of urban development and what land use planning supports sustainable transport?

Interaction between land use patterns, transport and the environment

The spatial distribution of housing, working, shopping, leisure, and other activities determines average trip distances in urban transport. High population density, as well as a mixture of land uses for various social and economic activities , maintain low distances between origins and destinations of urban trips. Conversely, low-density development and large road areas increase trip lengths and lead to a higher share of automobile trip. (Transport Policy Advice).

By influencing the spatial structure of locations in the urban environment, land use planning can contribute to a minimization of kilometers driven, and support a high transit share. Dense and mixed-use development helps to keep walking and cycling attractive. These are the most environmentally friendly transport modes. International comparative studies have indicated that there are close links between population density, motor vehicle use and per-capita energy consumption in the transport sector. Given the high specific emissions per kilometer of motor vehicles in developing countries, the amount of traffic generated by unfavorable spatial structures directly affects air quality. (Transport Policy Advice).

Further, oil consumption and greenhouse gas emissions will inevitably increase rapidly if transport and land use policies in countries follow the kind of spatial transformation which the highly motorized countries have undergone. Figure 1 illustrates the “vicious cycle” of car traffic leading to deteriorated living conditions, heading to suburbanization and transforming the rural areas into settlements, in which households are dependent on the private car for daily mobility. Increasing car use again follows the traffic spiral, when more roads are built to satisfy car commuters, transforming precious urban land into wasteland as shown in the Seattle photo (Picture 2) (LUTRAQ).



Picture 2: Traffic and land use interaction (traffic spiral) Wuppertal Institute VE-151e / 95.

These insights are based on local experiences, on the observation that congestion and travel times are ever-increasing, and on the monetary burdens caused for private and public budgets. (LUTRAQ).

Additionally, there are the concerns for the local environment, especially air pollution, noise, groundwater pollution from run-off, loss of soil functions, and loss of biodiversity. And then there are the global concerns with respect to energy resources and greenhouse gas emissions. International climate policy has begun to initiate reduction commitments, which put energy- saving land use policies on the agenda. This has contributed to a critical attitude towards the amount of automobile use – some name it automobile dependency . The Kyoto Protocol is just the beginning; future negotiations will require the developing countries to also contribute to greenhouse gas emission reductions. (Transport Policy Advice).

How can urban land use planning contribute to future responsible mobility with less emissions and energy consumption?

Managing conflicting demands for urban space

Mobility of passengers and of goods is a necessary element of social and economic interaction, forming the basis for progress and welfare by bringing talents and skills together. Division of labor increases productivity, at the cost of increasing transport activities. Migration and population growth cause additional requirements for housing and other land uses. Individualization of lifestyles and liberalization of economic activities transform into market forces which compete for scarce urban space. Livable cities need to balance economic, social and environmental requirements against limited space. Besides the competition between housing, shopping, green areas and roads within the traditional urban boundaries, there is the problem of occupying agricultural land by suburbanization of the various urban functions. Historically, cities have been located in fertile areas where agricultural production could feed the urban population (URBAN TRANSPORT (GTZ)).

Even if current agricultural production in developing countries may be sufficient in total quantity, loss of resources for nearby food production increases the volume of goods transported over longer distances. Sustainable regional development, on the contrary, would aim at the preservation of agricultural production within close proximity to the urban population. In general, regional manufacturing would provide opportunities for less transport activities, but under current transport price conditions other cost factors dominate the spatial decisions, resulting in larger production and distribution networks. (URBAN TRANSPORT (GTZ)).

Although market pressures in most countries work in favour of low-density, space-consuming settlement decisions, land-use planning should aim at creating transport-avoiding structures. (URBAN TRANSPORT (GTZ)).

Involvement of the public may support this concept, and back the decisions of planners against interest groups (URBAN TRANSPORT (GTZ)).

Mobility and transport in International Comparison

The terms “mobility” and “transport” are often equated. Mobility is reduced to movement, standing simply for the change of location and transport itself. The number of kilometers driven becomes the focus of attention and often becomes the indicator of mobility. As a consequence other options for realizing the destinations and purposes that are connected with mobility are not taken into consideration. In fact, a person driving a lower number of kilometers can be more flexible and mobile if he has to drive or even cycle/walk a lower number of kilometers for fulfilling his activities than somebody who depends on a car in order to reach his destinations. In this sense, mobility should be measured in a wider sense relating to “potential access”, rather than simply to “kilometers of movement”, (URBAN TRANSPORT (GTZ)).

Urban density and modal choice

The decisions taken in favour of one of these two major development paths do not only concern the competitive relationship between the urban transport modes, but also shape urban development beyond the transport sector. Where transport is more based on transit, a city grows differently than in a car-oriented development paradigm. (LUTRAQ).

The specific character of an urban transport system in the table ranked according to the Transit-oriented urban development aims at supporting structures which encourage public transport and discourage car use. But land use planning can only resist the spread of car use to a limited extent. This has been exemplified by the European experiences, where a degree of car-based sprawl has taken place despite land use planning efforts. (LUTRAQ).

Impact of Land Use on Urban transport at Different Scales

Property, building and site level; street characteristics

Trip frequency, trip distances and modal choice related to home, site and street characteristics have recently been analyzed in the Netherlands (Meurs/Haaijer, 2001). The type of home (flat, detached/semi-detached, terraced house, with or without garden) influences personal mobility choice, as well as street characteristics (e.g. cycle route at front door, easy or restricted parking, traffic calming). However, stronger effects were attributed to variations in neighborhood characteristics. (LAND USE PLANNING AND URBAN TRANSPORT (GIZ)).

The traditional urban housing type of “block wing tip edge building” (perimeter develop- ment) forms dense blocks along urban streets; this is still the typical configuration in and around many central districts of European cities. (Picture 3 gives an example from Berlin.) In many Asian cities this type of building prevails in quarters built up to the 1930s. Later on, line land development became the ruling paradigm of urban planners worldwide with the con squence of increasing trip lengths. (LAND USE PLANNING AND URBAN TRANSPORT (GIZ)).

The traditional road-side blocks of up to 6 floors have a number of advantages for sustain- able mobility: Immediate access from house entrance to the pedestrian walkways, and close visual as well as acoustic contact between in- habitants and the pedestrian areas which make stronger effects were attributed to variations in neighborhood characteristics. (LAND USE PLANNING AND URBAN TRANSPORT (GIZ)).

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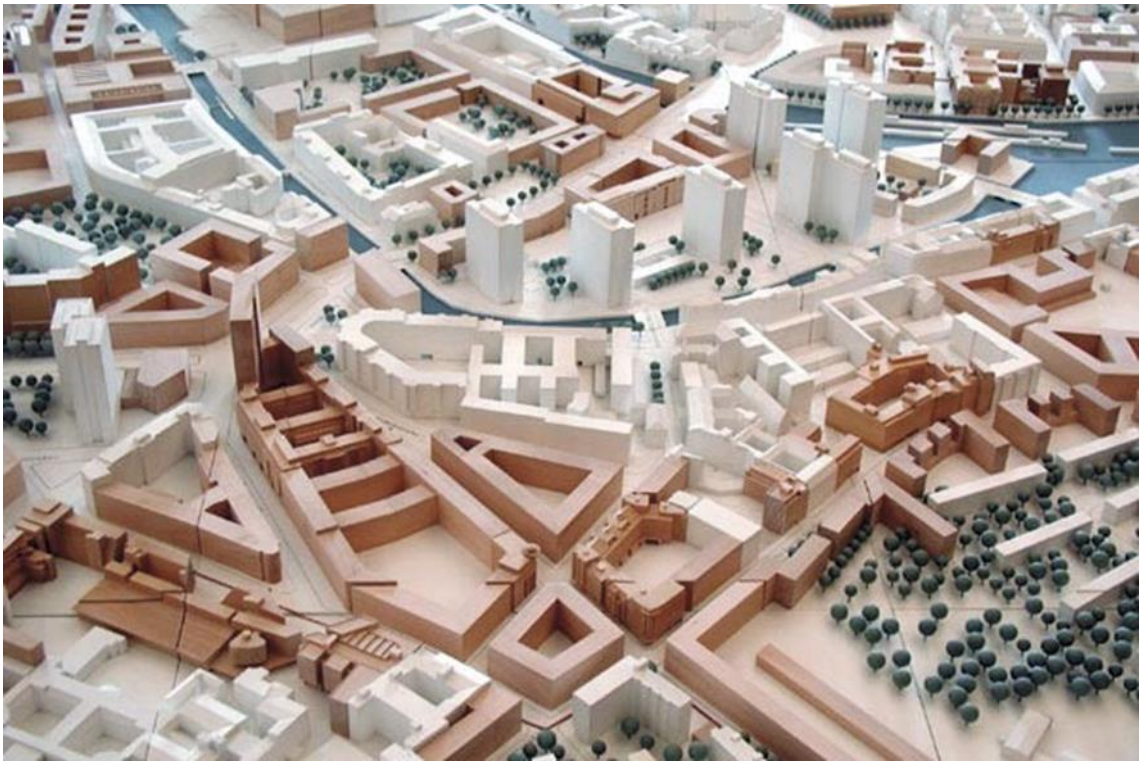


Picture 3: City of Berlin (Block wing edge buildings (Berlin) (Architectural Model))

The traditional road-side blocks of up to 6 floors have a number of advantages for sustainable mobility: Immediate access from house entrance to the pedestrian walkways, and close visual as well as acoustic contact between in- habitants and the pedestrian areas which make walking comfortable and safe. Building fronts typically are narrow, often with the combination of shops at ground level with flats on the upper floors. This type of mixed-use housing allows high accessibility to a large variety of urban functions

within short walking distances. Access to bus and tram stops is easy, too. It has been found that the longer walking distances to bus and tram stops along rows of houses are accepted where building fronts are varied. (LAND USE PLANNING AND URBAN TRANSPORT (GIZ)).

Different styles and ground floor uses are to be preferred from that point of view, rather than large front lengths and monotonous faces of buildings.

With increasing motor vehicle traffic on the roads, however, living conditions are affected by noise and emissions. Reacting to these worsening environmental conditions, designs of buildings were changed in a way that the living rooms no longer faced the streets but were turned backward. Visual contact and public safety are suffering from this development, which makes walking less comfortable and safe. (LAND USE PLANNING AND URBAN TRANSPORT (GIZ)).

In the second half of the 20th century, line land development became popular amongst architects and developers, locating buildings no longer front-by-front to the roads but at some distance from streets, surrounded by greens and bushes. (See high-rise buildings in the upper part of photo 4.) These buildings are not favorable locations for shops and services because of the distance to the street and to passers-by, resulting in increasing separation of functions. Although this site structure may improve environmental conditions, this type of development is less attractive to pedestrians, increasing average trip distances and reducing accessibility. The paradigm shift with respect to buildings has changed mobility preferences. (LAND USE PLANNING AND URBAN TRANSPORT (GIZ)).

Where the distances are growing and roads are wider, and parking lots are provided around the isolated buildings, car use becomes more comfortable than transport walking and public transport. (LAND USE PLANNING AND URBAN TRANSPORT (GIZ)).

Blocks, residential areas, city neighborhoods

Land use parameters at the neighborhood level include density (in terms of addresses per hectare) and multiple configuration of functions, with easy access to all daily destinations by foot; locations for shopping, services, leisure locations, parks, etc. Most activities are made within the residential area as very short trips. This should focus attention of transport planners on the local level. Good pedestrian and bicycle facilities, connections through blocks for non-motorized traffic, parking schemes and short distance access transit (below 300 meters) are important variables for encouraging choice of sustainable transport modes. Distance to public transport stops strongly influences mode choice. (WEGENER/FURST. 1999).

The traffic load on local streets determines the quality of living in the residential area. Traffic calming increases the share of walking and cycling. High density of homes, achieved either by small dwellings or by multi storey buildings, generates sufficient concentrated transport demand to support good public transit supply. (WEGENER/FURST. 1999).

Space requirements for different transport modes vary significantly, as already illustrated by Picture 3. This is important for considering the kind of mode to be supported by urban transport planning. In order to provide mobility opportunities for a certain amount of persons travelling, buses, pedestrians and cyclists make better use of scarce urban space than automobiles. Approximate maximum passenger flows per lane is given in Table 1. (LAND USE PLANNING AND URBAN TRANSPORT (GIZ)).

Table 1: Space requirements for various transport modes, under various operating conditions. #

Mode	Capacity Scenario (Users/Hour/Lane*)	Speed (km/h)	Space Demand (m2 per user)
Pedestrian	23,500	4.7	0.7
Pedal cycle +	5,400	12	8
Motorcycle ++	2,400	12	17.5
Car (urban street)	1,050	12	40
Car (expressway)	3,000	40	47
Bus (55 seats)	7,700	10	4.5
Bus or Tram (150 seats)	18,000	10	2
Tram (250 seats)	24,000	10	1.5
Metro rail	40,000	25	2.5

These figures are not maximum values or typical speeds for all situations, but rather present the space required, under various conditions.
The width of a lane is assumed as 3.4 m.
+ One user per pedal cycle.
++ 1.1 users per motorcycle.
All public transport modes are assumed to be 80 % full.

Car ownership inevitably requires urban land consumption even when the car is not moving, thus reducing the opportunities for other land uses. Roadside parking occupies scarce land resources needed for improved public space, bus lanes, bicycle lanes, and improved traffic flow. One passenger car requires about 10 to 15 m2 at the roadside. For parking lots one has to calculate twice as much use of land space to account for access and egress (Gorham, 1998). For a rough estimate of the accumulated land cover- age, every car can be estimated to be associated with 1.5 parking places at various locations (home, office, shopping, etc.), and two-thirds of these places can be assumed to be off street. This leads to more than 3 km2 parking area requirements for an urban fleet of 100,000 cars. (LAND USE PLANNING AND URBAN TRANSPORT (GIZ)).

Private passenger cars should park in commercially operated parking lots or garages, or on private property. Vendors should leave space for pedestrians, and bus stops also require space.

Driving behavior and speed is directly related to road design. The faster a driver is going, the higher the risk of an accident, and the more severe the consequences. In traffic situations with cars, cyclists and pedestrians sharing roads, the highest risk is on the side of the "soft targets". Figure 5 demonstrates the relation between pedestrian mortality when hit by a car and vehicle speed. Limitation of maximum traffic speeds to 30 km/hr has been identified as a suitable and cost-effective measure to reduce accident and fatality rates. (LAND USE PLANNING AND URBAN TRANSPORT (GIZ)).

Road width in residential areas should not exceed 3.5 m, to prevent drivers from going too fast. Figure 2 shows the risk of fatal injuries to pedestrians in car accidents. Road width reduction may enable provision of additional space for pedestrians and/or bicyclists.

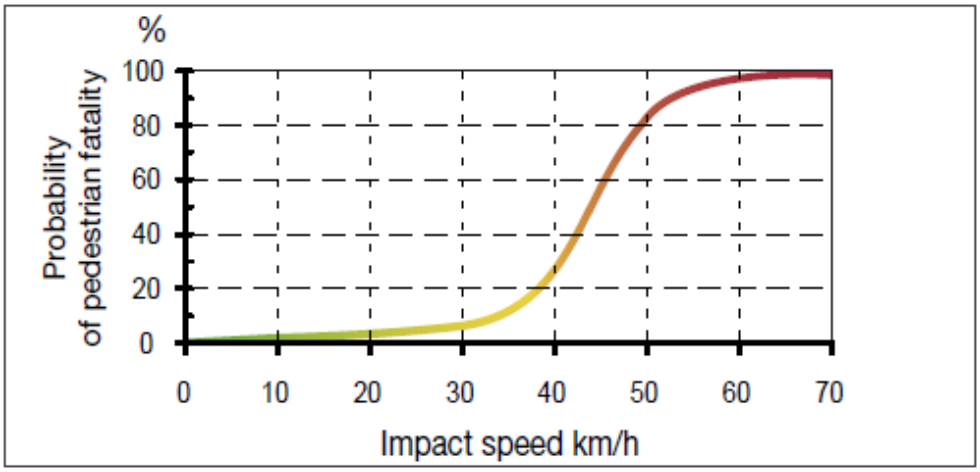


Figure 2: Probability of pedestrian fatality by impact speed. Barter et al., 2000

Average travel speed on urban roads in housing areas is in any case mostly below 30 km/h. On busy roads and in densely built areas, reduction of peak speeds via a speed limit of 30 km/h will not affect average car travel times significantly. (LAND USE PLANNING AND URBAN TRANSPORT (GIZ)).

There is a well-known relationship between the width of a road and driving speed. While in most countries the maximum allowed urban speed is 50 km/hr, wide lanes and lack of police enforcement lead to much higher peak speeds, thus increasing accident risk and especially endangering crossing pedestrians. The extremely broad road arteries for instance in Chinese cities (Photo 5) tempt car drivers into higher speeds of 80 km/hr or even more between intersections ,increasing not only risk and impact of accidents but also exhaust and noise emissions. Because road capacity restraints typically are caused by throughput at junctions, rather than by road dimension of the sections in between, road width could be reduced without negative impact in terms of congestion and travel time. This could either lead to improvements for pedestrians and cyclists, or provide options for greening along streets (Picture 5). (LAND USE PLANNING AND URBAN TRANSPORT (GIZ)).

Picture 4: A typical urban road in Shanghai. Karl Fjellstrom

Picture 5: Urban road space with green belt (Frankfurt). The green strip is the Zeil, one of Europe's premiere shopping streets. Karl Fjellstrom

Ecological quality of urban greens along roads may not be high with respect to biodiversity of flora and fauna, but there is a positive effect in terms of walking comfort and microclimate, as well as for clearing run-off waters. These advantages have to be

balanced with the road area requirements. (LAND USE PLANNING AND URBAN TRANSPORT (GIZ)).

Integrated planning and steering cultures

Integrating transport and land-use planning? How steering cultures in local authorities affect implementation of integrated public transport and land-use planning.

Integration in general concerns “the management of cross-cutting issues in policy making that transcend the boundaries of established policy fields, and do not correspond to the institutional responsibilities of individual departments” (STEAD AND MEIJERS 2009).

In the research literature on land use and transport planning, integration is viewed as a hierarchy, the first tier of which is confined to co-operation and information between sectors. The second tier involves trying to avoid conflicting objectives. This does not necessarily mean having the same objectives for different sectors, but it does mean a certain co-ordination in the planning of implementation. Co-ordination and efforts to avoid conflicting objectives are also present on the third tier, but now sectoral fields are integrated in a way which creates greater value than individual parts. The same objectives are used here for formulating various long-term plans and strategies. Representatives of different sectors work together and endeavour to create inter-sectoral synergies in the planning of implementation (STEAD AND GEERLINGS 2005).(DIVA 2016).

While policy integration should not be seen as an end in it self.To benefit public transport, the planning of urban development and of public transport itself should be integrated in such a way that new urban development takes place in locations which are good for public transport. A large customer base can be created by building densely and by intermingling housing and workplaces. In this way the traffic load during peak hours can be evened out. Central stopping points, straight runs and measures to ensure brief transit times are also needed to make public transport more competitive in relation to motorism (DIVA2016).

The need for integrated planning has, admittedly, achieved a major rhetorical impact. The new buzzwords in research literature, planning manuals and policy documents, both in Sweden and in other Western European countries, are integration of transport and land use in practical planning. National authorities in Sweden are end eavouring, through inspiration and best practices in planning manuals, to induce municipal politicians and officials to plan on an integrated basis (Tornberg 2009; Swedish Transport Administration 2010, Swedish National Board of Housing, Building and Planning 2013). But translating objectives for integrated planning into practice has proved difficult (see for example studies in Australia, the United Kingdom and the Scandinavian countries: McEldowney et al. 2007; Legacy et al. 2012; Curtis 2012; Hrelja et al. 2013; Næss et al. 2013; Smith 2013, Smith et al. 2014). Previous studies

have shown the integration of transport and land use to require careful handling of sectoral interests by politicians and officials (ISAKSSON ET AL. 2009).

Research has shown that in practice the feasibility. officials of integration is often eviscerated by conflicts between politicians and officials with rival agendas. The meaning of sustainable transport systems and urban development is differently interpreted from one sector to another and is variously “translated” by the politicians and officials concerned, depending on the context (HULL 2005: HULL 2008).

And so actual decision the context practice in the municipality can still be fragmented between different sectoral fields and affected by conflicts of interest. Research has shown that the ability of politicians and officials to create viable forms of cooperation and to achieve a consensus on objectives is often crucial but at the same time hard to achieve in practice (CONNELLY AND RICHARDSON 2004).

In summary, experience teaches us to expect conflicts between transport modes, and tension among different planning sectors and their representatives in local transport and land use planning (DIVE 2016).

The Theory of Land Use and Transport

An extensive literature review exercise identified successful land use and 'transport policies based on theories, empirical and modelling studies [Greiving and Kemper, 1999; Wegener and F~rst, 1999]. (DIVE 2016).

The review concluded that:

a. Land-use and transport policies are only successful with respect to criteria essential for sustainable urban transport (reduction of travel distances and travel time and reduction of share of car travel) if they make car travel less attractive (i.e. more expensive or slower). (DIVE 2016).
b. Land-use policies to increase urban density or mixed land-use without accompanying measures to make car travel more expensive or slower have only little effect, as people will continue to make long trips to maximise opportunities within their travel cost and travel time budgets. However, these policies are important in the long run as they provide the preconditions for a less car-dependent urban way of life in the future. (DIVE 2016).
c. Transport policies that make car travel less attractive (more expensive or slower) are very effective in achieving the goals of reduction of travel distance and share of car travel. However, they depend on a distribution of homes, jobs and services which are not too dispersed. In addition, highly diversified labour markets and different job locations of workers in multiple worker households set limits to an optimum co ordination of work places and homes. (DIVE 2016).
d. Large retail and leisure facilities that are not spatially integrated in the urban area increase the distance travelled by Car and the share of car travel. Land-use policies to prevent the development of such facilities ('push') are more effective than land-use policies aimed at ‘promoting high density, Mixed-use development (‘pull). (DIVE 2016).

e. Fears that land-use and transport policies designed to constrain the use of cars in city centers are detrimental to the economic viability of city centers have in no case been confirmed by reality (except in cases where at the same time massive retail developments at peripheral greenfield locations have been approved). (DIVE 2016).
f. Transport policies to improve the attractiveness of public transport have in general not had a major effect on the reduction of car use. They have attracted only little development at public transport stations, but contributed to further suburbanization of population.

The Administrative and Legal Provisions Influencing Integrated Land Use and Transport Planning

Following a literature review of planning policy in each of the 15 European countries, member states were grouped into one of three categories according to their degree of co-ordination and integration of transport and land use planning. This enabled a framework to be applied later in the project to evaluate the transferability of instruments and best practices, especially considering the wide variations in administrative and planning structures in the European countries. The analysis showed that regional planning represents an important issue for coordinating and integrating transport and land-use planning in a horizontal direction (between planning departments and organizations at the local level) and in a vertical direction (between planning guidance and policy at the national, regional and local levels). Regional planning is therefore a key factor in the categories. As far as the local level is concerned, most member states include an institutionalized municipal planning level with binding land-use plans as important prerequisites for the co-ordination and integration of land-use and transport planning. (TRANSLAND (2000) FINAL REPORT (FOR THE EC)).

Category A: Horizontal and vertical co-ordination of transport and land use planning
Institutionalized regional planning with regional plans
Binding effect of regional plans or binding impact through directives or guidelines
Regional planning is the responsibility of a regional planning authority with powers in planning, decision-making and policy implementation in transport and land-use issues. The regional planning authority sets the basis for formal co-ordination as a framework for local departments and stakeholders. Vertical co-ordination is by regional planning, either through binding plans, directive powers or binding guidelines. Horizontal integration of land-use and transport issues takes place at the regional level as well as at the local level in comprehensive spatial plans. (TRANSLAND (2000) FINAL REPORT (FOR THE EC)).

Category B: Horizontal co-ordination of transport and land use planning
Institutionalized regional planning without binding effects at the local level Similar to the first category, regional planning institutions are responsible for regional planning. In countries of this category regional planning cannot influence local planning through

binding plans, directive powers or binding guidelines. Therefore, fulfilling regional objectives in local plans relies on voluntary forms of co-ordination. (TRANSLAND (2000) FINAL REPORT (FOR THE EC)).

Category C: Co-ordination of transport and land use planning only at the local level
No institutionalized regional planning and/or regional plans This category includes countries where institutionalized regional planning is weak or absent, making co ordinated action difficult. Due to their informal character, regional plans do not have any binding effect on local plans .Therefore, local plans play an important role in integration. (TRANSLAND (2000) FINAL REPORT (FOR THE EC)).

Chapter Three: Case Studies

Twenty-six case studies based on transport and land use integration were analysed to review the state of the practice. They were selected on the basis of their interactions between land-use and transport at the urban-regional level both in terms of study of the effects and in terms of co-ordination of planners and policy makers. The selection process gave particular emphasis to case studies which were innovative. (TRANSLAND (2000) FINAL REPORT (FOR THE EC)).

Case Studies

Twenty-six case studies were chosen on the basis of

• Country:

Denmark (1), Italy (2), France (5), Great Britain (4) Germany (6), Spain (1), Sweden (1) and Switzerland (2), Portugal (1), Netherlands (3).

• Territorial scale:

Local area (2 cases), regional or metropolitan areas (in 6 cases), urban areas (in 8 cases), central cities (2 cases) and parts of an urban area (in13 cases).

• Size of urban area:

From less than 100 000 inhabitants to more than 2 million inhabitants;

• Level of implementation:

Case studies already implemented with monitoring data available enabling assessment of their effects and case studies still in the development phase without monitoring data;

• Integration between transport and land use:

• Good practices and bad practices:

Bad practices were included, as a way of illustrating what should be avoided. In addition, some of the cases of good practice also highlight factors that should be eliminated to make the implementation more successful.

(TRANSLAND (2000) FINAL REPORT (FOR THE EC))

Of the twenty-six case studies, 12 were studied in detail using interviews with the local authorities in charge of the case studies. The remaining 14 were difficult to analyse in detail, generally because the case studies that had not yet been fully implemented. The analysis of these case studies relied on published information and a limited amount of contact with some key decision makers .Tables 2 and 3 summarise the 26 case studies. (TRANSLAND (2000) FINAL REPORT (FOR THE EC))

Table 2: Summary of Case Studies Analyzed in Detail

Case Study	Country	Main Feature of Case Study
ABC Policy	Netherlands	The ABC location policy aims to match the mobility needs of businesses and services with the accessibility of different locations
Cycle Town Gavle	Sweden	A large level of investment has been made to improve cycle facilities and cycle modal share in a low density urban area.
Madrid	Spain	Creation of a regionalized planning department whose aim it is to promote the image of the city as a metropolitan region instead of 7 separate towns, whilst turning it into an integrated, efficient, and equitable community.
Messestadt Riem	Germany	Redevelopment of the former Munich airport as a mixed use, mostly independent and attractive distdct.
CentrO Oberhausen	Germany	A bad practice example of an urban entertainment and shopping centre that is mainly car oriented. However, a former freight railway line was converted to a public transport line for buses and light rail, offering a new public transport station
Potsdam- Kirschsteigfeld	Germany	A new community for about 7.000 new residents and 5.000 employees. This mix is concentrated at a new light rail-station.
Rennes	France	A long standing practice of regional urban planning in

		Rennes. The region also has fiscal harmonization of local taxes for companies.
Rome	Italy	The "Gates of Rome" project aims at increasing the rail mode within the metropolitan area through the creation of a series of node railway stations scattered around key access gates to the city. Institutional arrangements allow good co-ordination between the local authorities.
Strasbourg	France	A strong transport policy aimed at reducing car use and promoting bus and cycle journeys is operating in the city centre. The policy includes a complementary development plan.
Toulouse	France	Development of integrated planning at the urban level and the initial stages of a regional approach.
Vaud Geneva	Switzerland	Regional land use and transport policy concerning a network of three cities: Lausanne, Neuchatel and Montreaux. The approach is to co-ordinate land use and transport policies around railway stations for easier access for non-car modes.
VINEX Dwelling Locations	Netherlands	Urban development around a rail line in Twente is anexample of the Dutch housing criteria of high-Locations density settlements, distance to urban agglomerations and public transport accessibility.

Table 3: Case Studies Analysed In Less Detail

Case Study	Country	Main Feature of Case Study
Basel	Switzerland	An example of integrated land use and transport planning and strong promotion of public transport.
Bilbao	Spain	The city has agreed upon the creation of a public private partnership, Bilbao Metropoli - 30, to coordinate and implement the strategic plan for the revitalization of Bilbao.
Bologna	Italy	Car restriction in Bologna's historical centre. The project seeks to increase mobility through public transportation, cycling and walking and to raise the quality of life.
Camden	United Kingdom	Car free housing is part of Camden's Green Transport Strategy. This strategy contains many initiatives outlined in the Government's White Paper.
Greater Copenhagen	Denmark	Long term promotion of public transport and the protection of green space between the fingers. This illustrates the importance of a consistent policy towards regional and local land use and transport planning.
Edinburgh	United Kingdom	Car free residential housing
Euralille	France	A new business district in Lille with close links to the Channel Tunnel and a new TGV station.
Fraiburg Rieselfeld	Germany	An example of environment-oriented urban land use and transport planning in Germany. Recently a new tramway line was constructed simultaneously with a new residential development (Fraiburg Rieselfelder). Mixed use is concentrated at the tramline in the center of this district, connecting "Rieselfeld" with the city centre of Freiburg.
Groningen	Holland	Groningen Structure Plan. Groningen is one example of the 'compact city' structure now promoted in Dutch landuse policy. Cycling policy plays a major part and the concentration of institutions and employment-intensive development near the station is being strengthened. New housing areas are located near the city centre
Manchester Metrolink	United Kingdom	Phase 2 of the Manchester Metrolink at Salford Quays is agood example of integration between land use and transport. Allocating space for public transport during the planning phase makes public transport more effective.
Nantes	France	The effects of a light public transport network on modal split linked with an urban policy on public space.

Poundbury	United Kingdom	Poundbury as social housing mixed with private housing, as well as office, shops and light industrial uses. The development has been innovative, putting built form and urban space ahead of traffic requirements.
Saalepark	Germany	Saalepark is a new shopping centre where the only opportunitiy for using modes of public transport are shuttle-buses. In 1993 about 91.6% of the visitors travelled by car. It is an example of bad practice.
Tubingen Sudstadt	Germany	An example for re-using a military residential area in order to develop a mostly independent, mixed use district inTubingen. Primary aims of the reorganization are short walking distances between dwellings, shops, workspaces and social facilities for the new inhabitants.

Best Practice and Transferability

In Transland an attempt was made to define best practice. In the context of Transland, 'best practices' were 'good practices' that worked successfully in a wide range of situations and were shown to produce results satisfying integration and sustainability objectives. It was considered that an important dimension to best practice was that it should be transferable to other cities and countries, with differing geographic and institutional backgrounds. For the purposes of the Transland project, sustainability was mainly seen as the promotion of environmentally friendly modes, and their accessibility for different social groups, while reducing dependence on the private car. (TRANSLAND (2000) FINAL REPORT (FOR THE EC)).

A multi-criteria analysis was used to identify best practice from the twenty-six case studies. The first part of the analysis included a group discussion with experts and practitioners who attended the Transland Workshop based on a list of questions concerning best practice. The second part of the analysis was based on inputs delivered by experts concerning the definition of best practice, and the third part was the evaluation of case studies based on a questionnaire. (TRANSLAND (2000) FINAL REPORT (FOR THE EC)).

Determining best practice based on a five-level-framework

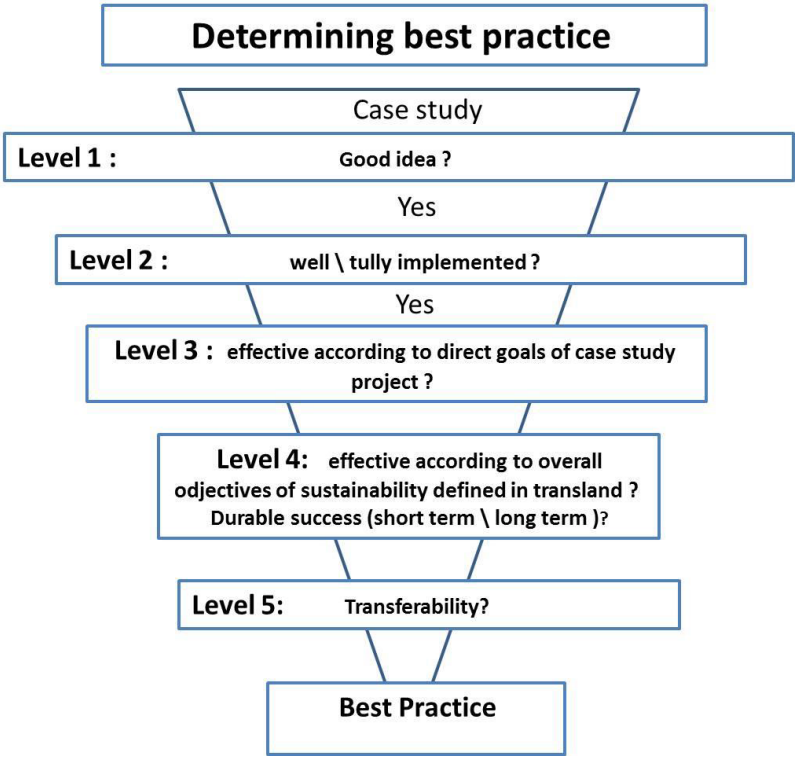


Figure 3: Every case study was examined on a five-level-framework

The five-level-framework was useful as a 'filtering down' process of case studies. Only case studies that were successful in every one of the five levels were considered as best practice. Other case studies remained on a level between 1 and 5. The following figure provides an overview of the 'filtering down' process of the twenty-six case studies. (TRANSLAND (2000) FINAL REPORT (FOR THE EC)).

Results of Best Practice Analysis

Level 1: Good idea?
Twenty-one of the case studies examined have a good concept with respect to the goals defined in Transland. Three of these case studies remain at level 1 because implementation has not yet taken place: Rome, Bilbao, Canton de Vaud / Canton Geneve. Four case studies show an idea which cannot yet be estimated as successful in reaching the goals set out in Transland: Toulouse, Basel, Saalepark and Greater Nantes. (TRANSLAND (2000) FINAL REPORT (FOR THE EC)).

Level 2: Well / fully implemented?
19 case studies reached this level. All of these case studies are well implemented with at least important building stages finished. Six case studies remain in level 2 because although they are implemented, their effectiveness in achieving their objectives cannot yet be measured. These case studies are: Camden, Edinburgh, VlNEX dwelling location,

Poundbury, Messestadt Riem and Rennes. (TRANSLAND (2000) FINAL REPORT (FOR THE EC)).

Level 3: Effective according to direct goals of the project?

Thirteen case studies reached this level. Whilst well implemented the case study CentrO did not achieve its stated objectives. Five case studies remain in this level because they are evaluated only as successful according to the goals of the project; successful promotion of sustainability cannot be seen at this stage of implementation. These case studies are: Strasbourg, Freiburg- Rieselfeld, Tubingen-Sudstadt-Suedstadt, Potsdam-Kirchsteigfeld and Madrid. (TRANSLAND (2000) FINAL REPORT (FOR THE EC)).

Level 4: Effective in overall objectives of sustainability?

Seven case studies passed level 4 of the framework for determining best practice. Two cases remain in this level: ABC-policy and Greater Copenhagen. ABC-policy refers to a specific planning process while the Finger Plan of Greater Copenhagen is the product of an ongoing vision which has lasted for 50 years. Because of their very specific framework, transferability to other countries may be difficult. Transferability could be possible if some fundamental changes in the planning framework of other EUcountries took take place. (TRANSLAND (2000) FINAL REPORT (FOR THE EC)).

Level 5: Best practice case studies being transferable Five case studies succeeded in passing the five levels of the framework for determining best practice. These case studies are Gavle, Manchester Metrolink, Bologna, Euralille and Groningen. But it is important to note that except Groningen, these case studies are mainly successful in promoting sustainable transport, although they considered aspects of land use. (TRANSLAND (2000) FINAL REPORT (FOR THE EC)).

Conclusion

To evaluate best practice in the field of integrated transport and land use Planning twenty-six case studies were chosen. Special consideration was Given to case studies with innovative policies. A range of case studies were Chosen depending on country, territorial scale, size of urban area, level of Implementation, integration between transport and land use, and good practices and bad practices. Five case studies were chosen as best practice; Gavle, Manchester Metrolink, Bologna, Euralille and Groningen. Of these case studies, all except Groningen are mainly successful in the field of transport. Elements of transport planning could be realized and shown to be Successful in the short run, whilst the success of land use planning is more Difficult to assess as its effects can only be measured in the longer term. (TRANSLAND (2000) FINAL REPORT (FOR THE EC)).

As part of the evaluation of best practice evaluation, transferability was considered. The results of case study examination shows that most successful elements are transferable. However, no project or planning approach is completely transferable. A precondition for

transferability is, in some cases, the structure of locations. Some elements of best practice are mainly transferable to the same structures, e.g. connection to attractive public transport depends on an existing nearby network of public transport, whilst other elements of best practice can be implemented elsewhere e.g. implementation of an infrastructure which promotes cycling could be implemented in existing structures as well as locations being newly developed. Most of the elements of best practice are transferable to other EU countries, mainly to countries of category A and B according to their planning framework. (TRANSLAND (2000) FINAL REPORT (FOR THE EC)).

Another important finding is the role of 'soft' policies for success of integrated transport and land use planning. Most of the innovative planning approaches examined include 'soft' policies to ensure the acceptance of measures and influence citizen's behaviour, for example, citizens' participation was identified as a key factor to success. The best practices identified show that good spatial organisation linked by a well balanced transport network can a precondition for enabling sustainable mobility. (TRANSLAND (2000) FINAL REPORT (FOR THE EC)).

Case study (2): Ways to better integrate land use planning and Public transport. Case studies from Sweden.

About the study

Aim:
• to identify critical factors for a successful integration of public transport and land use planning in the local urban context

Focus:
• formal and informal institutional conditions in the local planning and decision making process

Institutional conditions:
“Institutions are the humanly devised constraints that structure political, economic and social interaction. They consist of both informal constraints (sanctions, taboos, customs, traditions, and codes of conduct), and formal rules (constitutions, laws, property rights).” North 1991, p 97

Method:
• A qualitative case study
• Three medium-sized Swedish cities
• Three illustrative examples:
Östra Lugnet in Växjö
Kristianstadlänken in Kristianstad
Grundviken in Karlstad
• The study was funded by SKL, carried out 2012-2013

Research questions:

• What goals and visions have been formulated regarding the role of urban transport in urban development in the three cases?
• How were these goals and visions operationalized in the planning and decision making processes?
• What critical situtions appeared in the processes? How were they managed?
• What was the end result of each process?

Östra Lugnet/Växjö

• New housing area, 750 new dwellings
• Mixed development
• The planning process started 2005
• High ambitions to integrate public transport (PT) and land use planning
• Municipal comprehensive plan from 2005 emphasising the importance to explore conditions for PT early
• The old railway as a potential structure for PT
» In the end the old railway turned into a biking lane. Buses can not go through the area.

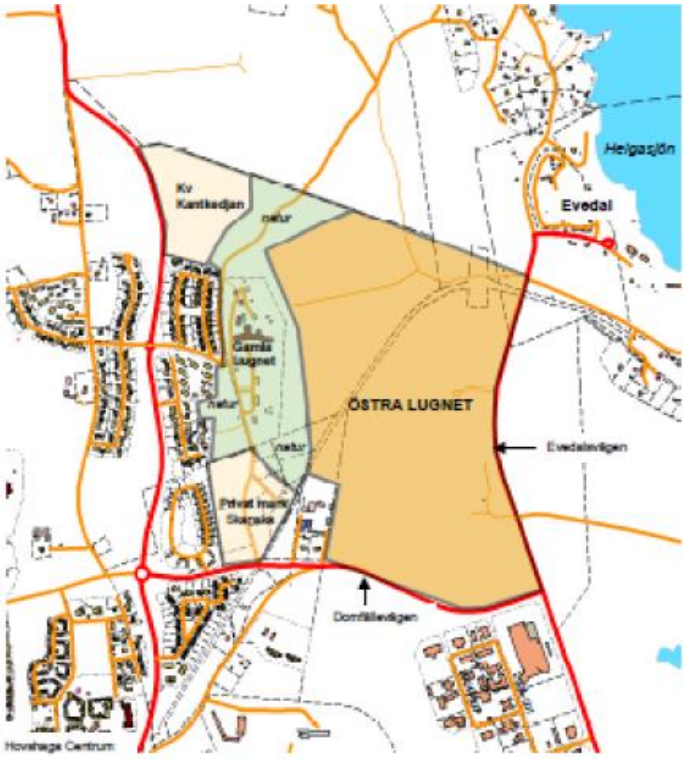


Figure 4: Källa: Växjö kommun

Key features of the planning process:

• PT competence not represented in the core project team.

• Time pressure in the detailed planning process.
• Urban design principles emphasising high density, narrow streets and local traffic safety.
• Conditions for public transport were not explored in detail until at a very late stage in the process.
• Unclear who had the responsibility for the integration of PT in this project.

Figure 5: Källa: Växjö kommun

• A new bus route through the central parts of Kristianstad.
• Aim: to reduce travel time through the city centre, increase bus frequency by better coordinated local and regional buses.
• Under construction.

Figure 6: Källa: Kristianstad kommun

Key features of the process

• The project was based on a idea formulated jointly by the city and the region.
• Comprehensive study 2003/2004.
• Joint letter of intent 2006.
• Several years of investigations.
• Decision by the municipal board 2010.
• Local resistance 2010-2011 almost stopped the project.
• Complementary investigations and a local information and communication campaign needed to regain political support.

Grundviken/Karlstad
» Part of a larger development project.
» 500 new dwellings.
» Mixed development, dense urban design, eco-friendly profile.
» Connected to Karlstadsstråket.
» Comprehensive plan for the area 2009, detailed development planning 2012- 2013.

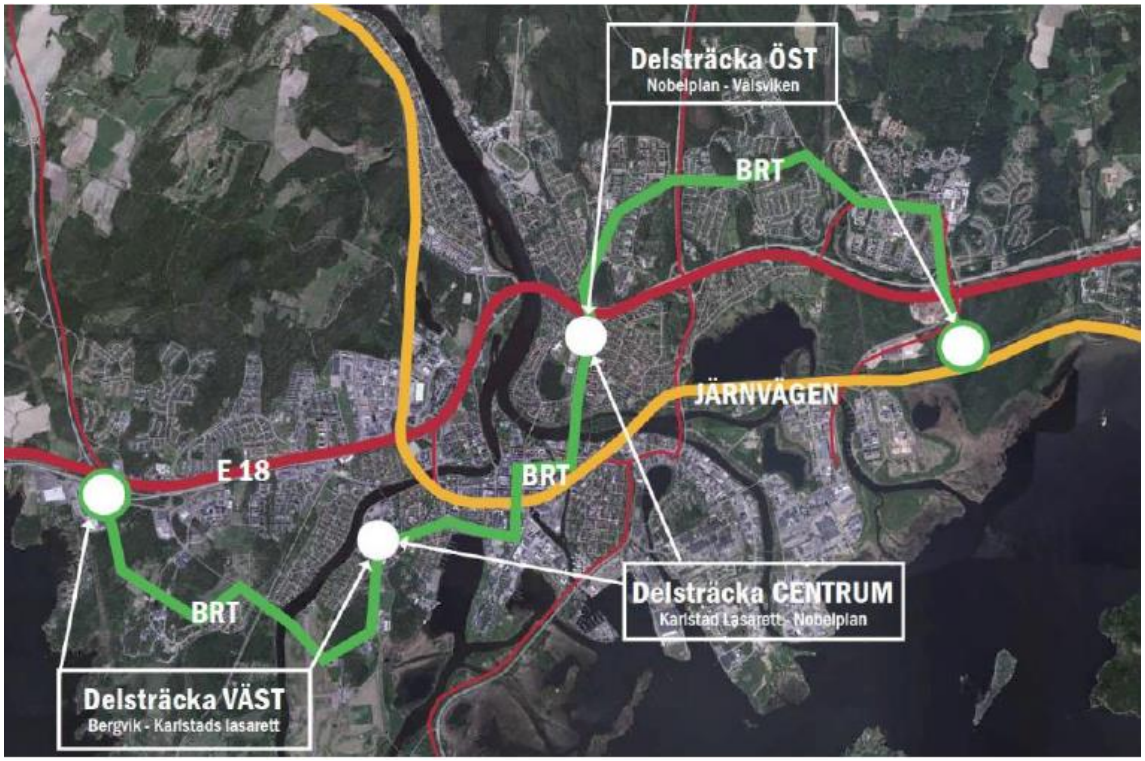


Figure 7: Källa: Karlstad kommun

Key challenges in the three cases:

» The role of strategic goals, visions and strategies.
» Are there any clearly stated goals and visions expressing a political ambition for PT and/or sustainable transport?
» How are these being operationalized in concrete standards and guidelines?
» How are they being communicated and embedded locally (local residents, stakeholders etc)?
» What happens in the local planning process.
» In the case of goal conflicts – how are these supposed to be managed?
» How are varioes competences being coordinated and integrated in the local planning process?
» Everything can not be solved with new formal arrangements. It is very much a matter of mindsets and culture.
» The link between local, regional and national perspectives.
» The cases are not only of local importance, but also of regional importance.
» How can regional and national actors work to support local planning administrations in these situations? (In a way that really makes a difference).
» A need for new arenas, routines and processes to support a better integration between PT and land use planning.

Concluding reflections

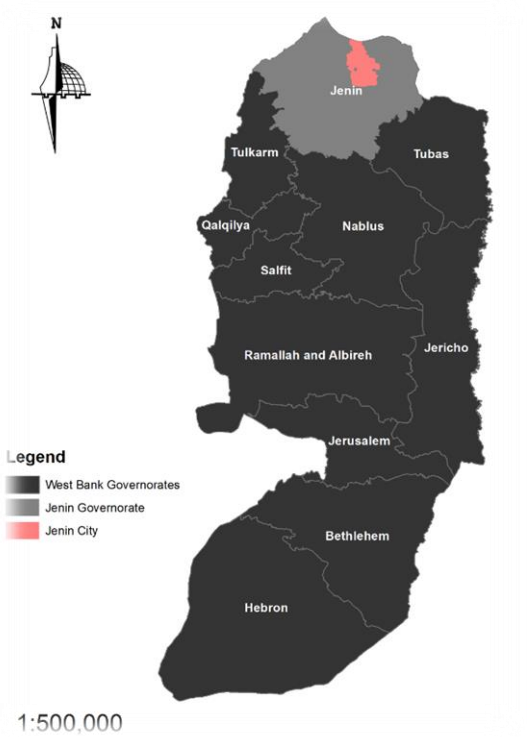
• A combination of formal and informal institutional conditions structure the integration between PT and land use planning.
• ”Everybody knows” it is important. But who is supposed to take the lead to safeguard a good integration? How can it be done? What forms are there today and how can they be further developed?
Critical:
• Building knowledge among players who drive land use development.
• The link and dialogue between strategic and operative level.
• The link and dialogue between actors between various administrative levels.

Chapter Four: Site Analysis

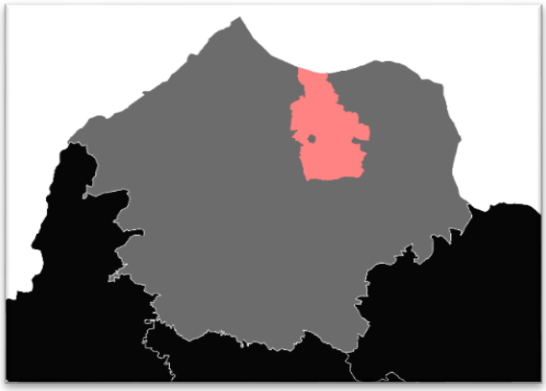
Picture 6: Zayed Intersection

Study Area Diagnosis

Jenin city importance: “Why Jenin city for the project”



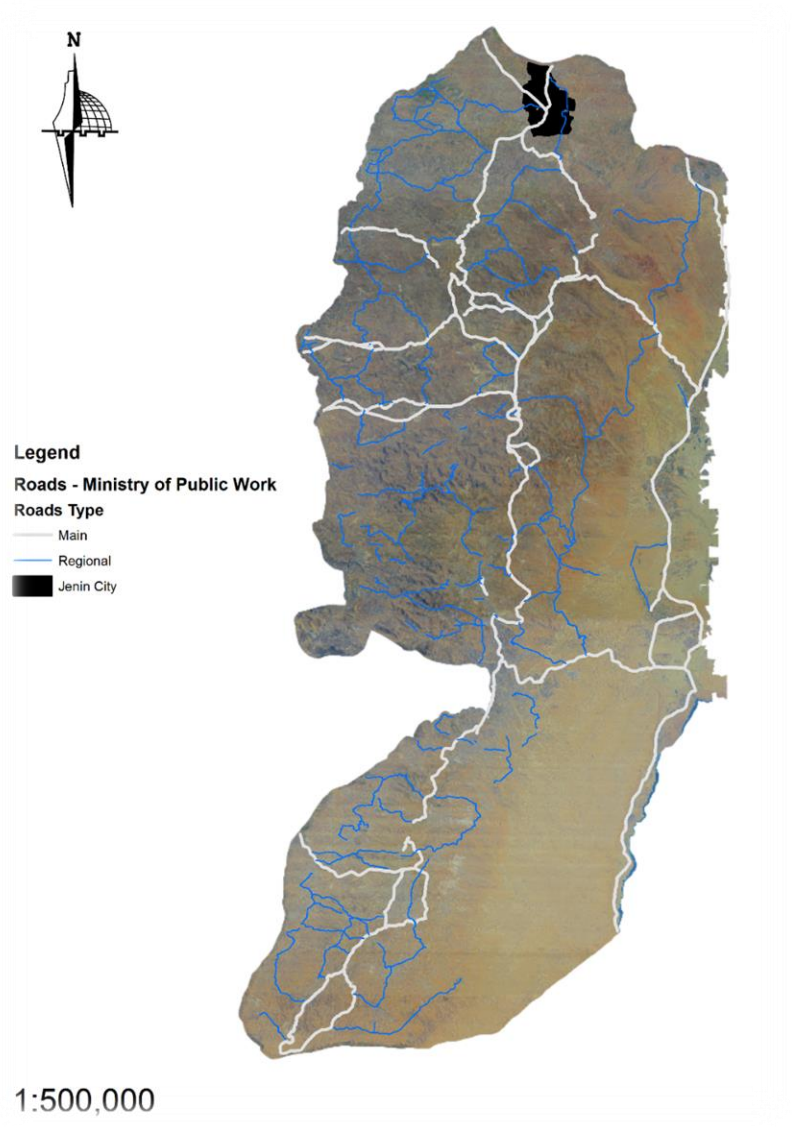
Map 3: Jenin governorate & city location according to other West Bank governorates



Map 4: Jenin City - Red Hatch

Picture 7: Nablus Road

Due to the geographical location of the city of Jenin as a link between the entrance of the West Bank and the occupied interior, a challenge was placed in front of the city of Jenin to modernize traffic in front of the huge number of cars entering the city every day.



Map 5: Roads - Ministry of Public Work

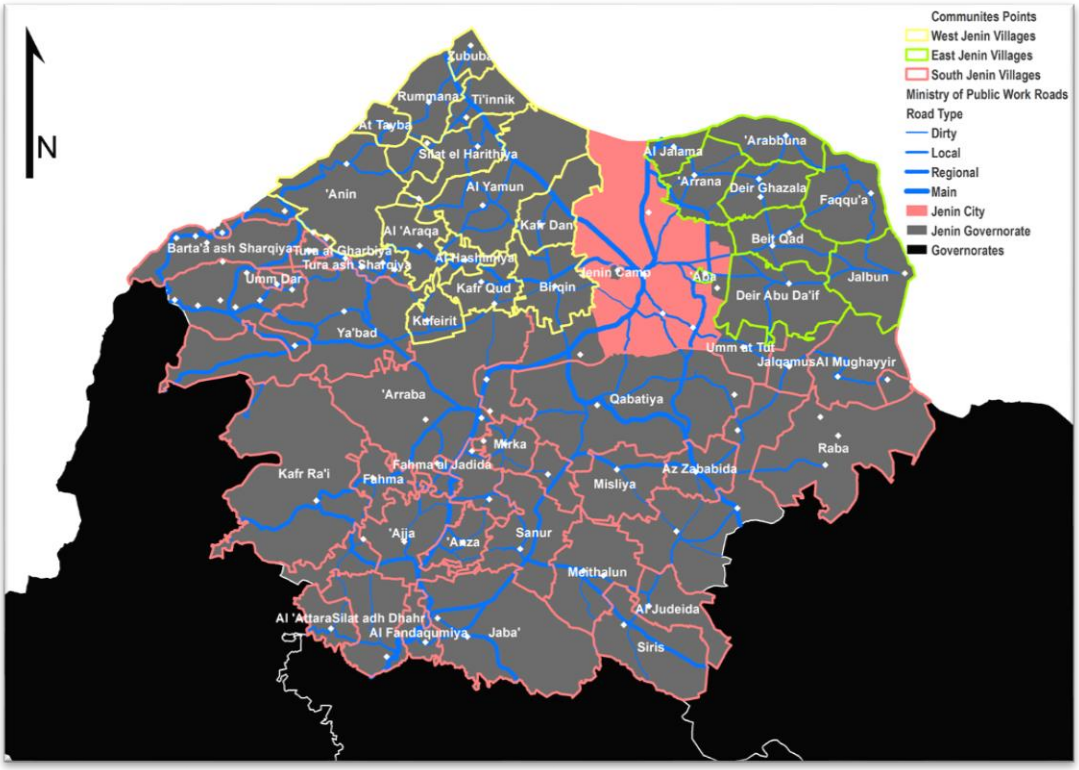
West bank governorates connected by main and regional roads

" Jenin City location "

There is a main road linking Jenin city with Nablus city

This is a positive point for the governorate, where it is easy to reach the regional center for the northern West Bank

Note: This Classification by Ministry of Public Work



Map 6: Communities that connected to Jenin city

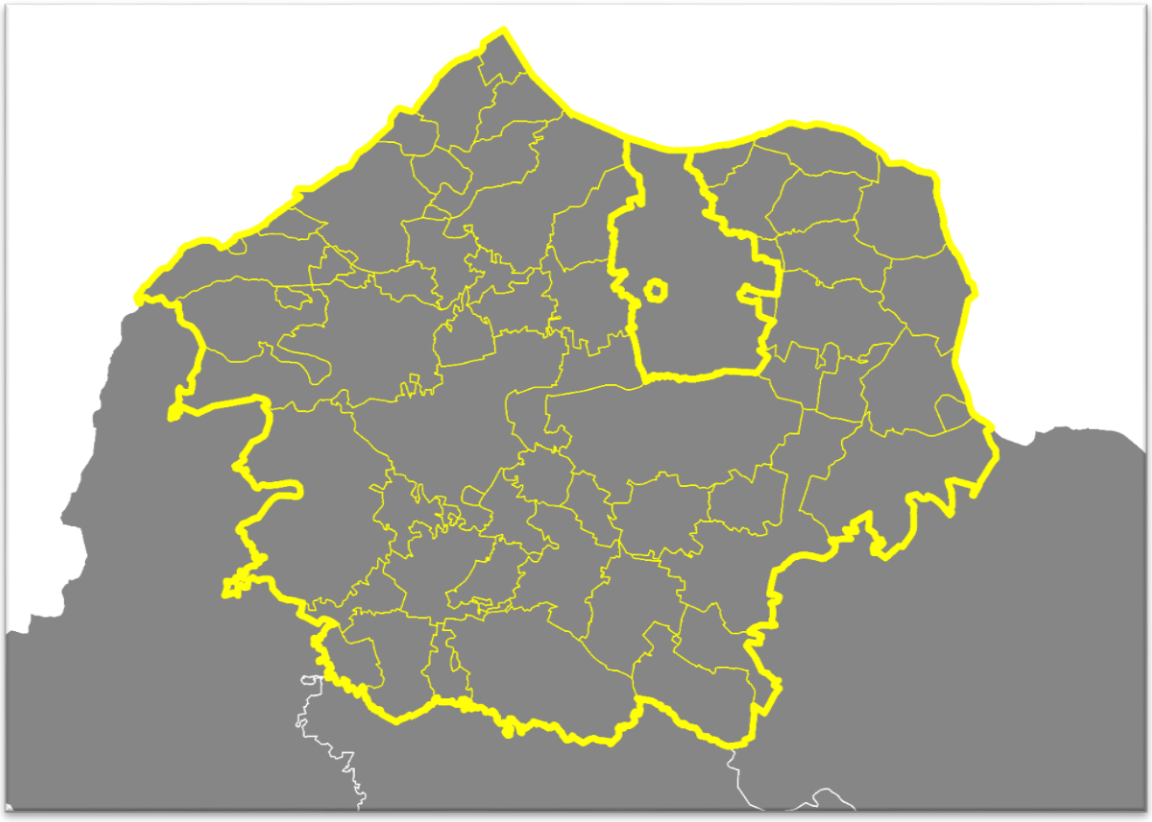
An enormous number of rural communities are linked in Jenin, which is an important reason for organizing traffic for cars entering and leaving Jenin, especially at the northern, southern and western entrances.

Why Jenin City for the Project?

Picture 8: Al-Cinema Intersection

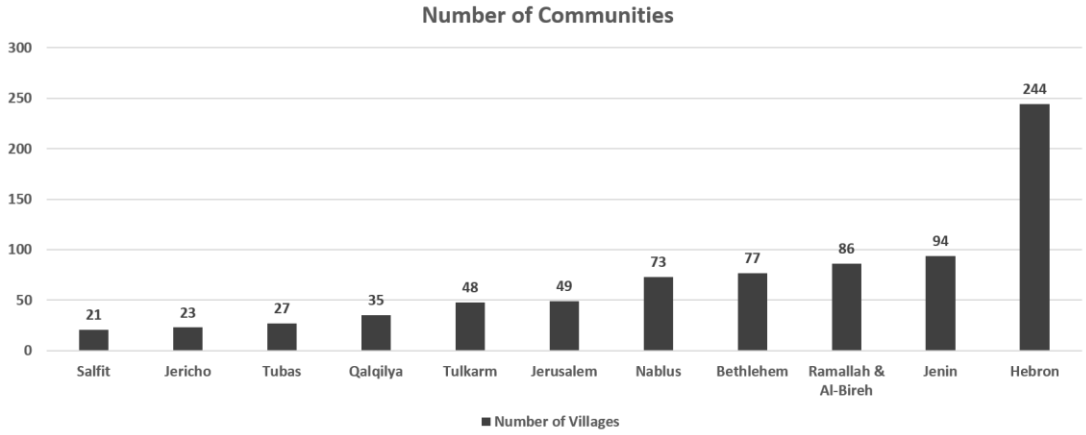
The Importance of The Geographical Location of The City of Jenin

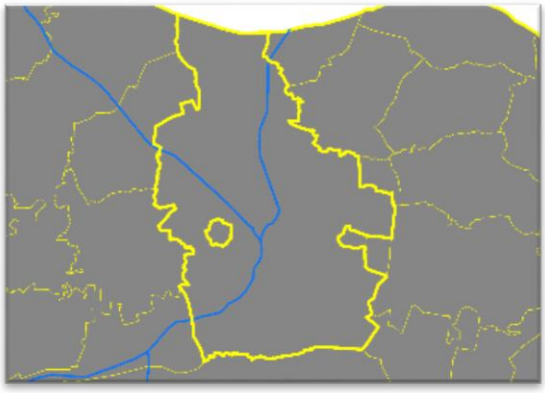
Picture 9: Nablus Road



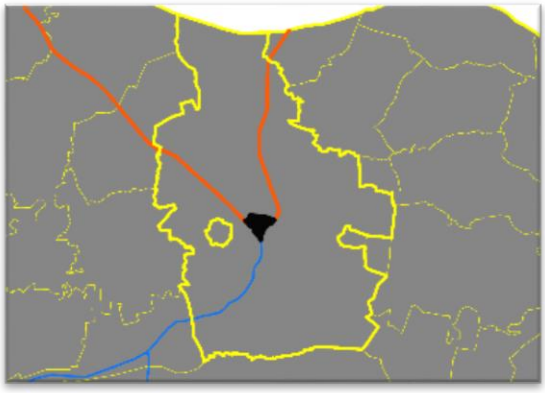
Map 7: Communities Belong to Jenin Governorate

Number of Communities = 94

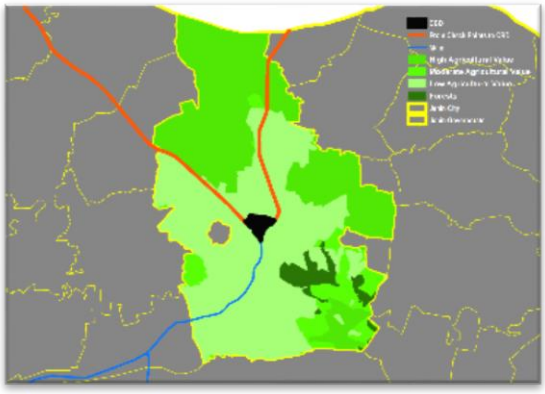




Map 8: 2 Regonal Roads Importance



Map 9: 2 Roads Linked Jenin City with Check Points

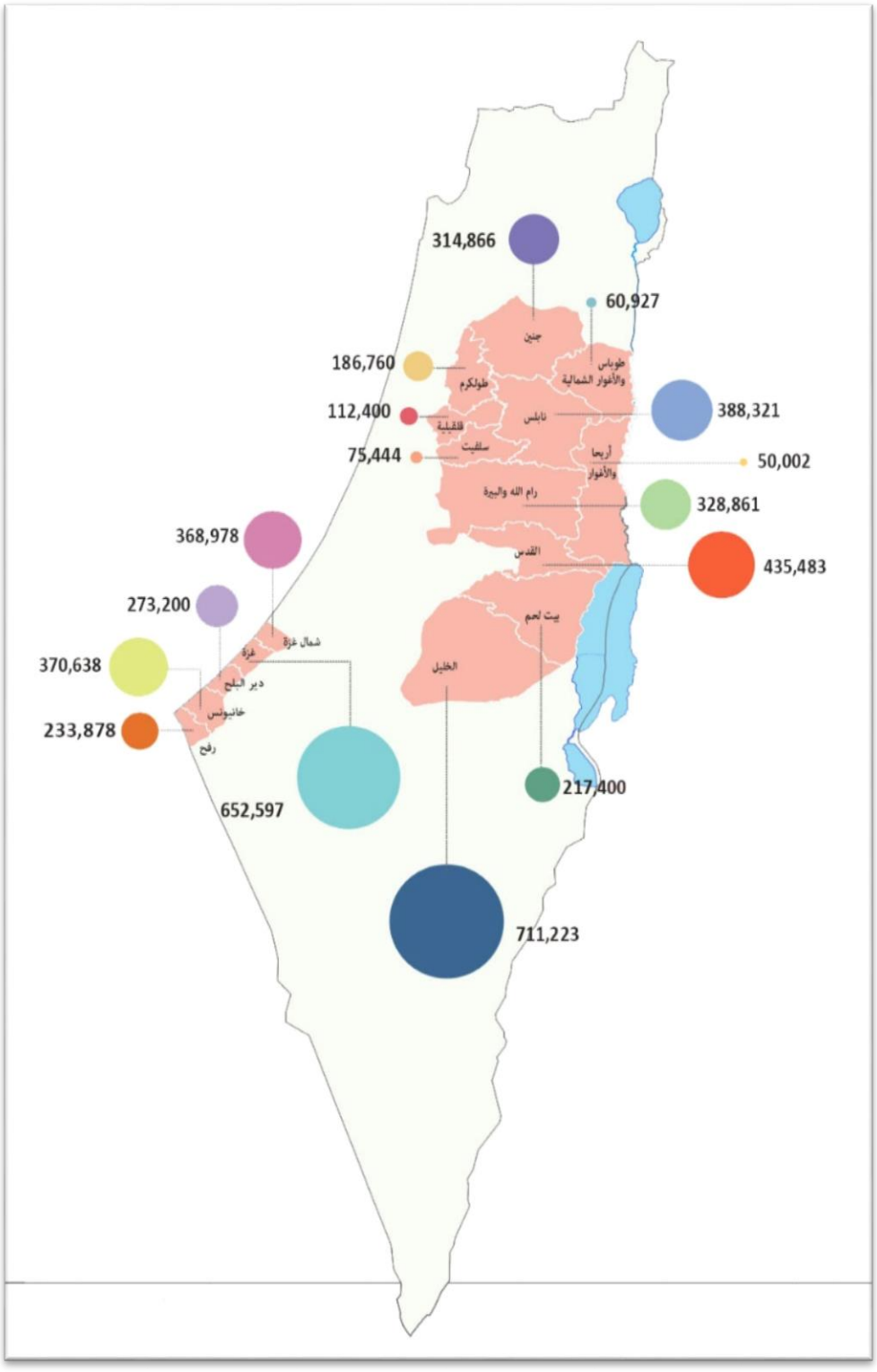


Map 10: Jenin Agricultural Land

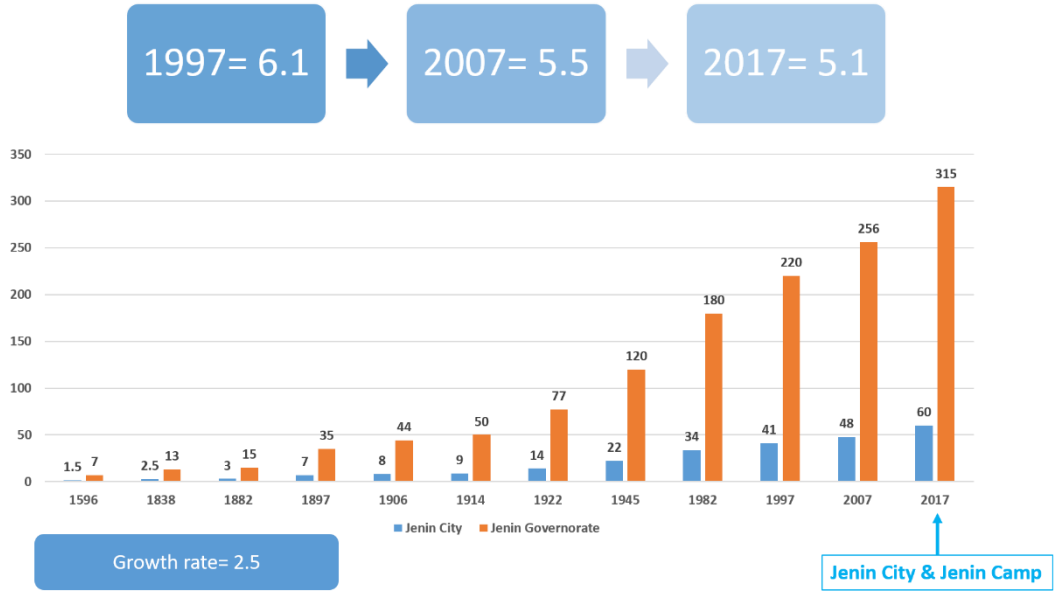
Population Density and Construction is increasing dramatically (Urban Sprawl of Jenin City)

Picture 10: Urban Sprawl in Jenin City

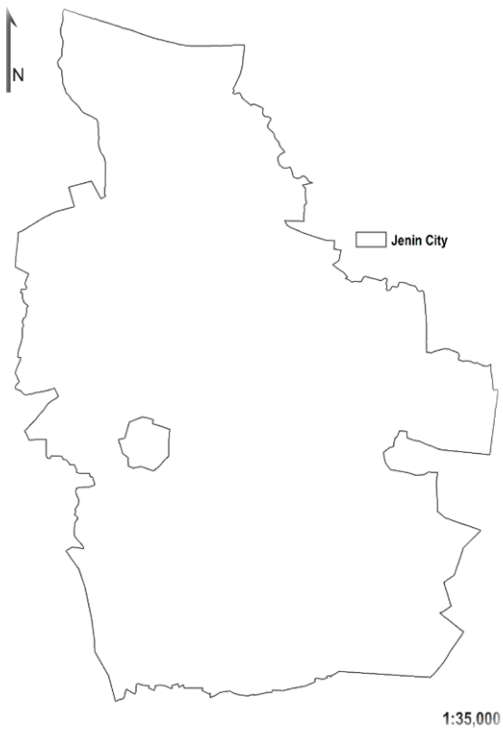
Fourth highest governorate in terms of population after Hebron, Jerusalem and Nablus



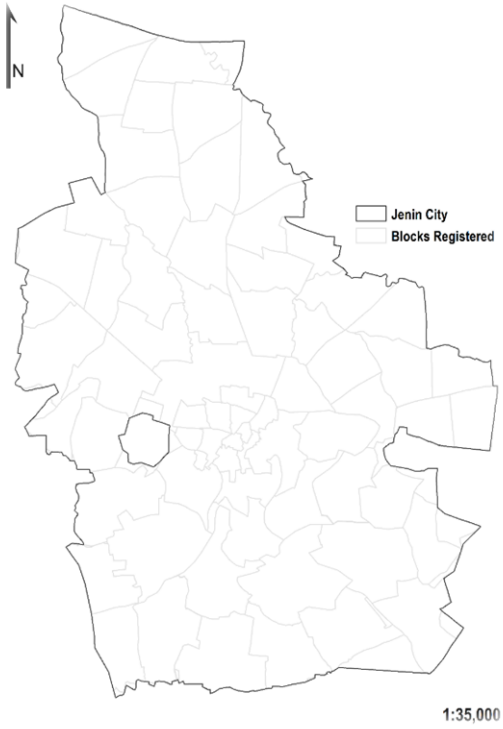
Map 11: Population in West Bank



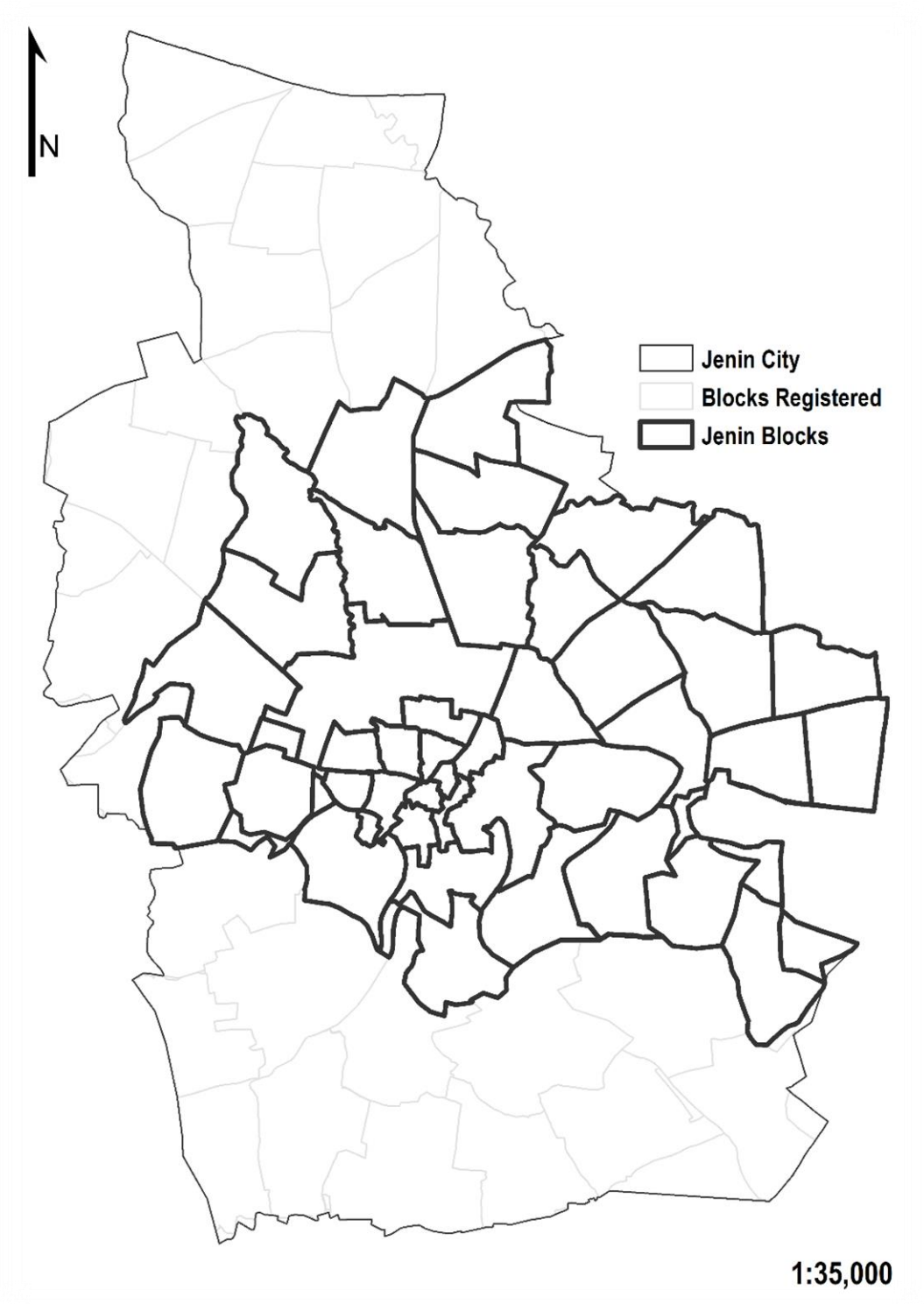
- *Al-Sibat (Old Town) 1800*
- *West Neighborhood 1920*
- *Jenin Camp 1948*
- *East Neighborhood 1950*
- *German Neighborhood & Wad Burqin 1960*
- *Al-Zahra Neighborhood & Al-Bsatin Neighborhood*
- *Kharouba Neighborhood & Aljabriat Neighborhood & Al-Switat Neighborhood & Sabah Al-khair Neighborhood*
- *Qabatya Blocks & 3 Main Roads Sprawl*



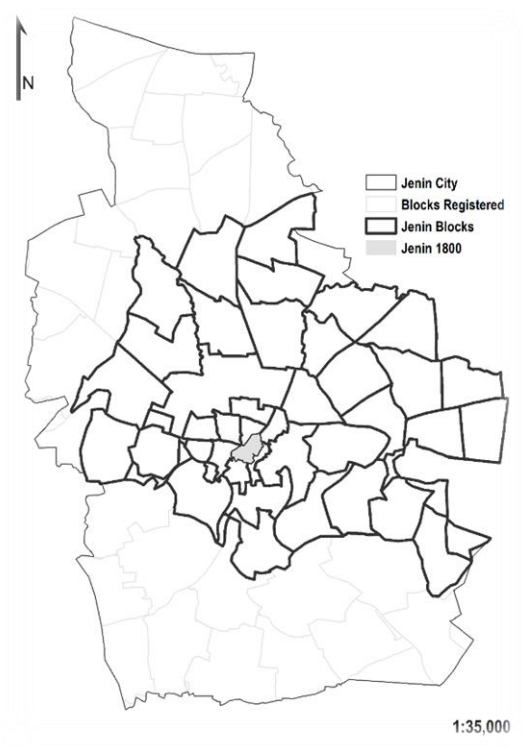
Map 12: Community Administrative Boundary



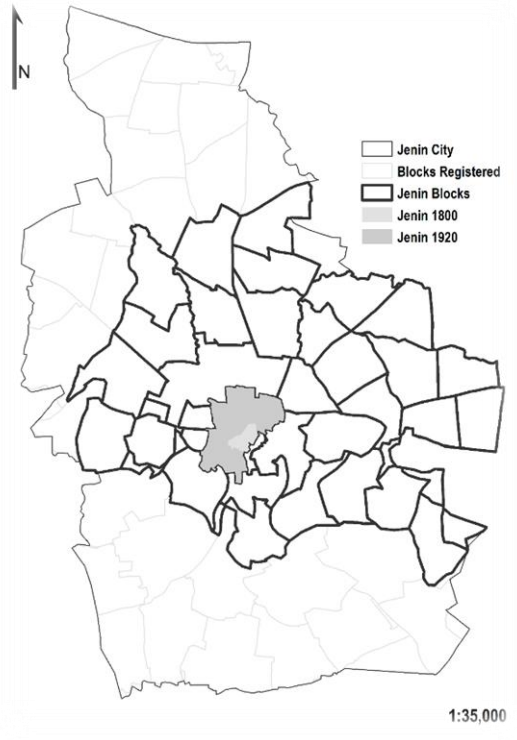
Map 13: Blocks Registered



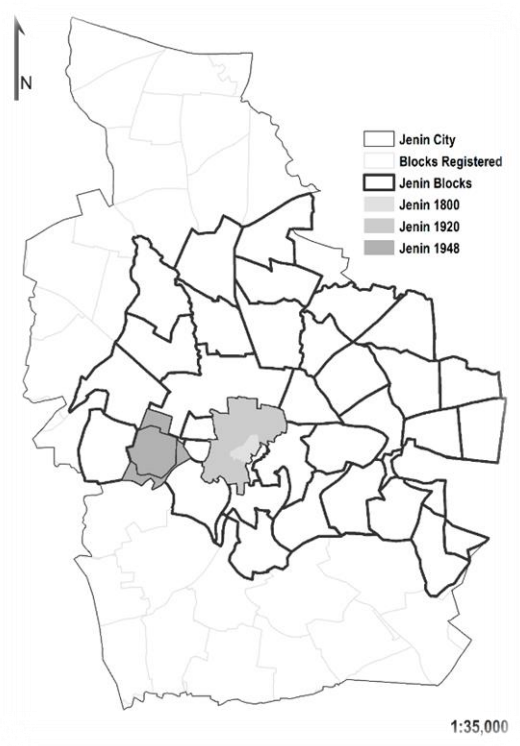
Map 14: Blocks belonging to the Municipality of Jenin



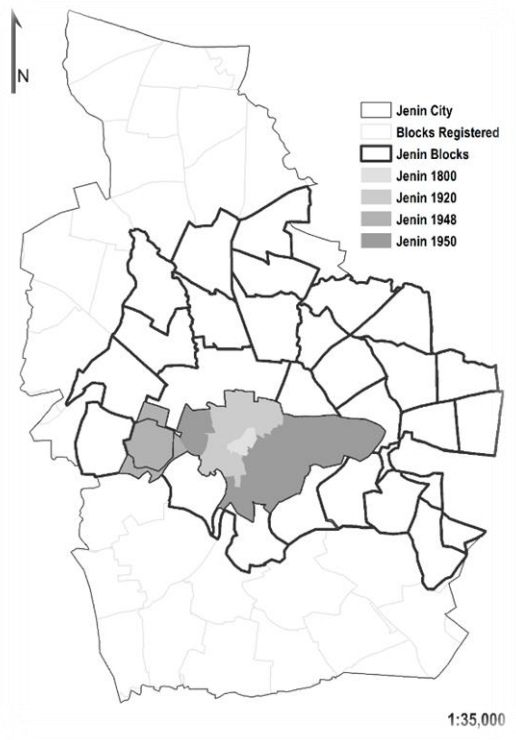
Map 15: Al-Sibat (Old Town) 1800



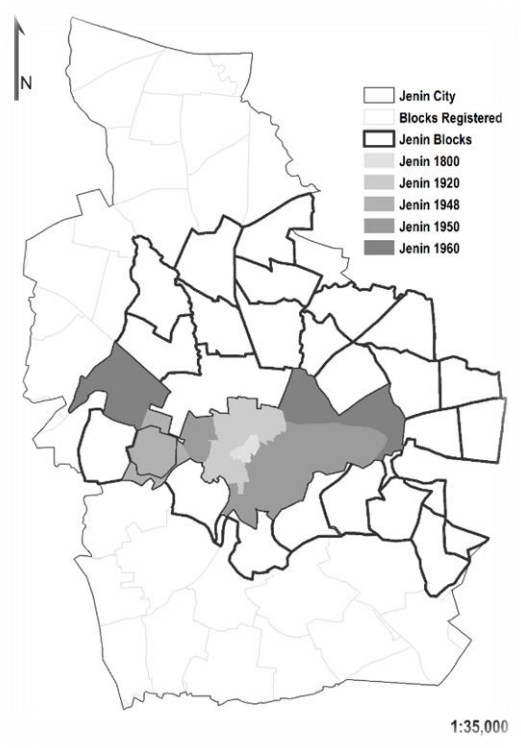
Map 16: West Neighborhood 1920



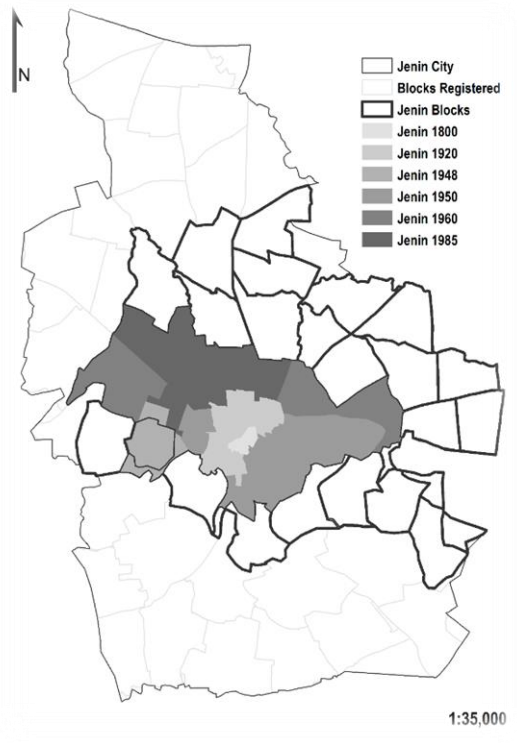
Map 17: Jenin Camp 1948



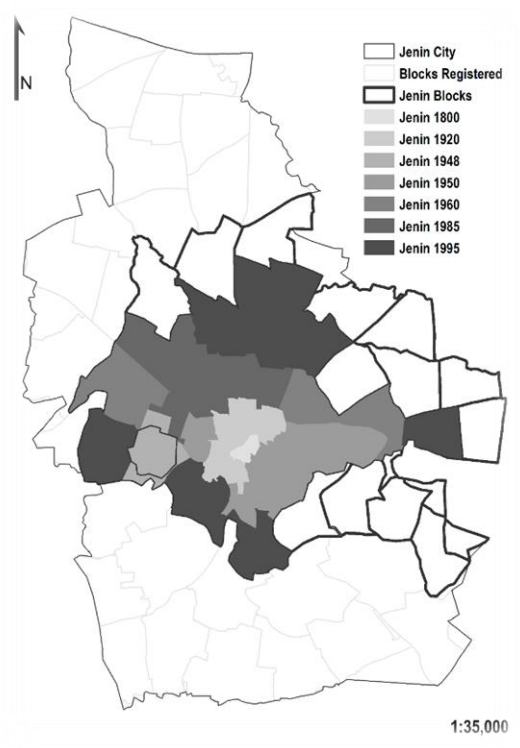
Map 18: East Neighborhood 1950



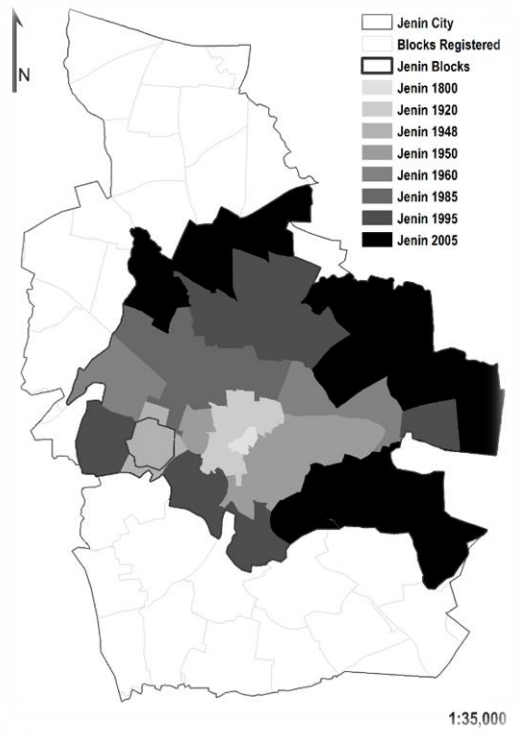
Map 19: German Neighborhood & Wad Burqin 1960



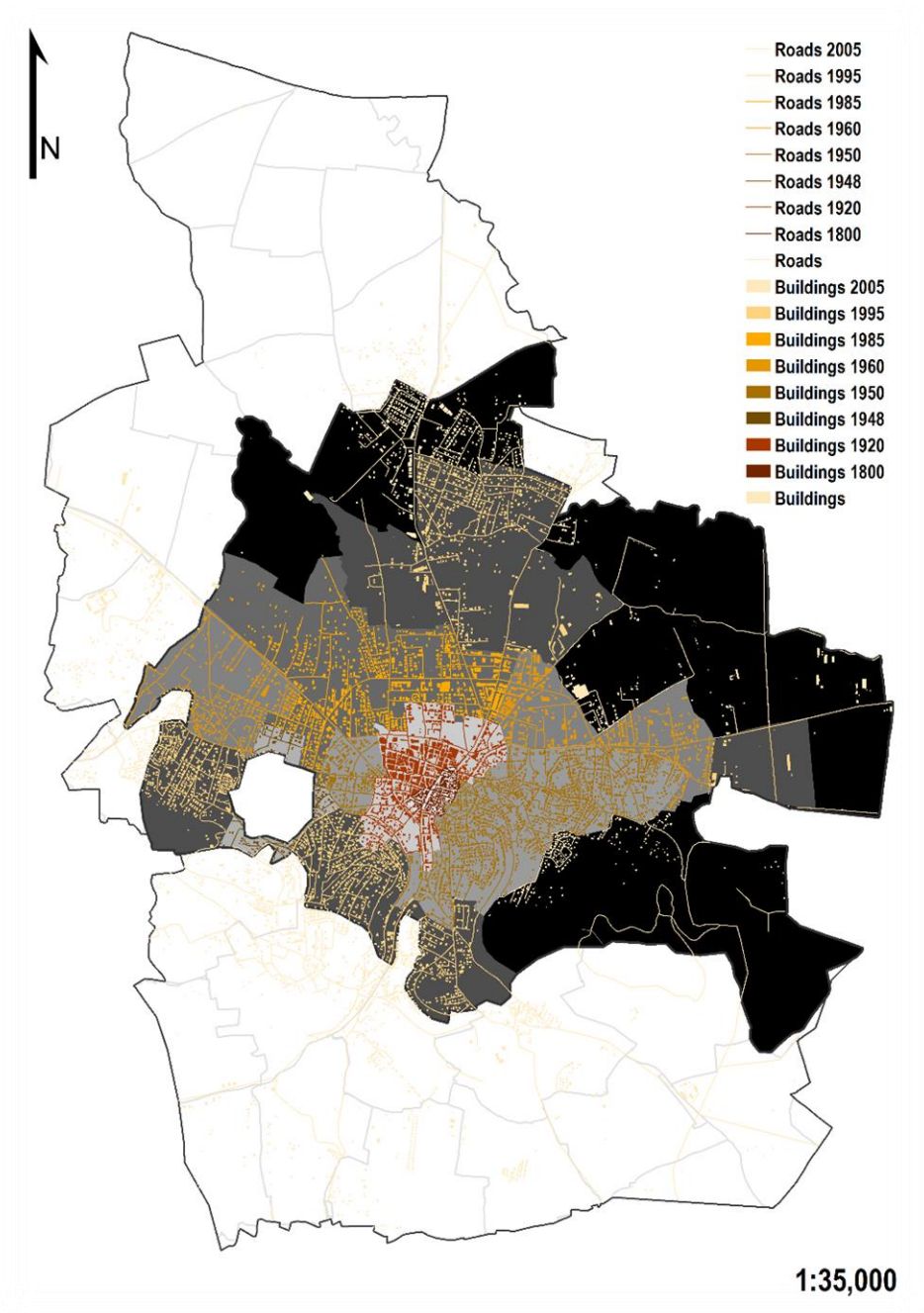
Map 20: Al-Zahra Neighborhood & Al-Bsatin Neighborhood



Map 21: Kharouba Neighborhood & Aljabriat Neighborhood & Al-Switat Neighborhood & Sabah Al-khair Neighborhood

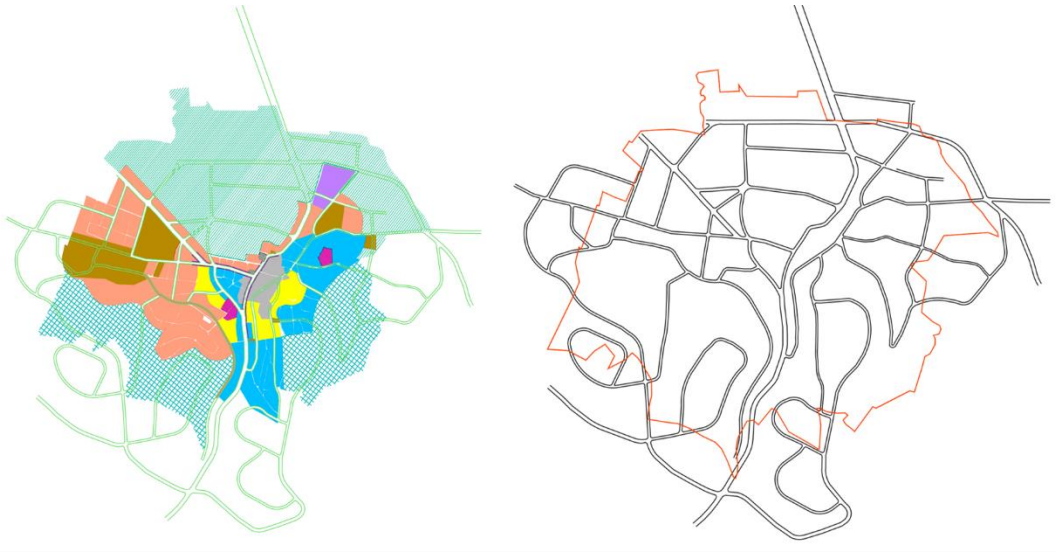


Map 22: Qabatya Blocks & 3 Main Roads Sprawl

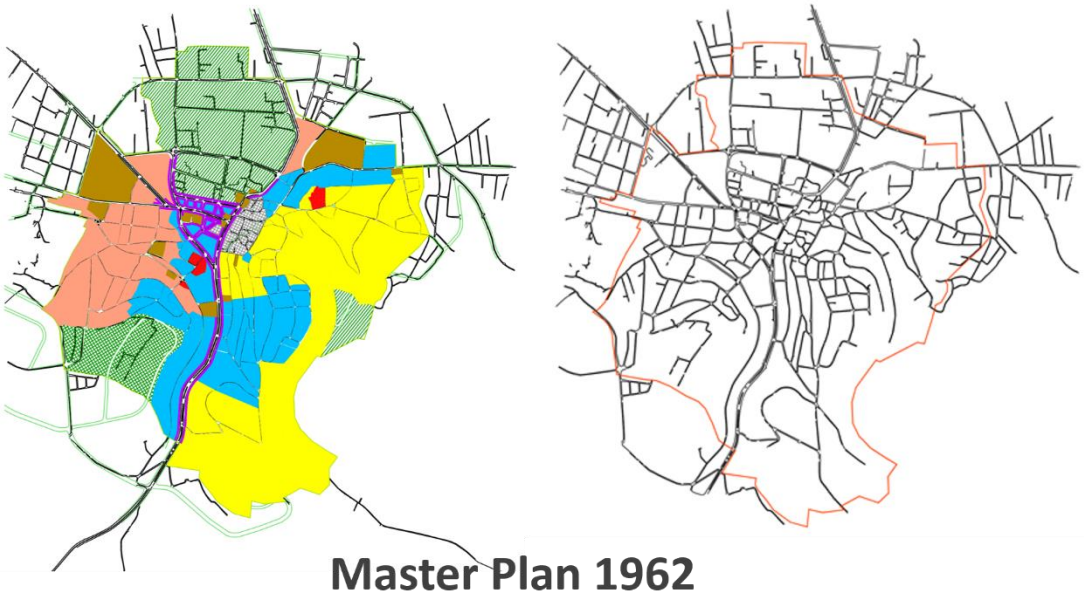


Map 23: Historical development of Roads and Buildings

Jenin Master Plans

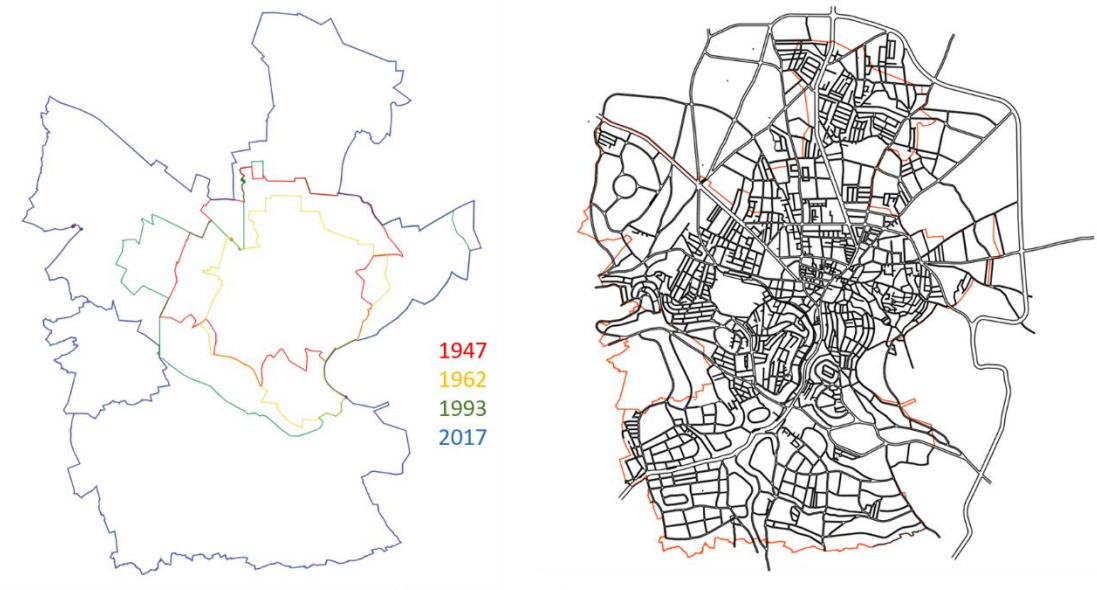


Master Plan 1947

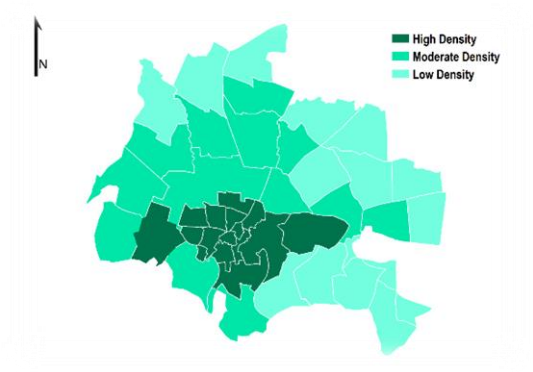


Master Plan 1962

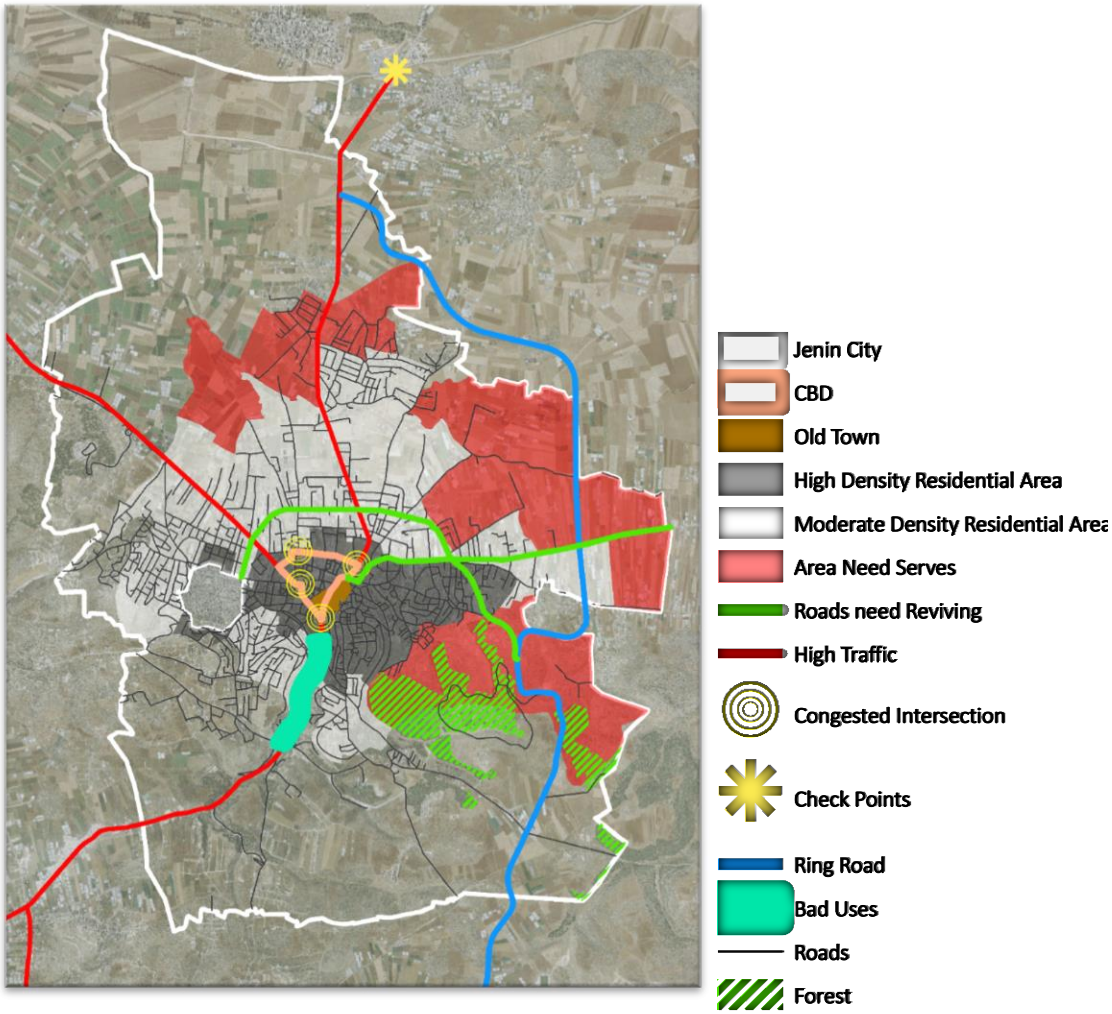
Master Plan 1993



Master Plan 2017



Map 24: Population Density



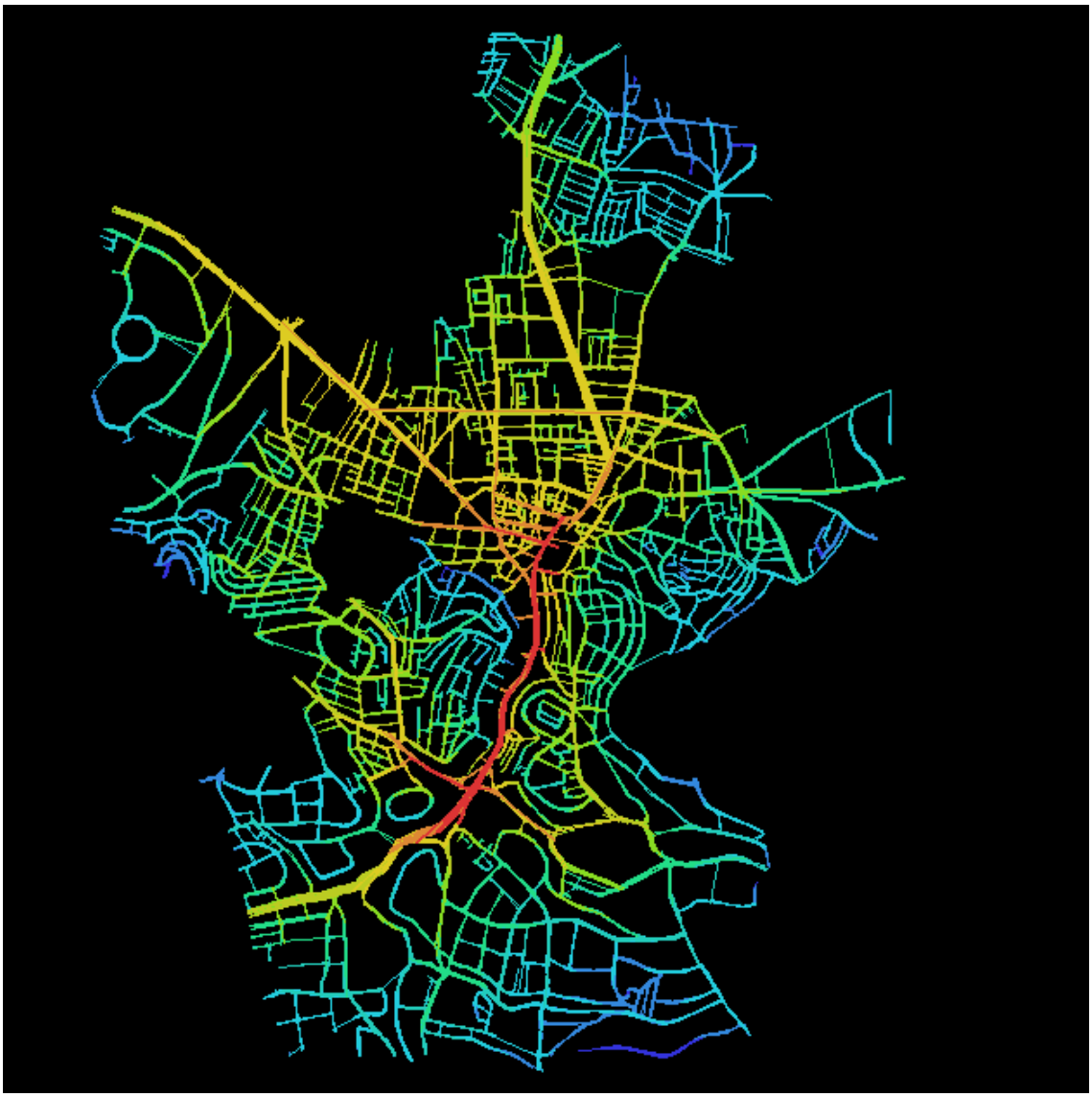
Map 25: Problems in Jenin City

Space Syntax Analysis " Depth Map " - Axial map " Municipality Behavior "

Map 26: Mean Depth

Mean Depth:

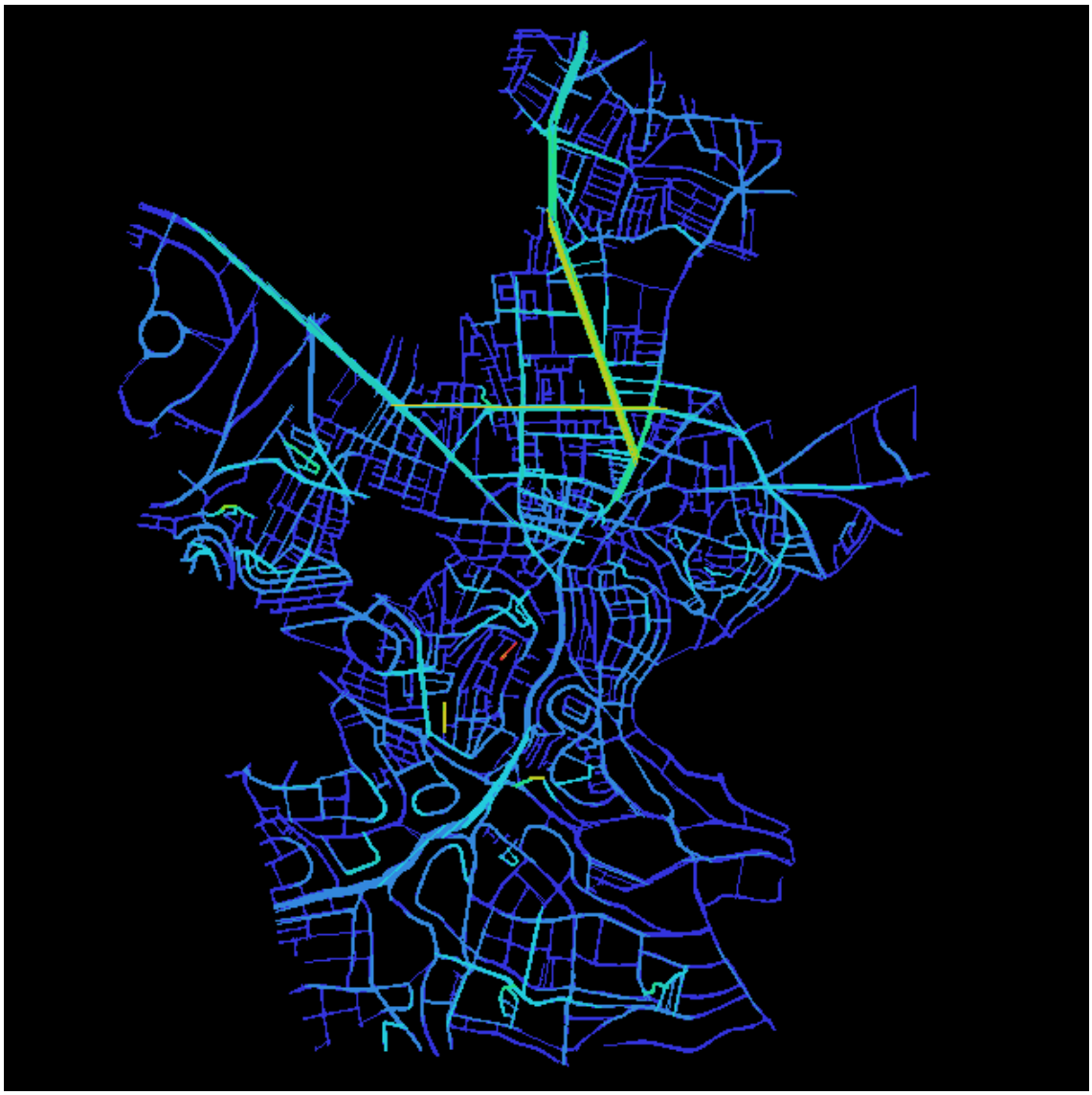
means number of intervening lines that must be crossed to get from space to another, the minimum number of steps means shallowness (integration), whereas the maximum number of ones means segregation.



Map 27: Integration

Integration:

is a static global measure. It describes the average depth of a space to all other spaces in the system. It describes how easy it is to get to one segment from all other segments.



Map 28: Connectivity

Connectivity:

measures the number of immediate neighbors that are directly connected to a space.

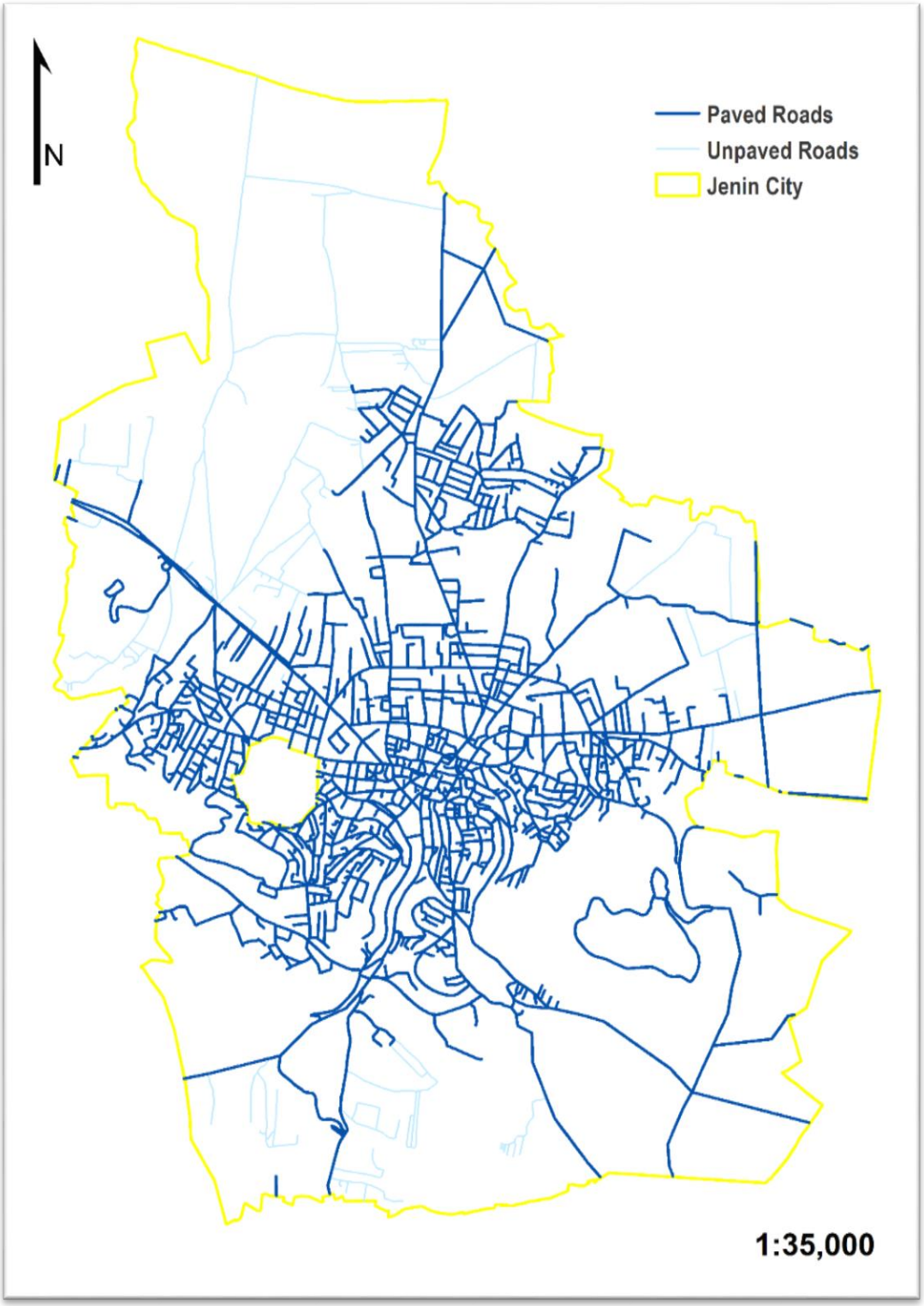
This is a static local measure.

Map 29: Choice

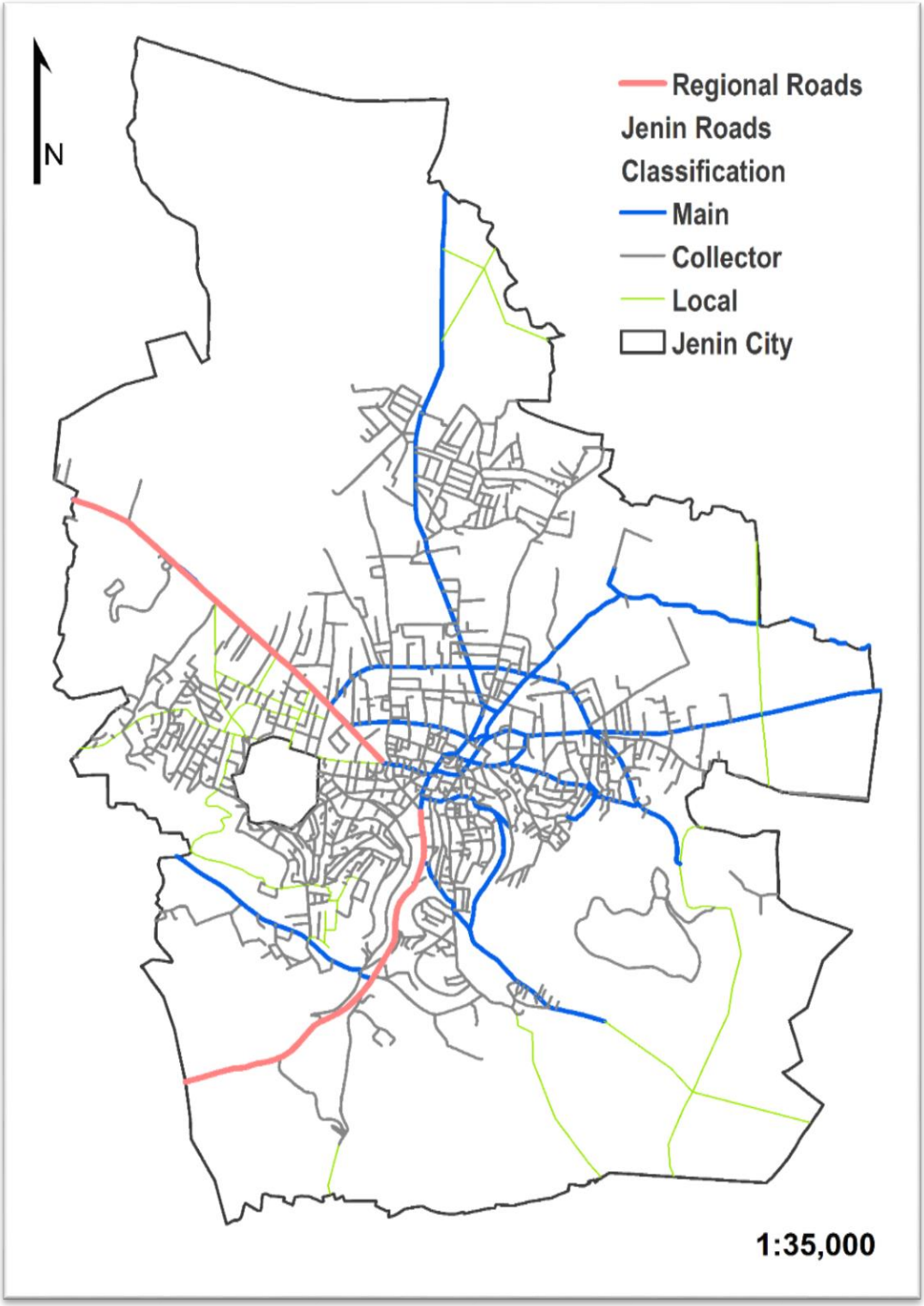
Choice:

is a dynamic global measure of the “flow” through a space. A space has a strong choice value when many of the shortest paths, connecting all spaces to all spaces of a system, passes through it.

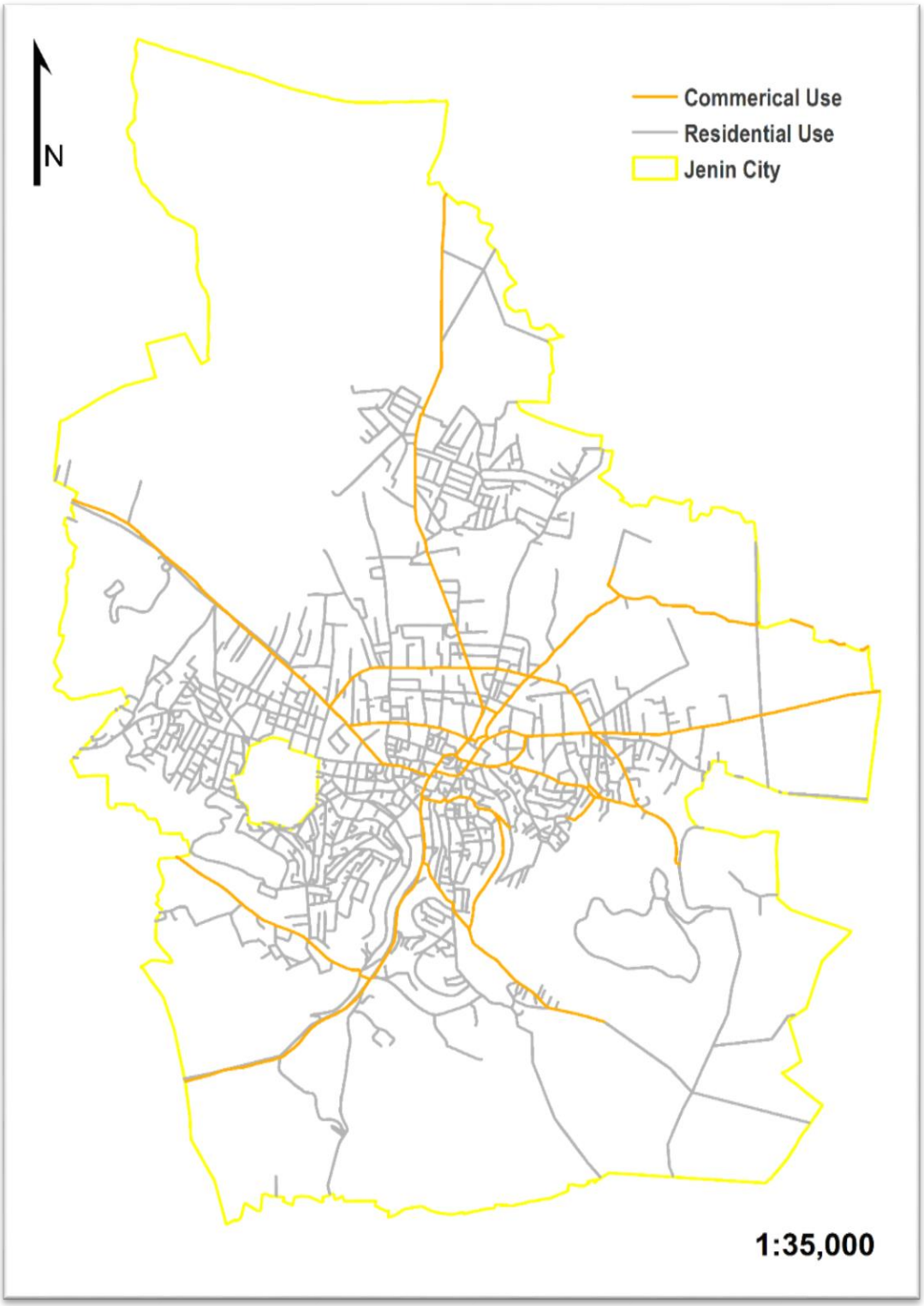
Map 30: Roads Width



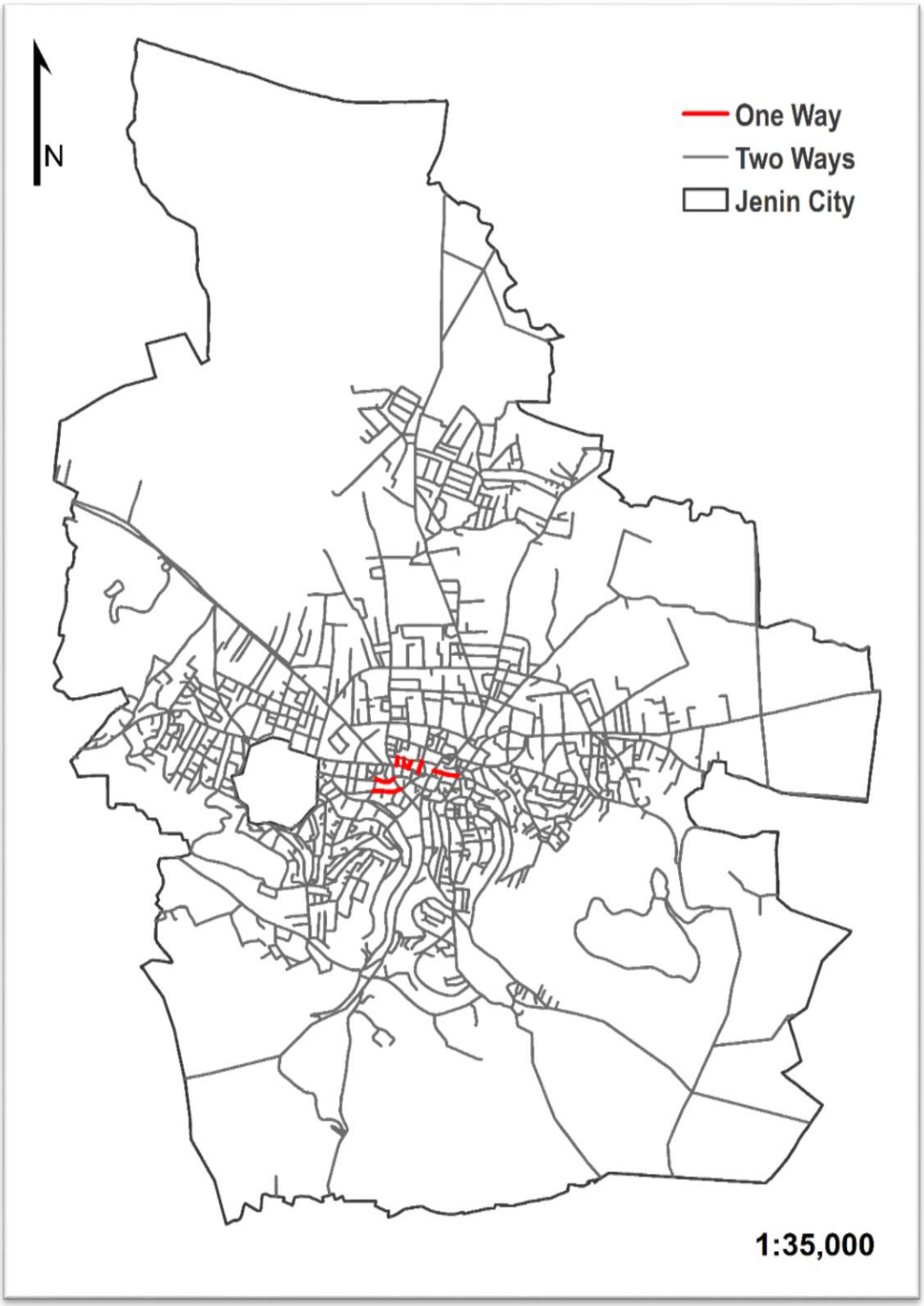
Map 31: Roads Surface



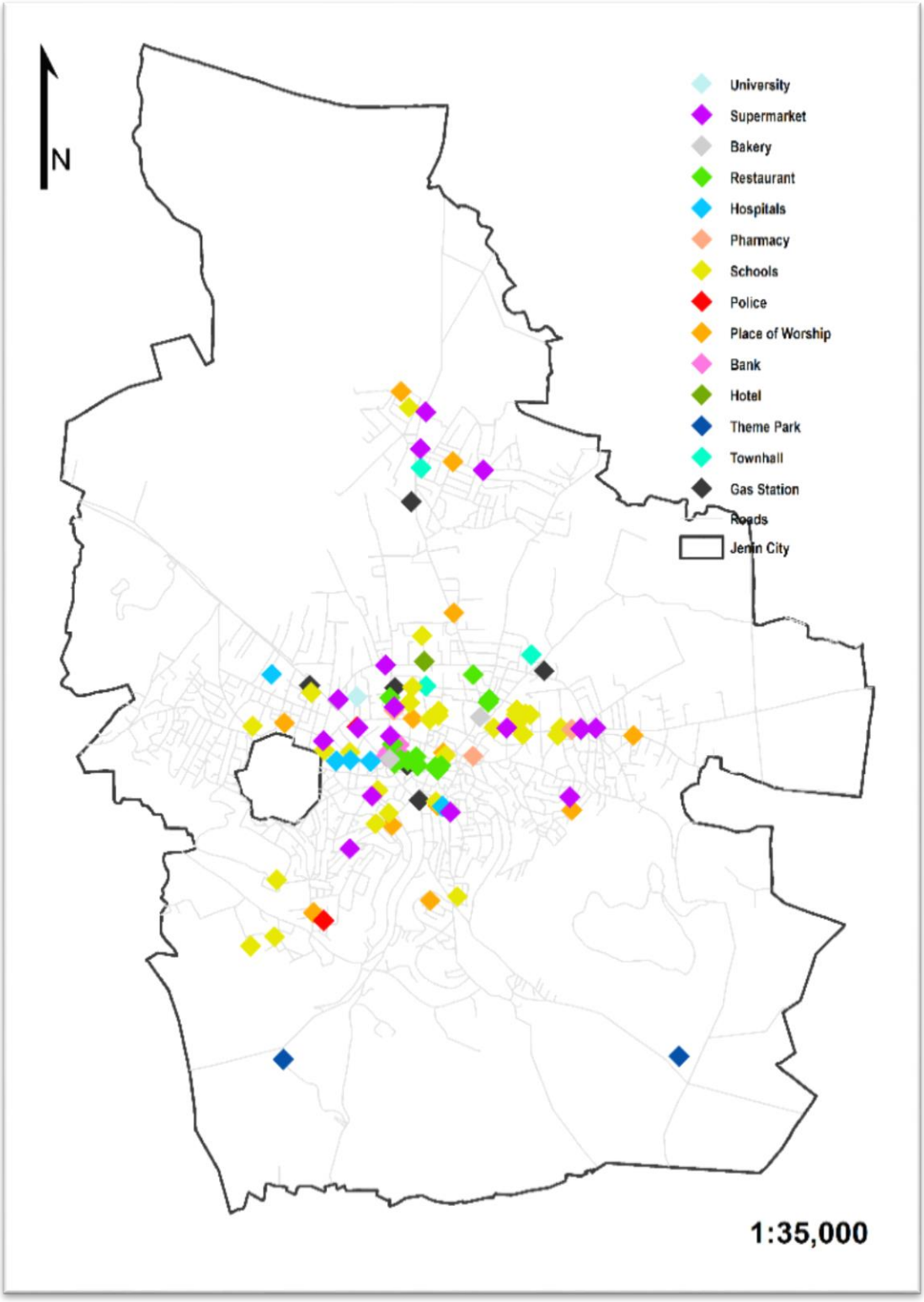
Map 32: Roads Classification



Map 33: Roads Use

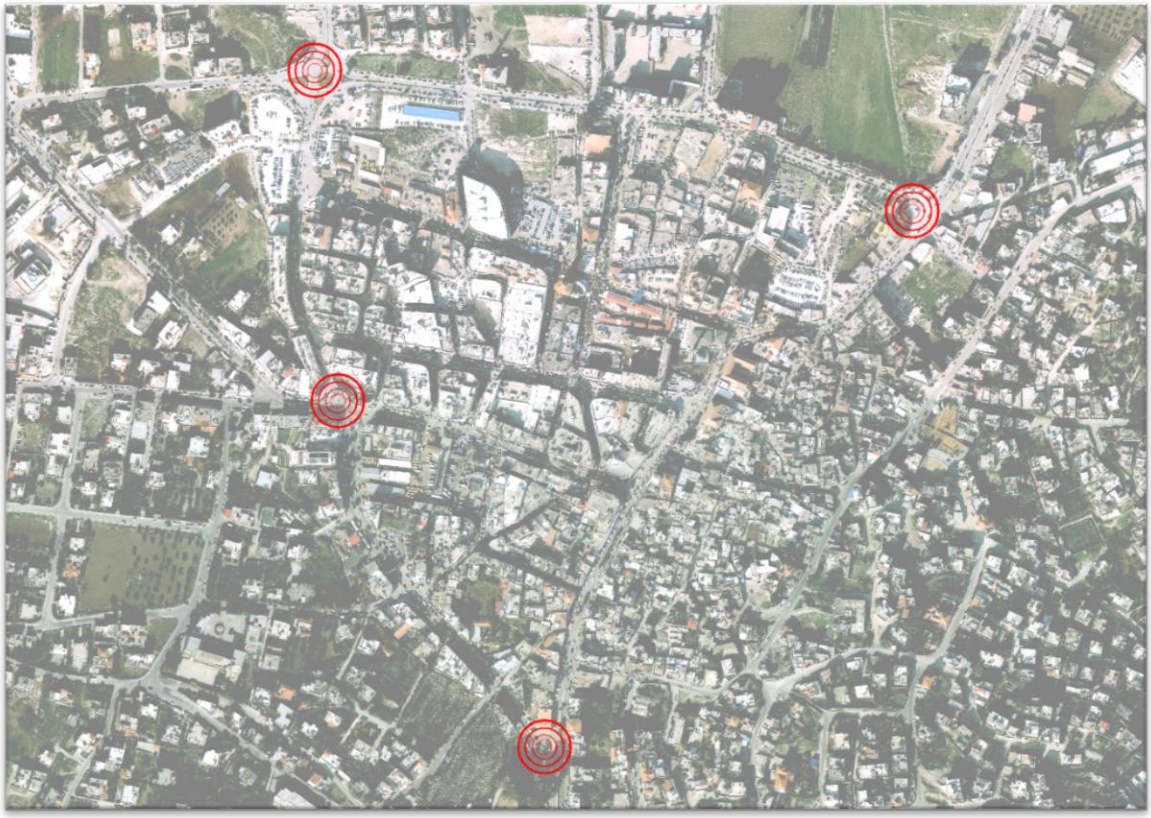


Map 34: Roads Direction



Map 35: Service

Traffic Volume Counts:

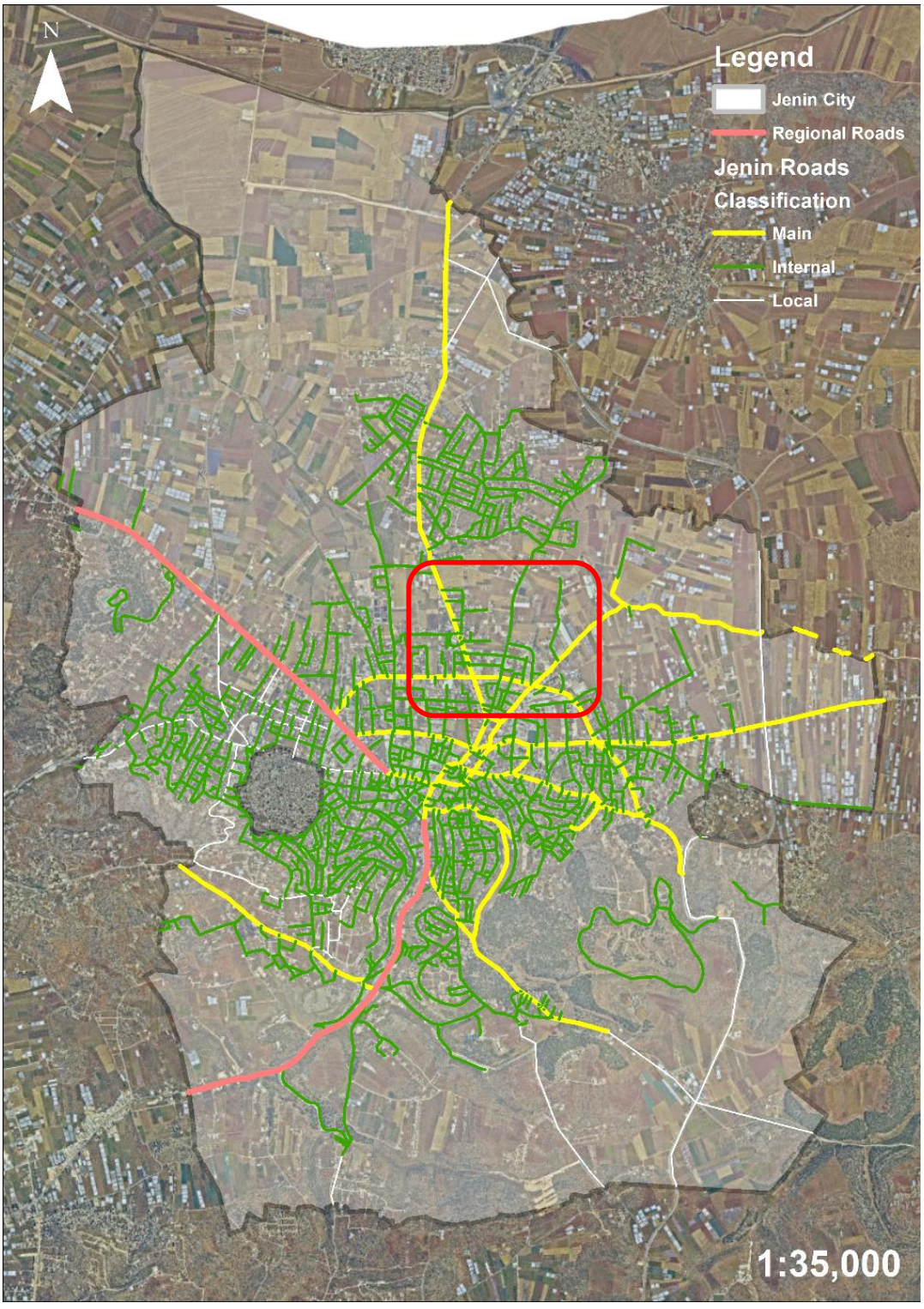


Map 36: Traffic Volume Counts

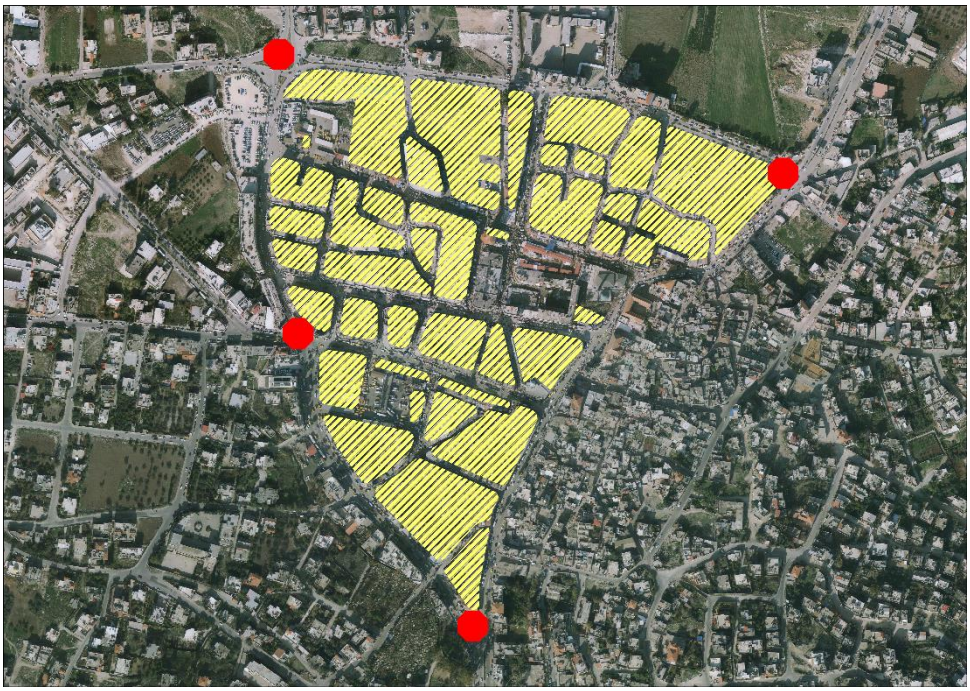
Inventory study

Before embarking on any project development process, the existing physical and geometry is conducts need to be known, to indicate these are modifiable,

Acceptable or not, and this assist in planning and design of space.



Map 37: Counting Zone (CBD)



Map 38: Counting Spots

Four Main Intersection were selected based on the previous analysis, where they were found to be the most problematic, and the traffic in them is continuous and very large.

Map 39: Ayyash Intersection

Map 40: Zayyed Intersection

Map 41: Naffa Intersection

Map 42: Al-Cinema Intersection

	Side walk width	Lane width	Parking width
1	1.5	14	No Parking
2	1.5	7.5	No Parking
3	3	14	No Parking
4	2	6	No Parking
5	1	13	No Parking
6	1	9.5	No Parking
7	2	21	No Parking
8	2	12	No Parking
9	1	16	No Parking
10	1	15	No Parking
11	1	19	No Parking
12	1	10	No Parking
13	1	16	No Parking
14	1	20	No Parking
15	1	15	No Parking

Note: This Numbers Noticed in Sketches Down

I have been using the manual method and camera in this project to count traffic volume at the intersections which reflects the natural of the traffic in the CBD area in Jenin city.

Analysis of traffic volume in the intersections is used to evaluate the (LOS).

The collected data is presented in the appendix. The data and time of counting are presented in table (1)

Table 4: Data and time of counting

Intersection Name	Time	Method Counting
Yahya Ayyash	7:00 AM – 4:00 PM	Camera
Zayed	7:00 AM – 9:30 AM 11:00 AM – 4:00 PM	Manual
Naffa	7:00 AM – 9:30 AM 11:00 AM – 4:00 PM	Manual
Al-Cinema	7:00 AM – 4:00 PM	Camera

Peak Hour Volume for Intersections:

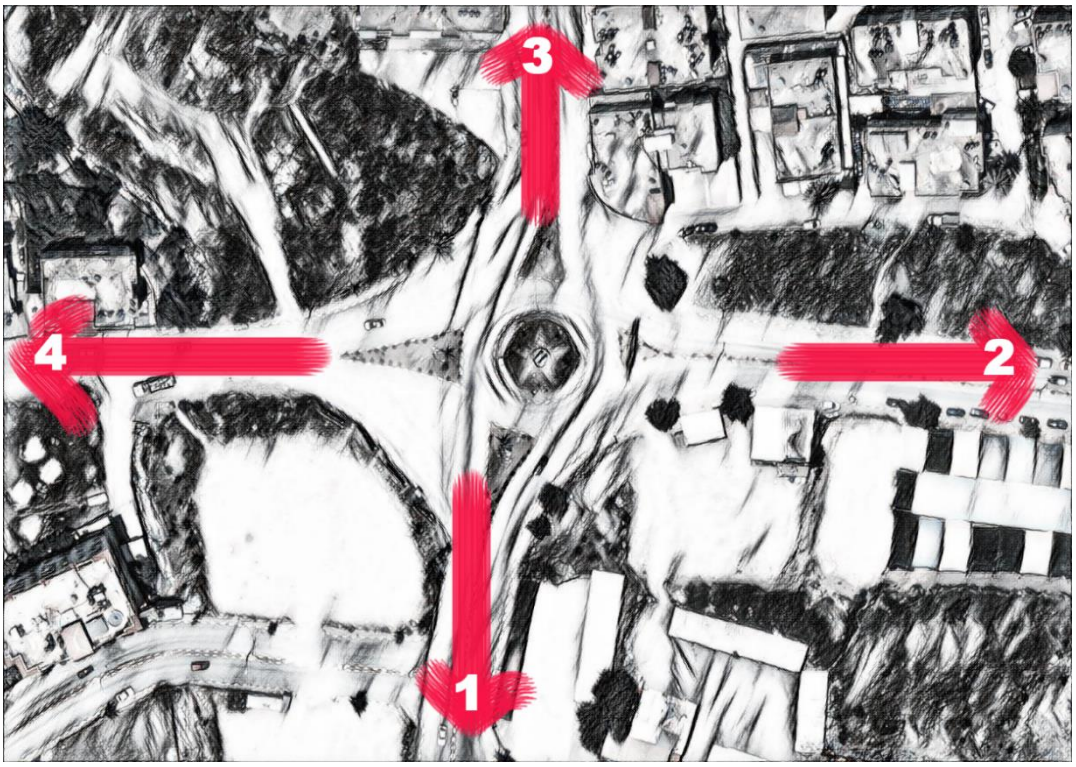
After finishing the counting process, the calculation has been done to find peak hour, peak hour volume, and peak hour factor which were illustrated in the tables below to be used in the analysis.

Table 5: Summery of the results of PH and PHV for each intersection

Intersection	PH	PHV (vehicle/hour)
Yahya Ayyash	12:00 PM – 1:00 PM	2905
Zayed	1:15 PM – 2:15 PM	2317
Naffa	1:30 PM – 2:30 PM	2485
Al-Cinema	12:00 PM – 1:00 PM	**3684**

Table 6: PH and PHV at Yahya Ayyash intersection

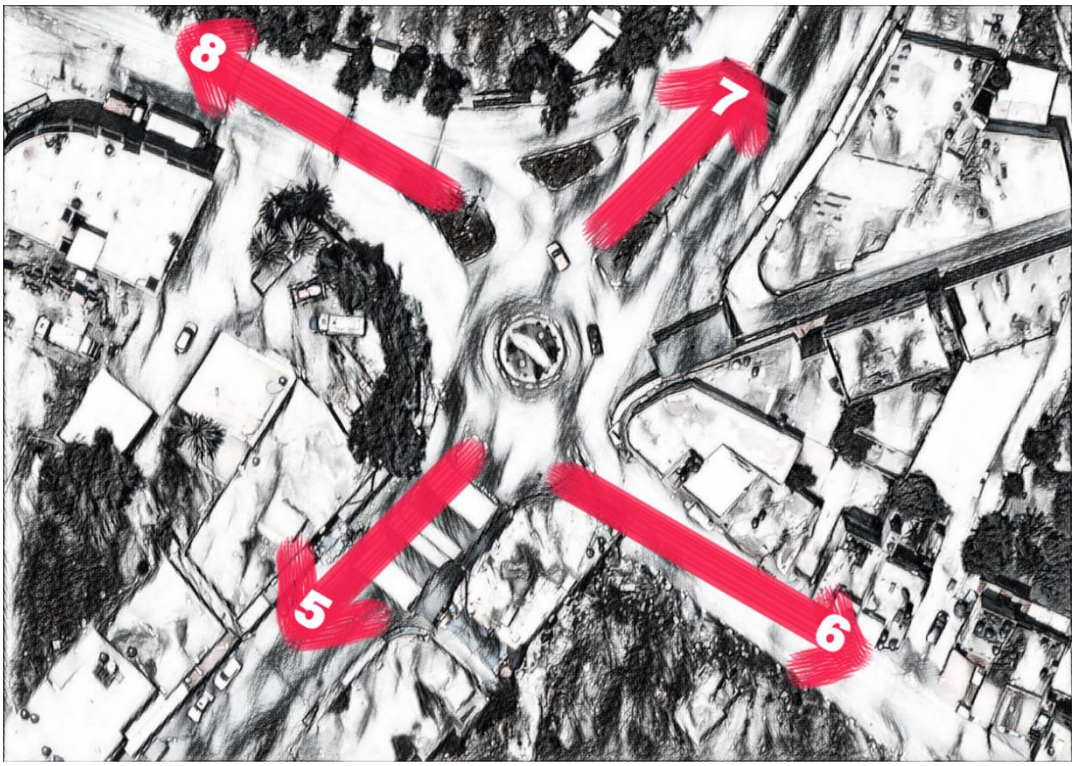
Yahya Ayyash	PH	PHV	Pedestrian
North Approach	12:00 PM – 1:00 PM	842	112
South Approach	12:00 PM – 1:00 PM	833	219
East Approach	12:00 PM – 1:00 PM	1576	119
West Approach	12:00 PM – 1:00 PM	487	150



Sketch 1: Ayyash Intersection

Table 7: PH and PHV at Zayed intersection

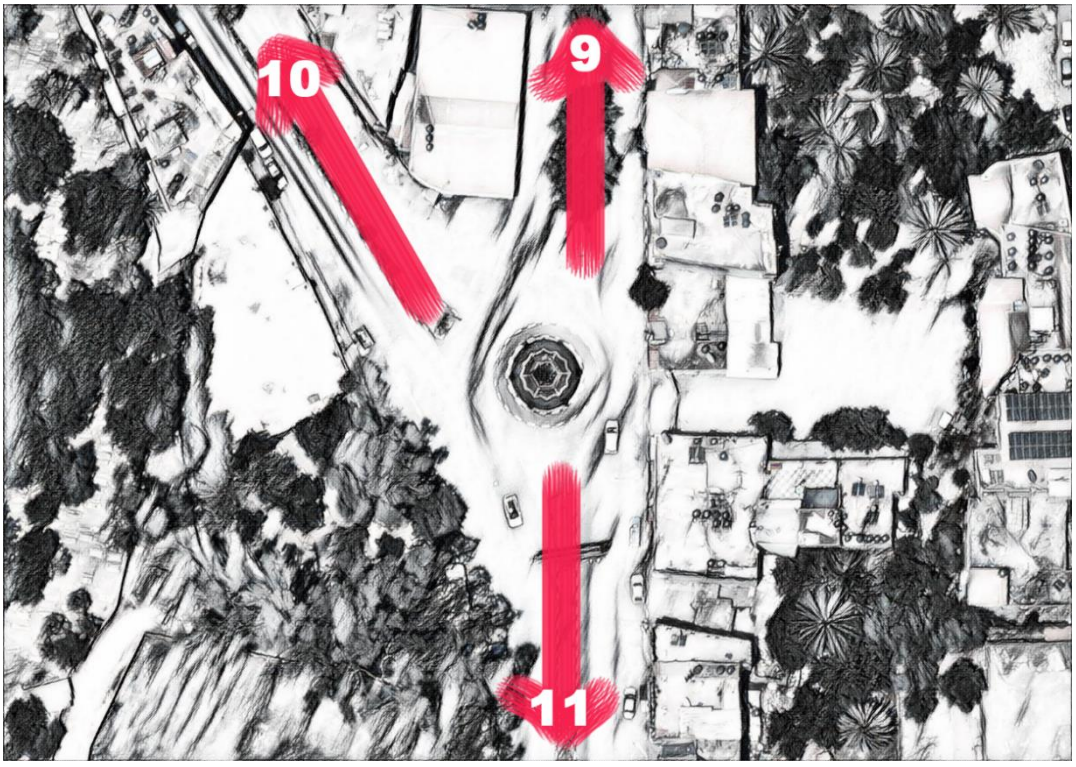
Zayed	PH	PHV	Pedestrian
North Approach	1:15 PM – 2:15 PM	908	175
South Approach	1:15 PM – 2:15 PM	472	189
East Approach	1:15 PM – 2:15 PM	329	476
West Approach	1:15 PM – 2:15 PM	574	148



Sketch 2: Zayyed Intersection

Table 8: PH and PHV at Naffa intersection

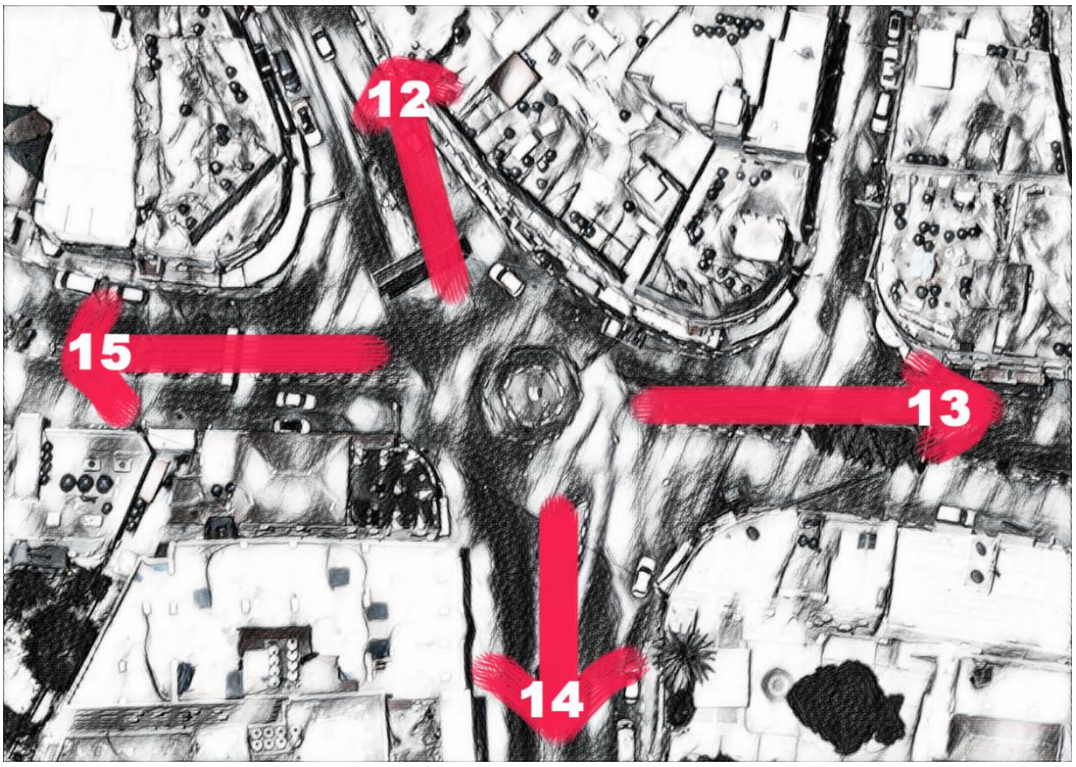
Naffa	PH	PHV	Pedestrian
North Approach	1:30 PM – 2:30 PM	614	49
South Approach	1:30 PM – 2:30 PM	817	22
West Approach	1:30 PM – 2:30 PM	1054	87



Sketch 3: Naffa Intersection

Table 9: PH and PHV at Al-Cinema intersection

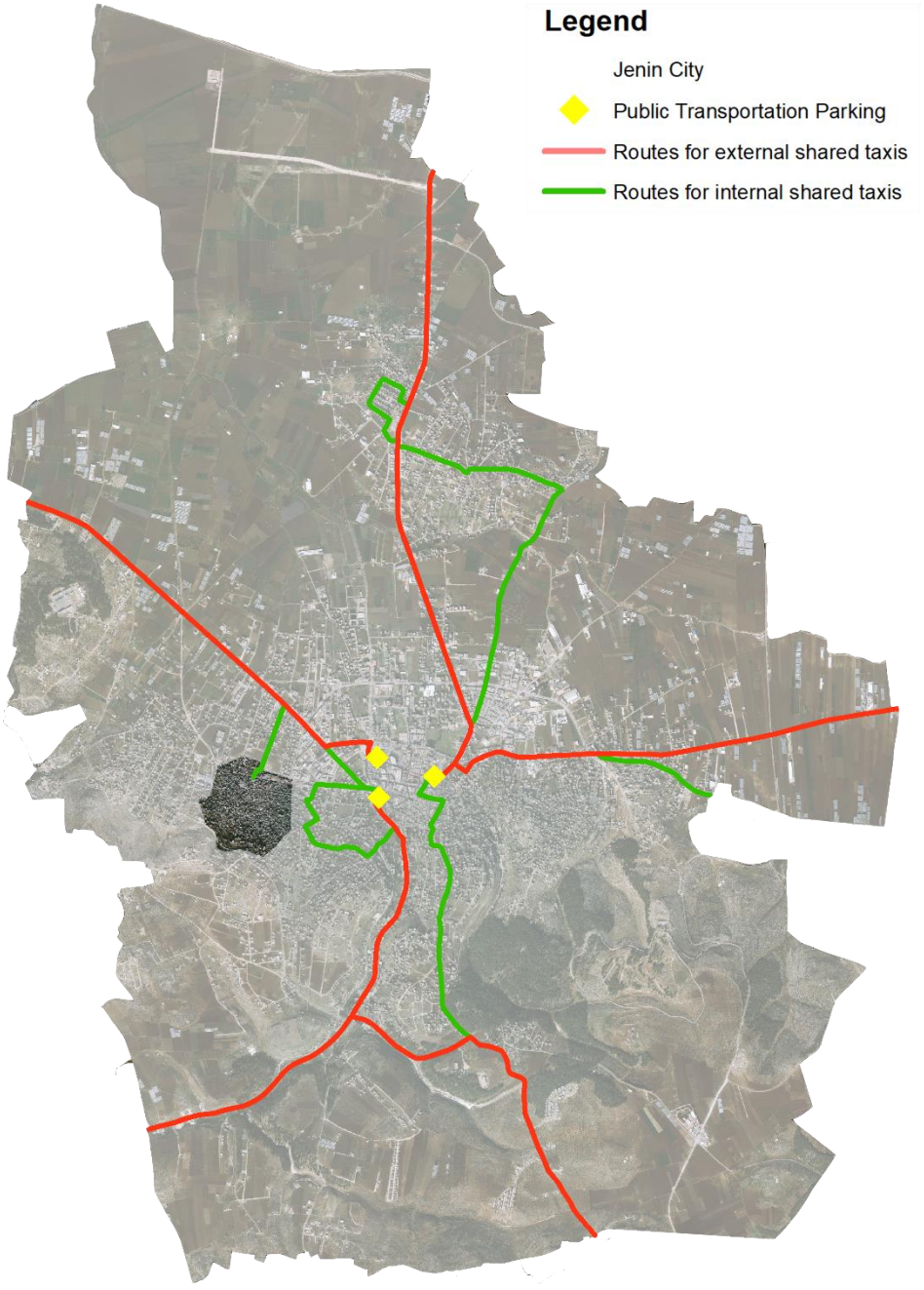
Al-Cinema	PH	PHV	Pedestrian
North Approach	12:00 PM – 1:00 PM	776	568
South Approach	12:00 PM – 1:00 PM	1121	837
East Approach	12:00 PM – 1:00 PM	777	350
West Approach	12:00 PM – 1:00 PM	883	219



Sketch 4: Al-Cinema Intersection

Public transportation movements analysis:

In this part, a complete analysis of the study area will be presented, and accordingly a set of hypotheses and constraints will be reached and then results and solutions will be reached so that they are logical and effective.



Map 43: Transportation Routes

المجمع الرئيسي	عدد المركبات	عدد الترددات (تقديري)	عدد الركاب (عدد المركبات * عدد الترددات * 7)
رام الله	48	3	1008
نابلس	41	3	861
طولكرم	16	3	336
اريحا	47	3	987
طوباس	22	3	462
زبابدة	20	3	420
قباطية	21	3	441
عرابة	27	3	567
يعبد	30	3	630
عجة	11	3	231
طورة	6	3	126
برطعة	11	3	231
صانور	7	3	147
جبع	12	3	252
سيلة الظهر	5	3	105
فندقومية	6	3	126
عنزا	4	3	84
ام دار	2	3	42
فحمة – كفرراعي	17	3	357
الجديدة – سيريس	14	3	294
ميثلون	13	3	273
ام التوت – جلقموس	7	3	147
المغير	5	3	105
مسلية	4	3	84
رابا	3	3	63
مركة	2	3	42

المجمع الرئيسي (سيرفيس)	عدد المركبات	عدد الترددات (تقديري)	عدد الركاب (عدد المركبات * عدد الترددات * 7)
جامعة القدس المفتوحة – مخيم جنين	19	10	1330
جبل أبو ظهير – خلة الصوحة	1	10	70

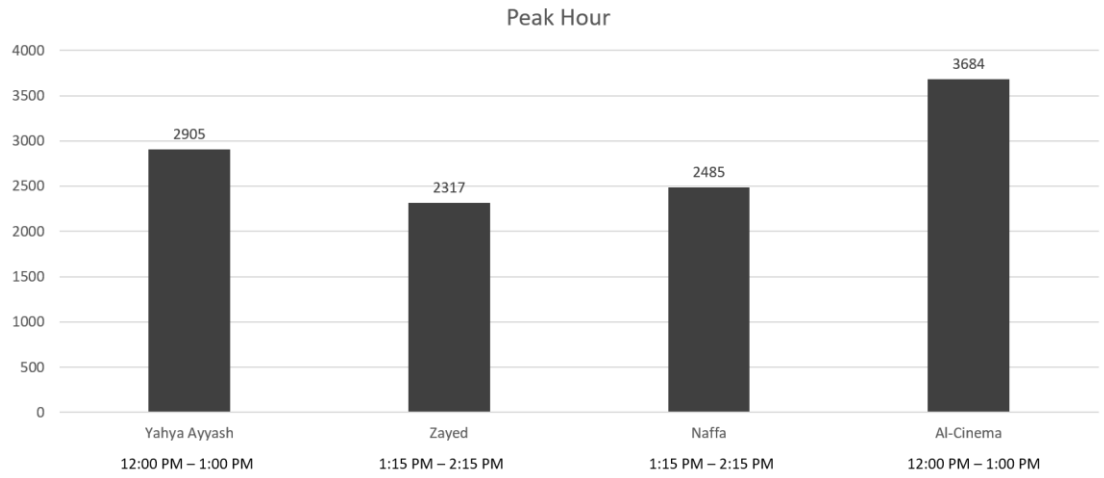
المجمع الرئيسي + المجمع الشرقي (حافلات)	عدد المركبات (كبير – صغير)		عدد الركاب
شركة باصات التميمي	1 (رام الله) 2 (نابلس)	2 (رام الله)	
شركة باصات برقين	1 (نابلس)	10 (داخل المدينة)	
شركة باصات أبو فرحة	3 (نابلس)	4 (الجلمة)	
شركة باصات لوران	2 (نابلس)	-	
شركة باصات قباطية	5 (نابلس)	3 (طولكرم) 2 (اريحا) 25 (قباطية)	
شركة باصات عرابة	2 (نابلس)	5 (فحمة – كفرراعي)	
شركة باصات الطنيب	3 (نابلس)	-	
شركة باصات صانور	1 (نابلس)	2 (جبع – السيلة – عطارة) 1 (صانور)	
شركة باصات برطعة	-	3 (برطعة)	
شركة باصات رابا	-	4 (رابا)	
شركة باصات يعبد	1 (رحل)	3 (يعبد)	
شركة باصات الزبابدة	4 (طلبات) 1 (البطريركية اللاتينية) 1 (رحل) 2 (أهالي الاسرى)	5 (زبابدة – طوباس)	
شركة باصات زكارنة	17 (الجامعة العربية الامريكية)	8 (ميثلون – سيريس – الجديدة)	
شركة باصات تنين	13 (الجامعة العربية الامريكية)	-	

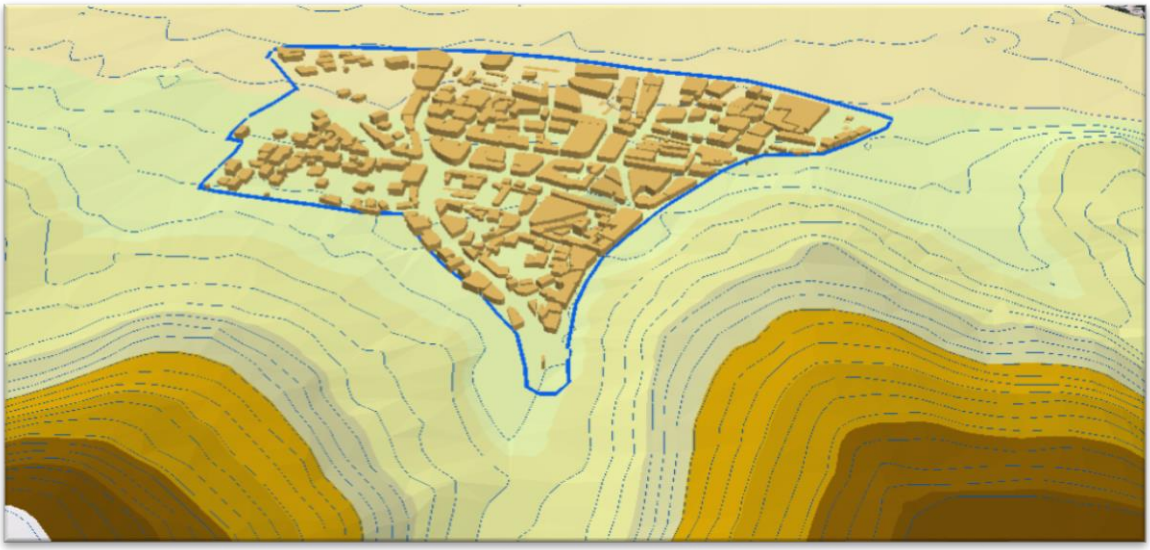
المجمع الشرقي	عدد المركبات	عدد الركاب
فقوعة	11	
بيت قاد	4	
دير أبو ضعيف	9	
دير غزالة	3	
جلبون	8	
الجلمة – عرانة	8	
عربونة	2	

المجمع الشرقي (سيرفيس)	عدد المركبات	عدد الركاب
صباح الخير - خروبة	6	
عابا الالمانية	5	

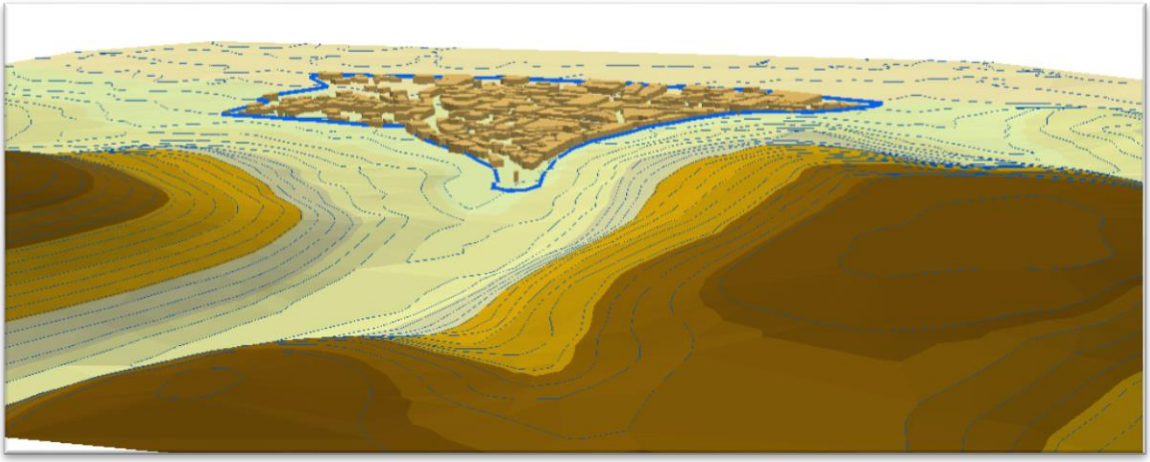
المجمع الغربي	عدد المركبات	عدد الركاب (عدد المركبات * عدد النقلات * 7)
كفيرت	6	168
رمانة – زبوبة	16	640
سيلة الحارثية	20	1000
اليامون	28	**1960**
كفرقود	4	84
كفردان	9	189
الطيبة	6	330
الهاشمية	3	90
العرقة	6	180
برقين	14	686
تعنك – عانين	9	189

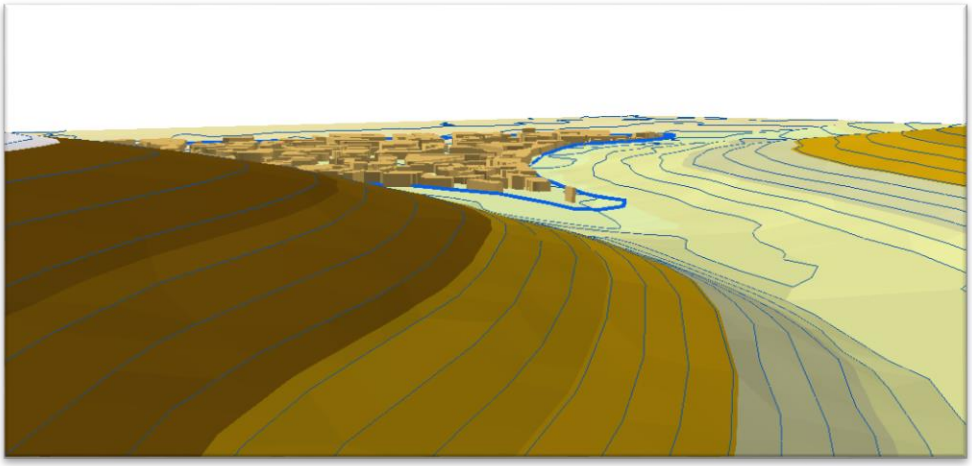
المجمع الغربي (حافلات)	عدد المركبات	عدد الركاب (عدد المركبات * عدد النقلات * 19)
رمانة – زبوبة	2	80
سيلة الحارثية	2	50
اليامون	2	60
كفردان	1	60
تعنك – عانين	2	60



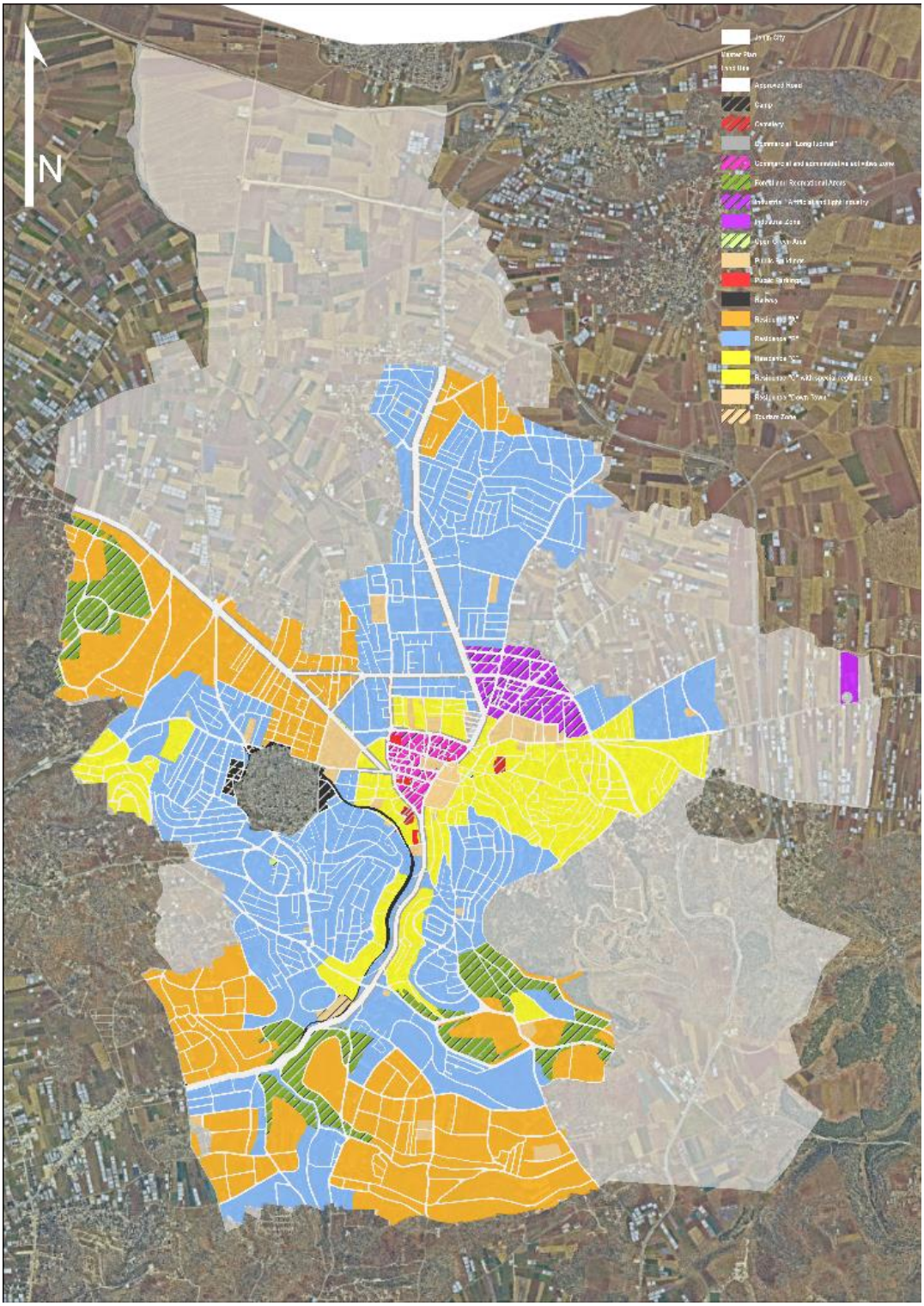


Map 44: CBD Topography

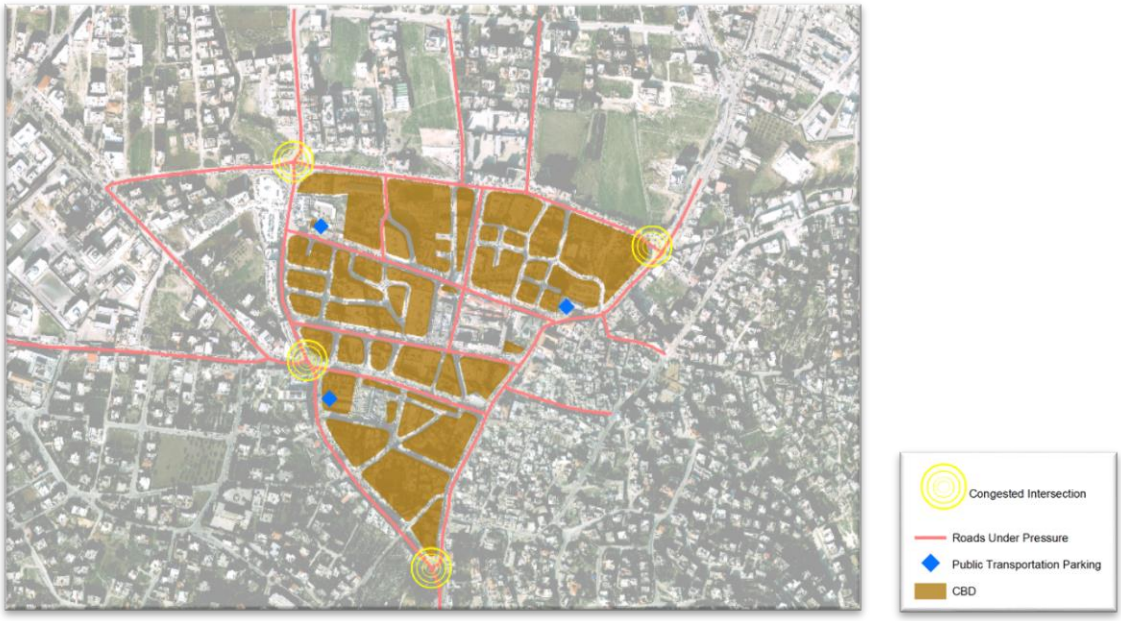




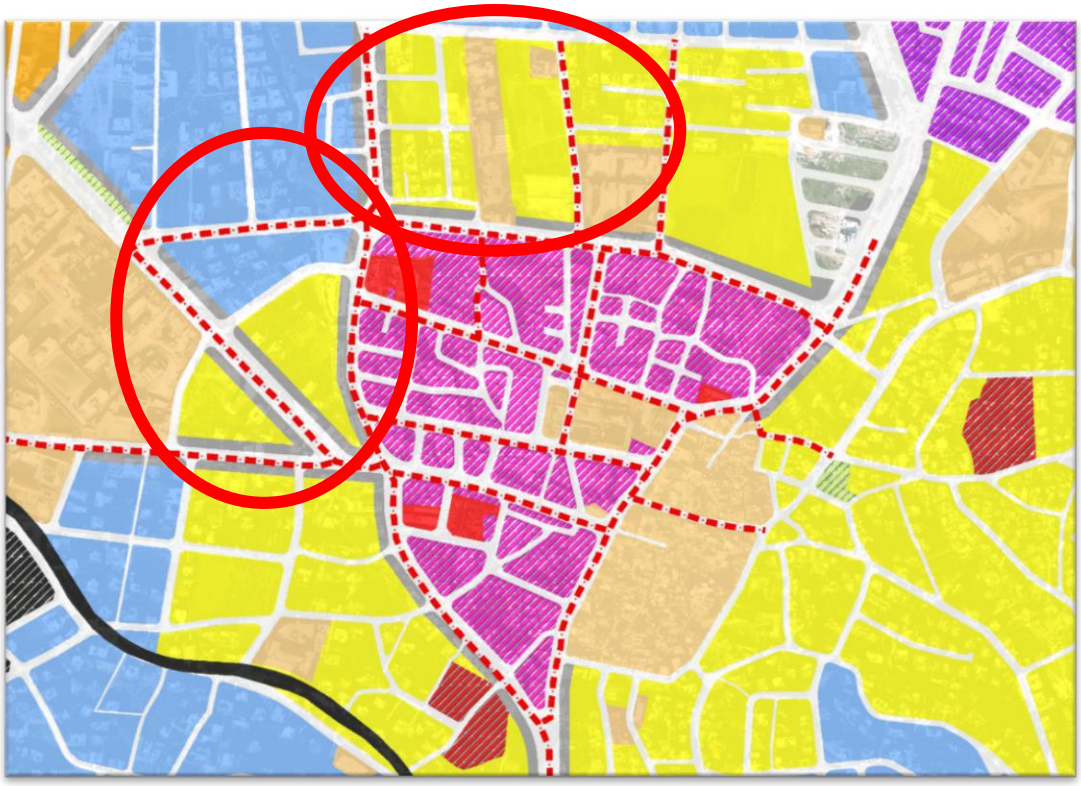
ANALYSIS & STRATEGIC PLANNING



Map 45: Jenin Master Plan

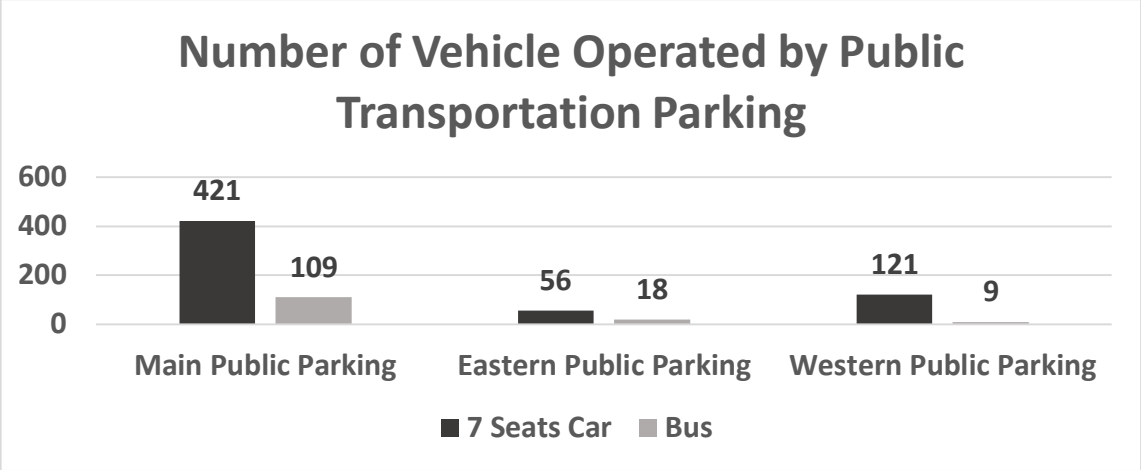


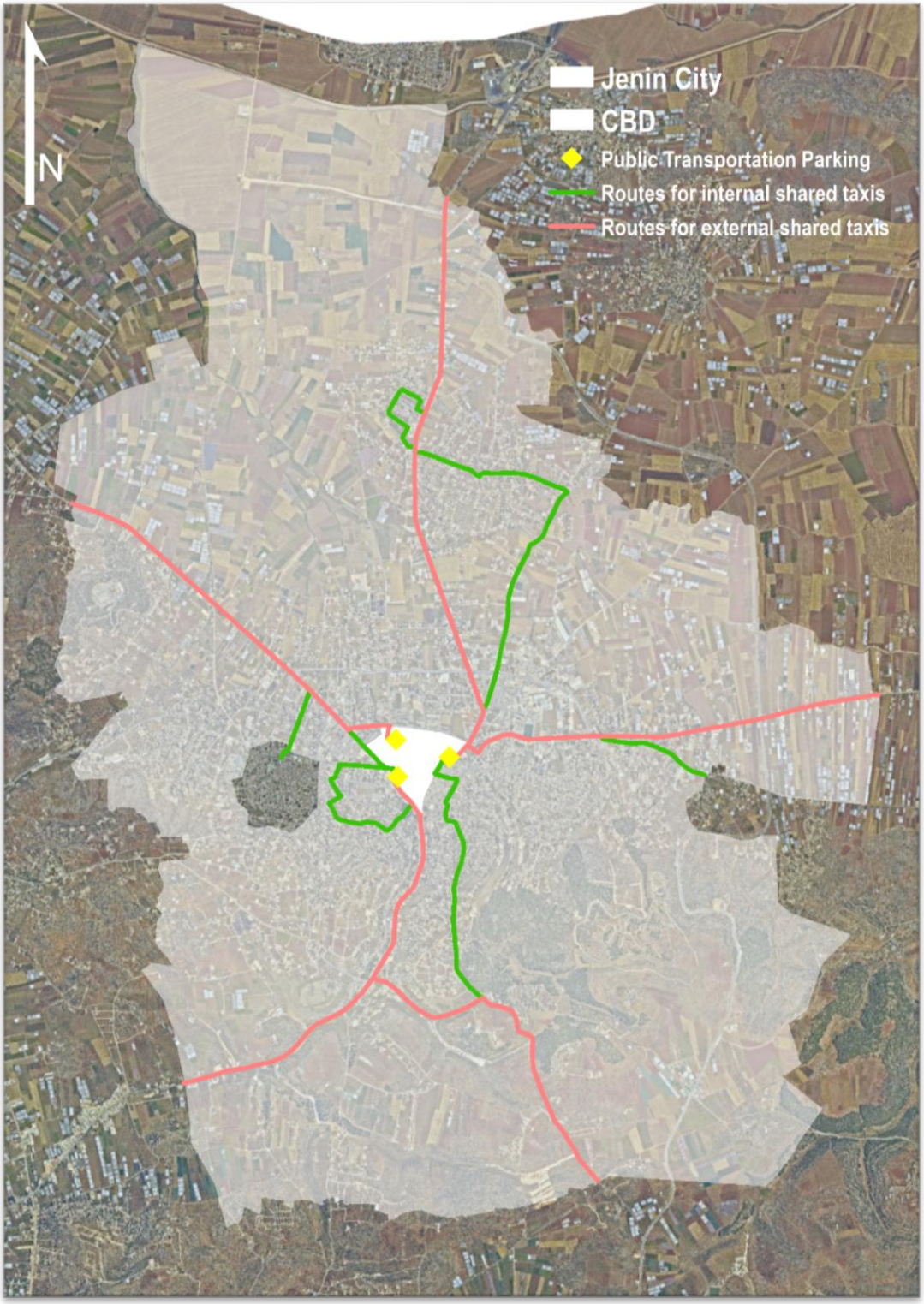
Map 46: CBD Boundaries

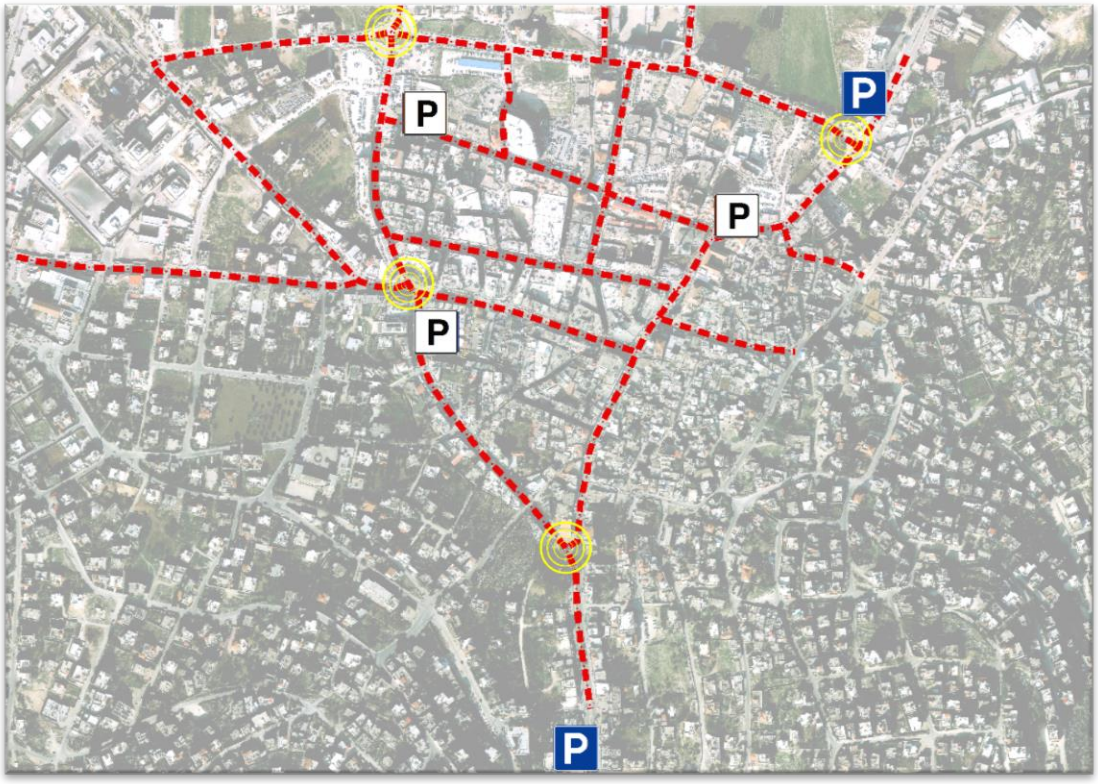


Change of land use in the vicinity of the city center

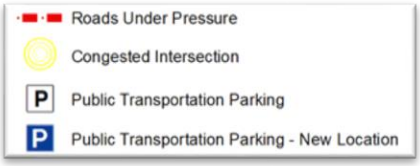
Table 10: Number of Vehicle Operated By Public Transportation Parking



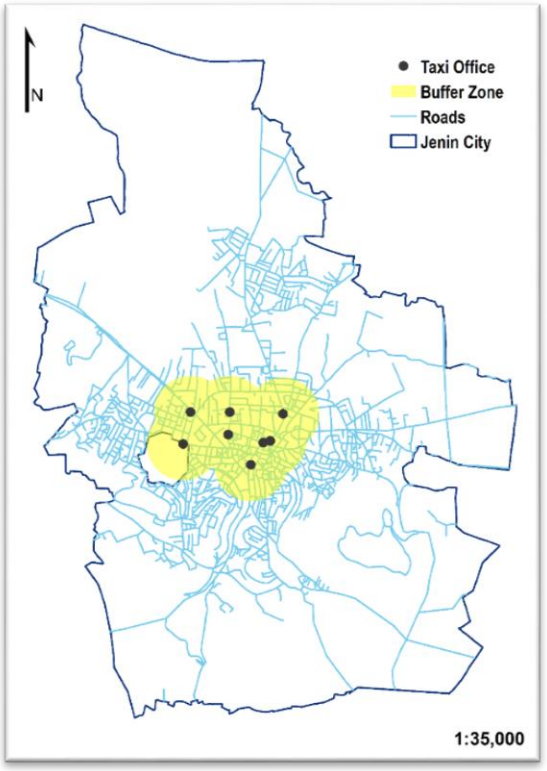

N
Jenin City
CBD
Public Transportation Parking
Routes for internal shared taxis
Routes for external shared taxis



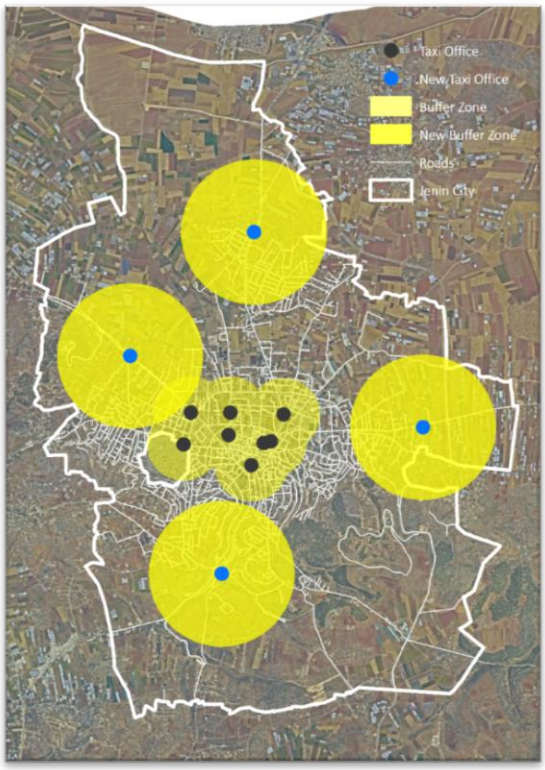
Map 47: Re-Centralization Public Parking



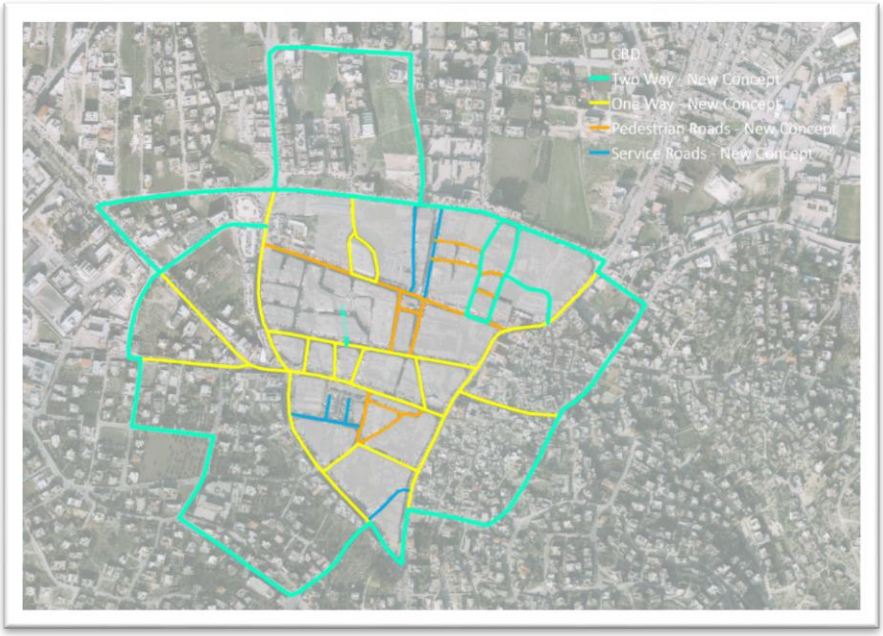
Map 48: Western Public Parking



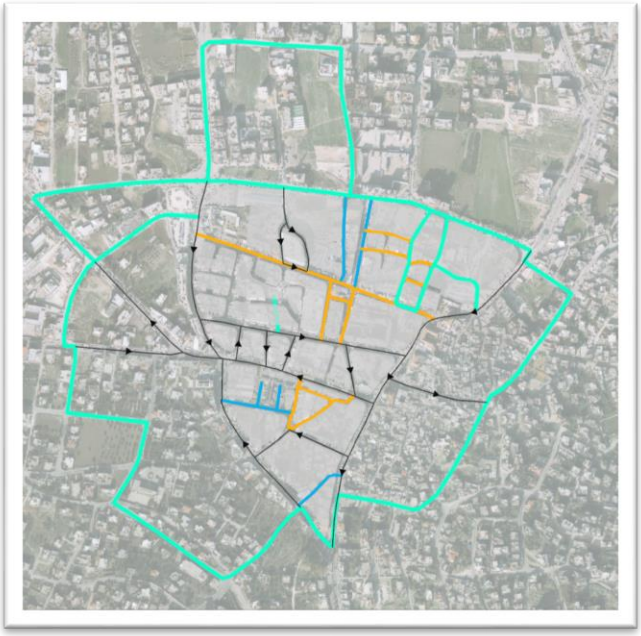
Map 49: Old Buffer Zone for Taxi Offices



Map 50: New Buffer Zone for Taxi Offices



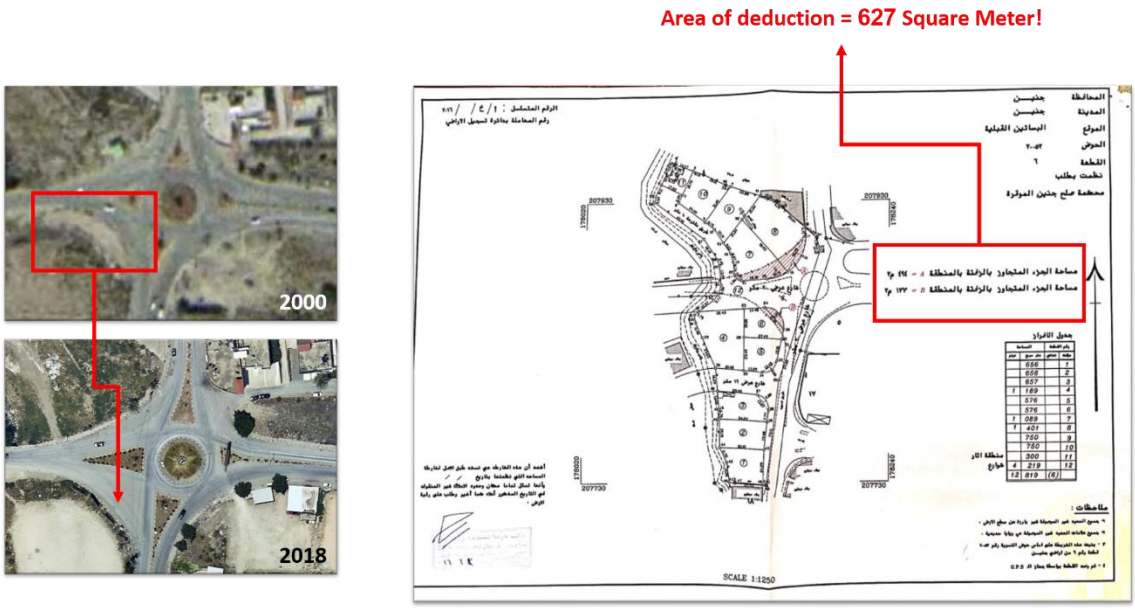
Map 51: Old Circulation



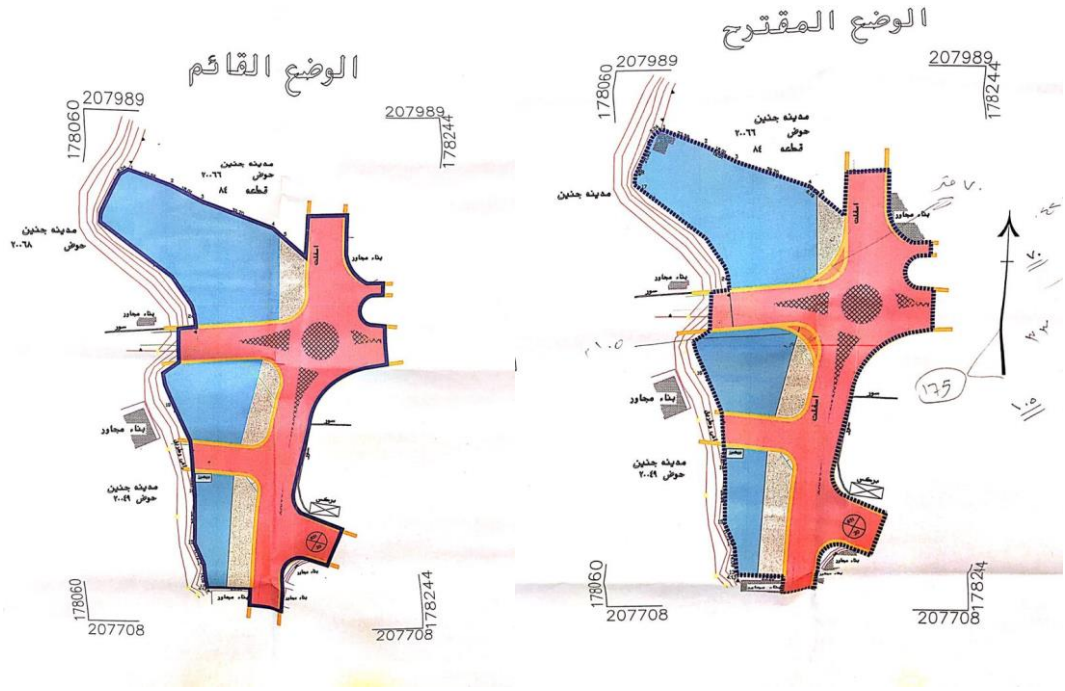
Map 52: New Circulation

Design Problem

Governorate: Jenin - City: Jenin - Location: To the west of the CBD - Block: 20052 - Parcel: 6

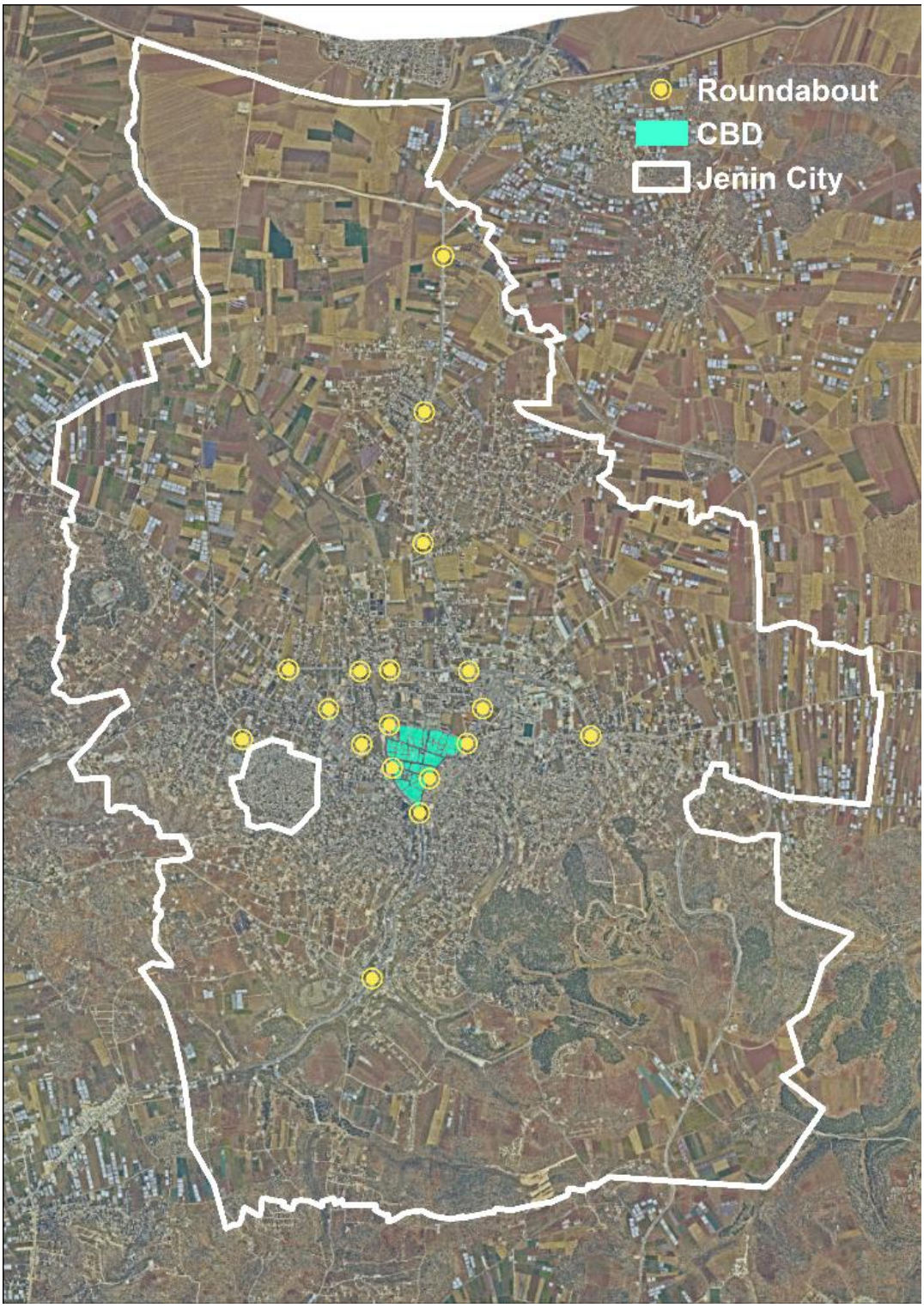


Map 53: Design Problem

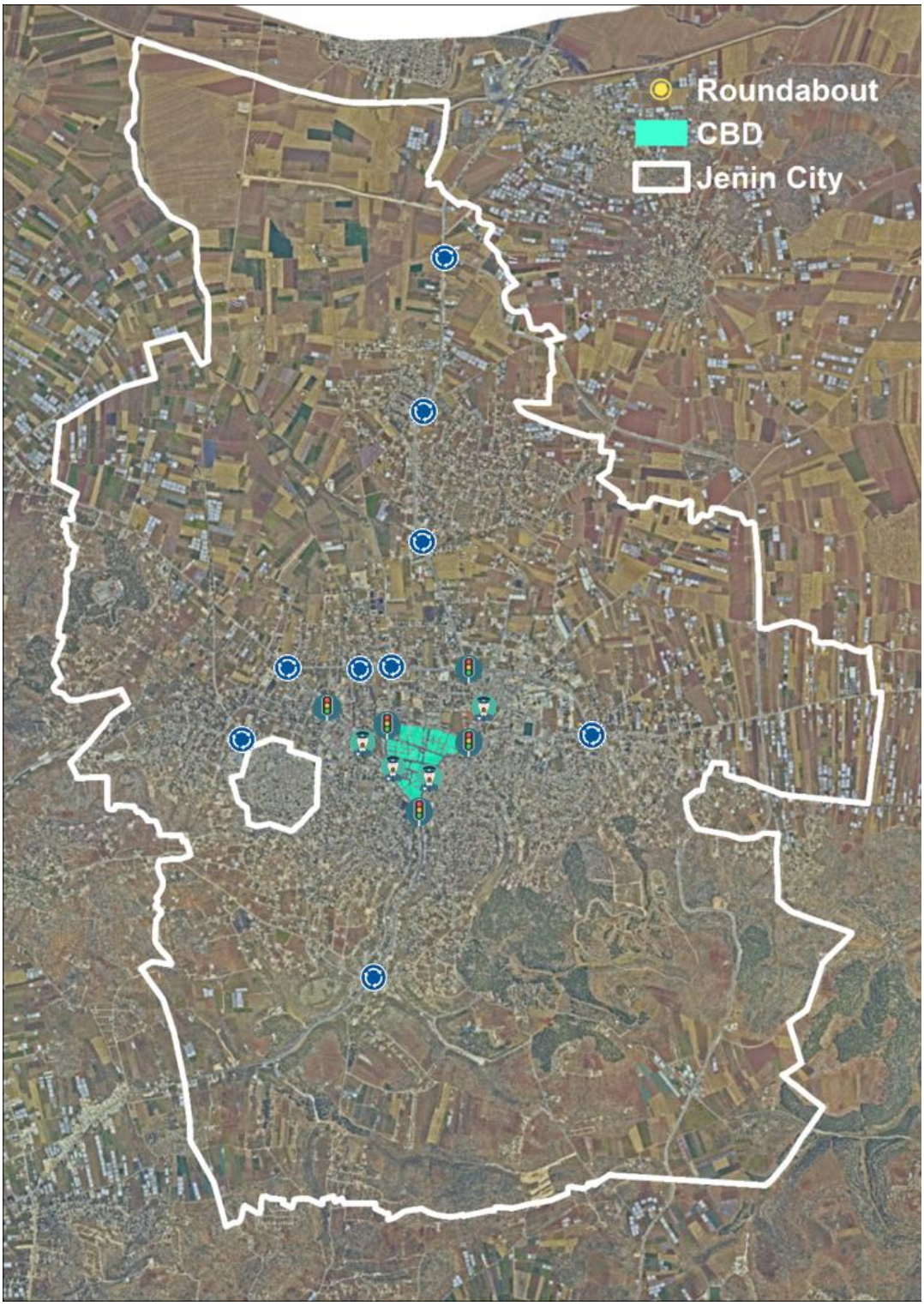


Solutions are legally rejected

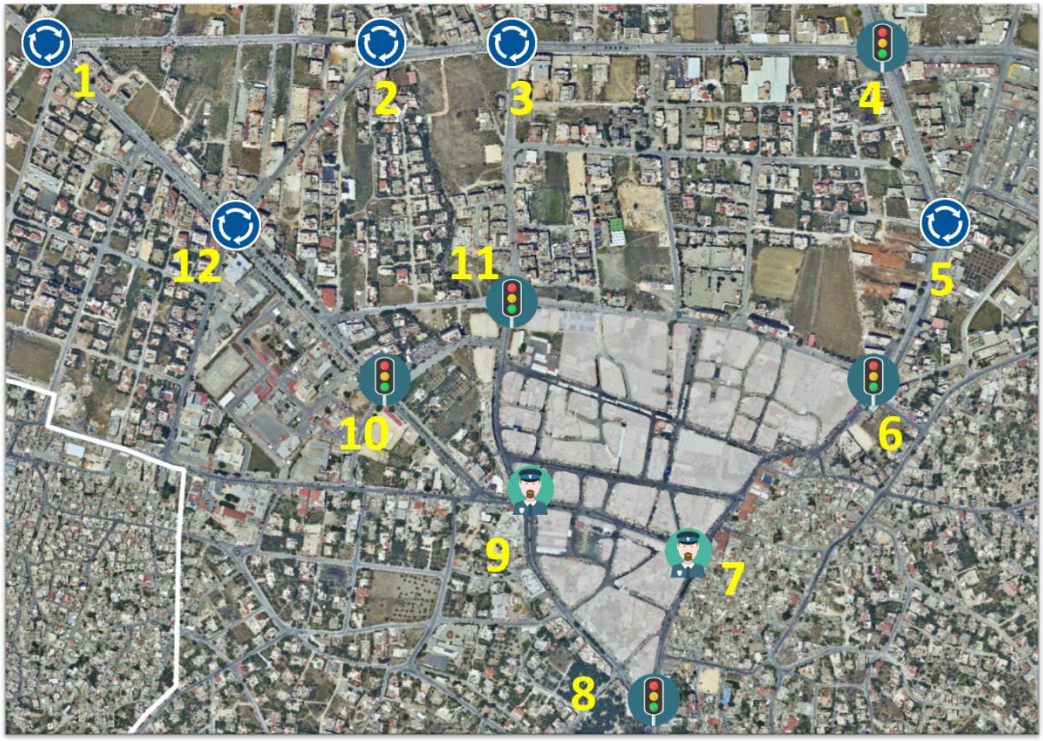
A distinction must be made between transit and destination at the entrances to the city



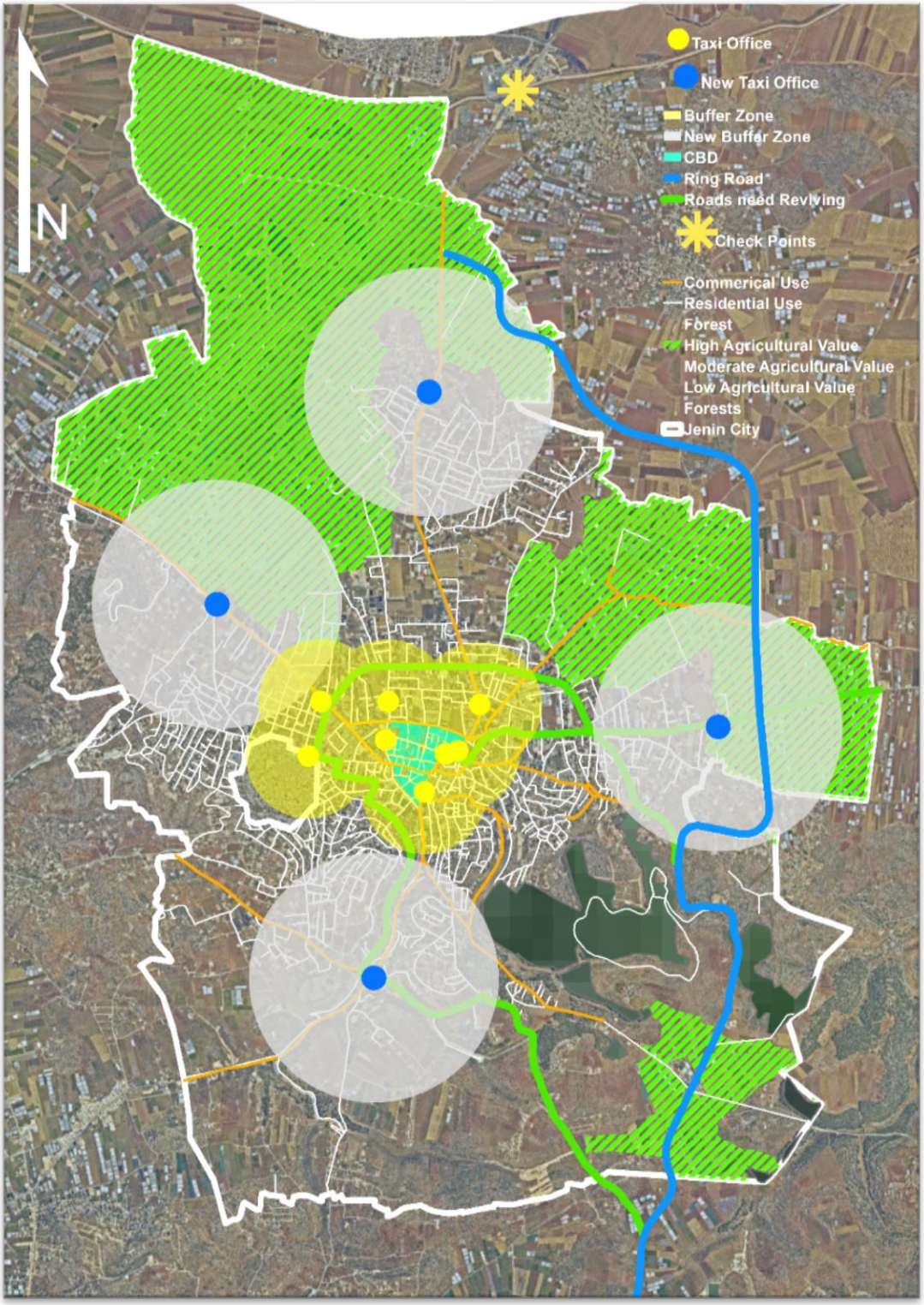
Map 54: Main Intersection in Jenin City



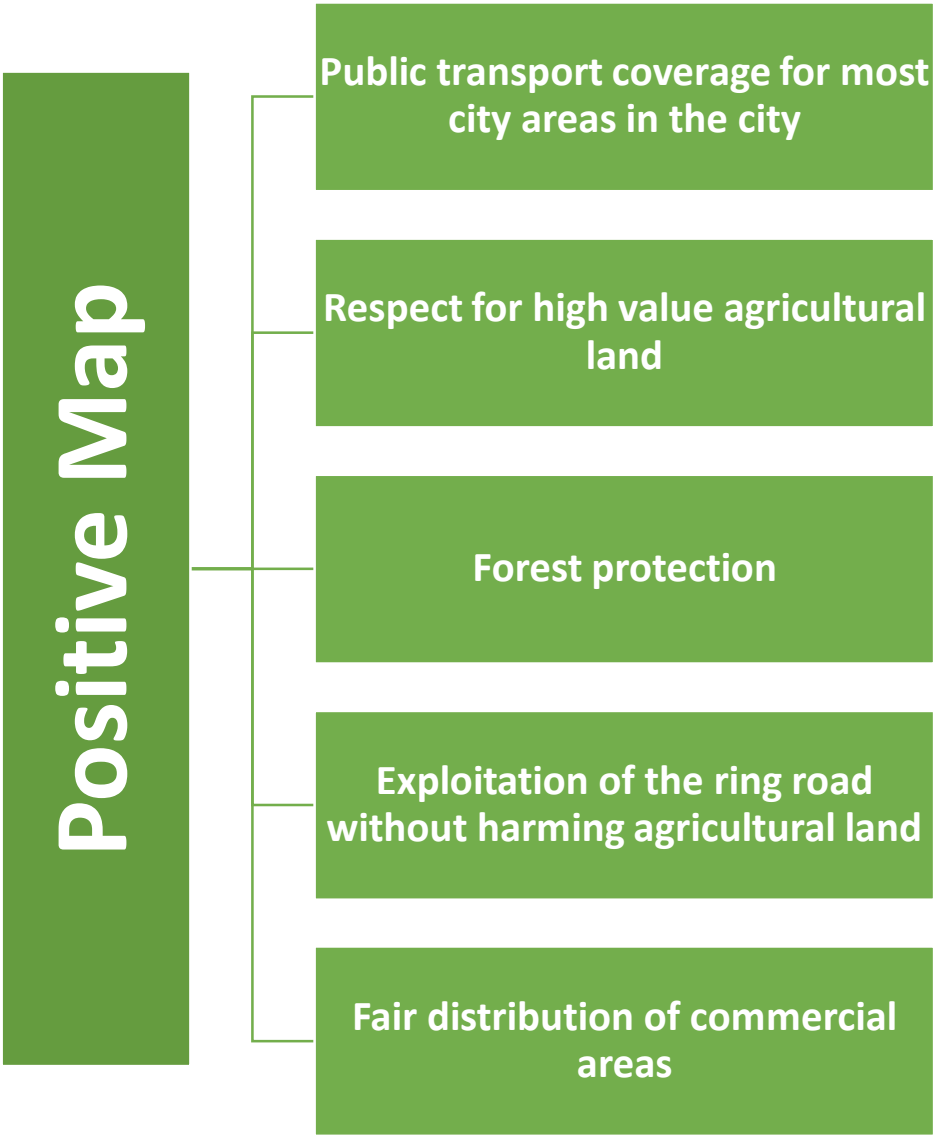
Map 55: Organizational solutions for each intersection

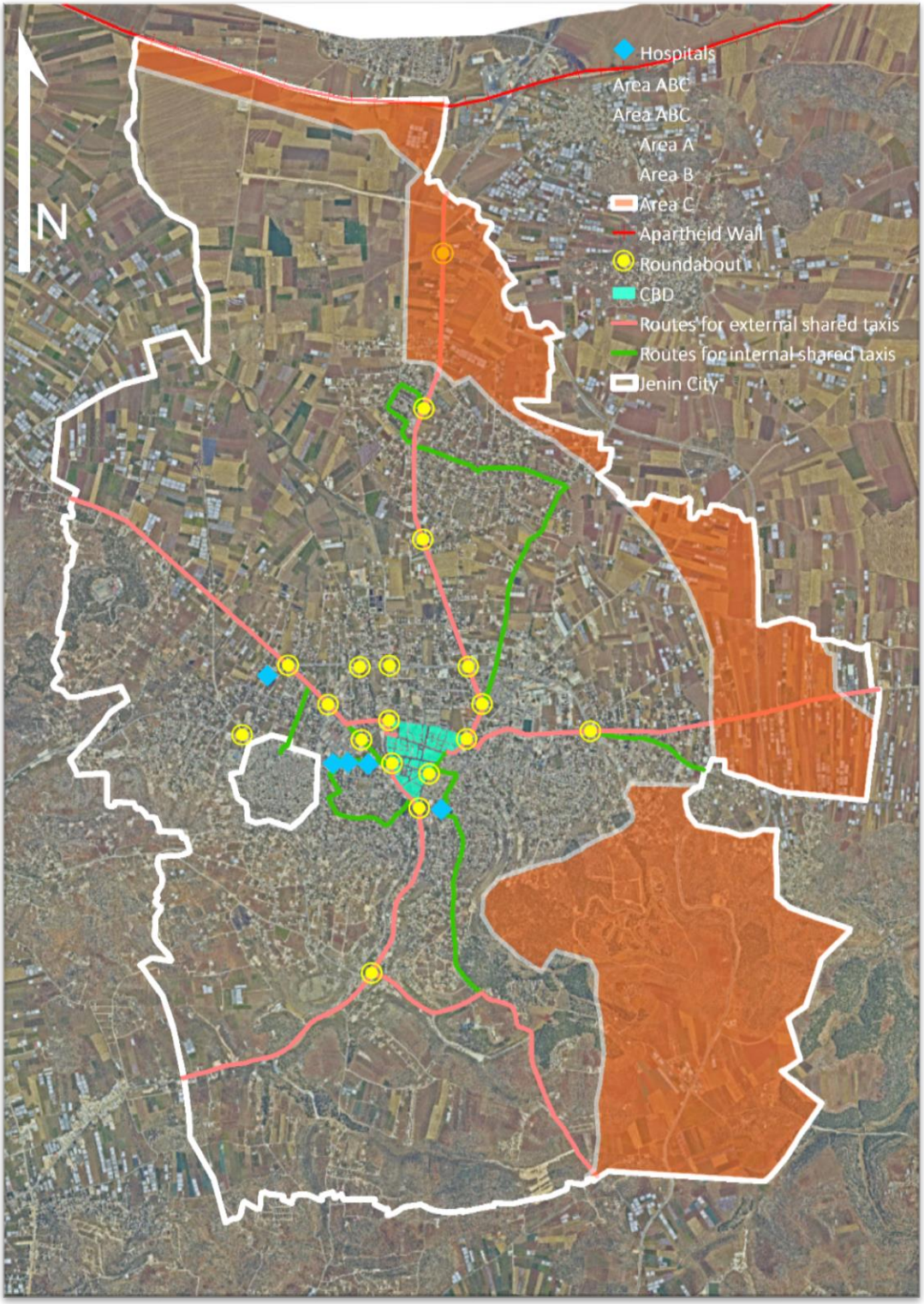


Intersection Number	Level of Service
1	C
2	C
3	C
4	D
5	C
6	F
7	F
8	F
9	F
10	D
11	F
12	C



Map 56: Positive Map


Positive Map
Public transport coverage for most city areas in the city
Respect for high value agricultural land
Forest protection
Exploitation of the ring road without harming agricultural land
Fair distribution of commercial areas



Map 57: Negative Map

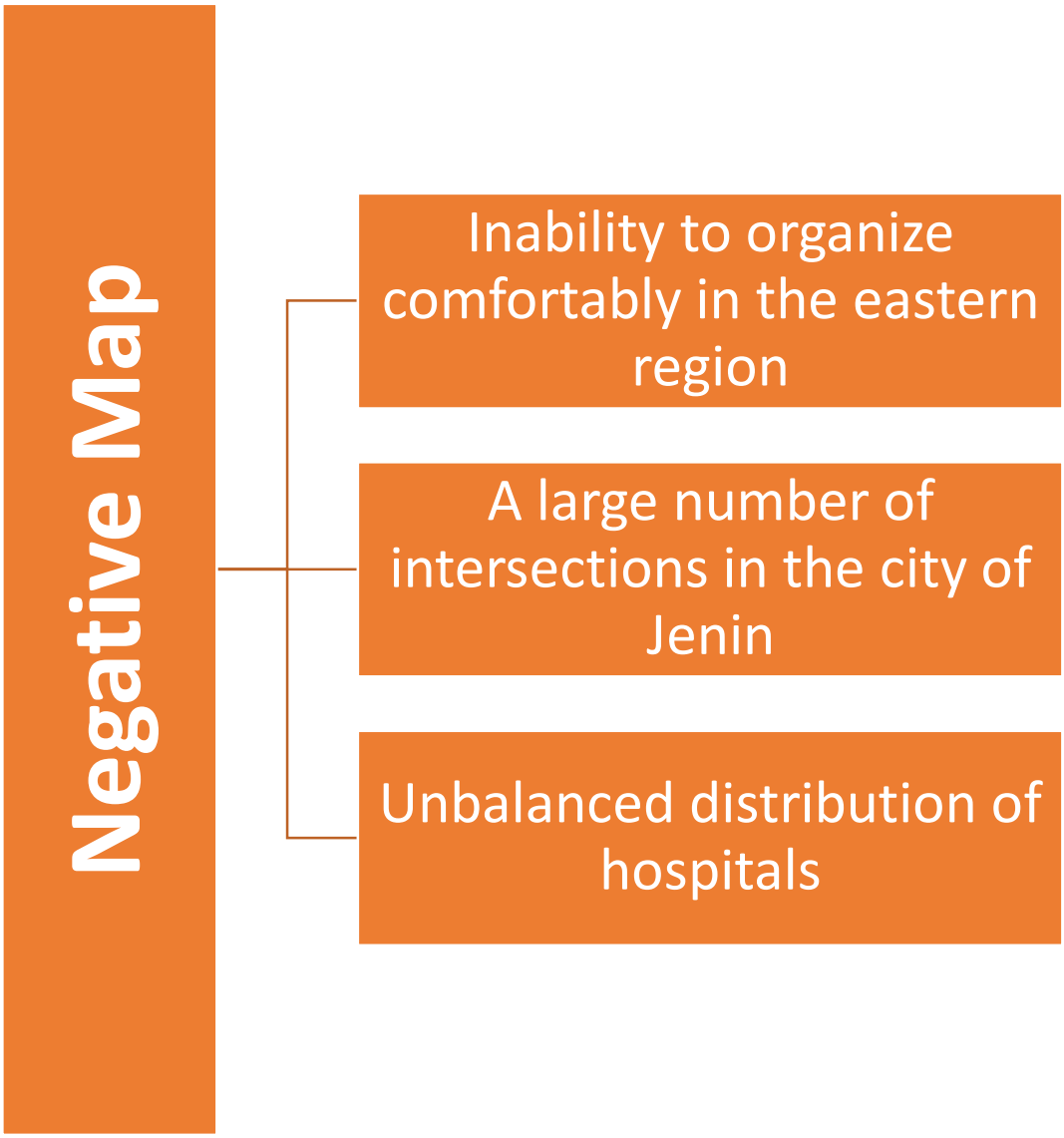
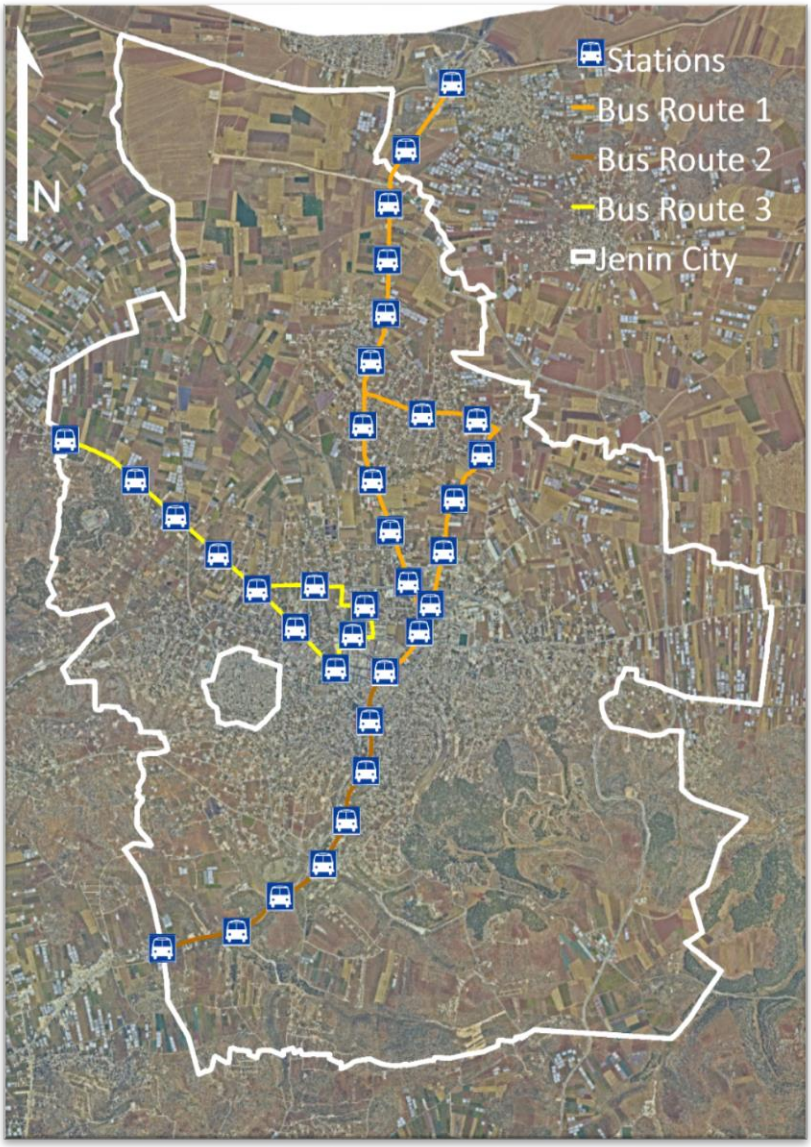

Negative Map
Inability to organize comfortably in the eastern region
A large number of intersections in the city of Jenin
Unbalanced distribution of hospitals

Table 11: Main Goals

Economic Benefits	Social Benefits	Environmental Benefits
Savings in transportation costs	Improved transportation options and choices	Green space
Increasing the demand for public services	Community cohesion	Reduced air pollution
Transfer more efficient	Increased physical activity and health	Reduced resource consumption
	Congestion reduction	Reduced water pollution
		Reduced "heat Island" effect

Figure 8: Issues



Map 58: Transportation System

Table 12: Route Length

	Route 1	Route 2	Route 3
Length	9 Km	4 Km	5 Km
Speed	40 Km/h	40 Km/h	40 Km/h
Trip Length	45 Min	20 Min	25 Min

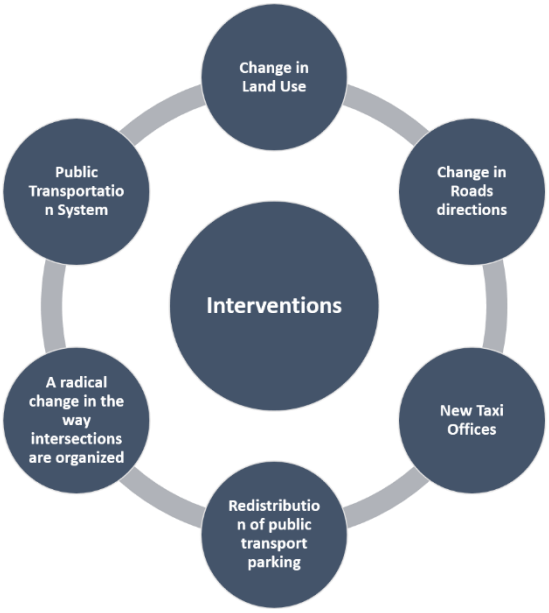


Figure 9: Conclusion

Thank you