REPUBLIC OF CYPRUS
Ministry of Communications and Works

"THE NICOSIA INTEGRATED MOBILITY MASTER PLAN"

FINAL REPORT

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SUMMARY

Nicosia depends too heavily on private motorised transport

Nicosia, the Capital of the Republic of Cyprus, faces serious traffic problems. Too long, the urban transport policy has been characterized by a one sided focus on the private car. As a result, Cyprus has at present one of the highest car ownership ratios in the world (more than 600 cars per 1.000 inhabitants) and a very low use of green transport. In the Greater Nicosia Urban Area, the share of trips by Public Transport is only 3% and cycling even lower, 2%.

The continuous increase of traffic problems has serious effects on the city's environment (air pollution, noise, etc.), road safety and the quality of life and as a result the city's attractiveness for business, shopping and living is reduced.

The IMMP is a Turning Point for Transport Policy

The Government of Cyprus and the Local Authorities have the ambition to ameliorate this situation, by increasing the share of Public Transport, Cycling and Walking and at the same time upgrading and completing the road network. The share of Public Transport Trips must be above 10% by the year 2020. In order to achieve these ambitious goals a sustained effort must be made to implement a series of measures. Measures related to all Transport modes must be implemented, that complement and integrate with each other. In order to meet the need for co-ordinated agreed actions/measures the Integrated Mobility Master Plan (IMMP) for Nicosia was developed.

The IMMP is about achieving *Sustainable Mobility*, using Public Transport, Cycling and Walking as modes of transport that are best suited for the urban environment. Increasing densities in specific urban areas, in other words a Polycentric Spatial Development, is an important precondition to achieve growth in sustainable modes of transport. The Local Plan for Nicosia includes such a Polycentric Spatial Development.

The Polycentric Nicosia needs excellent sustainable transport provisions that can compete with the private car. This means:

- Put in place a proper PT network with an excellent PT Service
- Provide for safe cycling, in order to play a major role for short and medium length trips
- Create a pedestrian friendly Nicosia
- Balance the allocation of road space: Give space to the car where needed, but at the same time make sure that other modes of transport are well provided with appropriate infrastructure, where necessary by redistributing the available space in favour of sustainable means of transport.

The IMMP is the beginning of a long term sustainable effort for improving mobility in the city rather than the end. There is an agreement amongst Stakeholders on the direction based on IMMP proposals, but all must put considerable effort to actually achieve this change and -maybe more importantly- in cooperation with each other. In order to enhance cooperation amongst all stakeholders, the Municipalities of the Greater Nicosia Area and the Government have agreed to establish a Transport Authority for the Greater Nicosia Area. In the Transport Authority the stakeholders involved (Municipalities and Government Departments) will decide on all relevant planning issues. This will make policy making much more effective.

An Excellent Public Transport Network

Two Public Transport Networks have been defined and evaluated:

- a network of **radial** configuration i.e. most of the bus lines having one of their terminals in the centre of Nicosia (Solomou Square) and
- a network of **multi-centre** configuration i.e. a network of lines terminating in the centre of Nicosia and also at other peripheral centres of activities, namely in the area of the New Hospital, in the area of the Makarion Stadium, at Strovolos near the municipality building, in the area of the University of Cyprus and in the area of Intercollege.

The multi-centre network (Figure 4.1) is the preferred network. The main advantages of this network are:

- It serves more passengers. The Network will be able to attract just over 10% of all trips made in Greater Nicosia for year 2020. In this figure the proposed changes to the road system were taken into account
- It can easily be modified to incorporate a tram network. It has fast and straight lines that run between ‘centres’ -trunk lines- and local bus services that feed the trunk lines. Three of the fast and straight lines can be replaced by trams and the feeder bus service will continue to connect the lower density residential areas with the tram lines

- It reduces the number of trips through the central area of Nicosia, in other words: it gives the opportunity for more efficient east west trips
- Accordingly less space is needed within the bus terminal in the central area of Nicosia

The network also has disadvantages: it leads to a larger number of transfers and longer average trip duration. However, the Multi-centre Network serves better the travel demand.

The **speed** of the Public Transport Service is very decisive for the number of passengers that the network attracts. Where congestion occurs and where the number of busses passing justify the introduction of bus lanes, these will be implemented. The planned bus lanes are shown in Figure 4.2.

Park and Ride

The Multi-centre network is a good precondition for Park and Ride facilities. The provision of parking places near the centres that function as Public Transport terminals will give car drivers the opportunity to park near a well developed supply of Public Transport.

The introduction of Trams might be feasible

A tram network of three lines connecting the four major centres in the area, the centre of Nicosia (Solomou Sq.), the New Hospital Area, the Makarion Stadium Area where the Administration Centre will be developed and the Strovolos central area has been considered (Figure 4.3). A Cost Benefit Analysis was carried out. Although many variables can not yet be determined in sufficient detail the analysis shows that the introduction of a tram could well be feasible. A detailed feasibility study following the IMMP should be carried out.

The Road System must be completed and managed in a different way, in order to serve all modes of transport

A number of road infrastructure projects are being recognised as important and feasible within the 2020 horizon of the IMMP. The completion of the road network is considered extremely important if the movements predicted for the year 2020 are to be served by all modes of transport.

The IMMP comprehensively improves conditions for Public Transport, Cycling and Walking and reallocates space to all modes of transport, including car, in accordance with the policy that underpins the Plan. In the Framework of the IMMP several options of how to make the road system more efficient, have been evaluated. The Preferred Alternative includes an extensive one way

road system, shown in figure 5.2. This one-way system will improve the capacity of the network and give the opportunity to implement bus lanes, Cycle tracks and pedestrians' provisions. One way streets offer better flow as the turning movements on these streets are generally less complicated and the number of conflicts at intersections are limited. It has to be accepted that the number of kilometres in the whole network slightly increases.

The following one way solutions can be indentified on the map:

1. Pairs of main arteries that will serve entry and exit to the city for the private car and that will offer the opportunity to include bus lanes on these main arteries where justified. The pair Dimosthenous Severi (from Proedrikou Megarou roundabout to Griva Digeni) and Kyriakou Matsi/ Nikis is a good example.
2. One-way systems along collector roads to ensure that access onto the main roads that are converted to one-way can be facilitated, without lengthy diversions; John Kennedy and Armenias (from the junction with Ifigenias) with Arsinois, Glafkou, Kratinou is a good example
3. One way systems in (mainly) residential areas enclosed by arteries. The one way systems in these minor roads will prevent traffic from diverting from the arteries looking for short cuts to avoid possible congestion on the arteries. An example is the area between Makarios Avenue and Nikodimou Milona street: after implementation of these changes it should not be attractive anymore to drive through the area trying to avoid congestion on Makarios Avenue.
4. A one way system in the walled city of Nicosia. The walled city is suffering from quite a lot of through traffic at the moment, as many drivers at least feel it is faster to go through the walled city when going from one side to another. A few 'loops' were created that guarantee accessibility for the traffic that has a destination in the area, but at the same time protects the residential and commercial function of that part of the city because it reduces traffic flows considerably. The one way system shown here is in line with the proposals included in the Nicosia Master Plan, the bi-communal plan that anticipates on a reunion of the two communities.

These changes still need to be carefully detailed in the implementation process. Some critical intersections have gone under functional redesign to confirm that the proposals are feasible. New designs have been made for the following junctions:

- Griva Digeni – Lordou Vironos – Agion Omologiton junction (Figure 5.4)

- Griva Digeni – Dimostheni Severi junction (Figure 5.5)

- Griva Digeni – Themistokli Dervi – Nikis – Kyriakou Matsi junction (Figure 5.6)
- Spyrou Kyprianou – Digeni Akrita –Makariou junction (Figure 5.7)
- Digeni Akrita – Nikodimou Milona junction (Figure 5.8)
- Digeni Akrita– Kalipoleos junction (Figure 5.9)
- Kosti Palama – Omirou – Diagorou junction (Figure 5.10)
- Alluminium Tower junction (Figure 5.11)

Organise/regulate Parking!

Parking today has a negative impact on the cityscape and it limits the operation of bus service, cycling and walking. The IMMP recognises very well the need for a parking policy. A complete policy must be developed as a follow up of the IMMP. The starting points of such a policy are:

- The optimisation of existing parking space availability by promoting short term parking instead of long term. In fact there is enough space available, although some of that space is situated on private land.
- The creation of incentives for the provision of new or alternative parking space, e.g. by raising the price for parking. At the moment the price of parking does not account for investment in new spaces.

Enforcement of existing and new parking regulation is an important part of the parking policy. Furthermore two other key issues were identified:

- The need for better information about the parking situation (e.g. a good Parking Guidance System).
- Improve the quality of the parking system, where necessary improve the permit system for residents and introduce afterward payment at parking lots (Access bars at the entrance/exit and automatic Payment Machines).

Create a Comfortable and Safe Cycling Network…..

A bicycle network will be implemented throughout the city, in order to promote alternative ways of mobility. With bicycle lanes running among major axes, people will be encouraged to access commercial and other activities using greener and more gentle means of transportation. The Cycling Network is shown in Figure 6.1.

A backbone network that will be implemented in the very short term is also defined. It connects all the Universities in the City with the centre of Nicosia and with the existing track along the Pedieos river.

….And more space for the Pedestrian

The most basic provisions for pedestrians still need to be completed. But the IMMP also indicates locations that could be made available exclusively to pedestrians: Leonidou and Mouseiou streets and Part of Makarios Avenue. These streets must be regenerated, for which first ideas are included in the IMMP.

Implementation Programme

A phasing of the works is proposed in three phases: 2010-2012, 2013-2016 and 2017-2020. It is illustrated in Figures 7.1, 7.2 and 7.3 for Public Transportation and Road Network and in Figures 7.5, 7.6 and 7.7 for the Cycling Network.

And Finally: A Marketing Plan must create support

The Marketing Plan addresses two groups: first the decision makers and second the stakeholders. Both must be committed to the IMMP philosophy which aims to improve mobility and the environment in Nicosia. Further positive public contribution shall be made in the process for promoting the measures that are aimed at increasing the share of sustainable modes of transport and improving the City's environment.

1 INTRODUCTION

The Capital of Cyprus faces huge problems in terms of urban transport. The existing situation does not meet the standards of a modern European city, offering access to economic and social destinations, taking into account equal opportunity, care for the environment, conservation of cultural heritage etc. Too long the transport policy for Nicosia has been characterized by a one-sided focus on the private car. The government of Cyprus and the local Authorities want to change that. This Integrated Mobility Master Plan (IMMP) is ambitious and focuses on the actual achievement of changes.

This IMMP is divided into the following seven chapters:

Chapter 1. gives the scope of the Integrated Mobility Master Plan and describes the contents of the Final Report.

Chapter 2 gives the vision and the general strategy for the sustainable mobility development in the Greater Nicosia Area by 2020.

Chapter 3 summarizes the procedures for selecting and elaborating the proposed transportation system.

Chapters 4, 5 and 6 describe the preferred transportation system, namely:

> Chapter 4: The development of the Public Transport System.
>
> Chapter 5: The Proposed Road System and Traffic Management for private motorised transport.
>
> Chapter 6: The Plan for supporting non-motorized transport development (bicycles, pedestrians)

Chapter 7 proposes a Phasing of Implementation.

Chapter 8 proposes a Marketing Plan to help to the success of the above development.

2 NICOSIA STRATEGY FOR SUSTAINABLE MOBILITY DEVELOPMENT UP TO 2020

2.1 Vision of the Nicosia City Up to 2020

Today, Nicosia is a city which was built on the basis of the car, because main spatial organizational parameters are such that residents are encouraged to extended use of the car.

“The Integrated Mobility Master Plan” outlines an urban transport concept that will help guarantee the accessibility of the Greater Nicosia Urban Area. Sustainable modes of transport will play an important role in these concepts.

The transformation of Nicosia to a different city obviously requires large changes in both urban and transportation planning. Traffic is a result of the town planning and organization of a city. The transport mode choices of the people depend, in addition to geography and nature of transport infrastructure, on additional parameters such as:

- The way the cities are structured,
- The densities, the location and the mixture of different land uses,
- The distances between land uses,
- The efficiency and quality of public space

The Vision for a sustainable Nicosia should not be considered as an issue of having only technical content but also social and political. It is directly related to the quality of everyday life, to the cohesion of the urban society, to the urban environment and to the social life.

The city is expected to increase considerably up to 2020. The population will reach approximately 280.000 inhabitants (1,5% yearly growth) and the employment will exceed annual growth of 2,5% during this period. This will result in a transportation demand of 740.000 - 800.000 daily trips in the Greater Nicosia area in ten years from today. Thus the operation of the future co-modal transport system and the spatial organisation of Nicosia should in 2020 be at a level that could efficiently accommodate and serve in an environmentally friendly way, the increased mobility needs.

The alleviation of the division of the city is a priority for the future. However, additional priority objectives are formulated, such as for Nicosia to become a place with a more dominant presence of the population in the open public spaces, more favorable to human relations, more consistent to the history and the identity of Cypriots, friendlier to inhabitants and visitors, more accessible to children and people with special mobility needs.

2.2 Hierarchy of Strategic Approach for Sustainable Mobility Development in Nicosia

Achieve a Polycentric Spatial Development.

Nicosia has to achieve the form of a city that would support sustainable and efficient public transportation. This would be the form that would show potential PT customers concentrations over short distances from the PT network stops. The densely built modern centre comprises obviously a good source for public transport passengers. However, this is not sufficient because outside the centre the urban sprawl cannot be easily filled within the influence zones of the stops. The only way to change this is the creation of local centres in the area.

In order to turn Nicosia into a city that will be based on public transport, a major project needs to be developed that concerns the entire area of the city, both the centre and the periphery. It is a project of urban reorganization having as objective the adaptation of the public transport network geography by the city. This will necessarily adapt with the topology of the radial PT lines linking the suburbs to the centre.

Already some activity concentrations, particularly commercial, start to be formulated. Primarily these need to be strengthened. Several are located near to industrial areas, which tend to be abandoned, offering a good opportunity for introduction of other uses that are needed today by the city.

Local centres could be developed for example by the Mall of Cyprus where there are other commercial uses, a large hospital complex, the forest of Athalassa and very near to the university campus, in the exhibition centre, in the area east of the old town where now garages and similar uses are installed, etc. Almost all candidate regions have interfaces with university campuses so it is possible to achieve the desired mix of activities.

These local centres are located along corridors connecting more remote residential blocks, which could also be easily served through their expansion, when these local centres are connected to the modern centre through extended public transport. It should also be noted that, with the reunification of the city, the roads connecting the occupied with the Government controlled part will immediately meet the proposed local centres both to the east and west of the old town thus preparing in such a way the sustainable reception of the new traffic flows crossing from the north side.

Develop a proper PT network

The development of public transportation may be based on the creation of PT terminals at the periphery of the city (in line with the polycentric development above) which will be connected through radial high frequency and high capacity transit lines with the modern centre. This development pattern of public transport network complies with the proposed town planning scheme only if the local centres coincide with intermodal terminal, as it can feasibly develop in Nicosia.

Improve the quality of the PT Service

Attracting the population to the use of PT, requires the organization and the operation of an efficient and high quality service. This implies modern and environmentally friendly fleet and improved physical and ITS infrastructure at the terminals and the stations. Additionally, the provision of priority to PT through dedicated lanes creates direct competitive advantage for PT compared to private cars while it provides the opportunity for shared capacity schemes with the other sustainable modes of transport.

The study proposes a number of interventions at this level and defines the path for the gradual development of PT services and infrastructure, considering also the development of a TRAM network for the future.

Start to make cycling a major transport mode for short and medium length trips

In order for the bicycle to be selected as a transport mode the environment should be human, healthy, friendly, clean and beautiful. Only in an attractive city the bicycle will have a place and will be able to be developed. This points to a dignified and courageous inclusion of cycling in Nicosia by creating infrastructures at key radial routes of the city.

The Cyclist wishes to use clear, straight routes (for the cyclist this is even more important than for the car driver) that follow main arteries and that access commercial and other activities typically located along major axes. There are places where the car doesn’t follow the shortest possible route. In these cases the cyclist should have shortcuts that offer an advantage over the car.

In the areas between the arteries the Cyclist should feel him- or herself ‘at home’: it should be a quiet, friendly environment, without high speeds, where both the pedestrian and the cyclist feel safe and can choose any route, just as it suits.

It should be noted that in order to achieve this improvement for the cyclist the available space must be redistributed from the car to the cyclist at selected locations.

Create a pedestrian friendly Nicosia

The sustainable Nicosia of tomorrow should be rich in human presence, open and friendly to pedestrians. The quality and density of walking is the more representative life quality index in an urban environment.

Currently the use of motorized transport, even for very short distances, is the most 'common' solution in Nicosia. Walking is restrained only at the start and the ending part of a motorized trip. Safety conditions at roads create hostile environment for pedestrians.

Nicosia needs a dedicated policy for pedestrians that will vindicate and encourage walking. Such a policy should comprise:

- The development of a pedestrian network in the city centre.
- The basic pedestrian infrastructure development along roads.
- Road safety measures and campaigns focusing on the safety of pedestrians.
- The creation of protected dedicated areas for pedestrians that have a special character and function for the city.

The study proposes a number of measures that substantiate the above policy.

Balance the role of the car

The private car is the dominant mode in Nicosia serving about 90%of the daily trips. This situation has to be reversed gradually with a policy that will not "penalize" private motorized mode but will lead to the use of car for specific categories of trips in the Greater Nicosia area.

Such a policy is articulated to four levels:

1. Apply a road capacity hierarchy scheme for the network in order to achieve channelization of traffic to main roads and gradually restrain the use of car as approaching from the periphery to the Modern centre.
2. Introduction of a one–way roads system in the city centre with main emphasis on the creation of the necessary space for public transport, cycling and side pedestrians' infrastructure.
3. Enhancement of the functioning of critical intersections, introducing one-way roads for achieving fluid traffic conditions along the main axes.
4. Proper development of the road infrastructure to better serve the existing and proposed land uses and to avoid movements through residential and other sensitive areas.

2.3 Create a Transport Management Authority

The decision making process to facilitate mobility within the Greater Nicosia Region is proposed to be carried out by a Transport Authority which should be established as soon as possible. In fact there is an agreement between the Minister of Communications and Works and the Mayors of Greater Nicosia to have such an Authority in place within two years. This Transport Authority for the Greater Nicosia Area will be in close cooperation with the Ministry of Communications and Works as well as with the Department of Town Planning and Housing of the Ministry of Interior, where the transport planning framework as well as other activities will be carried out in compatibility with a transport Policy at the national level. This Authority can be:

1. *Alternative 1*. An independent unit with a president and a general manager that are appointed by a Board of Directors of the Municipalities of the Greater Nicosia Region. The Ministry will be represented in the board. The rest of the board members will be appointed by the various social, economic, educational, labor etc. unions.
2. *Alternative 2*. An independent unit with a President and a General Manager that are appointed by the Board of Directors. The Board of Directors will consist only of representatives of the Municipalities.

Considering the overall transport situation in Cyprus today as well as the specific transportation requirements and characteristics of the Greater Nicosia Area it seems that the first alternative is the most realistic to be applied immediately. Later on when institutions have matured the second alternative would be preferable.

The Transport Authority will be responsible:

- For all levels of planning (strategic, operational, detail) of the major road network (motorway and arterials) of the Greater Nicosia Region. The major network must be defined on the basis of the existing proposals, updated according to the proposals of the IMMP study. The rest of the network, (collectors and local roads) shall be completed by the Transport Authority in accordance with town planning best practices and principles as these shall be drafted in a Streetscape Manual.
- For all levels of planning for public transport serving the Greater Nicosia Region. The municipalities could also establish a network of public transport lines providing special services within the boundaries of a municipality or group of municipalities, including feeder routes to the Greater Nicosia Region public transport network.
- For monitoring the operation of the major road network and for applying measures to improve the provided level of service.

- For monitoring the operation of the public transport system and for applying measures to improve the provided level of service.
- For negotiating and awarding concessions to private operators of public transportation.
- For setting fare policies and fares for public transport, for taxis and for parking and monitoring and enforcing their implementation.
- For evaluating and approving the connection of major traffic generators such as supermarkets, shopping centres, garages and parking lots over a specified minimum number of parking spaces etc. with the major road network.
- In general for a coordinated planning, designing, financing, implementing, construction, management, operation, maintenance etc. in the Greater Nicosia Region, by properly combining the available potential of each Municipality, avoiding duplicated and uncoordinated efforts.
- Setting up policies and monitoring their implementation for pedestrian and cycling networks.

3 THE BASIC CONCEPT FOR THE IMMP

Various alternative scenarios were examined and evaluated in order to arrive to the preferred scenario described in the next chapter. The target year for all scenarios examined was 2020 for which the same assumptions were made for the size and geographic distribution of population, socioeconomic situation, land uses and car-ownership. The Nicosia Local Plan, under revision by the Department of Town Planning and Housing of the Ministry of Interior, was taken as a basis for the formulation of the scenarios. It was also assumed that the Public Transport improvements in fleet, infrastructure, traffic management and organization (new buses, terminals, shelters, stops, lanes, bus priorities, new technologies, new services, extension of operation time etc.) will be similar for all alternative scenarios examined.

Alternative scenarios, considering alternative measures, were examined and evaluated for two major components of the IMMP, namely Public Transport and the Road Network. Within the alternatives all basic assumptions as mentioned above were kept constant.

The alternative scenarios were evaluated with the use of appropriate forecast models (Appendix Chapter 3.1). A concept that showed the best results in terms of the number of trips served by Public Transport, the amount of kilometers covered by private motorized traffic and the overall level of congestion was selected as preferred for future development.

Future alternative scenarios were also evaluated from a point of view of their environmental impact. It shows that an improvement of the public transport network increases the local environmental quality considerably. In most roads of the main network of Nicosia emissions of pollutants are reduced, as are the noise levels.

It was further explored how this concept could be optimised. Based on these analyses a final concept was developed that includes:

- Pedestrianisation of Makariou Avenue (between Evagorou and Digeni Akrita Avenues)
- The multi-centre Public Transport Network
- € 1 for a single fare ticket for Public Transport. This is an acceptable price for a good product, lower than the price for a single fare ticket today and it is a very easy and clear price for the user
- An extended system of one-way streets in the areas between the main arteries, i.e. in the residential areas, which avoids through traffic looking for shortcuts in these residential areas and concentrates the traffic on the main arteries.

The development of this concept is discussed separately for Public Transport in Chapter 4, the Road System for vehicles in Chapter 5, and for non-motorised Transport in Chapter 6.

Two public transport networks with different characteristics were evaluated: one is a Multi-centre network that puts the focus on the connection of many possible centres in the urban area, the other is a Radial network that focuses on the Town Centre as the main attractor of trips. Although the Multi-centre network does better in the calculations than the Radial network, it is not obvious that this will show in practice as well. For instance, the Radial network, as it was developed in this study, is much closer to the existing situation and therefore will be more clear to potential travellers. Therefore it is a good starting point for implementation in 2010. The Multi-centre network however is a good concept for a gradual development. This will be supported by a policy that aims to strengthen the centres of the Greater Nicosia municipalities. Furthermore, the transformation to a Multi-centre Network will be necessary to support the use of a tram, in the case that that mode will be built on the medium to long term. This is another reason to adopt the Multi-centre network in the preferred 2020 scenario.

4 DEVELOPMENT OF THE PUBLIC TRANSPORT SYSTEM

4.1 Introduction

The proposals that have been developed for the Public Transport (PT) system of the Greater Urban Area Nicosia for the year 2020 have taken into consideration:

- the existing PT system and its evolution through the last two decades,
- the attitude of the residents of the urban area towards the usage of PT as this has been expressed in the telephone survey which has been conducted within the context of the study,
- the objective set by the government of Cyprus to design a PT system that can attract at least 10% of the trips,
- to promote the development of the urban area towards the objectives of the official Town Plan.

The major challenges in achieving the above objectives have been:

- the low densities of the urban area,
- the very high car ownership and use and the very low use of public transport,
- the dispersion of trip generation throughout the urban area,
- the high percentage of trips made during the peak hour and
- the very bad image of the existing public transport system.

4.2 Alternative PT Networks and Evaluation

Two PT network configurations have been defined and evaluated at the strategic and operational levels of planning:

- a network of radial configuration i.e. most of the bus lines having one of their terminals in the centre of Nicosia (Solomou Square) and
- a network of multi-centre configuration i.e. a network of lines terminating in the centre of Nicosia and also at other peripheral centres of activities, namely in the area of the New Hospital, in the area of the Makarion Stadium, at Strovolos near the municipality building, in the area of the University of Cyprus and in the area of Intercollege.

For the two networks to be comparable, the area coverage, the average overall frequencies of service and the resulting bus fleet were practically equivalent. Both networks have been applied to the same road network.

The basic characteristics of the two PT networks i.e. number of bus lines, length of bus lines, overall service frequencies, hours of service, are shown in the following table.

Table 4.1 Basic Characteristics of the Defined Public Transport Networks

PARAMETER	RADIAL NETWORK	MULTI-CENTRE NETWORK
Number of bus lines	31	35
Length of bus lines kms	642	640
Daily number of bus trips	2.808	3.103
Area coverage (Sq. Kms)	82,7	84,2
Number of bus stops	732	746
Hours of operation	05:30 – 23:00	05:30 – 23:00

The assumed initial frequencies of service of the bus lines and the resulting supply (passenger seats offered by line per direction) are, in general, considerably higher than the expected corresponding demand. This was considered necessary in order to increase the attractiveness of the PT system. Thus the lowest frequency for most of the lines of the networks has been set at 20 minutes during the peak periods.

Both networks attract approximately 10% of all daily trips. The Multi-centre Network does somewhat better than the Radial Network.

The basic service parameters of the two networks that are related to the level of service offered (to the passengers) are shown in the following table.

Table 4.2 Transportation Model (VISUM) Results for the PT Networks

PARAMETER	RADIAL NETWORK	MULTI-CENTRE NETWORK
Daily number of passenger trips - % of total daily trips	10,1%	12,4%
Daily number of passenger trips	81.800	100.900
Total number of transfers	3.100	5.100
Average travel time per trip (min)	38,4	41,1

The fleet requirements for each network, the daily number of kms travelled by buses and a preliminary estimation of the operational cost are shown in the following table. It is noted here that these estimations are based on a number of assumptions, the same for the two alternative networks, and they are valid

for comparison purposes only. Some of these assumptions have been modified in the following stage of elaboration of the selected alternative (see below) considering relevant values as these have been set in the official contract signed between the Ministry of Communications and Works and the Operator of the Public Transport System of the District of Nicosia.

Table 4.3 Operational Characteristics of the Alternative PT Networks

PARAMETER	RADIAL NETWORK	MULTI-CENTRE NETWORK
Total fleet (buses) in operation during the peak periods	115	116
Number of Standard/Midi buses	54/61	51/65
Bus kms per year (millions)	9,9	10,0
Cost covered by fares	83%	107%

The above parameters have been used together with other parameters which are related to the road network, passenger car traffic and environmental aspects to select the preferred PT alternative.

The alternative selected is the multi-centre PT network (Figure 4.1). The main advantages of this network are:

- It serves more trip - passengers.
- It can easily be modified to incorporate a light rail transit or tram network – feeder bus service.
- It reduces the number of trips through the central area of Nicosia.
- Less space is needed for bus terminals in the central area of Nicosia.

Apparently the Multi-centre Network does better serve the travel demand although this leads to a larger number of transfers and a longer average trip duration.

Park & Ride

The Muilti-centre Public Transport network offers opportunities to develop Park and ride. Locations where park & ride will be developed include:

- The already existing parking lot at the Makarion Stadium.
- Near the junction of Strovolou Avenue with Spyrou Kyprianou Avenue.
- Near the junction of the A1 and Kalamon Street.
- The New GSP Stadium.
- The Solomou square, to also facilitate the visit to the walled area (see Section 4.3.3 “Bus Terminals”).

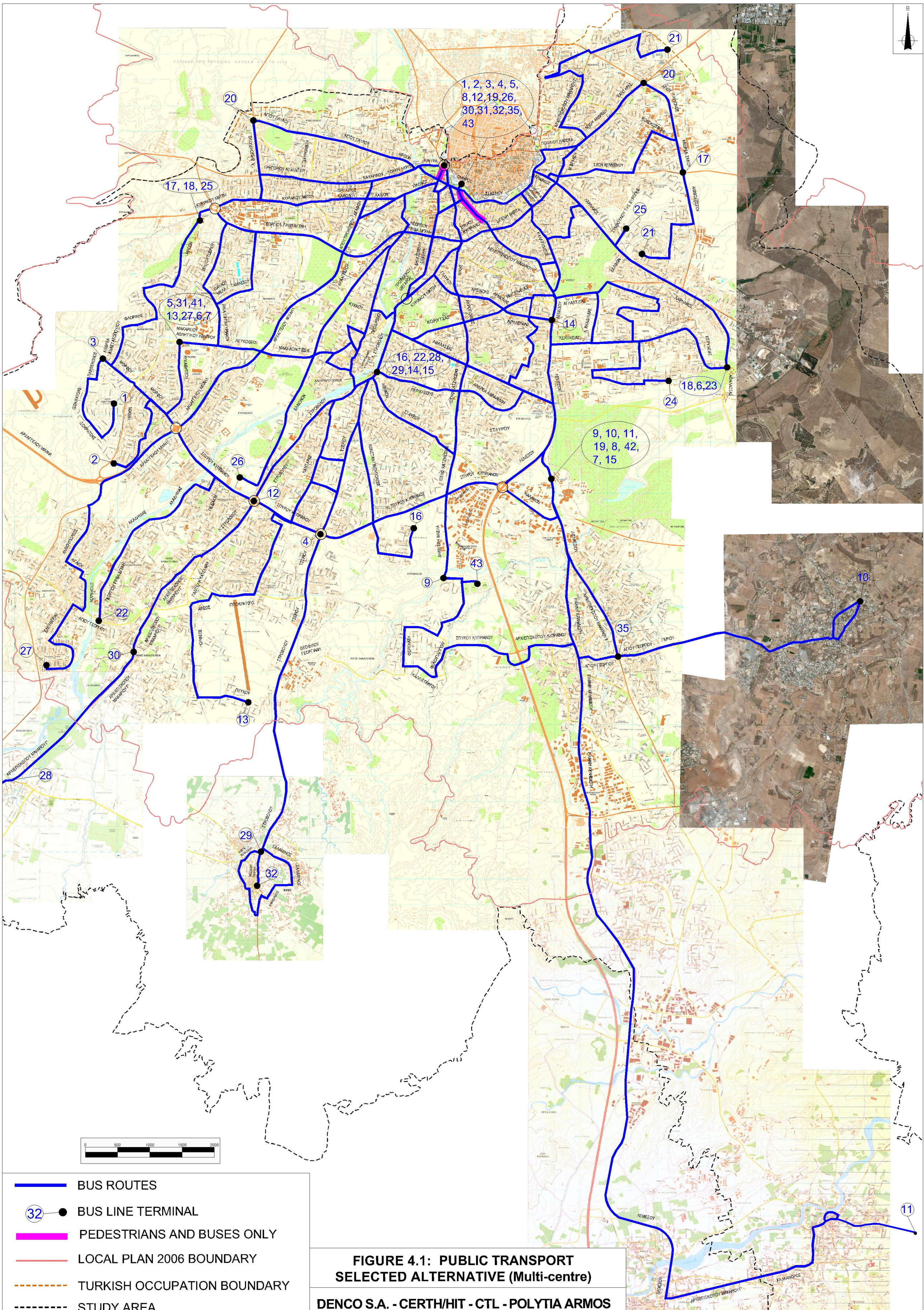

FIGURE 4.1: PUBLIC TRANSPORT SELECTED ALTERNATIVE (Multi-centre)

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4.3 Elaboration of the Selected Alternative

4.3.1 Network Characteristics

The selected PT network was further elaborated and modified considering additional one way street systems in the wider central area of Nicosia and in the central area of Strovolos as well as modifications in the bicycle network and in the pedestrian network including, among others, the pedestrianisation of Makariou Avenue, Mouseiou and Leonidou streets.

These modifications of the road network, especially the introduction of an extensive one-way street system, mainly being collector roads, limited the congestion for car traffic to an acceptable level. As this increases the average speed of car trips, it reduces the relative attractiveness of the PT system, compared to the initial calculations.

4.3.2 Bus Fleet

Considering the new PT share of the total daily trips and also the number of passengers served per bus line and direction of travel, a new fleet estimation was made keeping the lowest frequencies of service as they were set originally. The resulted number of buses by bus type and bus line (standard type –ST/12m long buses and midi buses –MD/7,0m – 8,6m long buses) are as follows:

- Total fleet 118 buses
- Standard type buses 45
- MIDI buses 73

Therefore, the total number of buses remains practically the same 116/118. On the other hand the number of MD buses increased from 65 to 73 and the number of standard type buses decreased from 51 to 45.

The study considered the findings and the proposals for alternative fuel and traction systems for Nicosia as these have been thoroughly investigated in a very extensive and detailed recent (2002) study for Nicosia by AXIS (5).

Considering also the passenger volumes along the bus routes it has been concluded that conventional buses, either diesel, LPG or CNG, seem to be the most appropriate mode up to the year 2020.

4.3.3 Bus Terminals

The terminal at Solomou Sq. serves 14 bus lines with 760 scheduled bus trips (entering the terminal) per day. The next busiest terminal is the New Hospital

terminal serving 8 lines and 400 trips followed by the Makarion Stadium terminal serving 7 lines and 348 daily bus trips. Then comes the Strovolos terminal with 6 lines and 208 trips. The other two terminals – at the University of Cyprus and at the Intercollege area - serve 3 lines each and 129 and 111 daily bus trips respectively.

Some intermediate major bus stops, preferably stops serving more than one major bus lines, must have standby facilities where buses can remain for a few minutes in order to keep the scheduled times of arrival at the bus stops along their routes. These stops should be determined by a special study which should also determine where bus shelters should be provided and what types of bus shelters are most appropriate for the specific characteristics of the urban area of Nicosia.

The new bus terminal at Solomou Sq. under tender at the present time, where six bus stops will be provided, can not serve at a desirable level of service the estimated 760 bus arrivals and equal number of bus departures per day. It is therefore necessary that more stops will be established near by at Omirou and Leonidou Streets.

The exact sites of the other bus terminals are not known at the present time but they must be located soon. The terminals at the New Hospital and at the Makarion Stadium will also serve the rural bus lines. The required space must be estimated and also terminal facilities including bus parking areas for the rural buses.

Car parking areas should also be provided at the terminals to facilitate park and ride. Special parking rates at these parking facilities should be established for the users of the bus lines (see also Section 5.2.2.4 “Park and Ride”).

Such a parking facility should be provided at Solomou Square

- to facilitate mode interchange at the major bus terminal of the city,
- to accommodate transfers to the special bus service (currently under study) that will connect the Old Town of Nicosia with the Central Business District,
- to facilitate the visit to the Walled City, where extensive pedestrianisations are programmed.

This car parking is considered to be of high priority as in the transition period from now to the year 2020 the PT network will be mostly radial with its focal point at the Solomou Square.

4.3.4 Bus Lanes

A rule of thumb that is used to determine where bus lanes should be provided is that the number of busses traversing a road section during the peak hour should be at least thirty. Other factors to be considered are the average overall speed at that section, the number of bus stops, passenger volume and the continuity of bus lanes.

Based mainly on bus trips per road section during the peak hour and considering also the general average traffic speeds at these sections, as these have been determined through modeling, it is proposed that bus lanes should be considered at the following road sections, provided that the road cross sections are appropriate (Fig. 4.2).

Axis Strovolos – Solomou Sq.

- Strovolou Avenue From Tseriou Avenue to Proedrikou Megarou Square
- Demostheni SeveriAvenue . From Proedrikou Megarou Square to Evagorou/Grigori Afxentiou junction
- Grigori Afxentiou Avenue From Evagorou to KostiPalama
- Kosti Palama Avenue. From Grigori.Afxentiou Avenue to Omirou Avenue
- Omirou Avenue. From Kosti Palama Avenue to Evagorou Avenue

Axis Solomou Sq. – Strovolos

- Leonidou Street. From Omirou Avenue to Evagorou Avenue
- Evagorou Avenue. From Leonidou Street to Diagorou Street
- Diagorou Street. From Evagorou Avenue to Griva Digeni Avenue
- Kyriakou Matsi Street. From Griva Digeni Avenue to Proedrikou Megarou Square
- Strovolou Avenue From Proedrikou Megarou Square to Athinon Street

BUS LANES

BUS LANE UNDER CONSTRUCTION

B

ΗΡΩΩΝ

ΚΙΝΥΡΑ

ΛΟΥΚΗ ΑΚΡΙΤΑ

ΟΜΗΡΟΥ

ΣΤΑΣΙΝΟΥ

ΕΥΓΕΝΙΟΥ & ΑΝΤΩΝΙΟΥ ΒΕΟΠΟΥΛΟΥ

ΔΙΓΕΝΗ ΑΚΡΙΤΑ

ΓΕΩΡΓΙΟΥ ΓΡΙΒΑ ΔΙΓΕΝΗ

ΔΗΜΟΣΘΕΝΗ ΣΕΒΕΡΗ

ΠΡΟΕΔΡΙΚΟΥ ΜΕΓΑΡΟΥ

ΝΙΚΗΣ

ΑΡΧΙΕΠΙΣΚΟΠΟΥ ΜΑΚΑΡΙΟΥ Γ'

ΚΑΛΛΙΠΟΛΕΩΣ

ΑΓΛΑΝΤΖΙΑΣ

ΑΡΧΑΓΓΕΛΟΥ ΜΙΧΑΗΛ

ΜΑΚΑΡΕΙΟΥ ΑΘΛΗΤΙΚΟΥ ΚΕΝΤΡΟΥ

ΛΕΥΚΟΘΕΟΥ

Λ. ΣΤΡΟΒΟΛΟΥ

ΠΡΟΕΔΡΙΚΟΥ ΜΕΓΑΡΟΥ

ΛΕΜΕΣΟΥ

ΚΑΛΑΜΩΝ

ΓΕΡΟΛΑΚΚΟΣ

ΑΓΙΟΣ ΔΟΜΕΤΙΟΣ

ΕΓΚΩΜΗ

ΛΕΥΚΩΣΙΑ

ΠΑΛΛΟΥΡΙΩΤΙΣΣΑ

ΛΥΚΑΒΗΤΤΟΣ

ΜΑΚΕΔΟΝΙΤΙΣΣΑ

ΠΑΡΙΣΣΙΝΟΣ

ΑΓΛΑΝΤΖΙΑ

ΑΚΡΟΠΟΛΗ

ΠΛΑΤΥ

ΑΘΑΛΑΣΣΑ

ΚΑΤΩ ΛΑΚΑΤΑΜΕΙΑ

ΑΡΧΑΓΓΕΛΟΣ

ΣΤΡΟΒΟΛΟΣ

ΔΑΣΟΥΠΟΛΗ

ΚΟΥΛΟΥΡΑΤΟΣ

ΒΙΟΜΗΧΑΝΙΚΗ ΠΕΡΙΟΧΗ

ΔΥΟ ΚΑΜΙΝΙΑ

0 500 1000 1500 2000

FIGURE 4.2: PROPOSED BUS LANES SELECTED ALTERNATIVE

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Other road sections

- Giannou Kranidioti Street (Old Lemesou Road). From the round about to Kalamon Street.
- Kalamon Street. From Giannou Kranidioti round about to Lemesou Avenue (A1) round about
- Nechrou Street
- Egyptou Street
- Makarion Stadium. From Lycavitou Street to Papakyriakou Street (both directions)
- Evagorou Avenue. From Diagorou Street to Grigori Afxentiou Avenue
- Stasinou Avenue. From Evagorou Avenue to Evgenias Theodotou Street
- Makariou Avenue From Aluminum Tower Junction to Leonidou Street. From Bouboulinas Street to Leonidou Street the bus lane is on a pedestrian street.
- Mouseiou Avenue, the bus lane is on a pedestrian street.
- Archangelou Avenue now under construction. One direction bus lane is provided.

The road section most used by buses is Grigori Afxentiou Avenue with 65 bus trips during the peak hour followed by the sections of Evagorou Avenue between Leonidou and Diagorou Streets and the section of Omirou Avenue between Kosti Palama Avenue and Leonidou Street with 55 bus trips.

4.3.5 Investment and Operation Cost and Ticket Revenues.

Cost and revenue estimates were made using the per km. operating cost specified in the contract signed in December 2009 between the Ministry of Communications and Works and the company that will operate the bus PT system of the Nicosia District.

The assumptions used for the estimations are the following.

- Cost of operation per km. for standard type buses: 3,45 €
- Cost of operation per km. for midi type buses: 2,90 €
- Bus service provided from 05:30 to 23:00
- Peak hour operation per day: 4 hours.

- Regular working days per year: 305
- Bus kms made on Sundays and holidays - % of bus kms on regular working days: 70%
- Passengers of PT on Sundays and holidays - % of passengers on regular working days: 55%
- Price of regular ticket valid for two hours: 1,0€
- The fare is flat.
- Reduced ticket - % of regular ticket price: 50%
- Passengers traveling with regular ticket - % of total passengers:65%

Using the above assumptions the total number of bus kms serving the bus lines are estimated at 10,1 million per year. The bus kms per working day are estimated at 29.200.

The total bus hours during the regular working days are estimated at 1.600, including the layover times. The average travel speed for buses is therefore, including the layover time, 18,2 kms/hr.

The total cost per year for the operation of the bus fleet is estimated at € 31,5 million.

The total number of bus passengers per year is estimated at 29, 2 million (86.300 per working day).

The total earnings from tickets per year is estimated at € 24,1 million.

It is expected therefore that the operation will result in a deficit of € 7,4 million in the year 2020.

4.4 Introduction of Tram Lines in the PT System of Nicosia

Although a dense and high frequency bus system with modern vehicles will offer an attractive alternative to the private car, in the framework of the IMMP the question has been raised whether a tram system could have added value to a future public transport system for Nicosia. Generally a tram is considered more comfortable for the passenger. The analyses described in the remaining sections of this chapter have shown that a tram might be feasible in Nicosia!

A tram lines network of three lines has been proposed forming a triangle of service by interconnecting the four major centres of the urban area namely the centres of Nicosia (Solomou Sq.), the New Hospital Area, the Makarion

Stadium Area where the Administration Centre will be developed and the Strovolos central area (Figure 4.3). The four major transportation terminals are also located in these areas, as was indicated earlier.

This interconnection of the major centres and transport terminal is achieved with a mode of transport offering a high level of service in service reliability, in trip directness, in travel time, in safety and comfort and in the protection of the environment. The multi-centre bus network can easily be modified to act to a certain degree as a feeder service to the tram network.

The introduction of the tram network necessitates the restructuring of the bus network. The bus lines that will either be eliminated or modified are the following:

- Bus lines 4, 12, 19, 31, 32 and 35 are eliminated.
- Bus lines 3 and 14 are connected to form a new bus line.
- The frequencies of service of lines 28, 29 and 30 are increased.

The above changes in the bus network reduce the number of kms traveled by buses per day by approximately 6.000 kms (from 29.200 to 23.400) and the number of buses by 23 – from 118 to 95. The number of standard type buses and midi buses is estimated at 33 and 62 respectively.

The total number of bus kms serving the bus lines are estimated at 8,1 million per year. The bus kms per working day are estimated at 23.400. The annual cost of operation of buses is estimated at € 25,1 million.

The network length of the three tram lines is 18,4 kms.

The average frequency of service on all three tram lines is 7,5 minutes.

During the introduction of the tram network, some designing difficulties were faced, e.g. as far as the line 31 is concerned in the section of Evagorou str. between Diagorou Street and Grigori Afxentiou Avenue, the two-way tramway will occupy all the available width of the existing pavement. The proposed cross-section is presented in Figure 4.4. Of course the detailed study for the tram network that will follow, will provide solutions for such problematic road segments.

TRAM LINE No 15

TRAM LINE No 19

TRAM LINE No 31

PRIMARY ROAD AND INTERCHANGE (LOCAL PLAN 2006)

FIGURE 4.4

0 500 1000 1500 2000

FIGURE 4.3: PROPOSED TRAM LINES

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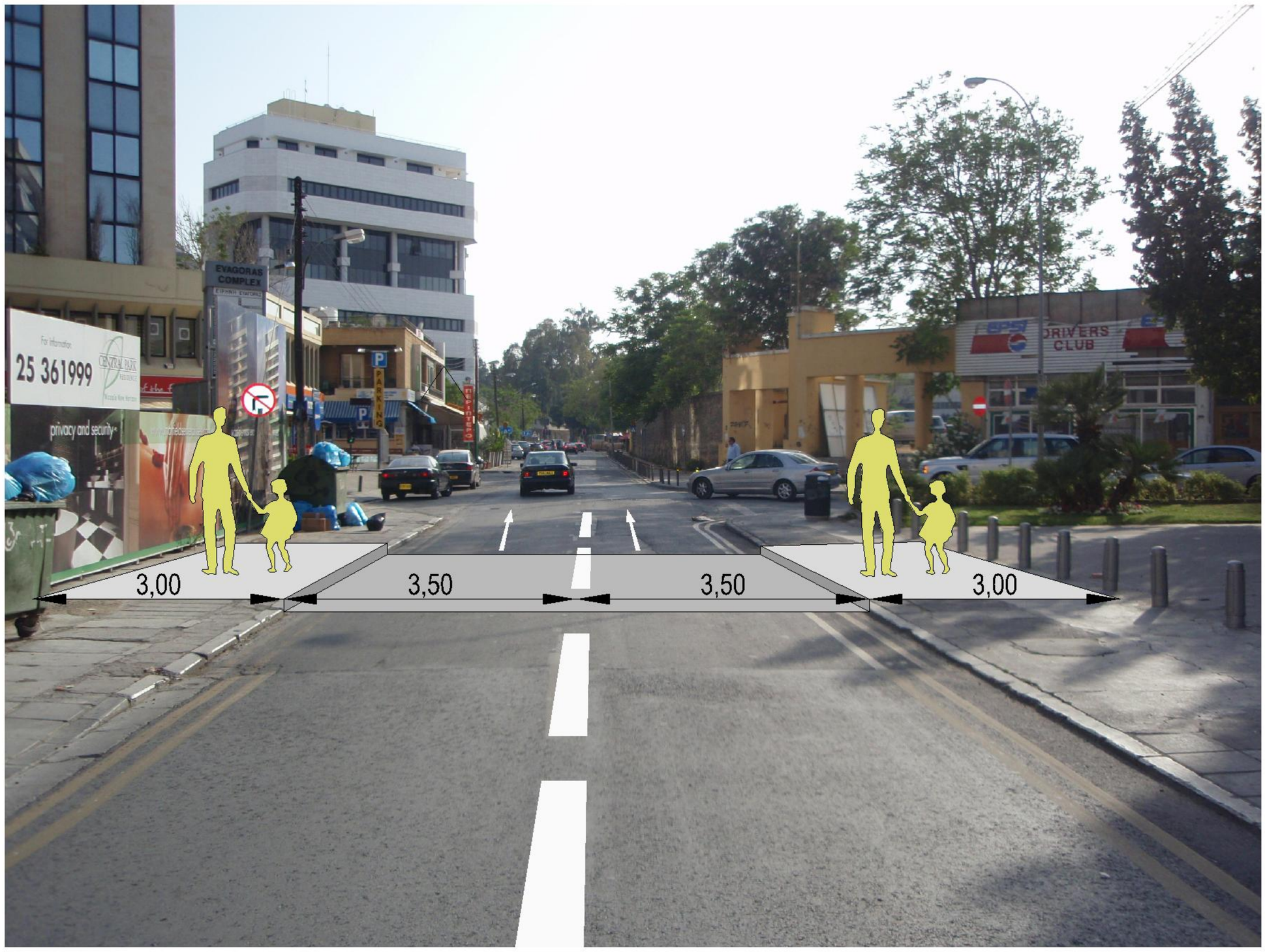


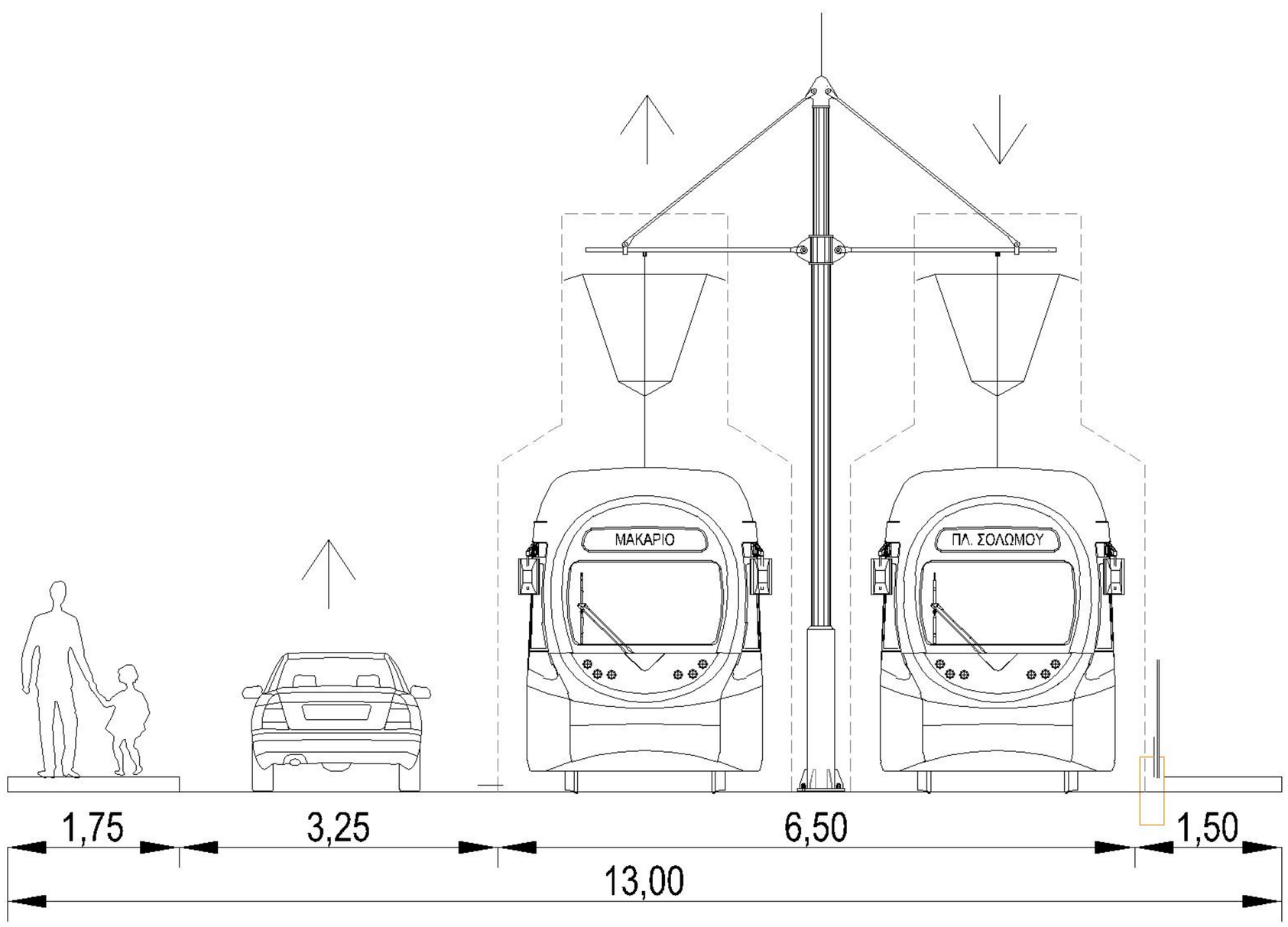


FIGURE 4.4: PROPOSED CROSS-SECTION FOR EVAGOROY STREET

SCALE 1:100

DENCO S.A. - CERTH/HIT - CTL - POLYTIA ARMOS

The total number of tram kms are estimated at 1,6 million per year. The tram kms per working day are estimated at 4.600. The annual cost of operation of trams is estimated at € 6, 2 million[1].

The number of passengers of the integrated Public Transportation System per regular working day is estimated at 99.800 (80% by buses and 20% by tram) and the yearly number of passengers 33,7 million in the year 2020.

The total inflows from tickets per year are estimated at € 27,8 million.

The introduction of the tram system is estimated to attract 13.500 more passengers per regular working day or 4,6 million per year, thus increasing the share of the PT by 1,7% to a total of 12,3%.

The total investment cost for the construction of the tram is presented in the following table:

Table 4.4 Total Investment Cost for the Construction of the Tram

Cost of …	in million €
double line (14.5 kilometers):	203,2
single line (3.9 kilometers):	42,7
depot:	43,8
tram-wagons (20):	45,0
Total	**334,7**

4.5 Evaluation of Impact on the Atmospheric and the Acoustic Environment with Respect to the Development of the Public Transport System

4.5.1 Introduction

The environmental impact of the implementation of measures proposed in the IMMP on the local Air Quality and noise levels (road traffic noise) have been calculated. The impact depends on many factors, such as the speed of the vehicles, the composition of the traffic flow, but the most decisive is traffic volume. As the studies underlying the IMMP show, the factor that influences traffic volume most is the success of the new Public Transport System. Nonetheless it must be noted that the success of the Public Transport System

[1] Including maintenance cost, personnel cost, cost of electricity, cost of water supply, cleaning cost, insurance cost and administrative cost, as presented in detail in Appendix Section 4.6.

also depends on the traffic management measures that guarantee free flow of Public Transport.

The evaluation of environmental impact, concerned all alternative scenarios of Public Transportation traffic organisation considered for the year 2020, as well as a "Do Nothing" scenario, which is the case of 'current trends extrapolated to the year 2020 with only minor adjustments'. All the scenarios were evaluated and compared with the "Do Nothing" Scenario, in order to determine whether they deliver any improvement in the quality of the atmosphere or the acoustic environment. Furthermore it was explored, from the environmental point of view, whether a Tramway would have further positive effects when included in a PT system.

All data available for the main network of Nicosia (data from forecast models used for the study), concerning road traffic volumes, speed, length of road segments, etc. were used to calculate pollutant loads per passenger and to estimate noise levels. The environmental evaluation took into account the same assumptions that were used for the forecast models.

4.5.2 Evaluation of Impact on the Atmospheric Environment

Road traffic is decisive for the air quality in urban areas. The basic differentiation in the source of atmospheric pollution is a result of the change in traffic flow and traffic conditions in the affected road network, due to the operation of a new system of transportation. Based on scientific research, it has been proved that there is a direct relation between the improvement of traffic conditions and the reduction of atmospheric pollution, which is greatly influenced by traffic conditions and by the level of Public Urban Transportation use.

Emissions levels of pollutants are lower when a large percentage of the trips on the network are made by Public Transportation (PT). The basic advantage of PT is the high capacity for transporting passengers, hence smaller required space per transported passenger while at the same time, the consumption of energy per transported passenger is lower. Indicatively, it is reported that production of CO per transported passenger by car is five times higher than the one that corresponds to a passenger transported by the Athens Metro (Attiko Metro A.E. 2008).

The impact on the local air quality is evaluated using emission per transported passengers, an index that well indicates changes in the level of pollution that results from traffic flow in an urban environment.

For each alternative scenario (including the Do Nothing scenario) and for every road segment affected (main network of the city), the polluting loads of the basic gas pollutants during the 2 hour morning peak, based on

corresponding emission factors, were calculated. Then the pollutant load per passenger, based on the total number of passengers, was calculated in order to evaluate the difference with the operation of the transportation system in the wider area. The traffic data that have been taken into account (2-hr peak traffic volumes, number of buses, speed, etc.) for every road segment was derived from the forecast models used in this study.

From this analysis, all tested scenarios were more favourable than the "Do Nothing" scenario, with regards to the pollutants per transported passenger. **The development plan for any of the tested scenarios for the 2020 has positive effects as far as the quality of the atmosphere is concerned, in relation to not implementing any plan other than minor adjustments (Do Nothing scenario)**.

When evaluating the impact of the development scenarios, a reduction of pollutant per transported passenger was specifically observed in central roads (e.g. Omirou, Griva Digeni, John Kennedy, Nikis, etc.) but also in other roads with high traffic volumes (e.g. Athalassas, Strovolou, Limasol, etc), depending on the alternative scenario and the way the PT system is implemented. It is obvious that the pollutant per transported passenger particularly decreases in roads where a large number of bus lines are proposed, since this increases the capacity of the road i.e. more people moving using fewer vehicles. **By comparing the different alternative scenarios, it can be said that in terms of the impact on the atmospheric environment, they are approximately equivalent with no major differences**.

It was further explored whether the introduction of a Tramway system would have further positive effects. For this purpose, two alternative scenarios, the selected alternative scenario **without the Tramway** and the same **with the Tramway** were considered. For every road segment affected, the polluting loads of the basic gas pollutants during the 2hr morning peak were calculated (exactly as described above in the evaluation of the basic development scenarios). Then, the pollutant load per transported passenger was calculated based on the total number of passengers for each scenario (including here the transported passengers using PT and Tram in the relevant scenarios). Data for the calculations comes again from the forecast models where the Tram was taken into account in the relevant scenario.

From this evaluation, it appears that the **scenario With the Tramway is definitely more favorable than the scenario Without the Tramway with respect to the pollutant per transported passenger**. This can be explained by the fact that the traffic flow in the main road network is lower with the use of the tramway, due to the fact that tram vehicles attract (in combination with buses) a larger number of people around the city, which in turn means fewer cars on the road. Besides, tramways moved by electricity, emit less pollutants than buses.

4.5.3 Evaluation of the Impact on the Acoustic Environment

It is a fact that road traffic influences the acoustic environment (Road Traffic Noise), mainly due to the volume of vehicles moving around the road network in difficult traffic conditions. The improvement in the conditions of traffic flow by increasing the use of public transportation, improves the acoustic environment due to the decrease, in some degree, of secondary sources of noise and generally uproar caused by conditions of traffic congestion.

In order to have a more complete estimate of future noise levels in the study area, traffic conditions during operation for each alternative scenario were analysed and the British Method L10 (1hr) – CRTN for estimating noise levels was used. This method calculates L10 (peak hour) levels of noise in dB (A).

Given the fact that in comparing the three alternative scenarios examined, there were no major differences in the calculated volumes per road segment or speed (hence influencing significantly noise levels), the evaluation of the noise levels was indicatively done for the selected scenario in comparison to the "Do Nothing" scenario. The affected road segments, with the highest volumes of traffic were selected, in order to evaluate possible impacts on the acoustic environment from the implementation of the proposed scenario. Road segments with a total volume of less than 500 cars in the 2hr peak have not been examined as far as the noise level is concerned, due to the fact that their contribution is expected to be insignificant. Most of the road segments examined, serve a high number of vehicles and they decisively influence the quality of the acoustic environment in the areas through which they pass. The traffic volumes, the composition of the traffic, the speeds etc. per road segment were again derived from the forecast models' output.

The difference noted in the evaluation of the results, between the selected scenario and the Do Nothing scenario, concerns the increase and decrease of noise levels for L10, depending on the volume calculated for each road segment and the relevant forecasted speed. It is obvious that if the traffic volume increases in some road segments with or without a higher speed, there is usually an increase in noise levels. On the other hand, a decrease is observed when the traffic volume decreases in any given road segment.

In evaluating the results, it can be said that a decrease is observed in the majority of the selected road sections (>60%). The rest of the road sections show an increase, most of which is insignificant, meaning less than 1 dB(A). In any case, most of the road segments showing an increase in noise levels (e.g. Athalassas Ave.) are roads characterized mainly by commercial or mixed use.

In addition to the above analysis, it was further explored whether a Tramway would have additional positive effects if introduced.

Two alternative scenarios, as with the atmospheric evaluation above, the selected alternative scenario **without the Tramway** and the same scenario **with the Tramway** were considered, using the same assumptions and relevant data. Taking into account the analysis and the relevant results, it is noted that there is a small differentiation between the scenario with tramway and the scenario without tramway in the levels of noise for index L10.

The expected decrease in noise levels (road traffic) between the two scenarios is considered to be quite significant, due to the fact that there are many residences in many of the evaluated road segments. It must be noted that most of these road segments are already characterized by high traffic volumes and relatively high noise levels. **The implementation of the scenario with the tramway is expected to result in a decline in traffic related noise levels, compared to the scenario without the tramway making it an environmentally favorable scenario for the city of Nicosia**.

Again we note here that Tram is generally an environmentally friendly PT mean and in many similar cases (as per Athens recent tramway project), due to new technology of tram vehicles and tramway rail support, all noise measurements indicate that noise emitted from the tram operation is considerably lower than the environmental urban background noise.

4.5.4 Conclusions

In comparing all scenarios it can be concluded that the traffic plan selected for Nicosia, for the year 2020, shows positive effects as far as the quality of the atmospheric and the acoustic environment is concerned, compared to the Do Nothing scenario. The use of tramway, is giving the opportunity to have a further improvement in the quality of the environment.

Indicative calculations and relevant results are given in the Appendix 4.5.

4.6 Pre-feasibility Study for the Operation of a Tramway in Nicosia

A Prefeasibility Study has been carried out in order to be able to indicate the feasibility of the implementation of the Tram in Nicosia. In the framework of the Prefeasibility Study a Financial and an Economic Analysis have been carried out. The difference between these two approaches is:

- The **Financial Analysis** considers all the flows of money, goods and services including investment costs, operating costs and benefit earned from these activities. The return on invested capital is calculated.

– The **Economic Analysis** assesses the project from the view of the society as a whole. This means that, in addition to the financial analysis, other effects are considered such as the effect the project has on the labour market and the benefits in terms of time savings, e.g. because the project contributes to the efficiency of the transport system.

In all of these analyses the situation without a Tram (but with an improved public transport system put in place) was compared with the situation with a Tram, where the tram replaces some bus lines in the improved public transport system. The Transport Analysis in the previous section has shown that implementation of the Tram will increase the number of passengers that the public transport system serves (from 10,6% to 12,3% of all trips in the Greater Nicosia Area).

Details about the methodology used, accountability for starting points, detailed calculations etc. are included in Appendix 4.6.

For the financial analysis, the greater risk is from the budget of the project followed by that of the inflows (either from trips or share of public transport). From the society´s point of view, that is the economic analysis, the greater risk is from the budget of the project and then from the inflows side (either from trips or time saved).

Similar projects invariably show a negative Financial NPV and are still implemented, because the Economic Analysis is positive. Indeed, almost all non-toll bearing transport infrastructure projects have a negative Financial NPV. The Economic Analysis for the Tram Project in Nicosia shows that, if considerable time savings by commuters are realised, the project is acceptable from an economic point of view.

In order to be able to judge more reliably the economic feasibility of a tram, a comprehensive Feasibility Study should be carried out. Such a Study should rely on a well established Traffic Forecast Model that predicts travel times for users of the private car, the Public Transport System (with and without the availability of a tram) with an acceptable level of reliability.

5 PROPOSED ROAD SYSTEM AND TRAFFIC MANAGEMENT FOR PRIVATE VEHICLES

5.1 Major Road System

The proposed major road network (Motorways, Arterials and Collectors) for the preferred variation is shown in Figure 5.1 for the whole study area.

The primary road network (Motorways and Arteries) and the interchanges proposed in the 2006 Local Plan, now under revision, are also shown. The phasing and the implementation time schedule for each of these roads is given in the next chapter.

The Nicosia Peripheral Road (Motorway), now under final design, is shown with a different line because it is not expected to be operating by the target year 2020 of the present study. However, the alignment of this road was considered in the proposed variation for future implementation.

<u>One-way System</u>

The creation of the extensive one-way road system of the selected alternative is given in Figure 5.2 for the Centre of the Greater Nicosia Area and in Figure 5.3 for the Strovolos central area, for all road categories including local roads.

The IMMP will guarantee a good level of service provided by the public transport system. This can only be achieved if the public transport system has dedicated infrastructure on selected parts of the network. This means that the road infrastructure now available has to be re-distributed over transport modes. In order to create a balanced transport system the road system must be ‘re-organised’, which will result in improvement of the efficiency of the use of the available road capacity.

One of the most effective way of improving the efficiency is to convert roads to one way operation. One way roads offer better flow as the turning movements are generally less complicated and the number of conflicts at intersections are limited. It has to be accepted that the number of kilometres in the whole network slightly increases. For the central area of Nicosia (roughly north of the line Athalassa Avenue - Sans Souci - Arsinous) different concepts of one way systems have been developed. These systems are shown on figures 5.2 and 5.3 (specifically for the centre of Strovolos). The following one way systems can be indentified in these figures:

1. Pairs of main arteries that will serve entry and exit to the city for the private car and that will offer the opportunity to include bus lanes on these main arteries where justified. The pairs of arteries are:
   - Makarios Avenue and Kallipoleos
   - Dimosthenous Severi (from Proedrikou Megarou roundabout to Griva Digeni) and Kyriakou Matsi with Nikis
   - Dimosthenous Severi with Grigoriou Afksentiou and Diagorou with Themistokli Dervi
2. One-way systems along collector roads to ensure that access onto the main roads that are converted to one-way can be facilitated, without lengthy diversions:
   - John Kennedy and Armenias (from the junction with Ifigenias) with Arsinois, Glafkou, Kratinou
   - Bouboulinas and Theodotou
3. One way systems in (mainly) residential areas enclosed by arteries. The one way systems in these minor roads will prevent traffic from diverting from the arteries looking for short cuts to avoid possible congestion on the arteries. An example is the area between Makarios Avenue and Nikidimou Milona street: after implememtation of these changes it will not be attractive anymore to drive through the area trying to avoid congestion on Makarios Avenue.
4. A one way systems in the walled city of Nicosia. The walled city is suffering from quite a lot of through traffic at the moment, as many drivers at least feel it is faster to go through the walled city when going from one side to another. A few ‘loops’ were created that guarantee accessibility for the traffic that has a destination in the area, but at the same time protects the residential and commercial function of that part of the city because it reduces traffic flows considerably. The one way system shown here is in line with the proposals included in the Nicosia Master Plan, the bi-communal plan that anticipates on a reunion of the two communities.

These changes still need to be carefully detailed in the implementation process, involving all stakeholders and the general public.

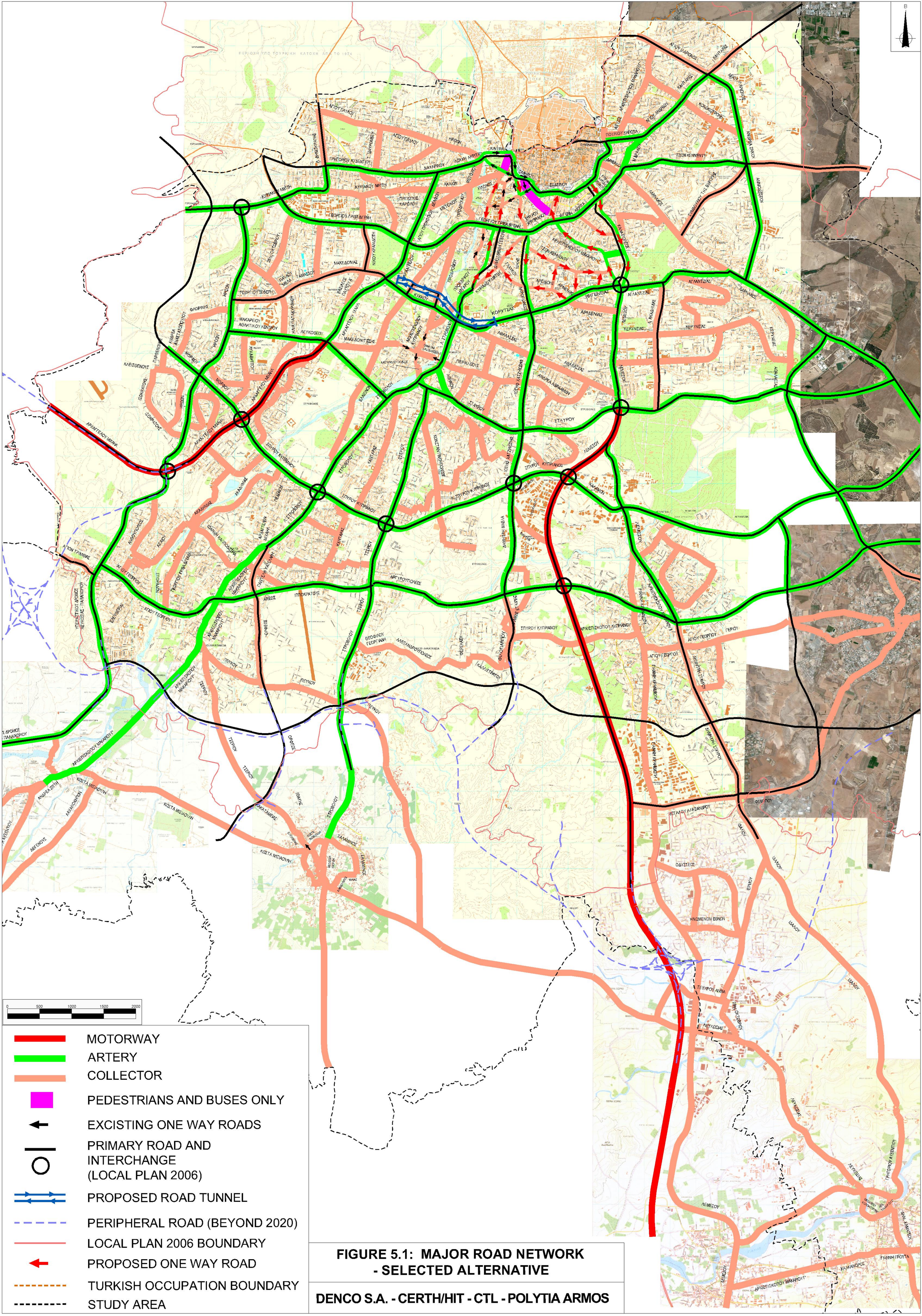


FIGURE 5.1: MAJOR ROAD NETWORK - SELECTED ALTERNATIVE

DENCO S.A. - CERTH/HIT - CTL - POLYTIA ARMOS

PROPOSED ONE WAY ROAD (VARIATION D)

PROPOSED JUNCTIONS THAT NEED MODIFICATIONS (VARIATION D)

PROPOSED ROAD REGENERATION AND PEDESTRIANIZATION

ZONE OF EXTENSIVE TRAFFIC CALMING MEASURES

PROPOSED ROAD TUNNEL

FIGURE 5.2: ROAD NETWORK - NICOSIA CITY CENTRE - SELECTED ALTERNATIVE

DENCO S.A. - CERTH/HIT - CTL - POLYTIA ARMOS

0 100 200 300 400 500

PROPOSED ONE WAY ROAD (VARIATION D)

PROPOSED JUNCTIONS THAT NEED MODIFICATIONS (VARIATION D)

PROPOSED ROAD REGENERATION AND PEDESTRIANIZATION

ZONE OF EXTENSIVE TRAFFIC CALMING MEASURES

PROPOSED ROAD TUNNEL

FIGURE 5.3: ROAD NETWORK - STROVOLOS CITY CENTRE - SELECTED ALTERNATIVE

DENCO S.A. - CERTH/HIT - CTL - POLYTIA ARMOS

0 100 200 300 400 500

Critical Intersections Management

Some critical intersections have gone under functional redesign to confirm that the proposals are feasible. New designs have been made for the following junctions (the functional redesigns are shown on the next page and following):

B

GRIVA DIGENI

LORDOU VIRONOS

AGION OMOLOGITON

GRIVA DIGENI

968

4422

3608

2805

1305

2597

STOP

STOP

STOP

0 10 20 30 40 50m

3608 PROJECTED FLOWS 2020 (vehicles) Morning Peak 2h

DEMOLISHED CURBS

NEW CURBS

FIGURE 5.4:
GRIVA DIGENI - LORDOU VIRONOS - AGION OMOLOGITON JUNCTION

DENCO S.A. - CERTH/HIT - CTL - POLYTIA ARMOS

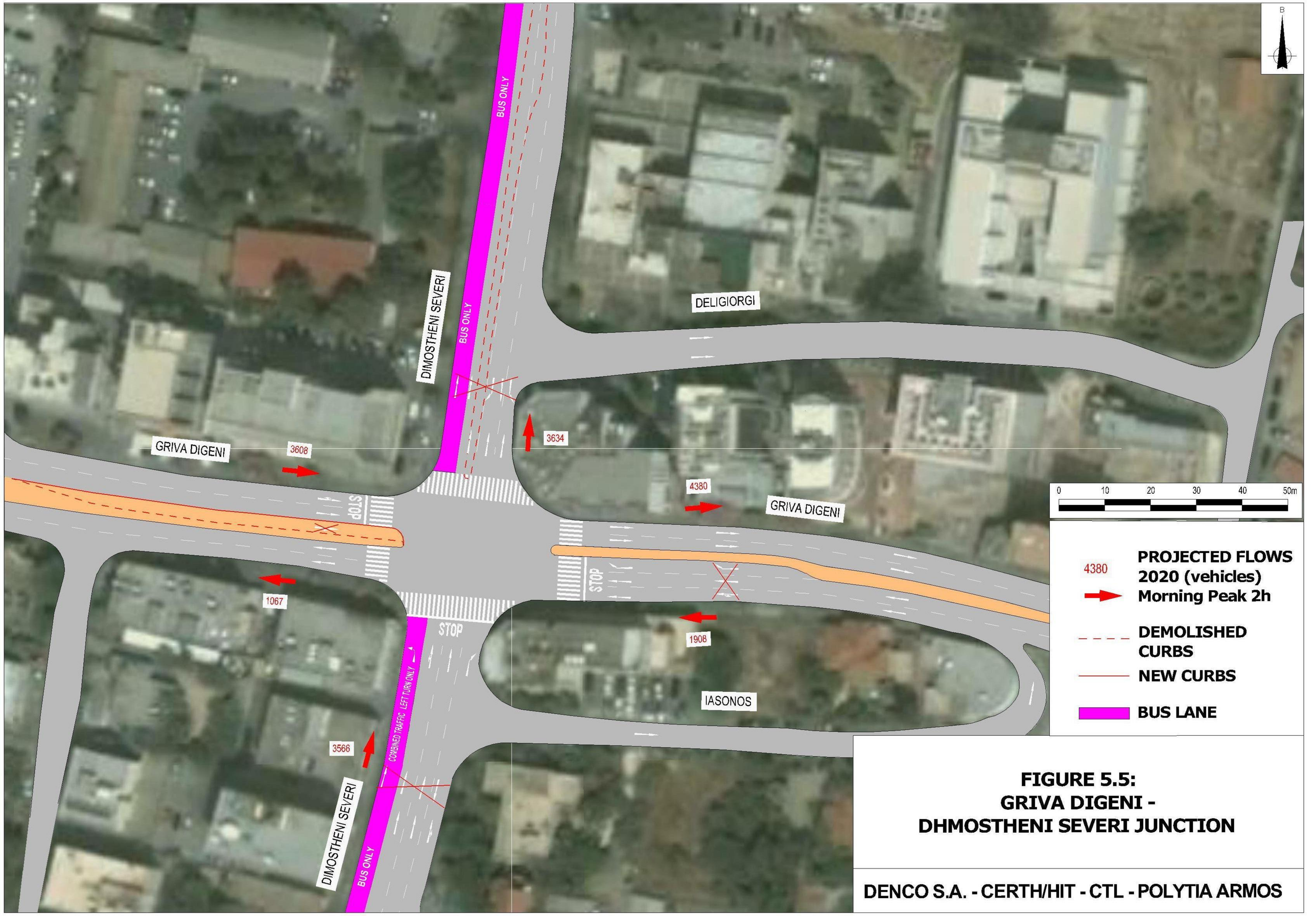


FIGURE 5.5:
GRIVA DIGENI -
DHMOSTHENI SEVERI JUNCTION

DENCO S.A. - CERTH/HIT - CTL - POLYTIA ARMOS

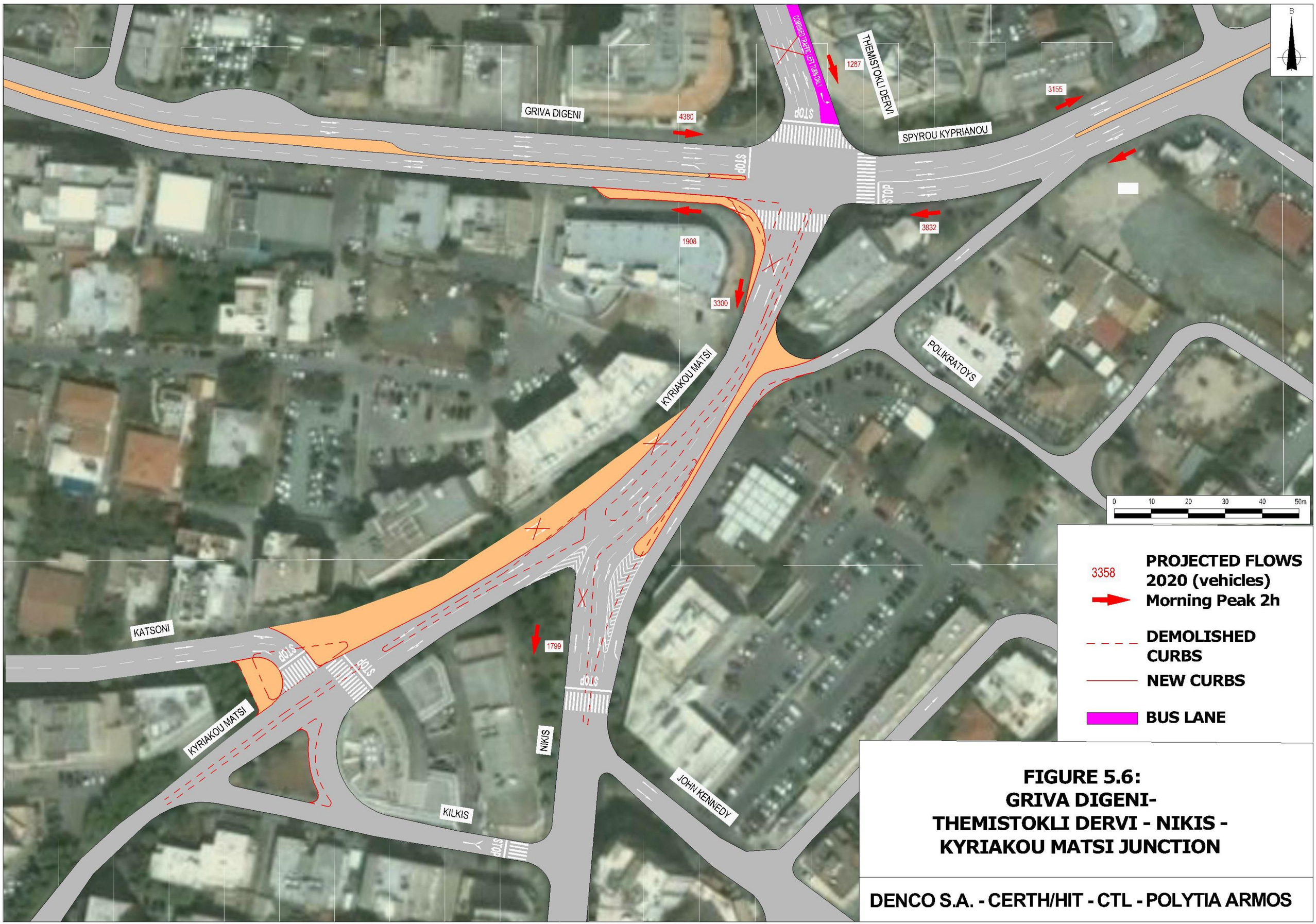
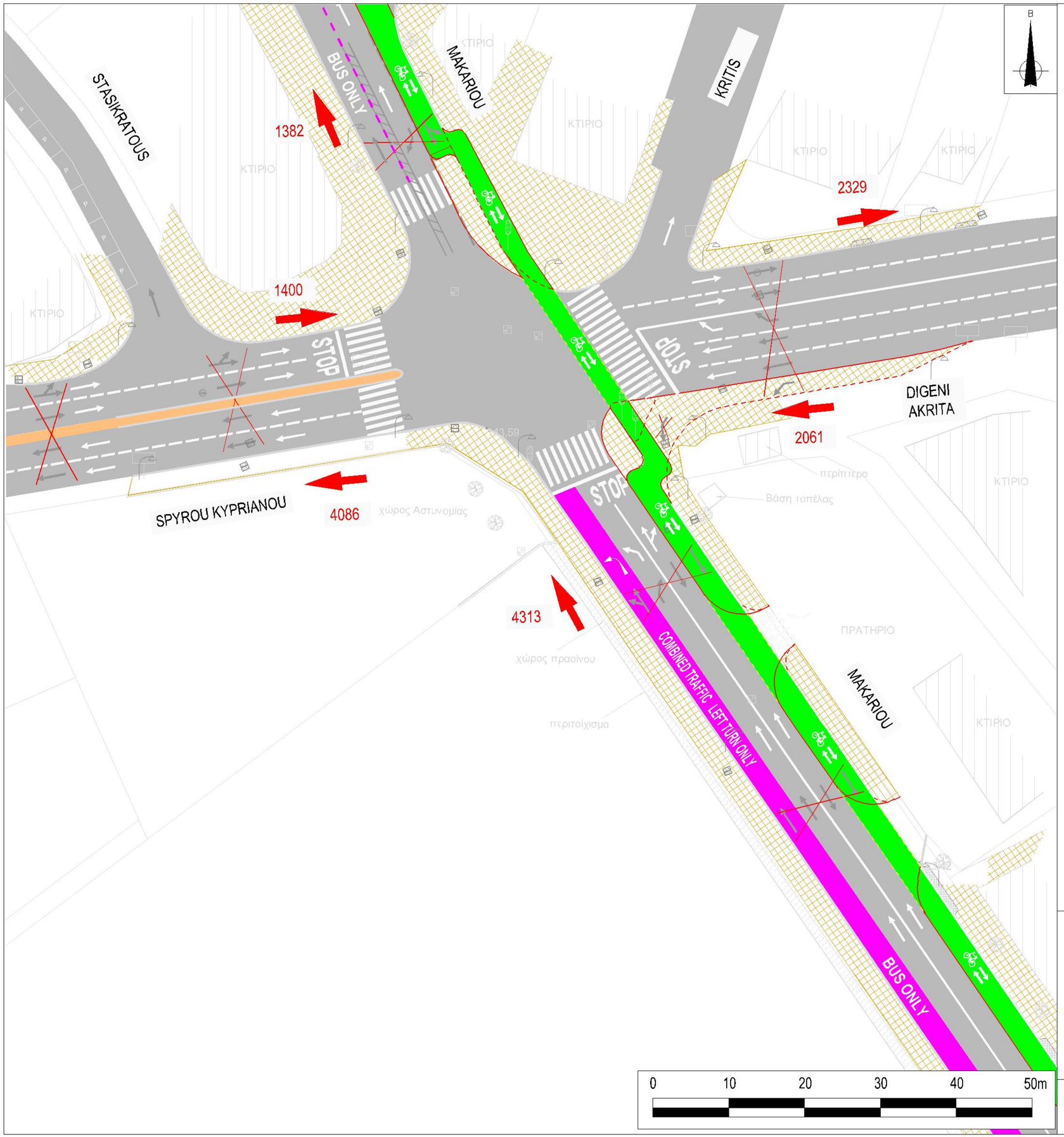


FIGURE 5.6:
GRIVA DIGENI-
THEMISTOKLI DERVI - NIKIS -
KYRIAKOU MATSI JUNCTION

DENCO S.A. - CERTH/HIT - CTL - POLYTIA ARMOS



4313 **PROJECTED FLOWS 2020 (vehicles) Morning Peak 2h**

DEMOLISHED CURBS

NEW CURBS

Parking spaces

CYCLING LANE

BUS LANE

FIGURE 5.7: SPYROU KYPRIANOU- DIGENI AKRITA - MAKARIOU JUNCTION

DENCO S.A. - CERTH/HIT - CTL - POLYTIA ARMOS

FIGURE 5.8:
DIGENI AKRITA-
NIKODIMOU MILONA JUNCTION

DENCO S.A. - CERTH/HIT - CTL - POLYTIA ARMOS

FIGURE 5.9:
DIGENI AKRITA-
KALIPOLEOS JUNCTION

DENCO S.A. - CERTH/HIT - CTL - POLYTIA ARMOS

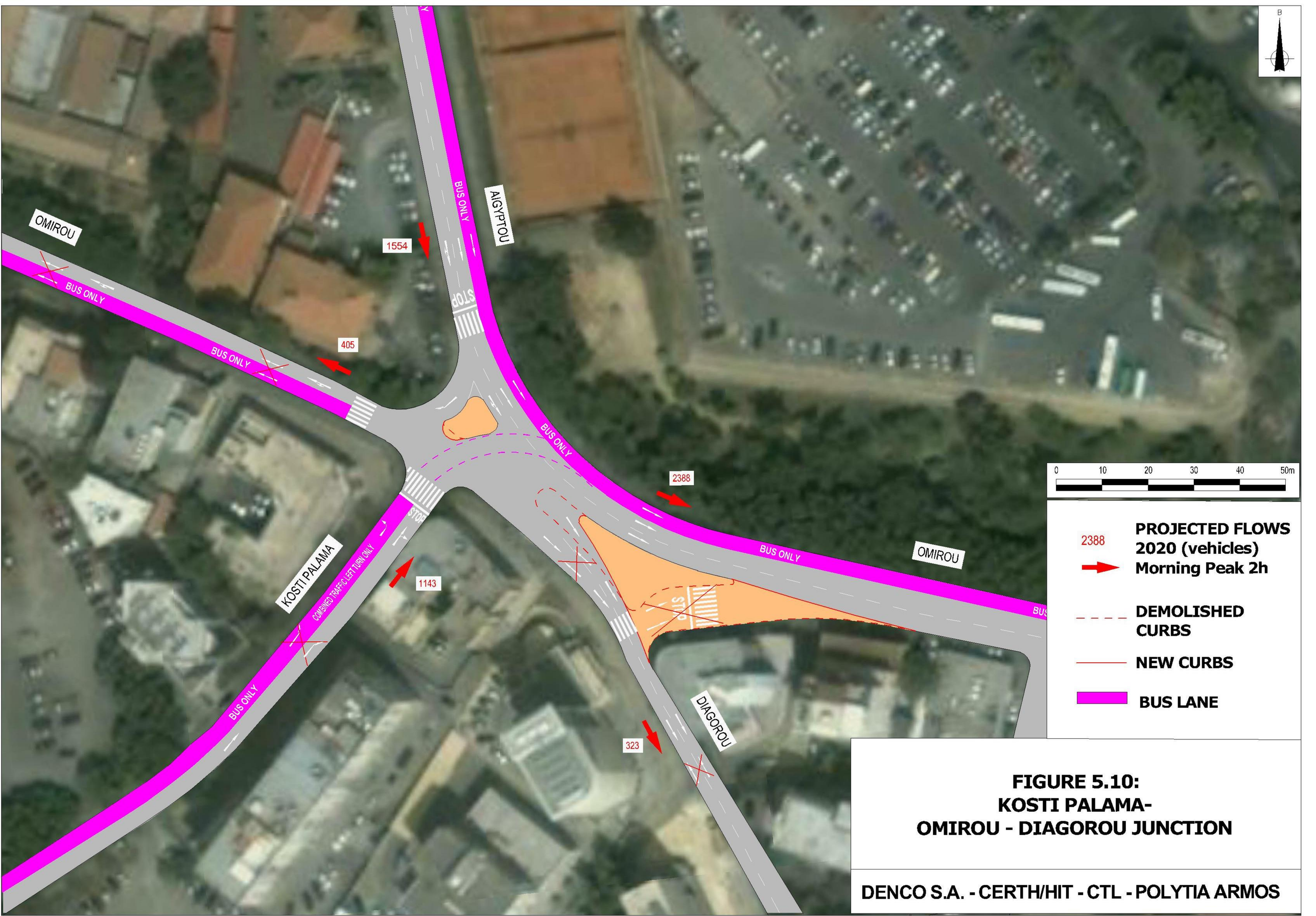


FIGURE 5.10:
KOSTI PALAMA-
OMIROU - DIAGOROU JUNCTION

DENCO S.A. - CERTH/HIT - CTL - POLYTIA ARMOS

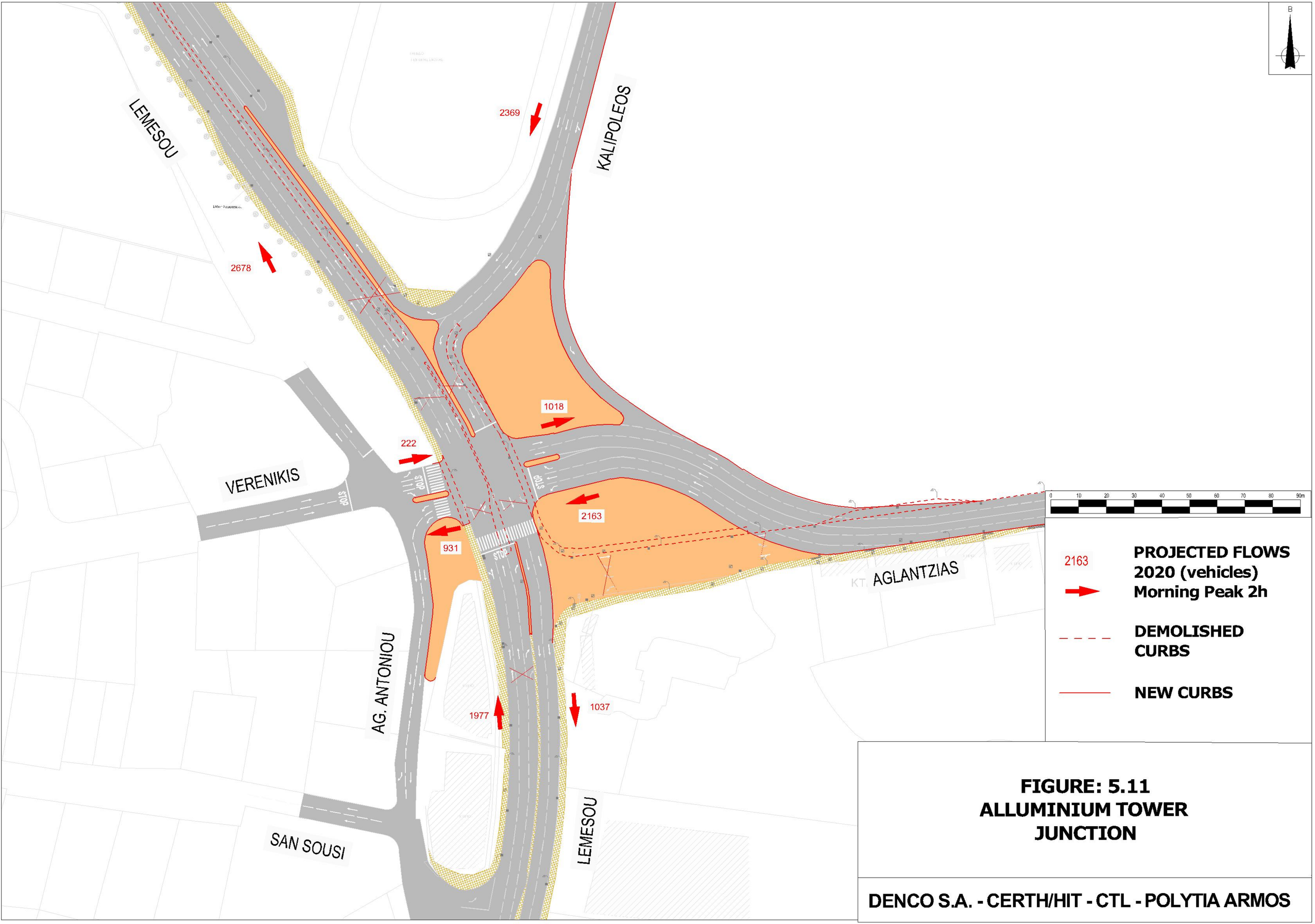


FIGURE: 5.11
ALLUMINIUM TOWER
JUNCTION

DENCO S.A. - CERTH/HIT - CTL - POLYTIA ARMOS

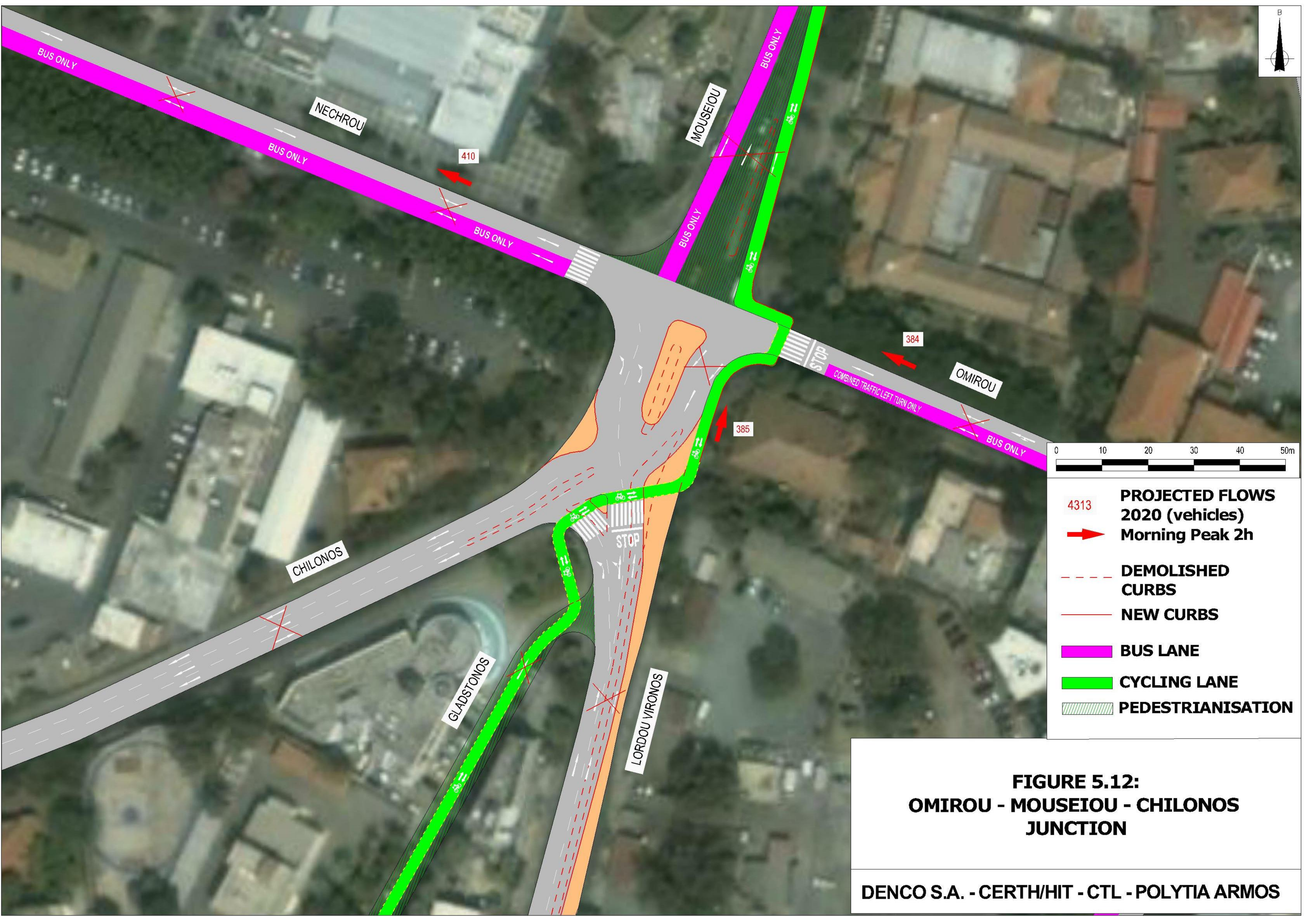


FIGURE 5.12:
OMIROU - MOUSEIOU - CHILONOS JUNCTION

DENCO S.A. - CERTH/HIT - CTL - POLYTIA ARMOS

5.2 Parking

5.2.1 Existing Situation

The growing car ownership and use increases the demand for parking space while the lack of systematic police enforcement favours illegal parking with all known undesirable effects on traffic, environment and townscape.

The general impression is that, although all known policies and measures have been proposed to solve the severe parking problems, the lack of an integrated parking policy still exists. It is of the outmost importance that such a policy is determined and implemented for the whole Greater Nicosia Area stating clearly all conditions and parameters affecting parking of all vehicle categories. Since parking management is the responsibility of the Municipalities, initiatives must be developed at the local Government level.

Supply and Demand

The present regulations concerning parking within the Study Area vary widely. There are legal parking spaces without restrictions, others with time restrictions (30 and 60 minutes) as well as parking meters and parking spaces controlled by Pay & Display machines. Parking is prohibited along the main arteries and on other critical locations (bus stops, intersection approaches, etc.).

<u>On-street Parking</u>

According to the most recent relevant studies the number of offered on-street parking spaces, within the central Nicosia area is about 950 (2, p. 51).

Although the existing statistics concerning illegally parked vehicles give rather low numbers, their effects are obvious in traffic congestion and is dangerous for the safety of vehicles and pedestrians. The number of the illegally parked vehicles is constantly increasing due to the following reasons:

- Lack of systematic enforcement.
- General disregard for parking restrictions.
- Confusion regarding present parking regulations.

<u>Off-street Parking</u>

According to the results of the more recent survey the available capacity of the off-street car parking lots is 6.135 cars in 115 parking lots (2, p. 54).

Fees

The WebPages of the Nicosia and Strovolos Municipalities give some data for the existing supply and cost of parking spaces. The most recent fees are given in the following table.

Table 5.1 Current Fees for Municipal Parking Lots in Central Areas in Nicosia and Strovolos

Parking duration; up to	Prices (€)	
	Nicosia	Strovolos
2 hours	1,25	
3 hours	1,50	1,00
4 hours	2,05	
5 hours		1,50
6 hours	2,55	
7 hours	3,05	2,00
8 hours	3,25	
9 hours	3,90	3,00
10 hours	4,10	

It is obvious that, in both Municipalities, **the fee structure is degressive** promoting long term parking and favouring the use of private cars.

Parking Routing Information System

The existing Parking Routing Information System in the Municipality of Nicosia is not always operational, not covering all main parking lots and produces very poor results. The system of variable message signs must be expanded to cover the main city entrances, so that drivers are informed about the availability of parking spaces in order to avoid detours in search of parking.

Parking Regulation

Traffic Code. The available Traffic Code is very old (early 80's) and should be renewed as soon as possible. The new Traffic Code must be free of ambiguities concerning parking restrictions and be applied for the whole of Cyprus. It should be based on recent international compatible Traffic Codes.

Fines. They are very low for not paying parking fees (€ 8 as compared to € 20 in Greece). Combined with the lack of systematic enforcement they urge users not to pay even the very low present fees. The Fines for illegal parking are much higher varying according to the severity of the violation.

Local Nicosia Plan. The Local Nicosia Plan (6,7,8), issued by the Department of Urban planning and Housing of the Ministry of the Interior in 2003 (last revision 2008), provides parking standards for new buildings, i.e. the required minimum parking spaces depending on the use of each new building. The categorization of the various uses is quite detailed in the tradition of German Legislation. The specifications are to be re-examined periodically to ensure compliance with modern needs. It is imperative however to ensure that all

specifications are fully enforced. Although there is a regulation, that in cases where the construction of the full number of parking spaces prescribed by law cannot be implemented, the owner should be obliged to pay a relevant fee to the Municipality, the collected funds are not used in providing new parking spaces and in parking improvements throughout the city as the law specifies.

Incentives Plan for Providing Public Parking Lots. The Incentive Plan for period 2007 – 2012 (10), is an extension of the 2000 – 2005 Incentive Plan (9) which ended in December 2005 and provided permits for the creation of 705 public parking spaces in the areas of four large urban complexes.

5.2.2 Implementation of a Parking Policy

Introduction

As already pointed out there is a need for an integrated parking policy. The general outlines of such a policy are decided as well as a policy pilot (4, Appendix Section 3.5.1). Implementation of the Policy Pilot has started.

In the Greater Nicosia Area, the implementation of parking policy is necessary, especially with regard to the central urban areas. This policy consists of the following points:

- Creating the framework of controlled on-street parking.
- Offering proper access by PT and Bicycle, especially to people working in the city centre.
- Optimising the availability of the existing parking space.
- Offering short term parking to visitors, in order to boost the activities of the centre of the city (trade, public services, education, leisure).
- Providing parking for residents by giving them parking privileges and setting, at the same time, parking restrictions for visitors in residential areas.
- Preparing a parking system monitoring programme to be repeated every three years
- Thorough enforcement of illegal parking, using physical means where possible, especially in the approaches of major intersections and other critical locations. Improve parking enforcement by means of the establishment of a special department, a Parking Management Unit, that operates according to the rules of a private company
- Raising prices for regulated short-term parking substantially and correct them for inflation every few years.
- Planning and constructing new off-street parking spaces in order to supply basically long term parking demand, taking into consideration the

effects on the current or future traffic capacity, which will determine the maximum number of parking spaces to be constructed.

- Providing park & ride parking near Public Transport's Terminals
- Improve quality of parking by means of the implementation of a dynamic parking routing information system (PRIS) and afterwards payment where possible.
- Increasing the Minimum Parking Requirements in New Buildings which, in many cases, are considerably lower than those of other countries of the EU. Enforce strictly these minimum requirements which refer to residents, employees and visitors of the new buildings.
- Creating a Traffic Code free of ambiguities concerning parking restrictions and applicable for the whole of Cyprus. It should be based on recent international compatible Traffic Codes.

Controlled On-street Parking

Controlled parking is – and should be used – as a tool for the promotion of specific urban design, economic and social goals, and therefore it should be included in the rules of a general policy.

Each municipality of the Greater Nicosia Area should organize, proclaim and assign comprehensive controlled parking studies for at least their central commercial and administrative area. The existing parking meters in public streets should be incorporated in the new system (modified as to fit the necessities of new selected methods of payment) and their parking fees must be redefined. It is important that the selected areas are clearly separated from the rest of the surrounding area by, for example, a park or major arteries etc., so that the application of the controlled parking system does not lead to shifting of demand to adjacent areas. Draft terms of reference for the study of a controlled on-street parking system in the Greater Nicosia Area are given in the Appendix Section 5.3. These studies should follow the implementation of the selected traffic plan in order to take in consideration all the changes which affect the number and the kind of existing parking supply.

Off-street Parking

The existing off-street parking should be modernized and their parking fees, which today are relatively low, redefined according to the general parking policy.

The parking data base which will be created should also include all elements of off-street parking (exact location, capacity, fees). Thus the database will present a dynamic icon of the parking balance of each Municipality.

Park & Ride

The park & ride locations should be rescheduled on the basis of the selected traffic plan. The locations to be considered are given at the end of Section 4.2.

Like off-street parking, park & ride elements should be recorded in the created parking data base.

6 PLAN FOR SUPPORTING NON-MOTORIZED TRANSPORT DEVELOPMENT

6.1 Bicycle

Figure 6.1 shows a network that can be implemented up to the year 2020. It will give good cycling opportunities for many travel motives (work based, education, recreational) as it offers a basic density of network. The phasing for the implementation is described at the next chapter (Section 7.5).

Recently two categories of cycling provisions were already implemented:

- The Pedieos river form Strovolos south to Lakatamia;
- In Aglantzia almost completely connecting the two campuses of the University of Cyprus.

The government believes that young people, school children and students are sensitive to a cycling policy that promotes cycling as being fancy, healthy and a cheap way of traveling. The Pedieos river track is quite successful as it can be observed that many families are cycling here at night and during the weekends. Taking advantage of what already exists and starting from the idea that young people could be convinced to start cycling, a first priority network was defined that will be implemented in the two years to come and that connects:

- the existing track along the Pedieos river with the centre of Nicosia;
- all the Universities in Nicosia with the Town centre and with each other.

This part of the network is relatively easy to construct and can be seen as an early winner. The early winner network is highlighted in Figure 6.1

EXISTING CYCLE ROUTES

(EARLY WINNERS)

UP TO 2012

UP TO 2016

UP TO 2020

PRIMARY ROAD AND INTERCHANGE
(LOCAL PLAN 2006)

LOCAL PLAN 2006 BOUNDARY

STUDY AREA BOUNDARY

TURKISH OCCUPATION BOUNDARY

FIGURE 6.1: PROPOSED CYCLING NETWORK

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6.2 Pedestrianisation and Regeneration

The roads proposed to be redesigned for the exclusive use of pedestrians and public transport are shown in Figures 5.2 and 5.3. Furthermore a more elaborate regeneration of selected roads should be implemented. Figures 6.2-6.6 show six examples of the proposed street regenerations on selected keystreets in the study area. More details on regeneration are given in this study (4, p.p. 40-45).

Figure 6.2 Proposed Street Regenerations. K. Palaiologou Avenue. Before and After

Figure 6.3 Proposed Street Regenerations. Ermou Street. Before and After

Figure 6.4 Proposed Street Regenerations. Chryseleousis Street. Before and After

Figure 6.5 Proposed Street Regenerations. Makarios Avenue. Before and After

Figure 6.6 Proposed Street Regenerations. Mouseiou Avenue. Before and After

7 PHASING OF IMPLEMENTATION

In this chapter, the complete amount of works that are needed for the implementation, is presented. There are considered three time periods:

- Phase A (2010-2012)
- Phase B (2013-2016)
- Phase C (2017-2020)

For each major item, the generalized investment cost is given and **it should be pointed out that the cost and the time schedule for the completion and implementation are indicative**. More detailed estimates could be made only when some preliminary studies will be conducted during the new project. The following five items will be examined separately:

- Public transport
- Major road network
- Interchanges
- Park and ride
- Bicycle lanes
- Pedestrianizations and regenerations

7.1 Public Transport

Implementing the Proposed PT Bus System

In implementing the proposed PT network three phases of implementation are considered (as these have been mentioned earlier). In general, during the first phase of implementation some of the major north – south radial lines and a few major east – west lines are implemented. During the second phase of development most of the feeder lines to the transportation centres are implemented and the rest of the lines are implemented in the third phase.

The following 14 bus lines, Figure 7.1, are proposed to be in operation by the end of the first period of PT network development:

- **Bus line # 3. From Solomou Sq. to Morfou & Parthenonos** through Ag.Prokopiou – Agchangelou – Achaion.
- **Bus line # 5. From Solomou Sq. to Makario Makarion Stadium** through Metochiou – Achaion – Delfon – Ag.Prokopiou – Griva Digeni – Tamassou.
- **Bus line # 6. From Makarion Stadium to University of Cyprus** through Athalassas and Kerinias.
- **Bus line # 7. From Makarion Stadium to New Hospital** through Sp.Kyprianou.
- **Bus line # 8. From Solomou Sq. to New Hospital** through Nikis, Akropoleos and Sp.Kyprianou.
- **Bus line # 12. From Solomou Sq. to Strovolou & Sp.Kyprianou**.
- **Bus line # 17. From Intercollege to Palouriotissa** through Griva Digeni.
- **Bus line # 18. From Intercollege to University of Cyprus** through Stasinou and Larnakos.
- **Bus line # 19. From Solomou Sq. to New Hospital** through Makariou and Lemesou.
- **Bus line # 30. From Solomou Sq.to the centre of Lakatamia** through Strovolou – Arch. Makariou.
- **Bus line # 32.** From Solomou Sq. to Tseri through Strovolou.
- **Bus line # 35.** From Solomou Sq. to Latsia through Lemesou.
- **Bus line # 41.** Circular line **from Makarion Stadium to Ministries.**
- **Bus line # 42.** Circular line **from the New Hospital to Ministries.**

The fleet to serve the above lines is 26 Midi Buses and 27 Standard type buses.

EXISTING ONE WAY ROADS

PROPOSED ONE WAY ROADS

MAIN JUNCTIONS
THAT NEED MODIFICATIONS

PROPOSED
PEDESTRIANISATION

TWO WAY BUS ONLY

BUS ROUTES (PHASE A)

41 42 LINES PER LINK

19 BUS LINE TERMINAL

FIGURE 7.1: PUBLIC TRANSPORTATION AND ROAD NETWORK - PHASE A

DENCO S.A. - CERTH/HIT - CTL - POLYTIA ARMOS

The following 12 bus lines, Figure 7.2, are proposed to be in operation by the end of the second period of PT network development:

- **Bus line # 1. From Solomou Sq. to Archangelos**
- **Bus line # 9. From New Hospital to Neo GSP**
- **Bus line # 10. From New Hospital to Geri.**
- **Bus line # 11. From New Hospital to Dali.**
- **Bus line # 13. From Makarion Stadium to Lakatamia.**
- **Bus line # 14. From Strovolos to Dasoupoli.**
- **Bus line # 15. From Strovolos to New Hospital.**
- **Bus line # 16. From Strovolos to Kostantinoupoleos.**
- **Bus line # 22. From Strovolos to Pano Lakatamia.**
- **Bus line # 27. From Makarion Stadium to Anthoupoli.**
- **Bus line # 28. From Strovolos to Pano Deftera.**
- **Bus line # 29. From Strovolos to Tseri.**

The fleet to serve the above lines is 34 Midi Buses.

The remaining 10 bus lines, Figure 7.3, are to be implemented up to the year 2020. The fleet required for the operation of these lines is 15 Midi buses and 16 Standard type buses.

The bus terminals at Solomou Sq. at Makarion Stadium and at the New Hospital Area should be in operation by the end of the first phase of development. The bus terminals at Strovolos at Intercollege and at Cyprus University should be in operation by the end of the second phase of development. The rest of the terminal facilities should be in operation by the end of the third phase of development.

Assuming that the construction cost of the boarding platforms at terminals including the platform and its shelter will be 30.000€ per platform and that, in general, each platform will serve two to three bus lines depending on the frequencies of service of the bus lines, the total number of platforms required is roughly estimated at four at the Makarion Stadium, at five at the New Hospital, at two at the University of Cyprus, at two at the Intercollege and at three at Strovolos – total 16 platforms with a total cost of 500.000€ not including the cost of the terminal at Solomou Sq.

Assuming also that the total number of bus stops will be roughly 1.500, that bus shelters are needed at 40% of the bus stops and also that the cost per shelter including pavement works will be around 6.000€ and the cost per stop without shelter 1.500€, the total cost for shelters and simple stops is estimated

at 4.950.000€. A part of this cost is expected to be financed by the private sector (advertisements).

Finally the cost of bus lanes can vary considerably depending on the type of bus lanes to be constructed. The major cost item is the pavement construction in the cases where special pavements are needed. The other cost items are the signs and markings. In the case of Nicosia the expected pavement loadings by buses are such that no special pavements are needed. Therefore, considering only the cost of signing to be approximately 21.000€ kilometer, the total cost for the implementation of bus lanes is estimated at (15,5 km x 21.000€=325.500€) . In case that pavement reconstruction is needed the cost per kilometer is approximately 140.000€.

The above costs are assumed to be more or less equally distributed to the three phases of development.

The feasibility and preliminary designs for the tram lines should be studied during the first phase. The detailed design during the second phase and implementation works can start in the third phase**.**

All the above operational and implementation procedures, are given in Table 7.1

EXISTING ONE WAY ROADS

PROPOSED ONE WAY ROADS

MAIN JUNCTIONS THAT NEED MODIFICATIONS

PROPOSED PEDESTRIANISATION

TWO WAY BUS ONLY

BUS ROUTES (PHASE A)

41 42 LINES PER LINK

BUS ROUTES (PHASE B)

1 LINES PER LINK

19 / 1 BUS LINE TERMINAL

FIGURE 7.2: PUBLIC TRANSPORTATION AND ROAD NETWORK - PHASE B

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EXISTING ONE WAY ROADS

PROPOSED ONE WAY ROADS

MAIN JUNCTIONS THAT NEED MODIFICATIONS

PROPOSED PEDESTRIANISATION

TWO WAY BUS ONLY

BUS LINE TERMINAL

BUS ROUTES (PHASE A)

LINES PER LINK

BUS ROUTES (PHASE B)

LINES PER LINK

BUS ROUTES (PHASE C)

LINES PER LINK

FIGURE 7.3: PUBLIC TRANSPORTATION AND ROAD NETWORK- PHASE C

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TABLE 7.1: PHASING FOR IMPLEMENTATION OF PUBLIC TRANSPORT

		Description of Projects		2010-2012			2013-2016				2017-2020				2020+	Costs
				2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
PHASE A	1	Implementation of some of the major north – south radial lines and a few major east – west lines. The fleet to serve the lines is 26 Midi Buses and 27 Standard type buses.	Bus line # 03. From Solomou Sq. to Morfou & Parthenonos through Ag.Prokopiou – Agchangelou – Achaion.													
	2		Bus line # 05. From Solomou Sq. to Makario Stadium through Metochiou – Achaion – Delfon – Ag.Prokopiou – Georg.Griva Digeni – Tamassou.													
	3		Bus line # 06. From Makario Stadium to University of Cyprus through Athalassas and Kerinias.													
	4		Bus line # 07. From Makario Stadium to New Hospital through Sp.Kyprianou.													
	5		Bus line # 08. From Solomou Sq. to New Hospital through Nikis, Akropoleos and Sp.Kyprianou.													
	6		Bus line # 12. From Solomou Sq. to Strovolou & Sp.Kyprianou.													
	7		Bus line # 17. From Intercollege to Palouriotissa through Gevrg.Griva Digeni.													
	8		Bus line # 18. From Intercollege to University of Cyprus through Stasinou and Larnakos.													
	9		Bus line # 19. From Solomou Sq. to New Hospital through Makariou and Lemesou.													
	10		Bus line # 30. From Solomou Sq.to the center of Lakatamia through Strovolou – Arch. Makariou.													
	11		Bus line # 32. From Solomou Sq. to Tseri through Strovolou.													
	12		Bus line # 35. From Solomou Sq. to Latsia through Lemesou.													
	13		Bus line # 41. Circular line from Makario Stadium to Ministries.													
	14		Bus line # 42. Circular line from the New Hospital to Ministries.													
	15		Bus stops													1.980.000 €
	16		Bus lanes													186.000 €
	17		Bus terminals at Solomou Sq. ,at Makario Stadium, and at the New Hospital Area.													281.000 €
	18		Feasibility study and preliminary designs for tram lines													1.200.000 €
PHASE B	19	Implementation of the feeder lines to the transportation centers (hubs). The fleet to serve the lines is 34 Midi Buses.	Bus line # 01. From Solomou Sq. to Archangelos													
	20		Bus line # 09. From New Hospital to Neo GCP													
	21		Bus line # 10. From New Hospital to Geri.													
	22		Bus line # 11. From New Hospital to Dali.													
	23		Bus line # 13. From Makario Stadium to Lakatamia.													
	24		Bus line # 14. From Strovolos to Dasoupoli.													
	25		Bus line # 15. From Strovolos to New Hospital.													
	26		Bus line # 16. From Strovolos to Kostantinoupoleos.													
	27		Bus line # 22. From Strovolos to Pano Lakatamia.													
	28		Bus line # 27. From Makario Stadium to Anthoupoli.													
	29		Bus line # 28. From Strovolos to Pano Deftera.													
	30		Bus line # 29. From Strovolos to Tseri.													
	31		Bus stops													1.732.500 €
	32		Bus lanes													163.000 €
	33		Bus terminals at Strovolos, at Intercollege, and at Cyprus University.													219.000 €
	34		Detailed design of tram lines													1.800.000 €
PHASE C	35	Implementation of the rest of the lines. The fleet required for the operation of these lines is 15 Midi buses and 16 Standard type buses.	Bus line # 02 From Solomos Sq. to Archangelou.													
	36		Bus line # 04 From Solomos Sq. to Tseriou.													
	37		Bus line # 20 From Ippodromos to Paliouriotisa.													
	38		Bus line # 21 From Pyli Pafou to Kaimakli.													
	39		Bus line # 23 Proedriko.													
	40		Bus line # 24 Makareio Hospital.													
	41		Bus line # 25 From Intercollege to Larnakos.													
	42		Bus line # 26 From Solomos Sq. to Agios Andronikos.													
	43		Bus lien # 31 From Solomos Sq. to Makario Stadium.													
	44		Bus line # 43 From Solomos Sq. to GSP.													
	45		Bus stops													1.237.500 €
	46		Bus lanes													116.000 €
	47		Implementation works of tram lines													334.730.000 €
		implementation														**343.645.000 €**
		studies														

7.2 Major Road Network

In order to achieve full sustainability for the preferred public transport scenario, it is very important that the proposed road network, figure 7.4, should be completed according to the phases given below. The schedule for the implementation is shown in Table 7.2.

Phase A

- Stavrou : From interchange Stavrou-Lemesou to Antistaseos-Kodrou junction
- Stavrou : From Antistaseos-Kodrou junction to Athinon-Stavrou junction
- Athinon: From Athinon-Stavrou junction to Athninon-Strovolou
- Irakleous-Pithonos: From Athinon-Irakleous junction to Irakleous-Strovolou junction
- New road section 1 : From new interchange of Lefkotheou-Archagelou M.- Makedonitisis to new junction with Strovolou
- New road section 2: From New GSP interchange to New Argiroupoleos until Ipokratous-Tseriou junction
- Ippokratous: From junction with Tseriou to Areos junction
- Melinas Merkouri (Areos): From Giannou Kranidioti (Orfeos) roundabout to Ippokratous junction
- Giannou Kranidioti (Orfeos): From Pefkou junction to National Stadium junction
- New road section 3: From National Stadium junction to new junction with Tseriou-Lakatamias

Phase B

- New underground tunnel: From Koritsas - 28 October new junction to new road section of Kikou (now under construction)
- Makedonias: From Nikou Kranidioti (Kikou Monastery) new junction to Tamassou junction
- Tamassou: From Makedonias junction to Pavlou Mela - Dikeosinis junction
- Pavlou Mela: From Dikeosinis - Tamassou junction to new roundabout with Ilia Papakiriakou
- Georgiou Seferi: From new roundabout with Papakiriakou to new roundabout with Iroon Av.

- Iroon Avenue: From interchange Archangelou M. to new roundabout with Morfou
- Iroon Avenue: From new roundabout with Morfou to new roundabout with Makarion Stadium
- Makarion Stadium: From new roundabout with Iroon to Ilia Papakiriakou junction
- Lefkotheou: From Ilia Papakiriakou junction to new interchange with Archangelou M.-Makedonitisis
- Akadimias: From Omirou to Higher Technical Institute str.

Phase C

- Simvouliou tis Evropis: From Pentagias junction to roundabout with Amohostou and John Kennedy
- New road section 4: From new interchange of New GSP to new roundabout with Giannou Kranidioti (B1)
- Philippou Papakiprianou: From Petrou Iliadi junction to Platonos Stilianou junction
- Philippou Papakiprianou: From Arhiepiskopou Makariou junction to junction with new road
- New road section 5: From junction with new road to Athalassis junction
- New road section 6: From Epektasi Kalamon to new road junction
- Morfou: From Likavitou junction to new roundabout with Iroon Av.

MOTORWAY

ARTERY

COLLECTOR

PROPOSED MODIFICATIONS

PEDESTRIANS AND BUSES ONLY

EXCISTING ONE WAY ROADS

PRIMARY ROAD AND INTERCHANGE (LOCAL PLAN 2006)

PROPOSED ROAD TUNNEL

PERIPHERAL ROAD (BEYOND 2020)

LOCAL PLAN 2006 BOUNDARY

PROPOSED ONE WAY ROAD

TURKISH OCCUPATION BOUNDARY

STUDY AREA

FIGURE 7.4: MAJOR ROAD NETWORK- PROPOSED MODIFICATIONS

DENCO S.A. - CERTH/HIT - CTL - POLYTIA ARMOS

0 500 1000 1500 2000

TABLE 7.2 PHASING FOR IMPLEMENTATION OF MAJOR ROAD NETWORK

	NUMBER OF ROAD WORKS AS SHOWN IN FIGURE 7.4			2+2	1+1	Length (kms)	New infrastructure	Upgrade	2010-2012			2013-2016				2017-2020				Estimated Costs
									2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
PHASE A	1	Stavrou	From interchange Stavrou-Lemesou to Antistaseos-Kodrou junction	√		1,1	√													6.600.000 €
	2	New road section 1	From new interchange of Lefkotheou-Archagelou M.-Makedonitisis to new junction with Strovolou	√		1,3	√													7.800.000 €
	3	New road section 2	From New GSP interchange to New Argiroupoleos until Ipokratous-Tseriou junction	√		3,1	√													18.600.000 €
		Philippou Papakiprianou	From new interchange of New GSP to new roundabout with Giannou Kranidioti (B1)	√		1,2	√													7.200.000 €
		Philippou Papakiprianou	From Petrou Iliadi junction to Platonos Stilianou junction		√	0,27	√													810.000 €
	4	Melinas Merkouri (Areos)	From Giannou Kranidioti (Orfeos) roundabout to Ippokratous junction	√		0,35	√													2.100.000 €
		Ippokratous	From junction with Tseriou to Areos junction	√		1,5		√												4.500.000 €
	5	New road section 3	From Municipal Stadium of Lakatamia junction to new junction with Tseriou-Lakatamias	√		1	√													6.000.000 €
	6	New underground tunnel	From Koritsas - 28 October new junction to new road section of Kikou (now under construction)	√		1,7	√													50.000.000 €
	7	Makedonias	From Nikou Kranidioti (Kikou Monastery) new junction to Tamassou junction	√		0,5	√													3.000.000 €
		Tamassou	From Makedonias junction to Pavlou Mela - Dikeosinis junction	√		0,6	√													3.600.000 €
		Pavlou Mela	From Dikeosinis - Tamassou junction to new roundabout with Ilia Papakiriakou	√		0,32	√													1.920.000 €
	8	Simvouliou tis Evropis	From Pentagias junction to roundabout with Amohostou and John Kennedy	√		1,2	√													7.200.000 €
	9*	Akadimias	From Omirou to Higher Technical Institute str.		√	0,3		√												900.000 €
	10	Kallipoleos	From Stasinou Theodotou junction to Aluminum Tower			1,62		√												4.860.000 €
	11	Makariou III	From Aluminum tower to Spyrou Kyprianou Junction			1,5		√												4.500.000 €
PHASE B	12	Philippou Papakiprianou	From Arhiepiskopou Makariou junction to junction with new road		√	1,8	√													5.400.000 €
	13	New road section 5	From junction with new road to Athalassis junction		√	1,5	√													4.500.000 €
	14	New road section 6	From Epektasi Kalamon to new road junction		√	1,15	√													3.450.000 €
	15	Stavrou	From Antistaseos-Kodrou junction to Athinon-Stavrou junction	√		1,6		√												4.800.000 €
	16	Athinon	From Athinon-Stavrou junction to Athninon-Strovolou	√		0,6		√												1.800.000 €
	17	Irakleous-Pithonos	From Athinon-Irakleous junction to Irakleous-Strovolou junction	√		0,6		√												1.800.000 €
	18	Giannou Kranidioti (Orfeos)	From Pefkou junction to Municipal Stadium of Lakatamia junction	√		0,95		√												2.850.000 €
	19	Georgiou Seferi	From new roundabout with Papakiriakou to new roundabout with Iroon Av.	√		0,8		√												2.400.000 €
	20	Iroon Avenue	From interchange Archangelou M. to new roundabout with Morfou	√		1,1		√												3.300.000 €
		Iroon Avenue	From new roundabout with Morfou to new roundabout with Makariou Athletic Center	√		0,9		√												2.700.000 €
		Iroon Avenue	From Makariou Athletic Center to Georgou Seferi	√		0,5		√												1.500.000 €
	21	Makariou Athletic Center	From new roundabout with Iroon to Ilia Papakiriakou junction	√		0,9		√												2.700.000 €
		Iosif Chatziosif	From Athalassas to Kyprianou	√		1,7		√												5.100.000 €
		Lefkotheou	From Ilia Papakiriakou junction to new interchange with Archangelou M.-Makedonitisis	√		0,7		√												2.100.000 €
	22*	Verenikis - Ifigenias	From Ifigenias and Armenias junction to Verenikis Stasinoy junction		√	0,75		√												2.250.000 €
	23	Morfou	From Likavitou junction to new roundabout with Iroon Av.	√		0,7		√												2.100.000 €
																				178.340.000 €

construction

studies

*to be determined thouroughly by detailed studies

7.3 Interchanges

According to the previous schedule for the implementation of the road network, figure 7.4, a complete phasing program should follow for the implementation of the interchanges regarding the completion of the project. This detailed phasing is given in table 7.3.

Phase A

- New GSP Stadium : Implementation
- Spyrou Kyprianou - Iosif Hatziiosif: Feasibility study
- Stavrou-Lemesou: Feasibility study
- Spyrou Kyprianou - Iosif Hatziiosif: Detailed design study
- Stavrou-Lemesou: Detailed design study
- Spyrou Kyprianou – Tseriou: Feasibility study
- Spyrou Kyprianou – Tseriou: Detailed design study
- Lefkotheou-Archagelou M.-Makedonitisis: Feasibility study
- Lefkotheou-Archagelou M.-Makedonitisis: Detailed design study
- Aluminium Tower

Phase B

- Stavrou-Lemesou: Implementation
- Spyrou Kyprianou - Iosif Hatziiosif: Implementation
- Spyrou Kyprianou – Tseriou: Implementation
- Lefkotheou-Archagelou M.-Makedonitisis: Implementation

TABLE 7.3 PHASING FOR IMPLEMENTATION OF INTERCHANGES

				2010-2012			2013-2016				2017-2020				Estimated costs
				2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
PHASE A	1	New GSP Stadium	Implementation												22.000.000 €
	2	Spyrou Kyprianou - Iosif Hatziiosif	Feasibility study												700.000 €
	3	Stavrou-Lemesou	Feasibility study												700.000 €
	2	Spyrou Kyprianou - Iosif Hatziiosif	Detailed design study												1.300.000 €
	3	Stavrou-Lemesou	Detailed design study												1.300.000 €
	4	Spyrou Kyprianou - Tseriou	Feasibility study												700.000 €
	4	Spyrou Kyprianou - Tseriou	Detailed design study												1.300.000 €
	5	Lefkotheou-Archagelou M.-Makedonitisis	Feasibility study												700.000 €
	5	Lefkotheou-Archagelou M.-Makedonitisis	Detailed design study												1.300.000 €
PHASE B	3	Stavrou-Lemesou	Implementation												20.000.000 €
	2	Spyrou Kyprianou - Iosif Hatziiosif	Implementation												20.000.000 €
	4	Spyrou Kyprianou - Tseriou	Implementation												20.000.000 €
	5	Lefkotheou-Archagelou M.-Makedonitisis	Implementation												20.000.000 €
	6	Spyrou Kyprianou - Lemessou (A1)	Studies and implementation												22.000.000 €
		construction													**132.000.000 €**
		studies													

7.4 Park and Ride

The facilities of park and ride are considered to be of high priority, as during the transition period from today to the year 2020. As it is known, the existence of public transport main bus terminals in several sites, it is important to consider a plan for the implementation of such parking facilities. The phasing of this project is given in Table 7.4.

Phase A

- OLD GSP STADIUM: Implementation
- SOLOMOY SQ. : Implementation
- MAKARION STADIUM: Study (Traffic impacts & construction)
- AGHIOS ANTONIOS MARKET Study (Traffic impacts & construction)
- NEW HOSPITAL Study (Traffic impacts & construction)
- NEW GSP STADIUM Study (Traffic impacts & construction)

Phase B

- MAKARION STADIUM: Implementation
- AGHIOS ANTONIOS: Implementation
- NEW HOSPITAL: Implementation
- NEW GSP STADIUM: Implementation

TABLE 7.4 PHASING FOR IMPLEMENTATION OF PARK AND RIDE

	A/A	NAME - DESCRIPTION		TIME PERIODS						
				2010-2012			2013-2016			
				2010	2011	2012	2013	2014	2015	2016
PHASE A	1	OLD GSP STADIUM	Implemention							
	2	SOLOMOY SQ.	Implemention							
	3	MAKARIO STADIUM	Study (Traffic impacts & construction)							
	4	AGHIOS ANTONIOS MARKET	Study (Traffic impacts & construction)							
	5	NEW HOSPITAL	Study (Traffic impacts & construction)							
	6	NEW GSP STADIUM	Study (Traffic impacts & construction)							
PHASE B	7	MAKARIO STADIUM	Implemention							
	8	AGHIOS ANTONIOS MARKET	Implemention							
	9	OLD HOSPITAL	Study & Implementation							
	10	NEW HOSPITAL	Implemention							
	11	NEW GSP STADIUM	Implemention							

7.5 Bicycle Lanes

Phase A (2010-2012) - early winners project

In this phase all the bicycle lanes that are presented in figure 7.5, must be completed.

The total length of bicycle lanes of this phase is 24 km. The east west corridor that was presented in Interim Report 3, connecting various university campus, is included.

Phase B (2013-2016)

In this phase all the bicycle lanes that are presented in figure 7.6, must be completed.

The total length of bicycle lanes of this phase is 50 km.

Phase C (2017-2020)

In this phase all the bicycle lanes are presented in figure 7.7, must be completed.

The total length of bicycle lanes of this phase is 46 km.

In all three phases, during the first year, all the design and studies must be completed. During the remaining time of each phase, the construction and implementation will take place. For all three phases, the cost of the feasibility studies and the detailed final designs is estimated 10% of the total construction cost. The complete phasing and Implementation procedure is shown in Table 7.5

EXISTING CYCLE ROUTES

(EARLY WINNERS)

PHASE A

PRIMARY ROAD AND INTERCHANGE
(LOCAL PLAN 2006)

LOCAL PLAN 2006 BOUNDARY

STUDY AREA BOUNDARY

TURKISH OCCUPATION BOUNDARY

FIGURE 7.5: PROPOSED CYCLING NETWORK - PHASE A

DENCO S.A. - CERTH/HIT - CTL - POLYTIA ARMOS

0 500 1000 1500 2000

EXISTING CYCLE ROUTES

(EARLY WINNERS)

PHASE A

PHASE B

PRIMARY ROAD AND INTERCHANGE
(LOCAL PLAN 2006)

LOCAL PLAN 2006 BOUNDARY

STUDY AREA BOUNDARY

TURKISH OCCUPATION BOUNDARY

FIGURE 7.6: PROPOSED CYCLING NETWORK - PHASE B

DENCO S.A. - CERTH/HIT - CTL - POLYTIA ARMOS

0 500 1000 1500 2000

EXISTING CYCLE ROUTES

(EARLY WINNERS)

PHASE A

PHASE B

PHASE C

PRIMARY ROAD AND INTERCHANGE
(LOCAL PLAN 2006)

LOCAL PLAN 2006 BOUNDARY

STUDY AREA BOUNDARY

TURKISH OCCUPATION BOUNDARY

0 500 1000 1500 2000

FIGURE 7.7: PROPOSED CYCLING NETWORK - PHASE C

DENCO S.A. - CERTH/HIT - CTL - POLYTIA ARMOS

TABLE 7.5 PHASING FOR IMPLEMENTATION OF BICYCLE LANES

				2010-2012			2013-2016				2017-2020				Estimated Costs	
				2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
PHASE A	1	In this phase all the bicycle lanes that were given in figure 7.5, must be completed. The total length of bicycle lanes of this phase is 24 km.	EARLY WINNER												3.600.000 €	
			feasibility study and the detailed final designs												383.600 €	
	2		Implementation												4.411.400 €	8.395.000 €
PHASE B	3	In this phase all the bicycle lanes that were given in figure 7.6, must be completed. The total length of bicycle lanes of this phase is 50 km.	feasibility study and the detailed final designs												1.400.000 €	
	4		Implementation												16.100.000 €	17.500.000 €
PHASE C	5	In this phase all the bicycle lanes that were given in figure 7.7, must be completed. The total length of bicycle lanes of this phase is 46 km.	feasibility study and the detailed final designs												1.288.000 €	
	6		Implementation												14.812.000 €	16.100.000 €
															41.995.000 €	41995000

construction

studies

8 MARKETING PLAN

In chapters 1 through 7 an Integrated Mobility Master Plan (IMMP) was defined. This contains mainly the technical layout. These goals can only be achieved by changing the mindset of the Cypriots: they should be more aware and think positive about walking, bicycle use and PT than they do now. Therefore a Marketing Plan was developed, that is described in this final chapter.

A. Scope

This marketing plan is about implementing the ideas of the IMMP in the minds of the Cypriot residents, both the general public and the (professional) stakeholders and decision makers!

B. Relevancy : Why do we need it?

Cyprus accounts for the highest ratio of cars to population of any country in Europe. Almost all transport takes place by cars, that are fast and comfortable. Cars have however negative aspects for the environment: they pollute and require lots of space. Cars are also expensive too; not everyone can buy or drive one. Moreover, there are groups of people who are not yet allowed to drive a car (children), or are not able to do so any longer (elderly, disabled). They have to make use of other transport systems, such as buses and bicycles.

Exactly these means of transport need to be developed strongly. The public transportation of Cyprus shows a very low market share, by far the lowest in the European Union. Infrastructure sees little room for cyclists, pedestrians, and there are only few facilities for disabled people. The current roads in Cyprus have no separate lanes for bicycles and buses. Most of the time pedestrians need to do without level-crossings. On the other hand there are lots of parking spaces for private cars, which are free or low in costs.

The government of Cyprus plans to change this: the transport of the residents should be guaranteed or even be improved, while negative aspects are minimized. A sustainable transport system can do so. It improves environmental conditions, health of the residents and contributes to better living!

C. Goals : What do we expect of it?

The IMMP is a plan. A plan that consists of ideas and proposals how to change the present car-based mobility system into a modern, more sustainable version. Market share of public transport and bicycles should be raised fundamentally. The increase in mobility is expected to be +39% in 2020.

By promoting sustainable transport we will achieve a shift in transport modes. And if the market share of bus & bike increases, we will achieve that car-mobility still increases, but (far) less than the predicted growth of 39%.

D. Strategy: what will it take to make the IMMP effective?

However, the IMMP is a plan. And of course: you cannot drive in a plan... The plan is a start. The starting point of people thinking different about travelling by bus & bike. When they do so, it's necessary to accommodate their new transport needs by building new networks and infrastructure. New facilities, adding quality to the bus and bike network, may invite more people to use them. Promotion and improving the transport system at the same time enhance the effectiveness.

Firm internal base

At first, we need a firm base to build the plans upon. Plans that consists of both communications and building networks and infrastructure.

These are the highlights of this marketing plan. We first make sure that we have a solid base; Bus and bicycle have - next to the car - a conspicuous place in the transport system. Using simple yet proven measurements, such as adequate travel information, the system will be improved. Via a communication campaign we tell (possible) users about the advantages of sustainable mobility.

Then we work to improve the concept and associated smart marketing. Finally, we continuously improve the quality of the system and innovate where possible; sustainable mobility has become a fixture in the transport system of Cyprus!

This plan aims to use marketing and communication techniques that result in public support and a positive image of public transportation in general.

Keys to a successful innovation

The Cyprus mobility system needs a thorough change to be successful in the future. Ambitious and challenging steps have to be taken. A plan is designed that consists of three innovation strategies with the following goals:

1. assure a firm internal governmental basis for developing a new Cyprus public transportation system
2. develop a management structure with clear responsibilities and tasks
3. build a brand new public transportation system based on high-effective investments and smart concepts

Innovation of this system is delicate and should be positively influenced by an enthusiastic attitude of the stakeholders and decision makers.

All things that deal with the IMMP need to show consistency, continuity, convincement and commitment. Building the sustainable transport system and taking all the innovation steps need a strong support from all government officials and civil servants. Only then the inhabitants of Cyprus will change their negative opinion about bus & bike. Although this might take a considerable timeframe, finally will start adopting it.

The success of this process starts by this dedicated marketing plan, that is convincing to its stakeholders and that is generally agreed on.

E. Actions: what should we do to embed the IMMP in the Cyprus society?

A series of actions should be taken to promote the IMMP among stakeholders, decision makers and the general public. Effective, multi media marketing of the plan consists of these 10 actions and activities:

1. Give the IMMP a strong identity
2. Organize a marketing unit
3. Emphasize firmly and consequently the benefits of the plan
4. The Minister is the prime ambassador
5. Inform stakeholders and decision makers about the progress
6. Inform the general public about the contents of the plans
7. Make the IMMP visible
8. Enforce two way communication
9. Meet the concerned and committed
10. Celebrate milestones

Descriptions for each of the above actions are given in Appendix Chapter 8.

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