Anexartisias street is closed for motor traffic between the Coastal Road and Gladstonos. All buses exiting from the Themistokleous bus terminal go through the section north of Andrea Themistokleous street up until Gladstonos.

Supply and waste disposal services for commercial premises on Anexartisias will be possible either during specified hours before morning peak hour or during night time. Also, facilities on Anexartisias can be accessed from the rear side from Ellados and Georgiou Malekidi at specified hours with specified vehicles (see also section 10)
7.3.4 Associated administrative or policy measures

The most important measure to provide safe and convenient infrastructure is to implement appropriate regulations into all planning processes that may affect walking. Establishing adequate regulations with minimum requirements is crucial to end the prevailing current practice of disregarding pedestrians as equal road users. Beyond the regulations, a strict law enforcement is needed to keep existing and future walking infrastructure free from parking vehicles and to remove hindering obstacles. Specific administrative and policy measures to increase (public) space, safety and quality of pedestrian infrastructure are:

- Provision of (public) land for the creation of footways as well as green and quiet places to serve for rest and recreation
- Provision of land and regulations for safety measures to provide adequate space for pedestrians with all types capabilities to access public transport facilities
- Request of provision of land for pedestrian infrastructure as part of residential/ commercial development tenders
- Promotion of walk-to-school schemes in public and private schools (incentives for winning schools)
8 Cyclist Measures

8.1 Introduction

All over Europe, cycling is becoming more and more popular with respect to recreational and sportive activity but also as a convenient mode of transport for serving every-day trips such as commuting.

- Cycling is healthy, improves fitness and reduces stress
- Cycling is a low-priced mode of transport with respect to purchasing a bike and operational costs
- Cycling is faster on short and medium distances compared to public transport and even the private car
- Cycling serves climate and environmental protection, it does not consume fossil energy and is emission free
- Cycling relieves roads, reduces congestion and has lower demand for parking space
- Cycling supports local trade and inner cities since cyclists’ shop rather close to their homes
- Cycling means reduced costs for the city (e.g. less investment into road infrastructure despite growing population)

8.1.1 Current Status

The household survey conducted for the SUMP Limassol revealed a share of 0.4% of trips by bicycle! In a city where pleasant weather conditions (apart from summer months when temperature is quite high) prevail throughout the greatest part of the year and which has rather favourable (flat) terrain.

Similar to the pedestrian network, an assessment of the cycling infrastructure was conducted on selected network elements in Limassol and the five municipalities. A set of indicators was developed to analyse the usability and quality of the network:

- Existence of separate cycle paths (raised/ next to road or clearly marked on the road)
- Sufficient width (minimum 1.5m if separated, 2m otherwise)
- Existence of obstacles (e.g. trees, pillars, and traffic signs or other installations) that limit the effective width
- Parked vehicles (short term and beyond)
- Quality of surface (paved/cobbled, damaged)
- Road traffic (low/medium/high volumes, effective speeds)
- Bicycle parking facilities in the vicinity

From the indicators listed above, six respective Levels of Service were defined:

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
<td>separate bike path</td>
</tr>
<tr>
<td>B</td>
<td>2</td>
<td>coloured bike lane</td>
</tr>
<tr>
<td>C</td>
<td>3</td>
<td>no facilities, good surface, safe</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
<td>no facilities, good surface</td>
</tr>
<tr>
<td>E</td>
<td>5</td>
<td>no facilities, rough surface</td>
</tr>
<tr>
<td>F</td>
<td>6</td>
<td>obstacles, dangerous, heavy traffic</td>
</tr>
</tbody>
</table>

Figure 52: Cycling network: Levels of Service

The detailed results of the pedestrian network assessment are described in detail in Deliverable D5.1 Problem Analysis Report, section 3.5.2

The analysis revealed that apart from the recreational cycling infrastructure along the sea-front park and some river beds, almost no separate infrastructure (dedicated cycle ways or marked cycle lanes) exists. Consequently, the levels of service were rated mainly from 3 to 6, with the best level (rated as 3) mainly attributed to streets characterized by low traffic volumes and good surface so that cycling on the road is convenient and rather safe.
8.1.2 Objectives of Cycling measures

The objective of the cycling measures concept is to provide a framework for the promotion of everyday, as well as recreational/ tourist, cycling. This should help to significantly increase the importance and consequently, the modal share of cycling.

The key targets are:

- To improve the quality of connectivity between the quarters’ and/ or municipalities’, which could attract people to choose the bicycle for medium-type distances. The longest bee-fly distance between one of the five municipalities (e.g. Ypsonas or Germasogia) and Limassol city centre is less than 8km. By choosing a convenient route, the distance would be maximum 10km which takes up approximately 30 minutes by bicycle.

- To improve the accessibility of social, educational, administrative, commercial, cultural attractions for all person groups, thus allowing almost all people to travel independently almost cost-free to any desired destination in reasonable vicinity (e.g. within the study area).

- To improve interconnectivity with other sustainable modes of transport provides the opportunity to cover also longer distances, for example by combining cycling (own or rented bicycle) with public transport. To a lesser degree the interconnectivity to motorized transport helps to reduce car traffic in central areas by using P & R facilities to change from car to (rented) bike.

- Establishing cycling as an independent and safe mobility mode for children and youngsters caters for their health, also offering greater independency to attend sporting activities or other social pursuits when their parents are not available to transport them. This in turn helps to significantly reduce drop and fetch trips or the need for dedicated school bus services.

- For older people, being able to cycle safely means more freedom to attend social and recreational events, access services when other transport options are not available.

- For people who are economically disadvantaged or do not drive cars, being able to cycle safely facilitates their search for work, access to services and also to retain social connections.

- To improve traffic safety for cyclists and other road users is of utmost importance to establish cycling (and walking) as an every-day mode of transport for short and medium distance trips.

- The promotion and support of cycling helps to reduce motorized traffic and in turn improves quality of life by reducing emissions of pollutants and noise specifically in central, densely populated and used areas.

- By promoting cycling and consequently short- and medium-ranged activities, the city development target towards ‘city of short distances’ is supported.

8.2 Key Strategies

For bicycle riders, cycling as a low-priced mode of transport is healthy, improves fitness and reduces stress. Specifically in cities, it can be faster on short and medium distances compared to Public Transport and private cars. For the society, cycling serves climate and environmental protection, does not consume fossil energy and is emission free. It significantly reduces congestion and demand for parking space and consequently means reduced costs for the city. For the local economy, it supports local trade and increases accessibility.

The proposed concept aims provide a framework for the promotion of everyday, as well as recreational/ tourist, cycling. This should help to significantly increase the importance and consequently, the modal share of cycling.

The key strategies in detail are:

- Development of a coherent, comprehensive and safe bicycle network
  - Implementation of sufficiently dimensioned cycle lanes along all major roads
  - Separate cycle tracks where road space is not sufficient for cycle lanes
  - Dedicated cycle tracks for combined every-day and sportive/ leisure cycling

- Associated Bicycle infrastructure
  - Supplementing infrastructure for bicycle parking at or near relevant locations (potentials) such as schools, university, cultural, touristic or retail facilities, public administration
  - Establishment of regulations and guidelines to provide appropriate infrastructure
Bicycle renting systems
- Enhancement of current rental systems, implementation of e-bike rental schemes
- Associated administrative and policy measures
  - Creation and provision of adequate infrastructure for cycling and supplementing infra-structure
  - Adoption of cycling requirements into LLP
  - Provision of land for cycling infrastructure
  - Promotion of cycling with regards to commuter (including education) cycling, provision of incentives
  - Promotion and support of bicycle rental operators and facilities

8.3 Detailed presentation of measures/ interventions provided in the preferred scenario

With respect to cyclist measures, the preferred scenario of SUMP Limassol is (amongst others) described

- Development of a coherent, comprehensive & safe (based on design criteria and standards) bicycle network:
  1. Bicycle lanes along all major corridors (LLP - first and second priority axes)
  2. Bicycle only roads for fast bicycle connections (LLP along streams/ rivers) - "greening urban arterials"
  3. Safe and weather-protected bicycle stands at all major destinations

People want cycling infrastructure. Many people say they would like to cycle more, especially if separated cycling infrastructure was provided. There is evidence from around the world: an increased number of people cycling was observed after cycling infrastructure had been built.

More people cycling may also constitute roads much safer. There is evidence that more people cycling may reduce the rate of risk of serious injury and fatality per bike rider from accidents involving motor vehicles. This so-called ‘safety in numbers’ phenomenon is due to factors like:

- greater expectation amongst motorists that bicycle riders will be present
- greater awareness of bicycle riders who are present
- more motorists knowing what it is like to be on a bicycle and behaving more safely around them, and
- motorists’ attitudes improving towards people who ride bicycles.

As a consequence of all the above, the SUMP Limassol aims to significantly increase the extent of cycling infrastructure, obviously beginning from an extremely low level.

8.3.1 Approach

There is a controversial discussion whether to plan and implement segregated cycle facilities. The controversy is mainly about safety. We are clearly on the side of promoting segregated (also referred to as designated) infrastructure, preferably the on-road types (see below Figure 53).

John Forester (born 1929) is a noted cycling activist and known as ‘the father of vehicular cycling’. ‘Vehicular cycling’ in this context means that the cyclist is acting as driver of a vehicle, just as traffic law requires. Forester concludes: “Cyclists fare best when they act and are treated as drivers of vehicles”. Consequently, Foresters’ motto is “The bicycle is a vehicle and belongs on the road.”

We share this idea but combine it with dedicated cycling infrastructure, namely cycle lanes on roads, in contrast to separated cycle ways (or ‘cycle tracks’) usually hidden behind parked cars or other obstacles, often sharing the available space with pedestrians (footways). Apart from potential conflicts between pedestrians and cyclists and adverse cycle conditions due to exits, mainly intersections pose a serious risk for cycling on ‘hidden’ cycle tracks.
For our proposal, we distinguish the following on-road cycle facilities

I. Marked and reserved
II. Marked but not reserved
III. Shared facilities

The description and usage of the two different approaches differs from country to country. Usually they have in common, that I) is separated by a broad solid (white) line while II) is marked with a dashed (white) line. In most countries, I) is reserved for cyclists and must not be crossed by motorized vehicles under any circumstances. Consequently, the marking has to be made in a way so as to consider all necessary crossings by breaking the line where required. A special form of this type of bike lane is the so-called ‘protected bike lane’. Here, the actual bike lane is separated from the road by a wide safety area (> 0.85m) or even physical barriers. This increases safety (actual and perceived) but also creates small risk for cyclists to crash in it and fall over. Also, barriers may become an obstacle for pedestrians and specifically handicapped persons that want to cross a road with protected bike lane.

For II) applies, motorists have to give way to cyclists on the marked lane but can cross it in case of necessity. This includes to stop for dropping someone off, or picking someone up, entering or leaving a premise. However, according to the Cyprus Bicycle Regulation from 2018, it is still not allowed to park on any dedicated cycle lanes, be it I) or II! An alternative to bicycle lanes would be shared cycle facilities III). In our proposal this is applied in shared bus and cycle lanes.

In case on-road cycle facilities cannot be implemented, separate infrastructure needs to be considered. Cycle tracks, often shared with footways are distinguished

IV. Along the road, usually in parallel alignment either directly besides the carriageway or behind parked vehicles/trees. With appropriate width, bicycle-only lanes should be preferred over shared facilities

V. Independent from roads as separate right-of-way infrastructure. With appropriate width, bicycle-only lanes should be preferred over shared facilities

For the Limassol SUMP the following specifications (illustrated in Table 25), derived from international regulations and recommendations, for the cycle facilities are proposed:

<table>
<thead>
<tr>
<th>Specification</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Marked with solid line (width 0,25m)</td>
</tr>
<tr>
<td></td>
<td>Width inclusive line: 1,8m (minimum 1,5m)</td>
</tr>
<tr>
<td></td>
<td>Painted in contrasting colours at least on intersections or major access’</td>
</tr>
<tr>
<td></td>
<td>Remaining road lane width: 3,25m (minimum 2,75m)</td>
</tr>
<tr>
<td></td>
<td>Obligatory to use for cyclists</td>
</tr>
<tr>
<td></td>
<td>May not be used by motorized traffic in driving direction</td>
</tr>
</tbody>
</table>

Figure 53: Potential conflicts for cyclists on separate cycle tracks at intersections
<table>
<thead>
<tr>
<th>Specification</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane be crossed to turn, to access premises, to access parking places</td>
<td></td>
</tr>
</tbody>
</table>
| II | Marked with dotted line (width 0,15m)  
Width 1,5m (minimum 1,25m)  
Remaining road width: 5m (minimum 4,5m)  
Optional (advised) use for cyclists  
Can be used exceptionally by motorized vehicles to let pass ongoing vehicles  
Lane be crossed to turn, to access premises, to access parking places |
| III | Marked with solid line (width 0,25m)  
Width > 4,75m allows for passing within the lane OR  
Width 3,5m (minimum 3m)  
Optional (advised) use for cyclists  
Bus and Bike only, may not be used by any other motorized traffic in driving direction  
Lane be crossed to turn, to access premises, to access parking places |
| IV | Marked with sign bicycle only or shared bicycle/footway  
Width 2m (minimum 1,6m) bicycle only  
Width 3m (minimum 2,5m) shared bicycle / footway  
Safety distance to parked vehicles: 0,75m  
Not applicable with frequent intersections / driveways  
Shared bicycle / footway not applicable in case of high pedestrian volumes |
| V | Marked with sign bicycle only or shared bicycle / footway  
Width 2m (minimum 1,6m) bicycle only  
Width 3m (minimum 2,5m) shared bicycle / footway  
Sufficient width for shared bicycle / footway in case of high pedestrian volumes (4 to 5m) |

Table 25: Specification of cycle infrastructure

According to the Cyprus Bicycle Regulation (2018):
- Motorists have to adapt the speed and course of their vehicle in such a way as to facilitate the movement of the cyclist
- Motorists passing cyclists have to maintain a safety distance of at least one meter from the cyclist
- On cycle lanes, cyclists have absolute priority over motorists
- It is forbidden to place at any point on a bicycle or bicycle track any obstacle that prevents or is likely to interfere with the free and safe riding of a cyclist

Following the aim to improve cycling infrastructure and taking into account that there is a very dense road network already in place, we propose to establish bicycle lanes along all major roads (see the following Figures 54, 55 and 56 for examples of cross sections and Figure 57 for street conversion).
Figure 54: Cross section: one-way street with cycle lane

Figure 55: Cross section: road with 2 lanes plus 2 cycle lanes

Figure 56: Cross section: road with 2 lanes plus 2 shared bus/ cycle lanes
Figure 57: Street conversion: Makariou street with cycle lanes

Only under circumstances where this would pose a serious risk on cyclists (and motorists) or an undue obstacle for the traffic flow, separate (shared) cycle ways along the roads will be considered. To guarantee safety for cyclists but also for motorized vehicles and buses, specific design solutions at intersections and bus stops are required. The following figures 58-60 represent some solutions in this respect.

Figure 58: Reserved cycle lane at bus stop
Reserved bike lanes turn into non-reserved bike lanes approximately 25 - 30m before and 10m after the actual stop to allow buses to cross the lane respectively let cyclists pass the buses while buses are stopping for boarding/alighting.

<table>
<thead>
<tr>
<th>Carriageway</th>
<th>Cyclists have to stop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Footway</td>
<td></td>
</tr>
</tbody>
</table>

Figure 59: Shared bus/ bike lane < 3.5m

In the solution above, cyclists have to wait at bus stops as while buses are stopping for boarding/alighting.

<table>
<thead>
<tr>
<th>Carriageway</th>
<th>Cyclists may overtake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Footway</td>
<td></td>
</tr>
</tbody>
</table>

Figure 60: Shared bus/ bike lane > 4.75m

In the solution above, cyclists can pass the bus at bus stops while buses are stopping for boarding/alighting.

In residential streets, no designated cycle infrastructure is envisaged. Specifically in the environmental and buffer zone, realised speed (significantly lower compared to design speeds) of motorized traffic are assumed to be lower than 30km/h and motorized traffic volumes are certainly below 400 vehicles per hour. On those streets, cyclists can ride their bikes jointly with motorized traffic on the carriageway, where they are clearly visible also approaching intersections.

In the environmental zone, the proposed one-way streets will have cycle lanes and form the backbone of the local cycle network. In the mostly pedestrianised streets, pedestrians have the right of way, but bicycles are also allowed to pass those streets.

Besides on-road cycle facilities and in few exceptions separate cycle ways or shared footways, dedicated separate cycle tracks are already in place, more are planned, and additional ones be proposed. They are mainly following the coastal front and the rivers. Since there is limited potential with respect to regular/ every-day trips such as commuting or errands along those alignments, they also serve for recreational cycling.

In pure residential areas and on small minor roads where there are predominantly very low traffic volumes, cyclists can and should share the road with motorized vehicles (vehicular driving).

8.3.2 Cycle network

A cycle network was developed to improve the local connectivity between quarters, between Limassol city centre and municipalities as well as between the municipalities. Moreover, the focus was on the local accessibility of social, educational, administrative, commercial and cultural attractions.

To reach the targets, a set of attractions in form of Points of Interest (PoI) was developed. The area under consideration for cycle measures covers the city of Limassol with its numerous central facilities, such as service, retail, education and touristic facilities. There is therefore a concentration of important trip potentials in the area. A differentiation to source and destination points does not occur, since destinations always also represent starting points of cycle trips.

In addition to the city centre, there are the adjacent municipalities where sources and destinations are located. This is the case around the municipality centres, which hold great importance for the local activities. Here, for example, short distances are taken to the nearest bakery or supermarket. Of course, the residential quarters, which extend over almost the entire area under investigation, are also important starting points of cycling trips.
Other important sources and destinations for cycling traffic are (or will become) schools, social infrastructure facilities such as administrative facilities, ecclesiastical and cultural institutions, touristic places as well as recreational (e.g. sport) facilities.

Figure 61 represents the Points of Interest (Pol) that were considered relevant for the SUMP Limassol.

Specific attention was given to school locations in order to allow for safe accessibility for all pupils.

The following figures represent the proposed cycle network at different levels of detail. It is structured in:

- Existing cycle ways: mainly separate cycle tracks along the sea front and following the rivers
- Planned cycle ways: mainly extension of existing tracks and some road connections
- Proposed cycle way: to complement the existing and planned cycle way system (mainly along the rivers and along the sea front), an extension towards the north is proposed also to consolidate local traffic and allow for convenient crossing of Motorway A1 near Mesa Geitonia
- Proposed cycle lanes: the scheme described above, comprising of marked and reserved, marked not reserved and shared bus/cycle on-road cycle lanes. In exceptional cases it can be complemented by separate cycle infrastructure, shared with pedestrians or without
- Proposed cycle routes mainly follow rather quiet roads with low traffic volumes. They will have no dedicated cycle infrastructure but will be well signposted (see Figure 62 and 63).

Figure 61: General Pol: study area
Figure 62: Existing, planned and proposed cycle network: Study area
Figure 63: Existing, planned and proposed cycle network: Limassol and municipalities
At the study area level it can be seen that all municipalities concerned are well connected by cycle infrastructure to the city centre of Limassol as well as between each other. In most cases the route can be selected between rather direct connections mainly on cycle lanes along the major roads or alternative routes such as the cycle tracks or cycle lanes on minor roads. Moreover, well signposted cycle routes will form the basis for trips to tourist destinations from the Limassol city centre, from the tourist areas in the North-East as well as from the municipalities.

At the city and municipalities level, it becomes evident that a dense network will provide access to and interconnectivity for cyclists between the major destinations represented by the PoI. In addition, almost all school locations are situated in the vicinity of dedicated cycle infrastructure.

Taking into account that most of the streets in the environmental zone are pedestrianised and open for bicycles, in the Limassol city centre a very dense network allows for riding bicycles safely almost anywhere.

To guide cyclists to their respective destinations, two approaches are distinguished: destination-oriented vs. route-oriented. In the city of Limassol, in the municipalities and between the municipalities (or even quarters), destination-oriented signposting is important for all types of trips. The system can be differentiated hierarchically: main destinations may be municipalities, medium destinations can be quarters and destinations with local context would be of lowest hierarchy. The hierarchical system is in turn reflected in the total distance that it consistently covers for a specific destination. While signposting municipalities may be necessary through the entire study area, a local police station is sufficiently signposted within a radius of few hundred meters.

Route-oriented signposting is mainly used for tourist and weekend bicycle trips (see Figure 64). This type of signposts needs to be complemented with orientation maps and/or navigation apps to clearly indicate the route and to guide non-locals through unknown environments.

In Limassol and the municipalities, a combined signposting system needs to be implemented. On the one hand, relevant local destinations (see PoI above) will be signposted for cyclists and pedestrian likewise as is already now the case in some places. The destinations on this level would be classified under the lowest hierarchical level and need to cover the area of the respective centre only.

It is suggested to amend the local signposting by using colours to differentiate between different types of destinations, for example touristic, administrative, cultural facilities.

The other levels of destination-oriented signposting concern the municipalities and quarters. If those are sufficiently signposted for motorized traffic, a complementing bike-specific signposting could be applied, where the cycle route to the actual destination differs from the route for motorized traffic (see Figure 65). This may be the case where a designated shorter or more convenient cycle route is available compared to the general route.

For the route-oriented approach, one or more appropriate routes connecting the relevant destinations have to be defined. Those can be the historic, cultural, recreational and social facilities and the routes may be assigned to different themes. An example would be the historical route from Kolossi castle via Limassol castle to the Amathus archaeological site along the sea front (see Figure 66).
8.3.3 Associated Bicycle infrastructure

Apart from the infrastructure directly related to the actual bicycle riding activity, supplementing infrastructure mainly for parking and increasing needs for e-bike charging needs to be provided. In many cases, bicycle stands were found only in very few locations, while often even those locations were hardly accessible by bicycle at all (for bicycle stands see also Annex V).

For the future, to cater the demand of bicycle parking, appropriate facilities with respect to quantity and quality need to be provided for instance at or near the following potentials:

- Educational facilities such as schools, University premises
- Cultural facilities such as museums, theatres, cinemas
- Retail facilities, malls
- Public administrations

In 2012, a German research council published a study4 ‘Hinweise zum Fahrradparken’ (Advice on Bicycle Parking) where amongst others the quantitative demand for parking facilities on the basis of characteristic values was estimated. Moreover, the study reflects on good-practice examples for design and location of parking facilities.

8.3.4 Bike rental system

Numerous shops in Limassol offer bike and e-bike rental. Nevertheless, apart from guided tours where the bikes are transported to or returned from specific locations, the rented bikes must be returned to the shops where they were obtained from.

Currently, from the free-flow operators only Nextbike is renting bicycles in Limassol. The service is station-based currently only at 22 locations (see Figure 67).

Since no data could be obtained, site visits showed that the bikes rented are used for recreational purposes and regular trips by locals and tourists. Following the recreational use, students at the Cyprus University of Technology (city campus at Athinon street) also make frequent use of Nextbike. Although the charging fee for students is reduced (currently EUR 10, per month), no cooperation between the University and Nextbike is envisaged. On average, about a third to half of the bikes of one bicycle stand is rented simultaneously. For the future, the number of locations should be increased in general. Most

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4 Forschungsgesellschaft für Straßen- und Verkehrswesen (FGSV), Köln
crucial locations will be the P&R places and some major bus stops and of course the Themistokleous terminal needs to have sufficient number of bikes on offer.

![Figure 67: Nextbike rental locations](image)

Currently, no free-flow e-bikes are available, but this need to be envisaged for the future. Specifically for tourists who would like to visit cultural sites such as Kolossi castle or the Amathus archaeological site, the distances within the greater Limassol area (up to 25km from East to West) can easily be covered by e-bikes. Specifically, so by providing convenient cycle tracks along the entire length of the sea front. In this context again, it has to be noted that the existing track is quite narrow in some places. Once the track will be shared by standard bicycles and faster e-Bikes, the width will have to be adopted accordingly.

The estimation of investment and maintenance costs is part of the Cost – Benefit – Analysis (CBA). The LLP includes provisions for cycling infrastructure. Our approach for the SUMP Limassol though has adopted some of the details and proceeds beyond with respect to the extent and level of detail.

### 8.3.5 Associated administrative or policy measures

Most importantly, creating appropriate facilities for cycling (mainly cycle lanes and cycle tracks) but also creating associated infrastructure (see above) or just providing space for those is considered the best administrative measure to promote cycling. In addition to the actual creation of cycle infrastructure, the implementation of strict requirements and regulations into local planning policies provides opportunities to significantly improve conditions for cycling and consequently for sustainable change of mode of travel preference. Possible interventions in this regard are:

- Adoption of bicycle parking infrastructure requirements into the LLP (e.g. conditions for granting permits to new developments)
- Provision of land for and co-operation with bicycle rental companies to increase the market
- Request of provision of land for cycling infrastructure as part of residential/ commercial development tenders
- Promotion of cycle-to-school schemes in public and private schools (incentives for winning schools)
- Promotion of cycle-to-work schemes in public administration and private commercial entities with financial incentives for participation in respective programs
- Promotion of and incentives for bike leasing schemes in public administration and private commercial entities to provide employees with personal company bicycles that can be used also for commuting and private trips
- Permission to use showers in public entities (e.g. sports facilities) for cyclists
9 parking

9.1 Introduction

This chapter aims at describing the general principles for a sustainable integrated parking policy in downtown Limassol, which are in line with the sustainability principles and measures of the Limassol Sustainable Urban Mobility Plan (SUMP). The levels of analysis for the proposed parking policy presented in the following sections are the traffic zones, as they have been defined in the transport modelling activities elaborated in the context of the SUMP. The parking policy implementation area corresponds to the 33 traffic zones surrounded by the streets of Omonoias Av. – Roosevelt – Dimokratias – Makariou III and the seafront (Figure 68 below).

The selection of this level of analysis provides a number of benefits, the most important of which being data availability and comparability at spatial, as well as at temporal levels (base year and 2030 time horizon). Indeed, the forward-looking character of policymaking requires for a vision of the future transport system that is based on evidence and is forecast through relevant methodologies. Also, the zones can be aggregated and further analysed in order to inform policy and evaluate the benefits and impacts of the proposed policy choices. Therefore, the figures and calculations presented throughout this chapter are based on the SUMP traffic zone classification, OD data, GIS calculations and the parking survey.

Figure 68: Traffic zones under study for the Integrated Parking Policy

9.1.1 Current status

The current status in the 33 traffic zones that constitute the integrated parking policy study area, exhibits a total population of 20,830 inhabitants, which using an estimated value of 2.6 persons per household, is translated into around 8,158 households. This value was estimated based on the average household values observed for years 1992, 2001 and 2011 and the respective decreasing trend. Car ownership index lies on the high side, meaning that car dominance is existent in Limassol and that there is room for change towards a more sustainable mobility reality.

Estimated parking demand is classified as resident and non-resident demand, with the latter referring to the demand that is attracted to the traffic zones under study. It can be seen in Table 26, that non-resident parking demand is slightly higher than resident demand, which can be explained by the diverse land use characteristics that the study area entails. Total parking demand accounts for more than 27,700 parking places, while the respective number for the estimated supply is a little more than
24,200. This results in a parking balance that currently shows deficit of a bit less than 3,500 parking places. This supply comprises of on-street parking places, resident off-street parking places and off-street parking establishments that include free and paid open air or closed parking areas.

<table>
<thead>
<tr>
<th>Base Year (2017)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
</tr>
<tr>
<td>Average Household size (estimated)</td>
</tr>
<tr>
<td>Number of Households</td>
</tr>
<tr>
<td>Car ownership index</td>
</tr>
<tr>
<td>Total Resident Parking Demand</td>
</tr>
<tr>
<td>Non-resident Parking Demand</td>
</tr>
<tr>
<td><strong>Total Parking Demand</strong></td>
</tr>
<tr>
<td>Resident/Non-resident Parking Demand Ratio</td>
</tr>
<tr>
<td>On-street parking supply</td>
</tr>
<tr>
<td>Resident Off-Street parking supply</td>
</tr>
<tr>
<td>Sum of On-street &amp; Resident Off-Street parking supply</td>
</tr>
<tr>
<td>Off-street parking supply</td>
</tr>
<tr>
<td><strong>Total parking Supply</strong></td>
</tr>
<tr>
<td><strong>Parking Balance [SUPPLY - DEMAND]</strong></td>
</tr>
</tbody>
</table>

Table 26: Current status parking profile

9.1.2 Objectives of this area of intervention

Mobility is widely acknowledged as a public good that according to sustainability principles, is to be protected not by allowing people to extend the use of their private cars but rather by providing them the necessary options to use Public Transport and the active modes. To the other end, high parking availability, not to mention free parking supply, is obviously against these principles and should be managed in such a way that in the time frame of the SUMP implementation (2019-2030) is fully controlled and rationalized.

Parking supply is in general terms the trigger for a driver to make his/her final decision on how long and how close their car is parked in relation to their final destination. To this equation we now have to add high quality alternatives with Public Transport, walking and cycling.

Taking into account the strong car dependency of Cyprus, this task is obviously not an easy one and has to be gradually implemented and well defined. As any other regulatory framework cannot be achieved — at least in its first implementation steps — without effective enforcement that will be enhanced and supported by innovative ITS solutions proposed for implementation in the relevant ITS supporting systems described herewith.

The Limassol SUMP should among others to be regarded as a Master Plan for changing the city’s mobility patterns towards sustainability. Although safety and security for any large city is obviously very important, it is not directly tackled by interventions related to mobility aspects of our daily life. To this end the project suggests an integrated parking policy structure with separate divisions for residential parking permit administration and on street design and enforcement. The extended use of Intelligent Transport Systems (ITS) will allow efficient enforcement through sensors, minimising the time allocated to patrolling to the benefit of their other duties (public order, access control to pedestrian ways, noise levels, health and safety regulations in restaurants and night clubs etc.). Leaving parking offenders to act without control provides the wrong message to the citizens and poses questions on the level of safety and security they enjoy.

9.1.3 General approach – the principles

The basic principles of the proposed parking policy for Limassol are the following:

- Residential parking for those already living in the central areas of Limassol, ensuring at least one (1) parking space per household
- Reserved parking spaces for the Disabled and other special categories of users (e.g. banks, public authorities etc)
- Adequate parking space for loading/unloading for retail stores, restaurants etc.
- Paid on-street parking spots for the public, that should be adequately priced in the years to come, to allow gradual abandonment of the private car
- Paid off-street parking spots which should be rational and fully controlled, taking into account that off-street parking impact is permanent and costly
- Finding a balance between well-defined legal parking options and effective enforcement is a crucial objective. Returning a share of these revenues to the local community can/will raise social acceptance levels
- Land Use policies such as the minimum parking requirements have a strong impact on parking supply and should be re-thought and re-designed in order to achieve sustainability objectives
- Public transport operations such as Park & Ride as well as specific incentives for enabling modal shift and high-quality services, are deemed essential and should be closely co-ordinated in a central manner.

The Limassol SUMP should among others to be regarded as a Master Plan for changing the city’s mobility patterns towards sustainability. Although safety and security for any large city is obviously very important, it is not directly tackled by interventions related to mobility aspects of our daily life.

To this end the project:

1. Suggests an integrated parking policy structure with separate divisions for residential parking permit administration and on street design and enforcement. The extended use of Intelligent Transport Systems (ITS) will allow efficient enforcement through sensors, minimising the time allocated to patrolling to the benefit of their other duties (public order, access control to pedestrian ways, noise levels, health and safety regulations in restaurants and night clubs etc.). Leaving parking offenders to act without control provides the wrong message to the citizens and poses questions on the level of safety and security they enjoy.

2. Having a complete master plan in place is one thing, implementing and monitoring its deployment is another. This is the reason behind the formulation of the Limassol SUMP implementation team that is to be formulated in parallel to the SUMP adoption process and will undertake the task to monitor the progress of the interventions and regularly evaluate its performance. This new entity will have members from the Municipal Authority and other key stakeholders in order to ensure seamless operations.

9.2 Key strategies

Figure 69 below describes the proposed structure for implementing a sustainable parking policy for Limassol. In detail, each key strategy is presented in the followings.
9.2.1 Parking permits policy

During the period of migration to new era of sustainable mobility, it is deemed essential to satisfy as much of the residential parking demand as possible. Extended areas of the CBD below Gladstonos str. will have to cope with the new pedestrianized scheme in which more than a thousand (1000) on-street parking spots will be no longer available and new set-ups will have to take place especially in the transitional period.

Parking Permits office is envisaged as a core function of the new municipal parking authority that will have to:
- Receive and evaluate parking permit applications from the citizens for acquiring the parking permit
- Applications for Persons with Special Needs (PSN) parking and other special arrangements based on medical records and other credentials
- Take municipal decisions to create loading/unloading parking spots in the urban network based on type and levels of demand and supply in the corresponding parking zone
- Use a geo-referenced software application to monitor and control supply and demand attributes of on- and off-street parking
- Receive, evaluate or re-evaluate off-street parking license procedures in all controlled areas.

9.2.2 Set the right pricing/enforcement policy

Implementing market prices to parking, is without doubt a very efficient tool for controlling parking demand and should be receive special attention by the Municipal authority. Limassol’s strategy on parking was until now based on providing a substantial percentage of the total public parking spots free of charge, a fact that is well justified as a trigger for promoting extensive car use. The new parking policy to be implemented is based on the following main actions:
- Tripling the parking fares in CBD area/ doubling it in Buffer 1 constitutes the starting point for the city.
- An Advanced Parking Payment System should be procured in the next couple of years, enabling collection of dynamic data on status of each parking spot in terms of availability, turnover and overtime parking. The Municipal authority is already searching adequate ICT solutions through Public Private Partnerships.
- Evaluate parking balance per parking zone and make informed decisions on the level of meeting residential demand (issuing more parking permits or not)
- Evaluate the implemented pricing scheme in terms of average occupancy rate/ average parking time per vehicle during peak hours and off-peak.

Consider Demand Responsive Parking options as a means to control demand. The idea behind this system is to be flexible on charging rates based on availability and levels of demand on- and off-peak hours as well as guiding drivers to use underutilized parking spots in a larger distance from the city centre. The city of San Francisco (San Francisco Municipal Transport Authority) has tested this new parking management system between 2009-2011 at 7,000 of San Francisco’s 28,800 metered spaces and 12,250 spaces in 15 out of 20 City-owned parking garages with very promising results.

Although sustainable mobility is primarily based on changing behaviours, obviously that change cannot be achieved from the beginning. Any parking regulatory scheme, has to achieve a number of important goals as follows:
- To make clear to all users that we have entered a new phase in our social life
- To make clear that illegal, non-paid on street parking is deemed an anti-social behaviour that is not against the local authority but rather against the local community
- Charges have to be relevant to the time frame, proximity to the core CBD area and overall level of comfort they offer to the user (not too high so no one is using it, not too low to work as a “trigger” for the decision to use their car).
- The average price of 1 Euro/ hour for on-street parking is to be tripled for parking zones in Environmental Zone and doubled for the traffic calming zones. This pricing scheme has been tested by the transport model of the SUMP and found to have a positive impact to the drivers’ behaviour if accompanied by all other measures included in the proposal.
To be simple and logical in order to be comprehended by the users in little time (through informational leaflets, but also through information signs on-the-sport close to the curbs).

To provide incentives for the users to park for more time and less charge if they are willing to park at a larger yet reasonable distance from the CBD area.

An effective enforcement scheme is essential to get everyone’s support (retail store owners, residents and visitors alike) especially if part of the revenues is returned to the local community.

The users usually decide to take the risk to park either illegally or overtime if current enforcement scheme is loose and their chances to get a fine are less. ITS smart parking solutions proposed in the ITS chapter, substantially minimize the need for on-the-sport enforcement, thus consolidating the need to obey the law.

Fines for overtime parked vehicles should not be very high, probably giving a second chance by not charging anything to first- or second-time offenders. Fines should not be regarded as a financing mechanism or a punishment mechanism.

9.2.3 Return Parking Revenues to the local community

In many occasions the public debate suggests that we as citizens have been heavily taxed though the years for building the streets, so questions are raised as to whether we have to pay again for parking along them. The idea of using a share of the municipal income from paid parking or fines from illegal parking is a step to the right direction, as it could eventually receive the full support of the residents living in the area, the retailers working in the area and the visitors alike. It is reasonable to say that parking supply (on- and off-street) will not be eliminated due to SUMP’s interventions, but rather should be balanced to the extent possible mainly through managing demand and controlling supply.

Dedicating part of the revenues in a transparent way for improving everyday life for everyone in the area, is an important driver for getting citizens’ support and also an attractive policy intervention to the benefit of the society. The municipal authority could through this budget to announce and gradually finance:

- Improvements to sidewalks
- Better street lighting
- Planting street trees
- Constructing curb ramps
- Putting Electricity wires underground
- Finance cultural activities.

9.2.4 Continuous evaluation of Land Use Policies affecting parking supply

Defining a strategic goal for sustainable parking management should be to minimize the demand rather than increase supply. To this end, current provisions of the Cypriot land use law for new buildings having to provide minimum number of on-site parking spots seems outdated most likely resulting in more vehicle trip by car for work, leisure and shopping and eventually in new demand for new private parking.

Incentives given to new building investments through Decisions of 22/10/2013 and 29/05/2014 of the Ministerial Council should be re-thought under the light of sustainability principles and changed probably from minimum parking requirement to maximum parking requirements as a starting point.

It is probably the planning and policy tools suggested in this report that should enhance the works of the Special Technical Evaluation Committee (formulated under a Decision recently made (29.07.2015) in order to make informed decisions on evaluating proposals for new high-rise developments taking into account:

- Their location in the road network/ impact on local traffic conditions
- The real parking needs of the area – by avoiding off street oversupply
- Ease of traffic congestion at local level
- Other similar developments in the area.

The existing Parking Incentives Scheme which supports the creation of extra public parking spaces through the increase of the allowable plot ratio expired in January 2019 and it is not suggested for
extension in the future. Controlling parking supply and demand in the greater area of Limassol is deemed crucial in order to implement the Limassol SUMP in the best way possible.

### 9.2.5 Promoting Synergies with Public Transport Network

A crucial momentum is taking place in Cyprus with regards to the Public Transport Networks and services:

1. The Fleet Management telematics, electronic fare collection and passenger information systems have been successfully launched and are in full operation.
2. The new international tenders for all PT concessions in Cyprus, are to be announced within the second quarter of 2019, thus the new contracts are expected to be signed in 2020. New buses and new terminal stations will give a clear sign of change to the new era.
3. Limassol being the first city in Cyprus to complete its SUMP, will provide to the new contract documents an enhanced bus network.
4. 100% of the new bus fleet everywhere in Cyprus and in Limassol will be accessible by persons with disabilities.
5. The Ministry of Transport is taking all necessary preparatory steps to upgrade the bus stops around the state, as well as other necessary infrastructures such as the central Bus Station in Limassol.

Building synergies and establishing seamless cooperation between the Parking Authority and the Public Transport operator is absolutely necessary in order to get the most out of the raised Bus ridership the soonest possible. Points of mutual interest include:

- Decision of adequate placement of Park & Ride stations along A1 as suggested by the SUMP but to other locations, had both members of this cooperation decide for more.
- Gradual deployment of supportive ITS measures for enhancing PT operational efficiency (exclusive bus lanes, bus priority schemes, bus lane enforcement systems, real time passenger information at bus stations, terminals etc.)
- Taking advantage of PT data from the telematics system to design new features at selected bus stops (i.e. bicycle stands, bicycle sharing stations, e-Skates etc.)
- Mutual design of new incentives enabling modal shift towards PT and active modes of transport (abandonment of unnecessary practices like free parking during holidays and introduction of other interventions that do not harm public transport ridership).

### 9.3 The detailed description of measures

#### 9.3.1 General

The following sections provide an overview of the basic parking management principles and strategies, as well as the methodology used in order to quantify and define in detail the first two (2) key strategies of sustainable parking policy for Limassol Table below sums up the Origin-Destination data used for the parking demand calculation in terms of share, destination and purpose (commute, business, other). It is clear from the table that a modal and car trip purpose shift is expected for year 2030, compared to the base year.

<table>
<thead>
<tr>
<th></th>
<th>Total trips</th>
<th>Trip w/Parking Policy Study Areas Destination</th>
<th>% of Total Trips</th>
<th>% of Trips to Parking Policy Study area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base Year</td>
<td>553,531.00</td>
<td>95,555.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Car Commute</strong></td>
<td>177,086.51</td>
<td>37,997.77</td>
<td>21.5%</td>
<td>39.8%</td>
</tr>
<tr>
<td><strong>Car Business</strong></td>
<td>15,484.32</td>
<td>1,994.23</td>
<td>12.9%</td>
<td>2.1%</td>
</tr>
<tr>
<td><strong>Car Other</strong></td>
<td>360,960.17</td>
<td>55,563.44</td>
<td>15.4%</td>
<td>58.1%</td>
</tr>
</tbody>
</table>

2030

| **Car Commute** | 172,882.82  | 25,885.82                                      | 15.0%            | 50.1%                                  |
| **Car Business** | 17,877.77   | 2,326.04                                       | 13.0%            | 4.5%                                   |
| **Car Other**   | 369,448.68  | 23,485.56                                      | 6.4%             | 45.4%                                  |

Table 27: Origin-Destination by car data (base year and year 2030)
It is clear from the table above that car trips to parking policy area will almost half compared to the base year. It also important to highlight that the car trips to the parking study area are almost half despite the fact that the total car trips in 2030 increase slightly.

### 9.3.2 Methodology & discussion of analysis results

The proposed methodology for the development and implementation of an integrated parking policy in the central area of Limassol is structured upon the consideration of: a) SUMP parking and mobility demand survey data, b) existing and future parking supply estimations, c) land use, d) development of new mobility strategies through new infrastructure and traffic management, e) the current parking regulation and supply in the Limassol CBD, f) the functional characteristics transportation system and g) the estimated for the future (2030) characteristics of mobility patterns after the implementation of the SUMP measures.

The figure below shows the set of methodological steps for the development and implementation of the Limassol integrated parking policy. Detailed description of each step can be found in **Annex VI**.

**Figure 70: Methodological steps for Limassol integrated parking policy**

1. **Calculation of resident parking demand per traffic zone (base year & year 2030)**
2. **Calculation of non-resident parking demand per traffic zone (base year and year 2030)**
3. **Comparison of parking demand categories per traffic zone (base year & year 2030)**
4. **Calculation of parking supply per traffic zone (base year & year 2030)**
5. **Calculation of indicators for guiding parking policy formulation**

**Figure 71: Parking balance per traffic zone for year 2030**
As it can be seen in Figure 71, parking balance shows totally different characteristics prior and after the parking policy interventions. This means that although base year shows a total negative parking balance of around 3,400 parking places, by year 2030 this condition is completely reverted, and a positive balance is estimated. In parking policy terms this means that there seems to be no need for additional parking for year 2030, based on the methodology and assumptions presented earlier in this chapter (for more information please refer to Annex VI).

Moreover, from a policy perspective, sustainable planning means prioritizing sustainable mobility and environmentally friendly transport modes. Thus, in this context, one should take into consideration that any shortage in parking places does not necessarily mean that policy measures should be adopted in order to satisfy the remaining parking demand, but within a framework of a sustainable modal mix, more people should be attracted into using Public Transport and active transport modes. To sum up, introducing policy measures that provide more parking spaces for private car, results in higher private car usage, which does not align with the objectives of a smart and sustainable modern city.

On the other hand, alternative transport modes can only challenge the car dominance status quo through high quality alternative modes and disincentives for using private cars, especially in a culturally, historically and functionally sensitive area, such as the city centre of Limassol.

9.3.3 Proposals for integrated parking policy in Central Limassol

Taking into account cluster of zones, current and future parking balance and the policies applied by SUMP, five (5) parking policy zones are proposed. The zones are presented in Figure 72 below and the general parking strategy proposals are summarized hereinafter in Table 28.

<table>
<thead>
<tr>
<th>Parking Policy Zone</th>
<th>Description</th>
<th>Traffic zones included</th>
<th>Proposed Parking Policy</th>
<th>Estimated balance of supply &amp; demand for year 2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Includes the heart of the CBD and the area where vast pedestrianization is foreseen for 2030. Currently, it is considered having very low resident demand and low on-street supply, however due to the concentration of many off-street parking places, the off-street supply is high. In the future, it is estimated that balance will be achieved between parking demand and supply, with increased ratio of resident over non-resident demand.</td>
<td>KATHOLIKI 01, KATHOLIKI 04, TZAMI TZATIT 02, TZAMI TZATIT 03, AGIA NAPA 02, AGIOS ANTONIOS 01, TZAMI TZATIT 01</td>
<td>1. Subsidy for residents to use off-street parking, cross-subsidized by non-resident parking fees. 2. Extended on-street parking prohibition, except for special parking places needed for loading/unloading etc 3. Limited on-street parking places along one-way commercial streets for short-term parking of less than two hours. 4. Increase of parking fees.</td>
<td>By considering the parking balance in each zone (176 + 164 + 310 + 111 + 253 – 168 – 165 = 681), as estimated by the methodology, in this parking zone total supply and total demand show a surplus.</td>
</tr>
<tr>
<td>B</td>
<td>This area near to the core of CBD, along the seafront, is characterized by high residential demand. Non-residential parking demand is expected to be halved by 2030 and is also characterized by efficient parking supply, mainly off-street. Although the parking balance is negative in the current situation, it will be improved in the 2030 horizon and will show a slight surplus, mainly due to the high parking supply in Agia Triada 03.</td>
<td>AGIA TRIADA 03, AGIA TRIADA 01, AGIA TRIADA 02, AGIA NAPA 01</td>
<td>1. On-street paid parking places along the major streets for short-term parking of less than two hours. 2. Increase of on-street parking fees. 3. 30% of on-street parking allocated to residents through resident parking permits with or without fee.</td>
<td>By considering the parking balance in each zone (740 – 779 - 636 + 1009=334) as estimated by the methodology, in this parking zone total supply and total demand shows marginal surplus.</td>
</tr>
</tbody>
</table>
### Parking Policy Zone C

**Description**
This parking policy zone consists of five traffic zones, which have three common characteristics (high residential demand, high non-residential demand, and high on-street supply). Regarding the availability of off-street parking, two of the traffic zones have medium off-street supply (AGIA ZONI 01 & 02), while KATHOLIKI 07 and AGIA ZONI 03 have low off-street parking supply. A common parking policy for all zones is proposed to achieve counterbalance between zones. The application of a common parking policy for this aggregation of zones is justified also by the position and function of this area in overall CBD function. The major streets for accessing the CBD area are here and with the SUMP proposals, the role of these streets for city centre accessibility is further increased in the time horizon of 2030.

<table>
<thead>
<tr>
<th>Traffic zones included</th>
<th>AGIA ZONI 01, AGIA ZONI 02, AGIA ZONI 03, AGIA ZONI 04, KATHOLIKI 07</th>
</tr>
</thead>
</table>

**Proposed Parking Policy**

- 1. On-street paid parking places along major streets for short-term parking of less than two hours.
- 2. Increased on-street parking fees.
- 3. Strict enforcement of parking regulation, also including technological solutions.
- 4. Resident protection from parking demand spill-over: Protective buffer extended to 2-3 building blocks adjacent to the streets where on-street paid parking is implemented and where parking places dedicated to residents is provided.

**Estimated balance of supply & demand for year 2030**
By considering the parking balance in each zone (581 – 145 + 690 + 13 – 412 = 846) as estimated by the methodology for 2030, in this parking zone total supply and total demand shows considerable surplus.

### Parking Policy Zone D

**Description**
This parking policy zone includes traffic zones which in the current situation are characterised by high resident and off-street parking supply, reinforced by resident off-street open-air parking areas. In the 2030 horizon, demand and supply characteristics of all traffic zones in this area are expected to keep the base year profile be normalised and be stabilised to low-to-medium demand and supply conditions. The parking balance in the current situation is negative but manageable, around -150 parking places per traffic zone, and it is expected to be doubled in year 2030. The negative effect of the parking balance of these zones is the result of the increase of resident population. KATHOLIKI 02 traffic zone constitutes an exception, showing important positive parking balance for the time horizon 2030 because of the decrease of non-resident trips performed by car.

<table>
<thead>
<tr>
<th>Traffic zones included</th>
<th>ARMAOUTOGTOONIA, KATHOLIKI 05, KATHOLIKI 02, KATHOLIKI 08, KATHOLIKI 03, AGIOS IOANNIS 07, AGIOS IOANNIS 01, AGIOS IOANNIS 02, AGIOS IOANNIS 03</th>
</tr>
</thead>
</table>

**Proposed Parking Policy**

- 1. Resident protection from parking demand spill-over: Protective buffer extended to 2-3 building blocks adjacent to the streets where on-street paid parking is implemented and where parking places dedicated to residents is provided.
- 2. With strong enforcement to ensure the implementation of the resident permit parking system. On-street paid parking places along commercial routes and resident protection buffer zones, especially in KATHOLIKI 02 traffic zone.

**Estimated balance of supply & demand for year 2030**
By considering the parking balance in each zone (-748 - 109 + 482 - 86 - 91 – 303 – 276 – 150 - 678 = -1959) as estimated by the methodology for 2030, in this parking zone total supply and total demand becomes slightly deteriorated than existing deteriorated conditions.

### Parking Policy Zone E

**Description**
This zone includes traffic zones that hosts non-residential land uses and is under development and expansion, both at the level of road infrastructure and land use development. This is therefore a zone where parking policy should be adaptable to the rhythm of the development that will be implemented in the area. This zone includes also one of the major off-street parking of Limassol, near the Marina area, which makes AGIOS ANTONIOS 03 zone to offer high off-street supply. In 2030, the resident parking demand will be increased from low to medium, producing considerable negative parking balance in the area.

<table>
<thead>
<tr>
<th>Traffic zones included</th>
<th>AGIOS ANTONIOS 02, ARNAOUT 02, AGIOS IOANNIS 04, AGIOS IOANNIS 05, AGIOS ANTONIOS 03, AGIOS IOANNIS 06, TSIFLIKOUIDIA 04, TSIFLIKOUIDIA 03</th>
</tr>
</thead>
</table>
Proposed Parking Policy

1. Limited restrictions to on-street parking near supra-local land uses, also for facilitating traffic management.
2. Legislative framework imposing construction of necessary parking facilities to new buildings and real estate developments.
3. Incentives related to (2) above.
4. Strict enforcement of parking regulation, also including technological solutions for doing so.

Estimated balance of supply & demand for year 2030

By considering the parking balance in each zone (588 – 127 – 123 + 78 - 335 + 498 - 137 + 388 = 830) as estimated by the methodology for 2030, in this parking zone total supply and total supply shows surplus.

Table 28: Parking Policy Zones A-E: Description, Traffic Zones, Proposed Parking Policy, Supply & Demand for 2030

Figure 72: Parking Policy Zones
9.3.4 Resident Parking Accommodation Test

As mentioned earlier, integrated parking policy is based on the efficient use of the existing parking supply, which should also take into account the sustainability objectives set for the city. The distinction between resident and non-resident supply and the estimations presented in this chapter, allows for a closer investigation of the demand per se, as well as the policy directions for each of these parking users.

The different parking characteristics and needs should be taken into account when developing parking policy and protection measures should also be taken, whenever necessary. Parking duration is one of the main differences between the two categories and is directly linked to the trip purpose.

For this reason, non-residents usually park for shorter time than residents, that for longer periods and in locations usually closer to their house. Thus, high parking turnover rates are desired in commercial areas and along commercial streets since it is a measure that supports the financial viability of the system.

However, the spill-over effect of non-resident demand may strongly affect resident parking demand, which means that certain policy measures should be taken, such as secured resident parking through a parking permit scheme. The following Table shows the accommodation of each parking demand type by the three parking demand types, namely on-street, resident off-street and off-street parking, in a phased way, for year 2030.

One proposed policy measure is the implementation of a controlled parking scheme along the main commercial corridors, where pricing policy will be adopted on the basis of a trade-off between incentives for increased turnover and affordability. For this reason the total on-street supply is reduced by the on-street parking places that are destined for use by non-residents and that account for around 1,062 places.

Another policy measure that protects resident parking demand is the allocation of one secure parking place per household, accommodated firstly by the remainder on-street parking supply. As it can be seen in the Table, all five parking policy zones show a deficit, meaning that the remainder on-street parking supply is not sufficient to cover total resident demand. This issue can be considered in detail at the stage of implementation through a specific study.

The remainder of the secured resident demand is expected to be accommodated by off-street resident parking supply, and in such a case, calculations show that parking policy zones A and B exhibit shortage. When considering the supply provided by off-street parking facilities for the remainder of the secured resident parking places, the secured resident supply is covered, which means that special arrangements should be made to ensure that off-street parking establishments accommodate resident permit owners through (cross)subsidization. Remaining non-secured resident demand can be accommodated in resident off-street and/or off-street demand.

As far as non-residents are concerned, the remainder of the off-street capacity can accommodate all remaining non-resident demand that is not accommodated along commercial streets, and the balance is positive in all parking policy zones, except for parking policy zone, that shows a deficit of a bit less than 2,000 parking places to accommodate non-residents.

9.4 Conclusion on Parking Management

This chapter provided an analysis of parking needs in the central area of Limassol, using a methodological approach that, based on data derived from field surveys, transport modelling and statistical analyses, and under certain assumptions, allowed for the calculation of a theoretical parking balance, initially at the traffic zone level. It should be noted that field studies were performed in selected parking routes, covering a small representative part of central Limassol, but the results established the adopted methodological assumptions so as to assess parking surplus or deficit in a much larger area (whole broader city centre) and for two-time horizons, namely base year and year 2030. This parking balance shows large variance among traffic zones, with negative balance ranging from 0 to -200 and -400.

As it was seen in Table 26 and based on the calculations presented in this chapter and the respective assumptions (e.g. car ownership, parking turnover etc), base year shows a total negative balance of around 3,400 parking places, while by 2030 the balance is positive. The latter indicates that there
seems to be no need for additional parking for year 2030 (see also Deliverable D5.1). Thus, these calculations that provided insights about potential parking needs, constituted major input for the development of a parking policy that identified the similarities and differences between traffic zones and aggregated them into Parking Policy Zones.

It is very important to point out that, from a policy perspective, parking deficit does not necessarily mean that policy measures should satisfy the remaining parking demand, because this consideration is not in line with the sustainability objectives of a smart modern city that is prepared to address the future mobility challenges in the most environmental, social and economic way. More precisely, the solution lies mostly in convincing more people to use Public Transport and active transport modes through high level mobility services, top quality infrastructure and efficient reallocation of public space. Indeed, the extended pedestrianization of the central area serves such a purpose, but a holistic parking policy should also adopt mitigation measures in favour of affected users.

However, due to the loss of on-street car parks due to pedestrianisation (21% reduction) and the probable loss of private off-street car park areas in the city centre due to new building activity, some flexibility could be given to replace this probable loss of private off-street parking spaces outside the pedestrianized area and maybe more specifically in Parking policy zone D, where a deficit of almost 2000 spaces is identified for 2030. Such a policy measure is also in line with the feedback received from a shop-owners group and the Limassol mayor about the possibility of including these parking areas at least outside the pedestrianised area.
10 Freight logistics

10.1 Introduction

The city of Limassol is a place of great concentration of economic and social activities with logistics being of highest importance for the sustainability and the economy of the city but also the entire region. With the goal to optimize city logistics while preserving the environment and increasing the attractiveness of the city, various measures have to be taken.

Apart from general measures affecting also freight transport, no specific urban logistic related interventions were included in the scenario development. This is mainly due to the lack of detailed input data that would be required in order to generate a dedicated freight model, reflecting realistic transport movements. Nevertheless, interventions such as new roads and road upgrades on the one hand, speed and capacity reductions and even road blockings on the other hand do have an even more severe impact on LGV and even more so on HGV traffic.

The key issues identified for the SUMP Limassol logistics section are:

- The city logistics with respect to the central city area
- The heavy freight traffic caused by the Limassol port’s commercial activities

10.1.1 Current Status

As stated in Terms of Reference and as it is obvious in the city, the current logistics system is not based on an integrated concept. Consequently, urban logistics in Limassol is inefficient and causes various negative impacts such as congestion, air and noise pollution.

In the city centre (besides illegally parked cars) urban freight traffic affects residents, shoppers, tourists, cyclists as well as pedestrians but also private motorized traffic.

Especially on the roads towards and from the port of Limassol, heavy freight traffic uses roads that are partly not suitable for trucks. Besides hindering private and even more so public transport, pedestrians and cyclists, residents, shopper/ shop owners, tourists and passers-by are severely affected by the heavy trucks.

Having sea containers loaded, it is quite obvious that a significant share of LGV on Omonoias and also other urban roads use shorter connections to and from the port despite the fact that the generously dimensioned Vertical road was meant to handle port traffic. Permanent traffic counts revealed almost equal HGV volumes on the Omonoias and Vertical road in 2017. This might have been partly caused back then due to road blockings and construction works at the intersection of the Vertical road with motorway A1.

10.1.2 Objectives of Freight Logistics

The most severe problems caused or significantly aggravated by urban commercial traffic are:

- Traffic flow/ congestion issues caused by large traffic volumes, traffic incidents, inadequate driver behaviour
- Noise and pollutant emissions
- Issues resulting from parking and loading/ unloading

Consequently, the main targets of an urban freight logistics concept have to be:

1. Minimising the number of vehicle trips by optimizing urban freight transport
   - With optimal routes
   - Consolidated efficient loading
2. Minimising the impact of the traffic
   - Zero or low emission vehicles of appropriate size
   - Delivery/ removal time slots
3. Minimising the impact of parking, loading/ unloading
   - Clearly signed, dedicated loading bays, parking infrastructure
   - Law enforcement to prevent illegal parking, loading/ unloading behaviour
10.2 Key Strategies

The city of Limassol is a place of great concentration of economic and social activities with logistics being of highest importance for the sustainability and the economy of the city but also the entire region. The current logistics system is not based on an integrated concept; therefore, urban logistics is inefficient and causes various negative impacts.

The proposed concept aims to reduce negative impacts, namely congestion in urban environments, noise and pollutant emission

The key strategies in detail are:

- **Optimising routes of commercial / freight traffic outside the environmental zone**
  - To consolidate trips of commercial traffic, signposted routes serve to direct the vehicles on optimal routes to their destinations
  - Destinations are both, gates to the environmental zone as well as final destinations

- **Minimising the impact of commercial traffic generally in environmental zone particularly**
  - Access restrictions: no commercial traffic allowed in sensitive areas at all, access from alternative streets only
  - Vehicle restrictions: appropriate size and high environmental standards allowed only
  - Time restrictions: time slots for delivery and removal trips
  - Incentives for consolidation of delivery trips to reduce number of trips

- **Minimising impact of parking, loading and unloading**
  - Dedicated loading bays for commercial vehicles
  - Clearly signed and specified restrictions and provisions for loading / unloading
  - Designated parking places for commercial vehicles

- **Optimising port traffic**
  - Incentives and regulations to consolidate trips from and to the port of Limassol
  - Optimising routes to / from port by signposting dedicated routes (e.g. between port and motorway A1)
  - Implementation of heavy vehicle restrictions on routes that are currently used as shortcuts

10.3 Urban freight logistics for the city centre of Limassol

The central city logistic proposal will be mainly built upon general experiences acquired in similar projects in European cities. For Limassol and most other cities, there is a fundamental urban freight transport dilemma: the future success of the city centres depends on their effectiveness in different dimensions and those are often contradictory.

Urban areas must be attractive places to live, work, shop and spend leisure time. In this context, they face increasingly severe competition, notably from out-of-town retail and leisure parks. If retailers, other employers and income generators aim to preserve confidence in town and city centres, efficient logistics systems must be provided so that commercial as well as private entities can be serviced in a cost-effective manner.

In contrast, urban planners are very conscious of the need to maintain or improve the quality of city centre environments, to attract shoppers, tourists and workers and perhaps to persuade people to live there. There is a common perception that specifically large and noisy goods vehicles are detrimental to the urban environment. In fact, they are contributing significantly to the problems of congestion, pollution, safety and noise. Therefore, it is obvious, that conflict can arise between commercial interests and the environmental lobby as far as urban logistics is concerned.
10.3.1 Reduction of freight traffic volumes

The Limassol city centre (here considered to be the environmental and the buffer zone) occupying an area of slightly more than 6 square kilometres, will have in 2030 a population of about 24,000 (22% of total Limassol population) and almost 44,000 working places. The latter constitutes more than half of the working places in Limassol.

As an estimate based on empirical data in Germany\(^5\), one resident induces approximately 0.1 commercial vehicle trips per day (commercial passenger car, LGV, and HGV). In addition, one employee induces 0.5 to 1 commercial vehicle trips per day. Based on these data, the area described above induces between 24.4 and 46.4 thousand vehicle trips per day! It has to be noted, a Courier, Express, Parcel service (CEP service) round trip serving “n” recipients consists of “n plus 1” trips.

A large traffic survey was conducted in Germany in 2010\(^6\) aiming to analyse road traffic. Data were mainly obtained from the owners of almost 115,000 vehicles of all vehicle types. The questionnaires comprised of questions regarding the vehicles and also their usage and trips. Amongst the questions, the operators of CEP services were asked for information on the trip chains of delivery tours. This revealed an average of 32 CEP legs within a round trip.

To reduce the traffic volumes, it is important to ensure unavoidable trips to be as short and direct as possible and to avoid detours and search traffic. For this purpose, a clear signposting is crucial, to warn the drivers when roads are inappropriate for their vehicle (e.g. narrow alleys), inform about regulations on roads (e.g. vehicle weight, time restrictions) and parking/loading regulations.

Not so important for the urban logistic, but even more so for origin/destination and transit traffic (e.g. port of Limassol, see below), is to sign advisory or statutory truck routes mainly for heavy freight traffic. The routes can be defined for several reasons:

- Strategic route to consolidate trucks on suitable (major) roads
- Connections between truck routes
- Access routes to provide suitable access to particular locations

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\(^5\) Hinweise zur Schätzung des Verkehrsaufkommens von Gebietstypen", Forschungsgesellschaft für Straßen- und Verkehrswe- sen (FGSV) Nr. 147, 2006

\(^6\) Kraftverkehr in Deutschland 2010, BMVBS, 2012

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Electronic navigation systems or printed maps should provide the information on truck routes and should be complemented with information on other relevant freight traffic infrastructure such as major freight generators, truck parking facilities, motoring associations. In combination with real-time information and ITS, the freight traffic routes can be optimized, and their direct impact minimized.

For the Limassol Environmental Zone and for the Buffer Zones, a One-Way Road scheme is proposed to service the areas. For the urban freight traffic and particularly for the heavy freight vehicles, proper signposting is required to lead the traffic to the respective entrance points (see Figure 73).

Another important measure to reduce the number of trips and consequently vehicles, is to consolidate the deliveries. There are a number of concepts, also referred to as Central goods sorting point, Urban transhipment centre, Urban Consolidation or Distribution Centre. The idea is to reduce the number of vehicle trips, delivery time (personnel costs), potential reduction in the number of drops, improvement in the volume/weight utilisation of vehicles.

To a certain degree consolidation centres have in common that they may generate additional handling procedures (and consequently costs) to the delivery chain, that competitors would have to cooperate and share knowledge (e.g. about customers). Also, increasingly deliveries are promised and expected in time and partially even more than once a day, which contradicts the concept of consolidating various single deliveries into more efficient consignments. Moreover, consolidation centres require space and as a result induce costs, specifically so in the vicinity of city centres. As a consequence of those (partly perceived only) disadvantages and in combination with the unwillingness of communities to sustainably provide funding to reduce additional costs, (Urban) Consolidation Centres in most cases did not reach profitability in the long run and were abolished.

10.3.2 Reduction of freight traffic impacts

For safety and environmental reasons, regulations with respect to vehicle restrictions can be imposed to prevent vehicles of a certain weight and/or length to use particular streets. In case the restriction is of regulatory nature and physical conditions do not prevent the respective vehicle type from passing, regulations can exempt vehicles that need access for a delivery.

Figure 74: Time regulations for motorized traffic at a pedestrian zone
Time regulations should be used to control urban freight transport, but also private road vehicles. In some areas of Limassol city, this is already the case, providing access to Pedestrianised areas from 6:00 am to 10:00 am only (see Figure 74). Access to Pedestrianised areas will be allowed for vehicles with special permits only. This also applies for the freight traffic, and here the access should be combined with time regulations.

While the current regulations do not specify the types of vehicles or the purpose of the transport, those could be used to control freight traffic.

Increasingly, Low Emission Zones (LEZ) are introduced in European cities (e.g. London, Brussels, Antwerp, Berlin) and also elsewhere (e.g. Hong Kong). Depending on vehicle size (Car, Van, LGV, HGV) and emission class, vehicles (private as well as commercial) are either charged for entering/passing through the LEZ or even generally banned from entering. In some cases, the ban is combined with time regulations.

Due to the worldwide concerns over emissions, a wide range of projects aim to develop and promote Environmentally Friendly Vehicles (EFV), also in the context of urban logistics. Since costs are the decisive factor in transporting goods, while EFVs partially still have higher operating costs (or lower speeds, increasing costs in turn), charging (heavy) polluting vehicles helps to increase competitiveness of EFVs. Another option also suggested for the city of Limassol would be to support EFVs, for example by providing charging stations free of cost or at reduced cost. Additionally, providing dedicated space for parking EFVs near the city’s area of operation would facilitate the promotion of environmentally friendly logistics.

Finally, incentives could be given to the most environmentally friendly logistics concept: the cargo bike (with or without electric support). Specifically in the pedestrian zones they can be used without restrictions for delivery of small loads or parcels. Combined with stationary boxes at appropriate places next to the permitted road network, they can serve to reduce the amount weight of the load and allow for multiple tours through the Pedestrianised streets. Taking into account the nature and increasing importance of delivery trips with smaller consignments, this approach can help to significantly reduce the overall impact of urban freight transport.

10.3.3 Reduction of parking, loading/unloading impacts

A study conducted by the Frankfurt University of Applied Science in 2014\(^7\) included the analysis of urban commercial traffic. The findings from the study described above may not necessarily reflect exactly the same issues prevailing in Limassol, but it can be assumed that the situation is very similar, having comparable size of study area (CBD with partly very narrow streets), similar economic characteristics (mainly retail and touristic destinations) and still a significant number of residents.

Negative impacts of parking, loading/unloading vehicles are:

- occupied (road) space in general
- blocking space for other dedicated uses (e.g. parking reserved for people with reduced mobility)
- hindering other traffic (also cyclists and pedestrians) if parked illegally
- noise and even pollutant emissions from running engines
- noise and even pollutant emissions from air-conditioning/cooling equipment
- noise from loading/unloading equipment (e.g. cranes, hoisting platform or pallet trucks)

A parking scheme for all private and commercial traffic is proposed for the Limassol Environmental as well as for the Buffer Zone (see also Figure 76). In combination with the Pedestrianised areas, parking is permitted only on designated parking areas which are liable to pay costs. In order to guarantee necessary deliveries of goods and services, loading bays and waiting areas need to be provided. Particularly this holds true for one-way streets and most importantly for those served by bus lines. Here illegally parked vehicles would severely hinder the bus operation and in turn all other traffic.

\(^7\) Optimierung des Wirtschaftsverkehrs in der Frankfurter Innenstadt
Special attention must be given to roads through which bus services operate. In particular in the Environmental Zone, some of the streets with bus services are rather narrow even for one-way traffic (see Figure 77). Here loading and unloading has to be organized in detail for shops, restaurants but also private premises avoiding any interference to the bus operation. For those streets and also for the Pedestrianised Anexartisias street, time regulations could be considered in very early hours or even during the night hours. Due to the small number of residents in those small commercial streets, the impact on residents might be considered reasonable.

![Figure 76: Signs to restrict loading / unloading and waiting (e.g. short delivery stop)](image)

Figure 76: Signs to restrict loading / unloading and waiting (e.g. short delivery stop)

Obviously, strict law enforcement is needed to exact the regulations. On the one hand urban freight traffic needs to be capable to serve residential and commercial premises with goods and services on a regulated bases, on the other hand residents, shoppers, tourists but also workers must not be affected too much by commercial traffic.

### 10.4 Limassol port traffic

Traffic counts on the Vertical and Omonoias road show almost similar volumes of HGV traffic of approximately 300 to 500 trucks per day and directions. Site visits indicate, that a significant share of the trucks on Omonoias are semi-trailers loaded with 6 and 12 metres (20/40ft) ISO sea containers.

On the one hand, those trucks are affecting residents and passers-by, pedestrians and cyclists as well as other motorized traffic, on the other hand the road is partly not suitable for such heavy trucks. In contrast, given that the Vertical road with 2 lanes per direction as a high capacity and has an alignment not so close to built-up environment, the number and intensity of effected people is far lower.

Therefore, as a measure to consolidate freight traffic (but potentially also coaches) to and from the port, a clear signage of the proposed lorry route in combination with restrictions on Omonoias road should be applied.

No detailed data on port turnover in terms of quantities handled, imported and exported were made available. Apparently approximately 300,000 containers (TEU) and 3,000,000 tons of cargo are currently handled per year. It is not known how much the internal turnover between vessels and what enters and leaves the port exactly is. But the maximum per day and direction would be 500 trucks loaded with containers and 250 trucks (20 tons payload) loaded with other cargo. This would correlate with the counted total of 1,800 HGV on Omonoias and Vertical road, taking into account also a share of local freight vehicles.
The population of the urban area of Limassol represents a share of about 20% of the total Cyprus population. Assuming this to be also the share of goods to remain in the wider Limassol area and the rest to be distributed by road transport to the other 4 districts, approximately 650 loaded trucks plus estimated 50 empty return vehicles per day and direction should be consolidated to and from the motorway A1. Although the route via the Vertical road is slightly longer compared to Omonoias (1.4km), the travel time even in the unloaded network is shorter by 2 minutes.

This would be achieved by signposting the proposed route via the Vertical road already at the port exit gates for traffic leaving the port, additionally the eastern port exit could be permitted for local freight traffic, buses and passenger cars. In the opposite direction, the port of Limassol should be clearly signposted at the motorway A1 exit signs. This would include (coming from the East) indicators already from the city entrance to not use an exit before the Nikaias/Vertical road. In addition, Omonoias road should be closed for trucks of a length exceeding 15 metres (with exception of local delivery).

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11 Traffic Safety

11.1 Introduction

Road safety is an integrated system of infrastructure, infrastructure components, rules and regulations, behaviour and attitudes of road users, moving vehicles, cyclists and pedestrians, individual behaviour of drivers and other road users. Road safety obviously has a major impact on those who are directly affected by an accident, but it also impacts on the perception of the transport system, the possibilities to use the public road space for different activities ranging from moving with motorized vehicles, cycling, walking, lingering. Consequently, it affects the freedom of people and particularly of the younger generation to use the road space or to being allowed by their parents to use it.

11.1.1 Current Status

A road network safety analysis was conducted and revealed

- Serious problems with parking on and next to the roads, in bus bays, at intersections
- Significant shortcomings of markings and signage/combinations thereof
- Inadequate road lane widths
- Safety issues with multi-lane roundabouts
- Serious insufficiencies of pedestrian sidewalks
- Almost total lack of road cycling infrastructure
- Unsafe unsignalized pedestrian crossings

Also, a safety inspection of 3 kilometres of Limassol city roads was conducted, confirming in detail the general findings of the network safety analysis. Moreover, an accident accumulation zone analysis was conducted for road accidents from the years 2013 to 2016. In general, it can be concluded from the analyses that the road safety situation in Limassol needs massive improvements. The detailed results of the analyses can be found in the Problem Analysis Report (Deliverable D5.1).

11.1.2 Objectives of Traffic Safety

Road and traffic safety strategy as part of the SUMP aims to mitigate the risks for all road users. Therefore road safety measures are chosen to reduce the number of accidents as well as the number of injuries and fatalities on the roads of Limassol. The goal is to create safe infrastructure for all road users, especially improving the situation for pedestrians and cyclists. All road users should have a feeling and perception of safety on Limassol’s road network. A safe road network which considers the needs of all road users and furthers non-motorized and public modes of transport is required to enable the mobility of all generations, especially younger ones.

11.2 Key Strategies

A road network safety analysis, a specific road safety inspection and an Accident Accumulation Zone analysis were conducted for the SUMP Limassol. The analyses revealed serious issues concerning road safety in a wide range of aspects from parking, to marking and signage, lighting, cycling and pedestrian infrastructure, lane widths and multi-lane roundabouts.

The aim of traffic safety proposal is to mitigate the risks for all road users. The key strategies are:

- Safe pedestrian crossings using (physical/raised) road median as crossing-aid s to increase safety for crossing pedestrians and block vehicles from overtaking (e.g. stopping buses)
- Separated / protected right turning signal phase as standard to reduce risk of head-on collision, improve safety of crossing pedestrians
- Pedestrian signals with sufficient green-times at all signalised junctions
- Improvement of visual contact/reduce sight obstructions, enforcement of organised safe parking
- Road network classification under safety aspects considering flow and access functions
- Reduce number of lanes to reduce speeds and minimize overtaking manoeuvres, shorten turning lanes
- Improve equipment for handicapped people (e.g. acoustic signals during green time)
- Crossings aids at public bus stops to allow for safe crossing and reduce risk of vehicles overtaking stopping buses
11.3 Traffic Calming Programme

As described in sections 5 and 7, several schemes are proposed for traffic calming. Besides some one-way streets, the environmental zone is fully pedestrianised (see Figure 79). In the buffer zone and the home zone, one-way schemes and other measures are proposed to complement traffic calming outside the Environmental zone.

Figure 79: Environmental Zone: Pedestrianisation of city streets and one-way scheme

As described in section 5.3.6, due to the low number of buses operating in pedestrianised streets (compared to current volumes of private passenger cars, LGV, HGV and buses) the conflict between buses and pedestrians/cyclists can easily be managed as many examples around the world show.

11.4 Accident Accumulation Zone analysis/mitigation

Current Status - Results Accident Accumulation Zone Analysis Limassol 2013 - 2016

Accident accumulation zones are areas where accidents repeatedly occur. Often local features (conspicuities) of the traffic situation, mainly the infrastructure, contribute to such accidents taking place. Road accident accumulation zones are areas in the road network with a minor spatial extent, at which a defined limit of number of accidents is reached or exceeded. Accident accumulation zones can be traced at curves, junctions or intersections.

For accident accumulation zones in urban road networks, the following criteria are defined in the German guideline for local accident investigation Merkblatt zur Örtlichen Unfalluntersuchung in Unfallkommissionen [MUko12]8 (Guideline for local accident analysis in accident commissions):

<table>
<thead>
<tr>
<th>Period</th>
<th>Number of accidents</th>
<th>Spatial extent</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 Years</td>
<td>5 accidents with injuries</td>
<td>50m</td>
</tr>
</tbody>
</table>

The aim of the Accident Accumulation Zone Analysis is to filter out accident-promoting factors of the traffic system and to provide hints in regard to the most common accident sites in the road network so that their corresponding problematic issues can be rectified in order to reduce the risk of accidents. The Accident Accumulation Zone analysis of the provided accidents from 2013 - 2016 revealed 12 road accident accumulation zones in the city of Limassol. The Accident Accumulation Zones are listed below

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8 Merkblatt zur Örtlichen Unfalluntersuchung in Unfallkommissionen - M Uko, Cologne: FGSV-Verlag
in Table 29 the form of a ranking order and a map (Figure 80). The ranking considers the following criteria:

- First ranking criteria: Number of accidents with fatalities and severe injuries
- Second ranking criteria: Number of accidents with only light injuries

Road accident accumulation zones:

<table>
<thead>
<tr>
<th>Location</th>
<th>Accidents</th>
<th>Accidents w/ fatalities</th>
<th>Accidents w/ serious injuries</th>
<th>Accidents w/ slight injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td>RAAZ 1 Arch. Makarios III Ave / Agias Fylaxeos</td>
<td>7</td>
<td>1</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>RAAZ 2 Spyrou Kyprianou Ave / Omonoias Ave</td>
<td>8</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>RAAZ 3 Arch. Makarios III Ave / Despoinas kai Nikou Patichi</td>
<td>5</td>
<td>0</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>RAAZ 4 Arch. Makarios III Ave / Agias Sofias</td>
<td>5</td>
<td>0</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>RAAZ 5 Anemonis / Lotou</td>
<td>7</td>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>RAAZ 6 Kolonakiou / Ayiou Athanasiou</td>
<td>7</td>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>RAAZ 7 Parou / Fragklinois Rousvelt</td>
<td>5</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>RAAZ 8 Arch. Makarios III Ave / Georgiou Averof</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>RAAZ 9 Nikou kai Despoinas Pattichi / Christofi Ergatoudi</td>
<td>6</td>
<td>0</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>RAAZ 10 Spyrou Kyprianou Ave / Agias Fylaxeos</td>
<td>6</td>
<td>0</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>RAAZ 11 Arch. Makarios III Ave / Vasili Michaelidi</td>
<td>5</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>RAAZ 12 Polemidia Junction</td>
<td>7</td>
<td>1</td>
<td>0</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 29: Road accident accumulation zones

The following figure represents the locations of the Road accident accumulation zones within the network.

Figure 80: Location of Road Accident Accumulation Zones, Map: © OpenStreetMap contributors
Road Safety Concept

The status of the infrastructure in terms of road safety has been analysed in the Problem Analysis Report for the City of Limassol in general and for special areas, which had a high amount of accidents in the last year. To improve the road safety of all road users the following aspects should be improved:

- Safe pedestrian crossings using road median as crossing-aids:
  - Existing medians often are too narrow or only realized as markings. The construction of wider medians, which also form a physical barrier for motorized traffic, can support safe crossings along roads. Furthermore, they also facilitate to block overtaking vehicles at bus stops.

- Separated/protected right turning signal phase:
  - Separated right-turning phases should be the standard since this makes it not necessary to look for oncoming vehicles. In addition, the situation for crossing pedestrians at intersections is improved because the focus of turning drivers is mainly on the oncoming vehicular traffic but not on the crossing pedestrians that make up the next conflict point.

- Pedestrian signals at all signalised junctions:
  - There should be a pedestrian traffic signal on every enter/exit road at an intersection. If there is a traffic island/median, it should also be equipped with a traffic signal for pedestrians. Pedestrians should then also get sufficient green times.

- Improvement of visual contact/reduce sight obstructions:
  - Regular inspections of the conditions of the street spaces will help in maintaining a safe road environment with sufficient sight (see each other) and visual (communicate by eye-contact) contact between road users and on street furniture. Parking needs to be organised and enforced more strictly. Speed limits and actual speeds need to be balanced with sight distances. Shortened sight distances need lower speeds in order to provide for a safe traffic flow.

- Road network classification under safety aspects:
  - Organising for a safer road traffic condition always starts with a sufficient road network classification that considers safety aspects. This needs a clear separation between flow and access function. A mixture between flow and access function (e.g. intensive land use and high traffic volumes) should be avoided because this is deemed critical under safety considerations.

- Reduce number of lanes, shorten turning lanes:
  - Additional lanes per direction allow for more overtaking manoeuvres, which lead to higher speeds. To reduce speeds in urban areas and to improve the safety of crossing pedestrians it is necessary to reduce the number of lanes and the length of turning lanes to a minimum.

- Improve equipment for handicapped people:
  - Special signals/infrastructure for handicapped people and acoustic signals that provide a sound during green time in order to proceed on a safe crossing.

- Crossings aids at public bus stops:
  - Public bus stops are a main origin and destination for pedestrians and as such places with a lot of pedestrians crossing the road. Passengers tend to cross right after exiting in front or behind the bus. In this case the bus is like a visual obstruction and critical situations with passing or overtaking vehicles arise. For this case, crossing aids such as traffic islands (see diagram below) fulfill several tasks:
    - Crossing aids help pedestrians crossing the road. It is divided into two parts, with a safe resting area in the middle of the roadway.
    - Traffic islands – if long enough – can block vehicles behind the bus that need to overtake during passenger transfer, reducing conflicts between pedestrians and overtaking vehicles.
    - Traffic islands serve as a safe space in the middle of the roadway, waiting passengers on the traffic island can be seen from oncoming vehicles from all directions (good visual contact).

Especially at the analysed accident locations/zones, measures to improve the current situation should be implemented as soon as possible. A detailed list with road safety measures for the abovementioned RAAZ can be found in Annex VII, Chapter 1. Proposed improvements for the RAAZs 4, 8 and 11 are presented in preliminary design sketches in Annex VII, Chapter 2.
12 Needs of specific groups

12.1 Introduction

Although the focus is on the accessibility of all groups and users to public space, special attention is given to certain groups. Given their mobility limitations in physical, social and financial aspects and well as the higher vulnerability of certain groups, those specific groups are:

- blind persons,
- visually impaired persons,
- wheelchair users,
- persons with mobility disabilities,
- elderly,
- children,
- youth and students,
- people with low income.

When referring to accessibility and social inclusion in the following section, we mean a state and situation in which all citizens are offered transport options that enable access to key destinations and services. We also refer to accessibility to public spaces such as roads, pavement, public squares, parks and beaches in Limassol. It does not include accessibility within buildings such as libraries, schools, universities or government buildings.

12.1.1 Current Status

Typical situations in current everyday life are:

- Conflicts between different modes (parked cars vs. pedestrians and people in wheelchairs)
- No guidance for the visually impaired in the public space – Solution: Square design with guidance system
- Bus stop with no orientation point for the visually impaired

In terms of walking and pedestrian infrastructure, persons with mobility limitations face the same problems all pedestrians face in Limassol, which are among others:

- Problematic pavement geometry (small width)
- Lack of and/or poor maintenance of existing pedestrian crossings
- Incomplete short or long-distance pedestrian streets network (discontinuities)
- Limited public "green" areas (leisure parks)
- Poor walking conditions on the pavements (damage to the walkway, parking on the sidewalk, poor cleanliness, obstacles, lack of shading or unsuitable trees, strays, non-existent benches, traffic congestion, noise pollution, etc.)
- Poor walking conditions on existing pedestrian streets (safety issues, unpleasant environment, motor vehicle violations, etc.)

In present-day Limassol, people with permanent and temporal mobility disabilities encounter deficiencies even in the elementary infrastructure thus impeding the free and unhindered movement. When using private cars, mobility impaired persons miss parking options as the dedicated parking areas for disable people within the CBD, but also in other areas are few in numbers. The parking lots dedicated for disabled people is considerably low as account for 0.8% of the total parking lots within the CBD; at Core City Centre level, the relevant figure is quite higher as it reaches 3.4% of the total available parking lots.

But also, when using public transport, mobility impaired persons are confronted with a lack of appropriate infrastructure and equipment to serve persons with reduced mobility. Given the different
needs of persons with mobility limitations, the current bus-based public transport imposes certain problems and obstacles which include:

- Inadequate, not barrier-free public transport infrastructure with old buses not adjusted to people with permanent and temporal mobility limitations (e.g. wheelchair, strollers)
- Insufficient connections, paths and frequencies - low reliability (inability of trip planning, loss of precious time, inconvenience)
- Malfunctions in use (purchase and cancellation of tickets, absence of multiple-route tickets)
- Lack of information at bus stops about the arrival time of buses, lack of easy-to-use printed information material/need to refresh the website

Currently, there are only few public transport facilities available to people with physical disabilities. Many existing buses are unsuitable for all persons with mobility limitations (disabled, elderly, parents with baby carts, etc.). The bus fleet has to be replaced with low-floor buses, have a gradient to the side of the entrance and a ramp drawn to meet the sidewalk or the ground. Furthermore, it is necessary to adjust the public transport infrastructure by building accessible urban environments with coherent access chains including appropriate accessible bus stops.

Besides physical barriers impeding the barrier-free movement and mobility, there are also psychological barriers impeding the movement of people. Such psychological barriers are fear-inducing spaces, might it be during night-time or due to the characteristics of individual locations such as poorly lit parking lots or public spaces. The personal sense of security in public space is an important aspect particularly, in regard to the mobility behaviour of women but also of elderly persons as well as of children and teenagers, disabled or homeless persons. They all may also feel vulnerable to attacks at certain locations. The perception of public and private spaces as fear-inducing is dependent on the actual criminality and on the subjective feeling of safety. In Limassol, some parking places and underpasses are perceived as fear-inducing spaces.

12.1.2 Objectives

The overall objectives for improving the mobility of persons with permanent and temporary mobility limitations are social inclusion and accessibility. Both aim at ensuring that all citizens are offered transport options that enable access to key destinations and services - equal and free choice of transport modes as well as accessibility to public space for all groups and users.

As transport and mobility are prerequisites to participate actively in society, enforcing the mobility of all people in Limassol is one way of increasing social inclusion. The measures aim to increase the free movement of all persons in Limassol independent of their social status, age, gender, physical constitution and income as well as transport mode preferences. As part of the preferred scenario for the future development of Limassol, the most relevant measures are:

- improvement of public transport service (better PT network, upgrade of PT services, reduction of fares),
- improving parking availability for disabled persons,
- increasing the number of accessible points of interest for disabled persons,
- safe crossings for children, elderly as well as disabled persons.

Whereas measures to increase accessibility and barrier-free movement focus on removal of physical obstacles, measures to increase social inclusion to people with low income focus on affordability and the removal of financial impediments. The latter include measures to subsidize public transport tickets for certain groups and/or to exempt them from the obligation to purchase tickets for public transport. Among others, the Ministry of Education and Culture proposed the free of charge transport of the children with special needs. While in the preferred scenario, free public transport is one of the measures (see below and also section on public transport).

As stated in Cyprus’ First National Disability Strategy and in previous National Disability Plans, the main challenge as well as the focus of future actions and measures is on making all public space accessible so that people with mobility limitations can use it without being dependent on an accompanying person. In order to guarantee to people with special needs both barrier-free movement and wider mobility, it is also necessary to address both the barrier-free access to public transport and the supply of parking spaces for people with disabilities. The barrier-free design of public space is an ongoing task.
Future measures are to make public space ever more barrier-free and to increase the affordability of mobility.

Improved accessibility is made possible by:

1. Easy and quick access to all the city's land uses (alternative transport modes, travel time reduction, reduction of congestion)
2. Respect for all citizens' particularities and equal provision of free and accessible space (infrastructure facilities for disabled people, ramps, sufficient pedestrian width for strolling, infrastructure for blind and deaf persons, etc.)
3. Enhancement of the Public Transport system services (creation of a central station, regional terminals and P&R stations, network coverage, scheduling, special services for people with disabilities, etc.)
4. Development of a Public Transport system on Demand and increase of densities to support the public transport demand
5. More equitable distribution of road capacity to all users. Obviation of the phenomenon "road boundary" - "urban ravine"
6. Unobstructed access to the coastal front
7. Intersections’ and gateways’ management, multimodal connections’ development and creation of routes vertical to the coastal front

12.1.3 General Approach – the principles

Making all public space accessible so that it can be used by people with mobility limitations without being dependent on an accompanying person involves different measures in different fields of actions, the main ones being:

1. Construction and technical measures: Changing infrastructure
2. Changed distribution of use within the construction measures
3. Technical measures
4. Public awareness

The elaboration of measures to satisfy the needs of specific groups in the SUMP Limassol is grounded in the following findings:

- The dismantling of barriers requires a long breath.
- Accessibility is not a purely technical construction goal, but rather a political strategy with different levels of implementation and associated time horizons.
- There is a need for a lasting and secure provision of financial resources for the gradual realization of more accessibility.
- A staged/tiered concept of accessibility is necessary, with at least three quality level:
  - Barrier-free to the greatest possible extent:
    Areas are barrier free to the greatest possible extent if all technical, design and organisational measures which correspond to the state of the art of the technology have been taken to enable all people with disabilities to use public spaces safely and without problems, just as people without disabilities do.
  - Largely barrier free:
    Public spaces are largely barrier-free if existing regulation, guidelines and good practices are implemented and if it is ensured that deviations from the guidelines do not cause any impairment to persons with mobility limitations and higher vulnerability.
  - Barrier-free to a limited extent:
    Public space and situations are barrier free to a limited extent if the regulations and guidelines applicable to them are not fully complied but are nevertheless complied with to the extent that compliance would lead to disproportionate additional expenditure.
Currently, the focus of several public organizations in Cyprus and Limassol is on the removal of physical barriers as they are perceived as a primary problem for disabled persons. Consequently, the efforts include a Pavement Accessibility Commission, Accessible beaches, parking without hindrance.

When focusing on infrastructure and construction measures for increasing accessibility to public space, those measures apply to:

- Sidewalks
- Pedestrian crossings with large and easy to reach buttons to call green
- Public places, squares, green areas and parks, including beaches, playgrounds and sports facilities
- Public transport stops
- Traffic lights
- Ramps and staircases
- Disabled parking spaces

For Cyprus, various organisations including the Office for People with Disabilities at the Ministry of Transport, Communications and Works promote the barrier-free and “Design for all” («Σχεδιασμός για Όλους») by providing guidelines, technical specifications for different structural elements including sidewalks, pedestrian crossings and parking spaces.

As nearly all aspects of urban design are affected by making cities accessible and all public space and its tremendously diverse functional areas need to welcome all persons without limitations, such guidelines need to include:

- Structural elements of public space, such as
- Surface design and materials of walking areas
- Stairways and steps
- Inclined surfaces and ramps
- Tree pits
- Gutters
- Equipment in public space, such as
- Equipment for orientation in public space (by vision - drawings, signs, colours, contrasts; by touch – surface texture of pavements and squares)
- Resting areas and seating arrangements (taking into account different weather conditions so that people can choose between sunny and shady places as well as wind-sheltered areas)
- Public sanitary facilities (barrier-free, lightning, locking system, well maintained and clean)
- Lightning (including aspects as light intensity, light distribution and light density as proper lightning is an important aspect of road safety, public and individual/subjective safety, orientation in the public space)
- Plants (as they are part of parks being structural elements, but sometimes also are visual barriers and impede the visual connection and sometimes impede barrier-free movement by its roots and branches)
12.2 Key strategies

For persons with disabilities to be able to move freely and self-determined, all efforts and measures undertaken in public transport, pedestrianisation, parking, traffic and road safety are necessary but not sufficient conditions.

It is necessary to develop a public transport system both in time (service times and frequencies) as well as in space (bus stops and hubs in the central areas and at the destinations not just close to them). Furthermore, it is mandatory to have coherent access to, in and from the public transport and its means/vehicles. The same applies to pedestrian measures. For persons with disabilities as well as for the visually impaired, elderly and children, it is also necessary to improve the pedestrian infrastructure by providing adequate and wide pedestrian pavements as well as a coherent, coherent pedestrian network connecting homes, shops, work, leisure, medical and other facilities. Following and implementing a coherent "Design for all" concept in new and already existing built environment, removing obstacles and providing clear orientation, both visual as well as tactical, are mandatory steps to make public space accessible, convenient and barrier free.

With respect to measures directly and indirectly related to special needs groups, the key measures are (also included in the preferred Scenario of SUMP Limassol):

- Improvement of the layout / structure of the Public Transport network
- 3 Public Transport network levels - Primary bus lines, Secondary bus lines, Feeder/ On Demand Services (geographic coverage - density of bus lines)
- Upgrade of the Public Transport services
- Extending operation hours
- Increasing frequency on primary lines, secondary lines as well as feeders
- Vehicle characteristics / acceptable service levels (improved & very modern bus fleet: low floor, air conditioning, etc.) accessible to persons with disabilities
- Increase the number of accessible points of interest for disabled people
- Concerns particular points of interest, such as the CBD area, municipalities and communities as well as shopping centres, university, hospital, stadium, social insurances services
- Creation of accessible routes linking the points of interest of disabled - Provisions around the points of interest of disabled (within a radius of 100 meters) based on design criteria and standards
- Increase the number of "safe pedestrians' & cyclists' crossing" along pedestrian & cycling ways network
- For all cross-section points of the particular networks to the main road network
- Development of a safe pedestrian infrastructure
- Closure of selected areas to motorised traffic (pedestrianisation - only for pedestrian / bicycle use and / or Public Transport) - "environmental zones"
- Balanced allocation of road network to cars & pedestrians - "calming areas"
- Adoption of low speed limits (<30kmph) - "home zones"
- Increase the "safe buffers" around primary schools
- Secure a safe buffer with a radius of approximately 50 m around all primary schools

12.3 Detailed presentation of measures

12.3.1 Improvement of public transport infrastructure and services

Making Public Transport more attractive, convenient and comfortable is one way to serve the needs of special groups.

Extending the operation time as well as the coverage of public transport

Providing more public transport options by extending the operation hours, the public transport network helps increasing the mobility of persons with disabilities as well as elderly, children and
 Pregnant women who do not have the possibility to use a car and depend on good public transport infrastructure or other persons to move them around. The improvement and extension of the public transport operation hours is one necessary, but not sufficient condition. As long as public transport facilities are hardly or not accessible to specific groups, the extension of public transport services will not improve the mobility of persons with mobility limitations. The public transport vehicles as well as the infrastructure have to be adjusted to allow coherent access chains.

**Vehicle characteristics/acceptable service levels (improved & very modern bus fleet: low floor, air conditioning, etc.) accessible to persons with disabilities**

Currently, there are only a few buses in Limassol suitable for persons with mobility limitations, particularly disabled persons, elderly with wheeled walkers/rollators, parents with baby carts. The bus fleet needs to be replaced with low-floor buses, which have a gradient to the side of the entrance and a ramp drawn to meet the sidewalk or the ground as well as suitable space to transport two-wheel chairs, wheeled walkers/rollators and/or baby carts (see Figure 81).

![Figure 81: Bus with wheelchair ramp](9)

In its interior, buses in Limassol need sufficient space to cart wheelchairs, baby strollers, buggies, baby carts and wheeled walkers (see Figure 82).

![Figure 82: Suitable bus interiors](10)

- Improvement of public transport infrastructure: Allowing coherent access chains to and from public transport access points/bus stops

With this, it is necessary to adjust the public transport infrastructure by building accessible urban environments with coherent access chains including appropriate accessible bus stops.

Making the public transport infrastructure more accessible to persons with mobility limitations also has to go hand in hand with making a journey with public transport as convenient and comfortable as possible. This includes pleasant waiting areas with possibilities to sit and rest on seating arrangements. Bus stops should also be designed in such a way that people are able to choose between sunny and shady places as well as being wind-sheltered when wind is blowing. Charging points for electric wheelchairs at stops and also in buses should be implemented.

9 [Source: Blog “Accessible buses - Instructions for Drivers and Disabled passengers” / “Προσβάσιμα λεωφορεία - Οδηγίες προς Οδηγούς και ΑμεΑ επιβατές”, online: http://leoforiaaccess.blogspot.com/ (accessed 09 March 2019)]

10 Suitable for one or more wheelchair, baby carts, strollers, buggies and wheeled walkers/rollator (Source: Blog “Accessible buses - Instructions for Drivers and Disabled passengers” / “Προσβάσιμα λεωφορεία - Οδηγίες προς Οδηγούς και ΑμεΑ επιβατές”, online: http://leoforiaaccess.blogspot.com/ (accessed 09 March 2019))
Affordable mobility and public transport: Reduction of public transport fares

Once well-developed public transport services with high frequency, adequate capacities and suitable geographic coverage are available, lowering or suspending public transport fares is another measure to increase public transport’s attractiveness. Thus, low and no public transport fares help to increase the individual mobility by overcoming financial impediments. However, the public transport services have to be capable to provide appropriate capacities to meet the demand once more people shift from car to public transport.

Low and no public transport fares are one means to increase the individual mobility by overcoming financial impediments. If low and no public transport fares are accompanied by well-developed public transport services with high frequency, adequate capacities and coverage, then public transport can become much more attractive.

The preferred scenario includes the “no PT fare” scheme. With the methodology and the transport model chosen, it was not possible to conduct a proper analysis as the developed transport model follows an aggregated approach and therefore, it is not sensitive to all parameters of users’ behaviour including their response to a free public transport service. For this reason, the testing of such a “no PT fare” scheme for Limassol, would require a disaggregated approach. For testing this measure, it is suggested to do a stand-alone Stated Preferences Survey for the willingness to use free public transport or, alternatively, to conduct a pilot with a trial phase of 2 to 6 months duration in order to draw solid conclusions on the response in the passenger demand.

The implementation of a bus free of charge scheme in Limassol urban area has some pros and cons:

- **Pros**
  - Excess capacities (no costs for increase of the vehicle fleet)
  - No cost for automated e-ticketing system
  - Small surcharging needed due to low public transport passenger volumes in Limassol and very cheap ticket

- **Cons**
  - Low modal shift response to public transport ticket changes
  - Possibility to affect walking trips by reducing them

12.3.2 Improvement of accessibility for disabled persons

Moving around in the city as a visually impaired person, as a person in a wheelchair as well as an elderly person is more convenient if shops, medical centres, everyday commodities and services as well as work or school are in close vicinity to the homes. But it is also convenient if the ways are free of obstacles and barriers. Unfortunately, the built environment in Limassol includes barriers and/or misses orientation guidance. At some locations, there is a zebra crossing with lowered pavement. But there is no orientation for visually impaired and the signs, street lights as well as other street furniture
and infrastructure devices (e.g. distributor boxes, street lights) are obstacles for many persons with mobility limitations.

In Limassol, several efforts have been made to increase the accessibility of persons with mobility limitations, including among others installation/refurbishment of traffic lights with acoustic and tactile devices to support blind and deaf people at traffic light crossings, tactile pavers on footways and pavements supporting orientation of visually impaired as well as “Accessible Beaches for People with Special Access Needs” by the Deputy Ministry of Tourism. Although positive, what is needed next are integrated, coherent, barrier-free and coherent access chains connecting daily activities of persons with mobility limitations (e.g. visually impaired, disabled, elderly and parents with small children).

**Increase the number of accessible points of interest for disabled people by establishing coherent access chains and accessible routes**

In order to provide access to and connectivity between major destinations as well as to locations of daily activities around home, work and leisure activities, an accessibility network of access chains was created. With very few exceptions, the network follows pedestrianised streets and connects also public transport facilities and car parking.

![Accessibility Routes in Limassol city centre](image)

The accessibility network will:

- be designed without any stairs or curbs to be suitable for wheelchairs, walking frames, etc.
- be signed with tactile pavers for visually impaired persons (see also Chapter on pedestrian measures)
- provide clear orientation with tactile pavers on the footway and visual design (combining contrast, brightness, colour and shape of materials used in the built environment) and
- at best offer digital information systems at crucial points (including tourist sightseeing spots) conveying information visually and audibly.

Visual and tactile orientation is also possible be using different surfaces (see **Annex VII, Figure A-VIII 1** for some examples of visual and tactile orientation for pathways and crossings).

Within the Environmental zone, there are some potentially conflicting points where the one-way streets have to be crossed. Despite very low traffic volumes, here crossing should be appropriately
designed (e.g. zebra stripes) and equipped with tactile pavers and acoustic signals. Those conflicting points are illustrated in the Figures 85 and 86 below.

Figure 85: Accessibility Routes: potentially conflicting points in environmental zone

Figure 86: Accessibility Routes: potentially conflicting points at the edge of environmental zone

At the edge of the Environmental zone, major roads with significant traffic volumes require safe signalized crossings as described below.
Development of a safe, barrier-free and convenient pedestrian infrastructure

Developing safe, barrier-free and convenient pedestrian infrastructure is to follow the motto and motivation: “Make walking a pleasant activity for all, not just for persons with limitations in its mobility”. Applying the “Design for all” («Σχεδιασμός για όλους») concept consistently and coherently includes among others the following (for a detailed description see for example “Berlin - Design for all” manual):

- Adequate surfaces
  Choosing the right surfaces is one element of making built urban environment barrier-free and safe. Surfaces of walking areas are to follow the minimum requirements of “level, non-skid surfaces; small joint spacing; tight, even joints, especially for joints bigger than 8 mm; paving stones with a small chamfer or unchamfered; tactile and colour contrasts as well as functional drains” (Source: Berlin Design for all, 2011, p. 12). For visually impaired persons, tactile pavers support them in walking and orientating in the public space indicating them the direction of travel, warning them when approaching streets, stairs, ramps and the like.

- Stairways and steps
  Minimum requirements for stairways include slightly ascending stairs with marked steps, handrails, integrated detectable warning surfaces with visual and tactile elements (see also Annex VIII, Ch. 2).

Safe crossings

Pedestrian crossings of streets constitute another important element of barrier-free and safe movement. Safe pedestrian crossings differ in type, appearance, used materials including colours. Some crossings are delineated by zebra stripes with/without reflectors; others are only two parallel white lines, while others have a different colour than the asphalt. In addition, some crossings are equipped with traffic lights including warning systems for visually and hearing-impaired persons supporting them audibly. Important aspects of safe crossings are a clear indication and orientation both for pedestrians and car drivers as well as motorcyclists and cyclists and integrated detectable surfaces with visual and tactile elements both for the visually impaired and children. In case of traffic lights, the waiting time for crossing the street must be satisfactory for persons with reduced mobility.

For increasing the convenience, attractiveness and amenity of public space, the following aspects are to be integrated in the design and refurbishment of public space:

- Resting areas and seating arrangements
  (taking into account different weather conditions so that people can choose between sunny and shady places as well as wind-sheltered areas)
- Public sanitary facilities
  (barrier-free, lightning, locking system, well maintained and clean)
- Lightning
  (including aspects as light intensity, light distribution and light density as proper lightning is an important aspect of road safety, public and individual/subjective safety, orientation in the public space)
- Adequate and wide pedestrian pavements along all urban roads
- Pedestrian crossings in general or special equipped ones for the visually impaired
- Road curbs designed and realised at appropriate locations to allow easy wheelchair and baby buggy crossing

Parking

As the car is the dominant transport mode in Limassol and persons with mobility limitations also depend on them, an element to facilitate the easier movement of persons with reduced mobility concerns the provision of adequate parking, in particular for persons with wheelchairs.

12.3.3 “Safe buffers” around primary schools

Regarding the needs of children, public transport and its improvement is a measure for facilitating children’s and teenagers’ ability to move in Limassol. A specific measure for the needs of primary-school pupils concerns the implementation of safe buffers around primary schools. Within a range of the school entrance, the ways to the school have to be made safe and adequate to the needs of children of ages 5 to 12 years old. Where feasible, the most efficient way to achieve this is through pedestrianisation around primary schools. First starting with a radius of 50 meters, the minimum
radius of a pedestrianised zone around primary schools should be at least 100 meters.

Both cases are only minimum requirements and do not fully reflect the needs for children to move safely by bike or by walking to school, but it is a start. The application of a 100-meter buffer zone to the primary schools in the city centre of Limassol shows in Figure 87:

![Figure 87: Primary schools in the city centre with a 100-meter safe buffer](image)

In cases it might not be possible to pedestrianize street segments, alternatives are “No Parking areas”, called and signed as “Drop-off and Pick-up Zone”, “Kiss and Ride Zone”, or “Kiss and Drop Zones”. One option is to have a zone on the school side of the road which is designated by “No Parking” signs in close vicinity to the school entrance. Another option is to have those zones in a 50 to 200 meters distance to the school entrance. In those zones, drivers are supposed to drop off and pick up children within a certain timeframe (i.e. 2 or 3 minutes). Children then walk on their own to the school.

Those zones are meant to prevent congestion including parking in second row in close vicinity to the school and its entrance. They rather provide a safe location for parents to drop off and pick up their children by car. The drivers always remain in the vehicles while the children get in or get out of the vehicle on the far side of the lane. In some countries (i.e. Australia), supervising adults authorized by the schools assist the children to get off or get in the car. Thus, those zones are a means to avoid dangerous traffic situations in front of schools as it is mostly the parents and carers who abruptly stop, do U-turns or other dangerous turning manoeuvres, impede other road users and in addition, drive too fast in front of schools. “Drop-off and Pick-up Zone”, “Kiss and Ride Zone”, or “Kiss and Drop Zones” help to equalize the traffic flows of parents bringing their children to school and picking them up again (see Figure 88).

As parents are the ones hard to convince and as it is not feasible to control all zones adequately by authorized persons respectively policemen, one could also focus on the children instead. Once zones have been implemented, incentives for children can help to trigger a behavioural change of their parents. When walking from the zones to the school on their own, those pupils and their classes could receive and accumulate points which they could utilize for certain rewards (i.e. school excursions, short trips, visit to museum).

![Figure 88: Signs for School Drop-off Pick-Up Zone](image)

12.3.4 Administrative measures to improve the conditions of special needs groups

As already stated, accessibility is not a purely technical construction goal but rather a political strategy with different levels of implementation and associated time horizons. The dismantling of barriers requires perseverance which also needs a lasting and secure provision of financial resources for the gradual realization of greater accessibility.

Administrative measures to improve accessibility of all persons, but particularly those with reduced mobility includes:

- Developing a political strategy with different levels of implementation and associated time horizons
- Strategic plan and action plan to implement accessible urban environments with coherent access chains including public transport
- Establishing forms of participation in infrastructure planning and refurbishment (similar to Pavement Accessibility Commission)
- Audit of the existing infrastructure by accessibility experts and representatives
- Inventory of the public space regarding accessible urban environments with coherent access chains with problem identification and tailor-made solutions
- Survey of public transport regarding accessible urban environments with coherent access chains with problem identification and tailor-made solutions
- Inventory of fear-inducing spaces; problem identification and tailor-made solutions, such as better lighting, designation of well visible, well-lit parking lots for women and disabled persons
- Lightning policy, strategy and actions plans

Making all public space accessible involves different measures in different fields of actions, the main ones being:

1. Construction and technical measures: Changing infrastructure
2. Changed distribution of use within the construction measures
3. Technical measures
4. Public awareness

Achieving accessibility and social inclusion for all persons, but in particular for persons with disabilities to be able to move freely and self-determined, efforts and measures to undertake are in public transport, pedestrianisation, parking, traffic and road safety.

Regarding the costs in designing, planning and implementing accessibility, the Department of Economic and Social Affairs of the United Nations Secretariat states in its publication “Good Practices of Accessible Urban Development – Making Urban Environments Inclusive and Fully Accessible to ALL” (2016, p. 9):

“Available evidence illustrates that urban infrastructures, facilities and services, if designed and built following accessibility or inclusive “universal design” principles from the initial stages of planning and design, bear almost no or only 1 per cent additional cost. Therefore, progressive realization of accessibility following universal design principles in urban development is not beyond reach for low-income countries. Cities that depend on a tourism economy are also likely to pay high opportunity costs for inaccessible infrastructure and services if they exclude tourists with disabilities, older persons and parents with young children, who may experience accessibility limitations, who may otherwise have visited these destinations.”
13 Intelligent Transport Systems – ITS

13.1 Introduction

Smart city can be considered as a long-term vision of an enhanced urban area aiming at reducing its environmental footprint and at creating conditions for better quality of life. It can be perceived as a cost-effective strategy to cope with severe urban problems such as traffic, pollution, energy consumption and waste treatment. It is part of Limassol’s vision to promote innovation through the smart city concept, in order to become a place where traditional networks and services are made more efficient with the use of digital and telecommunication technologies for the benefit of its inhabitants and commercial activity.

A smart city goes beyond the use of information and communication technologies (ICT) for improved resource use and fewer emissions. It means smarter urban transport networks, upgraded water supply and waste disposal facilities and more efficient ways to light and heat buildings. It also involves a more interactive and responsive city administration, safer public spaces and meeting the needs of an ageing population.

Smart mobility is largely dependent on the technological sector, i.e. infrastructure and communication technology, intelligent transportation systems. The most frequently met smart mobility objectives are:

- reducing air and noise pollution
- reducing traffic congestion
- increasing peoples’ safety

Smart mobility should be considered as a complex combination of projects and actions with different goals, contents and technological intensity. This chapter should be considered as a comprehensive road map for selecting and combining such ITS projects, based on legacy systems and maturity of telecommunication networks already in place always taking into consideration time plan and budget constraints may be applied in funding such activities in a still unstable financial environment in South East Europe and Cyprus.

13.1.1 Current Status

The Ministry of Transport, Communication and Works of Cyprus (Public Works Department – PWD) published the first National ITS Action Plan in line with the requirement of 2010/40/EU Directive: “Deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport, July 2010”. The relevant EU Directive has been adopted by the Cypriot Parliament on 16 November 2012. Following the Directive adoption, the National ITS Action Plan has been published by PWD on December 2012 where the main presented planned projects were based on the findings of the ITS National Study completed in 2009, entitled “Study and Implementation of Intelligent Transportation System (ITS) & Development of Geographical Information System in Cyprus”. The latest National ITS Action Plan progress report has addressed the time period from August 2014 to August 2017. Based on results of previous ITS projects DIAVLOS and PRODROMOS, the main planned ITS applications in Cyprus are based on the EU co-funded CEF projects and INTERREG Programmes: Crocodile II, Crocodile III, TN-ITS GO and Step2Smart. However, the majority of the ITS applications refer to city of TEN-T road and the city of Nicosia; ITS applications relating to Limassol Area are relatively low. However, programmed ITS interventions in the city of Limassol are not included in the afore-mentioned projects. However, systems planned to be implemented (e.g. National Access Point – Open Data Portal) can be integrated in the future with systems that can be implemented in the city of Limassol.

Existing Intelligent Transportation Systems that cover the Limassol Area are briefly described below:

- Traffic Detection. Permanent traffic counters and Bluetooth devices have been gradually installed upon the road network of the Study Area (DIAVLOS, MIELLE and PRODROMOS projects). Therefore, traffic levels, average speed, traffic composition and travel times are monitored and stored in real-time state. Such data are available and managed by the PWD Traffic Management Control Centre (TMCC) in Nicosia. The existing geographical coverage within the Study Area is quite limited, since the A1 motorway and specific vertical axes leading to Limassol port, are quite adequately monitored (Figure 89 below).
Vehicle Actuated Traffic Signallization System (SCOOT). In PWD, a dedicated Control Room for traffic signal management and operation is on operation. The SCOOT system has been installed in 90 intersections in Cyprus and provides advanced functionalities for traffic-actuated traffic signals operation, traffic signal optimization in an arterial or a specific selected network. The system for all traffic signalized intersections in three (3) cities of Cyprus: Nicosia, Limassol and Larnaka is centrally managed by the PWD Control Room. However, the SCOOT system is not currently in operation in the city of Limassol since the existing traffic controllers are old, while there is also need for some further maintenance and upgrading of telecommunication connections as well as inductive loops installed in the road (i.e. real-time traffic detection units). The Ministry of Transport, Communication and Works is currently preparing a procurement project for new traffic controllers in the city of Limassol, which can be considered as a major prerequisite for the actual and smooth operation of the vehicle actuated traffic signalization system. The SCOOT system has been installed in nineteen (19) traffic signalized intersections within the Study Area and are mainly allocated within Limassol Central Business District (CBD).

Bike Reservation System/Bike Sharing System. A bike reservation/bike sharing system has been introduced in Cyprus and specifically in Limassol. The service operator is NextBike Cyprus which enables cycling around the city. A public bike sharing system is available in Limassol with bikes available 24/7. A web-portal is available for users to reserve their bikes according to the real-time bike availability in various stations within the Study Area. This service is managed and operated by a private operator. It is not currently integrated and managed by the PWD with the use of Traffic Management Control Centre (TMCC) in Cyprus.

Bus Fleet Management System. An Automated Vehicle Location (AVL) System is installed on the entire urban and rural bus fleet of Limassol. This system is expected to optimize bus operation and time-schedules of the Limassol bus operator, while the Ministry of Transport, Communication
and Works will be able to centrally monitor the service level of bus operation. The system is under initial operation phase.

- **Bus Travellers’ Information System.** Based on the installation of the AVL system in the entire urban and rural bus fleet of Limassol, a dynamic travellers’ information system is installed for the provision of dynamic bus time-schedules and bus arrivals. The dynamic information will be available via on-board dynamic displays, LED signs at bus stops and a web-portal application. There are currently six (6) LED signs installed in Limassol: in Makariou street, Mall, Franklinou Rousvelt street, New Hospital and Old Hospital. Additionally, a web-travellers’ information system has been developed. A web-travellers’ portal (http://www.motionbuscard.org.cy) has been also developed, which provides real-time information about arrival times at the bus stops per city, timetables and routes as well as electronic payment services; such information is also available as a mobile application for bus travellers’ information.

- **Bus Ticketing System.** An advanced bus ticketing system with smart cards and web-service reservation/purchase system will be installed for the Limassol Bus Operator. The Ministry of Transport, Communication and Works will be able to receive reports on the actual transaction of bus service. The smart cards can be purchased and be renewed via bus terminals/stations. In parallel, paper ticket can be also purchased and validated within the bus vehicle by suitable ticketing machine. The system is at its final implementation stage.

Additionally, the following projects are under planning or tendering stage:

- **Procurement of Traffic Controllers Equipment.** There is a short-term plan by the Ministry of Transport, Communication and Works to proceed with the procurement of new traffic controllers for the city of Limassol. The planned EU funded project is expected to be procured for the city of Limassol in 2019. The installation of new traffic controllers’ equipment will ensure the proper and smooth operation of the vehicle-actuated traffic signalized intersections (SCOOT system) in the city of Limassol. The relevant works are expected to be completed in 2020.

- **Speed Enforcement System.** A tender is under preparation stage for implementation of 90 speed enforcement cameras and numerous mobile cameras to cover Cyprus needs, including also Limassol.

### 13.1.2 Objectives of this Area of Intervention

Intelligent Transportation Systems (ITS) are considered as effective means to support the achievement of urban mobility goals. ITS are viewed as a set of tools assisting into the introduction of various transportation planning/management measures and actions.

Clearly, the deployment of ITS is much more complex within an urban environment since there are many inter-related urban transportation functions carried out by different actors. The cooperation of different actors is a prerequisite for successful implementation and operation of ITS within the city in order to support effectively the urban mobility system. In parallel, integration and interoperability among different systems and transportation modes is considered as a significant ITS aim in order to support integrated transportation services within the city, promote inter-modality and assist to travellers’ information needs.

The main objectives of this area of intervention is to define the suitable ITS measures/interventions in order to serve as an effective tool the specific policies and measures defined within the Sustainable Urban Mobility of Limassol in different areas such as:

- Traffic Management within the city centre.
- Public transport operation.
- Parking management.
- Road safety.
- Freight logistics.
- Cycling.
- Pedestrian.
- Specific group needs.
Based on a comprehensively methodology, the ITS high-effectiveness measures/interventions are identified in order to serve high level objectives, operation objectives and the specific measures of the pre-mentioned areas of Limassol SUMP.

So, ITS measures/interventions have been addressed by examining horizontally all relevant measured defined within the Limassol SUMP.

13.1.3 General Approach/Principles

The overall approach aims to determine suitable ITS measures fully aligned with the defined Limassol SUMP measures (more details can be found in Annex IX, Table A-IX 1). To identify the suitable and high effectiveness ITS measures for the city of Limassol, the overall approach is briefly described below:

- For each thematic area of SUMP, as pre-mentioned in section 13.1.2, the specific measures defined in this study have been reviewed. Those measures are strongly coherent with the high-level and operation objectives of each area, i.e. traffic management, safety, public transport etc. The ITS measures defined serve the following SUMP measures:
  - Improving the layout/structure of the PT network to better respond to mobility needs and promoting the complementarity of transport systems.
  - Upgrading the PT services.
  - Affecting costs of using PT.
  - "Development of emissions free zones in the city centre and other sensitive locations. Discouraging the use of car in selected (environmentally sensitive or congested) areas and/or through residential areas. In parallel, facilitating traffic around these areas and increasing the availability and level of service of PT".
  - Affecting operating costs of the car and/or costs of using it.
  - Increasing road safety.
  - Affecting environmental conditions.
  - Increasing the public space for citizens.

- Potential ITS measures are prioritized by taking into account the expected benefits, best ITS practices, the local characteristics as well as possible budget and time limitations. The systems ranked as high priority are considered as the most suitable for short-term implementation in parallel with the adoption of the corresponding SUMP measures (preferred scenario 6).

- Early ITS winner projects for the city of Limassol are identified, i.e. projects that can be implemented in very short-time period since there is no need to fulfil many prerequisites or their operation is dependent on other proposed implementation activities presented in this study.
The system prioritization has been carried out by taking into account the following criteria:

- Reduced pollution. Expected benefits in environmental emissions and reduced noise levels.
- Reduced congestion. Expected benefits in traffic congestion (e.g. less private traffic, road arterial optimization) and reduced vehicle queues (e.g. queues at traffic signals).
- Increase safety. Expected benefits in terms of enhancement of road safety (e.g. reduced road accidents, improved response of emergency services).
- Improved speeds. Expected savings in travel times of all modes resulting in improved speeds upon the transportation network.
- Reduced transfer costs/Improved Operators efficiency. Reduced transfer costs refer primarily to passengers and freight transportation costs; improved operators efficiency refers to improved stakeholders’ efficiency (e.g. faster response for receipt of traffic management measures, faster response time of emergency services, better scheduling of public transport services operation).

### 13.2 Key Strategies

As mentioned previously, the defined ITS measures address horizontally the various SUMP policies and measures. The key ITS strategies for Limassol Area are summarized in the box on the next page.

The suitable ITS measures in relation to Limassol SUMP measures (approved by scenario 6) are depicted on the relevant Table of Annex IX, Table A-IX 1; the ITS measures prioritization is also shown.

### 13.3 Detailed Description of Measures

Through this detailed methodology, a significant number of High Priority ITS measures has been identified to support the effective implementation of reduction of private car traffic flows passing through the city centre (coastal street). The high priority measures have been presented in section 13.2.

Following the analysis carried out, the high prioritized ITS measures are briefly described mainly in terms of their main functionality and the area of implementation in the Limassol road network. This section should also be considered as a presentation of the finally selected relevant and high priority ITS systems for Limassol in close relation to the selected SUMP measures.

#### 13.3.1 Dynamic Bus Display

The system objective is to provide dynamic/real-time information about the bus arrivals, bus departures and bus time-schedules so that passengers receive promptly reliable information about bus time-schedules and to enhance bus terminal/station operation.

Different LED signs and monitors should be installed at Central Bus Terminal (CBT), to all Transfer Bus Stops, to all Multimodal Transport Hubs and to all Park & Ride Stations (please refer to Figure 34 and 36 of this document for exact locations). Depending on each station’s characteristics, the dimension of the monitors may vary. A central software system should be hosted in a local control room at each bus terminal/transportation centre/park & ride station in order to receive and process data from the fleet management systems of each bus operator and to manage bus services time-schedules at the relevant terminal.

#### 13.3.2 Bus Priority System

The system objective is to provide bus priority in traffic lights intersections in order to reduce bus intersection delay and to optimize bus travel time upon a road arterial. The system will be installed in road segments where dedicated bus lane will be implemented in order to enhance bus operation and to improve bus schedule reliability.

The bus priority system will be implemented in significant number of critical intersections where a dedicated bus lane will be introduced in Limassol.
Intelligent Transportation Systems (ITS) should be implemented in Limassol by taking into account the existing systems in operation as well as strategies, policies and measures to be implemented in order to develop a more sustainable transportation and urban development.

The introduction of ITS is as part of the Limassol Sustainable Urban Mobility Plan (SUMP) since ITS are considered as cost-effective measures and tools in order to support various Limassol SUMP measures in the areas of public transport management and operation, traffic management, road safety, parking management, freight logistics, cycling, pedestrian and specific group needs.

The key ITS strategies to support the SUMP Limassol implementation measures are described below:

- **Integrated Traffic Management Control Centre Operation.** All ITS city related applications (existing and future) should be centrally managed and in coordinated manner with the participation of all key city transportation actors.

- **Traffic Management & Control.** The introduction of ITS applications for the improvement of traffic conditions and congestion as well as the enhancement of the efficiency of transportation actors in relation to the receipt of traffic management actions/measures in real-time or semi-real-time fashion for both private and public transport operation.

- **Local Travel & Traffic Information Systems.** The introduction of multi-modal ITS applications for the enhancement of travellers’ information both pre-trip and on-trip in order to gain travel time savings for the users and to improve the balance between transportation/parking demand and supply.

- **Safety & Emergency Systems.** The introduction of ITS applications for the enhancement of passengers’ and drivers’ safety either for pro-active purposes or improved incident reaction management and corresponding times.

- **Integrated Ticketing & Mobility Services.** The introduction of modern payment mechanisms to improve transport operators’ efficiency as well as to improve the demand balance between the various transportation modes.

- **Enforcement.** The introduction of ITS applications for improving the enforcement of transportation measures such as the use of bus lane, speed limits and to reduce illegal driving such as crossing red light intersections.
Coastal street: Vertical Port Axis to Mediterranean Hotel (Amathountos/Kykladon): Eighteen (18) intersections are included. It should be noted that the vast majority of intersections is not currently centrally managed by SCOOT.

Arch. Leontiou street: From Navarinou to Arch. Makariou III including 3 intersections. All SCOOT currently managed intersections.

Thessalonikis street: From Gladstonos (Five Roads IC) to Arch. Makariou III including 2 intersections. 1 SCOOT currently managed intersection.

Ag. Zonis with Arch. Makariou intersection which is SCOOT currently managed intersection.

The implementation area within the city centre, i.e. Arch. Leontiou and Thessalonikis street are illustrated below:

![Map of Bus Priority System Implementation Area](image)

Figure 93: Bus Priority System Implementation Area

It should be noted that red intersections denote the currently SCOOT managed intersections, whereas green lines denote the approved scenario 6 bus dedicated bus lanes.

### 13.3.3 Bus Lane Enforcement System

The purpose of the system is to enforce unauthorised use of dedicated bus lanes expected to be implemented within measure 2.5 – Exclusive lanes for PT. The core of the system lies in the use of Automatic Number Plate Recognition Cameras (ANPR), the development of an appropriate back-office system for data management, penalty validation, penalty issuing and to manage penalizing procedures in order to reach to violator’s address.

Two common solutions are to be deployed for this ITS configuration:

- Fixed infrastructure of ANPR cameras close to the road network, where a specific area of coverage can be achieved.

- Bus vehicle mounted cameras to detect the bus lane situation at an approximate distance of 20 m. The system digitally photographs vehicles in the bus lane 20m ahead of it and transmits the registration number of those vehicles to a variable message sign near the end of the bus lane. The digital images are stored and can be used for subsequent enforcement procedures.

The bus lane enforcement system is initially planned for 2 road segments within the city centre where the bus dedicated lanes will be introduced according to preferred SUMP scenario. The system will be initially implemented in the Arch. Leontiou street and Thessaloniki street (5 sites in total). Since, two (2) bus lanes are expected to be introduced in each road segment, 10 ANPR cameras are expected to be installed within the implementation area (see Figure 94).
13.3.4 Advanced Urban Traffic Control System (Existing System Upgrade)

The system optimizes the traffic flows in the urban environment by using advanced traffic regulation algorithms in order to serve in real-time the optimized traffic demand requirements. The systems are especially effective in areas with significant traffic variation within the day in critical traffic signalized intersections and corridors.

The system works by analysing the traffic data from an extensive network of traffic detectors located strategically in the network. Detectors layout is one of the key aspects of the project, since selection of detection location are closely related to the traffic regulation (usually detectors are located at least 150m to 200m prior to each traffic light intersection). According to this, data received real-time by the on-site equipment, a central software decides dynamically the parameters of the traffic lights signals such as cycle, green split and off-set.

The implementation area includes existing SCOOT managed intersections (19 intersections) and a significant number of other traffic light intersection located mainly in the CBD (45 intersections). In total 61 intersections will be centrally managed in Limassol covering adequately the traffic control management needs in the city centre. The main streets leading to the city centre as well as main arterials within the city centre will be centrally managed by SCOOT such as part of the: coastal street, north-south vertical axis (Ag. Filaxeos, N. Pattichi, Potamianou/Varnava), Kavazoglou street, Omonia street, Spirou Kyprianou, Arch. Makariou), Griva as well as Giannou Kranidioti (northern to A1: motorway) which is a highly traffic congested axis (maps illustrating deployment layout can be found in Annex IX, Figure A-IX 1).

The geographical expansion of SCOOT includes:

- Coastal street: Vertical Port Axis via Franklinou Rousvelt until Amathountos with Ag. Saranton (Grand Resort), 18 intersections in total (2 intersections are currently managed by SCOOT)
- Kavazoglou/Paphou street, from Miltonos street (south to Spirou Kyprianou) to Yiltiz, 6 intersections in total (2 intersections are currently managed by SCOOT).
- Spirou Kyprianou, from Paphou street to Ag. Athanasiou, 16 intersections in total (2 intersections are currently managed by SCOOT).
- Griva Digeni, from Arch. Makariou to Edessis, 5 intersections in total (1 intersection is currently managed by SCOOT.
- Yannou Kranidioti street (northern to A1): 5 intersections
13.3.5 Traffic Detection

Permanent traffic detection units should be procured and installed on the road network in order to record basic traffic data all year round. The minimum traffic data that needs to be collected are the traffic flows, the traffic composition (the classification scheme should include at least 5 vehicle types, but there are systems that can yield very accurate data such as the make of the car, Euro emissions rating and the year of manufacture), the average vehicle speeds and percentage of occupancy in the detection zone (real or virtual). Moreover, it is important for both directions of traffic to be recorded. The system should feed the data to the existing central traffic management software (MISTIC) at time intervals of no longer than 5 minutes.

The traffic detectors should be installed at strategically selected locations on the road network. The location of traffic detectors will be determined in such a way to best serve the operation of the existing traffic management software which is supported by a Dynamic Traffic Simulation Model. The locations should enable the operator to receive representative information regarding the pertaining road conditions at primary arterial and critical secondary urban roads. The second criterion that will be used to base the selection of equipment locations is road geometry. High road inclinations and high curves should ideally be avoided. The proximity to private or public private access points and to dedicated areas for the loading and unloading of trucks need to be taken into consideration. Moreover, since this traffic detection system does not intend to serve traffic signalling management purposes, detectors should be located at a reasonable distance from traffic lights (more than 200m if possible) and should ideally be installed in the middle of any road segment to be fitted with traffic detection capabilities.

An extensive traffic detection system is recommended to be introduced within the study area.

For traffic detection units, the entire study area is satisfactorily covered with 30 additional new traffic detection sites. Similarly, for sample detection of travel times in predetermined routes, a quite satisfactory coverage can be achieved by introducing 14 new detection sites. The Figure 95 below illustrates the recommended new traffic detection and travel time detection sites Variable/Dynamic Message Signs (VMS/DMS)

Variable Message Signs (VMS) are electronic signs used on the roadway to provide information to travellers in priority order. Several types of messages can be displayed via VMS.

- Travel time information.
- Real-time traffic congestion and/or the presence of queues.
- Unscheduled lane/road closures due to collisions or other incidents.
- Planned lane/road closures due to construction, maintenance or special events.
- Safety messages in support of Police initiated education/enforcement programs.
- Missing child alert (AMBER alert).
- Severe weather condition alerts (e.g. flooding, winds).
- Environmental related messages.

The PWD TMCC should manage the information that is being displayed on the Signs by verifying current road conditions through field equipment such as traffic detection units, traffic (CCTV) cameras and automatic incident detection cameras.

Seven (7) Variable Message Signs (VMSs) are foreseen initially in the Study Area as follows:
- Two (2) large size VMSs in the A1/A6: Motorway: western to Anthoupoli IC (Kato Polemidia) with eastbound direction and eastern to Moutagiaka IC with westbound direction.
- Five (5) smaller size VMSs with direction to CBD: (a) Giannou Kranidioti street (Pano Polemidia), (b) Ag. Filaxeos street (southern to Agh. Fyla), (c) Ag. Athanasiou street (northern to A1), (d) Ag. Paraskevis (southern to Germasogeia) and (e) coastal street between Arch. Makariou and Chrikta Kranou.

![Variable Message Signs Locations](image)

**Figure 95: Variable Message Signs Locations**

### 13.3.6 CCTV

The scope of CCTV cameras is either to view, in real-time, any traffic events or incidents, or to verify a specific traffic event or incident after receiving some relevant notification (such as traffic variables indications by traffic detectors, receiving a notification by police or local council or citizen).

The recommendation is that CCTV cameras that are not required for traffic counting or other continuous processing should be PTZ so that the operator will be able to monitor larger road stretches, using a single camera. Through PTZ cameras, the covered surveillance area is expected to be widened considerably as opposed to a situation where static cameras are used. The positioning of CCTV cameras depends heavily on their intended use. The main scope for Limassol should be to achieve visual surveillance of critical traffic signalized intersections such as highly congested intersections, as well as intersections where dedicated bus lanes are in operation. In the future, the CCTV system can be further expanded in order to achieve a significant adequate coverage of primary road arterials in Limassol.

A quite wide coverage of Traffic Monitoring CCTV/PTZ system is recommended in order to monitor traffic conditions and incidents. For the selection of the sites, the main criteria are to cover satisfactorily intersection presenting (i) significant traffic levels, (ii) quite high accidents rate (presented in previous study’s deliverable) and (iii) dedicated bus lanes. In total 25 CCTV sites are allocated within the study area (please see Annex IX, Figure A-IX 4 for details of the CCTVs System area).

### 13.3.7 Incident Detection

Automatic Incident Detection (AID) cameras should be installed in order to detect automatically traffic incidents and abnormalities upon the road network. The cameras should be fixed, so CCTV/PTZ cameras can be in parallel installed to verify and monitor in parallel the traffic conditions in the incident detection area.

The most suitable candidate positions for installing AID cameras are the following:
- Monitoring complicated intersections and road segments that are associated with multiple turning movements, frequent traffic flows/queue variations, and frequent traffic incidents.
- Transmission of images during special traffic events and incidents.
- Monitoring road segments with increased probability of incidents.
The system will be installed initially in few intersections by taking into account traffic levels as well as accidents rate (as presented in previous study's deliverable). The system will be installed at 4 intersections (see Figure 96 below), where one (1) AID should be allocated per intersection approach, i.e. in total 16 AID units.

![Automatic Incident Detection (AID) sites](image)

**Figure 96: Automatic Incident Detection System Sites**

Incident detection system can be used within the existing PWD traffic management platform in order to provide real-time warning and information to users for re-routing. It is rather a synthesis of various parameters to achieve reduction of delays (please refer to section 13.3.10).

Regarding insurance claims on vehicle priority or illegal driving behaviour, the video storage could be used for such issues, but the legal framework has to be thoroughly examined (e.g. protection of personal data).

### 13.3.8 Integrated Parking Guidance System

The system refers to a fully operational parking guidance system for the provision of information regarding parking space availability at main off-street parking areas based on real-time information. This information will allow drivers to choose their final parking destination en route.

The underlying rationale of a parking guidance system is to combine strategically selected parking areas with the provision of alternative transportation modes (such as bus and bicycle) in order to incentivise modal shift for at least part of the journey for a cluster of commuters. Accordingly, Park and Ride areas are also good candidates for the installation of such system.

By taking also into account pedestrianization of the core city centre (according to preferred scenario 6), the implementation area including the off-street parking areas and dynamic parking guidance system is illustrated in the following Figure 97.
Figure 97: Parking Guidance Implementation Area – Parking Areas & Dynamic Signs Locations

Twelve (12) off-street parking areas will be monitored by the system where LED signs will be also installed at the entrance of parking areas. Additionally, ten (10) parking guidance signs are located within the CBD of Limassol so that drivers can promptly decide about their preferred parking area based upon real-time parking availability.

13.3.9 Advanced Parking Payment System

The system objective is to develop a smart parking payment system in Limassol in order to modernize the current parking payment methods available to parking users for on-street parking, as well as, to ensure on-street parking pricing efficiency. The system will also provide tools to enforcement officers to enhance parking enforcement activities and minimise unnecessary patrol through the city.

The following streets are expected to be included in the system:

- Arch. Makariou III.
- Papachristoforou.
- Emanouil Roidi.
- Griva Digeni.
- Sioukri.
- Ag. Zonis.
- Epikourou.
- Thessalonikis.
- Gladstonos.
- Ag. Filaxeos.
- Zinonos.
- Georgiou Karaiskaki.
- Eleftherias.
- Eirinis.
- Ag. Theklis.
- Spirou Araouzou/Christophorou Chatzipavlou (coastal street)
- Ipatias.
It is also expected to install 26 smart parking meters at convenient locations for on-street parking users, i.e. close to parking segments with charging policy (Subject to changes in case the parking policy suggests otherwise, e.g. Full restrictions of on-street parking in CBD area). 20 PDAs are assumed to be purchased for parking law enforcement officers in order to detect illegal parking in real time.

Finally, it is also considered that 80 parking sensors will be installed in various locations within CBD in order to detect illegal parking, as an additional tool to parking law enforcement officers. This measure would work as a supplement to the traffic signs in the proximity of a junction, by allowing traffic police to get warnings on their PDAs for the presence of vehicles.

### 13.3.10 Control Centre

It should be noted that the Strategic ITS Master Plan in Cyprus (2009) examined the solution of development of a Local Traffic Management Control Centre per city, which would be integrated with the Central PWD TMCC located in Nicosia. However, such a solution has not been decided by PWD and consequently all related ITS investments in the period 2010 - 2020 regarding ITS mainly focused on achieving centralized management by the PWD Traffic Management Control Centre in Nicosia.

By taking into account the relatively low demographic and geographical coverage of Cyprus, the PWD TMCC is expected to serve at least for the medium-term horizon the traffic management needs of the Limassol Study Area. The same architecture is also currently adopted for the PWD UTC Centre which is also located in Nicosia. Consequently, by taking into account the existing ITS conditions in Cyprus and Limassol, the high priority proposed systems can be managed and/or monitored by different Control Centres.

#### Medium Term Solution

The following systems are expected to be integrated and centrally managed by the existing PWD TMCC:

- Traffic Detection Systems.
- Variable/Dynamic Message Signs.
- CCTV system.
- Incident Detection System.
- Integrated Parking Guidance System.

The following systems are expected to be centrally managed by the existing PWD Urban Traffic Control Centre:

- Advanced Urban Traffic Control – existing system upgrade for Limassol.
- Bus Priority System.

A Control Room should be developed in order to host the parking applications for central management by Limassol Municipality:

- Integrated Parking Guidance System – also integrated with PWD TMCC.
- Advanced Parking Payment System.

The following systems are expected to be also managed or monitored by the existing Traffic Police Control Centre located in Nicosia:

- Bus Lane Enforcement System.
- CCTV – via integration to the PWD TMCC.
- Incident Detection – via integration to the PWD TMCC
- Advanced Parking Payment System – via integration with Limassol Municipality Control Centre for strictly enforcement purposes.

The Dynamic Bus Display Signs that will provide real-time information for city, rural and intercity travel can be managed by the relevant public transport operators’ Control Rooms (Limassol bus operator, Inter-city Bus operator). Control rooms have been recently developed by bus operators to centrally manage the bus fleet management system, the bus travellers’ information system and the advanced payment system.

Data communication and some form of integration is needed between the different Control Centres in order to ensure coordinated services for the transportation network of Limassol. The
communication between the Control Centres is depicted in following Figure 98; the dashed lines denote the required integration while the single line denotes current integration.

As it can be seen the PWD TMCC plays an important role to the city’s traffic management, since it is expected to collect the majority of dynamic information by the various systems. More specifically, the PWD TMCC should receive the following information in order to provide some coordinated and integrated traffic management actions:

- Receive vehicle actuated traffic signalized data such as intersection delays and traffic flows from the PWD UTC.
- Receive parking data such as off-street parking occupancy from the Limassol Municipality Control Room.
- Receive public transport data from the public transport operators’ control room; this communication has been recently established.
- Share CCTV and Incident detection images and stream with Traffic Police Control Centre; this communication has been established for the existing CCTV systems which are in operation in Nicosia.

The data exchange between Control Centres should be conducted through a virtual private network (VPN).

**Long-term Vision**

The cities are becoming ever more crowded with people and vehicles and the traffic infrastructure has its limits. The congestion does not disappear. The only way to challenge this growing problem is by employing advanced Intelligent Transportation Systems and thus actively managing the traffic flows.

Traffic Management Control Centres (TMCC) are established at city level to serve integrated ITS operation for various functions such as traffic management, traffic lights control, incident management, public transport management, and parking management. The TMCC objective is the integrated multi-modal management of a significant set of transportation functions within a city. The TMCC within the city can be integrated with other Control Centres such as emergency control centres (traffic police, ambulances, fire brigade) or various operations to be carried out within TMCC by emergency stakeholders’ representatives.

For the long-term smart transportation vision in Limassol, an integrated Urban Traffic Management Control Centre should be considered for central hosting, management and operation of all ITS related city applications in Limassol which can be operated by personnel with various skills and possibly allocated by different stakeholders (e.g. public transport operator, traffic police, Municipality, PWD).
14 Strategic Plans and Policies

14.1 Introduction

The success of a sustainable mobility plan depends strongly on the coordination and integration of the transport and land-use policies in a study area. In the case of the Limassol SUMP the preferred policy Scenario chosen in order to achieve the vision and objectives of the SUMP is Scenario 6, which has been described in Deliverable D8.1. Scenario 6 consists of a set of transport mobility strategies and an urban policy strategy based on the polycentric and mixed land use development pattern. This chapter evaluates the existing development plans of the study area and analyses the proposed policies of the polycentric land-use development of Scenario 6.

The proposed land-use strategy tackles the existing challenges of the Local Development Framework and mitigates against the negative mobility trends taking place in Limassol. The recommended land-use policy package, complements and adds value to the transport interventions proposed by the SUMP and plays a key role in achieving the desired objectives.

14.2 Current Status

Assessment of existing Development Plans

The existing development plans and related policies affecting the study area have been assessed in WP2. The Development Plans that affect the SUMP Study Area are the Policy Statement for the Countryside (PSC), the Limassol Local Plan (LLP) the Limassol Central Area Scheme (LCAS). All these Development Plans contain most of the modern sustainable planning principles, but the implementation of these principles has failed, resulting in dispersed development and strong car dependency. The main conclusions of the assessment of these Development Plans are described below.

1. Policy Statement for the Countryside (PSC)
   - The PSC planning policies are too general to be effective. The transport policy is not effective because it is not area specific and it only attempts to list sustainable mobility principles without any spatial consideration.
   - The peri-urban communities that are included in the Limassol SUMP study area but fall within the PSC have more urban than rural characteristics and are part of the greater Limassol Metropolitan Area. Their inclusion in the PSC is an anachronistic planning measure that needs to change.
   - The relaxation policies for single housing in the PSC and the continuous demand for expansion of development zones without a real demographic need has created a huge problem of dispersed and scattered development, which is opposite to all sustainability principles. A real effort must be made by the relevant Authorities to halt the unnecessary expansion of the city and to promote compact development.

2. The Limassol Local Plan (LLP)
   - The general principles of the LLP are in theory compatible to the objectives of a Sustainable Urban Mobility Plan. The LLP includes the principle of a mixed and polycentric land-use development pattern with a strong emphasis to the development of the central area. However, this pattern has not been implemented. Development is scattered, and commercial development is mainly linear along main roads creating traffic safety, operation issues and car dependency.
   - The environmental area theory which promotes mixed land-use development and on which the proposed LLP structure is based has failed. This has resulted in road safety problems and in increased car dependency. Land-use policies have to be re-examined during the LLP review so as to promote more compatible mixed land-uses, which will minimise the need to travel.
   - The objectives of the LLP Transport Policy mainly correspond to the objectives of a SUMP. Consequently, applying the principles of the LLP will also support the SUMP of Limassol and vice-versa.
   - The general parking policy of the LLP does not promote sustainable mobility but maintains and strengthens the use of the private car. The policy must be thoroughly reviewed to include an in-
integrated approach taking into consideration improvements of the public transport service, efficient parking pricing policy and enforcement. If the parking spaces are simply reduced without an integrated approach, then this may lead to the decline of the town centre.

- The existing parking standards for developments and the Parking Incentive Scheme both for the LLP and the LCAS promote in many cases the use of the private car and thus, must be evaluated and reviewed.

- Although the public transport objectives and principles of the LLP are compatible to the SUMP approach, the proposed implementation of policies and measures is ambivalent. Some of the proposed measures will in fact promote a sustainable development, reducing the need to travel by car and providing alternatives. However, some other measures seem to be counterproductive, such as upgrading the road network in the central urban areas. Providing more road capacity, if no other measures are implemented limiting the access of private motorised vehicles, will induce more car traffic and not less. It is important to improve access and provide space for the sustainable modes of transport and simply restrict access by the car.

- The cycle and pedestrian network policies and measures of the LLP are adequate and in line with SUMP principles. However, they are not complete. The policies mainly focus on providing infrastructure for non-motorised modes. This is important and necessary but not sufficient. In order to really achieve a change towards greater sustainability, the built environment has to be adjusted in order to promote walking and cycling and encourage people to take action and change their travel behaviour. In addition to providing dedicated infrastructure, it is necessary to change attitudes, through public marketing and awareness campaigns, information and many more strategies and policies.

3. The Limassol Centre Area Scheme (LCAS)

- There is a strong interaction of the planning approach of the LCAS with the SUMP process. The SUMP takes both into consideration, the distribution of land-uses and the maintenance of architectural and historical heritage. The preservation of the traditional urban fabric excludes the car, as the car only intruded into the urban fabric a few decades ago. Centuries before that, urban settlements existed on the basis of closeness and non-motorised mobility. It is therefore imperative, to have a spatial management that aims at mixing land-uses rather than segregating them, which will ultimately result in more sustainable mobility patterns of the population and visitors.

- A compact town structure is more favourable for promoting sustainable mobility, short trips, non-motorised trips or using collective modes of transport. However, even with a town structure that has evolved historically, there are always possibilities to use the advantages and minimise the disadvantages. It will be part of the plans and future sections of the SUMP process to tackle these specific issues related to the current town structure. There are some conflicts between the LLP and the LCAS concerning the location of the central bus station. The LLP suggests the bus station at Leontiou Street while the LCAS proposes a bus depot station at Leontiou street and a bus transfer station at Themistokleous street. These proposals have been evaluated and the final SUMP proposal is the creation of the main bus station at Themistokleous street.

- The western extension of Aktea street, which will be included in the revised LCAS, should preferably be a traffic calmed road instead of a four-lane avenue. Scenario 6 of the SUMP proposal contains a specific proposal for this coastal road, which includes dedicated bus lanes, pedestrian and cycle infrastructure.

- The Technical University of Cyprus (TEPAK) is situated in the area of the LCAS. The location policy of the University in the central area is a correct one but generally, the evaluation of the car-parking policy of the TEPAK location is alarming and disappointing. Worldwide, in developed countries, it is the students, the young generation that have adopted alternative mobility patterns—that are clearly distinctive from the older generations, i.e. they cycle, walk and use public transport far more than their parents. It is to be expected that this young generation is more dynamic and capable and willing to change. In Europe and Northern America, young people tend not to own a car anymore, many not even hold a driving licence. It is the mobility behaviour that young people learn during their university times that will be reflected during the rest of their lives. It is therefore even more important to encourage students not to use the car and to promote sustainable means of transport. In this respect, it is utterly counterproductive to build car parks for the university and particularly for students. This is certainly not compatible with any kind of sustainable development and must be addressed.
14.3 Objectives

The polycentric land-use scenario follows the principles of sustainability endorsed by the Limassol SUMP. These principles aim at promoting multi-modal transportation and improving the quality of life of citizens.

The general scope of the proposed land-use strategy is the creation of a liveable, safe and inclusive built environment for the citizens of Limassol. The specific objective of the strategy is the enhancement of the peri-urban centres while maintaining and strengthening the pivotal role of the City Centre. The strategy also aims at attracting investment so that the city remains competitive nationally and internationally.

The diagram below (Figure 99), illustrates the general the objectives of the proposed planning strategy.

![Diagram: Planning Strategy Objectives]

**Figure 99: Planning Strategy Objectives**

14.4 General Approach – The principles of the Polycentric Scenario Strategy

In order to successfully deliver the vision of SUMP the existing planning policies should be updated to reflect the present urban challenges. As mentioned above, the existing Development Plans support the use of sustainable means of transport but have failed to deliver such results.

Therefore, it is considered crucial to empower traditional means of formulating planning policies. The Polycentric Scenario Strategy proposes the inclusion of fiscal measures and a set of new supplementary planning policies and tools in order to coordinate and guide future land-use and transport development and achieve sustainability.

The main principles of the Strategy are the following:

- Enhancement of peri-urban centres
- Maintain and strengthen the primary role of the Central Area
- Compact urban development and increased population density
- Affordable housing and workspace.
- Activation of empty residential land.
- Reduction of travel distance.
- Challenge existing travel behaviours to favour public transport, cycling and walking
It is also important to achieve better coordination between transport and land-use plans and relevant decision makers and stakeholders. Participation and transparency in the decision-making process is crucial.

The proposals of the Polycentric Development Strategy must be incorporated in the new LLP and the LCAS which are currently in the process of being revised.

14.5 Key Strategy Policies

The proposed Strategy is divided into four policies, with each policy acting as complementary to each other. The proposed main policies aim at ensuring that the mobility policies proposed by SUMP are reflected in the urban form and land use of the Greater Limassol Urban Area.

The policy package is summarised and illustrated below in Figure below.

Figure 100: Polycentric Urban Policy
14.6 Detail Description of the Strategies and Policies of the Polycentric Urban Development Scenario

Polycentric development

The proposed polycentric development aims at strengthening the urban centres in the periphery through the support of mix-use development, ensuring that the centres provide the necessary services to be self-sufficient, while maintaining the primary role of the city centre. The strategy also promotes compact development in existing development areas for sustainability reasons and in order to support public transport. This strategy is in line with the vision and the philosophy of the LLP and specifically with the following three basic LLP goals:

1. Goal 3.2(α): Future development in Limassol should be encouraged and guided in existing development areas and urban centres through various planning incentives.

2. Goal 3.2(γ): Compatible and balanced mixed land-use development should be encouraged.

3. Goal 3.2(ζ): The primary and crucial role of the city centre should be maintained and strengthened.

The above LLP goals and especially goal 3.2 (α) Limassol have not been achieved in Limassol. The proposed strategies aim at achieving the polycentric and compact development through the introduction of more target specific policies and measures. The aim is to enable the central area of Limassol to continue to form the most important area of the city, while also allowing the peripheral urban centres to flourish.

The proposed strategies will have to be closely monitored and reviewed since substantial changes in existing development patterns are not always easily implemented. For this reason it should be noted that a number of the transport related measures of the SUMP may also work independently and do not completely rely on the full implementation of the proposed polycentric scenario.

The proposed polycentric scenario has identified specific urban areas in the periphery of the central area of Limassol which already constitute parts of peri-urban communities of the Greater Limassol urban area. These identified urban areas are intended to be transformed and developed into vibrant and dynamic urban spaces(sub-centres) and transport hubs. Independent, with services within walking distance from housing units and efficiently connected between them. As mentioned in section 6.7 ‘Bus Stops’, the SUMP preferred scenario proposes the creation of multimodal transport hubs (combined urban and intercity lines). Three of these transport centres are proposed at strategic peripheral locations. These stations could promote the polycentric development as vibrant transport hubs with suitable land-uses around them.

Similarly, the aim of the polycentric development is to attract population and employment in the urban cores of the identified peripheral areas. This could be achieved with various planning and fiscal tools like increased building and population densities in specific centres and around transport centres and financial and planning incentives for attracting people and business. The aim is to transform these peripheral areas into strong magnets for development, offering the opportunity for regeneration projects to attract new housing and employment.

Brief description of the polycentric urban development of SUMP Scenario 6

It is estimated that the population of the Limassol SUMP area will increase by 32,357 persons between the years 2016 and 2030 and the employment by 19,427 jobs for the same time period.

The predictions of the expected population and employment growth are based on the surveys of the Statistical Service of Cyprus. The process included the analysis of the existing trends of growth and the formulation of three different scenarios. Specifically, the projection included scenarios based on low, moderate and extreme rate of change, with the moderate rate of growth adopted. This rigorous statistical process was clearly presented and approved in Deliverable D3.2.

According to the polycentric scenario, the expected population and employment growth will mainly concentrate beyond the highway in the centres of the chosen peripheral communities. The Limassol City Centre will also maintain its significant economic and administrative role. The mixing of uses will be supported through appropriate policies.
According to the proposed scenario, 85% of the expected population growth will be guided towards five peri-urban centres as explained below. 15% of the expected population growth is expected to occur in the central area promoting the idea of mixed-use development. The existing residents in the central area should be encouraged to remain and new residents should be attracted to the central area by ensuring and increasing the quality of life in this area. This forms part of the polycentric strategy which promotes mixing of land-uses and decreasing travel distances.

Consequently, these various centres including the central area will be concentrations of the different activities working, shopping, leisure and will be in close proximity of where people reside, resulting in short distances and reducing the need to travel.

The figure below (Figure 101), illustrates the location of the targeted densification areas and the distribution of the population growth. These areas are indicative of their strategic location with development focusing within proximity of their existing centres and shouldn’t be misinterpreted in supporting a sprawling-built environment. According to the chosen scenario, population will be distributed around the following centres:

- 25% in the Municipality of Ypsonas which can also act as a regional development pole for Erimi and Kolossi
- 20% in Agios Athanasios and Germasogia
- 15% in the Centre of Limassol
- 15% in Kato Polemidia
- 15% in Agios Tychonas.
- 10% in Agia Phyla

Table 30: Modification of population distribution
Approximately 50% of new workplaces predicted/expected to be created in the Limassol Central Area while the remaining 50% will be distributed in the peripheral centres proportionally to their population. The assumed employment distribution of the chosen polycentric scenario is shown in the following figure.

Figure 102: Polycentric Development: Work Places

Proposed strategy and policies

In order to achieve the proposed polycentric and mixed-use urban development, a clear change in the land use and urban policies from today’s planning approach and urban policies is imperative. The recommended strategy and policies aim at revising and strengthening the existing planning framework and the utilising of new planning and fiscal tools.

As stated above, the policies proposed are interconnected and complementary to each other and are divided in the following four action categories.

A. Ensuring that the Limassol SUMP is a legal binding planning document.

B. Revising existing and introducing new planning policies.

C. Introduction of new fiscal measures.

D. Designing and implementing Area Action Plans

A. Establish SUMP as a binding planning legal framework

The primary recommendation of the strategy is to ensure the validity of SUMP as a legal development framework and to ensure that the proposed actions are delivered. This can be achieved through making the SUMP proposals and policies an integral part of the LLP and the LCAS. The participatory process of the SUMP study included the representation of the Department of Planning and Housing, the Planning Board and the Limassol District Officer in the Steering and the Key Stakeholders Committees. These Authorities are also directly involved in the process of the review of the LLP and the LCAS, thus facilitating the integration of the recommended SUMP policies with the new land-use policies.

The above recommendation will coordinate the sustainable land-use and transport policies and will allow a review of the SUMP every five years through the existing planning legal framework, improving the implementation and monitoring of the policies. This proposal will also ensure public participation through the procedures is included in the planning process.

It is also proposed that the LLP and LCAS boundaries are revised to reflect the SUMP study area, to allow for the merging of the documents and avoid conflicts and contradictions. The upcoming revision of the LLP and LCAS provide the opportunity for a fast integration and legal validity for SUMP.
Another more long-term proposal is the preparation of local transport plans for the areas covered by Local Plans and Area Schemes. These local transport plans could be also published and become compulsory legal documents with the publication of Local Plans and Area Schemes. This proposal requires changes in the existing planning and other relevant legislation.

In the long term, a National Transport Plan for Cyprus could enhance the legal validity of the SUMP study. The recommended plan will assist in the coordination of transport infrastructure across the island, enhance connectivity and endorse a sustainable mobility vision for Cyprus. Ensuring that the proposed policies are delivered and are supported by political and public will. This is related to a more general issue which concerns the preparation of a new Island Plan to replace the existing Policy Statement for the Countryside. Such a decision has political implications and is a long-term pending political issue.

B. Planning Policies

Adjust Land Zoning

The increase of building density and promoting mix use development in the urban centres of municipalities and in proximity to the proposed transport hubs is identified as pivotal to the delivery of the SUMP objectives. This will tackle the issues of urban sprawl, concentrate future development and enhance the liveability and attractiveness of the identified urban centres.

It is proposed to increase the plot ratios of the residential zones in proximity of the chosen urban cores to allow for a more vertical development and avoid the creation/extension of new residential zones unless this is substantiated by planning parameters such as the population capacity of existing zones. This will allow the construction of small blocks of flats in zones near the centres of the chosen peripheral areas. An example of increase in plot ratio is the increase from a plot ratio of 0.9:1 to 1.2 :1. Site specific examples are also included at the end of this chapter.

It is also recommended to change the existing residential policies and allow more land-uses in residential zones such as offices, education and some leisure facilities to promote mixed land-use patterns.

It is critical to adjust the above recommendations accordingly to the specific site characteristics of the peripheral urban centres.

The central area of Limassol should maintain its function as the primary activities’ area in the Limassol urban area. It is therefore recommended to increase plot ratios in this area based on substantiated studies.

A new comprehensive policy for the location of high-rise buildings is also recommended. The existing practice of the delivery of the high-rise buildings in Limassol along the seafront, is incompatible with sustainable transport principles. This is because, the construction of high-rise buildings towers is limited to residential uses and have low occupancy rates. This trend is likely to continue in the near future, with more high-rise buildings planned or under construction. As a result, the buildings will not contribute to necessary densities for efficient public transport operation and instead cater for more motorised trips for the occasional and wealthy residents. Additionally, the current planning practices supports the creation of new public car parks, under the new buildings that directly incentives more trips by car to their centre, which is incompatible with the SUMP philosophy. Therefore, it is proposed that existing policies are adjusted, to reflect the opportunities and challenges of high-rise buildings, dealing with issues such as their low occupancy rates, land-use and location.

Activate construction in existing empty residential areas

Compact development is also an essential land-use policy recommended in the SUMP plan. It is therefore recommended to activate the development of existing empty residential land which remains empty mainly due to the lack of suitable road access. The first step for this recommendation concerns the identification of suitable residential areas to be activated. Following this action, a main road layout plan should be prepared for each area and this plan should be implemented by Local Authorities either by acquiring the necessary land by compulsory acquisition (expropriation) or through agreements with the affected land owners. It is suggested that an action plan is prepared for this recommendation, which will define priorities and timelines.
Incentives for development in residential land with infrastructure

The policy recommends that the Plot Ratio increases by 0.10:1 in empty residential plots where the road and utilities infrastructure exist, within a radius of around 1.5 km around the centres of the peripheral areas, provided the plots are developed within a period of five years from the date of the publication of the new LLP. This will act as a strong incentive to activate empty residential plots and increase population density.

Affordable housing

At the identified urban centres, planning incentives can further add to the percentage of Plot Area Ratio, through the provision of affordable housing. This will ensure that construction of buildings is financially feasible, increase density and attract investment to the periphery.

The soon to be published National Housing Policy will play a key role in the implementation of the affordable housing scheme. This is because it will address existing issues that hinder the delivery of affordable housing. These include the role of the government in the provision of housing, the clarification of the criteria for eligibility to affordable housing schemes and the establishment of a public body responsible for the management and control of the affordable housing scheme.

The strategy recommends that the policy for affordable housing schemes in the urban centres and in proximity to the transport hubs becomes more flexible and lenient. The recommended increases in plot ratio for affordable housing at the identified peripheral urban areas is shown in the Table below.

<table>
<thead>
<tr>
<th>Percentage of Affordable Housing in new developments</th>
<th>Percentage increase in Plot Area Ratio given to the new development</th>
</tr>
</thead>
<tbody>
<tr>
<td>20%</td>
<td>10%</td>
</tr>
<tr>
<td>30%</td>
<td>15%</td>
</tr>
<tr>
<td>50%</td>
<td>25%</td>
</tr>
<tr>
<td>100%</td>
<td>50%</td>
</tr>
</tbody>
</table>

Table 31: Raise affordable housing

According to Table above, if a new development creates a percentage of the total buildable area as affordable housing then it is entitled to increase its plot ratio (i.e. buildable area) by a certain percentage as shown in the Table above. An example relating to the first row of the table above is the following:

If a plot with an area of 2,000 m² is located in a residential zone with a plot ratio of 1:1 the developer may construct 2,000 m² regular housing units. The plot ratio may be raised to 1.1:1 (10%) and the developer may build 2,200 m² if he constructs 440 m² (20% of the development) affordable housing units. The size and the construction materials of the affordable housing units may be different than the regular housing units so that they may be affordable.

It should be noted that the above suggestions for promoting affordable housing through planning incentives is in line with the scope of the recent housing policy of the Government. This new Housing Policy contains suggestions for planning incentives (increases in plot ratios) and other measures including fiscal measures for rent subsidies. However the new Government Housing Policy for affordable housing does not apply for plot ratios below 1.0:1 and this creates a problem for the proposed polycentric development since all the urban centres suggested to be developed above the Limassol-Nicosia Highway have plot ratios less than 1:0:1. It therefore suggested that this new Housing Policy and the suggestions of the Limassol SUMP are elaborated by the Planning Board and adjusted to promote the proposed polycentric development of Limassol.

Minimum Parking Requirements and Parking Incentives Scheme

Parking standards for developments included in the LLP and LCAS, is one of the most crucial factors influencing the proposed transport policy and mobility patterns. It is recommended that parking standards are revised so that the parking requirements of developments are reduced especially in the city centre. This will reduce the costs of major developments, free up space that would have been used for parking to be delivered as open space and promote the use of public transport, walking and cycling.
Specific uses can benefit from the removal of minimum parking requirement. For example, student accommodation within mix-use complex that are well connected to the university and the public transport network are considered as ideal case studies to implement such policies.

The existing Parking Incentives Scheme which supports the creation of extra public parking spaces through the increase of the allowable plot ratio expired in January 2019. It is suggested that this scheme is not renewed. If the intention of the Government is to renew this scheme, then it is suggested that the revision considers the principles of the Limassol SUMP which require to minimise the supply of parking especially in the central area in order to promote public transport. Additionally, it is recommended that if the scheme is renewed, the funds collected are invested in the delivery of public transport, cycle and pedestrian infrastructure. Improving the quality, inclusivity and accessibility of the public realm.

**Policy for commercial and office uses along grade separated junctions (roundabouts)**

The existing policy for commercial and office uses surrounding roundabouts on A1 motorway at strategic location must be strengthened and updated. This is because the sites serve the primary public transport network and can enhance employment in the periphery of the city.

Issues that have been identified and are in need to be reviewed include the existing percentages of Plot Ratio, minimum parking requirements, provisions for specific land-uses as well the neglect of including key roundabouts, particularly in Kato Polemidia.

**Re-assess policy for single housing outside the development zones**

The single housing policy outside of the development zones has contributed to the sprawling-built environment across Cyprus. It is a priority to revise this planning policy to limit building single housing units outside development zones through stricter conditions.

**Re-access location of Special Uses**

The existing LLP allows for the creation Special Uses outside development zones. This contributes to the sprawling environment as developments take advantage of cheaper land value. The location of such developments must be re-accessed, allowing such developments closer to the urban centres, therefore, reducing the need for commuting.

**C. Fiscal Measures**

It is recommended that a set of fiscal measures, which may reduce various community and other taxes for business developments in the selected in the peripheral zones, is examined by the Planning Board in coordination with the Ministry of Finance and included in the revised LLP.

The soon to be published National Housing Policy will play a pivotal role in providing access to new household owners to loans with low interest rates and provide clarity on tax reduction schemes that will assist in the growth of the peripheral urban centres. These fiscal incentives will complement the planning incentives and result in an attractive and dynamic polycentric region.

A new planning and fiscal tool which should be investigated is the creation of Business Improvement Districts (BID). This policy aims at creating BIDs in order to strengthen employment opportunities in specific areas such as the selected peripheral areas. Businesses that agree to form a BID will be required to pay an additional tax in order to fund projects within the district’s boundaries and to fund shared training and mentorship schemes. Combined with funds from Local Authority, the BID will act as an opportunity to decentralise public spending and allow locals to influence decision-making.

Moreover, it will enhance collaboration between businesses, work towards a common vision and enable SMEs to grow, contributing to the diversity of the local economy. Providing transparency and exposure of the sector’s successes and challenges; to encourage meaningful collaboration within the city, the region and beyond.
Figure 103: Fiscal Measures

Formulation and Publication of Area Action Plans

The polycentric plan of the area will benefit from the formulation and publication of Area Action Plans, that can facilitate and coordinate development in the periphery of the city. Similarly, to the LCAS, such documents will assist in adjusting the land zones, strengthening the character of the area and attracting housing and employment investments. It is proposed that the planning legislation is revised in order to include the development of such Area Action Plans with quicker and simpler procedures that are required for the development of Local Plans and Area Schemes.

The key deliverables of the Area Action Plans will be achieved through the establishment of a common Vision, implementing a public realm policy, pinpointing of sites that are suitable for re-generation, as well as improving transparency between the planning system and the public.

Planning at a smaller scale can guide future developments towards a specialised service and assist in creating strong agglomerations of businesses. These clusters will provide the employment opportunities required to avoid the commuting from the periphery to the centre.

The peripheral districts will benefit from an in-depth analysis of the existing development trends and proposed developments. Such as the new Limassol Football Stadium in Ypsonas and Kolossi, the Verregaria Brownfield Masterplan, which includes new educational facilities and student housing and the corporate hub in Agios Athanasios. Accordingly, the Area Action Plan will provide site-specific land-use interventions that can further support services to flourish. Acting as a tool for branding the peripheral areas.

Urban Design Principles

Complementary to the land-use policies, the Area Action Plan can provide people-oriented design principles and ensure that the urban form is not negatively impacted from new developments and that it remains homogenous. Recommending interventions to the public realm that are tailored to the specific challenges and opportunities of each urban centre and enhancing the living experience of the city, through improving the spaces between buildings.

The design principles will include guidance towards ensuring active ground floor uses, through the use of permeable materials, well shaded pavements with a diversity of street furniture and construction materials. The design principles can ensure that the diversity of building age is protect-ed, in order to safeguard the character of areas and cater for a diverse range of business and residents, balancing real estates’ values. Where building height inconsistencies might develop through the increase in the Plot Area Ratio, the design principles can provide guidance on building height set-back, creating a homogenous urban environment.

The aim of the design guidance is to enhance the multi-sensory experience of the built form of the urban centres, creating attractive urban cores, places where locals want to live and work. Therefore, creating resilient communities and not commuter suburbs.

It should be noted that the LLP includes adequate policies concerning the conservation of old historic urban areas and includes incentives for safeguarding listed buildings. The above Area Action Plans should be complimentary to these policies of the LLP taking them a step forward. In the Annex X, you find some site-specific examples of implementing the above recommendations in Ypsonas/Kolossi/Erimi; Kato Polemidia; Agios Athanasiaoa/Germasogia; Agia Phyla; Agios Tychonas.
The polycentric planning strategy reflects the vision for sustainable transportation in Greater Limassol Area, proposed by the SUMP and ensures that the transport policies proposed are compatible with the urban form and land uses of the Greater Limassol Area.

The strategy is divided in four policy sections which are developed in depth, in order to deliver the targeted densification of the peri-urban centres and to strengthen the role of the City Centre. Guiding future population and employment growth in proximity of existing centres and creating inclusive, mix-use and dynamic centres, where amenities and jobs are within close distance.

The integrated and holistic approach of the SUMP must be endorsed by the decision-makers and key stakeholders, through the integration of the recommend transport and land use policies in the Development Plans. Although the key principle of compact and mix-use urban form is imperative to the delivery of the SUMP objectives, it is recognised that the transport related measures of the SUMP can also work independently and do not completely rely on the full implementation of the proposed polycentric scenario.
15 Implementation Plan

15.1 Introduction

The Implementation Plan is quite important for getting into the 4th Phase of the SUMP Cycle. To start implementing the SUMP proposed policies, projects, interventions, and actions, a well-structured plan containing all necessary information as well as time schedule is required. A good and comprehensive Plan can of course be a prerequisite for success only if at the same time the measures and policies proposed by the SUMP:

- have been positively evaluated from the key stakeholders and the majority of the citizens, therefore not only planning for people but also planning with people
- have been positively evaluated in terms of benefits being greater than their corresponding costs
- are technically feasible and legally permissible
- funding is available in an adequate pace

The current implementation plan builds on the work done so far regarding the Limassol SUMP and relies on decisions made up to now as well as on client’s approvals of the previous project deliverables. More specifically, the Implementation Plan takes into account the staged implementation of the various interventions as placed in time during the SUMP implementation period of 10 years, i.e. from 2020 to 2030.

Cost elements of projects and interventions, proposed by the preferred SUMP scenario, are included in market values, increased by the respective VAT, currently at 19% (different from budget figures used in the CBA Analysis, net of VAT and other transfer payments such as taxes and subsidies.

Obviously, the Implementation Plan is closely related to the Monitoring and Evaluation Plan, which in effect establishes clear procedures and describes who, when and how, the activities carried out during the implementation phase. These two documents are bound to each other, thus any change occurred in the Implementation plan will inevitably influence the M&E in terms of output indicator values and SUMP project/intervention progress levels. This process loop though should be considered valuable as it allows us to understand success and failure as well as to identify new challenges for the future (please see D11.1 for the whole Implementation Plan).

15.2 Contents of the Implementation Plan

The Implementation Plan is intended to serve as a practical and useful tool to those involved during the period of preparing the project or intervention as well as during the initial steps of implementation. Since a number of interrelations between the various activities exist not only at spatial level (e.g. same or adjacent location) but also in terms of preparatory studies/works in construction, telecommunications as well as relative regulatory/legal frame.

Most interventions are interrelated to other interventions which will take place at the same location and therefore they must be coordinated. Similarly, other projects or interventions may precede or follow in time, which again means that coordination will be required. The specific coordination needs depend on several factors such as the type of the project or intervention, the need for functional or design studies, the prior approval of one or more involved authorities etc. Most of these required procedures are governed by the respective legislation; therefore, if the legislation alters, these interrelationships may be altered as well. Table 32 provides a first cut view of the SUMP program with the unique ID numbers, titles and timing of deployment, which are further detailed and analysed in Deliverable D11.1 and its Appendices A, B and C.
The final list of interventions that have been included, evaluated through the transport model and finally selected in the preferred scenario and during the final steps of the project have been detailed and thoroughly discussed with the Project’s Steering Committee. In this list, the project that comes first and is of utmost importance for the successful implementation of the SUMP as a whole, is the enhanced PT operation (ID 01). Taking into consideration the current provisions of the new concession tenders the available already allocated subsidy for PT operating cost, including depreciation and maintenance of all investments on bus fleet, depots and other equipment, amounts at 10 million per annum from 2020 until 2030. For the forthcoming two 10-year periods (2030 to 2039 and 2040 to 2049) additional PT operating cost is estimated at 13 million and 15 million Euro respectively which corresponds to the 50% margin from the then initial contract value. Worth underlining that out of 22 interventions included in this table, ID 01 for PT operations is likely the first to be implemented and one of the very few already having confirmed budget line. Project IDs 2, 3, 4, 5, 6, 7 and to some extent ID 18 for the ITS, are related to the PT system enhancement, therefore their deployment in the first couple of years seems adequate. Project ID 20, dealing with the proposed integrated parking policy is also deemed of great importance and should be given special attention as it is widely acknowledged.

<table>
<thead>
<tr>
<th>ID number</th>
<th>Measure/Intervention Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID 01</td>
<td>Enhanced level of operation for Public Transport</td>
</tr>
<tr>
<td>ID 02</td>
<td>Interchange Bus Stops</td>
</tr>
<tr>
<td>ID 03</td>
<td>Park &amp; Ride Stations (excluding Land cost)</td>
</tr>
<tr>
<td></td>
<td>Land Acquisition cost for Park &amp; Ride Stations</td>
</tr>
<tr>
<td>ID 04</td>
<td>Main Bus Terminal (Themistocleous)</td>
</tr>
<tr>
<td></td>
<td>Land Acquisition Cost and/or Opportunity Cost for Main bus terminals</td>
</tr>
<tr>
<td>ID 05</td>
<td>Telematics Bus Stops</td>
</tr>
<tr>
<td>ID 06</td>
<td>Exclusive lanes for Public Transport on existing roads</td>
</tr>
<tr>
<td>ID 07</td>
<td>Exclusive lanes for Public Transport on new roads</td>
</tr>
<tr>
<td>ID 08</td>
<td>Construction of Aktaia Odos</td>
</tr>
<tr>
<td>ID 09</td>
<td>Pedestrianisation of selected areas to motorised traffic</td>
</tr>
<tr>
<td></td>
<td>Pedestrianisation of selected areas to motorised traffic at the local centres of the other municipalities</td>
</tr>
<tr>
<td>ID 10</td>
<td>Low speed limit area (&lt;30km/h)</td>
</tr>
<tr>
<td>ID 11</td>
<td>Increase the length of travel / one-way streets: Leontiou, Agias Filaxeos, Thessalonikis, Yitz/Navarinou/ Glandatnos</td>
</tr>
<tr>
<td></td>
<td>Increase the length of travel / one-way streets: CBD area</td>
</tr>
<tr>
<td>ID 12</td>
<td>Bicycle lanes along all major corridors</td>
</tr>
<tr>
<td>ID 13</td>
<td>Bicycle only roads for fast bicycle connections</td>
</tr>
<tr>
<td>ID 14</td>
<td>Bicycle lanes along Sea Side Boulevard and Aktaia street</td>
</tr>
<tr>
<td>ID 15</td>
<td>Safe and weather protected bicycle stands at all major destinations</td>
</tr>
<tr>
<td>ID 16</td>
<td>Safe crossings</td>
</tr>
<tr>
<td>ID 17</td>
<td>Adequate and wide pedestrian pavements along all urban roads</td>
</tr>
<tr>
<td>ID 18</td>
<td>ITS equipment</td>
</tr>
<tr>
<td>ID 19</td>
<td>Traffic calming measures in Traffic Calming Zone area (Buffer 1)</td>
</tr>
<tr>
<td>ID 20</td>
<td>Integrated Parking Policy</td>
</tr>
<tr>
<td>ID 21</td>
<td>Safety Buffer Zones around primary schools and creation of accessible routes</td>
</tr>
<tr>
<td>ID 22</td>
<td>Improving traffic safety in selected road network locations</td>
</tr>
<tr>
<td>ID 23</td>
<td>Road Development projects</td>
</tr>
</tbody>
</table>

Table 32: The Implementation plan for the Limassol SUMP
that a decision whether to use our private car or not, strongly depends on parking availability, enforcement restrictions, cost of parking/hour etc. This is the idea behind the “early winner” proposal presented in Chapter 4 of this report, having both PT operational enhancements through ITS and traffic control as well as the new parking design at the same time. Project ID 16, 21 and 22 are related to road safety enhancements with emphasis on creating safety crossings. Last, but not least comes the rest of the projects deal with pedestrianisations and bicycle ways, that involve substantial funding and their implementation roll out is heavily depended on budget constraints, so it is spread out to the extent possible. Special attention also should be given to project ID 11 (one-way street network) whose budget line is manageable and can start as early as possible, to substantiate the change to a new driving behaviour and prepare the citizens for a new era of mobility for the city.

In Table 3, more details are given in tabular form on:

- Time frame of the implementation plan split by year for three (3) time horizons (0-5 years, 5-10 years, over 10 years) to allow measure implementation
- Cost estimates as a way of knowing the value of the implementation plan and also as input to the assessment and the prioritization of measures on a yearly basis.
- Allocation of responsibilities: A description of which stakeholder is responsible for the implementation of each specific measure. In most cases, the municipal authority is responsible for the implementation of the selected measures and interventions.
- Activities within a measure: Definition of the activities required within a measure. For a measure to be implemented it is usually necessary to break it down into two or more activities.
- Stakeholders involved: In some cases, stakeholders other than the city department are needed to implement a measure, e.g. state authorities such as the Ministry of Transport, Communications and Works. External stakeholders can also add extra value to the measure or will help its implementation. Such examples are for instance, bicycle associations when examining a measure related to cycling.
- Potential funding sources: Having established the source of funding could help gaining approval for the measure. Funding sources can also be an initial point for project development.

The total SUMP program budget sums up to **413 million Euro** for the period between 2020 and 2032 with an anticipated average yearly spending of 40 million. All SUMP related interventions will cost **170 million Euro**, the cost of the Public Transport service enhancements at **119 million Euro**, the funding of which has already been decided at the level of the Ministry. It was found reasonable to include in this total budget **124 million Euro** for funding specific road development projects included in the reference scenario 2030 that will receive funding during the same period of the SUMP implementation, though they are neither proposed by the SUMP, nor their implementation is deemed necessary in order to deploy the programme (see Table 32 hereinafter and for more details please refer to Deliverable D11.1 “Implementation Plan”).

### 15.3 “Early Winner” projects

The Limassol SUMP being a strategic project, has to implement a number of individual projects, many of which are interrelated either as predecessors and successors or in some other cases bound together in terms of enhancing their mutual performance. To this end, some of the most mature and highly regarded interventions can serve as “early winners” showcasing a new era of mobility for the city. Public Transport services will be substantially enhanced in short term, with an ambitious target of more than gradually tripling PT ridership by 2030. The proposed set of projects is the following:

a. Enhanced Level of operations for Public Transport – The momentum is crucial and very positive as Cyprus is ready to air the new concession tenders while at the same time the PT telematics project is at its final stage of full deployment. Expanding hours of operation during the day and improving headways during peak hours constitute substantial enhancements that are expected to make a clear statement for what PT can deliver in the years to come (ID01), ID06, parts of ID18 for bus lane enforcement)

b. Exclusive bus lanes along a vertical arterial of the city – the concept is well known and mature and clearly underlines the importance of Public Transport as the main road transport means. Even before launch of the new contracts, EMEL (the current PT operator) will be willing to take part immediately (ID06)
c. Bus lane enforcement system – the system could be implemented in cooperation with the current PT telematics vendor who has all necessary know-how and can identify system requirements for procurement (part of ID18)

d. Bus priority system in selected signalised intersections along the selected corridor, constitutes an important Centre to Centre communication between the Urban Traffic Control and the PT telematics (part of ID18).

e. Advanced UTC (Urban Traffic Control System) is already in the pipeline for deployment and is directly bound to the bus priority system above (part of ID18)

f. Main Bus Terminal (at A. Themistocleous – ID04) and bus-only access through Kanari, Themistocleous and Anexartisias streets (ID08 through Phase 1)

g. Dynamic Bus display signs for the CBT (part of ID18)

h. Integrated Parking Policy (part of ID20)

The idea behind this proposal, is to provide the Ministry with a viable and ready to be implemented package of interventions fully related to PT operation but not limited only to these operations as it includes parking policy implementation as well as construction of the new CBT at Andreas Themistocleous str. These set of projects have a lot of common characteristics to play this role:

- PT is considered the backbone of the new mobility scheme for Limassol and it currently receives full support by the Ministry

- The Integrating Parking policy is already ranking very high to the municipality’s agenda

- ITS related projects are relatively easy to implement, their budget it manageable and their cost to benefit ratio is very high.

- Cyprus in recent years has entered a new development era having shown a remarkable resilience after the financial crisis of 2013. Through right choices in funding and financing resources the SUMP can be implemented according to the plan.
<table>
<thead>
<tr>
<th>ID number</th>
<th>Measure/Intervention Description</th>
<th>Implementation timeframe</th>
<th>Responsibility</th>
<th>Activities within a measure</th>
<th>Stakeholders involved</th>
<th>Potential funding sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID 01</td>
<td>Enhanced level of operation for Public Transport</td>
<td>0-5 years</td>
<td>Bus Operator</td>
<td>Implementation of reserve tables, expansion of operating hours, new lanes, better scheduling</td>
<td>PWD / National Public Transport Authority</td>
<td>Concession contractality</td>
</tr>
<tr>
<td>ID 02</td>
<td>Interchange Bus Stops</td>
<td>5-10 years</td>
<td>PWD</td>
<td>Traffic study, Implementation study, Regulatory decision, Construction</td>
<td>Construction companies, Bus operators</td>
<td>Public funding combined with funding from the PT Concessionaire</td>
</tr>
<tr>
<td>ID 03</td>
<td>Park &amp; Ride Stations (excluding Land cost)</td>
<td>5-10 years</td>
<td>City administration</td>
<td>Traffic study, Implementation study, Regulatory decision, Construction</td>
<td>Construction companies, Bus operators</td>
<td>Public funding combined with private financing</td>
</tr>
<tr>
<td>ID 04</td>
<td>Main Bus Terminals (Thermopoleas)</td>
<td>5-10 years</td>
<td>City administration</td>
<td>Market research, Regulatory decision</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>ID 05</td>
<td>Land Acquisition cost for Park &amp; Ride Stations</td>
<td>5-10 years</td>
<td>City administration</td>
<td>Traffic study, Implementation study, Regulatory decision, Construction</td>
<td>Construction companies, Bus operators</td>
<td>Public funding combined with private financing</td>
</tr>
<tr>
<td>ID 06</td>
<td>Pedestrianisation of selected areas to motorised traffic at the local centres of the other municipalities</td>
<td>5-10 years</td>
<td>City administration</td>
<td>Traffic study, Implementation study, Regulatory decision, Construction</td>
<td>Construction companies, Bus operators</td>
<td>Public funding combined with EU funding</td>
</tr>
<tr>
<td>ID 07</td>
<td>Low-speed limen areas (&gt;100 km/h)</td>
<td>5-10 years</td>
<td>City administration</td>
<td>Traffic study, Implementation study, Regulatory decision, Construction</td>
<td>Construction companies, Bus operators</td>
<td>Public funding / Green funding</td>
</tr>
<tr>
<td>ID 08</td>
<td>Construction of Aktaia Odos</td>
<td>5-10 years</td>
<td>City administration</td>
<td>Traffic study, Implementation study, Regulatory decision, Construction</td>
<td>Construction companies, Bus operators</td>
<td>Public funding / Green funding</td>
</tr>
<tr>
<td>ID 09</td>
<td>Increase the length of travel / one-way streets: Leontiou, Aigas Fissaxis, Thessalonikis, Vitor / Nea Minorou Gladiotous</td>
<td>5-10 years</td>
<td>City administration</td>
<td>Traffic study, Implementation study, Regulatory decision, Construction</td>
<td>Construction companies, Bus operators</td>
<td>Public funding / Green funding</td>
</tr>
<tr>
<td>ID 10</td>
<td>Bicycle lanes along all major corridors</td>
<td>5-10 years</td>
<td>City administration</td>
<td>Analysis of bicycle lanes, Develop a bicycle network plan, Plan and construct bicycle lanes</td>
<td>Construction companies, bicycle associations</td>
<td>Public Funding</td>
</tr>
<tr>
<td>ID 11</td>
<td>Bicycle only roads for fast bicycle connections</td>
<td>5-10 years</td>
<td>City administration</td>
<td>Analysis of bicycle lanes, Develop a bicycle network plan, Plan and construct bicycle lanes</td>
<td>Construction companies, bicycle associations</td>
<td>Public Funding</td>
</tr>
<tr>
<td>ID 12</td>
<td>Analysis of bicycle lanes, Develop a bicycle network plan, Plan and construct bicycle lanes</td>
<td>5-10 years</td>
<td>City administration</td>
<td>Construction companies, bicycle associations</td>
<td>Public Funding / EU Green funding</td>
<td></td>
</tr>
<tr>
<td>ID 13</td>
<td>Bicycle lanes along Sea Side Boulevard and Aktaia street</td>
<td>5-10 years</td>
<td>City administration</td>
<td>Analysis of bicycle lanes, Develop a bicycle network plan, Plan and construct bicycle lanes</td>
<td>Construction companies, bicycle associations</td>
<td>Public Funding / EU Green funding</td>
</tr>
<tr>
<td>ID 14</td>
<td>Bicycle lanes along Sea Side Boulevard and Aktaia street</td>
<td>5-10 years</td>
<td>City administration</td>
<td>Construction companies, bicycle associations</td>
<td>Public Funding / EU Green funding</td>
<td></td>
</tr>
<tr>
<td>ID 15</td>
<td>Road development projects</td>
<td>5-10 years</td>
<td>PWD</td>
<td>Road development projects, Implementation studies / tender preparation / Construction</td>
<td>Construction companies, Bus operators</td>
<td>Public funding</td>
</tr>
</tbody>
</table>

**Table 33: SUMP Implementation Plan**
15.4 Funding and Financing Sources

As already stated above, the development and implementation of SUMPs is strongly dependent on securing the necessary financial resources. In most cities, investment financing needs for sustainable mobility outweigh the available resources. The potential difficulty in finding resources is mainly related to “heavy” projects such as building new or expanding existing transport infrastructure, which is not the case in Limassol SUMP with the exception of the Public Transport Operations. Subsiding Public Transport operations in Limassol district and in Cyprus is undoubtedly a substantial financial burden for the Ministry of Transport, but fortunately enough this decision has been already taken at Ministerial level, therefore can be deemed as fully secured from the outset.

Currently, no funding schemes regarding the implementation of the SUMP projects have been disclosed. Limassol SUMP funding will have in a way to compete with other investment needs considered by the Ministry, therefore the involved actors have to put reasonable efforts in finding ways to secure funding.

Funding and Financing are two terms often used for the same purpose, obviously though implying different processes. Funding refers to a capital provided by an Organisation or a Governmental body free of charge that is with no requirements to be paid back. On the other hand Financing refers to a capital that is provided to an authority with the expectation to be returned in full plus a reasonable percentage of interest (The following table briefly quotes funding and financing resources as described in Deliverable D11.1).

<table>
<thead>
<tr>
<th>Funding sources</th>
<th>Financing sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>The EU Funds (Structural, Investment, Cohesion, Social, Green funds)</td>
<td>Equity (shares),</td>
</tr>
<tr>
<td>Government and taxpayers</td>
<td>Bank loans ,</td>
</tr>
<tr>
<td>Investors, banks and capital markets</td>
<td>Institutional tools (capital markets),</td>
</tr>
<tr>
<td>Real estate owners and developers through Land Value Capture</td>
<td>Performance based public-private partnerships (investors on PPPs and innovative risk management),</td>
</tr>
<tr>
<td>Employers through levies, e.g. parking levy</td>
<td>Bonds issued by private corporations or governmental agencies etc.</td>
</tr>
<tr>
<td>Travellers through tolling, parking charging, etc</td>
<td></td>
</tr>
<tr>
<td>User revenues (e.g. farebox)</td>
<td></td>
</tr>
<tr>
<td>Ancillary revenues (e.g. advertisement, rentals),</td>
<td></td>
</tr>
<tr>
<td>Grants covering financing gaps and subsidies (both representing forms of equity),</td>
<td></td>
</tr>
<tr>
<td>Land value surplus capture around fixed guideway stations (LVC),</td>
<td></td>
</tr>
<tr>
<td>Community infrastructure levies and stamp duty land taxes (England),</td>
<td></td>
</tr>
<tr>
<td>In-lieu fees for private parking spaces paid by developers (e.g. Green Fund revenues in Greece),</td>
<td></td>
</tr>
<tr>
<td>Business taxes,</td>
<td></td>
</tr>
<tr>
<td>Workplace parking levies paid by businesses,</td>
<td></td>
</tr>
<tr>
<td>Carbon funding (revenues from selling of CO2 emission certificates),</td>
<td></td>
</tr>
<tr>
<td>Earmarked road and parking congestion charges.</td>
<td></td>
</tr>
</tbody>
</table>

Table 34: Funding and Financing Sources
16 Monitoring and Evaluation Plan

The current report is the Monitoring and Evaluation Plan (M&E Plan) of the Sustainable Urban Mobility Plan for the Greater Urban Area of the City of Limassol. The M&E Plan is an integral part of the SUMP planning cycle (8th stage) which is conducted during the plan elaboration.

The scope of this report is to address the main Monitoring and Evaluation activities that should be adopted and monitored during the SUMP implementation by the key and wider stakeholders in specific timescales as defined in the implementation plan of this study. The M&E plan ensures the successful planning progress of the SUMP and the satisfaction of the predefined objectives and targets during the implementation of the SUMP measures.

The M&E Plan establishes clear procedures and describes (i) how, which and when the monitoring and evaluation activities will be carried out, (ii) who is responsible for them and, (iii) what resources are necessary to implement them. It is a living document that should be adapted to modifications during SUMP implementation stages due to non-foreseen/incidental changes or knowledge gained during the process.

The M&E Plan has been developed according to CiViTAS Guidelines “Applied framework for evaluation in CiViTAS PLUS II” (2013) which is designed to maximize the benefits from M&E activities and minimize the risks and impacts of potential barriers. The current M&E Plan has been customized and adapted to the local conditions of the Limassol area; the private motor vehicle is the dominant transport mode while (i) the public transport services are carried out only by bus with low LoS and very low passenger demand and (ii) cycling network is quite limited with almost negligible demand. Hence, an overall SUMP aim is to discourage the use of the motor vehicle and promote other environmentally friendly modes of transport such as public transport, cycling and walking by adopting and implementing relevant strategies and measures.

The delivery and monitoring of the M&E Plan activities require the establishment of M&E Team that should include a Limassol SUMP Monitoring and Evaluation Manager (MEM) and the Coordinators that should represent the various Municipalities or Communities within the Study Area. The organizational structure of Limassol M&E Team is summarized on the following diagram (Figure 104); the M&E Plan contains a detailed description of the activities of the M&E team as well as the responsibilities of the individual partners during its implementation.

In close coherence with the CiViTAS guidelines, the M&E Plan includes both the impact evaluation and the process evaluation for the selected scenario 6 that combines the polycentric land use approach (where development is focused in the municipalities of the Urban agglomeration) with the more advanced level of transport policy measures (please see D11.2 for the whole M&E Plan).

Three (3) pillars of evaluation and assessment are integral part of the M&E Plan, as depicted on the following diagram (Figure 105) and described in more detail below.
1. **Self-Assessment Tool (Pillar 1).** This is a simple and comprehensive tool for evaluating and assessing the robustness of the process in preparing the SUMP up to the point where it has been approved for implementation. It is basically a questionnaire of 100 “yes-no” questions that follow the steps in the well-known SUMP preparation cycle and generally focus on whether an action or activity relevant to SUMP preparation has or has not been carried out. It is designed to be undertaken immediately after the SUMP has just been approved and adopted.

2. **Impact Evaluation (Pillar 2).** An assessment of the impacts of a measure (e.g. impact on safety) on a particular target group (e.g. society). The impact evaluation uses indicators to assess the impacts caused by the implementation of the SUMP’s qualified measures. The process of indicators’ selection included public consultation by taking into account a number of factors such as relevance, accuracy, importance, credibility, ease of measurement and understanding. The indicators used are divided into five main categories (further analysed below): (i) **outcome indicator**, (ii) **transport activity indicator**, (iii) **output indicator**, (iv) **input indicator** and (v) **contextual indicator**. The relationship among the five (5) type of indicators as well as the correspondence with the entire Limassol SUMP plan regarding the objectives, strategies, instruments and resources is presented on the following diagram.
Forty-three (43) outcome Indicators are adopted (please see Annex XI, Table A-XI 1 for the indicators), serving the relevant performance targets for the high-level objectives including: a) economic efficiency, b) environmental sustainability c) accessibility and social inclusion, d) safety and e) quality of life.

Eighteen (18) Transport Indicators are adopted in order to monitor and evaluate the effectiveness of implemented transport strategies and to identify potential causal factors leading to the observed outcomes. The indicators are distinguished into five (5) categories as listed below:

(i) Traffic: i) Motorisation, ii) traffic volume iii) corridor capacity utilisation iv) vehicle use, v) higher vehicle usage costs to motorists

(ii) Public Transport: i) Bus journey travel times, ii) control over headways iii) average PT occupancy, iv) PT user satisfaction, v) frequent PT service access, vi) adapted bus services, vii) smart ticketing, take up rate

(iii) Parking: i) Unrestricted Parking Spaces Restricted Parking Spaces. ii) illegal parked cars

(iv) Sustainable transport: i) Perception of infrastructure quality for walking and cycling ii) modal share (trips)

(v) Other: i) Travel behaviour characteristics

In total, thirty (30) Output Indicators are adopted for measure implementation distinguished into seven (7) thematic categories. Indicative output indicators for each category are listed below:

(i) New infrastructure: Length of new infrastructure construction by mode and type.

(ii) Public Transport: i) Higher frequency services implemented?, ii) has smart ticketing been implemented?, iii) number of bus Stops with Telematics infrastructure.

(iii) Sustainable travel: i) Number (or percentage) of shared cars, ii) number (or percentage) of shared bikes.

(iv) Access: i) Number of buses with disable friendly access (low platforms), ii) number of accessible points of interest for disabled people.

(v) Safety: i) Number of primary schools with safety barriers, ii) Number of safe crossings for pedestrians and/or cyclists.

(vi) Parking: Parking fines collected.

(vii) Shared road space: i) Length (km) of streets converted to “environmental zones”, ii) length (km) of streets transformed in to “calming areas”.

Figure 106: Relationship between indicator types and objectives, strategies, instruments and resources
Input indicators are adopted to monitor the use of resources for the implementation of the SUMP for Limassol, as listed below:

(i) Transport investment costs for new/improved infrastructure.  
(ii) Start-up costs for new transport schemes.  
(iii) Expenditure for maintenance of streets, roadside facilities and PT infrastructure.  
(iv) Subsidies for operation of Public Transport.  
(v) Subsidies for discounted Public Transport fares. 

Contextual indicators should be also taken into account for Limassol, such as:

- Socio-demographic developments (population size and composition)  
- Economic performance (GDP/resident, employment, number of businesses, retail turnover, tourism if relevant)  
- Tourism economic performance.  
- National or international transport policy campaigns and legislation  
- Other sector policies (e.g. regeneration, health, education) 

3. Process Evaluation. The main goal of the process evaluation procedure is to develop new findings about factors of success and strategies to overcome possible barriers during the implementation phase. The process evaluation should also be conducted at the “bundled measure” level rather than at the “individual” level. The process evaluation is linked with the typical phases of bundle of measures, known as the investment life cycle, which can be classified into three time periods: 
   a) Preparation Phase, b) Implementation Phase and c) Operation Phase. 

![Figure 107: CIVITAS PLUS II Process Evaluation Design](image)

The process envisages questionnaires and interviews that should be conducted at predefined phases. In specific, all “bundled measures” should be assessed in the same way after the end of each of the three phases, with information gathering based on a semi-closed questionnaire, which is called the Measure Process Evaluation Form. This form is to be completed by the person responsible for implementing the measure. The process evaluation of the ‘focused’ measures will consist of additional interviews at the end of each project phase. This will result in three in-depth interviews with main stakeholders. 

Additionally, the data reporting requirements are defined within the M&E Plan. The purpose of reporting is to provide information to assist the implementation team and stakeholders in comparing performance against plans so that (i) the current or potential problems can be analysed and mitigated, (ii) the monitoring process is enhanced and (ii) the decision-making process is well supported. Four (4) major reports are needed such as quarterly monitoring reports, annual monitoring report, mid-term evaluation and end of project evaluation. 

Finally, the M&E Plan includes a guidance framework of the required activities during its implementation, such as the staffing requirements, the estimated costs of data collection, the adoption of a management information system as a tool to analyse and visualize the M&E information and, the analytical schedule of M&E activities within the time period of the Limassol SUMP (for more details on the Programme of M&E Activities please see Annex XI, Table A-XI 2).
17 Promotion and Marketing Strategy

The Promotion and Marketing Strategy consists of 2 parts:

- PART ONE – BACKGROUND
- PART TWO – STRATEGIC PROGRAMME

Part one provides a theoretic background for the marketing and communication strategy. It summarises those parts of the proposed SUMP objectives, strategies, measures and approach that need to be communicated and marketed. This includes the description of vision, objectives and targets of the SUMP for Limassol, the communication challenges, risks and barriers, the prerequisites for success, the SUMP stakeholders involved in the change of the transport and mobility system, their reaction to date and an initial marketing and communication SWOT analysis. While the first two of these subsections are quite theoretic, the analysis of stakeholders is already more specific and related to the actual stakeholders of the Limassol metropolitan area. These stakeholders are also distinguished into different levels of influence on the SUMP and levels of being affected by the SUMP, as these different levels need to be addressed individually and in parallel, as they influence each other (see Figure 108):

Figure 108: Stakeholders in Limassol and their levels of influence on the SUMP

Part two describes the strategic approach to the Marketing and Communication Strategy.

The programme for the SUMP is what is often called a Public Awareness Programme. It should comprise both marketing and two-way communications.

UK's Chartered Institute of Marketing defines marketing as 'The management process responsible for identifying, anticipating and satisfying customer requirements profitably'. Traditionally it is acknowledged to be about the four Ps: product, price, place, and promotion, that is selling a product or promoting a service at the right time, in the right place, at the right price. These are often extended to form 7 Ps, adding packaging, positioning and people.

In the case of the SUMP the marketing refers to:
Product: The SUMP, its infrastructure and all its components (bus lanes, pedestrianisation etc)
Price: The cost of implementing the SUMP
Place: Where the SUMP has been incorporated, e.g. bus lanes, pedestrianisation etc. and where physically and by whom it is being promoted
Promotion: The tools and communication channels used to communicate the SUMP
Packaging: The visual elements of the programme (corporate identity, websites, literature etc.)
Positioning: How the SUMP is seen and thought about by all its stakeholders
People: The people who are concerned with marketing the SUMP

For the purpose of this report broadly marketing concerns the collateral used to promote the product, in other words, the tools with which it will be promoted such as literature, website, presentation material, workshop materials, images etc (please see D12.1 for the whole P&M Plan).

Communication is a vital part of the ingredients as it comprises all the channels used to gain the understanding and support of the stakeholders of the key planks of the programme (such as sustainability, economy, health and wellbeing) and to change behaviours. The channels include printed and broadcast media, social media, blogs, articles, presentations and face-to-face meetings.

It is most important that the communication is not just one-way but that stakeholders are encouraged to feel as involved and invested in the SUMP aims. Indeed, some of this has already been achieved through stakeholder and public consultations and through website involvement.

Part 2 of the marketing and communication strategy provides more details on the following implementation aspects:

Marketing and communication objectives: the key objectives for marketing are basically the SUMP objectives, aiming at influencing mobility behaviour towards more sustainability and the necessary planning and implementation steps. The specific marketing objectives are the creation of awareness amongst Limassol’s stakeholders at the different levels, e.g. create understanding amongst businesses, retailers and hoteliers of the economic implications of a successful SUMP strategy and create understanding amongst the residents of the historic centre of Limassol of the overall benefits of the SUMP. Key Performance Indicators will be defined to measure the success of the marketing programme.

The marketing strategy aims at changing long-standing habits of decision-makers, planners, stakeholders and the residents. In order to achieve this, alternatives have to exist and have to be attractive, particularly if the strategy wants to be effective in the Cypriote conditions. The significant behavioural change which will be necessary to make Cypriots less reliant on cars must come from a mix of pan-Cypriot government laws and initiatives, powerful public awareness programmes. Factors that are important for a behavioural change are

- Collective objective factors
- Collective subjective factors
- Individual objective factors
- Individual subjective factors

Broadly, the marketing and promotion strategy should be based on three key areas: health and wellbeing, the environment, and the economy

PESO – Channels of communication: The main channels of communication will be based on the PESO model: Paid, Earned, Shared and Owned and various media will be used to form an integrated marketing programme. These channels are adapted to the Cypriote conditions, e.g. the current use of “social media” on the internet.

Key messages: These messages will vary depending on the target audience and will be based on visions and objectives of the SUMP Limassol and on experience from other regions.

New brand identity: A strong visual brand identity will be developed for the SUMP, which will be striking, attractive and immediately recognisable as the Limassol SUMP project. It would be used on all printed and online information and must therefore be versatile. A specialist designer will be employed to create this.
Website: The website http://sump4cyprus.org already exists. It should be developed further and updated regularly. The sections are denoted in the report.

Key partner programme: Key partners for this purpose include all relevant national and local government agencies, as well as some others listed as stakeholders, such as the Police, civil servants etc. They are key to the success of the programme, as each one can become an unofficial ambassador for the SUMP.

Educational initiatives: If the programme is to succeed in the long term, it will be essential to educate children about the benefits of a green city with healthy citizens. They will not only have an impact on their parents’ thinking children and become young ambassadors for fitness for the whole family but are also the responsible citizens of the future. This includes mainly school initiatives as in other regions (example of Swindon (UK) “walking bus”), a sponsorship programme and a student’s programme.

Retailers: This group of stakeholders is highlighted in the report as they are directly affected by the SUMP and the proposed changes in the historic centre of the city of Limassol. Obviously, these concerns have to be taken very seriously. And in fact, accompanying strategies should be implemented, improving the commercial attractivity of town centre locations for shopping. Shop-owners have to be convinced of these and strategies have to be implemented also to change shopping behaviour, to become less car-dependent. Consequently, more and sufficient marketing and communication with the shopkeepers are appropriate and necessary in order to convince the majority if not all of them, as they could exert considerable influence on the programme.

Residents of the Historic Centre: There are concerns from some of the residents of the historic centre of Limassol, relating to accessibility as a result of pedestrianisation, parking arrangements, security etc. The results of meetings with the residents showed that residents are in favour to SUMP strategies and measures, even if it affects their immediate environment. However, care has to be taken when limiting the access to the residents themselves. It will be useful to follow the recommendations, e.g. to install a council for the concerns of the historic centre and its residents, and certainly to have regular meetings between planners and residents.

Media Programme: The media programme is of course one important component of the marketing and communication strategy. It includes all relevant media, traditional and new media, like Press, radio and TV, “Social” Media and “Influencers” on the Internet, advertising on Facebook, bloggers and influencers. It is important to use all channels and media to reach all population groups, particularly the younger generation, as these are the residents of the future.

Advertising: It is suggested that the investment in advertising is modest as very much can be done by other methods of public relations, communication and marketing.

Stakeholder matrix of behaviours and communication channels: this section is the core of the marketing strategy as it identifies the relevant stakeholders, classifies them on the different levels if influence on the SUMP and of being affected by the SUMP. The strategy then identifies the desired behaviour for the different groups of stakeholders and proposes the appropriate measures of achieving this. The desired behaviour starts with accepting the SUMP, taking ownership of its vision, objectives, targets and approach, accepting the own role, implementing the measures and changing the own behaviour. The measures include targeted presentations, small meetings, emails, webpage, newsletters, workshops, coverage in the media and many more.

Marketing and communication measures: particular and specific measures are identified for different stakeholders and summarised under

- Who to be addresses?
- What to be communicated and how?
- When to carry out the specific measures?
- Where to carry them out?
- Why?
- And giving an estimated budget for these specific measures.
<table>
<thead>
<tr>
<th><strong>SIZE / CHARACTERISTICS</strong></th>
<th><strong>QUANTITY</strong></th>
<th><strong>PRICE [€]</strong></th>
<th><strong>ESTIMATED ANNUAL COST YR 1 [€]</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Office costs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lead manager</td>
<td>1</td>
<td>25,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Administrative assistant</td>
<td>1</td>
<td>15,000</td>
<td>15,000</td>
</tr>
<tr>
<td>Office rent</td>
<td>1</td>
<td>1,250 pm per 100m2</td>
<td>15,000</td>
</tr>
<tr>
<td>Office equipment</td>
<td>Printer, scanner etc – one off</td>
<td>6,500</td>
<td>6,500</td>
</tr>
<tr>
<td><strong>New brand identity development</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design of brand identity for all visual material (logo etc)</td>
<td>One off</td>
<td>3,000</td>
<td>3,000</td>
</tr>
<tr>
<td>Quarterly, printed, A4, 8 pages, colour newsletter for all stakeholders</td>
<td>A4 8 pages colour newsletter</td>
<td>1000 per issue; 6 p.a.</td>
<td>500</td>
</tr>
<tr>
<td><strong>Design &amp; printing of some of marketing collateral:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leaflets with sections on ‘What is the SUMP’, benefits, key overall messages, map showing new bus routes, pedestrianized streets, Park &amp; Ride etc</td>
<td>A5 4 pages Colour</td>
<td>1000</td>
<td>350</td>
</tr>
<tr>
<td>A5 4 pages Black and White</td>
<td>1000</td>
<td>250</td>
<td>250</td>
</tr>
<tr>
<td>Poster promoting the SUMP, benefits and key messages</td>
<td>A1/colour A2/colour</td>
<td>100</td>
<td>700</td>
</tr>
<tr>
<td>100</td>
<td>450</td>
<td>450</td>
<td></td>
</tr>
<tr>
<td>Exhibition stands (pop-up boards)</td>
<td>80*200</td>
<td>4</td>
<td>125</td>
</tr>
<tr>
<td><strong>Schools walking clubs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>cost of leaflet design (gatefold – A4 folded 3 times)</td>
<td>A4 folded 3 times</td>
<td>-</td>
<td>300</td>
</tr>
<tr>
<td>Print leaflet (gatefold – A4 folded 3 times)</td>
<td>A4 folded 3 times</td>
<td>1000</td>
<td>500</td>
</tr>
<tr>
<td><strong>Other:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Advertising in newspapers - 12 a year in Limassol weekly newspaper, Eviomadia Lemesos.</td>
<td>One full page 25cm(width)*35.5cm (height)</td>
<td>12 posts</td>
<td>3000</td>
</tr>
<tr>
<td>¼ colour 12cm(width)*17cm (height)</td>
<td>12 posts</td>
<td>800</td>
<td>800</td>
</tr>
<tr>
<td>On bus stops/shelters/terminals – at selection of all six Limassol municipalities – e.g. two per municipality, duration 6 months, changed every 6 months</td>
<td>12 for 6 months</td>
<td>21,600 (300 each month)</td>
<td>36,000</td>
</tr>
<tr>
<td>On bus vehicles- displaying key SUMP messages inside and on the exterior, i.e. using visual display panels or graphics on the body of the vehicle</td>
<td>Body</td>
<td>6 For 3 months</td>
<td>850 pm</td>
</tr>
<tr>
<td>Printing of stickers on bus exterior</td>
<td>For 3 months</td>
<td>1,896 x 6</td>
<td>11,376</td>
</tr>
<tr>
<td>On hoardings in road in key sites – say 12</td>
<td>Printed both sides</td>
<td>12 for 3 months</td>
<td>10,000 both sides = 36,000 for 3 months</td>
</tr>
<tr>
<td>In Tsirio Stadium – for key matches</td>
<td>1 for a year</td>
<td>12000-15000</td>
<td>13,500</td>
</tr>
<tr>
<td>On road VMS electronic sign displays</td>
<td>12 for 3 months</td>
<td>20000</td>
<td>20,000</td>
</tr>
<tr>
<td>Development of an app with walking/cycling maps (app developer costs - for Android and iPhone)</td>
<td></td>
<td>15,000-20,000 (extra 1,000 pa for maintenance)</td>
<td>17,250 + 12,000</td>
</tr>
<tr>
<td><strong>Estimated total costs Year 1:</strong></td>
<td>225,576 Euros</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Estimated total costs Year 2+:</strong></td>
<td>215,276 Euros</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 35: Marketing and communication measures
Measurement and evaluation: The key measurables for the SUMP marketing and promotion programme are whether the marketing and communication objectives stated previously are being met. The related measurements are described including the objective, how it can be measured and how frequently.

Resources: The resources necessary for the implementation of the marketing and communication strategy are defined, consisting of SUMP marketing and promotional team staffed at least by a lead manager and administrative assistant, Office space and equipment, Targeted surveys, Engagement of a specialist company to design a logo and marketing collateral, Printing of marketing collateral and finally a Modest advertising budget.

Budget: The cost of the marketing and promotions programme is estimated for year 1 and for the following years (see Table 35). As some costs are a one-off, the budget will reduce in ensuing years. The costs for specific marketing measures as described above are additional costs to these annual costs. The regular annual costs include office costs, costs for development of new brand identity, costs for design & printing of some of marketing collateral, costs for schools walking clubs and other costs. Total costs for marketing and communication are estimated at € 225,576 in the first year and € 215,276 in the following years.
18 Strategic Environmental Impact Assessment

18.1 Introduction

A Strategic Environmental Assessment (SEA) Study was conducted for the Sustainable Urban Mobility Plan (SUMP) of Limassol in accordance with the Terms of Reference of the SUMP Study and the provisions of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive) and the respective national Assessment of the Impact on the Environment from Certain Plans and/or Programmes Law (No.102(I)/2005).

The main objective of the SEA study is to identify the likely significant effects on the environment and the reasonable alternatives of the Limassol SUMP and to propose measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment from the implementation of the Plan.

The SEA study commenced in WP9 with the scenario assessment exercise and was fully completed in WP14 with the finalisation of the Limassol SUMP. The main environmental effects of the SUMP identified by the SEA and the mitigation measures proposed to address these impacts are summarised below.

18.2 Summary of Main Environmental Impacts

18.2.1 Air Quality

The implementation of the SUMP will have a positive effect on air quality as the proposed package of strategies aims to achieve a shift from car use to more sustainable and less polluting modes of transport such as PT, walking and cycling.

With regards to core emission pollutants, based on the Transport Model results, relative to the “business as usual” scenario, the implementation of measures included in the SUMP will cause a general reduction of emissions by 2030. Specifically, a 4.2% decrease is predicted for CO, followed by a 2.8% reduction for HC, 2.7% for NMHC, 2.6% for PM 2.5% for PN. The smallest decreases are expected for NOx and NO2 with 1.7% and 1.8% respectively.

However, during the implementation period of the SUMP, a minor and temporary negative impact to air quality may occur due to the use of heavy vehicles and equipment for the construction of the proposed infrastructure schemes as well as road closures and traffic diversions will need to take place during the transition period.

The planning policies included in the SUMP support the development of residential uses along the A1 motorway and in some parts recommend the densification of such areas. This might potentially lead to long term negative health impacts to the local residents, from noise and air pollution caused by the operation of the motorway.

18.2.2 Climatic Factors

The SUMP aims to boost the availability and effectiveness of more sustainable modes of transport and discourage the use of the car resulting in a direct reduction of greenhouse gas (GHG) emissions from transport.

The Transport Model has also estimated a 3.0% reduction in the volume of CO2, emissions, in relation to the “business as usual” scenario, which however proportionally is not considered significant, particularly when measured against the National Binding target for a 24% total reduction of GHG emissions in 2030 in relation to 2005 levels (non-ETS sectors). Therefore, additional or more extensive measures to achieve a greater modal share of greener forms of transport may be needed if these targets are to be met.

However, during the subsequent stages of the development of the SUMP the operation of public transport has been optimised and bus service kilometres have been reduced by about 25–30%. As a result, the implementation of the SUMP may potentially achieve better results than the ones predicted by the Transport Model.
Furthermore, some measures proposed by the SUMP (e.g. parking enforcement, park and ride stations) could not be modelled and are therefore not reflected in the CO2 reduction results. Other external factors which can support further reductions in GHG emission include the natural penetration of electric vehicles, the promotion and deployment of clean vehicles and the decrease in the average age of public bus fleets required by the new concession contracts of 2020.

During the implementation period of the SUMP infrastructure projects, emissions from construction and changes to traffic flows, may result in a temporary minor increase in CO2 emissions, until the SUMP’s proposals are fully in place and operational.

A number of transport proposals are located within or adjacent to the 1 in 100-year return flood risk zones, putting their integrity and normal operation, in the event of a flood event, at risk. In the event that infrastructure is not correctly designed with regards rainwater drainage management, it may potentially affect drainage patterns and increase the risk of floods in sensitive areas.

18.2.3 Soil/Geology

The majority of proposed schemes incorporate existing infrastructure and will be developed on brownfield land, with only a small number of greenfield sites affected, located outside the central urban area of Limassol.

Additionally, the promotion of the polycentric land use model is expected to restrict further expansion of the city and current trends of dispersed development and encourage a more compact and better organised urban environment. This will facilitate regeneration/utilisation of brownfield space and safeguard greenfield sites from uncontrolled development with moderate benefits for soil.

Most of the coastal area within the SUMP Study Area is prone to erosion, but there are no new major schemes proposed in coastal areas with steep slopes or areas prone to erosion. Some erosion may be observed along open channels due to surcharging during high-flow events, however, it is assumed that for individual projects, erosion control measures will be incorporated into their design. Also, proposed infrastructure inside flood risk zones, like bicycle and pedestrian paths extending along watercourses, might be subject to long-term erosion, but as with the previous case, this can be avoided with the implementation of appropriate design and the mitigation measures proposed by the SEA.

The construction of a new road at Aktea Odos is planned to take place on brownfield land and depending on the final design, the scheme may also require reclamati

18.2.4 Water resources

Apart from the implementation of Aktea Odos the SUMP does not propose major transport projects that will cause significant changes to riverbanks and coast lines or obstruct flow.

The construction of Aktea Odos will result in some soil sealing, which can affect drainage, however, it should also be assumed, that all transport schemes will be constructed by incorporating SUDS where possible (such as the use of permeable materials), according to best practice guides to allow for infiltration. With SUDs in place water quality will not be affected negatively and may even be improved. Runoff from these paths will be of better water quality compared to that from the roads because car use along the footpaths and cycle paths will be prohibited. The modal share of cars is also expected to generally decrease with further positive effects.

In the event that the construction of Aktea necessitates relevant reclamati

18.2.5 Fauna, Flora and Biodiversity

The proposed schemes mostly use existing infrastructure and are not expected to directly impact important habitat areas or areas with red book species. Exceptions are (i) the Aktea Odos scheme
which may, depending on the scheme design) affect coastal habitats, and (ii) cycleway and walkway schemes along riverbanks which may affect river habitats. For the Aktea Odos scheme, it is expected that an EIA will be carried out which will propose specific mitigation measures regarding the protection of biodiversity.

Indirectly, the habitats and species may also be affected by air pollution, GHG emissions and noise. According to the transport model results the plan implementation is expected to lead to the reduction of CO2 emissions in the SUMP Study Area. Similarly a reduction of NOx and SO2 emissions will occur, according to the transport model results. These air pollutants are the main components for the creation of acid rain which can cause harmful effects on ecosystems.

Green Infrastructure is linked with a range of environmental benefits, but the SUMP does not specifically propose green infrastructure as part of new transport schemes. These however are expected to be included in the final design of infrastructure in line with the SUMP’s environmental sustainability principles, for example to segregate cycle paths from roads.

The promotion of the polycentric land use model supported by the complementary Strategic Planning Policies will be beneficial for the surrounding natural environment as it anticipated that current trends of dispersed development and further intrusion of the city into important habitats will be restricted. Furthermore, disturbance to wild species from human presence, noise and light pollution will be reduced as new anthropogenic activity will generally be confined within/near the proposed cores.

### 18.2.6 Material Assets

The Limassol SUMP aims to drive a holistic improvement and shift of the transport modes of the study area towards more sustainable means and it is expected to have a significant positive impact with regards the number/length of existing transport corridors and infrastructure being utilised by sustainable modes.

It is anticipated that all transport schemes proposed by the Limassol SUMP will be implemented utilising modern and sustainable design, construction techniques and materials in line with sustainability principles. Therefore, it has been considered that an increase in the number and length of new transport schemes within the study area will lead to a general increase in the quality and lifetime of transport infrastructure while reducing the need and frequency for maintenance.

Also, the urban planning strategies proposed aim at achieving the polycentric and compact development of the Study Area, improving the quality of life of citizens and promoting multi-modal transportation which further supports the wider SEA objective for the sustainable use of material assets.

### 18.2.7 Landscape

The SUMPs proposals will result in the creation of a homogeneous and attractive streetscape but also lead to positive effects to the natural features of the landscape. This will help in the formation of the visual image of a sustainable, attractive and safe Limassol.

Significant positive effects will occur from proposed pedestrianisation schemes likely to be designed in line with sustainability principles (with appropriate paving finishes and materials, street furniture and landscaping) to reflect the local context and positive features of the prevailing streetscape character while enhancing its elements. Properly designed road lighting will create the desired ambiance for people to congregate outdoors during night and improve the sense of security.

Use of materials in harmony with the historic buildings is likely to instigate conservation, repair and restoration of historic structures and other key architectural features. The combination of pedestrian and community-level commercial streets will help enhance the liveliness of historic and cultural districts, further promoting the preservation and development of these neighbourhoods.

Tree planting and landscaping created in the context of infrastructure schemes, will formulate more aesthetically pleasing streets. Existing services will also be moved underground thereby removing unsightly power lines and poles and other surface or overhead utility infrastructure, which can also impede street tree growth. The changes to the Seaside boulevard and the development of Aktea road in line with sustainable mobility principles will add a new improved dimension to the presently car dominated seascape.
Additionally, the proposed Planning Policies can restrict further expansion of the city and encourage a more compact and better organised urban environment based on appropriate design principles while safeguarding historic buildings and the diversity of their local character.

18.2.8 Built Environment and Spatial Planning

Collectively, the SUMP study and its recommendations will have a strong direct impact on the availability of sustainable travel modes and the quality of transport infrastructure. The strategies will result in less space being gifted to cars and instead more space to other road users. This will create induced demand for cycling, walking and traveling by bus as citizens are influence from their positive travel experience.

The proposed polycentric urban development will directly contribute to strengthening the effects of the transport policies. Through the concentration of population growth in specific urban and peri-urban centres, the SUMP will enhance the existing built environment, reduce travel distance and discourage uncontrolled urban sprawl. The Area Action Plans will ensure that the densification areas are well designed, attractive and integrate the proposed transport infrastructure into the built environment. These will create highly functional urban spaces, with active ground floor uses animated by people congregating, waiting or passing through.

Additionally, the recommended SUMP actions and strategies are in line with the provisions, goals and sustainable urban mobility measures of the existing Planning Documents and included a rigorous participatory procedure that facilitate their smooth integration into the local planning framework.

18.2.9 Cultural, Archaeological, Architectural and Natural Heritage

The level of access to the identified areas of cultural, archaeological, architectural and natural importance will be directly improved from the implementation of SUMP. Particularly, the cycling and public transport interventions will enable more people to travel to the identified sites in a fast, safe and comfortable manner ensuring that all the identified sites are more accessible for all ages and social groups and not only exclusively to car owners.

Additionally, the pedestrianisation schemes proposed in urban and peri-urban areas and the Area Action Plans will enhance the surroundings of the sites and make the visiting experience more enjoyable. As a result, it is likely that the sites will increase their revenues and visitor numbers, which will also subsequently instigate and result in more funds for their protection, promotion and restoration. These conservation efforts will act cumulatively with the fiscal measures published by the Ministry of the Interior that promote the restoration and re-use of the listed/preserved buildings.

The reduction of car presence and the pedestrian-oriented design of the built environment might also act as a branding tool for the region attracting investment from national and international institutions.

18.2.10 Socio-economic Environment

The consortium of strategies proposed by the Limassol SUMP will enhance the employment opportunities in the urban and peri-urban centres of the study area. The key positive changes that will be delivered include the increase in the number of visitors in the urban and peri-urban centres, new jobs and better access to the commercial areas as people live closer and can travel in a safer and comfortable manner. This comfort will also influence visitors to travel more often the central areas, visiting for different reasons and further increasing the size of the market. As the image of the centres will be improved, it will attract investment for new entrepreneurialships and encouraging existing business to upgrade their facilities and services. Moreover, the changes in travel patterns will enable citizens to reduce their monthly travel costs allowing them to spend their money on other services or amenities.

However, the SUMP will also result in a temporary transition period for residents and shop owners, where a reduction in turnovers might be recorded. Particularly, in the first phases of the implementation when road congestions and closures might take place, while at the same time locals will still travel by car. Additionally, the expected economic growth and rise in real estate values might also lead in the displacement of existing local population if the increase in rent prices is not met by appropriate housing policies and rises in salaries.
18.2.11 Population, Human Health and Quality of Life

Collectively the SUMP’s strategies will have multiple positive impacts on the quality of life of locals and their health. The recommended policies and measures will result in directly improving the availability of open green spaces and encourage people to walk and cycle more, by promoting active transport. Improving safety will ensure that the public realm is inclusive for a wide variety of users and accommodating the needs of mobility impaired persons, whereas today the present street scape hinders their movements. The SUMP will also promote the upgrade of the aesthetic quality of public spaces, ensuring that walking and cycling is a pleasant activity that provides a multi-sensory experience, with multiple opportunities to stop and linger. Moreover, the reduction of distances between housing, work and services through the densification of centres, will directly facilitate an easier and functional daily routine for citizens.

However, as noted previously, the SUMP will result in some temporary negative impacts in the region that include increase in road congestion, accessibility problems, construction related pollution and conflicts in regard to the shared road space between cyclists and car users. Additionally, the imminent delivery of the Andrea Themistokleous Central Bus Station will result in a rise of noise and air pollution in the city centre, that will particularly affect residents living in proximity. These impacts, although they are considered important will be appropriately dealt and controlled with the delivery of all projects proposed by SUMP.

18.3 Summary of Proposed Mitigation Measures

18.3.1 Air Quality

a. Preparation of Traffic Management Plans for the SUMP Implementation Period

It is recommended that a comprehensive Strategic Traffic Management Plan is prepared by the Competent Authority in accordance with the Implementation Plan of the SUMP, so as to manage traffic and associated pollution and limit disruption to travel routes/patterns during the implementation period of the SUMP. This should be complemented by project specific Construction Traffic Management Plans which should be prepared by all Contractors involved in the implementation of the SUMP. Indicative measures to be specified include alternative routes for the public, routes for heavy construction vehicles, signage, safety measures and dissemination of information to the public.

b. Provisions for Private Electric Vehicles (EV)

Apart from electric buses and small lorries that are proposed for the freight needs of the pedestrianized centres, the SUMP does not include suggestions for electric vehicle infrastructure, so the SEA proposes the consideration of such provisions either in the context of the SUMP, or of National Policy. Such infrastructure may range from the installation of charging stations at strategic points, so to cover the needs of the city and its periphery, to the creation of mobile apps for the promotion and functionality of the EV network.

c. Incorporate Tree Planting at appropriate locations

The use of trees should be considered in appropriate locations to filter out pollutants and improve air quality at the project level but also at a wider scale. It is proposed that native tree and shrubs are incorporated into the scheme design of all proposed SUMP projects. Areas requiring particular attention and the creation of a green buffers to tackle air and noise pollution include the residential areas adjacent to the A1 motorway.

18.3.2 Climatic Factors

a. The preparation of specific measures/actions for the mitigation of climate change impacts, including flooding.

It is proposed that all schemes located within flood risk areas are designed and constructed appropriately with suitable permeable materials and incorporate the use of SUDs, wherever possible. It is also recommended that Competent Authorities (such as the Department of Town Planning and Housing, the Department of Public Works, the Department of Environment, etc) set specific measures and conditions in permits for all transport developments in Limassol, based on climate change adaptation and resilience principals.
b. Incorporate more extensive and/or additional measures for cycling and walking in the next SUMP review

It is recommended that during the next review of the SUMP, it is examined whether more extensive and/or additional measures to further decrease car use and increase the modal share of cycling and walking are necessary, with a view to achieving a greater reduction of GHG emissions from the transport sector in Limassol.

18.3.3 Soil/Geology

a. Minimise Soil Sealing

It is recommended that during the design process for the proposed schemes (particularly the Central Bus Terminal at Themistokleous Street and Aktea Odos) soil sealing is minimised and where this cannot be avoided, permeable materials should be used, wherever possible.

b. Prepare a list of measures for the prevention of erosion in the area

The application of erosion controls in the area is proposed in order to avoid sediment deposition and water turbidity. This can be achieved by the preparation of actions/measures which could be developed jointly between the competent Government Authorities e.g. regular monitoring of high-risk areas, measures to stabilise unstable slopes, measures to minimize river surcharge, measures for using SUDS and recommendations of corrective action in sensitive areas such as areas with erodible soils or steep slopes.

c. Carry out appropriate design measures to prevent erosion and overtopping for Aktea Odos (also linked to (b) above)

It is expected that an Environmental Impact Assessment study will be carried out for this study which will assess the impacts to the environment and propose specific mitigation measures. However, it is important to take the major expected impacts into account during the design stage so that these are mitigated early on and as much as possible prior to construction.

18.3.4 Water Resources

a. Measures to improve runoff and water quality in water receptors

1. Carry out regular monitoring in watercourses (during flow) and in the sea to identify pollutant sources measures such as SUDS (see below), oil/water separators can be located at appropriate locations.

2. It is recommended that all transport schemes will be constructed by incorporating SUDS where possible (such as the use of permeable materials), according to best practice guides to allow for infiltration.

18.3.5 Fauna, Flora and Biodiversity

a. Incorporation of Green Infrastructure into Transport Schemes

Green Infrastructure can make a significant contribution to achieving good water quality, enriching aquifers, mitigating the effects of hydromorphological pressures, and limiting the impacts caused by climate change and floods. Also, it can enhance scenic value and connectivity resulting in increased benefits from leisure and tourism. It is proposed that the Competent Authorities responsible for the design and implementation of the proposed SUMP schemes incorporate Green Infrastructure into the Transport Schemes at the Project Level.

b. Involve Environmental Groups and NGO’s early on during the design stage of large transportation projects

Environmental Groups and NGOs should be involved early on during the design stage of large transportation projects such as Aktea Odos and the central bus terminal in Themistokleous Street. Such stakeholder involvement will gather the different viewpoints and identifying areas of consensus and disagreement early and affect decision making. The projects can then be planned by taking on the views of the stakeholders in order to minimize reactions.
18.3.6 Material Assets

a. Supplementary Guidelines for Public Transport Infrastructures and Facilities

Even though the Department of Public Works has guidelines for public transport infrastructures and facilities, supplementary guidelines are proposed that will enhance and further improve the existing and proposed transport infrastructure within the Study Area. The existing Guideline should be reviewed and updated in order to meet the sustainability principles and standards promoted by the Limassol SUMP. The guidelines could include the incorporation of appropriate design, better (more sustainable) material selection which will allow for climate change adaptation and construction standards.

b. Maintenance Guidelines of Public Transport Infrastructures and Facilities

The objective of the guideline will be to reduce replacement costs, reduce delays and provide environmentally friendly maintenance solutions for new and ageing infrastructure networks, taking into account the sustainability principles of the SUMP proposals. This supplementary maintenance guideline should also take into account Climate Change impacts and maintenance recommendations should focus on the ability of materials to adapt to or mitigate against climate change impacts.

18.3.7 Landscape

Preparation of a Streetscape Guidance Document

In order to ensure high quality streetscapes and homogeneity and to set a high standard for the design of spaces and transport infrastructure in the study area, it is recommended that a Streetscape Guidance Document is developed which shall complement and constitute an integral part of the Limassol SUMP. The Guide should specify the main criteria for good design, material selection, installation and maintenance and include specifications for the entire range of projects covered by the SUMP with a view to achieving a visually appealing, functional and sustainable streetscape.

18.3.8 Cultural, Archaeological, Architectural and Natural Heritage

Strict implementation of the Design Guidelines in Special Character Areas and Traditional Settlement Cores

Although the existing planning conservation and protection guidelines in Special Character Areas and Traditional Settlement Cores will be strengthened with the proposed Area Action Plans, based on the previous practises of urban development, it is proposed to enhance the existing Development Control mechanism of the Town Planning and Housing Department by promoting adjustments in the existing legislation. This will ensure a stricter practise of the guidelines and a safeguard of sensitive areas.

18.3.9 Socio-Economic Environment

Package of measures and incentives to minimise the impacts on retail activity from the pedestrianisation of commercial streets

It is recommended that the Competent Authority develops a package of measures and incentives to minimise any impacts that may occur on retail activity throughout the implementation phase of commercial pedestrian streets but also during the brief transition period after the works are completed.

18.3.10 Built Environment and Spatial Planning and Population, Human Health and Quality of Life

a. Provide measures to avoid closing-off the city during the construction periods of large transport schemes.

The Competent Authority should consider appropriate measures to avoid closing-off the city and public space. An important measure is to provide the temporary use of areas (mean-while spaces) wherever possible, which can be used by the public during the extensive construction periods for large projects e.g. at Andreas Themistokleous Central Bus Station. These “mean-while spaces” can ensure that residents are not distanced from the city centre or avoid enjoying the public realm, during the implementation of SUMP policies.
A more radical measure is the inclusion of penalties for delivery delays, with residents and business owners compensated for delivery setbacks.

b. **Reduce impact of gentrification and community displacement as a result of rising real estate values**

The promotion of collaboration between new and old residents and entrepreneurs is proposed, through temporary events, social spaces and collaborative urban design schemes as they will enable people from different social groups to interact, creating a mutual bond and a common identity for the region. Such measures can be complemented by fiscal measures protecting the existing SME’s and allowing local business to evolve instead of being replaced. Additionally, the setup of housing cooperatives and shared co-working spaces can be evaluated in order to complement the proposed affordable housing policy.

c. **Design solutions to reduce the impact of noise and air pollution and on the landscape from the Andrea Themistokleous Central Bus Station**

Due to the number of buses planned to pass through and stop at the proposed Central Bus Station, noise and air pollution is expected to increase in the area. Appropriate design tools can mitigate the negative impact, through the combination of nature and technology. The existing trees can help improve the air quality and can be complemented by innovative air purifier machines. Additional tree planting in strategically chosen locations proposed by the SEA may also further reduce noise impact, improve air quality and provide shade. It is also important to consider the aesthetic and functional qualities of the bus station that can hinder the quality of life of people through appropriate design.

d. **Incorporate Sustainability Principles in the Proposed Area Action Plans**

In order to mitigate against noise, air and light pollution which is expected to be caused by the polycentric development approach, it is recommended that sustainability principles are fully incorporated in the proposed Action Plans. A public dialog between residents and planners is recommended early on, in order to enhance the public spaces through local design inputs and preferences and to mitigate against any potential reactions.

e. **Measures to mitigate against any potential threats to cyclists’ safety in the short run**

In order to improve road safety and protect cyclists in the short term and SUMP transitional period, awareness campaigns are proposed. Cycle to school and cycle to work schemes recommended by the SUMP can be further strengthened by schemes such as car-free Sundays. Similarly, initiatives that promote cycle training for all ages are encouraged.

In order to mitigate the potential negative outcomes of transport corridors with shared road space between buses and bicycles, it is recommended that in the long term and as travel behaviour changes, road space is taken from the private vehicle and given for bicycle use. Additionally, it is recommended to conduct cycling pilot schemes, in collaboration with residents, that support the collection of empirical evidence which can inform the delivery of cycling infrastructure.

### 18.4 Conclusions on SEA process

Based on the strategic environmental assessment conducted, the implementation of the Limassol SUMP is expected to result in considerable positive effects on the natural and human environment of the Study Area. This however is anticipated, since the SUMP promotes and has been prepared in line with environmental sustainability principles in order to address the existing transport related issues in Limassol. The majority of the negative impacts identified by the SEA are generally manageable and can be appropriately mitigated by the measures recommended by the SEA.
19 Conclusions

Cyprus has recognised the environmental and economic consequences of cities dominated by cars. It has, therefore, involved itself in the European SUMP4Cyprus initiative and wishes to embrace the underlying philosophy of the programme. The promotion of ‘sustainable transport’ is, however, quite a complex idea and touches many areas: health, environment, socio-economic factors, quality of life and even happiness. This is further compounded by the average Cypriot’s attitude to their cars, which they are unlikely to give up without a fight or incentives, which will make them change their behaviours. Any change programme can take years to bed in successfully. We are aiming to change long-ingrained behaviours of a whole country.

The project of developing a Sustainable Urban Mobility Plan SUMP for Limassol is not just a planning project. It includes planning of the future transport and mobility system, but it is a process. This process is based on a strong interaction between the team of planners, consultants, decisions-makers with the relevant stakeholders and the public, aiming at explaining and discussing the principles, the ideas, the background, the methodologies and the approach. This was carried out by a number of Key Stakeholder Committee meetings, by a number of public participation events, by communication via media, internet, by surveys of residents and stakeholders. Input, comments, critics and proposals by stakeholders, by affected groups and residents were taken on board, were discussed and responded. The result is a SUMP for Limassol that is broadly accepted.

Decision-makers and planning authorities have been involved, stakeholders and affected groups, NGO etc. making sure that these institutions and persons accept the SUMP for Limassol and take ownership of the SUMP, the approach, the strategies and the measures. Only with this interactive approach can it be ensured that the SUMP will not only be a study but will be a project that changes the mobility sector in Limassol completely over the next years, a paradigm change for mobility.

The proposed SUMP, the strategies and measures included in the plan are ambitious, require strength of planning institutions and will result in considerable behavioural changes. The impacts and effects have been modelled and calculated, they have been analysed and described in the various deliverables of the project. The strategies and measures are necessary, not always easy to implement. Still, in some cases these strategies and measures do not go far enough, can only be seen as a first step towards the final situation. But even a big change, even a paradigm change of mobility has to start with a small step. And this start is defined by the proposed SUMP for Limassol. The SUMP strategies include an integrated approach of adopting the future land-use development and the future transport and mobility system.

Relating to land-use, a polycentric planning strategy is proposed, reflecting the vision for sustainable transportation in Greater Limassol Area, proposed by the SUMP and ensures that the transport policies proposed are compatible with the urban form and land uses of the Greater Limassol Area. The strategy is divided in four policy sections which are developed in depth, in order to deliver the targeted densification of the peri-urban centres and to strengthen the role of the City Centre. Guiding future population and employment growth in proximity of existing centres and creating inclusive, mix-use and dynamic centres, where amenities and jobs are within close distance.

The integrated and holistic approach of the SUMP must be endorsed by the decision-makers and key stakeholders, through the integration of the recommend transport and land use policies in the Development Plans. Although the key principle of compact and mix-use urban form is imperative to the delivery of the SUMP objectives, it is recognised that the transport related measures of the SUMP can also work independently and do not completely rely on the full implementation of the proposed polycentric scenario.

Relating to transport and mobility, an integrated and well-balanced strategy between “carrots” and “sticks” has been designed, carrots being incentives for changing behaviour, more attractive alternatives for mobility, improved public transport systems, more space for pedestrians and non-motorised use of public urban space, less accidents and increases safety and security, less pollution and noise in the dense urban areas, the sticks being restrictions for car uses, pricing of parking, limitations of access to the centre by car etc. This well-balanced combination has been favoured by the stakeholders of Limassol and is the one that will lead to the necessary changes.

In the proposed future mobility system of Limassol, there will be a remarkable increase of the Public transport passengers. This is mostly because of the combined measures of more PT frequent services
with a respective increase in the itineraries, the bus lane and BRT schemes, the parking control measures and 5% increase in fuel costs. In spite of the very good performance in the increase of PT passengers from less than 2% to estimated 9.4%, the target of PT share of 10% by the year 2030 is only marginally reached. In the longer-term, a drastic measure for a bold increase in PT share in Limassol, similar to the “Congestion Charge” London scheme could be considered, particularly if objectives like a modal share of 20% for public transport are to be reached that would not be unreasonable for a city of the size and structure as Limassol.

Also, a significant increase of pedestrian trips from 5.7% to 10.1% and a modest increase of the trips with bicycles from 0.7% to 1.9% is calculated. This reflects the changes in the land use Polycentric Urban Policy, with a number of small distance trips that can be completed on foot or by bike and also the implementation of bicycle paths and new pedestrian areas.

The calculations show a very positive impact in the environmental indicators due to the proposed strategies and measures for the future years. All emission pollutants are significantly decreased. Also, the noise level in urban roads are restricted to an acceptable level of less than 65db during the day time. Still, the proposed plan is not sufficient to reach the target value of 24% reduction in CO2 by 2030. Supplementary policy measures would be necessary, restricting the car use further, increasing public transport shares and shares for non-motorised transport further and for the remaining car traffic including the promotion of electric cars and electric buses in Limassol.

The proposed SUMP for Limassol, discussed and accepted by stakeholders and residents is a milestone in the development of future mobility for Limassol. If implemented and if all necessary changes are accepted, then it achieves remarkable impacts in terms of sustainability,

- Environmental sustainability: reduction of Green House Gas emission from transport, mainly CO2, reduction of emission of pollutants and emission of noise,
- Social sustainability, increasing the share for non-motorised use of public urban space, reducing the negative impacts on safety, reducing number and severity of accidents, increasing the walkability in the city and the freedom of movement for all population groups, particularly, the children, the young, the old, the mobility impaired and generally those without access or without willingness of using a car, and
- Financial sustainability, increasing the profitability of public transport, increasing the potential for businesses in Limassol, particular shops, tourist attractions like hotels, bars, restaurants etc.

The months and years to come will show, whether the proposed and planned changes will be fully implemented to lead to the necessary change. If this is the case, then further development should be planned and implemented, limiting car transport further, improving alternatives even more. But these further and more severe limitations on one hand and improvements on the other hand can neither be politically proposed now nor can they be financed now. Both will only be possible when the first changes will become apparent and the positive impacts on the environment, the social life and the financial situation will become apparent and accepted by the public and the administration.