UNDERGROUND PARKING BUILDINGS UNDER THE FREE SPACE OF BUILDING BLOCKS IN THE CITY CENTER OF ATHENS

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Main topic
Land use, housing and mobility

Indicate relevance to the workshop description
Land use management, parking space, city center building blocks.
ABSTRACT

The lack of sufficient parking space in the densely inhabited city center of Athens is a serious problem that degrades the quality of life of the inhabitants.

The progressive increase of the number of cars parked on the roadside and often on pavements has caused a significant decrease of the road space available to, both, moving vehicles and pedestrians.

This paper describes a novel proposal, aimed at partially solving this complicated problem. This approach both respects the environment and, at the same time, offers some economic interests to the proprietors of the buildings.

This proposal has been applied to an upgrade study, ordered by Athens Municipality, for an area located in the city center of Athens.

More specifically, this proposal includes:

• Construction of multilevel underground parking buildings within the existing blocks of buildings, by unifying the free space of every building site in the block. The proprietors of the block will own a percentage of the underground parking space. At ground level the free space will be used as a unified open area for use by the inhabitants of the block.

• Control of land use in every building block of the area under consideration so that a balanced development and control of the traffic volume (due to established land uses) is achieved.

• Suitable amendments to the relevant legislation which will allow free space unification within a building block.

• Economic incentives and urban planning regulations for the construction, such as, partial financing of the works by proprietors of flats in the block, e.t.c.

Thus the main aim of this proposal is to partially solve the parking problem in town center area by being both economically feasible – participation of flat proprietors and private constructors is encouraged – and environmentally friendly – open recreation space is developed.
INTRODUCTION

One of the problems that cause degrading of life quality in the densely built up central areas of the Greek Cities is the lack of parking.

The centers of the cities were built mainly during the decades of sixties (1960) and seventies (1970) having blocks of flats without any space for parking, having as a result the continuous increase of parked cars which are taking up more and more space which should belong to pedestrians. The building blocks are densely built and their open space which is in the center is as split there are many properties in every block of flats.

In order to be positively dealt with by the proprietors and inhabitants of those problematic areas any proposal should solve the problem with respect to the environment and at the same time give some financial profit to those concerned.

In this article there is described a proposal that was sketched out in a study of upgrading of an area of Athens which is in the wider center of the city.

Proposals:

• The reduction of the totally allowed surface for building (construction factor) so that any new constructions could have a smaller number of installations. (flats, stores etc.)

• The resetting of the land uses in every building block of the area in order to achieve a balanced development and control of traffic volume which results from every installation.

• The construction of multilevel underground parking in the central open space of the blocks. On the level of the ground floor the open space will be shaped into a unified space of green and recreation for the residents.

• The definition of the right vehicle access to the installations so that there will be neither traffic problems on the roads nor problems with the access at the installations.

• The suitable modification to the relevant legislation concerning the unification of open space in the center of the building blocks so that the above construct can be materialized.

• The definition of financial and statutory motives for the construction of the construct as the partial financing of the proprietors.

The aim of the proposal is a partial solution to the problem of parking in central areas of the city with the participation of the proprietors and private building contractors and its financial feasibility.
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1. **URBAN PLANNING AND TRAFFIC ANALYSIS OF THE AREA.**

The area of Athens (Gisi) to which this study refers is in the wider centre of Athens and the densely built blocks are combined with narrow streets and lack of free common space which create high density.

In the above examined area the construction factor that determines the total allowed square meters per building plot is 3.6, which means the in a building block that has in this area on average 3.000 m² the allowed totally built surface is 3000X3.6 = 10.800 m² so most of the building plots of this examined area have been already built. The unbuilt plots are thirteen (13). As a result this is an exceptionally densely built area.

**SKETCH 1:** Proportion between built up area and unbuilt one in a typical section of the examined Quarter “Gisi” of Athens

The reconstruction of the area took place mainly during the decades of 1960 – 1970 at a quick pace so that the pressing need for residence could be covered.

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The buildings are high blocks of flats built of concrete as terraced blocks of flats with a commercial use on the ground floor and residence on the floors which contain many small flats of one, two or three rooms.

PHOTO 1: A present view of Alexandra Avenue. It is almost wholly built up with blocks of flats up to eight floors each.

In these Blocks of flats there is not any parking space for the service of the residents or those who work in them with a few exceptions.

Today you can notice a tendency to a change of uses with further extension of trade use on the ground floor. (It covers 64% of the whole built up surface of the ground floor) and the offices and others services on the first floors at the expense of residence (usually offices are on the ground floor ant the other floors with percentages of 41% and 47% respectively).

This phenomenon is getting more intensive especially with the buildings that have their facades on Alexandra Avenue.
DIAGRAM 1: Analysis of trade categories that appear on Alexandra Avenue.

DIAGRAM 2: Synthesis of land uses on the ground floor on Alexandra Avenue

These changes of uses aggravate even more the problem of lack of parking space in this area.
From the traffic analysis of the area we can conclude that parking covers only 1% of the total of uses, which does not cover the needs of the area.

The given percentages of parking in this area are: 12% for private parking, 2% under pay in parking buildings, 0.8% under pay in free plots, 85% by the street.

If we add to the above that most of these parking places are used and for park and ride it is evident how great the problem of parking in this area is. The examined area stretches along one of the most important arterial roads of the city (Alexandra Avenue) which is specially burdened by the traffic all day long.

During the year 2001, the average daily traffic of this road was 61.078 vehicles/.

The cross section of the road has three lanes for each direction. One of these lanes is used exclusively by means of mass transports (buses). There is no service road for the local traffic and the roadside installations and at the same time the road has many level intersections.

**PLAN 2: Cross – section of Alexandra Avenue**

![Cross-section of Alexandra Avenue]

**2. PROPOSAL FOR THE SOLUTION OF THE PROBLEM OF PARKING IN THE AREA BY UTILIZING THE UNDERGROUND SPACE OF THE OPEN SPACE OF THE BUILDING BLOCKS.**

First attempt for a more extensive approach of this proposal at least at its first stages, was made in urban planning studies for the upgrading of the area of Gisi that was commissioned by the Municipality of Athens.

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2 The area is on the boundaries of the inner ring that encircles the center of Athens and the running of vehicles is allowed alternately. On the days with odd number vehicles with an odd number on their number plate can run and respectively those that have an even number can run on days with an even number.

3 It is part of the inner ring of the city. Simultaneously it joins two main arterial roads (Kifisia Avenue and Patission Road) which serve the traffic from the center to residential areas and densely built suburbs. Moreover it serves a large number of public means of transport.
This proposal includes measures of urban planning traffic and statutory character.

2.1. Urban planning measures

It is suggested:

- Decrease of the construction factor from 3,6 to 3,0, since it is evident that the high density in building is the root of evil. The number of decrease came out after the check of advantages and charges from an economic, environmental, social, cultural, functional, traffic point of view.
- Restrictions in the use of “trade” so that to be avoided installations of trade of local importance which usually appear in the roadside space of the main arterial roads of the city of Athens. Sorts of trade that are described in table No 1 are forbidden.
- Their function means a large number of customers using vehicles and thus causing trouble in the traffic and making parking worse.

TABLE 1: Categories of trade that are forbidden along Alexandra Avenue

| Maintenance and rectification of vehicles and motorcycles, Retail Fuel Sale. |
| Supermarkets for food, beverages or tobacco |
| Department stores |
| Retail sale of food beverages and tobacco in specialized shops |
| Retail trade in open air shops at markets |
| Repairing of goods of personal or household use |

Moreover the use “Trade” is allowed only on the ground floor and in limited square metres so that the big installations of trade (shopping centers, Department stores, super markets etc. should be avoided. Those shops create local congestions and aggravate greatly the traffic volume and parking as well.

- **Utilization of the underground space of the central open space of building blocks (B.B.) combined with any degraded existing underground and ground floor space in the built bulk of (B.B) in order to create a unified multilevel place for parking.**
This proposal has the great advantage of solving the problem without increasing the existing building bulk of the area.

2.2. Institutional measures
Nowadays the law allows on certain conditions the beneficial extension of the parking space under the underground open space. But this applies only to every new building per plot. In order to be legal the construction of the proposed underground parking places under the open space of the built up plots there must be a modification of the law so that this advantage will be extended to the already densely built central (B.B) of the big cities of our country. Besides that, since very often the open space of every plot separately has a limited size, with the result that the construction of such a construct can be difficult or prohibitive for every plot, there must be allowed the unification of the underground space of the open spaces to be used as parking place. The enforcement of the suggested provision applies to certain (B.B) which have an intense parking problem.

2.3. Financial and Administrative measures
There must be the expectation of a profit so that the negative consequences from the construction of the project will be removed and the inhabitants will accept it. So it is proposed that the proprietors of the real estate will take advantage according to their percentage of their property and with a percentage on the resulting parking space that correspond to some price. A great and important problem of this proposal is the consent of the proprietors. In every block the number of proprietors is high and the understanding and consensus for such interventions is difficult. It is proposed the enforcement of the article 14 of the L. 2508/97 (viable house development) which determines that these constructs are realized provided the proprietors
The value of a parking place in this area is 15000€.
That means that the proprietor has a profit of:
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15000€ \times 0.20 = 3000€.
\]

Next we examined the financial feasibility and an investor's interest that such proposal can have.

The cost of construction of a parking place amounts to 10.500€.
That means that the total cost of the construct is 10.500€ \times 48 = 504.000€.
The value of selling a parking place in the area is 15.000€
The number of places that will be sold is 48-20 = 28 parking places.
The returns from the sale of these parking places is 15.000€ \times 28 = 420.000€.
The financial assistance according to Law 2601/98 for every parking place is 4.400€.
The total assistance is 4.400 \times 48 = 211.000€.
But 420.000€ + 211.000€ = 631.000€ > 504.000€ (cost of construction) and the expected profit from the construction is 631.000€ – 504.000€ = 127.000€.

So it is evident that the construct is technically feasible and economically viable as there is some reasonable profit that could attract interest for investment.
Thus the social consent should be encouraged towards this direction so that this specific proposal can be adopted.

3. CONCLUSION
This solution contributes to the improvement of living conditions in the centers of the cities of our country because it gives a solution to the serious problem caused by the lack of parking space.
The buildings that are permanent constructions form the space of the city, the meaning of urban culture and they gradually create its historical framework, its physiognomy.
Thus, for example, in the central areas there are blocks of flats built in terraced form and the aesthetic rules of modern Architecture which in spite of any problems have formed a classically "modern" environment. And Kenneth Frampton in his book with the title "Modern Architecture – History and Criticism" invites anyone who wants to get to know an application of modern Architecture to visit Athens.
Respect to this historical, cultural, social memory demands the modernization and the transformation of the existing building shell so that with the help of proper adoption to be on the same place with the more modern concept and the city will be revitalized. In this way the constant degrading will be avoided as well as the abandonment of central areas which create a vice circle of problems and the characteristics and role will be set off.

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of 65% of the total square metres of the plots and at least 50% of the separate units of horizontal property consent.

As far as the subject of administration of the construct is concerned (the drafting, the programme, studies, financing, construction, consent of the proprietors etc.) the law 2508/97 gives solutions in its articles referring to reformations demanding an establishment for this purpose of mixed conveyor of administration of public and private initiative. It is advisable that these should participate in this conveyor: public corporation, corresponding municipality, representatives of the proprietors, probably private contractors etc.

This proposal contributes to the solution of the parking problem in central areas of the city so that living conditions will be improved.


According to the above mentioned there is proposed the allotment of the (B.B) for common use and the use of:

- The ground open space as a private free space of green and recreation.
- The underground open space of many levels in combination with any degraded existing underground or ground floor space in the building bulk of (B.B) for parking. The proposal of the study concerns certain (B.B) of quarters where there is the possibility but also the need for converting the underground space into parking place. The (B.B) are determined after a local check up where the possibility of construction of the construct from a technical point of view was considered.

1. There were also taken into consideration the place, size, form of the open space, differences in altitude, density, the construction factor and the possibility of access to the open space. The above mention control referring to the feasibility of the construction of the construct was according to the still in force specification of such space with no harm to the safety of the existing buildings. At the same time the cost of construction should be