

S·h·L··W!

ShLOW! Show Me How Slow

Final Report

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1 Introduction

The following report includes the steps of the intervention that Kyriakou Nikodimos and Lefteris Sdoukopoulos attempted as part of their ShLOW project participation in 2009. Coordinating institute was the Hellenic Institute of Transport (IMET). The ShLOW “action” had to do with slowing vehicles entering an urban intersection with the use of horizontal and vertical signing.

The steps that were taken had to do with the definition of the project, the choice of the intersection, the study of the wider area, the study of the specific geometrical and transport characteristics of the selected intersection and the proposal an applicable solution to increase the level of safety at the use of the intersection.

The intervention aimed at making a certain intersection safer for both vehicles and pedestrians. The intersection that was chosen was the crossing of Filippou and Antheon streets at Peraia, a suburb south of Thessaloniki. In order to propose certain measures the current situation was monitored, traffic load measurements were taken and meetings with the local authorities took place.

Our background studies on traffic engineering gave us the necessary theoretical tools to deal with the issue. Our participation at the ShLOW camp gave us additional motivation and a wider view on such an important subject. It was also the reason that such a project took place and we really thank ETSC for this opportunity. We also thank IMET researchers Dr Maria Morfoulaki and Mr Dimitris Margaritis for all their help and patience during the whole project. Without their detailed advice and guidance none of the following would have been realized.

2 Project definition

The specific problem, that the current ShLOW action deals with, is the reduction of the speed in an urban intersection. Usually, the wrong use of an intersection leads to traffic accidents, especially when the drivers approaching it with the wrong speed.

The final goal of the project was to make the use of urban intersection safer for all users. The study of a specific case would show the reason that most of the accidents occur. Finally it could be proved how innovative vertical and horizontal signing could improve the road safety of the intersection.

The main target group of the intervention is of course the drivers. Reducing speed while approaching would have a positive effect at all the users including pedestrians.

The steps of the intervention should include the following

1. Initially a specific intersection should be selected. From a range of dangerous intersections, in the wider area of Thessaloniki, the ones that speed could be reduced with a low budget would be selected. Then, a contact with the local authorities would reveal if the necessary help and permissions would be granted.
2. Next step should include a visit from the members of the team, to reassure that an intervention would improve the situation. Traffic load measurements should be done in order to exclude the possibility that the only reason for wrong use of the intersection is the lack of traffic lights.
3. Final step includes the proposals for making the intersection to work better. The final proposed solution should lead to lower approaching speed and less

accidents.

Implementation of the proposal should have positive results on the following targets

- Reduce of the use speed of the intersection
- Reduce on the number and the severity of the accidents
- Improve of the pedestrian safety

3 Choice of intersection

The second meeting at IMET mostly had to do with the choice of intersection. Various dangerous intersections where discussed as suitable for studying. At some of the cases the reason was mainly the wrong design so it would be costly to have significant results. At others the main problem was high traffic load, so the installation of traffic lights would minimize the problem.

Finally the intersection that was chosen was the Filippou-Antheon urban intersection at municipality of Thermaikos. There had been many complains for the number of accidents or near misses occurring in the intersection and the initial contact with the local authorities revealed will for cooperation.

4 Area of intervention

The wider area of the intervention refers to the Thermaikos municipality at the south outskirts of Thessaloniki. Thermaikos area used to be a leisure and tourist area during the 60's, but now is one of Thessaloniki's major suburbs. Many of the areas residents work in Thessaloniki metropolitan area.

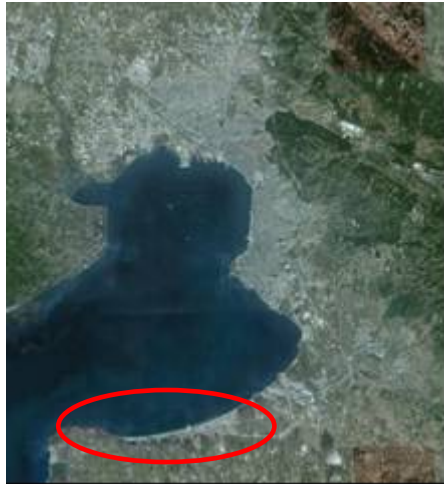


Figure 4.1 Municipality of Thermaikos in the Thessaloniki metropolitan area

The surrounding area consist of newly build apartment blocks that housed great part of former Thessaloniki residents that moved south and east for better living conditions. Figure 5.3 shows the rate of increase of the areas population between 1991 and 2001. The high number of accidents is, at a great part, depended on the fact that both streets are newly made.



Figure 4.2 Zone of the city expansion

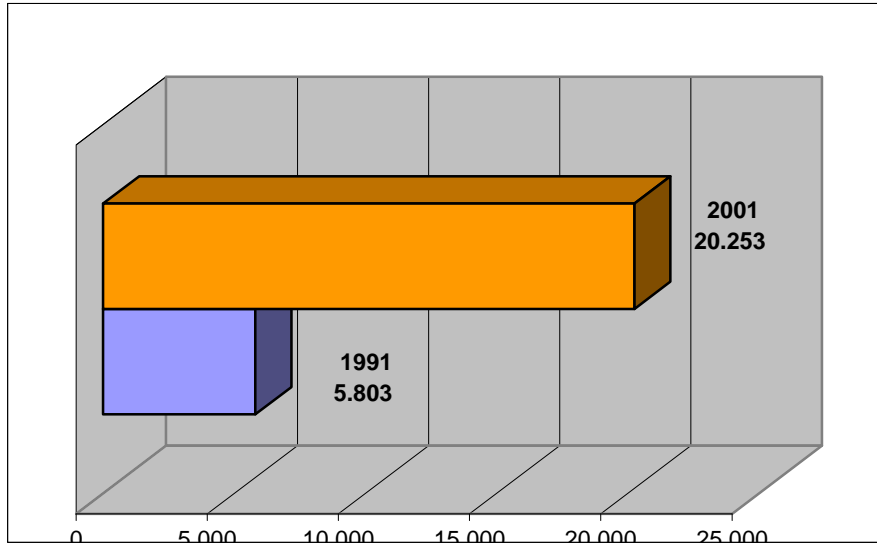


Figure 4.3 Rate of population increase

5 Intersection characteristics analysis

Filippou - Antheon intersection lies at the east part of municipality of Thermaikos. It is part of the traffic system of a newly built neighborhood that houses many former residents of central Thessaloniki area.

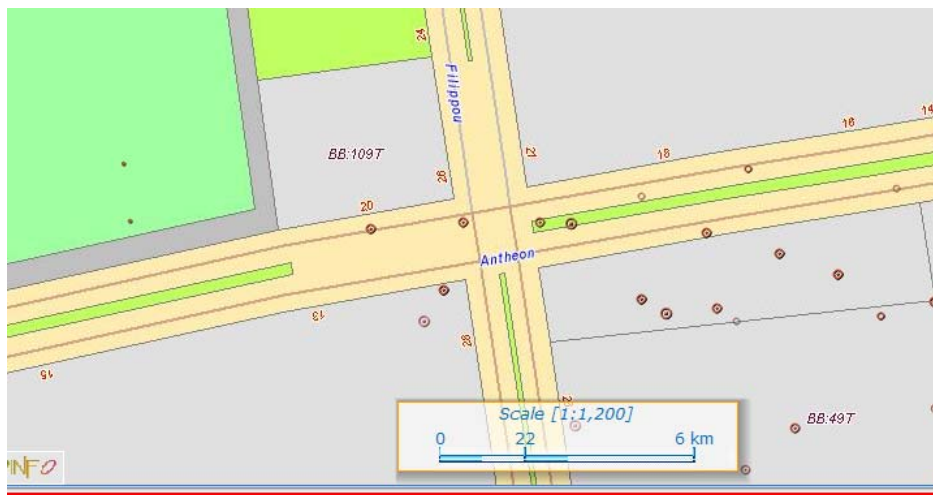


Figure 5.1 Map of the area



Figure 5.2 Pictures of Antheon Street

As shown in the later figure both Antheon and Filippou street are two-way streets with a separating islet in the middle. The width of Antheon street is between 7 to 8 meters per direction. Moving on Antheon street has the priority when entering the intersection. For the above reasons many times high speeds are observed.

The mixed land use attracts many car users to the area. At the side of both streets there is a significant number of parked cars. The presence of the cars results to lower visibility that can cause more accidents. Billboards make the problem of visibility more intensive.

Pedestrians can move on sidewalks at most of the sections except the yard at the lower right corner of the design. There is no “zebra” signing to make the crossing safer.

The width of Filippou street is 6,5 meters approximately and there are stop signs when entering the intersection. The high accidents number lead to the installation of



Figure 5.3 Traffic diagram of the area

6 Consulting with local authorities

Before any more actions were taken it was decided to meet the local authorities and discuss the type of the measures that should be proposed.

Firstly, there was a meeting with the director of public works of the municipality. There was an initial level of understanding on the subject's importance and a plan to finish the installation of signs as soon as possible. There would also be a funding support in order to install the necessary signs.

The next step included discussion with the traffic engineers of the technical department of the municipality. Many questions on the current situation were answered. For example, the islet of Filippou Street is that short, because there is a plan for the public transport bus to turn left there after some years.

The final meeting with the local traffic police department verified the high rate of accidents in the intersection. During 2008 more than 30 accidents took place according to the residents of the area, although only for 4 accidents there is police records because for all the others there was no call in the police there were no

serious injuries. Initially there was a plan to study the way and the reason the accidents occurred but this was not possible for personal data protection reasons.

7 Methodology

In order to decide the proposed measures certain methodological steps were taken. The first step had to do with the mapping of the current road status. As there was no reliable topographic drawing of the intersection, a draw was produced. At figure 7.1 the current situation is shown.

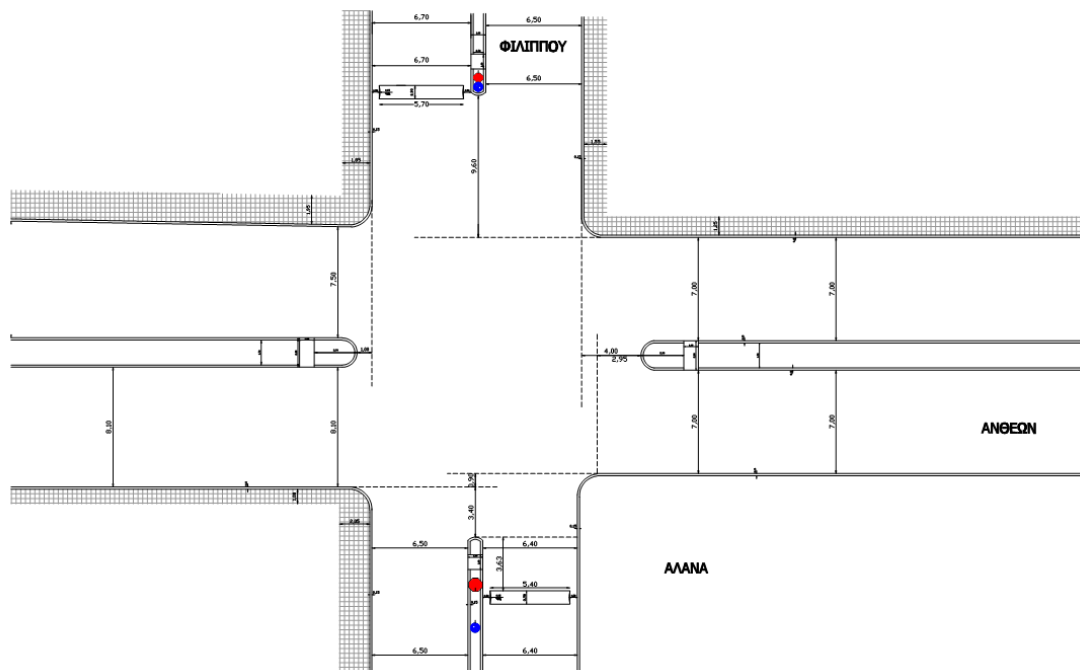


Figure 7.1 Current situation drawing

The second step included the measurement of traffic loads. As part of any traffic study volume counts gives a clear image of the use of the intersection related to the traffic volume.

As the counts were done by the team members on traffic especially sheets, there was enough time to observe the use of the intersection during various hours.

The counts were taken during three typical working days and a Saturday night.

The Saturday night measure was taken because of the nearby bars. The same counts were repeated a week later with the same results.

Study of the results revealed that the peak hours are from 7:45 to 9:00 at mornings and from 17:15 to 18:15 in the afternoon. During the peak hours, Antheon street is used by many vehicles, yet still in normal traffic condition, with approximately 400 vehicles per hour in both directions. During the morning rush hour the same amount is served only at the direction to Thessaloniki. At the afternoon the peak is much lower with approximately 230 vehicles per hour.

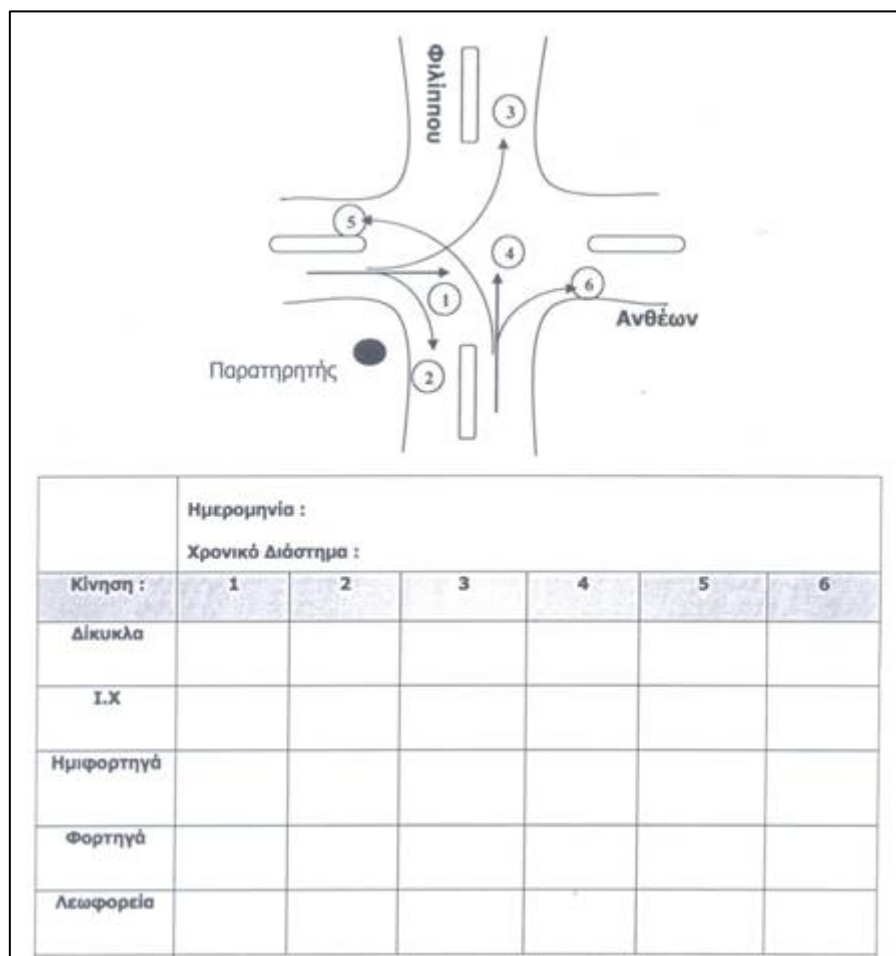


Figure 7.2 volume counts sheet

Filippou street has a lot less traffic except from the section entering from north. During the peak hours, both at morning and at noon, there are less than 100 vehicles per hour. All other sections and movements have much lower traffic load.

From the above it was clear that load did not justify the installation of periodical traffic lights. The installation could make the use dangerous, especially during non peak hours were less than 300 vehicles use the intersection per hour.

Most of the problems occurred in the Filippou northern entry were users had to wait some time in order to enter. Additionally, the sparse left turning cars of other sections could make the intersection use dangerous.

Date	12th September		15th September		15th September
	21:00		7:30		9:45
to:	21:15	to:	7:40	to:	9:55
	21:20		7:45		10:00
to:	21:35	to:	7:55	to:	10:10
	21:40		8:00		10:15
to:	21:55	to:	8:10	to:	10:25
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	17th September		17th September		19th September
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Table 7.1 Load measurement time plan

8 Problem analysis

After the previous analysis the cause of most of the accidents became could be defined. The problem had mainly to do with intersection geometry, traffic load concentration and left turns at peak hours.

Intersection geometry seemed to be problematic mostly at the higher section of Filippou street. As the islet is short in order to leave space for the public transportation bus to turn left safely, the U turn is almost allowed to vehicles.

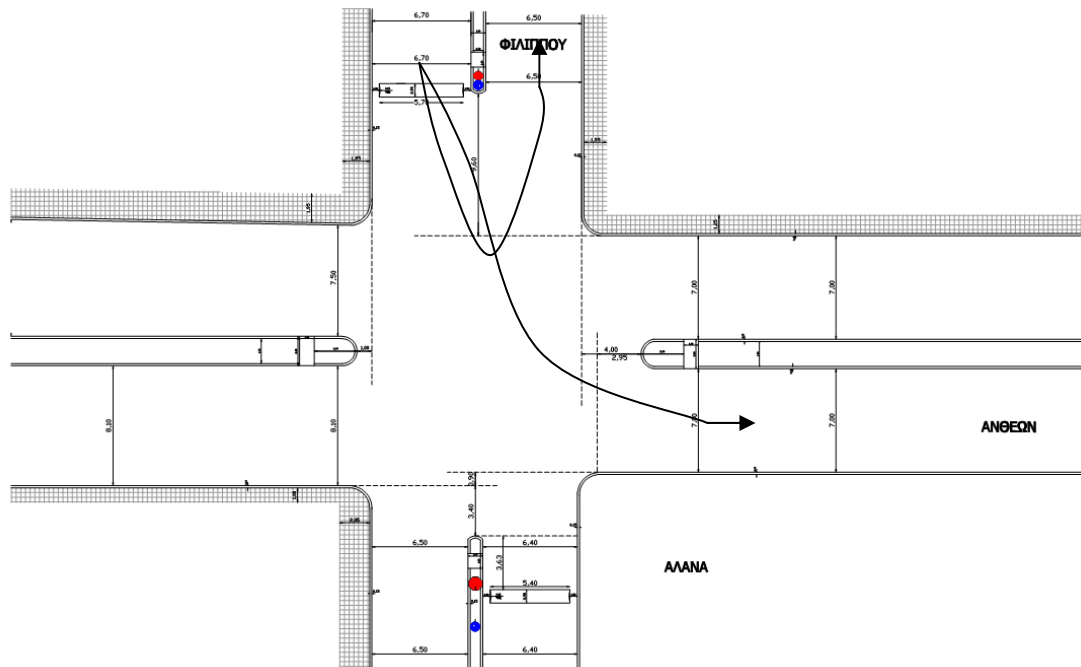


Figure 8.1 High speed left turn and U-turn

Moreover safe crossing for pedestrians, and most important students of the nearby high school, had to include 9+9 meter bypass, something that rarely happened.

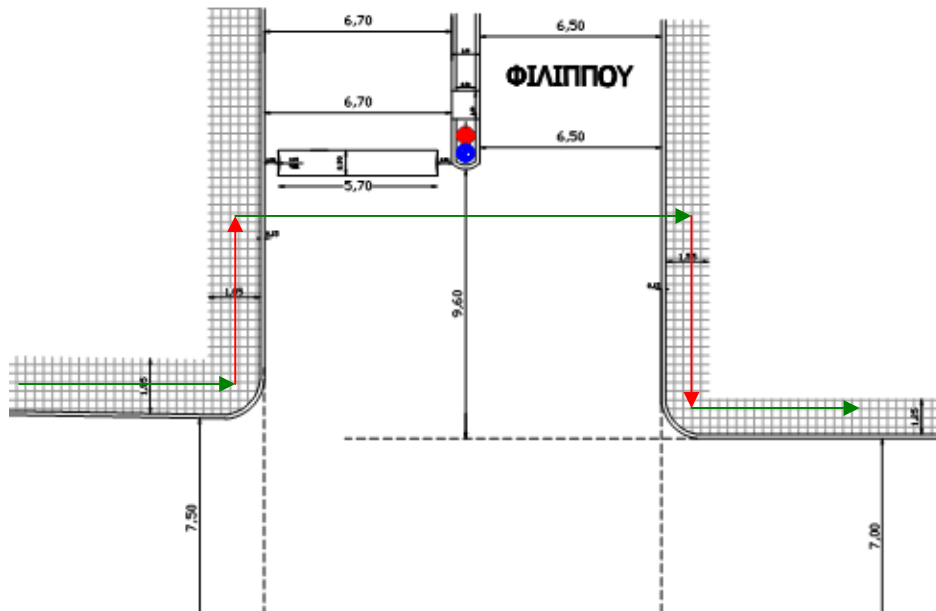


Figure 8.2 Pedestrian crossing

Left turns from all sections at peak hours where also highly problematic. As the Antheon street had stable vehicle movement it was very difficult for all other vehicles to enter the intersection, leading to dangerous situations. On the other hand, traffic load measurement showed that there was not enough traffic to justify the installation of traffic lights, specially at non peak hours. Experience has shown that wrong installation could lead to accidents of higher impact.

9 Suggested interventions for safer use of the intersection

The suggested intervention took in mind the traffic counts, the experience of the people who use the intersection every day, the experience of the people who live or work on the intersection (residents and owners or employees of the shops near the intersection). Many personal discussions (more than 50 people) with them and with

the drivers took place and the main results are the following:

- There are many Billboards on the sidewalk of the Phillipou Street and the Stop signs are not easily to be identified. For this reason many drivers that are not familiar with the road, are not stopping in the cross section.
- The geometrical characteristics of the Phillipou street are so good, that the speed most of the time is getting over the limit of the 30 km/hour and especially the night there is no clear sign to remind the drivers that they have to stop before entering in the intersection.
- The walking of the pedestrian is a nightmare for all the residents and the visitors of the area and especially for the kids who have also to cross the intersection in order to reach their school. There is no pedestrian sign or crossing in all the greater area.

Taking into account all the above, the final proposal included changes in horizontal and vertical signing. Unfortunately budget limitation excluded many proposals with higher possible impact. The Thermaikos municipality however agreed to fund the installation with 3.500 euros to purchase and install the suggested equipment.

Horizontal signing proposals included zebra crossings for pedestrians. The previously installed "humps" would remain in their former position as their impact was mostly positive. The lack of islet of the upper section would be replaced with proper signing in to make the passage from pedestrians safer, as they could stop in the middle of the crossing to check for vehicles in the other direction.

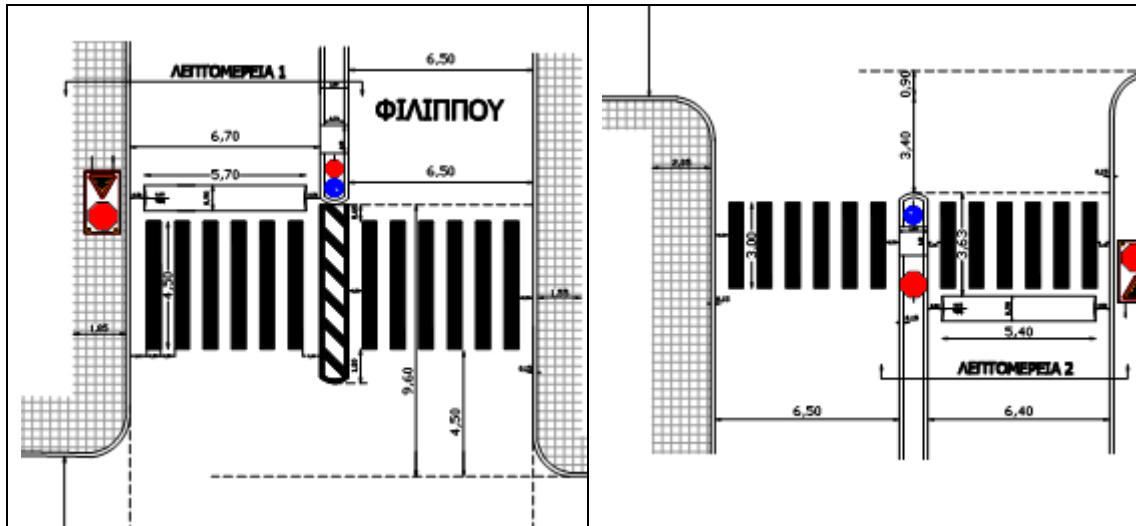


Figure 9.1 Suggested horizontal signing

Vertical signing would include additional stop signs on the right part of the streets. There would also be flashing orange lights on the combined “stop” and “pedestrian crossing” signs.

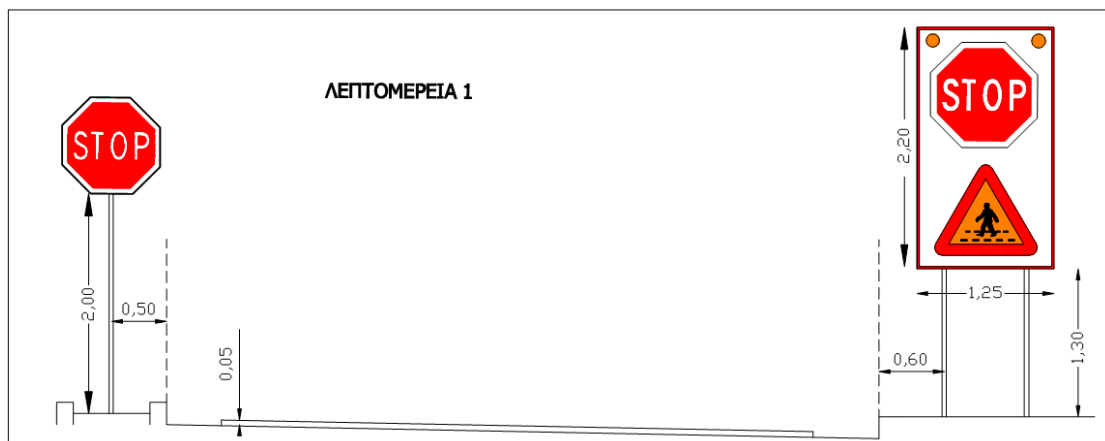
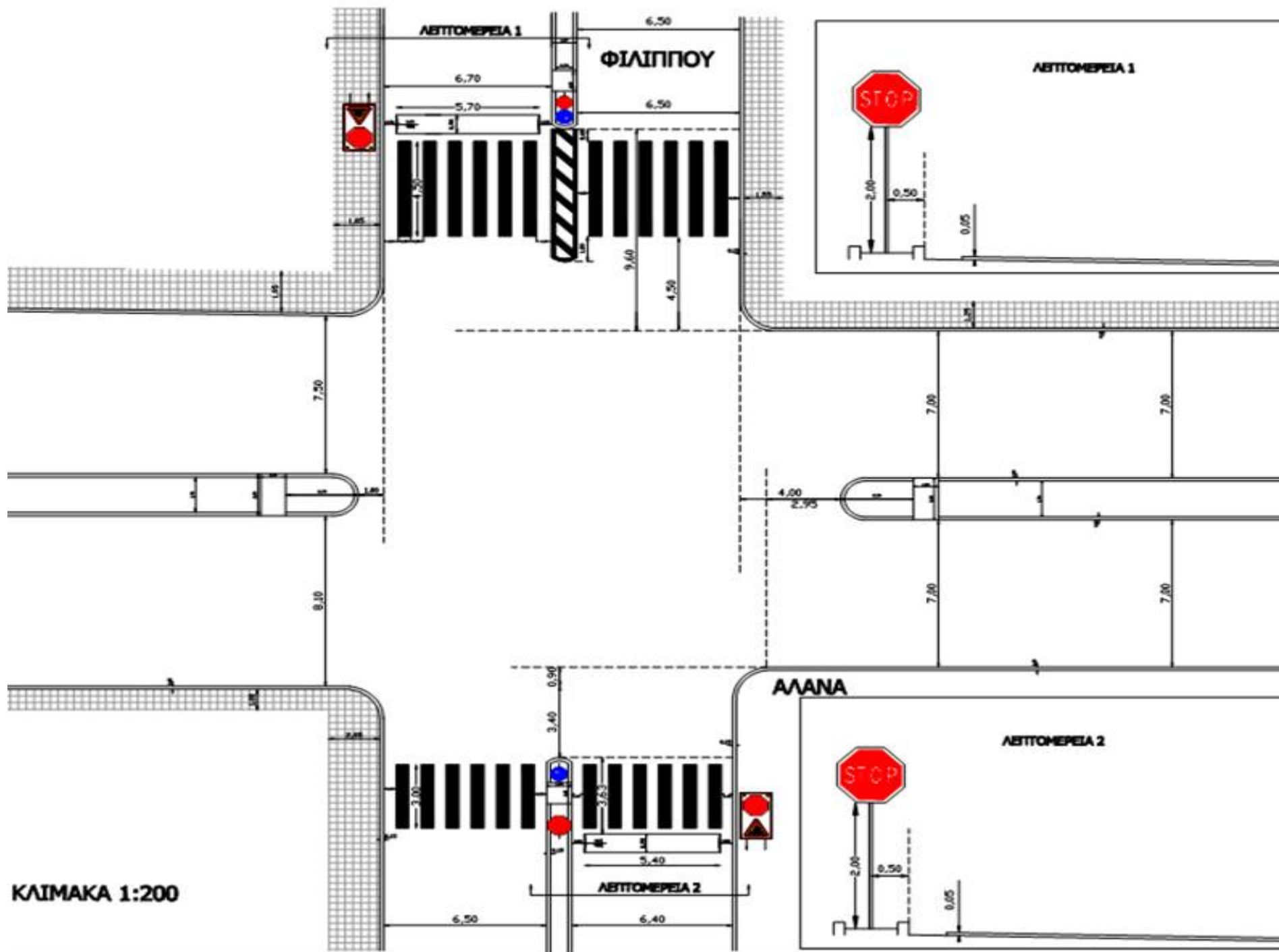


Figure 9.2 Suggested vertical signing

The final proposal is showed in the following map. In order to install the vertical signs and to succeed their target, many shop’s Billboards of the Filippou sidewalk must be taken away. This was the main problem that occurred and the main reason for the municipality authorities for not implemented the signs on time in order to have the final results of our intervention.



10 Conclusions

The main conclusions of the current work can be summarized as follows:

- One of the major problems that cause many accidents due to high speed in an urban area is the inappropriate or the non visible signing.
- Most of the times, the most unsafe crossings are the ones that two roads with high geometrical characteristics are crossed without a traffic light.
- These kinds of crossings are usually causes serious problems not only to the drivers but also to the pedestrian movements.
- The main solution in this kind of problems is the installation of visible signs in order to remind the drivers of the road priority and to protect the pedestrian walking across the intersection.
- The main scope of the signing must be the speed reduction in order to stop the vehicles before entering the crossing.

It is very crucial for the road safety to keep the side walks clear from any Billboards or other objects (lights, trees etc) that can reduce the visibility of the traffic signs.