

Investigating problems of vehicle parking in a low-rise residential area in Nangok-dong, Seoul

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Abstract. A number of low-rise residential areas in Seoul came to be filled with single-family houses in the 1970s. But as the housing pattern changed to multi-family housing and demand of cars explosively increased, vehicle parking in the area became problematic. Although the local government tightened regulations on parking standards and built a public parking zone to solve this problem, the residents' complaints worsened as parking many vehicles along a narrow alley caused community conflicts and pedestrian safety was threatened. In the study, Nangok-dong was investigated as most of the cars parked on a narrow road caused degeneration of pedestrian and residential environments. This study investigated the actual parking conditions in the study area and proposed a few ideas for solving the complex parking matter in a low-rise residential area.

Keywords: low-rise residential area, parking space, illegal parking problem

1. Introduction

Nangok-dong is one of the low-rise residential areas in Seoul and is designated as the city's urban regeneration area [1]. There are many reasons regarding why parking is problematic in the low-rise residential areas in Seoul. First, the areas were initially occupied by single-family houses through Land Compartmentalization and Rearrangement Projects in the 1970s. But some of the houses began to be changed to multi-family housing. Second, the demand for vehicles use explosively increased from the 1980s [2]. Accordingly, available parking space became deficient and many vehicles came to be parked along a narrow alley. This caused community conflicts and pedestrian safety problems.

The local government has implemented three policies to solve the parking problems. First, they constructed the public parking lots. Second, the resident priority parking area was designated on the road to manage the illegal parking and to add more parking space in the low-rise residential area. However, the vehicles occupied the alley of the residential area, and pedestrian safety was threatened. In addition, there is a limit to the parking supply fundamentally. Finally, 'Green parking project' was implemented to provide parking space by removing the fence of the houses. However, this project is effective only for some single-family houses [3].

Despite these efforts, the policies have not solved parking problems in Nangok-dong. Because constructing the public parking lot and designating the residents' priority parking area have limitation



of space for supply [4]. Since only 7% of the total houses are single-family houses in Nangok-dong, the green parking project is not effective.

2. Method

At first, the data on low-rise residential parking problems are collected through the internet, literature surveys and other papers. The author confirms the number of cars parked illegally in the area and identifies problems in the area. Second, the author categorizes each problem, formulates a solution strategy for it, and proposes an action plan under the proposed strategy.

3. Results and Discussion

3.1. Present conditions of illegal parking

The author investigated the number of illegal parking vehicles and the locations through on-the-spot inspection. As shown in Figures 1, 2, and 3, most of the vehicles are illegally parked on the road. During the daytime, 377 cars were illegally parked and at night 547 cars were illegally parked. This is a residential area, so more cars were illegally parked at night. Also, 190 parking spaces were located on the roads to resident priority parking areas. Most of these areas are located on the roads having a width of more than 6 meters. Especially in the case of the Site A and B, the space was too narrow to walk along the road due to the illegally parked vehicles. (see Figure 1, 2)



Figure 1. Illegal parking on the narrow road at daytime in Site A.



Figure 2. Illegal parking on the narrow road at night in Site B.

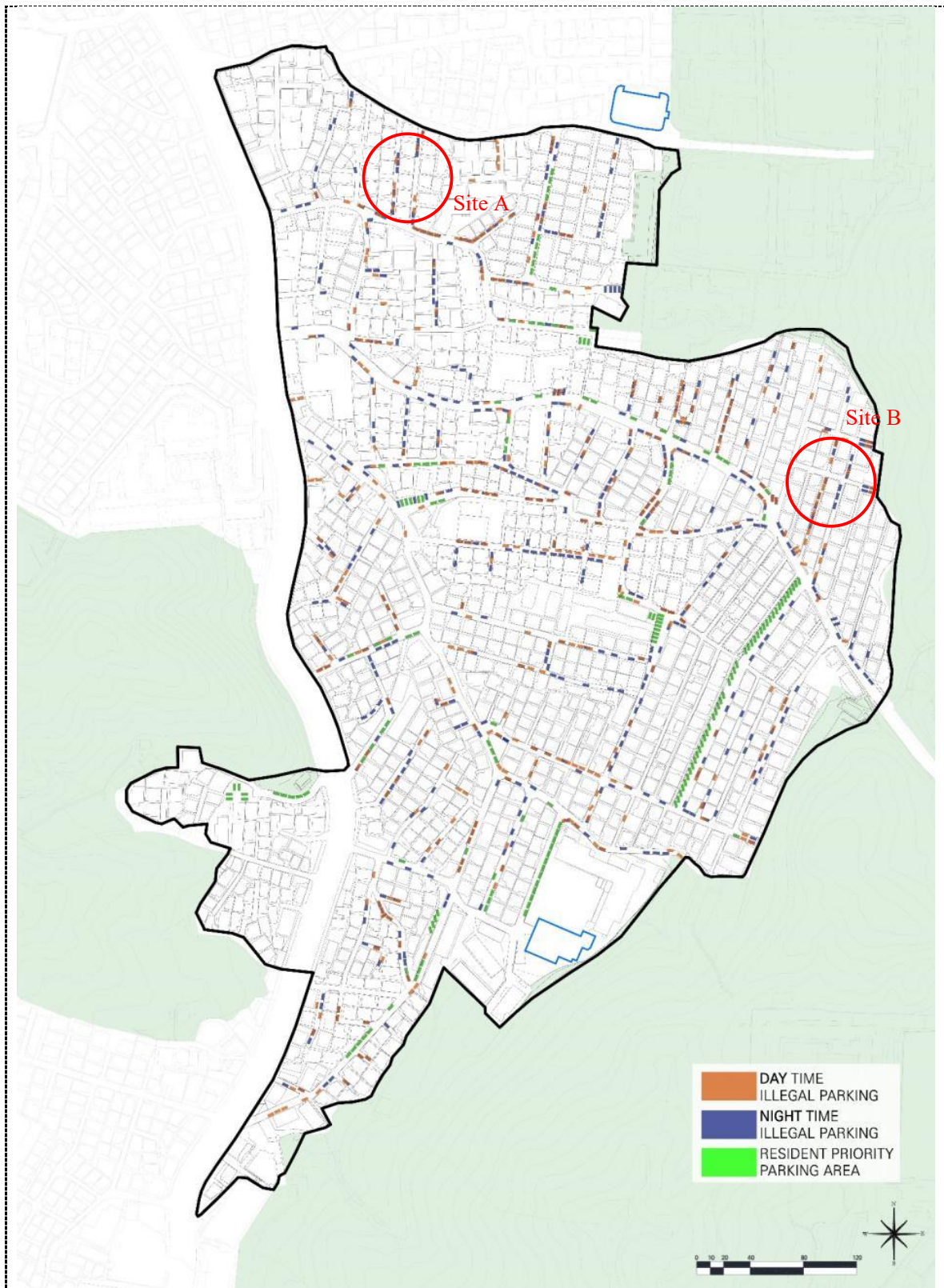


Figure 3. Illegal parking status on day/night time and resident priority parking area

3.2. Problems

Vehicles parked illegally on the road threaten the safety of pedestrians, interfere with vehicle traffic, and cause conflicts among residents. There are three reasons for the problems [5].

3.2.1 Quantitative shortage of parking lots

The author analysed the statistics of the area. As shown in Table 1, the number of vehicles registered per household is 0.52, and it appears that the number of parking lots is insufficient compared to the number of registered vehicles. So, there are no parking places for 1059 vehicles in Nangok-dong.

Table 1. Nangok-dong statistics in 2016

Statistics of Nangok-dong	counts
The number of households	12869
The number of vehicle registration	6689
The number of parking spaces	5630

3.2.2 Vehicle-dependent environment

There are two reasons why many residents in the area are dependent on vehicles. First, most public infrastructure is concentrated to the west of the neighborhood. On the west side, there is a wide road called 'Nangok road'. In this area, there are restaurants, cafes, convenience stores, and market, etc. Second, the altitude difference between the west and the east is about 60m. It is difficult for people to walk to their homes from the west to the east, because of the high slope. With this terrain and road infrastructure, residents have little choice but to rely on vehicles.



Figure 4. Concentrated facilities on the west in Nangok-dong

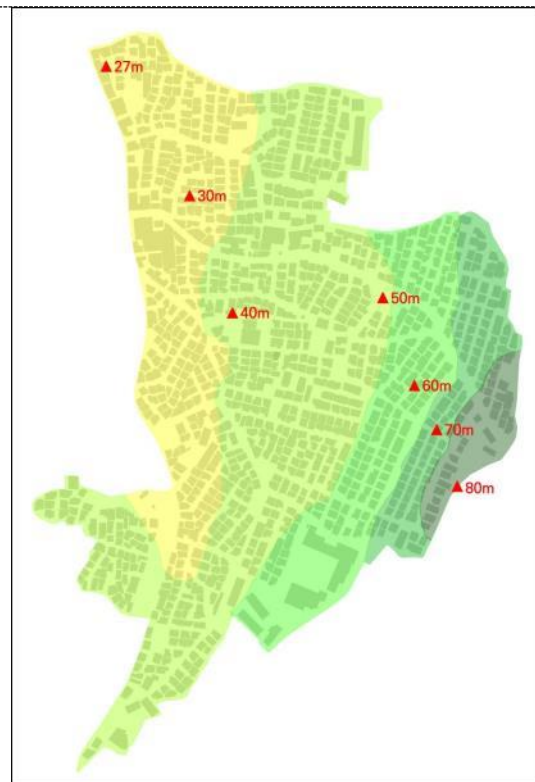


Figure 5. Altitude status in Nangok-dong

3.2.3 Inefficient use of parking space

During the daytime, the residents' priority parking area on the road is fully occupied, but the public parking lot is empty. This pattern can be seen as a result of the reduction in the available walking space and open space. (Figure 6) Another reason is the use of parking lot for other purposes. As shown in Figure 7, the parking lot is used as a warehouse, and the car is illegally parked on the road in front of it.



Figure 6. Full of resident priority parking area at the daytime



Figure 7. Use of the attached parking lot for other purposes

3.3. Potential solution

3.3.1 Supply of the public parking lots

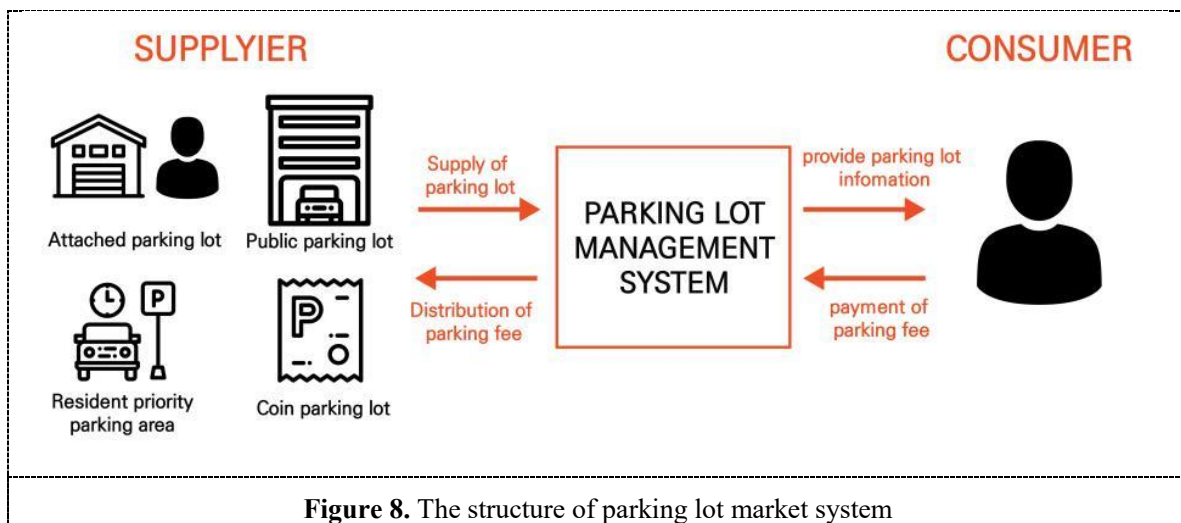
Since there is absolute shortage in the amount of parking lot, more public parking should be supplied. This may help to provide about 50% of previously deficient parking spaces. The remaining 50% may be solved by different methods, such as efficient use of the existing parking space.

3.3.2 Reduction in vehicle demand

Reducing vehicle demand is about making it convenient for people to live and commute without vehicles. There are two ways to do this. One is to place alternative mobility infrastructure to the east side. The other is to connect the east and the west with a walkable route and public transportation.

3.3.3 Parking lot management system

The structure of the parking lot management system is shown in Figure 8. The supplier input available parking lot to the system, which provides the consumer (e.g., vehicle owner) with the information. Then, the consumer pays the parking fee to the system, and the system distributes charge to the supplier. The system flexibly accepts different parking demand by time of day, makes the street occupied by cars an open space.



4. Conclusion

In conclusion, we can categorize problems of parking as follows: 1) quantitative shortage of parking lots, 2) vehicle-dependent neighbourhood environments, and 3) inefficient use of parking space. The author would like to propose potential solutions to each problem in three ways: the supply of the public parking lots, reduction in vehicle demand, and comprehensive parking lot management system.

5. References

- [1] Gwanak-gu Homepage(www.gwanak.go.kr)
- [2] Statistics Korea Homepage (<http://kostat.go.kr>)
- [3] Seoul real estate information plaza Homepage(<http://land.seoul.go.kr/land/>)
- [4] The Seoul Institute 2013 *A Study of Efficient Use of Parking Space in Residential Areas* 135
- [5] Traffic accident analysis system Homepage(<http://taas.koroad.or.kr>)