

Estimating Parking Supply and an Inventory of Parking Policies in UP Diliman

JACKLYN DANIELLE S. ESERJOSE

Undergraduate Student, B.S. Civil Engineering Program
Institute of Civil Engineering, University of the Philippines Diliman
E-mail: jdeserjose@gmail.com

Adviser:

Dr. Jose Regin F. Regidor

Professor, Institute of Civil Engineering, University of the Philippines Diliman

Abstract: With its large land area, UP Diliman still faces problems with regards to parking space. The University lacks a concrete parking management system. The main objective of this study is to undertake a comprehensive inventory of parking spaces and parking policies in UP Diliman. It is also aimed to determine if these parking spaces are enough. For the parking supply estimate, the study area includes parking facilities within the UP Diliman campus excluding UP Ayala-Technohub and UP Town Center. Parking policies of various colleges and other units with significant parking are to be considered for the parking policy inventory. A parking inventory survey was conducted alongside interviews for parking policies in order to characterize the general parking conditions in the campus. An estimate of 4,056 parking spaces was counted. Based on the survey and ITE's parking generation rate, only 3 out of 19 areas met the required number of parking spaces for their respective populations. From the interviews, the only policy that is commonly observed is the designated parking spaces for faculty. It is recommended to implement a concrete parking management system. Satellite parking is suitable for UP Diliman since it prioritizes faculty parking demand over student parking demand. It can address both the lack of parking spaces and a parking management system. This kind of system will also reduce the number of vehicles in the campus and promote alternative modes of transportation.

1. INTRODUCTION

1.1 Background

Through the years, universities from all over the world have faced the problem of parking demand for their campuses. Employees often encountered the problem of adequate parking, having to compete with students for spaces. With the logic that student parking demand is temporary compared to that of employee parking, these universities came up with strategies which prioritized employee parking over student parking demand.

UP Diliman has a total land area of 493 hectares, the largest among the constituents of the University of the Philippines System. It houses 949 buildings and keeps a 1:16 faculty to student ratio with 2,192 faculties and 23,757 students as of August 2014. (UP Diliman Information Office, 2014)

Although parking has never really been considered a problem for UP Diliman because of its size and expansive land, the current parking supply of the University has been found to be generally less than the current parking demand. (Espiritu and Gungon, 2014). Parking within the campus has become insufficient which in turn resulted in unregulated on-street parking. The need to establish a concrete parking management system is evident.

To determine the right course of action with the current parking dilemma of the University, a study involving the current parking supply and parking

policies of various colleges within the campus is necessary.

1.2 Objectives

The main objectives of this study are the following:

- To undertake a comprehensive inventory of off-street and on-street parking spaces in the campus; and
- To compile and assess parking policies in UP Diliman.

As such, this study aims to estimate the total on-street and off-street parking supply within the campus including both formal and informal parking spaces. It also aims to determine the current parking policies of various colleges and other units with significant parking in the University. A secondary objective is to conduct a simple assessment of whether the supply is sufficient.

1.3 Statement of the Problem

With the increasing student population, parking supply has become insufficient for the current parking demand in UP Diliman. The lack of a parking management system within the University has resulted in unregulated on-street parking caused by the scarcity of parking spaces and off-street parking facilities. An estimate of the current parking supply and an inventory of parking policies within the University will verify the need for more parking spaces.

1.4 Significance of the Study

With its large land area, UP Diliman still faces problems with regards to parking space. The University lacks a parking management system and this problem has not been addressed properly. A study involving the parking supply and parking policies of the University will aid in the identification of the proper solution to the parking problem of the University.

1.5 Scope and Limitations

For the parking supply estimate, the study area includes parking facilities within the UP Diliman campus excluding UP Ayala-Technohub and UP Town Center. Parking policies of various colleges and other units with significant parking are to be considered for the parking policy inventory.

1.6 Framework of the Study

Figure 1 shows how the concepts for this study will be developed and how these concepts are related. The parking characteristics of the University will be defined by the parking policies and parking supply gathered from surveying. A parking demand estimate from parking generation will also be used in the analysis.

The recommendations of this study will be based on the current parking characteristics of the University.



Figure 1. Conceptual Framework of the Study

1.7 Study Flow

A parking supply survey will be conducted to obtain an estimate of the current number of parking spaces in UP Diliman. Interviews will be conducted to determine the parking policies observed within the campus. A theoretical value for the parking demand based on parking generation will be used. The current parking conditions of the University will be analyzed using the parking supply inventory, parking policy inventory and the theoretical parking demand. Recommendations will be based on the results of the analysis.

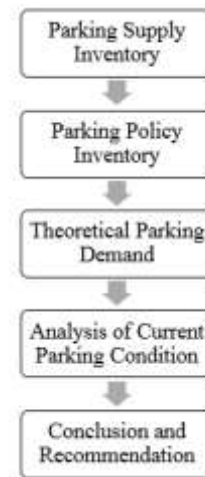


Figure 2. Study Flow

2. REVIEW OF RELATED LITERATURE

2.1 Parking Studies and Conditions in UP Diliman

Parking is one of the major issues discussed in “Transportation and Traffic Management Plan for the University of the Philippines-Diliman Campus” produced by the National Center for Transportation Studies (NCTS) in 2008. According to the study, the lack of parking regulations within the University results in vehicles parking even along the streets.

NCTS conducted a parking inventory survey in the study to establish the baseline values for parking demand analysis.

The study conducted by NCTS presented a series of solutions to remedy the parking problem of the University. Short term solutions such as parking restrictions, designation of parking areas, and pay-parking schemes were recommended. Medium term solutions in the form of multi-level parking facilities and satellite parking were suggested, proposing that satellite parking be required for all students and visitors. This is suitable for universities that prioritize employee parking demand over student parking demand. Strategic locations for satellite parking lots were also formulated. For long term solution, underground parking was proposed.

Another study entitled “Study of Parking Demand and Supply in UP Diliman” by Espiritu and Gungon characterized the general parking conditions and estimated the current parking supply and demand within UP Diliman. The results of the study generally indicate that the current parking supply is insufficient for the current parking demand at the College of Engineering and College of Law.

As shown in Figure 3, an inventory of parking facilities in UP Diliman was conducted in this study

to identify the general parking characteristic in the campus.



Figure 3. Inventory of Parking Facilities in UP Diliman

Table 1 shows the parking supply inventory from the survey conducted by Espiritu and Gungon. The data obtained is compared to the results from the NCTS survey from 2008.

Table 1. Parking Supply Inventory as Surveyed by Espiritu and Gungon

Area	On-street	Off-street	Off-street based from NCTS survey
Engineering			
Melchor Hall	-	99(16)	105
Apacible St.	38	(7)	-
NEC	-	54(6)	52
Law Complex	35(8)	136(2)	112

2.2 Parking Generation

“Parking Generation, 4th edition” by the Institute of Transportation Engineers (ITE, 2010) presented Parking Generation for Universities as a linear regression between parking demand and population. This will serve as the starting point for the determination of parking demand.

Immeasurable factors such as regional variations, changes in demand patterns over time, accessibility of the site and other variables influence parking demand. It is because of these factors that gathering local parking demand data is considered helpful in terms of validating the use of any parking demand rate. Surveys that reflect local conditions remain to be one of the best means in determining parking demand. (ITE, 2010)

Based on ITE, the average peak period parking demand data for urban universities is 0.22 veh / population. This was used by Espiritu and Gungon to

obtain the theoretical demand and determine the shortage of parking supply as shown in Table 2.

Table 2. Parking Shortage based from Theoretical Demand (Espiritu and Gungon, 2014)

Area	Theoretical Demand	Parking Supply	Shortage
Engineering	1099	160	939
NEC	60	60	0
Law Complex	188	173	15

3. METHODOLOGY

3.1 Defining the Study Area

The study area for this research is the UP Diliman Campus, excluding the UP Ayala-Technohub and UP Town Center. Figure 4 shows a map of the study area.



Figure 1. Study Area

3.2 Data Collection

A survey of the parking facilities in the campus must be conducted to characterize the general parking conditions in UP Diliman. The survey will cover all parking facilities within the UP Diliman campus excluding UP Ayala-Technohub and UP Town Center.

Interviews will also be conducted to obtain the information needed regarding the parking policies being implemented within the campus. A checklist will be used to categorize the parking policies of various units and colleges within the University. The number of enrolled students per college will be the basis for the population needed for the theoretical demand.

3.2.1 Parking Supply

A parking supply inventory survey will be conducted to estimate the number of parking spaces available within the University. The parking supply estimate will be obtained through manual count.

3.2.2 Parking Policies

Parking policies of various colleges and other units with significant parking will be considered for the parking policy inventory. Interviews will be conducted to gather the information needed for the inventory. The interviewees will be the respective administrators or the security in-charge of the parking areas.

A checklist will be used to categorize the policies implemented per college. The following policies will be inspected: designated parking spaces for faculty, designated parking spaces for students, reserved parking spaces for specific plate numbers, and reserved parking spaces for persons-with-disabilities.

3.2.3 Parking Demand

The theoretical parking demand will be obtained with the use of the parking generation rate according to ITE (2010). The average peak period parking demand data for urban universities is 0.22 veh / population.

Data about the population of various colleges will be collected. Tinig ng Plaridel, the official publication of the College of Mass Communication provides the number of registered electors per college during election season. The number of registered electors for 2015 is equivalent to the number of enrolled students during the second semester of A.Y. 2014-2015. The number of enrolled students per college will be the basis for the population needed for the theoretical demand.

4. RESULTS AND DISCUSSION

4.1 Parking Supply Inventory

A parking supply survey was conducted to characterize the current parking conditions in UP Diliman. The data gathered was then utilized to create illustrative maps that display the parking facilities for the respective areas within the universities.

Figure 4 shows maps of several areas indicating the parking locations. The red boxes stand for off-street parking while the green boxes are for on-street parking.

The parking supply estimate for some areas increased and for other areas, the parking supply estimate decreased.

A reason for the variation could be the fact that the NCTS survey only considered off-street parking for its parking supply estimate. Also, since the survey by NCTS was conducted 7 years ago, it is reasonable to observe changes with the parking supply. Parking slots may have been added or removed in the past

years. There are a lot of new areas or units with parking facilities that were not included in the NCTS survey.

From an estimate of 2153 parking spaces in 2008, UP Diliman now has an estimated supply of 4056 parking spaces. There is a notable increase in parking supply but there are a number of new buildings (Science Complex, Engineering Complex, etc.) as well.



Figure 4. Illustrative Maps for Parking Supply Inventory

4.2 Parking Policy Inventory

Securities in-charge of the parking areas of various colleges were interviewed to gather information needed for the parking policy inventory. The securities were asked about the current rules and regulations being implemented in their respective units. Their respective methods of implementation were also inquired.

Most colleges provide designated parking spaces for faculty and staff only. The remaining parking spaces are usually left for students, guests, and visitors. Some colleges observe parking space reservations through plate numbers. The spaces are reserved for the vehicles whose plate numbers are labeled on the parking slots.

Aside from the interviews, visual inspection was performed to help categorize the policies

implemented per college based on the checklist. The following policies were inspected: designated parking spaces for faculty, designated parking spaces for students, reserved parking spaces for specific plate numbers, and reserved parking spaces for persons-with-disabilities. Table 5 shows the parking policy inventory.

Table 5. Parking Policy Inventory

Area	Faculty Parking	Student Parking	Plate No. Reservation	PWD Reservation
College of Engineering	✓	✓		
CSSP	✓	✓		
School of Economics	✓	✓		
Virata School of Business	✓	✓		✓
College of Human Kinetics	✓	✓		
College of Architecture	✓	✓		
College of Mass Communication	✓	✓		
College of Arts and Letters	✓	✓		
College of Fine Arts	✓	✓		
College of Law	✓	✓		
Institute of Chemistry	✓	✓	✓	
NIMBB	✓	✓	✓	
Institute of Biology	✓	✓		
Institute of Mathematics	✓	✓		
College of Education	✓	✓	✓	
College of Music	✓	✓		
SURP	✓	✓	✓	
College of Home Economics	✓	✓		
NCPAG	✓	✓	✓	

4.3 Parking Generation

The average peak period parking demand data for urban universities is 0.22 veh / population. (ITE, 2010) Parking demand can be obtained by multiplying the rate from ITE to the population. The compute for the demand, the population data of various units were collected. Table 6 shows the population per area.

Table 1. Population per Area

Area	Population
Asian Institute of Tourism	308
College of Architecture	770
College of Arts and Letters	1,238
College of Education	1,551

College of Engineering	6,032
College of Fine Arts	660
College of Home Economics	1,111
College of Human Kinetics	646
College of Law	613
College of Mass Communication	1,120
College of Science	2,710
Area	Population
CSWCD	469
College of Music	379
NCPAG	607
CSSP	1,903
School of Economics	850
School of Statistics	604
SOLAIR	361
Virata School of Business	1,045

The parking demand obtained from the ITE rate will be considered the theoretical demand. The shortage will be determined by comparing the theoretical demand and the current parking supply of the given areas. Table 7 shows the shortage of parking supply per area. Only 3 out of the 19 selected areas met the parking requirement based on the theoretical demand.

Table 2. Parking Shortage

Area	Theoretical Demand	Parking Supply	Shortage
Asian Institute of Tourism	68	59	9
College of Architecture	169	55	114
College of Arts and Letters	272	45	227
College of Education	341	52	289
College of Engineering	1,327	265	1,062
College of Fine Arts	145	43	102
College of Home Economics	244	51	193
College of Human Kinetics	142	85	57
College of Law	135	137	0
College of Mass Communication	246	36	210
College of Science	596	671	0
CSWCD	103	25	78
College of Music	83	181	0
NCPAG	134	50	84
CSSP	419	270	149
School of Economics	187	106	81
School of Statistics	133	21	112
SOLAIR	79	24	55
Virata School of Business	230	121	109

5. CONCLUSION

5.1 Summary of Findings

From the supply inventory, a total of 4,056 estimated parking slots are available within the campus as compared to the estimated 2,153 slots available back in 2008. The illustrative maps for the parking supply inventory show how several areas in the University rely on on-street parking to address the parking needs of their respective units. This is an indicator of insufficient parking supply in the campus.

The shortage in parking supply is stressed even more by the results from the theoretical demand based on the ITE rate. Only 3 out of 19 areas met the required number of parking spaces for their respective populations. The shortage for the various colleges went as low as 9 slots for the Asian Institute of Tourism, to as high as 1,062 slots for the College of Engineering.

For the parking policies implemented within the University, the current rules and regulations are basic. All units were found to observe the designation of parking spaces for faculty and staff. The most elaborate policy that is currently implemented in the campus is the reservation of slots through plate numbered labels.

5.2 Conclusions

With the findings from the parking supply inventory, it has been verified that the University is indeed lacking parking spaces. Despite the notable increase in parking supply based on the survey conducted in 2015 compared to the survey conducted by NCTS in 2008, the current parking supply still fails to meet the current parking demand. There is a notable increase in parking supply but there are a number of new buildings (Science Complex, Engineering Complex, etc.) as well. Another possible reason for the huge increase in the parking supply estimate is the fact that NCTS only considered off-street parking in their survey back in 2008.

Based on the illustrative maps, several areas in the University rely on on-street parking to address the parking needs of their respective units. This is an indicator of insufficient parking supply in the campus. The shortage in parking supply is stressed even more by the results from the theoretical demand based on the ITE rate with only 3 out of 19 areas meeting the required number of parking spaces for their respective populations.

From the parking policy inventory, it is evident that the University still lacks rules and regulations on parking. Also, based on the parking policies, employee parking is prioritized over student parking all over the campus.

5.3 Recommendations

The first step that should be taken to address the parking problem of the University is to establish a concrete parking management system. The parking policy inventory showed how the campus lacks rules and regulations on parking. Restrictions for on-street and off-street parking facilities need to be established. Parking areas must be properly designated and labeled for motorists. Markers and barriers will aid in maximizing the use of parking spaces.

Also, based on this study, the need to supply more parking spaces is evident. From the parking policies currently implemented, employee parking is prioritized over student parking. This kind of prioritization is suitable for a satellite parking system, a medium-term solution earlier proposed by NCTS.

Satellite parking facilities provide vehicle owners with space to park but not within the immediate vicinity of the buildings they are servicing. For campus satellite parking lots, they usually lie in another circle outside the main circle of buildings or in the periphery of the campus. With satellite parking, the lack of parking spaces can be addressed. Rules and regulations can also be implemented on the satellite parking facilities to tackle the need for a parking management system. This kind of system will not only reduce the number of vehicles in the campus but also promote alternative modes of transportation

Further research on the feasibility of a satellite parking system in UP Diliman is recommended. To establish the feasibility of this system, the current parking characteristics of the campus is needed. That includes the parking supply and parking demand for all parking facilities in the University. Locations for the satellite parking lots need to be validated since locations have already been identified before. A shuttle service that passes through the parking lots and alternative methods of transportation within the campus should be considered as well. The opinions of stakeholders will also play a role in the acceptability of a satellite parking system.

REFERENCES

1. National Center for Transportation Studied (2008) Transportation and Traffic Management Plan for the University of the Philippines Diliman Campus. Diliman, Quezon City
2. Institute of Transportation Engineers (2010) Parking Generation, 4th edition. Washington DC, USA
3. Department of Public Works and Highways (2004) Revised Implementing Rules and Regulation of the National Building Code of the Philippines (P.D. 1096). Philippine Law Gazette 2005.
4. Espiritu A., Gungon M.P. (2014) Study of Parking Demand and Supply in UP Diliman. Diliman, Quezon City
5. UP Diliman Information Office. Facts at a Glance. 25 May 2015. <<http://upd.edu.ph/facts.html>>.

Others:

1. Google Maps. (2015) [UP Diliman Campus] [Street map]. Retrieved from <https://www.google.com.ph/maps/place/University+Of+The+>

- Philippines/@14.659974,121.07022,17z/data=!3m1!4b1!4m2!3m1!1s0x3397b76e0a414405:0x1c2a97897bd895eb?hl=en
2. Streetdirectory Pte. Ltd. (2014) [UP Diliman Campus] [Street map]/ Retrieved from http://www.streetdirectory.com/philippines/metro_manila/travel/travel_id_96507/travel_site_125419/travel_no_/
 3. Tinig ng Plaridel. (2015). Retrieved from <http://www.tinigngplaridel.net/>