

# Evaluation Of Free Bicycle Project In Wuhan, China



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## **Executive Summary**

Since 2009, a Free Bicycle Project has operated in the city of Wuhan, China, to serve the transportation needs to this city of 10 million people, was expected to support residents' transportation needs and encourage more bicycle ridership. The project is operated by a private company with subsidies and advertising exposure provided by the local government.

This paper evaluates the Free Bicycle Project of Wuhan city. The evaluation is based on reports, interviews, and public surveys of Wuhan city residents to gather public's opinion and feedback on the bicycle project. The surveys are analyze citizens' and students' willingness to use the free bicycle as well as their suggestions for improvement or critics.

Recommendations include examples from other cities, includes Shanghai and Chicago.

## Introduction

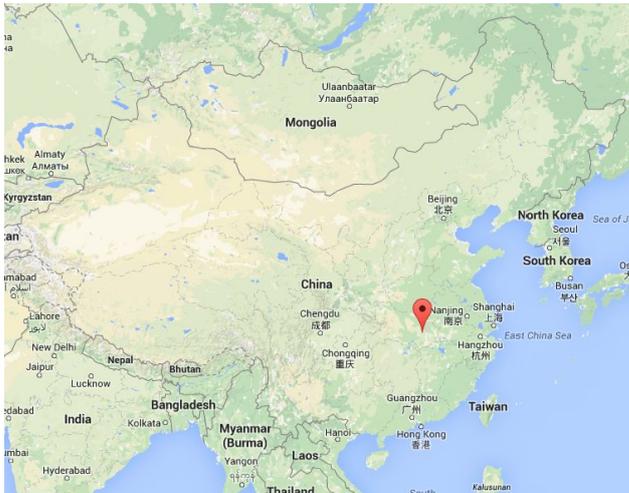
Wuhan is a metropolitan located in the central part of China, and has long been an essential transit hub for Chinese national transportation system. It is also a city with large population of more than 10 million citizens. To maintain inner city transit for citizens and national transit, Wuhan has built many public transportation systems to deal with the heavy loads brought by citizens' daily use and people from outside of Wuhan City.

Public bicycle has been widely regarded a good way for citizens who are not long-distance daily commuters. If you want to go to a supermarket, to walk there seems a little bit time consuming but to drive there the distance is too short, to take buses or metro make the trip even more cumbersome. Then, cycling is a good choice to fill the gap. Free Bicycle Project gives citizens one more choice which can also be provided to citizens who do not have bicycles and who do not have their own bicycles with them.

In a bicycle trip study of Taiwan, the report states that bicycle trip can be defined as a positive activity, which includes both environment protection and recreation experiences<sup>1</sup>. In social aspects, bicycle trips satisfy the tourists' demand with surrounding natural environment while cycling the bike. In environmental aspects, this bicycle trips can create an integrated "less fossil fuel" travel system that aims at reducing the emission of exhaust from private cars. Also for city budget issue, public bike system is much cheaper than building a new metro line in Wuhan, especially Wuhan is a city which the public bus system is already mature and overcrowded. For public health issue, promoting bicycle trips is a way to encourage citizens to do some exercise while making daily commute.

Following a brief overview of Wuhan, this paper distributes the methods used for the evaluation, provides details on the Free Bicycle Project, and summarizes results. The report concludes with recommendations and closing thoughts.

# 1. Backgrounds of Wuhan



## 1.1 Wuhan's Geographic Location

Wuhan is the capital of Hubei province, which is located in the central part of China. It is the most populous city in the central part of China and has a population of 10,220,000 (as reported in 2013)<sup>2</sup>.

Figure1. Wuhan's location in China

Source: Google maps

Wuhan's main urban area is located just in the center part of Wuhan city and it is segregated by three administrative districts, which are Wuchang, Hankou, and Hanyang.

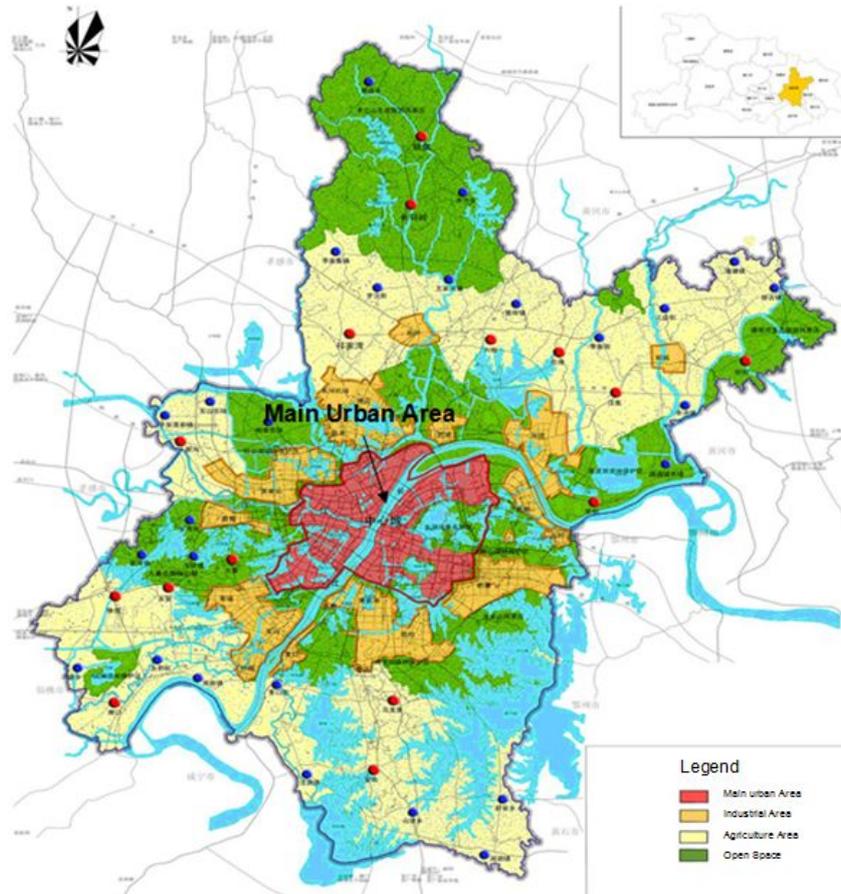


Figure 2. Main city area's location in Wuhan

Source: <http://www.xzqt.gov.cn/UploadFile/pic.asp?pic=20121213103006390.jpg>

## **1.2 Wuhan's Transportation Background**

Wuhan is an essential national transportation center for China. According to Annual Transportation Statistic Report 2014 of Wuhan City, the average daily traffic on weekdays in Wuhan has reached to 5,380,000 people and this statistic has been 1.89 times of last year's. At the end of 2014, the private car number in Wuhan had reached 18,000,000 which had increased 2,090,000 vehicles compared to last year's total vehicle number<sup>3</sup>.

In 2004, Wuhan became the fifth Chinese city with a metro system, only after Beijing, Tianjin, Shanghai, and Guangzhou. Till now, 3 metro lines have been put into use. Bus system in Wuhan also plays an important role in the public transportation. Totally, 267 bus routes almost connect every single place of Wuhan to another.

Apart from metro and buses, cycling is viewed a popular choice for Wuhan citizens. According to a statistic research in 2009 conducted by Wuhan Comprehensive Transportation Planning & Design Institute, there are about 1,600,000 private bicycles registered in Wuhan, and cycling can count up to 20.2% of citizen's daily commute.

## **1.3 Education and research background**

Wuhan is one of the biggest "University towns of China". According to the data published by the Department of Education of Wuhan in 2014, there are total 134 universities or colleges exist and more than 1,200,000 students live in and study in the city<sup>5</sup>.

## **2. Methods**

This paper mainly focuses on identifying the challenges of supporting the free bicycle project in Wuhan though budget, social demands, administration and policy aspects. Total 3 internet sample-selected surveys have conducted which are about Wuhan citizens' and students' willingness towards cycling as a way of daily commute and their feedback of the free bicycle system.

The first internet survey is posted to a government website for all universities in Wuhan, and is focused on university students who lives and study in Wuhan. The survey opened from March 16<sup>th</sup>, 2015 to April 10<sup>th</sup>, 2015. In this survey, totally 1131 students responded. It contains 3 questions as below:

- a. [Have you ever used Wuhan Free Bicycle System?](#)
- b. [Do you often use this System?](#)
- c. [Give the reason why you use or not use the system.](#)

The second survey is focused on Wuhan citizens and it is posted to a government website for public affairs. This survey opened from c. Totally 1804 people answered the questions online:

- a. Do you prefer to bike if weather permit and the distance is not long?
- b. Why you prefer to bike or not?
- c. What's your job or status?

The third survey is focused on the users of the free bicycle system and they were asked to **provide feedback about system**. This survey is posted to the official Free Bicycle Project website and it opened from March 16<sup>th</sup>, 2015 to April 10<sup>th</sup>. Totally 553 people shared their opinions and experiences.

Also, suggestions are formed by investigating through published reports, interviews from city officer and relative staffs as well as my own observations. I list Shanghai Minxing district's Free Bicycle project as an example for Wuhan, as its rental credit system is inspiring which Wuhan might learn from. Compared Wuhan with other city in the world, I use Chicago's bike lane design standards as an example for Wuhan city's further bike lane design as these two cities have similar traffic situation and population background.

### 3. Introduction of Free Bicycle Project in Wuhan

#### 3.1 Wuhan's Free Bicycle Project



Figure 3. Wuhan Free Bicycle Project

Source: <http://www.ichushang.com>

As private car number increased dramatically in these years, Wuhan's daily traffic load also increased a lot and many problems have showed up. As the report found out, the average daily by using public transportation means in 2014 is about 1,050,000, only about 20% of average daily traffic.

Wuhan's Free Bicycle Project allows Wuhan citizens to use the bike for free and only needs users to provide Wuhan citizen ID. With Wuhan ID, you can register as a member of the bicycle system and the officer will give you a chip card, which contains your information. Users can just slide the card in a rental station and the system would keep your rental history in records. Free bicycle needs to be returned before 10 pm. If you do not return bike in time or you break it, you should pay charges to the staff at the rental station when you return it.

#### 3.2 Who takes care of the Free Bicycle Project

Wuhan Free Bicycle Project is run by Xinfeida Company started in 2009. It has become one of the biggest free bicycle systems in the world<sup>6</sup>. This system has

more than 90,000 free bicycles, hundreds of stations distributed around in Wuhan city, invested with more than 50 million dollar (about 300 million CNY), and more than 1 million citizens has registered as the system's member. In the contract of the project, Wuhan city government gives the Xinfeda Company a certain amount of subsidy every year, based on the usage amount of free bicycles. More than 300 government-owned advertisement places in the main urban area of Wuhan are also given to Xinfeda Company as long as the company runs the free bicycle system. In a rough estimate, the value of those 300 advertisement places can bring in millions of dollar annually. Moreover, the Xinfeda Company can enjoy certain tax exempt policies as the Free Bicycle Project is defined as a part of public welfare of Wuhan city.

### **3.3 Bike rental stations development plan**

In the Bike Rental Station Development Planning in Wuhan, Wuhan Comprehensive Transportation Planning & Design Institute has brought out an overall rental station distribution plan for the free bicycle system. According to the data provided in the plan, the cycling trips among the 3 urban administrative districts are about 32,301<sup>7</sup>.

Besides, in a sample study, the department takes 7 testing stations as samples. The average daily use amount is 384 of the each station. Based on these results, the project firstly put 20,000 free bicycles into public use to encourage citizens to use the free bicycles provided by the system.

This plan segregates urban area of Wuhan city into 11 zones and distributes the stations based on mainly 5 different land use areas (see Figure 2. and Table 1. on next page)<sup>8</sup>. These 11 zones are not only the main urban area of Wuhan (city center), but also are very essential parts of city's commercial center. From the map we can tell some industrial areas gather along the river side, but the mostly common land uses are still business commercial and residential use.

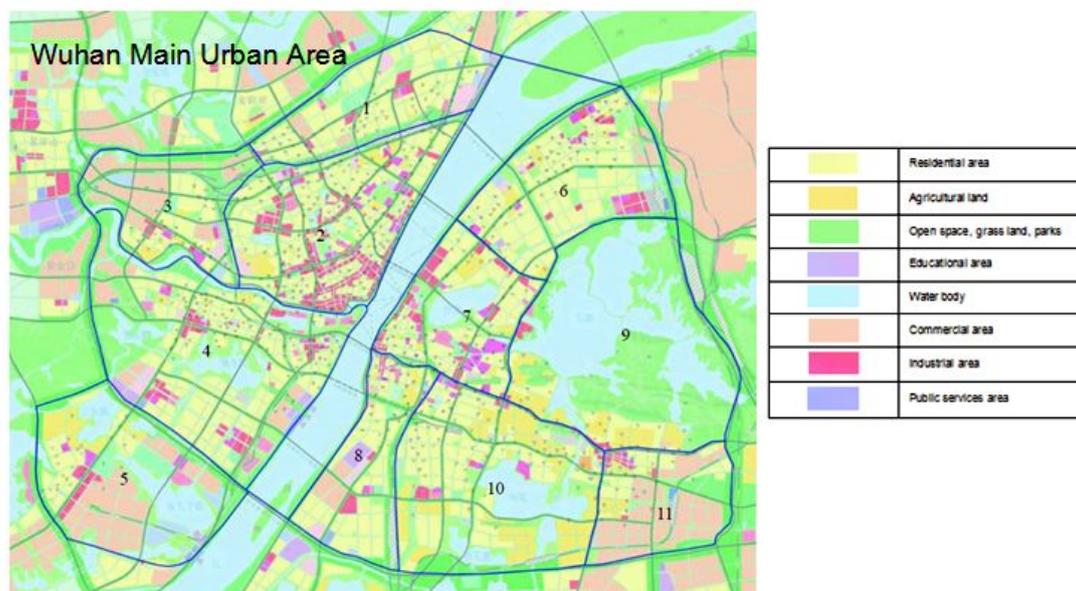


Figure 4. Planning proposal of bicycle rental stations in each zone

Source: *Bike rental station deployment planning in Wuhan*

Table 1. Distribution of free bicycle rental stations in each zone

Zone	Residential area	Public Service area	Bus Station	Campus area	Total
1	30	7	14	5	56
2	101	55	47	6	209
3	23	8	8	4	43
4	52	15	22	12	101
5	15	7	3	6	31
6	36	14	14	14	78
7	47	23	13	8	91
8	16	8	6	4	34
9	13	1	4	12	30
10	24	11	14	17	66
11	14	6	4	7	31
<b>Total</b>	<b>371</b>	<b>155</b>	<b>149</b>	<b>95</b>	<b>770</b>

Source: *Bike rental station deployment planning in Wuhan*

However, in April 2014, this project is facing the danger of closing down because the Xinfeida Company stated that this project has been in deficit for a long time, and they want to end the Free Bicycle Project contract with Wuhan city as the company does not have enough money to support the system's daily function.

## 4. Results

### 4.1 System issues

#### 4.1.1 The maintenance of system

In April 16<sup>th</sup>, 2014, Chinese Central Television Station reported a piece of news about the Free Bicycle Project of Wuhan city that the Xinfeda company had stopped to maintain system's facilities for several months and the system was in bad conditions. The Intelligent Renting System was broken down; many citizens were not able to borrow the bike. Sometimes, the citizens even found out that when they returning the bike back to the station, the system would not show the bike is being returned or being lent out. This facility inconvenience has led many people stop using the system as they found it hard to correctly retrieve the rent records of the free bicycle.

#### 4.1.2 The bike physical condition



Another thing that let fewer and fewer citizens use less free bike is the physical conditions of the bikes. According to an officer's word, on average, the life of a bike is no more than 3 months.

Figure 5. Broken bike

Source: <http://epaper.gxnews.com.cn>

Some of the bikes are badly crashed and broken, some of the bikes are stolen by thieves only after they had been used for just a few days. All these losses have put extra burden on the project's budget, which ask for huge money support from the company and city government. Besides, bikes were returned with broken parts on it and the Xinfeda Company could not efficiently charge these people for losses. This kind of credit issue also let the company and city government take responsibility for the broken bikes. According to the data provided by Xinfeda Company, the total number of their free bicycle is more than 90,000; however, less than 40,000 bicycles can be used in good physical condition.

#### 4.1.3 System's accessibility

Another aspect of the system is the access issue. In the policy, only citizens with Wuhan ID are allowed to use the free bicycle. However, Wuhan is a large immigrant city with numerous workers and students who do not have Wuhan

ID. As the second survey I conducted online shows, 36.4 percent of people who prefer to ride a bike are students and all kind of workers. That means a lot of people who want to try the system, but are derived away by the registration policy.

According to my first internet survey, 11% of these sample students have ever used the free bicycle system in Wuhan and only 2% of them often use the system. According to their response, the major reason that they do not use the free bicycle as transportation mean is that they do not have access to the system, both rental stations and bicycles.

From the rental station development plan of Wuhan, the data shows that only 95 rental stations are built in campus area. That is what many students said in my survey: "I cannot find where to rent the bike and where to return in my campus." ID issue is also a popular issue among students: "When I went to the office, they told me they cannot put my personal information into the system if I do not have Wuhan City's ID."

#### **4.1.4 Company redirect fund**

Moreover, in an article the author stated that an anonymous officer who works for the Xinfeda Company tells that the company right now is more focus on real estate and social media business for the sake of larger benefit, instead of focus on the services of Free Bicycle Project<sup>9</sup>. The company uses city government's subsidy for the Free Bicycle Project to run other business like purchasing a high-rise building in the city center. The result is that many rental stations do not have necessary service staffs all day long.

## **4.2 General issues**

### **4.2.1 Bike lane design**

From an interview of a city officer - Xiahuan, a vice chairman of Wuhan Transportation Committee, one more important reason that is holding back people's preference of using the free bicycle system is the lack of necessary bike lane. Most of the roads especially in urban area are built in early 1970<sup>th</sup>. At that time, city planners and road designers did not have the concepts of making space for bike lane. Thus, in many cases you can see bike riders share the lane with cars and buses in an extremely danger way.

### **4.2.2 Bike parking**

It is also the case that city planners do not pay attention to public bike parking at all. From my personal observation, everywhere on the street you can see bikes are parking attached to nearby trees or just lean on building's facet. Bike rack is not a common thing in Wuhan, especially in public places like shopping center, parks, and citizens in Wuhan have quite gotten used to the situation that they bikes are freely parked everywhere.

### 4.2.3 Misuse of bike lane

Another thing is people's behavior and efficient management towards bike lane. In 2010, a piece of news reported that the newly build bike lane on the road were used like an on-street parking lot<sup>10</sup>. Citizens, who really ride bikes, were forced to share the lane with cars and expose themselves to the traffic accidents. When police asked these drivers why they part their cars on bike lane, a large part of them said they even did not know it is a bike lane. They thought it is a newly built on-street parking space. Some of the drivers who know bike lane but continue to park their cars on bike lane still exist. As they thought, a few minutes' parking would not affect the traffic at all.



Figure 6. Bike lane is occupied by private cars

Source: <http://www.xout.cn>

### 4.2.4 Citizens' attitudes

The second survey I conducted online for Wuhan citizens is about their preference of cycling. If weather permit, 41 percent of responded people would prefer to ride a bike within a reasonable distance as they think it is both better for personal health and environment. 46 percent of people in this survey do not like cycling. The reasons that they mentioned in the survey are mainly 3 aspects: safety issue, time issue, convenience issue.

For time issue, they think cycling is much more time assuming compared with cars, buses or metro. For safety issue, most of them concern about the road side safety as the riders have to share lanes with fast moving vehicle in many cases. For convenience issue, citizens find it hard to make transit between cycling and other transportation means. For example, in Wuhan, bicycles are not allowed to take on metro and buses. If you need to make a transit for bus, you have to park your bike before you get on the bus. This kind of restrictions often make cycling trip inconsistent.

## 5. Recommendations

### 5.1 Stop the monopolized situation

It is not hard to find out that Xinfeida Company has monopolized the public bicycle market for years without any competing public organizations or other private company. Based on the principles of economics<sup>11</sup>, monopoly would cause allocate inefficiency and would not have incentives to let the company to cut costs. The city government could let a rental station have bicycles from different companies. Thus, the customers would choose the ones with better condition and services, and then form the competitions in the free bicycle market.

### 5.2 Link the bicycle rental credit to bank credit

Shanghai Minxing district also runs the Free Bicycle Projects for years and the result is much better than Wuhan, especially on the rental credit aspect. In the Minxing district, bicycles can only be rent if you can provide your credit card and ID. If you loss certain credit, not only you can not rent the bicycle, you would also be viewed as a danger customer of bank system. Thus, make the people who do not return the bicycle o time or break the bicycle on purpose hard to apply for loans from banks. On the contrary, if you always return the bicycle in time and with good physical condition, your credit will increase.

Another reason that the Minxing district link the free bicycle to credit card is that they can directly get the penalty from the users' card in case someone who refuses to pay the penalty on purpose.

### 5.3 Open special access for students

City government could plan a kind of special rental system only for student who lives in Wuhan but without Wuhan ID. In China, each student has a unique student ID number which can be used to identify the student. The system could allow students to enter their student ID number in the system.

Also, students' rental credit information can link to their personal education files, which record the students history of education and behaviors in their student periods.

### 5.4 Provide a better environment for cyclist



In 2010, Wuhan city government proposed a blue print which aims at building new bike trails and bicycle parking lots for the major urban areas. Till now, 5 trails have already put into public use and 464 parking lots are also provided for riders.

Not only new constructions like bike lane

Figure 7. New bike trail in Wuhan

Source:<http://www.baik.baidu.com>

and bike trail is important, the city government should also pay attention to the management of these facilities. More regulations should be made to forbid drivers to park on the bike lane, and no motor vehicle can use bike trails. City government should also try to link the transit between bicycle and other transportation means, like put a bike rack in front of the bus, which allow cyclist easily to transit from bike system to bus system.

### 5.5 Standardize the bike lane design

Wuhan city's bike lane design does not have certain standards which makes 2 bike lanes could not joint with each other.

Chicago is also an densely populated city in the world. Its metropolitan area is home to 9.9 million people<sup>12</sup>. Similar to Wuhan, Chicago also has varieties of public transportation system and extremely heavy daily traffic load. In 2002, Chicago published the Bike Lane Design Guide for the road designer. It provides different standards according to different road conditions<sup>13</sup>. For example, the bike lane on 50' wide street with no parking on both sides:

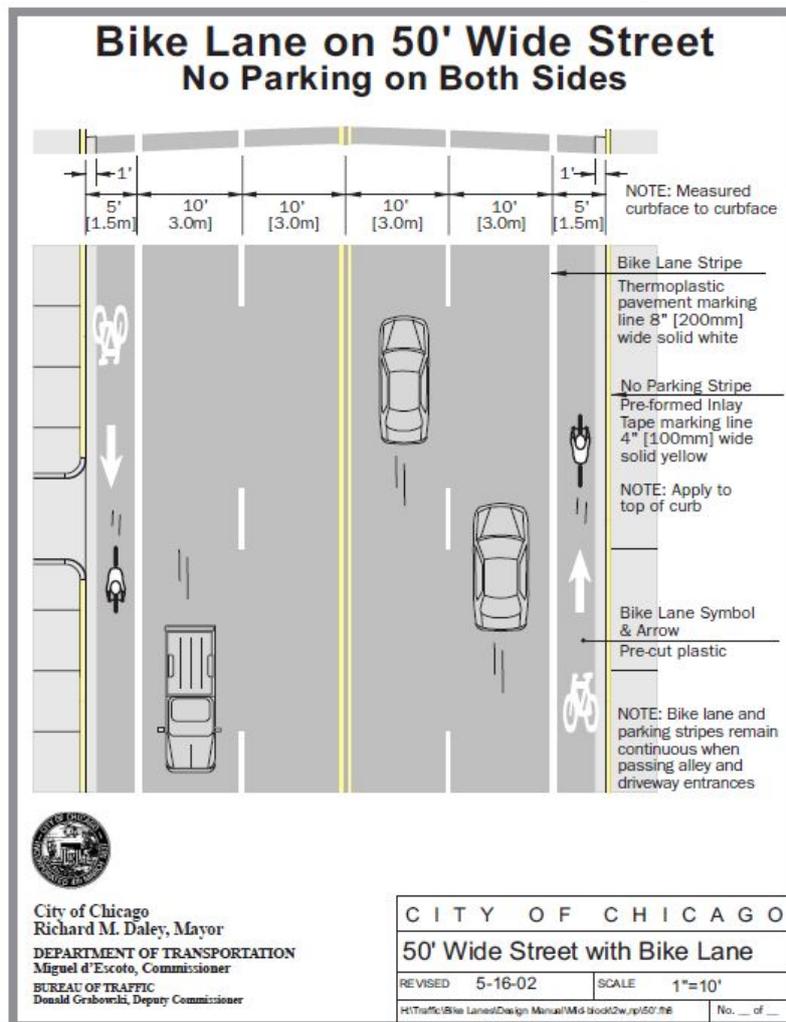


Figure 8. One of the bike lane design standard of Chicago  
Source: *Bike Lane Design Guide of Chicago*

## **Conclusions**

Wuhan Free Bicycle Project's failure uncovers the weaknesses of this project which had been ignored or concealed since the project started in Wuhan 7 years ago. By analyzing these existing issues, 5 suggestions are offered in this paper. If Wuhan city government still wants to go on providing this public bicycle system for its citizens, efforts must be made to make sure these weaknesses are being solved in a manner that would not affect the system's normal operation in the long run.

## Reference

1. Hsin-Wen Chang, "A Strategic Study of Bicycle Tourism in Taiwan," *The Eastern Asia Society for Transportation Studies* 5 (2003): 2-3.
2. "Wuhan," People's Republic of China, accessed April 1, 2015, [http://baike.baidu.com/link?url=Xv2cS6OMCMf-2vmxR6YpoDG7FPIv7XqGJ-T0wwa1wEP5xwZGL6Cu7I8FeJpwL6vJW59i0VAJv7UNnpHXSR-qkD\\_74gVyt8jvTqB0Z2KV65i](http://baike.baidu.com/link?url=Xv2cS6OMCMf-2vmxR6YpoDG7FPIv7XqGJ-T0wwa1wEP5xwZGL6Cu7I8FeJpwL6vJW59i0VAJv7UNnpHXSR-qkD_74gVyt8jvTqB0Z2KV65i), paragraph 1.
3. "2014 Wuhan Transportation Development Annual Report," People's Republic of China, accessed April 1, 2015, <http://www.chinahighway.com/news/2014/880880.php>, paragraph 1, 2.
5. "Education of Wuhan," People's Republic of China, accessed April 15, 2015, <http://en.wikipedia.org/wiki/Wuhan>, paragraph 7.
5. "Department of Education of Wuhan," People's Republic of China, accessed April 15, 2015, <http://www.whjyj.gov.cn/devjz.html>, paragraph 10.
6. "Wuhan Free Bicycle Project," People's Republic of China, accessed April 15, 2015, <http://baike.baidu.com/item/%E6%AD%A6%E6%B1%89%E5%85%AC%E5%85%B1%E8%87%AA%E8%A1%8C%E8%BD%A6?fr=aladdin>, paragraph 1.
7. Jie Liu, "Study of Green Network of Public Bicycle System," (Huazhong University of Science and Technology, 2010), 430074.
8. Lihui Li, "Bike rental station deployment planning in Wuhan." (Wuhan Comprehensive Transportation Planning & Design Institute, Wuhan, Hubei, 2009), 430017.
9. Qiaoming Zheng, "Where is Wuhan Free Bicycle Project's Future," *China Economics*, April 20, 2014, [http://www.ce.cn/xwzx/gnsz/gdxw/201404/20/t20140420\\_2687397.shtml](http://www.ce.cn/xwzx/gnsz/gdxw/201404/20/t20140420_2687397.shtml).
10. Que Nan, "The Bike Lane In Wuhan Has Become a Parking Place," *Jixian Daily*, July 26, 2010, <http://danche.xout.cn/xinwen/68078.html>.
11. N. Gregory Mankiw, *Principles of Economics* (Harvard: Harvard University, 2011),3.
12. "Chicago," United States of America, accessed April 15, 2015, <http://en.wikipedia.org/wiki/Chicago>, paragraph 1.
13. "Chicago Bike Lane Design Guide," United States of America, accessed April 15, 2015, <http://www.bicyclinginfo.org>, page 8-34.