

MEMORANDUM			
To:	Mary Catherine Snyder, SDOT Meghan Shepard, SDOT	Date:	November 16, 2005
From:	Jennifer Lowe	TG:	05085
cc:			
Subject:	Findings for Chinatown/International District On-Street Parking Analysis		

This memorandum summarizes the results of on-street parking data collection efforts for the Chinatown/International District study area. The Seattle Department of Transportation (SDOT) contracted with the Transpo Group to coordinate this data collection effort. The purpose of the study, which also included data collection in other areas of Seattle, is to establish a baseline of information of utilization, duration and turnover in both metered and non-metered on-street parking spaces and to make decisions regarding modifications to existing management of on-street parking spaces.

Data Collection

Data were collected in Chinatown/International District for approximately 35 blockfaces that were subdivided into four subareas. These subareas are identified in Figure 1. Prior to actual vehicle observation, an inventory of all on-street parking spaces on the study area blockfaces was completed. The inventory collected information on current management (metered, unmetered, time limitations etc.). In areas where parking was unmetered, an estimate was made as to the apparent supply.¹ The data collection for utilization, length of stay, etc. occurred on: Thursday, June 30 and Thursday, July 7, from 8 AM to 6 PM. The temperature on these days was relatively clear (no precipitation) with temperatures in the high sixties and low seventies (degrees Fahrenheit). During this time period, each parking space was observed every half hour, and license plate information (three-digit) was recorded into a hand-held data device. This information was then downloaded and summarized in reports for further analysis².

¹ As license plate and utilization information was collected, there were instances where actual parking exceeded the original estimated parking supply. These data were first noted in the data download as “squeeze-ins”. The inventory was typically modified to include those “squeeze-in” spaces as actual available parking, and they now appear as spaces in the inventory. However, there were also situations where vehicles were parked along blockfaces that were metered. These vehicles managed to find curb space parking and parked as if it were unlimited, unmetered parking. When identified as such, these vehicles were considered to be parked as if in “no parking” zones as, realistically, they were not parked in intended parking spaces. Every attempt was made to clean the data accordingly.

² Data collection in field was collected by All Traffic Data. Data was processed by Operations Management Group (OMG).

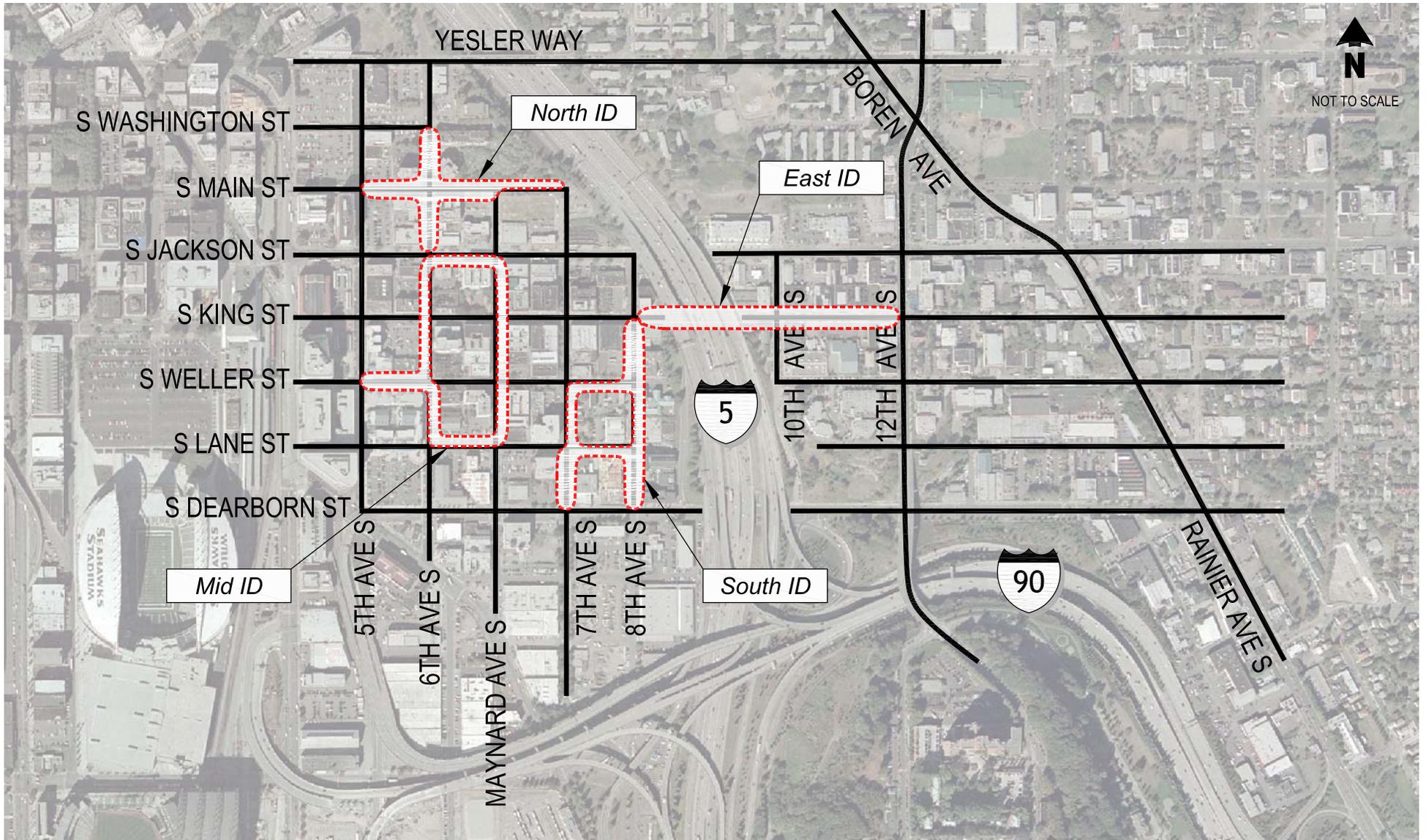


Figure 1
Chinatown International District Study Subareas

SDOT Parking Data Collection

Parking Space Inventory

The characteristics of the inventory of parking spaces in the four Chinatown/International District study subareas are summarized in Table 1. There are a variety of different types of on-street parking spaces within the study area. This report focuses on general time-limited and unlimited parking spaces. Loading zones and spaces for the disabled are combined into an “other” category. Details on these parking spaces are included in the detailed data tables, in attachments to this report. Note that some spaces are designated differently at different times of day. For example, some spaces are marked “No Parking” during morning and/or evening commute peak hours (7 am to 9 am and/or 3 pm to 6 pm) to allow for additional road capacity. The designations in Table 1 are determined by how the space is designated at 1:00 PM, which in this study area represents the designation for the majority of the daytime hours. Table 1 provides the number of each type of parking space in each subarea. (Note: footnote on page one describes how “squeeze-in” parking was handled in the inventory and subsequent data analysis.)

1. Number and Type of Parking Spaces by Subarea (at 1:00 PM)

Restriction (at 1:00 PM)	North C/ID	Mid C/ID	South C/ID	East C/ID
UNMETERED				
1 Hr			3	
2 Hr			46	45
Unrestricted	17	12	13	20
Total Other	6	10	12	15
Total	23	22	74	80
METERED				
2 Hr	68	38		
Half Hour	1	5		
Quarter Hour	2	1		
Total Other	2	5		
Total	73	49		
TOTAL ALL	96	71	74	80

General Characteristics of Chinatown/International District Study Subareas

The Chinatown/International District (C/ID) is a blend of residential and commercial land uses, on the fringe of light industrial uses to the south and east. Yesler Avenue serves as the northern border, Union Station and large office buildings anchor the west side and I-5 serves as the eastern border. The C/ID is relatively contained in a densely developed urban environment, with a variety of retail, restaurant, residential and social services within a small area. Data collection provides a sampling of parking behavior related to different parking management strategies currently in place.

North Chinatown/International District Subarea

Nine block faces around the intersection of 6th Ave S. and S. Main Street were sampled in the North Chinatown/International District subarea. There are very large residential buildings and the Kobe Terrace Park proximate to this intersection, while south of S. Main Street there are the commercial and commercial/residential uses more typical of Mid Chinatown/International District. On-street parking in the subarea is primarily limited to two hours, enforced by meters, though there is some unrestricted parking on 6th Avenue South, adjacent to one of the large residential complexes. This unrestricted parking is highly utilized. Time limitations at the meters here appear to be strictly enforced as parkers seem to be adhering to the time restrictions and enforcement activity was observed to be active in the neighborhood.

Mid Chinatown/International District Subarea

Ten block faces were included in the sample in the Mid Chinatown/International District subarea. The parking is primarily managed with 2-hour meters, though there are some unrestricted parking spaces on S. Lane Street, at the south end of the subarea. Parking in this subarea serves a high concentration of retail and restaurant uses. It is also impacted by its proximity to Seahawk Stadium, the bus tunnel and large office buildings to the west.

South Chinatown/International District Subarea

The South Chinatown/International District subarea sampled parking on ten block faces. This subarea borders on S. Dearborn Street, the major arterial that essentially separates the Chinatown/International District from more industrial uses to the south. There are no meters in this area, though most of the parking is limited to 2-hours duration. There are many residential and commercial land uses in this subarea, though the retail/restaurant activity appears to be a little less intense than that found in the Mid Chinatown/International District Subarea. The International District/Chinatown Community Center and branch of the Seattle Public Library are located in this subarea.

East Chinatown/International District Subarea

The East Chinatown/International District Subarea includes both sides of S. King Street between 8th Avenue S. and 12th Avenue S. Most of the land uses are light industrial and small retail establishments. There are no meters in this subarea. The parking in the sample is about two-thirds with 2-hour

limitations and about one-third unrestricted parking. The spaces with time-limits are the block at the west end of the subarea, closest to the center of the Chinatown/International District.

Effectiveness

Parking management measures, such as meters or pay stations, time limitations and special zones help influence parking behavior. Certain behaviors are desired, based on the types of surrounding land uses. For example, retail stores often rely on on-street parking to serve customers' parking needs, especially if adequate off-street parking is not available. Therefore, near retail establishments, frequent turnover is desired. When parking supply in an area is scarce or expensive, long-term parkers will often park on-street, especially if it is free and/or allows for a long period of parking.

The extent that on-street parking management measures are successful in influencing the desired parking behavior can be measured in several ways. The following indicators show how effective parking management is in:

- Encouraging turnover of parking spaces;
- Reducing occupancy of on-street spaces so that business-needed spaces are readily available; and
- Encouraging parkers to observe the posted or metered parking limitations.

These things can be measured by considering:

- The number of parkers that comply with posted and metered limitations;
- Turnover, which is the number of unique cars that park in a parking space over a day;
- Duration, which is the length of time a vehicle stays in a parking space; and
- Utilization, or the percentage of occupied parking spaces.

Findings

The following tables summarize those findings that help determine effectiveness of current management measures and help indicate what different measures may be appropriate.

Table 2 summarizes the percent of vehicles that were parked longer than the signed or metered time limitations in each subarea. Compliance with the vast majority of the 2-hour meters is very high, with 5% or less out of compliance. This is indicative of high enforcement efforts in the area. Parking Enforcement Officers (PEOs) were observed on several occasions to be actively enforcing parking regulations. Compliance with the half-hour limits is not as good (17-33%), however there were only six half-hour meters included in the entire study area. Non-compliance with the 2-hour unmetered parking, particularly in the South Chinatown/International District subarea, is high. Enforcement may not be as active in this area, as resources may be focused on metered spaces that are easier to monitor than unmetered parking.

Table 2. Percentage Exceeding Time Limitation

Restriction (at 1:00 PM)	North C/ID	Mid C/ID	South C/ID	East C/ID
UNMETERED				
1 Hr			29%	
2 Hr			23%	11%
Unrestricted	na	na	na	na
METERED				
2 Hr	5%	4%		
Half Hour	33%	17%		
Quarter Hour	0%	0%		
TOTAL ALL	95	71	71	141

Table 3 provides the measured average length of stay for vehicles in each type of parking in each subarea. Note that these numbers understate the actual length of stay, as vehicles that were parked at the last observation period may have stayed beyond the duration they were measured for. Parking length of stay in the 2-hour metered parking is somewhat less than the length of stay in the unmetered 2-hour parking, though both average below the 2-hour limit. Length of stay in the unrestricted parking is significantly higher, at over four hours, and as high as seven hours in the Mid-subarea. *Note that numbers are given in portions of hours. For example, 1.25 is equivalent to one and one-quarter hour or one hour and fifteen minutes. 0.89 indicates an average stay of just less than one hour.*

Table 3. Average Length of Stay Per Vehicle (in hours)

Restriction (at 1:00 PM)	North C/ID	Mid C/ID	South C/ID	East C/ID
UNMETERED				
1 Hr			1.10	
2 Hr			1.74	1.36
Unrestricted	4.11	7.00	4.6	4.40
METERED				
2 Hr	1.03	.85		
Half Hour	.67	.67		
Quarter Hour	.50	.50		

Tables 4 and 5 provide the average occupancy, or utilization, of parking spaces in the subareas. Table 4 provides the averages for occupancy over the entire course of the ten hour period of data collection, from 8 AM to 6 PM. Many businesses in the area do not open until mid-morning. For this reason, we also provide average occupancy that excludes the hours before 10 am. Table 5 includes the averages over this shorter time period. The average is for an eight hour period, from 10 am to 6 pm.

It should be noted that the percent occupancy varies greatly by block face. It is important to look specifically at individual blockfaces when making decisions about which management techniques to apply.

Generally, occupancy is higher for the unmetered parking. Occupancy in the unrestricted parking in all subareas is higher than ideal. Parking occupancy in most of the 2-hour unmetered parking in the South C/ID subarea is also higher than ideal.

Table 4. Average Percent Occupancy from 8AM to 6PM

Restriction (at 1:00 PM)	North C/ID	Mid C/ID	South C/ID	East C/ID
UNMETERED				
1 Hr			76%	
2 Hr			79%	64%
Unrestricted	75%	81%	100%	88%
METERED				
2 Hr	45%	63%		
Half Hour	40%	60%		
Quarter Hour	10%	85%		

Table 5. Average Percent Occupancy from 10 AM to 6 PM

Restriction (at 1:00 PM)	North C/ID	Mid C/ID	South C/ID	East C/ID
UNMETERED				
1 Hr			79%	
2 Hr			82%	73%
Unrestricted	74%	81%	100%	89%
METERED				
2 Hr	53%	72%		
Half Hour	50%	65%		
Quarter Hour	13%	100%		

Table 6 provides the calculated number of hours each type of parking in each subarea exceeded 75% occupancy between 8 am and 6 pm (maximum ten hours). Table 7 provides the calculated number of hours each type of parking exceeds 75% occupancy between 10 am and 6 pm (maximum eight hours). As with the other tables, this information should be considered along with an understanding of the total number of parking spaces of each type that are actually in each subarea. Unrestricted parking is highly utilized. Parking meters and enforcement provide for the best parking availability. Like the unrestricted parking in all subareas, the unmetered parking in the South C/ID subarea has very little availability.

Table 6. Number of Hours between 8 AM and 6 PM Percent Occupancy Is 75% or Greater (Max 10)

Restriction (at 1:00 PM)	North C/ID	Mid C/ID	South C/ID	East C/ID
UNMETERED				
1 Hr			5.0	
2 Hr			8.5	3.5
Unrestricted	8.5	9.5	10.0	8.5
METERED				
2 Hr	0.0	3.5		
Half Hour	4.0	4.5		
Quarter Hour	0.5	8.5		

Table 7. Number of Hours between 10 AM and 6 PM Percent Occupancy Is 75% or Greater (Max 8)

Restriction (at 1:00 PM)	North C/ID	Mid C/ID	South C/ID	East C/ID
UNMETERED				
1 Hr			4.5	
2 Hr			8.0	3.5
Unrestricted	6.5	7.5	8.0	7.5
METERED				
2 Hr	0.0	3.5		
Half Hour	4.0	3.5		
Quarter Hour	0.5	8.0		

Table 8 provides the turnover, by parking type in each subarea. Parking turnover is another indication of how well the parking is serving adjacent land uses. As previously defined, turnover represents the average number of unique cars that park in a parking space over the course of the day. Those parking spaces with a shorter time limitation should produce a much higher turnover than unlimited and longer permitted parking duration. For example, in spaces designated for a 2-hour limitation, a turnover of 3.0 or higher is desired, while 1-hour designated spaces should have a turnover of 6.0 or higher. The unrestricted parking is not turning over as frequently as desired in a commercial area, and may be used highly by employees or residents in the C/ID. The meters, however, are providing desired turnover. Note that the lower turnover for 2-hour meters is reflective of lower occupancy rates of metered parking, particularly those on S. Main Street, and not length of stay of vehicles in parking spaces.

Table 8. Parking Space Turnover

Restriction (at 1:00 PM)	North C/ID	Mid C/ID	South C/ID	East C/ID
UNMETERED				
1 Hr			7.00	
2 Hr			4.57	4.67
Unrestricted	1.82	1.17	2.31	1.95
METERED				
2 Hr	3.00	5.74		
Half Hour	3.00	7.20		
Quarter Hour	2.00	5.00		

Parking Management Techniques

Parking turnover, utilization, and compliance with the time-limits are three critical measures in determining when actions, such as adding new parking pay stations, should be taken. As a general rule of thumb, in the urban environment, parking turnover is typically three to four times greater than for off-street parking (Parking, Weant and Levinson). Each space used by workers turns over once daily, while each space used by business or shopper parkers turns over several times each day. Therefore, in a ten-hour study period, to best serve commercial uses, **in spaces designated for a 2-hour limitation, a turnover of 3.0 or higher is desired. With 1-hour limitations, a turnover of 6.0 or higher is desired.** While a space could actually turn over more (5 or more times for 2-hour parking or 10 or more times for one hour parking in a ten hour day) this would represent extremely high utilization. Since we are also looking to keep parking available for customers by maintaining an occupancy of 75% or less (please see below), the 3.0 and 6.0 turnover is used as our rule-of-thumb. These turnover rates, if vehicles park close to the time limitation, represent an occupancy of around 60% (three 2-hour periods, or six 1-hour periods in a ten hour day). With many retail businesses and services not opening or picking up until around 10 AM, this represents an average occupancy of 75% (six out of eight peak hours).

In terms of utilization of curb space, and customer convenience, **a goal of 75% occupancy or less** typically provides the amount of availability that is conducive to a good customer base. Repeat customers can be reasonably confident that they will find parking near their destination at a level of 80% occupancy or less, and potential pass-by customers will not have to go too far away from businesses they are interested in visiting if they find a parking space within a block or two of the shop they choose to frequent.

Meters encourage better compliance with the time-limit regulations. A study several years ago, which included over 900 municipalities, found that overtime parking was reduced by more than 75% in half of

the communities when meters were installed¹. The same study found that the percentage of vehicles parking overtime reduced from 24 to 13 percent after meters were installed. Since enforcement efforts are expensive, meters are a more cost effective way to encourage compliance with time limitations, though compliance is made further effective with additional enforcement efforts. We recommend that **meters should be strongly considered if non-compliance with posted time limitations exceeds 15% to 20%**.

General Findings

In observing the differences of parking patterns between unrestricted, time limited (sign only) and metered parking, in the Chinatown/International District study area, we conclude that:

- Metered parking and strong enforcement efforts are providing good turnover and parking availability for customers and visitors in this study area.
- Where parking is unrestricted, spaces are highly utilized and turn over infrequently. Employees or residents in, or adjacent to, the study area may be primary users of these spaces.

Subarea Summaries

Table 9 provides a summary of the utilization data, by subarea and parking regulation.

Note that because field data was collected every half hour, for the quarter hour meters in the North and Mid Chinatown/International District subareas a vehicle was only considered to be over limit if it was seen in the same space two or more times in consecutive checks. Therefore, the average length of duration shows as thirty minutes. The percent exceeding time limit was measured to be at zero (0), indicating that no vehicles were seen in these spaces in two consecutive checks. There may have been additional vehicles that utilized these spaces that were not recorded and there would be time between checks for vehicles to make very quick stops and not be included in the field count.

North Chinatown/International District Study Subarea

General Information:

- Compliance with parking restrictions is high, primarily due to meters and enforcement efforts.
- The parking on S. Main Street adjacent to Kobe Terrace Park was observed to be very available for park visitors.
- The unrestricted parking on 6th Avenue S., adjacent to the large housing complexes is highly utilized and turns over infrequently.

Recommended modifications:

- Determine the necessity of having some unrestricted parking near the residential complexes in the north side of the subarea. This parking is ripe for time limitations to provide better availability for visitors, however, availability of the angled parking on S. Main Street may cancel out this need. If time limitations are instituted they should be enforced with pay stations.
- Installation of pay stations will make enforcement even more efficient.

¹ Parking, Weant and Levinson, 1990 (p. 253)



Table 9 Summary Table

Restriction at 1 PM	SUPPLY	AVG TURNOVER	AVG HRS USE PER SPACE	AVG,LENGTH OF STAY PER VEHICLE	PERCENT EXCEEDING TIME LIMITATION	AVG PERCENT UTIL, 8AM to 6 PM	AVG PERCENT UTIL 10 AM to 6 PM	HOURS BETWEEN 8 AND 6 EXCEEDS 75%	HOURS BETWEEN 10 AND 6 EXCEEDS 75%
NORTH CHINATOWN/INTERNATIONAL DISTRICT Study Subarea									
2-Hour Meter	68	3.50	3.62	1.03	5%	45	53	0.0	0.0
Half-Hour Meter	1	3.00	2.00	0.67	33%	40	50	4.0	4.0
Quarter Hour Meter	2	2.00	1.00	0.50	0%	10	13	0.5	0.5
Unrestricted Space	17	1.82	7.50	4.11	0%	75	74	8.5	6.5
MID CHINATOWN/INTERNATIONAL DISTRICT Study Subarea									
2-Hour Meter	38	5.74	4.88	0.85	4%	63	72	3.5	3.5
Half-Hour Meter	5	7.20	4.80	0.67	17%	60	65	4.5	3.5
Quarter Hour Meter	1	5.00	2.50	0.50	0%	85	100	8.5	8.0
Unrestricted Space	12	1.17	8.17	7.00	0%	81	81	9.5	7.5
SOUTH CHINATOWN/INTERNATIONAL DISTRICT Study Subarea									
1-Hour Space	3	7.00	7.67	1.10	29%	76	79	5.0	4.5
2-Hour Space	46	4.57	7.95	1.74	23%	79	82	8.5	8.0
Unrestricted Space	13	2.31	10.62	4.60	0%	100	100	10.0	8.0
EAST CHINATOWN/INTERNATIONAL DISTRICT Study Subarea									
2-Hour Space	45	4.67	6.36	1.36	11%	64	73	3.5	3.5
Unrestricted Space	20	1.95	8.58	4.40	0%	86	84	8.5	7.5

Mid Chinatown/International District Study Subarea

General Information:

- Parking in this area is highly utilized as it serves this busy commercial district. However, the meters and enforcement are providing good compliance and high turnover of the parking spaces.

Recommended modifications:

- Continue with enforcement efforts, which may be made more efficient by the replacement of meters with paystations.

South Chinatown/International District Study Subarea

General Information:

- Utilization is very high of both unrestricted and time limited spaces.
- Lack of meters is leading to low compliance with time limitations.

Recommended modifications:

- Add time limitations to currently unrestricted spaces
- Use pay stations to help enforce the time limitations.

East Chinatown/International District Study Subarea

General Information:

- Parking utilization in this subarea is high.
- Turnover of the unrestricted parking is low, indicating that employees or residents are using this parking.
- Compliance with time limitations is high in most cases.

Recommended Modifications:

- Consider adding time limitations to currently unrestricted spaces.
- Use pay stations to help enforce the time limitations.