

FINAL REPORT



The City of Seattle Department of Transportation

Performance-Based **PARKING** —PRICING STUDY—

seattle.gov/ePARK	OPEN SPACES
PACIFIC PLACE	568
MARKET	278
	515



A Performance-Based Parking Program for Seattle.....

During adoption of the 2011 budget, City Council directed the Seattle Department of Transportation (SDOT) to set paid parking rates by neighborhood to achieve the policy objective of providing an average of one or two open spaces per block face throughout the day. As a result of this policy change in late 2010, SDOT conducted a citywide parking study and established 2011 on-street parking rates, ranging from \$1.00 per hour to \$4.00 per hour, in twenty-three paid parking areas. In the spring/summer of 2011, SDOT conducted the Performance-Based Parking Pricing study, including a large data collection effort, to evaluate new pricing programs. This report is the result of that effort.

The study developed performance-based parking pricing recommendations for implementation in Seattle's many neighborhoods. Performance-based pricing is envisioned as an on-street parking management system responsive to fluctuations in demand and compatible with existing parking technologies (primarily parking pay stations). This study included citywide paid parking data collection and analysis, economic analysis, identification of demonstration projects, and public engagement components. Included in the public engagement process was a Parking Sounding Board made up of a wide variety of community stakeholders. The Sounding Board provided valuable input that helped define and shape the study's final recommendations.

The study's outcomes included a phased plan for implementing performance-based parking pricing policies, including strategies and demonstration programs for downtown Seattle and neighborhood business districts.

The study also included an Expert Advisory Panel to provide insight and guidance for best management practices and the development of innovative parking strategies. The panel was comprised of a team of former and current parking professionals and downtown leaders with varying backgrounds in parking demand management, technology innovation, communications strategies, sustainability, and downtown development. The Panel's purpose was to provide insight into real world experiences related to the implementation of performance-based pricing strategies, analyze parking management alternatives, and help develop solutions for Seattle.

Successful implementation of this study will result in improved management systems for on-street parking that will provide better access, a more vibrant business climate, and greater customer satisfaction.



Project Goals and Objectives

PRICE AND MANAGE ON-STREET PARKING TO:

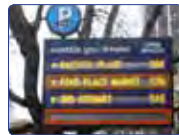
- ☑ Enable customers to find parking within easy walking distance of their destination, while balancing parking needs with other important curb lane uses (e.g., transit stops, loading, etc.)
- ☑ Conserve fuel, reduce greenhouse gas emissions and lessen traffic congestion from drivers circling and looking for parking
- ☑ Increase access to businesses by ensuring on-street parking space turnover
- ☑ Develop new technology and communication tools to improve parking ease of use and to enhance the customer experience



► **DATA DRIVEN POLICY:** Efficient and timely collection of data used to adjust pricing and time limits based on actual occupancy data.



► **IMPROVED ACCESS:** Performance-based parking pricing strategies are being implemented to create one to two open spaces per block face, to ensure convenient access to users.



► **EASE OF USE:** Enhance the parking experience with improved technology, new parking payment options and improved communication tools.

HOW PARKING CAN CONTRIBUTE TO A HEALTHY CITY

A healthy city has the qualities you see in the boxes. Parking plays a significant role in helping to build a walkable, bikable and transit-friendly city.



Neighborhood Vitality: Parking policies promote short-term parking turnover for customers and limit spillover impacts onto residential streets. This improves neighborhood vitality while supporting walking, biking and transit use.

Economic Vitality: Businesses see parking as critical to their success. Businesses need loading and dependable customer parking access. Through improved parking management, the goal is to improve parking availability and reduce congestion caused by people circling for that last open on-street parking spot.

Healthy Environment: Research shows that free parking is one of the biggest determinants for people's mode choice. Managing parking therefore is critical to addressing greenhouse gas emissions.

Equity: SDOT is committed to ensuring that parking solutions are implemented in an equitable fashion.



What is Performance-Based Parking Pricing?

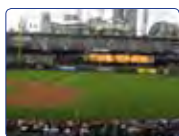
Performance-based parking pricing uses parking occupancy and turnover data to set parking rates and rules that drive demand patterns in a way that achieves a clearly stated policy objective. A performance-based parking pricing program can grow over time to include new data sets, expanded demand management strategies, and more sophisticated technology. As articulated by the City Council, performance-based parking pricing in Seattle is intended to achieve an objective of meeting the target occupancy of one to two on-street spaces available, on average, per blockface throughout the day. Pricing strategies include:



► **NEIGHBORHOOD SUBAREA PRICING** – In neighborhoods where areas of high and low parking demand can be geographically delineated, tailor rates and time-limits to smaller subareas to address distinct differences in parking patterns.

► **TIME-OF-DAY PRICING** – For neighborhoods with varying occupancy patterns over the course of the day, such as high lunchtime and late afternoon peaks and low morning demand, create different parking rates for each of these “time band” periods.

► **SEASONAL ADJUSTMENTS** – Implement higher parking rates during the peak season for neighborhoods where the demands area dramatically different based on the time of year.



► **EVENT OVERLAY** – In business districts where major events (e.g., sports or concerts) create parking dynamics that are very different than a typical day, assess the area parking goals to determine whether to create more event parking by increasing on-street rates and eliminating time limits to accommodate event-goers, or to keep time limits to retain on-street spaces for other businesses during event days.

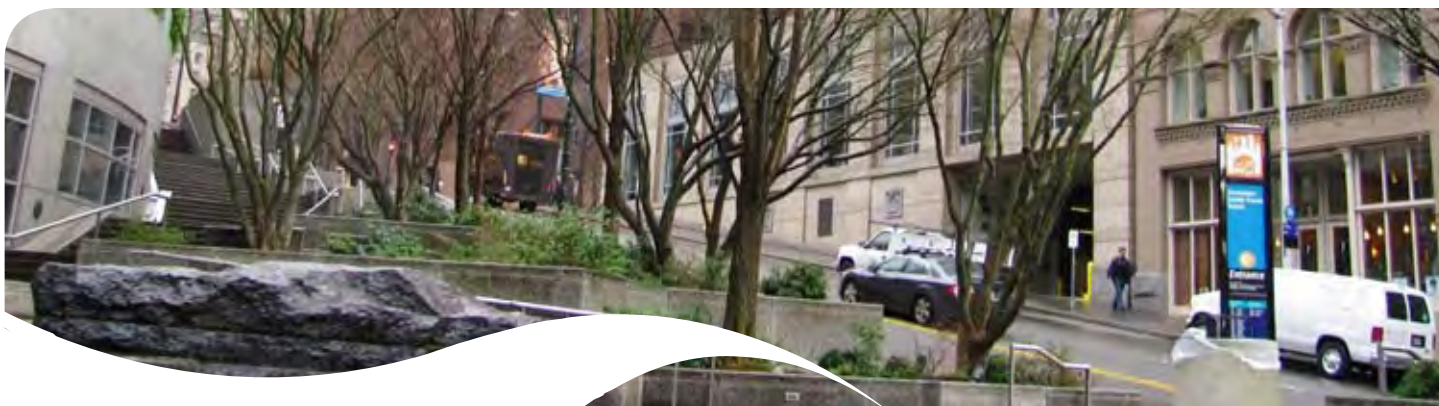
► **PROGRESSIVE PRICING** – For neighborhoods where longer on-street parking stays are desired (e.g., for dinner and a show) charge a premium for additional hours. This strategy could be in combination with time limit elimination or extension.



► **TIME LIMIT EXTENSION** – In areas with greater availability than one to two spaces per block and where land uses do not support short-term retail parking, lengthen the time limit to invite longer stays.

This study posits that “people don’t park just to park” – parking is part of the experience in reaching a desired destination. Data collected as part of this study demonstrated that lowering parking rates does not always result in increased parking demand. Therefore, although rate changes are the primary driver in performance-based pricing, they are not the only strategy to encourage open spaces. Adjusting time limits, addressing use and abuse of disabled parking permits, and adopting new technologies, such as payment by cell phone, can maximize use of limited parking and enhance the customer experience.

Many North American cities are pursuing performance-based pricing programs to address their parking issues. While eyes have been focused on San Francisco and Los Angeles, Seattle’s project can break new ground for the vast majority of cities that will not receive large federal grants.



Parking Programs in Other Cities

The research elements of this study included an extensive literature review as well as in-depth reviews of other programs around the country that include performance-based parking pricing programs.

SFpark

"SFMTA established SFpark to use new technologies and policies to improve parking in San Francisco. Reducing traffic by helping drivers find parking benefits everyone. More parking availability makes streets less congested and safer. Meters that accept credit and debit cards reduce frustration and parking citations. With SFpark, we can all circle less and live more. SFpark works by collecting and distributing real-time information about where parking is available so drivers can quickly find open spaces."



LA EXPRESS PARK

"ExpressPark™, the Downtown Intelligent Parking Management (IPM) Project is proposed as a comprehensive strategy to relieve traffic congestion, reduce air pollution, and improve transit efficiency in Downtown Los Angeles through the implementation of demand-based parking pricing and operational policies."



ExpressPark™
Downtown Los Angeles Intelligent
Parking Management System

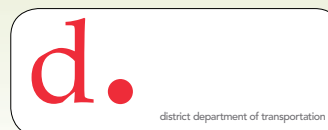
PARK SMART - NEW YORK CITY

"PARK Smart is a program to make parking easier while reducing congestion and improving safety. DOT is conducting six-month pilots in neighborhoods across the City to evaluate how the program works in different settings. The agency works closely with community boards, merchants, BIDs and other local stakeholders when developing the pilots."



WASHINGTON, D.C.

DDOT will test out multiple systems from a variety of vendors, including pay-by-space, pay-by-license plate and pay-by-phone parking. The goal is to identify the best technology and solutions to improve the parking experience for motorists in the District. The pilot project is targeted to last two years.





Study Recommendations

Neighborhood Engagement

1. Partner with neighborhood business districts to better understand customer needs, experiences and program impacts. Sustain relationships and implement strategies. Engage with businesses on strategic communications.

Data Collection and Analysis

2. A robust data collection, analysis and reporting effort is critical to success. Performance-based on-street parking pricing that is “data driven” requires an ongoing investment in data collection and analysis.

While “real-time” data systems are the ideal, they are not financially feasible for Seattle at this time. It is recommended that SDOT continue to conduct annual comprehensive parking occupancy surveys and quarterly or bi-annual surveys of high demand areas. The City is currently developing advanced statistical parking data analysis programs and the in-house development of predictive algorithms using pay station and other data sources. The consultant team recommends continuing these efforts in conjunction with evaluating private sector collaboration options.

Evaluate mobile license plate recognition as a possible alternative data collection methodology. The implementation of on-street parking rate changes based on documented parking utilization data is at the heart of performance-based pricing. Explore the most effective way to measure and document the impacts of parking rate adjustments.

Open Access to Data

3. “So do you have an app for that?” That’s a common question, and the study recommends

that the City continue to push out parking data for private sector computer program software developers to use. The data that the City has from several sources (pay station transaction data, parking utilization survey data, etc.) is a valuable asset that could be leveraged to create interest and potential investment by the private sector.

Pay-by-Cell

4. Pay-by-cell phone is an exciting new parking payment option being recommended for implementation in conjunction with the new Performance-Based Parking Pricing Initiatives. Providing this alternative payment method as a new option enhances the ease and convenience of parking and provides other tangible customer benefits.

An initial, one-time setup to link a credit card number with a phone number is required. After the initial setup, the system then uses caller ID to match the user with the account or another type of account ID.

Pay-by cell phone provides a new payment option that will bring real and tangible customer benefits related to the ease of parking and improved customer convenience. Apply city-wide.

Neighborhood Sub-Area Rates

5. A geographical/demand-based approach would better use parking occupancy data to define and cluster sub-areas with higher demand, then price those high demand accordingly. This approach would “let the data decide” the boundaries and pricing, in contrast to a general district approach. Creating demand-based sub-areas is a natural evolution from the City’s current rate-setting efforts.



Progressive Pricing

6. This recommendation merges two cutting-edge on-street parking management strategies to provide more flexibility in on-street parking options to accommodate the wide variety of customer trip purposes. The elimination or extension of time limits would be combined with “progressive pricing” (e.g., where hours 3 and 4 cost more than hours 1 and 2.) to provide a balance between creating more flexibility of time stays with the need for turnover.

It will be important to find willing neighborhood partners for this demonstration to fully understand parking dynamics prior to changing time-limits and creating sub-area rates. The consultant team’s recommendations for areas to implement this concept, based on the data, are either the Pike/Pine District or the Commercial Core District.

Seasonal Adjustment

7. Adjust rates based on demand patterns throughout year, likely with two seasons – winter/summer. Ballard Locks is a preferred candidate for this demonstration.

Event Overlay

8. Major events can significantly impact neighborhood districts and create parking dynamics that are very different than a typical day. Evaluate how parking might be managed differently during events. An event overlay approach could be tailored to specific areas impacted by major events (such as Pioneer Square and Chinatown/International District near the stadiums, or Uptown near the Seattle Center).

Time-of-Day

9. Peak demand periods may occur for only a few hours during the day. This strategy would adjust rates based on patterns of parking demand throughout the day. It would be important to find a willing partner for this strategy, as it was considered to be “difficult to communicate” by members of the Parking Sounding Board.

This recommendation will implement a time-of-day pricing pilot program, which will change pricing by common time bands (morning, afternoon, evening) based on actual demand patterns that are measured in each neighborhood.

For example, an area with high demand after lunch peaks would have higher prices during the afternoon period, but potentially lower prices in the morning and evening periods. The benefit of this strategy is better management of parking through pricing, but only in the periods that it is truly needed.

The following areas were observed to have significant changes in demand over the course of the survey day and would technically be good candidates for this pilot: Roosevelt, 12th Avenue, Chinatown International District, Ballard Locks & Fremont.

Disabled Parking

10. Changes in Regulation of Disabled Parking — Use and abuse of disabled parking privileges can greatly impact a city’s parking dynamics. In studies over the last ten years, the city has found that the tremendous amount of abuse of these permits limits access to legitimate permit holders and other parkers. Abuse, e.g. use of disabled permit by non-disabled persons, as well as legal use of permits and plates to obtain free all-day on-street parking for persons working in the immediate area effectively tie up large amounts of on-street parking for the entire day, prohibiting any short-term use by both disabled and non-disabled persons. This can be particularly true under a performance-based approach in which rates are increased in high-demand areas, adding to the incentive to use and abuse the disabled privileges.

Based on the June 2011 data, disabled permit usage was highest around the medical campuses in those areas, with use around 30-40%. In the Commercial Core, usage was typically around 20-25%.

It is recommended that the city implement 4-hour time limits in paid parking areas for vehicles with disabled parking permits (as authorized under state law). Proactive engagement with the disabled community should be continued and enhanced if this recommendation is acted upon. The city should also continue to pursue changes in state law to strengthen regulations for accountability within permit distribution and the role of doctors in approving permit.

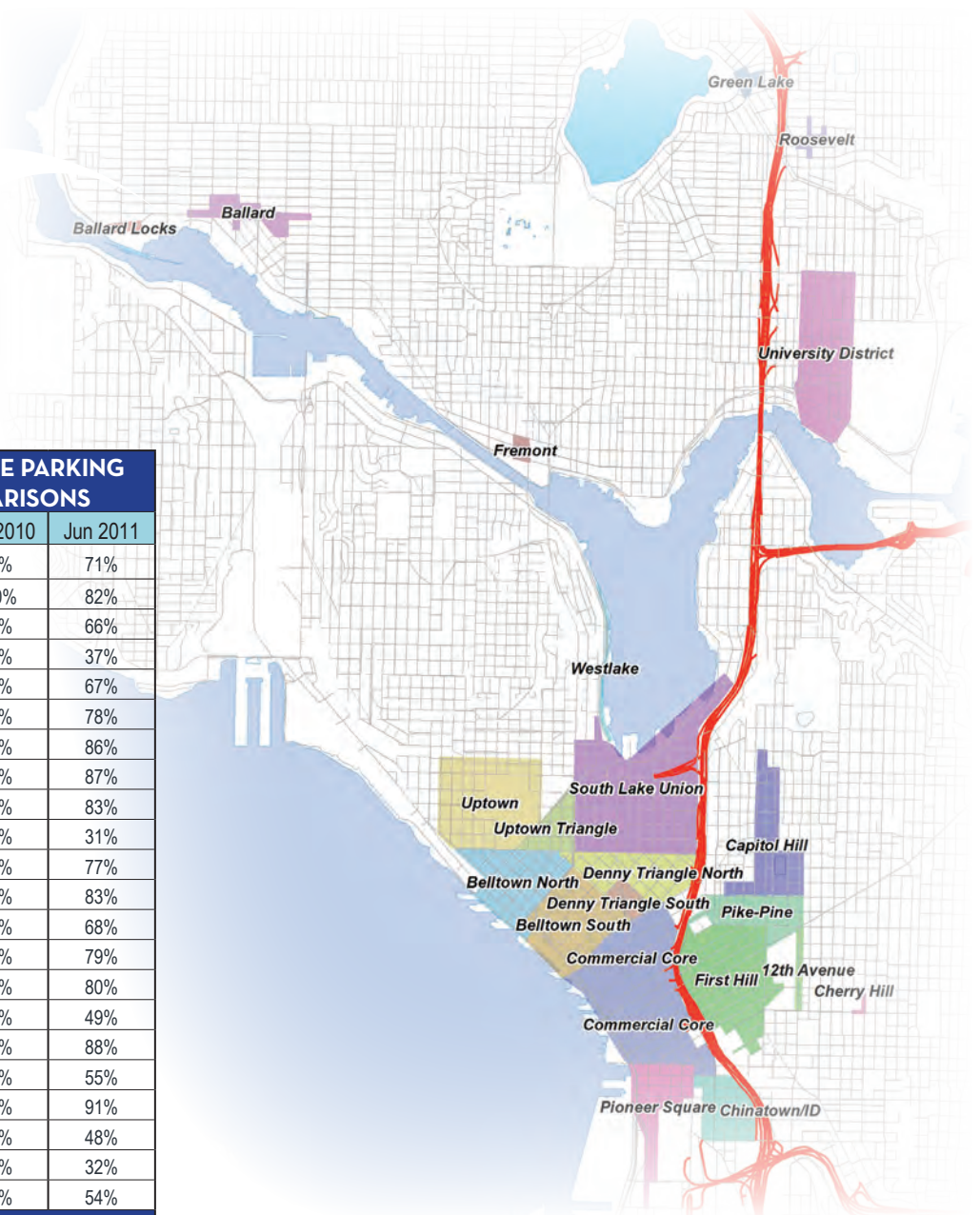


June 2011 – Annual Parking Occupancy.....

The June 2011 data collection effort covered all of the city neighborhoods with paid on-street parking. The 23 study areas were nearly identical to the areas for which data was collected in the November 2010 parking study, providing the opportunity to examine the effects of the 2011 parking rate changes. Each study area has a distinctive blend of commercial and residential development, parking supply and demand patterns, and hourly rates. The on-street data collection was completed over a three-week period in June and covered the areas shown in the map below:

- Each of the 23 neighborhood parking districts was surveyed.
- In areas where rates were increased, there was a slight reduction in occupancy; in areas where rate didn't change, results were mixed, with minor fluctuation in occupancy up and down; and, in areas where rates were lowered, there was not a dramatic increase in occupancy.

OVERALL PEAK DAYTIME PARKING UTILIZATION COMPARISONS		
Neighborhood District	Nov 2010	Jun 2011
12th	80%	71%
1st Hill	100%	82%
Ballard/Ballard Locks	68%	66%
Belltown North	46%	37%
Belltown South	65%	67%
Chinatown/International District	80%	78%
Capitol Hill	89%	86%
Cherry Hill	85%	87%
Commercial Core	97%	83%
Denny Triangle North	42%	31%
Denny Triangle South	71%	77%
Fremont	80%	83%
Greenlake	64%	68%
Pike-Pine	85%	79%
Pioneer Square	91%	80%
Roosevelt	67%	49%
South Lake Union Long Term	73%	88%
South Lake Union Short Term	58%	55%
U-District	64%	91%
Uptown	52%	48%
Uptown Triangle	29%	32%
Westlake Ave. North	61%	54%





JUNE 2011 PARKING OCCUPANCY SURVEY					
Neighborhood District	Overall Peak Parking Utilizations				
	8 AM – 12 PM	12 PM – 3 PM	3 PM – 6 PM	6 PM – 8 PM	Saturday Peak
12th Avenue	45%	71%	62%	96%	67%
Ballard	43%	53%	50%	109%	115%
Ballard Locks	31%	69%	60%	44%	105%
Belltown North and South	43%	49%	64%	98%	75%
Capitol Hill (Broadway)	49%	58%	87%	116%	114%
Cherry Hill	87%	80%	68%	N/D	N/D
Chinatown/International District	59%	78%	56%	89%	129%
Commercial Core	78%	83%	82%	70%	91%
Denny Triangle North	32%	33%	51%	82%	N/D
Denny Triangle South	78%	79%	91%	108%	N/D
First Hill	82%	76%	72%	71%	N/D
Fremont	44%	71%	66%	97%	89%
Green Lake	48%	52%	105%	119%	109%
Pike/Pine	63%	78%	90%	120%	113%
Pioneer Square	56%	70%	58%	46%	118%
Roosevelt	41%	50%	75%	79%	77%
South Lake Union (Short and Long Term)	65%	68%	67%	71%	48%
University District	47%	65%	66%	102%	83%
Uptown	38%	48%	48%	86%	94%
Uptown Triangle	28%	33%	44%	N/D	44%
Westlake Ave. North	52%	53%	52%	N/D	49%

Future Data Collection Efforts

The City of Seattle has invested in extensive parking data collection and analysis efforts in 2010 and 2011 creating the required baseline data needed to inform performance based parking pricing strategies. In order to maintain and expand the program, the City must be committed to the level of data collection necessary to maintain annual metrics and build a library of data that can inform rate setting decisions and management strategies, and forecast demand elasticities by neighborhood of the Seattle parking system on an on-going basis.

With the data report and comparison completed, a foundation has been built for a data-driven parking pricing system. The on-street parking occupancy data, along with paid parking transactions and other tools, can be used to inform and refine future year rate-setting processes. In order to build on this foundation, an annual data collection inventory is necessary to assess how these changes have impacted the existing parking conditions. This annual data collection inventory should be planned for the same months (May-June) each year to promote a more efficient and realistic comparison of annual data results. The City should continue to monitor and collect data for the same locations, to better understand how parking pricing decisions are affecting parking behavior throughout the community. Additionally, the City should continue to collect Saturday and Sunday data, as well as incorporate the weekend data into the annual rate setting analysis.

The City should also consider adding turnover and duration data collection to its annual roster of data collection tasks. As the City moves into the various realms of performance based pricing, the measurement and understanding of turnover will be critical to the development of future policies and the maintenance of the overall system. As a subset of this data, the City should consider measuring disabled permit occupancy and turnover, to better understand the impacts of the long-term disabled placard use and abuse within the community.



Parking Expert Advisory Panel

The panel included a team of former and current parking professionals and downtown leaders with varying backgrounds in innovative parking management, technology, sustainability and downtown management. The purpose of this panel was to provide insight through “real world experience” related to the implementation of performance based pricing strategies, analysis of specific parking management alternatives, and the development of unique solutions for the City of Seattle.

The following issues were key focus areas:

- Appropriate occupancy ranges
- Data needs
- Rate setting methodologies
- Dynamic pricing experiences and strategies
- Strategies on revenue forecasting
- Communication strategies
- Methodologies for implementation (pilot programs)
- Evaluation of other parking technologies



Parking Sounding Board

To inform the parking strategy development process, SDOT assembled a Parking Sounding Board, representing businesses and community, as well as other organizations in the city. The Sounding Board began meeting in June 2011, and will continue to meet after completion of the Performance-Based Parking Pricing Study.

The primary purpose of the Sounding Board was to provide a forum for two-way information exchange. The key goals for the Sounding Board included:

- Providing perspective on the effects of paid parking policies
- Representing constituency perspectives
- Reviewing and commenting on potential performance-based pricing strategies and implementation options

The Sounding Board met 4 times from June – August, 2011. The meetings kept Sounding Board participants informed of study progress. Data results were reviewed and discussed. The Board was engaged in discussions regarding performance-based pricing strategies and what strategies might make sense in their districts. There were lively discussions of potential enabling technologies, as well as larger parking and transportation issues and concerns.

PERFORMANCE BASED PARKING PRICING STUDY PARKING SOUNDING BOARD PARTICIPANTS

Katherine MacKinnon	Downtown Seattle Association (DSA)
Francine Fielding	Wright-Runstad
Laura Larson	Republic Parking
Ed Danyluk	Imperial Parking Corporation (IMPARK)
Mike Fuda	Diamond Parking Service
Josh McDonald	Washington Restaurant Association
Leslie Smith	Alliance for Pioneer Square
Chip Wall	Pike/Pine Urban Neighborhood Council
Doug Campbell	University District Business Owner, Bulldog News
Beth Miller	Ballard Chamber of Commerce
Don Blakeney	Chinatown/International District BIA
Jessica Vets	Fremont Chamber of Commerce
Susan Ranf	Seattle Mariners
Eric de Place	Sightline Institute
Erica Sekins	Seattle Commission for People with Disabilities
Jerry Everard	Seattle Nightlife and Music Association



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CHAPTER 1

Data Collection Effort

INTRODUCTION

This Chapter provides a discussion of data collection efforts associated with SDOT's Performance-Based Parking Pricing Study. The development of pricing strategies and parking management initiatives is intensely data driven, and SDOT realizes and appreciates the need for comprehensive data to fully understand its parking system needs and characteristics.

Within this Chapter, there are separate sections that define methodology study areas, a general summary of results, and recommendations for future data collection.

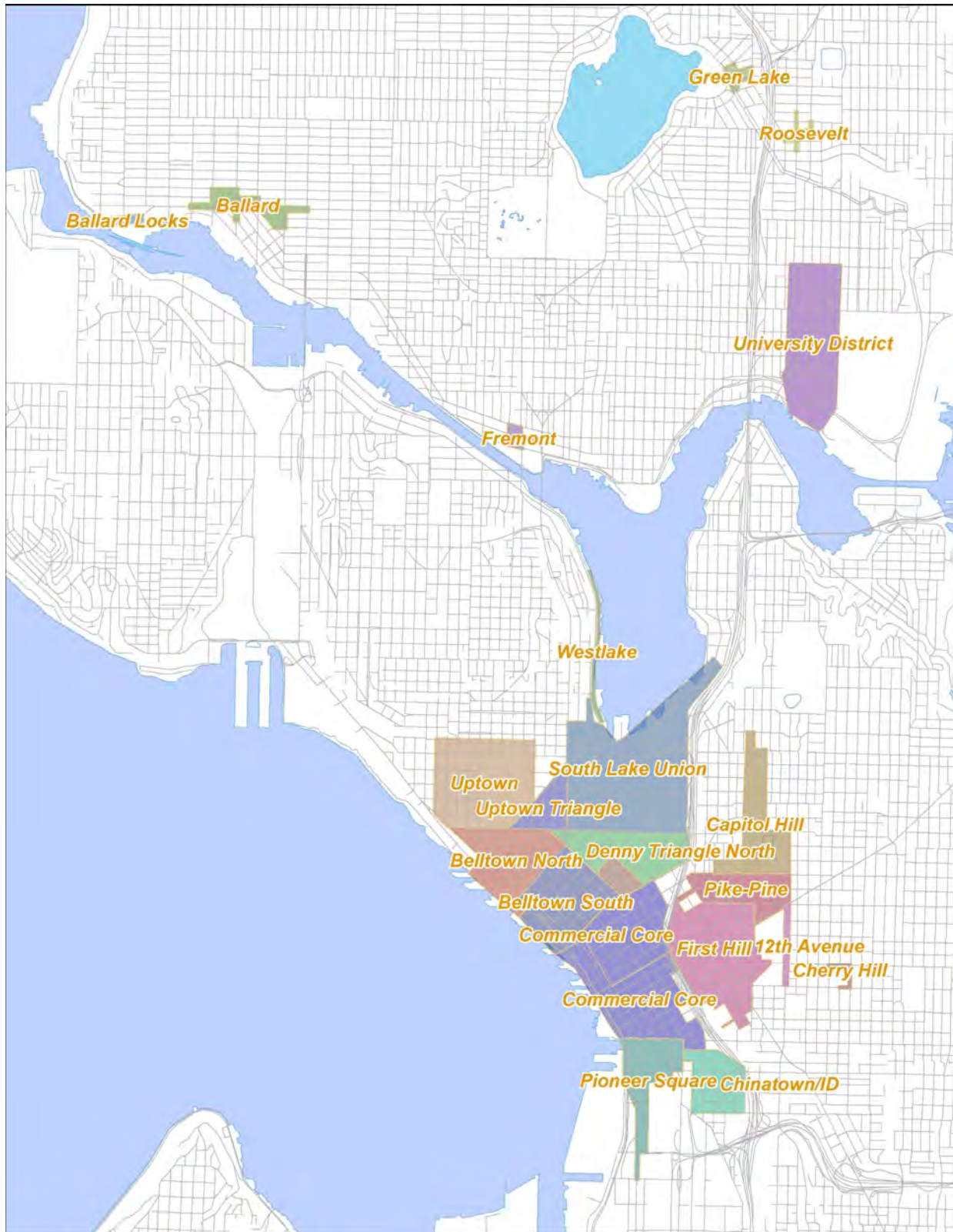
The neighborhood specific summary reports (available under a separate cover) provide the following information:

- General information about each area
- Rate changes and projected results from the 2011 Rate Setting Process
- Data collection methodology
- Weekday data comparison with November 2010 data
- Disabled permit usage (where applicable)
- Residential permit usage (where applicable)
- Weekend parking demands (where applicable)
- Event parking demands (where applicable)
- High demand areas (within the specific neighborhood)

Data Collection Methodology

The June 2011 data collection effort covered many different areas within the Seattle community, with 23 different paid parking areas. These study areas are nearly identical to the November 2010 data collection effort, which provides the opportunity to do a direct before and after comparison of each area. Each study area had its own unique blend of land uses, parking supply and demand patterns, and hourly rates. The on-street data collection was completed over a three week period in June and covered the areas shown in the map below.





Specifically, the following areas were analyzed as part of the June 2011 data collection efforts. Each area will be defined in greater detail in the subsequent sub-area data reports.

- Commercial Core – including Pacific Place, Pike Place, Financial District, and Western-Madison-Yesler sub-areas
- Pioneer Square
- Chinatown/International District
- Belltown (North and South)
- Denny Triangle (North and South)
- First Hill
- Pike-Pine
- Capitol Hill
- 12th Avenue
- Cherry Hill
- South Lake Union – including short and long term parking
- Westlake Ave North
- Uptown
- Uptown Triangle
- University District
- Fremont
- Greenlake
- Roosevelt
- Ballard
- Ballard Locks

Data were collected on typical weekdays (Tuesday through Thursday), a non-typical “Game Day” weekday and weekends (Saturday and Sunday) at hourly intervals from 8 am – 8 pm. The exceptions were Cherry Hill, Westlake Ave N, and Uptown Triangle where data collected ended at 6 pm. All study areas collected on Sunday had data collection hours from 10 am – 6 pm. The following table is a summary of the morning, afternoon and evening peak occupancies for each of the areas listed above.



June 2011 Parking Occupancy Survey				
Neighborhood District	Peak Parking Occupancy			
	8 AM – 12 PM	12 PM – 3 PM	3 PM – 6 PM	6 PM – 8 PM
Commercial Core	77.9%	83.2%	81.9%	70.0%
Pioneer Square	56.2%	69.8%	57.9%	46.0%
Chinatown/International District	59.1%	78.1%	55.9%	89.1%
Belltown	42.6%	48.8%	63.5%	97.6%
Denny Triangle North	31.7%	32.9%	51.1%	81.9%
Denny Triangle South	78.1%	79.0%	90.5%	107.6%
First Hill	82.4%	75.6%	71.9%	70.7%
Pike/Pine	62.5%	78.1%	89.8%	120.1%
Capitol Hill (Broadway)	49.1%	58.3%	87.1%	116.2%
12 th Avenue	45.1%	70.8%	62.0%	95.8
Cherry Hill	86.7%%	80.0%	68.3%	N/D
South Lake Union	64.9%	68.2%	67.4%	71.1%
West Lake Ave. North	51.9%	53.1%	51.9%	N/D
Uptown	38.4%	48.1%	47.8%	86.4%
Uptown Triangle	28.3%	32.6%	43.7%	N/D
University District	46.7%	65.3%	66.2%	101.8%
Fremont	44.1%	71.0%	65.6%	96.8%
Green Lake	48.2%	51.8%	104.5%	118.8%
Roosevelt	40.9%	49.5%	75.4%	78.5%
Ballard	42.9%	52.5%	50.0%	108.6%
Ballard Locks	31.3%	68.8%	60.0%	43.8%

During the collection periods several different types of data were collected:

- **Occupancy (OC)** – Total number of vehicles parked on-street during the inventory period related to the total number of available on-street parking space.
- **Disabled Parking Permits (Placards or License Plates) (DP)** – Vehicles with a placard or license plate displaying the international symbol for individuals with disabilities.
- **Restricted Parking Zone Permits (RPZ)** – Vehicles with a pre-paid permit in the form of a placard, windshield sticker or temporary dashboard permit to display authorization for parking on block faces with a matching Zone number.
- **Service Vehicles** – government exempt vehicles (e.g. City of Seattle, King County, Police, Fire, or Emergency Vehicles)

The collection of the above variables was dependant on the day of the week and study area. The table on the following page defines the overall days of data collection and what exact data was collected for each study area on that day. Following this table, summary tables define the peak observed occupancy

(typically during unpaid hours of operation), peak disabled permit usage, and peak residential permit usage.

Future Data Collection Efforts

In order to maintain and expand SDOT's performance-based parking program, as recommended in subsequent chapters, SDOT must be committed to a level of data collection necessary to maintain annual metrics and build a data library that informs rate-setting decisions, management strategies, and elasticity of the on-street parking system. The following recommendations are focused on building a consistent data collection program that can be built on over the years. A complete discussion of data collection and analysis recommendations is included in Chapter 2.

With the data report and comparison completed for November 2010 and June 2011, a foundation has been built for the future system. In order to build on this foundation, an annual data collection inventory is necessary to assess how these changes have impacted the existing rate structure. This annual data collection inventory should be planned for the same months (May-June) each year to promote a more efficient and realistic comparison of annual data results. SDOT should continue to monitor and collect data for the same locations, to better understand how parking pricing decisions are affecting parking behavior throughout the community. With the continued collection of Saturday and Sunday data, SDOT should incorporate the weekend data results into the rate setting process.

SDOT should consider adding duration data collection to its annual study. As SDOT moves into the various realms of performance based pricing, the measurement and understanding of duration will be critical to the development of future policies and the maintenance of the overall system. As a subset of this data, SDOT should consider measuring disabled parking permit occupancy and duration, to better understand the impacts of the long term disabled placard use within the community.



Data Collection									
Area	Thursday 6/2/11 8 am - 8 pm	Saturday 6/4/11 8 am - 8 pm	Thursday 6/9/11 8 am - 8 pm	Saturday 6/11/11 8 am - 8 pm	Sunday 6/12/11 10 am - 6 pm	*Tuesday 6/14/11 8 am - 8 pm	Wednesday 6/15/11 8 am - 8 pm	Thursday 6/16/11 8 am - 8 pm	Saturday 6/18/11 8 am - 8 pm
Commercial Core				OC, DP	OC, DP	OC, DP			
Pioneer Square			OC, DP	OC	OC	OC, DP			
International District			OC, DP	OC	OC	OC, DP			
Belltown								OC, DP	OC
Denny Triangle								OC, DP	
First Hill							OC, DP, RPZ		
Pike-Pine							OC, RPZ		OC, RPZ
Capitol Hill (Broadway)							OC		OC
12 th Ave							OC		OC
Cherry Hill							OC, DP		
South Lake Union							OC, RPZ		OC, RPZ
Westlake				OC, RPZ		OC, RPZ			
Uptown								OC	OC
Uptown Triangle								OC	
Universtity District	OC	OC							
Fremont				OC		OC			
Green Lake	OC	OC							
Roosevelt	OC	OC							
Ballard				OC		OC			
Ballard Locks				OC		OC			
OC = Occupancy DP = Disable Placard or License Plate RPZ = Restricted Parking Zone Permit * Seattle Mariner's Game Day Tuesday 6/14/11									

Overall Peak Occupancy (%)									
Area	Thursday 6/2/11 8 am - 8 pm	Saturday 6/4/11 8 am - 8 pm	Thursday 6/9/11 8 am - 8 pm	Saturday 6/11/11 8 am - 8 pm	Sunday 6/12/11 10 am - 6 pm	*Tuesday 6/14/11 8 am - 8 pm	Wednesday 6/15/11 8 am - 8 pm	Thursday 6/16/11 8 am - 8 pm	Saturday 6/18/11 8 am - 8 pm
Commercial Core				97.3%	110.0%	83.2%			
Pioneer Square			69.8%	117.6%	87.1%	81.3%			
International District			89.1%	128.7%	96.2%	119.0%			
Belltown								97.6%	85.2%
Denny Triangle								89.8%	
First Hill							82.4%		
Pike-Pine							120.1%		112.7%
Capitol Hill (Broadway)							116.2%		114.0%
12 th Ave							95.8%		66.7%
Cherry Hill							86.7%		
South Lake Union							72.4%		48.2%
Westlake				49.4%		53.1%			
Uptown								86.4%	94.3%
Uptown Triangle								43.7%	
Universtity District	101.8%	83.2%							
Fremont				89.2%		96.8%			
Green Lake	118.8%	108.9%							
Roosevelt	78.5%	76.7%							
Ballard				115.2%		108.6%			
Ballard Locks				68.8%		105.0%			
* Seattle Mariner's Game Day Tuesday 6/14/11									

Overall Peak Disabled Placard Occupancy (%)									
Area	Thursday 6/2/11 8 am - 8 pm	Saturday 6/4/11 8 am - 8 pm	Thursday 6/9/11 8 am - 8 pm	Saturday 6/11/11 8 am - 8 pm	Sunday 6/12/11 10 am - 6 pm	*Tuesday 6/14/11 8 am - 8 pm	Wednesday 6/15/11 8 am - 8 pm	Thursday 6/16/11 8 am - 8 pm	Saturday 6/18/11 8 am - 8 pm
Commercial Core				9.0%	3.4%	23.1%			
Pioneer Square			14.5%			11.5%			
International District			20.9%			22.2%			
Belltown								3.5%	
Denny Triangle								9.5%	
First Hill							21.9%		
Pike-Pine									
Capitol Hill (Broadway)									
12 th Ave									
Cherry Hill							40.0%		
South Lake Union									
Westlake									
Uptown									
Uptown Triangle									
Universtity District									
Fremont									
Green Lake									
Roosevelt									
Ballard									
Ballard Locks									
OC = Occupancy DP = Disable Placard or License Plate RPZ = Restricted Parking Zone Permit * Seattle Mariner's Game Day Tuesday 6/14/11									

Overall Peak RPZ Occupancy (%)									
Area	Thursday 6/2/11 8 am - 8 pm	Saturday 6/4/11 8 am - 8 pm	Thursday 6/9/11 8 am - 8 pm	Saturday 6/11/11 8 am - 8 pm	Sunday 6/12/11 10 am - 6 pm	*Tuesday 6/14/11 8 am - 8 pm	Wednesday 6/15/11 8 am - 8 pm	Thursday 6/16/11 8 am - 8 pm	Saturday 6/18/11 8 am - 8 pm
Commercial Core									
Pioneer Square									
International District									
Belltown									
Denny Triangle									
First Hill							24.5%		
Pike-Pine							5.8%		3.9%
Capitol Hill (Broadway)									
12 th Ave									
Cherry Hill									
South Lake Union							10.9%		11.2%
Westlake				8.8%		8.8%			
Uptown									
Uptown Triangle									
Universtity District									
Fremont									
Green Lake									
Roosevelt									
Ballard									
Ballard Locks									
OC = Occupancy DP = Disable Placard or License Plate RPZ = Restricted Parking Zone Permit * Seattle Mariner's Game Day Tuesday 6/14/11									

CHAPTER 2

Performance-Based Parking Pricing Strategies Development

Introduction

Within the larger context of the overall study, this chapter's primary focus is on performance-based parking pricing strategy development. The work that informs this chapter includes significant research and literature review elements, an exploration of other performance-based parking pricing programs, an assessment of the latest parking and related technologies, a specific evaluation of Seattle's existing inventory of on-street parking pay stations relative to potential new pricing strategies and a discussion of other keys issues identified during the research.

Chapter Purpose

The purpose of this chapter is to identify:

- On-street performance pricing strategies implemented around the country, with the successes, failures, and lessons learned
- Potential performance pricing strategies with associated communications and enabling technologies as well as their applicability to Seattle's parking conditions
- Recommendations for implementation

The recommendations are intended to accomplish the policy objectives set forth by the Mayor and Seattle City Council—to achieve a goal of one to two on-street spaces available, on average, per block face throughout the day. Determining the best plan and strategy for Seattle will be challenging. Learning from other national and international experiences and projects while tailoring a new system to the unique character and needs of Seattle is central to this study. Critical elements in the implementation plan are the required technology and communications capabilities. Other issues include funding, user understanding and acceptance, character of the affected parking districts, and other factors.

PURPOSE:

The purpose of this Chapter is to develop a performance-based parking pricing implementation plan (as informed by the data collection and analysis, economic analysis, and public engagement tasks) that contains recommended strategies, tactics, phases, and costs.

Background

It is important to understand the genesis of the City's policy goals. The basic concepts have evolved from the work of Donald Shoup, FAICP, professor of urban planning at the University of California, Los Angeles.

In his book, "The High Cost of Free Parking," Dr. Shoup creates his compelling case for using "market-based pricing" as a mechanism to improve traffic circulation and parking space availability in congested urban areas, business districts, and central city neighborhoods. Since the publishing of Dr. Shoup's book, numerous studies and research efforts have been undertaken by the academic, public, and private sectors to evaluate the potential impacts of such pricing concepts.¹ This work has led places like San Francisco, Washington D.C., New York, and Los Angeles to launch pilot programs for performance-based

¹ See, *City of Seattle – Performance-Based Parking Pricing Study – Project Research Summary*, (June 2010)

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parking pricing strategies. Motivating factors for conducting these pilots have included (but are not limited to):

- **Better Informed Management:** Technology is now enabling parking managers to leverage new levels of system information for improved parking management capabilities.
- **Improved Data:** Efficient and timely collection of data can be used to adjust pricing and time limits based on actual, around-the-clock data.
- **Improved Program Efficiencies:** Performance-based parking pricing strategies are being implemented to create one to two open spaces per block face, to ensure convenience of access to users.
- **Reduced Carbon Emissions:** Providing improved on-street parking availability reduces traffic and congestion caused by drivers circling for parking.

It is important to note that revenue collection is not a primary management goal. However, revenue generation is an outcome of good on-street parking management.

As discussed in Chapter 1, this overall study includes citywide paid parking data collection and analysis. An economic analysis, identification of demonstration projects, and public engagement components are included in Chapters 3 and 4. Overall project outcomes will include a phased plan for implementing performance-based parking pricing policies, including strategies, tactics, and pilot programs for downtown Seattle and neighborhood business districts.

Understanding Performance-Based Pricing

Data-Driven Processes

Performance-based parking pricing strategies set parking rates based on a set of data-driven characteristics; the most common characteristic is the availability of a supply of parking. A variety of pricing strategies can be considered in the context of performance-based on-street parking. Examples include rates changing by time of day, day of week, location, or a variety of other options such as seasonally adjusting rates to respond to different peak demand patterns. The purpose of performance-based parking pricing is to make finding parking easier and increase the likelihood that people will be able to park closer to their intended destinations including shopping, restaurants, entertainment, and appointments. By increasing parking availability, people will spend less time circling the block looking for parking, which also means less congestion, lowered vehicle emissions, and more convenient access to intended destinations. As such, pricing for parking increases with higher demand and reduces as parking supply falls below specific targeted demand thresholds.

Ultimately, the performance-based parking pricing program designed for Seattle will establish a data-driven parking strategy that effectively facilitates well-informed decision-making regarding parking occupancy, availability, and cost. The basic quantifier is the level of constraint (utilization in excess of a targeted demand threshold) as it relates to the supply of on-street parking and the price necessary to adjust that constraint to a lesser level as a means to improve parking access and street circulation.

Real-Time versus Predictive Algorithms

Performance-based parking pricing can take many forms. For the most part, the level of sophistication underlying the data system drives the type of performance-based parking pricing strategies deployed. Data systems to inform strategy and rate setting range from “real-time” systems with equipment such as wireless sensor technologies and advanced software systems to “predictive algorithms” that use traditional data sources such as periodic surveys.

Real-Time Pricing

Generally, the faster that parking occupancy data can be assembled and analyzed, rate adjustments can be more real-time. The ideal scenario for implementing real-time parking programs is with wireless sensor networks deployed to provide real-time utilization, turnover, and payment status information. Sensors are embedded in streets (in parking stalls) to detect vehicle presence at all times.² Sensor information is relayed to a consolidated network operations center where real-time rate adjustments are made based on occupancy and relayed back to the parking “meter” or customer payment system (e.g., smartphone, in-car meter system, etc.). However, as discussed later in this Chapter, sensors are a fairly recent technology and have not been in use by municipalities long enough to be considered reliable at this time. Additionally, the technology at this point is expensive and cities that are implementing the technology are

² Sensor technology today is more advanced than ever before. Parking sensors are self-powered, rugged, and completely wireless. Each sensor actually contains an array of different sensing components and logic to manage the collection of data at the individual parking space.

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Performance-Based Parking Pricing Strategies Development

doing so with Federal funding. Figure A below illustrates the basic infrastructure involved in this type of system.

Figure A
Real-Time Parking Pricing System



Several cities have begun piloting real-time data collection technology, including Los Angeles, San Francisco and Washington, D.C. For the most part, these pilot programs have involved significant public grant funds, largely off-setting the municipalities' costs. These grant funds are typically used for technology purchases and development of performance monitoring systems. LA received \$15 million from the U.S. Department of Transportation, and San Francisco procured a \$19.8 million grant from the U.S. Department of Transportation's Urban Partnership Program.

The advantages and challenges of real-time pricing systems include:

Advantages

- Data and occupancy information is real time, allowing for the potential for nearly instantaneous adjustment of rates to reflect and influence desired occupancies.
- Rates can be adjusted on an area-wide basis or on a block face by block face basis.
- Information reflects the true measure of occupancy at the point in time it is collected, although it does not necessarily record payment or illegal parking.
- Efficiencies are created for the deployment of enforcement resources to the most-impacted areas.

Challenges

- Extremely fluctuating rates, say on a daily basis, would be difficult to communicate to the public. If rate changes create confusion, they may not achieve the desired changes in parking behavior.
- These systems assume a high level of integration with electronic communications systems (e.g., mobile apps, smartphones, performance-based parking pricing, etc.) to inform and direct the public to parking.
- It is too early to determine the true cost recovery of the current systems in place. Without large grants or other subsidies, the financial viability of these systems is in question. Another issue that has yet to be fully measured is the effective life-cycle of sensors. Some vendors claim the sensors can last up to 15 years, but that has yet to be proven.
- Integration with existing parking systems. Real-time systems require sophisticated and comprehensive parking management support networks, requiring large investments to create integrated systems within municipal parking agencies.
- Real-time pricing strategies are still subject to influence of non-payment parking such as disabled permit parking.

These systems are still considered to be “experimental” and it is recommended that Seattle continue to monitor the outcomes from San Francisco and Los Angeles in regards to this technology.

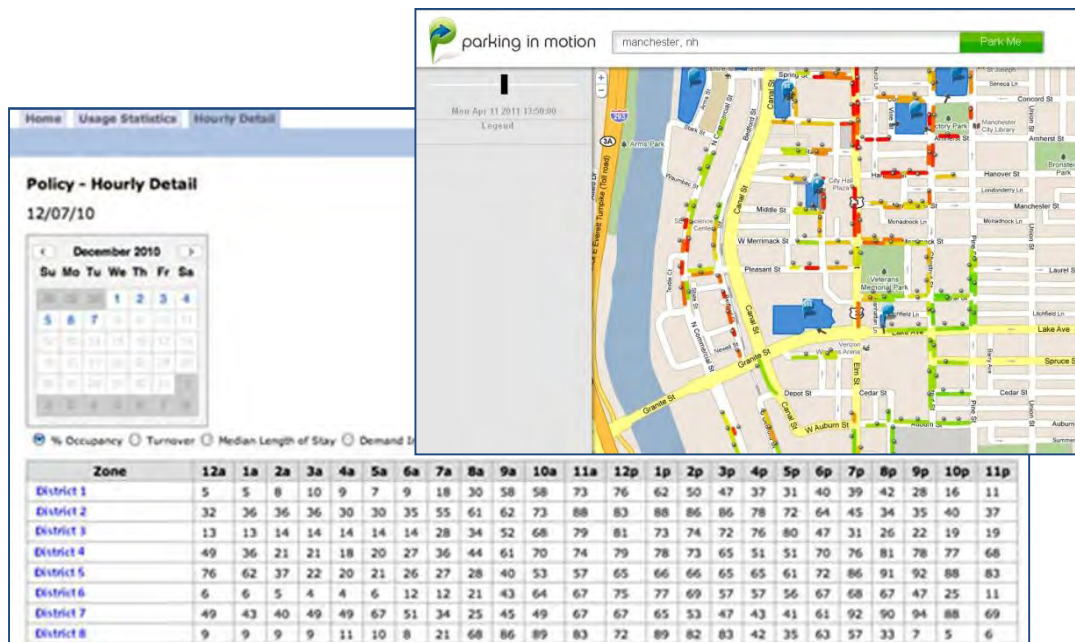
Predictive Algorithm Rate-setting

Systems that are less “real time” can also be effective, but are considered “predictive” because the assembly of occupancy data occurs routinely but far less frequently than real time. These systems provide innovative and powerful information solutions to inform policy and rate decisions. For instance, the use of “parking heat maps” is an effective tool for documenting and tracking parking utilization patterns. Parking heat maps use historical parking utilization information as a base and apply predictive algorithms to create maps that predict the likely availability of finding a space based on historical trends and predicted parking utilization patterns. This data can also be used to analyze parking utilization as it relates to performance-based rate setting for specific areas of a downtown or parking district.³

³ See for instance, www.parkinginmotion.com

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As collected information becomes richer over time (i.e., updated data sets by time of day, day of week, season, geographic area, etc.), the predictive nature of the system improves. Other data sources for the development of predictive pricing systems include:

- Traditional periodic manual parking surveys
- Hourly transaction data from existing pay stations
- Partial wireless sensor system deployed to achieve a “statistically valid sampling” of parking data by district versus continuous and comprehensively deployed sensor systems
- Mobile license plate recognition (LPR) as a means of sampling data versus continuous collection
- Data from municipal traffic camera systems employing video analytics technology

The advantages and challenges of periodic collection/predictive algorithm pricing systems include:

Advantages

- Provides an affordable alternative to sensors
- While working with less data, this approach can still be effective, particularly as historical data resources are updated and refreshed and predictive algorithms are refined over time
- Rate changes may be easier to communicate as changes are segmented to longer periods of time, as opposed to real-time changes

Disadvantages

- Does not account for occupancy fluctuations within a specific day or week

- LPR does not effectively account for non-payment parking (such as disabled parking) and the level of accuracy has also been noted as a concern
- Can be time and resource consuming from a labor perspective, particularly if data collection occurs through repetitive manual on-street surveys

Performance-based pricing applied to on-street parking is a fairly new concept; therefore, a large body of supporting literature or case study materials is not currently available. A growing number of performance-based parking pricing strategies are being implemented in various communities; however, there is no single, proven, regularly used standard for application as of yet. This study will provide the City of Seattle with a recommended phased implementation plan for the application of performance-based on-street parking pricing and other related parking management strategies tailored to the current realities (technological, social, economic, and financial) in Seattle.

Performance-Based Parking Pricing Strategies and Applications

The project team identified several initial performance-based parking pricing strategies following a review of project background materials, initial data collection survey results, and relevant research materials. These initial strategies were presented to the project Sounding Board on July 14, 2011. The primary strategies addressed in this document include:

1. Demand-Based Geographic Sub-Areas

Includes identifying sub-areas within overall neighborhoods that have high and low parking occupancy and adjust rates accordingly to improve parking system performance. Maximum time limits can also be adjusted (e.g., changing from 2 hour max parking to 4 hour or all-day).

2. Time of Day Pricing ("Time Bands")

A time of day approach applies variable parking rates based on established "Time Bands." For example, an area may have relatively low parking occupancy in the morning, but ramps up in the afternoon and evening, resulting in two or three different rates during one day.

3. Progressive Pricing

Progressive pricing of on-street parking rates is structured to (a) facilitate a desired rate of turnover, (b) keep rates for desired short-term parking lower, and (c) allow for longer-term stays for a premium.

4. Elimination (or Extension) of Time Limits

The elimination of time limits is, in theory, coupled with increased or possibly progressive rates. The increased or "market-based" rates provide an "economic limiting factor" that produces the desired turnover.

5. Event-Based Pricing Overlay

An event overlay approach would be tailored to specific areas impacted by major events.

6. Seasonal Rate Changes

Rates can be changed twice a year to accommodate areas that have a different winter and summertime peak periods.

7. Pay-by-cell

Pay-by-cell phone is an alternative payment option that is now well-proven and provides a number of tangible customer benefits that can improve the ease of parking.

8. Disabled Parking

Disabled parking permit abuse has the potential to negate, to a significant degree, gains made in regards to improved space availability through the application of performance-based parking pricing. Specific recommendations related to this issue are provided.

Research and Technical Assessment

This section provides an overview of the approach to this study and provides a summary of the project research efforts and sources. The approach to developing this technical report on performance-based parking pricing strategies is built on three key components:

- Focused literature review and online research component
- Reviews of municipal performance-based parking pricing programs
- Parking technology review

Literature Review and Online Research

The research component of the project involved an extensive literature review and internet research. The literature review uncovered several older articles, studies, and technical papers that dealt with the performance-based parking pricing largely on a theoretical or conceptual basis. Overall, the scarcity of materials corresponds to the fact that the application of these concepts to on-street parking is a new field.

The following are comments and observations made regarding the literature review and data collection exercise. Each finding is linked to specific documents reviewed and collected for this study. Appendix A (City of Seattle – Performance-Based Parking Pricing Study – Project Literature Review and On-line Research Summary) is a summary of the project research database contents.

Literature Review – Summary Comments and Observations:

1. **Old Concept – New Applications.** The concept of using pricing to moderate demand is a basic economic tenet and is widely used in the off-street parking market. Application of these principles to on-street parking is fairly new, particularly with funding from the federal government with the value pricing program. The work of Professor Donald Shoup and his book “The High Cost of Free Parking” has pushed performance-based pricing to the forefront of the current on-street parking management agenda on a national and international basis.
2. **Disabled Parking Placard Abuse: a National and Local Problem.** The abuse of disabled parking permits is a growing national problem that significantly impacts regulating urban on-street parking supplies. The disabled community can be a positive resource and partner in addressing this problem.
3. **Technology Is Driving Parking Policy and Management Innovation.** The leaps-forward in advanced parking technologies and related industry technologies, such as telecommunications, wireless technologies, mobile devices and applications, etc., are transforming the parking and transportation industries in several significant aspects including information transmission, customer service enhancements, and more convenient payment options.
4. **Growing Parking Management Sophistication and Integration with Broader Urban Space Management Programs.** There is a growing trend for more sophisticated and effective municipal parking programs to partner with downtown management organizations and adopt a more proactive approach to community and economic development.

5. **The Emergence of “Green Parking” Strategies.** There is a growing appreciation of the importance of sustainability and that transportation accounts for approximately 30% of the greenhouse gas emissions nationally. “Green Parking” strategies are expanding.
6. **Social Equity in Policy Development and Strategy Implementation/Planning.** The issues of social inclusion, diversity, and equity have been “mainstreamed” and are included as evaluation criteria when communities evaluate new policies, technology purchases, and implementation planning.
7. **Linking Performance-Based Parking Pricing to Larger Community Strategic Goals and Related Programs.** There are significant advantages to linking parking management, pricing strategies, and technology purchases to a larger strategic framework that encompasses transportation demand management, traffic congestion mitigation, environmental, and sustainability goals, as well as being sensitive to the “customer experience.”
8. **National and International Applications.** Urban parking and transportation issues are global in their scope. All major cities are struggling with similar issues. Many are approaching these common problems in both similar and very different ways.
9. **Dynamic Program Elements and Related Communication Challenges.** A common theme from most performance-based parking pricing pilot programs is the potential complexity and dynamic nature of the programs. This creates the need for special focus on communications strategies. Leveraging a wide range of communications tools and strategies is critical to success.
10. **Data, Data, Data.** All the performance-based parking pricing pilots have a strong reliance on the public dissemination of data and on building a “data-driven” program. The challenge lies in obtaining good data, performing solid and reliable data analysis, and effectively communicating the program outcomes based on the application of the data. Accuracy, transparency, ease of access, and timely information dissemination are key focus areas.
11. **Performance Metrics – How Is Success Defined?** Because many of the strategies associated with performance-based parking pricing strategies are still fairly new, little empirical data exists on the most efficacious approaches. Key at this stage is to measure, analyze, and adjust. The nature of performance-based pricing strategies requires ongoing monitoring and adjustment. As pricing adjustments impact one area, it is only natural that they can create changes in adjacent areas. Having a well-defined system of performance metrics is important not only to defining program success, but also to understand real program impacts.

Review of Performance-Based Parking Pricing Pilot Programs

Because of the relative newness of applying these concepts to on-street parking, the most valuable research involves reviewing the handful of performance-based parking pricing pilot programs currently underway in several major urban centers. These primary urban centers include:

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- San Francisco, CA - *SFpark*
- Los Angeles, CA- LA Express Park
- Washington, DC Pilot Programs
- New York City – Park Smart Program

More extensive information on each of these major performance-based parking pricing pilot programs is provided in Appendix B.

Parking Technology Review

A detailed section on new parking technologies is provided in Appendix C. This appendix covers the following topic areas:

- Multi-Space Meters - Pay-and-Display and Pay-by-Space benefits and disadvantages and
- Recent Trends in Multi-Space Meters
- Single-Space Credit Card-Capable Meters, benefits and disadvantages
- Pay-by-License Plate benefits and disadvantages
- Meter-less Pay-by-License Plate
- In-Vehicle Meters benefits and disadvantages

The following technologies are directly related to specific recommendations within this report.

Pay-by-Cell Phone

Pay-by-cell phone as a parking payment option is just as it sounds – once motorists park their vehicles, they call a phone number usually located on a sign or the parking meter, enter their space or license plate number, and then hang up. Smartphones have an app that doesn't require a phone call. An initial, one-time setup to link a credit card number with a phone number is required. The system then uses caller ID to match the user with the account. This technology has great potential for making parking easier and providing a significant number of customer benefits.



Wireless Sensors

When discussing on-street parking technology, the emergence of wireless sensor technology must be considered. Vendors now offer sensors integrated into single-space-credit card-capable meters; but most current applications are stand-alone sensors embedded in the street (or less frequently, curbside) and linked to either multi-space pay-by-space meters or single-space credit card-capable meters.

The two leading firms offering in-ground sensors both provide robust back-end software that can take information from pay-by-space meters (and also pay-by-phone applications) to provide parking metrics

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Performance-Based Parking Pricing Strategies Development

data and analysis and also have significant “directed enforcement” applications with interfaces to most major handheld vendors using open systems.

It must be recognized, however, that this technology is still evolving and has not been fully proven in large-scale urban environments. Issues that are still being addressed include sensor accuracy, detection and transmission latency (i.e., delays in transmission), interference from other electrical sources, and the ability to handle all types of spaces (parallel, diagonal, and perpendicular) and all types of vehicles (motorcycles, oversized trucks, etc.).

At present, the greatest obstacle to wide adoption of sensors is cost. Sensors have both substantial up-front and ongoing per-space costs. And the cost/benefit has not been conclusively demonstrated in a large-scale application, although that dynamic may become clearer over the next few years.

Parking Applications

Another major innovation is the increase in public and private sector applications intended to make more parking data available to the parking public and offer new services to parkers. SDOT has ventured into this work with the release of the Seattle Parking Map, and associated data on the City's data.seattle.gov. The Seattle Parking Map provides daily updated location and description of all parking signs, on-street parking rates, temporary no parking locations, as well as off-street parking facility locations, rates and hours of operation. The Map also displays real-time parking availability from the e-Park system.



Made possible by the tremendous increase in smartphone usage (originally the iPhone and now Android-based phones) and more recently the iPad and similar devices, all of which incorporate GPS capability, these applications can gather information about a parker's whereabouts while also offering differing levels of information about the environment in which the vehicle is located or to which it is heading.



One of the key questions for the industry going forward is the extent to which on-street data provided by intelligent meters and sensors will be made available to parking application vendors. Vendors currently earn fees by selling their applications at nominal rates and/or from advertising on their sites. Some, such as Parking In Motion, are perhaps being paid fees when users reserve parking at off-street lots. It is in the interests of cities and the vendors to have as much information publicly available as possible, but it is unclear to what extent cities (especially those implementing enhanced technology without major Federal support) will seek to recoup their capital cost by selling such information, and whether the customer base will pay enhanced fees for applications offering real-time data.

Business Process Implications

Implementation of new meter technology and associated changes in policies regarding pricing can have significant implications for day-to-day parking operations. Having an installed base of older pay stations, Seattle understands many of these impacts.

Revenue Collection

One of the greatest operational impacts of multi-space meters is in meter collections, especially when credit card and/or smart card acceptance is included. Fewer patrons pay with coins, so vaults fill up at a slower rate. More significantly, meter self-reporting of the need for collection allows more efficient use of collectors. Meters never get full, thus potential revenue losses are averted.

Revenue accountability/integrity is also increased. Since revenue is tracked and all access to the revenue compartment and coin vault can be recorded and audited, “leakage” is greatly reduced. This is especially true when electronic locks are used. On a given day the electronic “keys” can be programmed to only open those meters scheduled for collection, and a complete audit trail is maintained.

Revenue reconciliation can remain an issue; however, as vendors’ back-end meter management and revenue tracking software vary in capability. In fact, this aspect of a manufacturer’s product line—i.e., the back-end software, has recently become a significant differentiator among vendors. Some city parking managers report significant differences between vendors as to accuracy and timeliness of revenue data and ability to integrate with other reporting streams (especially as additional payment methodologies such as pay-by-cell are added.)

Maintenance

Meter maintenance is an increasingly complex issue, requiring a number of areas of expertise new to traditional parking meter shops: 1) greater sophistication in information systems that track types of components and programming, 2) personnel skilled in system diagnostics and troubleshooting, 3) development of quality control reporting and 4) GIS mapping capabilities, to name some of the more prominent elements. On one level, maintenance of newer multi-space meters is more efficient, since the units self-report problems via wireless technology and use swappable replacement parts. The increasing complexity of the overall system and of the communications elements can make meter repair more challenging. Even as some tasks remain fairly routine (routine maintenance, battery replacement, and receipt paper replenishment), some problems are harder to diagnose, especially those related to communications. It is also the case that as systems and backend software become more powerful and complex, managers and supervisors must be more skilled in the use of automated systems and databases, report generation, work planning and the management of exponential multiples of programming elements that are specific to pay station type, hours of operation, maximum duration, peak hour restrictions and rate structure. Finer grained sub-areas will depend more and more on sophisticated GIS mapping systems to identify and provide data to technicians servicing, programming and troubleshooting the pay stations. Greater complexity will require additional levels of quality control/quality assurance to monitor the stability of the system and individual pay station programming; for example, regular verification of rate structure and maximum duration are immediate requirements of the current system.

One potential approach is to implement skill levels or grades for meter techs, with entry level staff handling more mundane issues and a smaller, more highly skilled (and paid) group of techs assigned to more complex issues. The meter maintenance database would help support “right-sizing” such a staff based on trends in specific meter malfunctions. Toronto currently uses such a tiered maintenance staff.

The consulting team conducted an investigation into meter maintenance staffing. In a survey of four cities (Philadelphia, Los Angeles, Denver and Portland), where the average ratio of metered spaces to technicians averaged 1370, and industry standard is considered to be 1,200, Seattle is currently staffed at one technician per 1,930 spaces. To achieve the standard, Seattle would have 11-12 technicians as opposed to the seven currently on staff.

Enforcement

In the on-street environment, effective enforcement is critical to achieve a good level of public compliance with parking regulations and realization of the program’s parking management goals. A major area for potential improvements involves “directed enforcement.” Using a combination of data on space occupancy and payment status, it is possible to send data to enforcement handhelds regarding potential violations for unpaid meter or overtime parking. This can be accomplished using maps, if supported by the handhelds, and routed to the particular officer responsible for the beat containing the space.

Aggregation and Dissemination of Data

The more complex a performance-based system is, the more challenging it will be to gather, analyze, and disseminate data. Both of the major federally supported pilots, San Francisco and Los Angeles, are based around in-street real-time sensor networks, custom-built⁴ centralized parking management systems including multiple data warehouses, and sophisticated analytical tools. This network will provide the data on which dynamic parking rate adjustments will be made.

Such state-of-the-art parking central management systems will combine data from sub-systems for sensor management, meter management, meter collections and pay-by-cell. They will maintain historical information in various data warehouses and be capable of analytics supporting directed enforcement, directed collections and maintenance, flexible rate setting (including “what if” modeling) and feeding data to the public. Sophisticated use of GPS will allow tracking and analysis of information down to the block face level. More significantly, more so than at present, managers will be able to assess the relationship among fees, occupancy, violations and citation issuance over time. Equally important, these systems will have the ability to feed data on parking availability and fees to web-sties, smartphone applications, 511 systems, dynamic message signs and in-vehicle navigation devices. Such systems will require increased training and sophistication for city parking managers and substantial IT support, either in-house or vendor-supplied.

A fully-functioning performance-based parking pricing system will require staff and system tools to review and analyze data, set rates, and evaluate outcomes on an on-going basis. Additional staff resources and

⁴ It is interesting that in its *SFpark* pilot, SFMTA has opted to build its own parking management software, while Los Angeles has included this task as a major responsibility of its prime Express Park contractor.

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data analysis tools required for this effort include planners, statisticians, economists, GIS specialists and IT resources.

Seattle has already built a GIS and Oracle-based database of historical occupancy data and pay station transaction data. They review and evaluate pay station transaction data, through in-house analysts, to develop predictive algorithms related to parking demand and revenue modeling. One potential outcome of this analysis is to determine if this approach could eventually serve as a proxy for the more expensive manual data collection methodologies currently being employed as the basis for periodic on-street parking rate setting. These research and analysis efforts are promising and should be continued.

As it relates to the overall development of a performance-based parking pricing program, the staff required to analyze data, set rates, monitor changes following rate adjustments, review outcomes, estimate revenue impacts and report program status and accomplishments is significant. There are many variables that will impact the ultimate staff requirements to effectively implement this program. There are no real precedents for guidance as Seattle is the first major city of its size to take on this type of initiative. A program of this nature will require a combination of skill sets and expertise including: planners, statisticians, economists, GIS and IT resources. Other factors include the number and nature of the various pilot programs that will be implemented, new technologies that will be phased in, the data analysis approach and the type and frequency of data collection activities needed.

Changes in Regulation of Disabled Parking

Use and abuse of disabled parking privileges can greatly impact a city's parking dynamics. Abuse, e.g. use of disabled placards by non-disabled persons, as well as legal use of placards and plates to obtain free all-day parking tie up large amounts of on-street parking for the entire day, preventing short-term use by both disabled and non-disabled persons. This can be particularly true under a performance-based approach when rates are increased in high-demand areas, adding to the incentive to use and abuse the disabled parking permit privileges.

In studies in the last ten years, the city has found that the tremendous amount of permit use in downtown Seattle, First Hill and several other neighborhood business districts. The city currently allows permit holders to park without payment and without regard for time limit, allowing all-day free parking at the permit holder's discretion. However, the city is authorized, under state law, to install 4-hour time limits in paid parking areas for vehicles with disabled parking permits. This proposal has been under review as a pilot project for either the downtown financial / government area or around the hospitals on First Hill but, to date, the proposal has not moved forward. City staff regularly meets with advocates for people with disabilities and the Seattle Commission for People with disABilities to discuss parking changes and work together to improve public education around this issue. The city is also pursuing changes in state law to strengthen regulations for accountability within permit distribution and the role of doctors in approving permits.

While regulations governing the parking rights and responsibilities of those with disabilities reflect a complex mix of federal and state legislation, local ordinances, and local politics and culture, it is worth noting in the context of this report that some U.S. cities have effectively changed their regulations to greatly limit the impact of disabled placard abuse.

In 2000, the Philadelphia Parking Authority (PPA) concluded that it was dealing with epidemic levels of placard abuse in the core of the central business district. Over the previous eight years, the meter vacancy rate had declined from 7% to just 2%; in the same period, the percentage of meters occupied by a vehicle displaying a disabled placard had increased from 11% to 40%. The PPA rallied support from the downtown business community, which was concerned over the lack of turnover, and the disabled community, which had actually witnessed a decline in the availability of metered parking for the legitimately disabled. The PPA successfully pushed for ordinance changes and in its internal operations, which included the following:

- Enforcement of existing disabled space set asides in off-street garages, including annual audits
- Patrol of off-street disabled spaces by PPA enforcement staff
- A requirement that vehicles displaying disabled placard must pay at meters
- Designation of a set number of meters per block as "Disabled Only"
- Revised time limit regulations such that vehicles displaying a disabled placard and NOT paying at the meter would receive one hour of parking before being cited while those that did pay the meter were not subject to time limits.

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Implemented in 2000, the regulations have proven highly effective. By 2002, the percentage of central business district (CBD) meter spaces occupied by a vehicle with a disabled placard had dropped to 2%, and the vacancy rate at meters had risen to 13%. CBD meter revenue had increased by approximately 16%, although PPA had been careful never to promote increased revenue as a goal of the new rules. Since 2002, the disabled parking in the CBD has increased to approximately 4%, but remains well below the peaks seen in 2000.

It should also be noted that when Philadelphia implemented multi-space meters over the last several years, it simply left older coin-only electronic meters in place at the end of each block dedicated to vehicles with disabled placards. However, it is now considering replacing these with single-space credit card-capable meters.

Phoenix serves as another example of a city that adopted disabled parking policies very similar to Philadelphia, including dedicated disabled meters on each block, requirement that all vehicles pay the meters, and some leeway on time limits. The only difference is that even at disabled meters, patrons are not allowed to park all day, even if they pay. Although detailed occupancy data is not available, recent surveys conducted in the CBD observed occupancies by vehicles with disabled placards was not excessive, and appeared well below that reported for Los Angeles and San Francisco, cities which have reported substantial placard abuse.

In Seattle, the most recent data collection efforts showed that disabled parking usage varied. In June 2010, disabled permit utilization was collected in the Commercial Core, Pioneer Square, Chinatown/International District, Belltown South, Denny Triangle North, Denny Triangle South, First Hill, and Cherry Hill. From those observations, use was highest in the Commercial Core, Cherry Hill, and First Hill. In the First Hill and Cherry Hill areas, disabled permit usage was highest around the medical campuses in those areas, with use around 30-40%. In the Commercial Core, usage was around 20-25% typically. For more information, see Chapter 1 of this report.

Current System Capabilities

The City of Seattle was an early adopter of multi-space parking meter technology, and Parkeon was chosen as the preferred equipment supplier. Being an early adopter of multi-space meters now translates into a system with a large number of older pay stations. Many of these older pay stations cannot adapt their rate schedule programming to adjust to some of the rate models being considered in the context of this performance-based parking pricing study. However, as many of the pay stations are approaching the end of their projected 10-year useful life, there is an opportunity to replace them with units that have increased capabilities. This section provides a specific review of the current system's equipment base and capabilities.

Parking Pay Stations

Seattle has an existing installed base of Parkeon multi-space pay stations. Currently, the installed base consists of:

- 1,500 Stelio Pay-and-Display
- 700 Strada Pay-and-Display
- 17 Strada Pay by Space
- 10 CityPal Pay-and-Display (installation in progress)

A review was conducted with Parkeon of the capabilities of the current meters to facilitate performance-based pricing. Parkeon was asked to provide the capabilities of each type of meter to facilitate the following:

- Rate Setting by Time of Day
- Evening Flat Rate
- Day of Week Rates
- First Hour Free
- Progressive Rates
- Event Based Rates
- Seasonal Rates
- Vary Time Limits by Day of Week
- Frequent Rate Changes
- Pay by Cell
- Rate Setting by Smaller Geographies
- Integration with In-Street Sensors
- Multiple Simultaneous Rates
- License Plate Recognition

- Real-Time Data

A detailed assessment matrix is provided in Appendix D – “Parking Pricing Strategies and Technology Feasibility, Current Parking System Capabilities Matrix.” Below is a summary of current system capabilities and limitations. This followed by a matrix documenting where the various pay stations by type are located combined with a several key categories of neighborhood parking characteristics.

Stelio Pay-and-Display Meters

The 1,500 Stelio meters represent Parkeon's older generation pay-and-display meters. While the Stelio is a very robust meter and provides good performance in a basic pay-and-display mode, the older platform is not able to support most of Seattle's future performance-based pricing requirements. The Stelio is not well suited for performance-based pricing strategies and integration with the newer wireless technologies. The Stelio can accommodate some rate structures through hard-coded programming that requires each of the 1,500 meters to be individually visited to initiate the rate changes. The Stelio's main limitations are:

- The screen only allows a two-line display, 16 characters each. Parking rates are posted on rate cards affixed to the meter.
- Limited capability to wirelessly push rate information to each meter.
- Tariff constraint – Cannot enforce a time limit when parking time goes through a rate change

Strada Pay-and-Display and Pay-by-Space Meters

The Strada pay-and-display and pay-by-space meters represent Parkeon's more recent technology and provide more options for performance-based strategies. The cost for the upgrades must be weighed against the benefits achieved as well as the ability to provide all the pricing scenarios that Seattle may require in the future. Stradas in the pay-and-display mode will still require a visit to each meter for hard-coded parking rate changes. Pay-by-space can handle these changes wirelessly, but rate cards on the meters will need to be changed to reflect the rate changes. The alternative is to push rates electronically and conduct frequent quality control analysis to ascertain that the meter continues to charge the correct rate, as any electrical surge, battery failure or certain maintenance will cause the meter to revert to the last hard-coded rate. The Strada can provide the following capabilities; however, upgrades may be required:

- A display screen of six lines, 20 characters each.
- Possibility of downloading a tariff screen.
- A tariff engine compliant with a variable rate scenario.

CityPal

The CityPal meter represents Parkeon's latest technology. It is operated on a Linux platform with an open architecture that more readily facilitates integration with third-party technologies. It is real-time, all the time and capable of meeting all of the performance-based parking scenarios that Seattle may require (according to the vendor). Rate downloading can be performed wirelessly and does not require individually visiting each meter to hard-code the rate changes. Each meter can be operated in a pay-and-display, pay-by-space, pay-by-license plate (or other identification method). The meter may also be used

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for purposes beyond parking, such as citation payment, issuance of parking permits, and wayfinding mapping. The CityPal can provide:

- Remote and wireless downloading of rates and messages.
- Multiple parking modes can be managed at the same meter.
- Adapt parking rules and rates depending on events, time of day, seasonal rates, loyalty, free parking, progressive rates, variable rates, etc.
- Open architecture for integration with allied technologies.
- Large color touch screen that can accommodate multiple rate scenarios and related instructions.
- Real-time transaction, occupancy, revenue, and enforcement information available through the back-end management system.

Seattle is currently in the process of installing 10 CityPals as part of a pilot test program. Four meters have been installed with the remaining six meters to be installed by the end of August 2011.

The matrix below summarizes the existing parking conditions in each of the neighborhoods.

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	Short –term parking	Long –term parking	Installed base Stelios	Installed base Stradas	Stelio/Strada Mix	RPZ blocks	Core area occupancy different from edge	Time of day demand fluctuations	High disabled usage >15%	Seasonal demand fluctuations	Low demand overall <50%	Event impacts	Greater than 2 hour activities
12th Avenue	X		X					X	X				
Ballard	X		X				X						
Ballard Locks	X		X					X		X			
Belletown North	X				X		X				X		X
Belletown South	X				X		X						
Capitol Hill	X				X	X	X						
Cherry Hill	X		X						X				
Chinatown/ID	X		X					X	X			X	X
Commercial Core	X		X						X			X	
Denny Triangle North	X				X						X		
Denny Triangle South	X		X						X				
First Hill	X				X	X			X				
Fremont	X			X				X					
Green Lake	X			X								X	
Pike-Pine	X	X			X	X							
Pioneer Square	X		X				X					X	X
Roosevelt	X			X				X			X		
South Lake Union	X	X		X		X	X						
University District	X		X				X						
Uptown	X		X				X				X	X	X
Uptown Triangle	X	X		X							X	X	X
Westlake Ave N	X			X		X							X

Future Considerations

Based on the above summary and Appendix D, it is clear that the existing Stelios are very limited in their ability to provide a platform to facilitate performance-based pricing. The Stradas have more capability to provide some of the functionality—either as currently configured or with hardware and software upgrades. The CityPal has the latest technology available in the market today and is best suited to achieve the entire range of rate-setting scenarios described above as well as integrate with allied technologies.

It is likely not feasible or necessary for Seattle to replace all of the Stelios at one time. A plan could be developed to relocate some of the Stelios to areas in the city that do not require performance-based pricing. Upgraded Stradas could be utilized in areas that require minimal pricing schemes, and CityPals could be considered for areas with the most challenging and comprehensive pricing schemes. However, the City needs to begin to develop a phased pay station replacement plan. Creating a phased equipment replacement plan that dovetails with the priorities and goals of the performance-based parking pricing strategies is a logical approach.

Once the City determines the scale of the 2012 performance-based parking pricing program, the City may want to consider some of the following alternatives:

- Development of a phased-in replacement plan for some of the aging Stelios.
- Upgrading some Stradas to perform certain pricing schemes
- Determine feasibility of a trade-in program for Stelios and Stradas for the more technologically advanced CityPal. This could be done over a period of time as the program is phased in around the City.
- Discuss with Parkeon the availability of financing options available to replace the Stelios and upgrade the Stradas.
- Leverage this opportunity to evaluate other systems/vendors.

Parking Enforcement System

Seattle Parking Enforcement currently uses about 125 Intermec CN3 handheld units. The units run Advanced Public Safety (APS) software called "Pocket Citation." Each unit is BlueTooth, WiFi and cell phone capable, but these functions are not used at this time except on a limited basis (2 - 3 units) in the Westlake Ave N area with pay-by-space stations. As such, and for purposes of this study, the City's system is capable to integrate with pay-by-cell options should the City formally pursue such an option.

In anticipation of new technology applications, Seattle Parking Enforcement has already begun to lay the groundwork by evaluating and researching other handheld options (i.e., Motorola and others) to (a) stay abreast of general technology changes and directions and (b) recognize the useful life of the existing hand held system that was purchased in 2008. It is estimated that the current system has a life cycle of about seven years.

One limitation of the existing handheld system is difficulties with the digital display that is problematic in high sunlight and/or rain conditions.

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Finally, the City also maintains Autoview License Plate Recognition (LPR) systems on two vehicles. The City uses these vehicles in time limit restricted areas (primarily non-metered areas). These systems are approximately two years old.

Overall, the City is positioned to move toward integration with new technology options. All City parking management elements have been proactive in staying well informed as it relates to new technologies and directions that the industry is taking. They are actively engaged in efforts to understand and anticipate new trends and options in the field.

Framework for Performance-Based Parking Pricing For Seattle

Performance-based parking pricing in Seattle is envisioned as an on-street parking pricing system responsive to fluctuations in demand and compatible with existing parking technologies (primarily parking pay stations). This will allow the City of Seattle to initiate implementation of performance-based parking pricing strategies in the near term, while evolving the system over time as more sophisticated technologies are proven. This phased approach will benefit the City by maximizing the recent investment in on-street parking technology upgrades. Factoring in the effective life cycle of current systems and continuing to monitor the successes and challenges of the major federally subsidized on-street parking management programs, such as *SFpark* and *LA Express Park*, is a measured and balanced approach to implementing the policy objectives as set forth by the Mayor and Seattle City Council.

This approach has another important dimension on a national basis. While all eyes have been focused on San Francisco, LA, Washington, DC and New York City, this project is breaking new ground for the vast majority of cities that will not receive large federal grants to pilot expensive new technology solutions. By developing alternative and more cost-effective approaches to data collection to inform performance-based pricing rate setting, Seattle will be a leader in helping to move performance-based on-street parking pricing forward on a national basis.

An effective program of performance-based parking should allow SDOT to:

1. Track parking utilization accurately in the 23 parking districts
2. Use parking rates, combined with a suitable system of communication to the parking public, to influence parking behavior that results in peak utilization rates within targeted occupancy parameters (one to two available spaces on average per block face throughout the day).
3. Enact a policy for parking rate setting that is comprehensive (i.e., calibrated to parking utilization) but flexible enough to be implemented strategically over time as parking districts grow and evolve.
4. Use, to the highest degree possible, existing equipment technologies, staff resources, systems and databases to assemble, quantify, and analyze parking utilization.
5. Establish new parking pricing systems that are easily and cost-effectively replicable in other parking districts.
6. Establish performance-based pricing in a manner that is conducive and complementary to future technology enhancements.

Within the performance-based parking pricing strategy framework, the following preferred strategy elements have been identified. These elements begin to define the overall performance-based parking pricing strategy and implementation plan.

Recommended Strategies and Implementation Plan

As the City moves toward a performance-based parking pricing program, issues related to equipment technology, data collection and assessment, and frequency of rate adjustments need to be resolved. Five pricing strategies and one enabling technology are being recommended. This overview is followed by a more detailed implementation plan.

Recommended Approaches

The approaches recommended for implementation are summarized below:

- Neighborhood Engagement
- Invest in an Enhanced and Ongoing Data Collection and Analysis Program
- Leverage Private Sector Investment by Providing Open Access to City Parking Data
- Geographically-Based Rate Setting
- Add Pay-By-Cell Phone as a New Parking Payment Enabling Technology
- Pilot Progressive Pricing in Combination with the Elimination (or Extension) of Time Limits
- Make Seasonal Rate Changes
- Develop an Event Overlay Parking Pricing Strategy
- Implement a Time of Day Performance Pricing Pilot Program
- Address Disabled Parking Abuse

On-Going Neighborhood Engagement

Partnering and effectively communicating with neighborhood business districts, and other impacted stakeholders will be a key to success as parking management moves into implementing strategies. Engaging with businesses on strategic communications, keeping the public informed and building/sustaining relationships to better understand and respond to customer needs and experiences are all components of an performance-based parking pricing marketing/communications program.

A variety of specific program communications, marketing and branding strategies are provided later in this chapter, but the fundamental commitment to neighborhood/business district engagement is critical to on-going success. Many of these concepts are new and innovative thus creating a special need for enhanced community education. Not all strategies will be appropriate or applicable in all areas. For those districts where specific pilot projects will be implemented, having the neighborhood associations and other invested stakeholder engaged as willing partners can improve the chances for successful implementation.

Invest in an Enhanced and Ongoing Data Collection and Analysis Program

Performance-based on-street parking pricing that is “data driven” requires an ongoing investment in data collection and analysis. A robust data collection, analysis and reporting effort is critical to success.

While “real-time” data systems would be ideal, the wireless sensor systems being tested in other communities are still essentially unproven and expensive are not, therefore, recommended for Seattle at this time. It is recommended that the City continue to conduct annual comprehensive parking utilization surveys with supplemental quarterly or bi-annual surveys of high demand areas, unless better alternative emerge from recommended private sector pilot programs. The City is currently exploring advanced statistical parking data analysis and the in-house development of predictive algorithms using parking pay station paid parking occupancy and other data sources. The consultant team recommends the continuation of these efforts in conjunction with evaluating private sector collaboration options. The development of pilots to test different data collection, analysis, and reporting options is encouraged.

Leverage Private Sector Investment by Providing Open Access to City Parking Data

So do you have an app for that? Smartphone applications combined with dynamic websites, parking “heat maps”, instructional videos, etc. are all key communications tools that are essential to effective communications in a performance-based parking pricing program. Several companies have been developing on-street parking management systems, some utilizing wireless sensor networks and some without, to provide the data needed to manage on-street parking in more effective ways.

SDOT has assembled significant databases of information from several sources (pay station transaction data, parking utilization survey data, etc.). This is a valuable asset that could be leveraged to create interest and potential investment/partnership with the private sector. The potential benefits of this initiative could provide a variety of solutions that could reduce the cities costs, improve overall program communications, enhance the parking experience and contribute to community sustainability goals. The City is also encouraged to work collaboratively with other cities to develop a standard for sharing parking occupancy and transaction data.

Geographically-Based Rate Setting

Traditional on-street parking pricing results in a specific hourly rate (e.g., \$2.00 per hour) applied over all parking hours in a parking district. As such, the rate does not necessarily account for parking occupancy variations in different areas within a defined parking district. The underlying assumption with a district approach is that demand is consistent throughout the district. Examining the data results from the June 2011 study, this is not the case in eight of the 23 Seattle parking districts. These areas are University District, Ballard, Capitol Hill, Pioneer Square, South Lake Union, Belltown South and North, and Uptown.

A geographically-based approach would better use parking occupancy data to define and cluster sub-areas, then price those sub-areas accordingly. This approach would be to let the data decide the boundaries and pricing, in contrast to a general district approach. Creating sub-areas is a natural evolution from the City's current rate-setting efforts. SDOT can use the block face occupancy data from the parking studies and paid parking transactions analysis to determine where clusters of sub-areas that are a reasonable size (five blocks minimum), that are above or below the target occupancy for that neighborhood, and that make sense for a difference parking rate or time-limit.

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In this recommended strategy, rate-setting would be focused on parking occupancy by sub-area and even at a block to block level. This approach could be operationalized both in real time (with sensors) or predictively using periodic adjustments based on updated historical data. One challenge could be an increase in the number of pricing zones. If pricing is assessed using predictive modeling, similar distributions of demand by time of day, can still be developed, although changes to rates will occur on a much less frequent basis compared to the real-time applications being tested in LA and San Francisco. However, this may have some positive aspects, as it provides parkers time to understand the rate changes and modify their behaviors accordingly.

Another issue is that of “adjacency.” Sub-areas with substantially different rates could create an impetus for frequent parkers to park a block or two away to take advantage of lower rates. This is not necessarily a problem as it would be one way better distribute parking demand, thus creating the desired availability in the peak demand areas. However, it will be important to track shifting demand patterns and understand the impacts.

Pay-by-Cell Phone

To enhance the ease and convenience of parking and provide other customer benefits the addition of Pay-By-Cell Phone as a new parking payment option city-wide is recommended. Pay-by-cell phone is an exciting new parking payment option being implemented in conjunction with the new performance-based parking pricing initiatives around the country.

The pay-by-cell phone process begins with the parker creating an account by calling a designated phone number. This initial, one-time setup links a credit card number with a phone number. After the initial setup, the system then uses caller ID to match the user with the account or another type of account ID.

Program Benefits:

Pay-by cell phone provide a new payment option that will bring real and tangible customer benefits related to the ease of parking and improved customer convenience. Examples include:

- Pay for parking in your car when it is raining
- Receive text message notifications that your meter is about to expire
- Add time from the coffee shop
- Can sign-up for “E-Coupons” – a customer and business benefit
- Improve the customer parking experience
- Enhance parking information and communications

Progressive Pricing Strategy and Extension or Elimination of Time Limits

Progressive pricing of on-street parking rates is structured to (a) facilitate a desired rate of occupancy and turnover, (b) keep rates for desired short-term parking lower and (c) allow for longer-term stays on street, but only if the parker is willing to pay a premium rate for that privilege. For instance, Albany, NY employs a rate structure that incrementally increases with each additional hour parked. The goal is to ensure that 90% of users of the system turnover at stays of less than two hours, but to allow longer-term stays at a

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higher rate. As such, the hourly rate after two hours increases by the hour. Increases in rates after two hours are calibrated to ensure that the 90% goal of stays under two hours is supported. This approach tends to be more turnover based than strictly occupancy/demand based, though occupancy data should continue to be collected and monitored.

Extension or Elimination of Time Limits Strategy

Whereas one form of the progressive pricing approach can be used in situations with specific time stays (e.g., two-hour time stay with a higher rate for the second hour), a variation is to let the rates increase each hour with no cap on the number of hours parked or a cap of four hours.

An argument for the extension or elimination of time limits is that time limits are an artifice that can create anxiety in the minds of the customers about getting a parking citation and therefore causes them to “cut short their shopping activities.” While this argument has some merit, like most parking policies the reality is that a balance must be struck between providing convenience, availability, and pricing. Educating customers about the availability of longer-term parking options that do not involve the risk of getting a parking citation is an important element in this demand-balancing equation. Another element of a “balanced approach” could be increasing time limits, for example from two hour to four hours. Application relies on a good understanding of the local parking conditions and a strong understanding of business and customer needs. Longer time limits could reduce the referenced “anxiety” and provide for longer stays, while still addressing the need to maintain spaces for non-commuter parking purposes.

A disadvantage of eliminating time limits is the potential to encourage all-day single occupancy commuting patterns. This is especially a concern where the hourly on-street parking rate produces an 8-hour stay that is less than the off-street early bird rates. In these areas, for example north downtown, a four hour time limit may be preferable to encourage a longer stay but not employee parking.

Make Seasonal Rate Changes

There are some areas within the Seattle community that experience sharp swings in parking demand during different times of year. In areas such as Ballard Locks for example, parking demands are significantly higher during the summer months compared to winter months. Seasonal parking rate adjustment based on changes in demand patterns is another potential strategy to consider. Under this strategy, SDOT would monitor seasonal demand changes and adjust parking pricing accordingly, to either manage peak time demands or lower rates enough to potentially stimulate additional demand in non-peak seasons. While the utilization data evaluated in Chapter 1 and analyzed from elasticity point in Chapter 3 do not necessarily suggest that lowering rates will stimulate additional demand, the use of lowered rates during non-peak seasons may be a catalyst to help sustain local businesses during the less active seasons. Several members of the Parking Sounding Board were in support of this approach for that very reason.

Event Overlay Pricing Strategy

An event overlay approach would be tailored to specific areas impacted by major events (such as Pioneer Square and Chinatown/International District near the stadiums, or Uptown near the Seattle Center). An event overlay would be integrated over other pricing approaches intended to manage “typical day” demands in a geographic area. Portland, Oregon, for instance, manages an event overlay district near its

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Jeld Wen Field where major league soccer is played (approximately 20 games). Rates in this district on game days rise from \$1.60 per hour to \$3.50 per hour. The higher hourly rate was determined using historical data from game days, as Portland does not have a real-time system for assessing demand in place. Occupancy data is collected at each game, which is then used to refresh the data pool and continue to inform the City as to the ideal event rate necessary to manage supply availability. Portland is an example of a city using a predictive event pricing approach. Real-time systems could progressively calculate demand by game and by hour during a game. It should be noted that the SODO stadium area has many more game days (approximately 150), therefore studying parking impacts for each game day is not feasible. A more selective and periodic assessment process is recommended.

Addressing game day parking issues in Pioneer Square, Chinatown/International District and the Central Waterfront offer the opportunity to set rates based on very different demand conditions, documented by the 2011 data collection study. In addition, addressing game day parking impacts may support parking access in these areas once the Alaskan Way Viaduct parking impacts are made. The following table summarizes and compares the game day demands to the non-game day demands.

Pioneer Square – Non-Game Day Parking Demand			Pioneer Square –Game Day Parking Demand		
Time Period	% Occupied	Peak Hour	Time Period	% Occupied	Peak Hour
8 AM - 12 PM	56.2%	11 AM - 12 PM	8 AM - 12 PM	57.0%	11 AM - 12 PM
12 PM - 3 PM	69.8%	1 PM - 2 PM	12 PM - 3 PM	68.9%	12 PM - 1 PM
3 PM - 6 PM	57.9%	3 PM - 4 PM	3 PM - 6 PM	53.3%	4 PM - 5 PM
6 PM - 8 PM	46.0%	7 PM - 8 PM	6 PM - 8 PM	81.3%	7 PM - 8 PM

Chinatown/ID – Non-Game Day Parking Demand			Chinatown/ID –Game Day Parking Demand		
Time Period	% Occupied	Peak Hour	Time Period	% Occupied	Peak Hour
8 AM - 12 PM	59.1%	11 AM - 12 PM	8 AM - 12 PM	62.8%	11 AM - 12 PM
12 PM - 3 PM	78.1%	12 PM - 1 PM	12 PM - 3 PM	82.9%	12 PM - 1 PM
3 PM - 6 PM	55.9%	3 PM - 4 PM	3 PM - 6 PM	62.4%	3 PM - 4 PM
6 PM - 8 PM	89.1%	7 PM - 8 PM	6 PM - 8 PM	96.2%	7 PM - 8 PM

Time of Day Pricing Strategy

A time of day approach to parking pricing identifies peak parking demand patterns by geographic areas and applies variable parking rates based on broad “time bands.” For example, an area may have relatively low parking demand in morning hours, but demand increases around 11:00 am and stays constant through the rest of the day.

In implementing this strategy, an area might have an a.m. parking pricing time band (8:00 a.m. – 11:00 a.m. – “Time Band A”) that stays consistent with current on-street parking rates or could even decrease to the “rate floor” depending on the level of demand. In the peak demand period time band (11:00 a.m. – 3:00 p.m. – “Time Band B”) this area would have a higher on-street rate to promote increased vehicle turnover and space availability. If this area had healthy restaurant and nightlife activities with relatively high demands from 6:00 p.m. – 10:00 p.m. a higher evening rate may be applied.

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The following areas were observed to have higher changes in demand over the survey days:

- Roosevelt
- 12th Avenue
- Chinatown/International District
- Ballard Locks
- Fremont

There is some complexity when a parker's stay extends from one time band to another. Based on the example above: if the patron parked from 10:00 a.m. – 12:00 Noon, the first hour would be charged at the "Time Band A" rate and the second hour would be charged at the higher "Time Band B" rate.

It should be noted that this strategy was initially considered one of the primary strategies for evaluation, however, concerns from the Sounding Board regarding potential misinterpretation and confusion caused the consulting team rate this option as an alternative unless a neighborhood district specifically steps forward with a desire to champion this strategy.

Recommended Implementation Plan

The following are implementation plans for the primary recommended strategies and enabling technologies. These implementation plans are divided into two groups: those that are recommended for citywide implementation and those that are recommended for pilot programs on a smaller scale.

Strategies/Enabling Technologies to Be Applied City-Wide

The following strategies/enabling technologies are recommended for implementation in all 23 parking districts on a phased implementation basis.

Recommendation # 1: Neighborhood Engagement	
Problem Statement:	▪ Need to define how the performance-based parking program fits into the larger context of parking management and community-wide access management strategies. ▪ Need for a comprehensive parking management program with a well defined philosophy, guiding principles, and programs support the larger community's strategic, economic development, and sustainability goals.
Implementation Area:	Citywide
Implementation Timeframe:	2012

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Description:	The City has a Community Parking Program (currently understaffed) that provides parking district specific analysis, community interaction, and implementation. There is an opportunity to enhance the Community Parking Program in the context of geographic demand based within districts. A community parking strategy would be an excellent venue to discuss and engage community stakeholders about paid pricing management strategies.
Data Needs:	▪ Annual parking survey results by district
Strategy Components:	▪ Emphasize partnership with the neighborhoods. ▪ Emphasize agreeing on desired outcomes.
Strategy Issues:	▪ Community engagement and understanding ▪ Opportunities for partnership development ▪ Enhanced communications ▪ Funding
Enabling Technologies:	▪ N/A
Communications Elements:	▪ Neighborhood District Parking Plans ▪ Posting of performance-based pricing program changes/results ▪ More info about the city's Community Parking Program can be found at: http://www.seattle.gov/transportation/parking/communityparking.htm
Recommended Performance Metrics :	▪ Number of Neighborhood Plans Completed ▪ Stakeholder feedback
Budget/Estimated Costs:	▪ The recommended budget for the entire package (23 district plans) is estimated to be in the \$230,000 - \$345,000 range.

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Recommendation # 2: Invest in an Enhanced and Ongoing Data Collection and Analysis Program and Pilot Mobile LPR	
Problem Statement:	A data-driven performance-based parking pricing system requires an ongoing investment in data collection and analysis. While real-time data systems are the ideal, they are not financially feasible for Seattle at this time.
Implementation Area:	Citywide; different approaches may be used in different parking districts. LPR Pilot - Pilot in one parking district. If successful, expand to all geographic sub-areas with documented "high demand." Capitol Hill or South Lake Union are recommended as potential pilot areas for this strategy as they both have relatively high demand and neither have reached the \$4.00 rate cap.
Implementation Timeframe:	2012 - 2013
Description:	Invest in an Enhanced and Ongoing Data Collection and Analysis Program ▪ The City should continue to conduct annual comprehensive parking utilization surveys and add quarterly surveys of high demand areas. ▪ The City is currently exploring advanced statistical parking data analysis and the in-house development of predictive algorithms using parking pay station paid parking occupancy and other data sources. The consultant team recommends the continuation of these efforts in conjunction with evaluating private sector collaboration options. ▪ Leverage these investments in data collection with potential private sector partners as noted in Recommendation # 3. Pilot Mobile LPR as a Data Collection Strategy ▪ The City has already made some investment in mobile LPR, although preliminary testing of LPR as a data collection methodology has proven to be problematic. ▪ Other cities have reported better success with this technology. ▪ Identify specific problems/issues in Seattle and evaluate potential system upgrades to resolve issues (as recommended by one of the parking expert advisory panel members based on his experience with this system). ▪ Pilot mobile LPR as a possible resource to conduct more frequent data collection efforts in documented "high demand areas." Specifically to better document and track utilization pattern changes following rate changes.

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Data Needs:	▪ Annual comprehensive parking surveys as the primary information base. These should be conducted in the same months each year and in the same locations to promote realistic comparison of data. ▪ Development of parking demand maps by district ▪ Tracking of utilization changes following rate adjustments ▪ Tracking of non-paid parking occupancy (disabled parking placards, government vehicles, etc.) ▪ Parking duration statistics ▪ Paid parking transaction data
Strategy Components:	Data Collection Strategy Components Continue on the current path including: - o Ongoing analysis of study data collected as part of this study - o Development of new advanced statistical and predictive models of parking demand and utilization as a possible proxy to physical utilization surveys to inform future parking rate adjustments to achieve parking availability goals. LPR Pilot Strategy Components ▪ Work with current LPR vendor to assess the specific problems the City has experienced with past attempts to use mobile LPR in data collection. ▪ Review the apparently successful application of this technology for this purpose in Winnipeg. ▪ Identify the specific problem and recommended solution for the Seattle program and assess the cost/benefit of implementing the solution (presumably a software or firmware upgrade). ▪ If the solution is pursued, proceed with pilot application of documenting parking utilization in high demand areas. ▪ Identify desired frequency of data collection activities. ▪ Monitor all costs associated with the data collection and analysis efforts.
Strategy Issues:	▪ Recognize the issue of limited staff resources as it relates to the potentially large task of data assembly, organization, and dissemination. ▪ Compare the costs/benefits to other potential strategies for increased assessment of parking pricing impacts.

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Enabling Technologies:	Potential mobile LPR system upgrade
Communications Elements:	- Development of an internal data collection, assembly, analysis and distribution strategy that is understood and consistently applied by City staff is one important communications goal. - As the data begins to be shared with the public, the development of clear, concise and accessible data will be very important. This needs to be done within the context of the new program brand and in a way that is supportive of program goals. - Interaction of private sector firms, entrepreneurs, and others interested in accessing the parking data for the development of new products and applications will require the development of defined policies and protocols both from technical use and general use perspectives. The SFpark.org terms of use and API are good models for reference. - Submit evaluation and assessment report on pilot progress to SDOT director.
Recommended Performance Metrics :	Data Collection - Alternatives to traditional data collection surveys developed - Estimated savings in person hours - New web or mobile applications developed - Number of system users - Number of website “hits” LPR Pilot - Technology assessment completed - LPR as data collection strategy process developed - Successful field test - Estimated cost per pilot area (including data collection and analysis) - Estimated cost per block face
Budget/Estimated Costs:	Data Collection The costs referenced in Recommendation # 4 apply to this recommendation as well, including: - Annual comprehensive data collection survey: \$150,000 - Additional staff resources for data collection, analysis, system programming, and general planning/coordination: 2 FTEs of Analyst level staff.

LPR Pilot

- The cost for this pilot will depend on the outcome of the mobile LPR system assessment. One parking advisory panelist with experience in this area estimated the potentially needed upgrade at approximately \$60,000.
- Additional costs will involve staff time to monitor high demand areas.

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Recommendation # 3: Leverage Private Sector Investment by Providing Open Access to City Parking Data	
Problem Statement:	Make parking utilization and other data sets available to private sector for entrepreneurial development of desktop and mobile applications
Implementation Area:	Citywide
Implementation Timeframe:	2012
Description:	Leverage Private Sector Investment by Providing Open Access to City Parking Data ▪ The City has significant internal capabilities for parking data collection and analysis. The City, through the data.seattle.gov site, is able to distribute large data sets for private developer use. For this strategy to be fully implemented the City's IT program will need to develop a way to distribute data that changes on a daily basis. Currently, the City is not able to update data on the data.seattle.gov site without using additional time and technical resources. ▪ Other cities such as San Francisco and LA have expanded internal departmental resources and also contracted with large systems development and integration firms such as ACS and Serco to develop and manage the new programs. These initiatives were funded by large federal grants. In a different approach not relying on federal grants, New York City issued a Request for Qualifications (RFQ) for parking and technology firms with experience in the areas of "smart parking" system development and then, after initial evaluation, asked certain vendors to set up tests. It is this model that the consultant team recommends for Seattle. ▪ North American transit agencies have accomplished a great deal in recent years to share trip planner and real-time bus info. One lesson is the way that agencies highlight desktop and mobile applications. Examples are Tri-met and King County Metro, where a webpage provides links to tested privately developed apps. ▪ The various data sources (pay station transaction, inventory, occupancy) are valuable assets that could be leveraged to create interest from the private sector.
Data Needs:	▪ Parking curb space inventory updated monthly ▪ Parking occupancy / pay station transactions ▪ Parking rates per block face per month

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Strategy Components:	Make City parking data available through the data.seattle.gov site ▪ Consider developing an “Application Programming Interface” to guide interested parties in accessing the available data. ▪ Example documents from the SFpark project are provided in the project reference data base for review including: ▪ SFpark Availability Service API Reference ▪ Links to SFpark’s Developer RFQ ▪ Links to SFpark.org “Terms of Use” document. This document, provided by the San Francisco Municipal Transportation Agency, makes a variety of maps and datasets available for viewing or downloads through their project website. ▪ An RFI or some other vehicle may be needed to stimulate developer and vendor interest. ▪ This document should define the City’s goals and objectives (as well as specific terms of use.).
Strategy Issues:	▪ Difficulty of maintaining and updating large data sets ▪ With mobile applications, concern about private vendors accessing City servers holding these data sets
Enabling Technologies:	▪ N/A
Communications Elements:	This strategy assesses and creates partnerships with firms that can assist the City in development of important and necessary communications tool. The following is the type of data that potential private sector would likely request: <u>Unique pay station transaction information</u> ▪ Unique identifier for the paid space or blockface ▪ Unique identifier for the transaction ▪ Duration and date-time stamp of the transaction <u>Optional:</u> ▪ Transaction payment method and cost ▪ New purchase versus “re-up” ▪ Transaction revisions, cancellations, key-based overrides ▪ Open-ended transactions

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	<u>Data delivery options:</u> ▪ Static meter attributes: Mutually develop a method to provide the vendor with as many /attributes as possible about transaction data (geography, types, models, space-counts, rate schedules, hours of operation, enforcement, etc). And, mutually agree upon a mechanism for receiving updates as deployments change. ▪ Data can conceivably be delivered in three levels of frequency: Historical, Daily, and Real-Time. Existing Parkeon system cannot provide real-time transaction data, although daily and historical are possible. ▪ Implementations can begin with Historical and Daily dumps of the aforementioned data. ▪ Implementations can be completed without Real-Time coin transactions.
Recommended Performance Metrics :	▪ Data configured to optimize private partner collaboration, (see above) (CSV files for parking census data), uploaded and available ▪ RFI or other vehicle for soliciting interested parties ▪ Development of new applications or other useful tools
Budget/Estimated Costs:	Data organization and IT costs are included in the 2 analyst level FTEs noted earlier.

Recommendation # 4: Geographically-Based Rate Setting

Problem Statement:	The June 2011 data results highlight that eight of the 23 parking districts have distinct differences in parking occupancy within the district. Applying a district-wide rate and time-limit does not help the area meet the parking rate policy of one to two spaces available per block face throughout the day on average. The parking occupancy results by neighborhood show that a finer grained analysis is warranted.
Implementation Area:	Apply citywide; however, actual impact will be in both the higher and lower demand areas compared to the neighborhood target occupancy based on the neighborhood's parking occupancy data.
Implementation Timeframe:	2012. Conduct analysis annually and make rate and time-limit adjustments on an annual basis.
Description:	Adopt geographic strategy for parking rate adjustments and modify criteria for defining target utilization. Specific areas will be identified that are either experiencing high parking demand (greater than the target occupancy) or below the target occupancy. These areas would have a higher or lower rate or utilize other parking management strategies such as longer time limits. In addition, the consulting team recommends that SDOT change the practice for allowing pay stations to sell parking along block faces during times of morning and afternoon peak parking restrictions. The concern is that people buy time expecting to be able to park, despite the multiple signs along the block face. Changing this practice mainly affects the Commercial Core, Belltown South and North, Denny Triangle South and North, First Hill, Broadway, Pike-Pine, Roosevelt, University District, and Fremont.
Data Needs:	▪ Continue the annual data collection effort and build a historical database of parking utilization by area. ▪ Quarterly or bi-annual surveys of areas exceeding targeted occupancy ▪ Provide a standardized report that tracks changes to parking utilization in high and low demand parking in response to pricing adjustments to senior SDOT departmental staff.

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Strategy Components:	As a citywide recommendation, the consultant team recommends the following implementation steps: ▪ From the annual parking survey data, each spring/summer, based on data results, identify high and low areas of parking occupancy compared to the target occupancy range for each neighborhood. This effort could still involve reducing rates in some areas. ▪ As necessary, create new geographic sub-areas that reflect occupancy above the target threshold by using an average of the top three demand hours. These are the areas that should see parking rate increases (\$0.50/hour) in an attempt to create more space availability. Areas of low occupancy may have time limits adjusted to address lack of parking demand. ▪ The consultant team recommends that the high-demand areas be surveyed or paid parking occupancy data be reviewed and analyzed on a quarterly basis. ▪ Considering limited staff resources, SDOT should continue to investigate using paid parking transaction data as a proxy for survey data, or conducting surveys with mobile LPR technology. ▪ There is also an issue as to the frequency of rate changes and the ability to disseminate public information and allow time for behavioral changes to be realized. From an implementation and operations perspective, there are issues such as programming, graphics and operational sustainability that must be considered re: staffing and budgeting. These issues are further complicated by the technology limitations of older pay stations. ▪ If, based on the annual analysis of the high-demand areas, parking utilization is still above the target occupancy, those areas would receive another rate increase. If the utilization has dropped below the target occupancy level, the rates would remain unchanged or be dropped, or other parking management strategies considered.
Strategy Issues:	Parking Rate Caps in Highest Demand Areas In certain high demand areas, the desired level of on-street space availability may not be achievable with the maximum rate cap at \$4.00 hour. This is likely the case parts of the downtown Commercial Core and First Hill.
Enabling Technologies:	While all of the city's pay stations can handle geographically based rates, CityPals would offer enhanced communication methods with map display options. Smartphone apps and desktop mapping applications also are critical to educate people about different rates and time limits within a neighborhood.

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Communications Elements:	One of the most significant and challenging elements of implementing performance-based parking pricing strategies relates to the communication of parking rate changes and other program modifications to the public. Key communications strategies include: ▪ Development of a program brand, logo, and related program collateral materials ▪ A program web-site – see SFpark site configuration as an example below: Project Overview, “How it works,” FAQs, Resources, Links to News, Contact Us ▪ Project overview video for uploading to YouTube, as educational materials, and for SDOT website ▪ Continue to build and disseminate the data from the Seattle Parking Map ▪ Simple and easily read program policies ▪ Links to recent local and national newspaper and magazine articles to help with public education of the Seattle and other cities’ programs ▪ Collaboration/Information sessions with neighborhood business district associations and interested/impacted agencies ▪ A program “Launch Press Kit” and website, bus and other ads ▪ On-going website survey tool that regularly checks in with parking users about their comments about the City program
Recommended Performance Metrics :	▪ Current and target occupancy compared to previous data sets ▪ Average duration – change in average vehicle duration compared to previous data sets ▪ Number and length of stay of overtime limit violations per space per day
Pilot Budget/Estimated Costs:	1. Annual comprehensive data collection survey: \$150,000 (ongoing work already budgeted) 2. Additional staff resources for data collection, analysis, system programming, and general planning/coordination: 2 FTEs of Analyst level staff and 1 FTE Pay Station Technician staff to be able to operate and maintain an increasingly complex system that may require more frequent changes. 3. Costs for the communications and marketing program for this recommendation are estimated at \$80,000.

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Recommendation # 5: Add Pay-By-Cell Phone as a New Parking Payment Enabling Technology	
Problem Statement:	Provide alternative payment options to enhance the ease and convenience of parking and provide other customer benefits.
Implementation Area:	Apply citywide
Implementation Timeframe:	2012
Description:	Add Pay-By-Cell Phone as a New Parking Payment Strategy Citywide Pay-by-cell is now a well-tested and reliable technology. The addition of a new payment methodology provides additional convenience for customers. This particular payment option also brings a variety of other very practical benefits that will make Seattle more visitor-friendly. It also has potential benefits for businesses as well. The primary objectives of this strategy include: ▪ Provide a new payment option that will bring real and tangible customer benefits related to the ease of parking and improved customer convenience. Examples include: ○ Pay for parking in your car when it is raining ○ Receive text message notifications that your meter is about to expire ○ Add time from the coffee shop ▪ Improve the customer parking experience ▪ Enhance parking information and communications
Data Needs:	N/A
Strategy Components:	Issue a Request for Proposal (RFP) for a pay-by-cell vendor that can successfully interface with the City's existing pay-station infrastructure will be required.
Strategy Issues:	Systems Integration – This should be handled by the pay-by-cell vendor, but it must be noted that there is a need for integration between the meter manufacturers, enforcement hardware/software providers, and the pay-by-cell systems. Equip Seattle Police Department Parking Enforcement Officers with necessary resources and equipment to continue enforcement.
Enabling Technologies:	This strategy is the primary “enabling technology” recommendation of this study.

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Recommended Performance Metrics :	▪ Number of spaces ▪ Number of total users and users per month ▪ Number of total transactions and per month ▪ Revenue per transaction ▪ Cell phone payment adoption rate (track by month)
Communications Elements:	An ongoing and broad-based system of communication to inform patrons that pay-by-cell is available must be implemented. This should be a cooperative marketing and information campaign between the City, the selected vendor, and potentially the neighborhood district associations. Marketing and ongoing initiatives to enhance utilization and pay-by cell adoption rate: ▪ Develop and distribute press release via newswire ▪ Develop social media campaign (Twitter, Facebook, etc.) to heighten awareness ▪ Create a buzz and educate businesses, residents. and visitors ▪ Circulate wallet cards and/or flyers throughout the city ▪ Create stickers to be placed in citation/infraction envelopes ▪ Create banner ad with registration link on SDOT's website ▪ Pitch local media with pay-by-phone parking technology story (TV, radio, and local newspapers) ▪ Forge partnerships with local tourist attractions and business districts, business improvement districts, etc. ▪ Coordinate custom email campaign to local businesses by zip code
Budget/Estimated Costs:	1. Implementation costs should be relatively low. In fact, some companies claim they will install their systems at no charge to the City. Typical fees are based on a per transaction cost that is either passed along to the user or paid by the City, much like a credit card processing fee. Advisory panel members report that other cities have negotiated rates to be between \$0.10 and \$0.35 per transaction. Most cities pass the transaction costs on to the end user. 2. Estimated \$95,000 for planning and technology integration/project management expenses, depending on vendor selection process. This amount would cover the estimated \$25,000 annual increase in pay station Parkeon costs, and the public education campaign of \$25,000 and the \$45,000 annual cost to Parking Enforcement to activate wireless hand held units for internet access.

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3. Once the program is up and running an estimated 0.5 FTE of system accounting/management staff time will be required to respond to day-to-day system management, account reconciliation, response to questions, etc. SPD estimates an additional need for 0.25 FTE of IT support.

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Recommendation # 6: Pilot Progressive Pricing in Combination with the Elimination (or Extension) of Time Limits	
Problem Statement:	Progressive pricing could benefit districts where businesses and other land uses need both short duration stays (dry cleaners, coffee shops, etc.) and longer stays (especially in evening).
Implementation Area:	The criteria for where to implement this pilot are those locations with high sustained occupancy and extended parking stays. The following areas met these criteria (sustained high occupancy in excess of 80% and occupancy for 4 or more hours) based on the most recent (June 2011) study data: ▪ Commercial Core ▪ Pike-Pine ▪ Cherry Hill ▪ Pioneer Square ▪ Chinatown/International District The consultant team's top recommendations for areas to implement this pilot are either the Pike-Pine District or the Commercial Core District.
Implementation Timeframe:	2012 – 2013
Description:	Pilot Progressive Pricing in Combination with the Elimination (or Extension) of Time Limits This recommendation merges two cutting-edge on-street parking management strategies to provide more flexibility for a variety of trip purposes with different time limits while maintaining turnover. ▪ This strategy uses standard rates from one hour to two hours, and rates that increase for any period over two hours. ▪ The elimination of time limits could be used to increase utilization in under-performing areas by essentially changing the type of parking use permitted in an area. ▪ A modified approach could be to not fully eliminate time limits, but expand the time limits to allow longer stays (for example, from two hours to four hours).
Data Needs:	▪ N/A
Strategy Components:	▪ Structure pricing to: (a) facilitate a desired rate of turnover (b) keep rates the same for desired short-term parking (c) allow for longer-term stays but escalate rates by hour as a premium for the longer-stay privilege.

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	▪ Based on Albany, NY, parking program, the goal is to ensure that 90% of users of the system turnover at less than two hours, but to allow longer-term stays at a higher rate. ▪ A balance must be struck between providing convenience, availability, and pricing. Educating customers about the availability of longer-term parking options that do not involve the risk of getting a parking citation is an important element in this demand balancing equation.
Strategy Issues:	1. The ability of the current pay stations to implement progressive pricing fee structures (see section on Current System Capabilities). 2. From an equity perspective, this pricing approach could be perceived as favoring those with higher incomes.
Enabling Technologies:	▪ Selected pilot areas will require using Stelios or new generation pay stations
Communications Elements:	▪ Progressive rate structure and time limit change notifications will be accomplished via pay station rate displays (Ideally using the new City Pal units due to enhanced graphic and display capabilities supplemented with new signage. ▪ Leveraging SDOT website as a communications vehicle combined with a specific educational campaign focused on the selected pilot district is recommended. Collaboration with the neighborhood business district and merchant groups is also recommended. ▪ Mobile application for parking pricing information by area/time of day.
Recommended Performance Metrics :	▪ Number of spaces ▪ Revenue per space ▪ Occupancy (pilot area) before/after ▪ Turnover-vehicles per space per day (pilot area) before/after ▪ Average duration (pilot area) before/after ▪ Number of over-limit violations total -all spaces ▪ Number of over-limit violations per space per day (pilot area) before/after ▪ Average overall stay of over-limit violators (pilot area) before/after
Budget/Estimated Costs:	1. The primary cost for this pilot will stem from the need to upgrade pay stations. Therefore, the size of the pilot district may be a factor in choosing the pilot location. 2. The consultant team recommends budgeting approximately \$15,000 for each new Parkeon "CityPal" unit. This budget number includes sales tax installation and operating costs for monthly Parkeon communications/alarms charges. 3. Rental of these units is another option, which the City is already using. This approach, with an option to purchase, may make more sense for pilot program applications. Rental costs per unit are in the \$390/month range for each unit. 4. A modest revenue increase is anticipated in higher demand areas.

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Recommendation # 7: Make Seasonal Rate Adjustments	
Problem Statement:	Seasonal rate adjustments could benefit districts where businesses and other land uses experience swings in demands based on the time of year. A good example would be Green Lake or Ballard Locks.
Implementation Area:	The criteria for where to implement this pilot are those locations with large changes in demand from season to season. Based on data from the November 2010 and June 2011 study, these areas are examples of large seasonal demand changes: ▪ Ballard Locks ▪ Green Lake The consultant team recommends either of these areas for implementation of this strategy.
Implementation Timeframe:	2012 – 2013
Description:	Make seasonal adjustments to rates dependent upon the measured demands in the area for each season. For example, the higher demands in Green Lake or Ballard Locks during the summer season would necessitate a higher rate to help manage demand and ensure the desired one to two spaces per block face availability. During the winter months, rates should be lowered to promote more activity and higher use to help sustain adjacent business.
Data Needs:	Quarterly occupancy and utilization data – either manually collected, collected through use of LPR technology, or through the use of pay – station transaction data.
Strategy Components:	Seasonal Rate Approach ▪ Structure seasonal pricing to: (a) facilitate desired seasonal utilization (b) promote usage during high and low seasons (c) maintain one to two spaces per block face ▪ SDOT will need to monitor seasonal utilization data to determine triggers for raising or lowering rates
Strategy Issues:	1. Availability of data to determine the triggers for seasonal rate adjustments. 2. Communicating rate changes to the community and users – to both promote off-season lowered rates and communicate the need for peak season rate adjustments

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Enabling Technologies:	N/A
Communications Elements:	▪ Marketing and promotion of seasonal rate benefits and structure prior to rollout – marketing should occur within the BIA and then city-wide to ensure proper understanding of rate structure (both peak-season and off-season) and benefits. Collaboration with the neighborhood business district and merchant groups is also recommended. ▪ Leveraging SDOT website as a communications vehicle combined with a specific educational campaign focused on the selected pilot district is recommended. ▪ Mobile application for parking pricing information by area/season.
Recommended Performance Metrics :	▪ Seasonal utilization of area ▪ Number of available spaces ▪ Revenue per space ▪ Occupancy (pilot area) before/after
Budget/Estimated Costs:	1. The primary cost for this pilot will stem from the marketing and promotion of the seasonal rate adjustment strategy. This value should be accounted for in Recommendation #1 – Neighborhood Engagement. 2. The existing pay station infrastructure should be suitable for implementation of this strategy. 3. A modest revenue increase is anticipated in higher demand areas.

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Recommendation # 8: Develop an Event Overlay Parking Pricing Strategy	
Problem Statement:	Major events can significantly impact neighborhood districts and create parking dynamics that a very different than a typical day.
Implementation Area:	An event overlay approach would be tailored to specific neighborhood parking districts impacted by major events.
Implementation Timeframe:	2012 - 2013
Description:	Develop an Event Overlay Parking Pricing Strategy - It will be important to identify the true goals of this strategy application. For example, one goal might be to create more event parking by increasing on-street rates but eliminating time limits that make on-street parking not an option due to the length of the events. A different goal might be to keep on-street spaces available for other businesses during game days. These different goals would obviously employ different strategies to achieve their ends. - In addition to defining strategy goals, understanding the number and nature of events is critical to developing the strategy and the impacts. For example in Pioneer Square and Chinatown/International District, there may be over 150 event days total in a year. - An event overlay could be integrated into other pricing approaches for “typical day” demands as well as address parking impacts from major transportation projects, such as the Alaskan Way Viaduct project.
Data Needs:	Data collection on typical and event days by location and hour will be required.
Strategy Components:	- Parking utilization data would be collected in the affected neighborhood district(s) during each event. - Supply/demand data for the area would be analyzed for demand patterns and preferred locations. - This data would be used to create a specific event-related database that would continue to be updated and refined over time. - Appropriate event rates for on-street parking would be determined based on supply/demand characteristics and defined strategy goals.
Strategy Issues:	The most challenging part may be defining goals with respect to best use of on-street spaces as different groups may have conflicting interests. The public involvement process will be important in defining strategy goals.
Enabling Technologies:	Selected pilot areas will require using Stelios or new generation pay stations

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Communications Elements:	▪ Rate displays on multi-space meters ▪ Website with pricing zones and parking rates ▪ Mobile application for real-time parking pricing information ▪ Coordination with event venue(s) ▪ Print or radio/television ads
Recommended Performance Metrics :	▪ Number of spaces in pilot area ▪ Revenue per space (pilot area) before/after ▪ On-street occupancy (pilot area) before/after ▪ Turnover-vehicles per space per day (pilot area) before/after ▪ Average duration (pilot area) before/after ▪ Number of over-limit violations total – all spaces ▪ Number of over-limit violations per space per day (pilot area) before/after ▪ Average overall stay of over-limit violators (pilot area) before/after
Budget/Estimated Costs:	The primary costs associated with this strategy are expected to be in the following areas: Signage, pay station technology, graphics and programming. In 2012, the consultant is recommending that the City use \$50,000 for a comprehensive outreach effort to engage stakeholders in the sports stadium area to develop a specific events day overlay proposal for 2013 implementation. This timing would allow the City to coordinate with parking issues with respect to the Alaskan Way Viaduct project.

Phased Implementation Strategies / Pilot Programs

The following strategies/enabling technologies will be implemented, piloted, and tested on a selective basis within different parking districts based on district characteristics, availability of resources, and community willingness to partner.

Recommendation # 9: Evaluate Possible Implementation of a Time of Day Performance Pricing Pilot Program	
Problem Statement:	Peak demand periods may occur for only a few hours during the day. This strategy would adjust rates day based on patterns of parking demand throughout the day.
Implementation Area:	Apply in a selected parking district. The following areas were observed to have significant changes in demand over the course of the survey day and are good candidates for this pilot: ▪ 12th Avenue ▪ Ballard Locks ▪ Chinatown/International District ▪ Fremont ▪ Roosevelt
Implementation Timeframe:	2012
Description:	Implement a time of day performance-based parking pricing pilot program. The basic elements of this pricing methodology are described below: ▪ Analyze demand patterns and create time bands based on patterns of utilization data by time of day. ▪ Document levels of demand by time band. Apply pricing based on utilization levels and time band.
Data Needs:	▪ Annual parking utilization studies can inform this strategy. Assess whether paid parking transaction data could be used as a proxy for manual parking utilization studies. ▪ Each current parking district will be analyzed based on changes in demand within each time band from the previous utilization study compared to the current study to identify trends.
Strategy Components:	▪ Establish common time bands – morning, afternoon, early evening, depending on parking hours

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Performance-Based Parking Pricing Strategies Development

	▪ Within each time band, calculate average occupancy and compare to target occupancy. Make determination of whether rates should increase, decrease or stay the same for those areas. Based on the most recent parking utilization survey data and the criteria noted above, the parking demand by time band will be compared to the rate adjustment schedule below and the pricing adjustments will be applied: ▪ Above Target (High): Increase rates by .50 increments up to rate ceiling ▪ Within target (Average): Retain current rates ▪ Below target (Below Average): Reduce by .50 ▪ Rate adjustments may be made up to two times per year if updated utilization data is available. The minimum adjustment period will be annually. ▪ Paid parking occupancy data should be investigated as a potential proxy for more costly manual surveys.
Strategy Issues:	The primary issue with this pricing methodology is that most of the existing pay stations cannot handle the programming requirements, thus creating an issue of feasibility with regard to cost.
	The following are the limitations of current inventory of Parkeon pay stations related to Time of Day pricing: ▪ Stelio Pay and Display - Parking limits are managed by maximum payment amount so crossing a time band into a different rate area would not be feasible. ▪ Strada Pay and Display ▪ Parking limits can be managed by maximum payment amount OR maximum stay time. ▪ Credit card increments may be by amount only (e.g. 25 cent increments) or by time (e.g. 15 minute increments). Additionally, this strategy was perceived by Sounding Board members to be difficult to communicate and could lead to misconceptions and a negative perception of the parking.
Communications Elements:	▪ Rate increase notifications will be distributed via the SDOT website and other media no less than seven days prior to implementation. ▪ Specially formatted rate displays on multi-space meters, possibly supplemented with additional signage illustrating the time bands. ▪ See recommended communication strategies in Recommendation #4

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Performance-Based Parking Pricing Strategies Development

Recommended Performance Metrics :	▪ Number of spaces ▪ Revenue per space ▪ Occupancy (pilot area) before/after ▪ Turnover: vehicles per space per day (pilot area) before/after ▪ Average duration (pilot area) before/after ▪ Number of over-limit violations total all spaces ▪ Number of over-limit violations per space per day (pilot area) before/after ▪ Average overall stay of over-limit violators (pilot area) before/after
Budget/Estimated Costs:	1. Enforcement costs are not anticipated to change for this pilot. 2. The primary cost for this pilot program stems from the need to upgrade pay stations. Therefore, the size of the pilot district may be a factor in choosing the pilot location. Costs for graphics and signs changes are estimated at \$510 per blockface. Therefore, for a 20 block face area, the cost would be \$10,200. 3. The consultant team recommends budgeting approximately \$15,000 for each new Parkeon “CityPal” unit. This budget number includes sales tax installation and operating costs for monthly Parkeon communications/alarms charges. 4. Rental of these units is another option, which the City is already using. This approach, with an option to purchase, may make more sense for pilot program applications. Rental costs per unit are in the \$335/month range for each unit. 5. Costs to monitor occupancy and turnover are included in the staff resource additions in Recommendation #4.

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Recommendation #10: Address Disabled Parking Permit Abuse	
Problem Statement:	The issue of disabled placard use and abuse has the potential to rob the performance-based pricing initiative of any gains in on-street parking availability by having spaces freed by pricing adjustments taken by those abusing disabled placards.
Implementation Area:	City-wide
Implementation Timeframe:	Three to six months from time of authorization
Description:	<u>Issue-Specific Recommendation:</u> - Install four-hour time limits for vehicles with disabled parking permits in areas of high use and where there otherwise is strong need for parking turnover - Report findings on a regular basis to policy makers. - Promote the implementation of statewide legislation regarding disabled parking laws. See examples from other cities on pages 40-41 of this report.
Data Needs:	N/A
Strategy Components:	Administrative/political authorization
Strategy Issues:	Disabled parking placard abuse and legal use for all-day parking The issue of disabled placard use and abuse has the potential to rob the performance-based pricing initiative of any gains in on-street parking availability by having spaces freed by pricing adjustments taken by those abusing disabled placards. <u>Issue-Specific Recommendation:</u> - Install four-hour time limits for vehicles with disabled parking permits in areas of high use and where there otherwise is strong need for parking turnover - Report findings on a regular basis to policy makers. - Promote the implementation of statewide legislation regarding disabled parking laws. See examples from other cities on pages 2-16 – 2-17 of this report.
Enabling Technologies:	N/A

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Communications Elements:	▪ Standard policy change procedures ▪ Special outreach to the disabled community ▪ Partnership with People with disAbilities
Recommended Performance Metrics :	▪ Reductions in disabled permit abuse percentages compared to previous data collection period.
Budget/Estimated Costs:	▪ \$25,000 for policy change notification, public meetings, information dissemination and new on-street signage.

Communicating Policy, Strategy, and Rate Adjustments

The key to success for the City's performance based pricing program will be the ability to communicate succinctly with the public about the pricing system and structure. The Parking Sounding Board members frequently discussed the need for a robust communications strategy to accompany these recommendations. Under current operating standards, the public's understanding of on-street parking rates is likely fairly high and broad-based, since rates are adjusted every few years. This gives people time to learn the system, experience consistency, and adjust to changes as they occur.

As a parking system becomes more data-driven, communications challenges of different rates by time and location will become more complicated but ideally not terribly confusing or frustrating to the user. Overall, the City's goal in communication of any new performance-based pricing program should be a high standard of transparency, ease of access, use, understandability, and timeliness of response.

Since the consulting team is recommending a comprehensive performance-based pricing system with multiple rates, time limits and several pilot projects, SDOT will need a robust and extensive public information and communications program. It is further recommended that SDOT initiate efforts (and develop budgets) for expanding its current communications program to include design and development of cell phone/smartphone applications, social media networks (e.g., Twitter, Facebook, etc.), information technology (IT) assistance, and data organization.

To be successful, the City should develop the parking strategy and plan under a new brand. The following communications strategies are recommended:

- Development of a program brand, logo, and related program collateral materials
- A program web-site – including Project Overview, How it works, FAQs, Resources, Links to News, Contact Us
- Project overview video for uploading to YouTube, as educational materials, and for SDOT website
- Continue to build and disseminate the data from the Seattle Parking Map
- Simple and easily read program policies
- Links to recent local and national newspaper and magazine articles to help with public education of the Seattle and other cities' programs
- Collaboration/Information sessions with neighborhood business district associations and interested/impacted agencies
- A program "Launch Press Kit" and website, bus and other ads
- On-going website survey tool that regularly checks in with parking users about their comments about the City program

Should the City elect to move to a greater use of real-time rate-setting models and technology, it should be prepared to invest not only in systems that quickly communicate rate changes to the user (i.e., mobile applications, web links, etc.), but also consider systems that identify areas with increasing rates both

remotely (e.g., apps/cell links) but visually as well. This would include dynamic real-time signage at major access portals, “rate alert” systems, color or lighting systems at the meters themselves, and other more dynamic means of communicating change quickly and in real time. Examples of costs associated with public communications of dynamic parking pricing systems should be further explored in cities such as San Francisco, Los Angeles, and Washington D.C, where pilot programs are underway.

Overall, initiating a parking rate system that will be more data-driven and fluid than Seattle's current system will require a commitment to a higher level of communication with the public and the support network necessary to sustain it. As such, planning for and anticipating increased budgetary support for development and management of program communication is recommended.

Public Outreach and Marketing

The implementation of performance-based pricing and other parking meter management policy changes will be coordinated closely with public outreach programs. Public acceptance of this new approach to parking management is critical to its success. SDOT is already actively engaged in public outreach, and it is recommended that this focus continue. Examples of successful public engagement strategies from other communities include making presentations to the Chamber of Commerce, business improvement districts, neighborhood district associations, affected City Council offices, transit agencies, and other stakeholder groups.

Recognizing that a significant public outreach and marketing effort to educate the public about the functionality and benefits of performance-based parking pricing program and the E-Park parking guidance system is a critical component of the Seattle performance-based parking pricing study, it is recommended that \$100,000 - \$150,000 be budgeted for this effort. This public outreach and marketing program will include the following components at a minimum:

- Logo/brand development and copyright
- Sign and labeling design
- Brochures
- Public website
- Web-based instructional videos
- Public service message
- Attendance at public meetings
- Assistance in preparing press releases and media packages
- Development and placement of advertising
- Customer service assistance phone service
- Brochures, posters, and signs
- Social media, such as Facebook and Twitter
- Phone payment and wayfinding applications
- Partnership with local merchants

The public outreach and marketing campaign will focus on educating the consumer and the local businesses regarding the value of performance-based parking pricing, but it will also include an outreach effort to private parking operators for inclusion in the Seattle E-Park system, including pursuing mutual advertising opportunities.

In Conclusion

This chapter explored performance-based pricing strategies in terms of available technology, appropriate applications, collection, maintenance, and enforcement. Performance-based pricing can be accomplished using a number of methods. Those discussed in this chapter were real-time and predictive. Based on a review of the technology for each method, the predictive approach seemed a better fit at this point for Seattle. Real-time technology has not been widely tested and is expensive at this point. As a result of this review, ten application strategies were identified and included in the report as recommendations.

In review of the above research and resulting recommendations, the City of Seattle is in a position to be at the leading edge of strategic parking management applications. The strong political support and leadership that initiated this planning process to assess and implement a number of innovative demonstration projects has set the stage for significant potential improvements to the management of the City's public on-street parking program. These performance-based parking pricing strategies are intended to improve the parking experience, enhance economic vitality through greater access to businesses, while mitigating traffic congestion and thereby improving transit system efficiency. This application of advanced parking management strategies is an important and often overlooked component, of effective sustainable parking and transportation policies.

CHAPTER 3

Economic Impacts of Performance-Based Parking Pricing

INTRODUCTION

This chapter frames issues and sheds light on the underlying connections between on-street paid parking and the health of downtown and neighborhood business districts, and the importance of a customer service focus. What are the economic impacts, benefits, costs and effects of paid on-street parking on Seattle's downtown and neighborhood business districts? How well does the parking support business? Can it be improved?

After general comments about a customer service focus for Seattle's performance-based parking pricing program, this chapter continues with a discussion of parking elasticity and its relationship to overall parking occupancy, including an analysis of parking elasticity based upon recent data collection. Recommendations are provided for amending and strengthening SDOT's rate setting model used to establish on-street parking rates.¹ This chapter also reviews the city's rate-setting model and provides related recommendations.

This chapter concludes with input from one of the industry's foremost thought leaders. This commentary piece is meant to support Seattle's performance-based parking pricing program. It does not represent recommendations or City of Seattle parking policy. Dr. Donald Shoup, widely regarded as the creator of the concept of dynamic or performance-based parking pricing policy, provides insight into the economics of parking, and how pricing policy can influence demand and good urban transportation management principles.

Customer Service Focus

Seattle's performance-based parking pricing program is designed to use price as a way to ensure that one to two on-street spaces are available thereby benefiting businesses on the block as well as the customers they serve. Beyond these business friendly and customer-centric goals, additional traffic congestion mitigation and environmental benefits can also be realized. Based on the research of Dr. Donald Shoup, discussed at the end of this chapter, this approach centers on raising prices in portions of a business district or even on individual blocks until the desired vacancy rate is achieved. As part of this program, there is need for a strong customer service focus.

¹ Originally, this chapter was to include a review of relevant literature regarding traveler responses to various on-street or other parking management strategies, describing the state of the knowledge as it relates to parking elasticities and other parking demand assumptions. While there are many articles, essays, and studies on transportation-related elasticities, there are very few articles specifically on "on-street parking demand or price elasticity." Those that we found typically began with sentences like this:

"It should be noted up front that no directly applicable research on the cost elasticity of implementing parking fees has been found in the literature search..."

Rather than conduct a literature review, this document moves beyond the lack of known research by providing input from one of the industry's foremost thought leaders.



Customer experience should drive not just parking pricing decisions, but all decisions relative to downtown and business district paid parking. Creating a positive experience for the customer requires an understanding of the customer. The city should develop an underlying philosophy among all parking staff that understands and values customers. Parking is not about storing cars, but rather it is coupled with the overall experience of arriving at the preferred destination. People park because of this desire to go to a particular destination or area. Increasing costs will likely not deter people from coming if the desire to go to that destination is great enough. Instead, availability of parking becomes the most significant factor in influencing the customer experience. Additionally, customers may want more time to shop and/or socialize as part of their visit. A one- or two-hour time limit may not be enough and could contribute to a negative experience.

A thoughtful, well-funded study could be conducted to determine who uses downtown metered parking, how long they usually park, to which destinations they are going, how often they use on-street and off-street parking, preferred methods of communication (rates, time limits, availability, etc), and general opinion of the current and proposed systems. Any business should make it a priority to know its customers. The city's metered parking business shouldn't be any different.

Another aspect of designing a successful system is to work with and consult with stakeholders and merchants. Stakeholders can be anyone who uses or relies on on-street parking – business owners, property owners, downtown shoppers, downtown employers and employees, and downtown visitors. Individual merchants make downtown and city business districts interesting and unique places and allow them to compete effectively against suburban malls. Many of these businesses represent a substantial commitment by the owners, and numerous jobs for city residents. Changes in parking policy and pricing should be made with caution in these tough economic times, and certainly with the input of these downtown investors. The goal of working with these groups is to design a system that minimizes annoyances and offers increased value. The stakeholders can provide insight that can be useful when designing the best system for the city.

A strong focus on customer service not only requires a successful system, but also a focus on communication. Effective communication is always a challenge, yet it is essential. Customers may find metered parking annoying to begin with, and if new rates and performance-based strategies make it more confusing and more expensive, the result could be both a political and economic disaster. Efforts should be made to make sure everyone understands the new parking system and how to use it. It should provide added convenience. SDOT should place importance on the initial marketing and communications stage of implementation to ensure that the overall changes are understood by the community (both Seattle citizens and out-of-towners), accepted by the business community, and promoted by neighborhood leaders. The success of the performance-based pricing strategies will depend on the ability of the community to embrace the change and understand the benefits of better managed parking and projected parking availability. It is this type of customer focused approach to implementation that will ensure a successful and viable parking program for years to come.



The Elasticity of Parking

The measure of price sensitivity as it relates to the demand for parking is often referred to as the elasticity of parking. Many studies have been conducted on the subject, but there is no authoritative source or guideline that documents how changes in parking pricing will affect overall on-street parking behavior. In terms of the relationship between parking pricing and actual demand at the curb, the relationship is fuzzy and affected by numerous factors that go beyond cost. There are numerous non-pricing related factors; a few examples are provided below:

- **Type of Destination:** Depending upon the end destination for the trip, the motorist may be more likely to pay a higher rate for convenient parking. For example, someone shopping in a high end retail district is likely to find the cost of parking less impactful on their behavior than someone who is commuting to work. Weekend versus weekday trips may have different elasticities and parking behaviors.
- **Alternative Trip Choices:** As a motorist makes their destination and travel decisions, if more convenient and easily accessible choices are provided, the cost of parking may play a greater role in their mode choice decision. If an area is auto dependent, the cost to park may be seen as the cost to do business or conduct everyday chores. Other factors that affect mode choice include fuel costs, overall state of the economy, and localized conditions such as road construction or tolls. In an area with sustainable and efficient transit, high parking costs may effectively deter driving.
- **Decision Duration:** The longer the motorist has to assess pricing and its impacts on their decisions, the higher the elasticity of parking. As an example, as gas prices rise, motorists place a premium on smaller, more efficient automobiles or shorter commute times. The longer the period that gas prices stay above historic levels, the more likely that people will continue to make these decisions and increase the elasticity of that quantity.

Elasticity is calculated by dividing the change in demand by the change in price, as shown by the following formula:

$$E_d = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in price}} = \frac{\Delta Q_d / Q_d}{\Delta P / P}$$

Elasticities are defined as the percentage change in demand of something caused by a one-percent change in its price. For example, an elasticity of -0.1 means that for every 1% (one percent) increase in price there is a corresponding reduction in demand of -0.1% (one-tenth of a percent). A typical elastic value is projected as negative, indicating a decline in demand with an increase in price. Likewise, an increase in demand would theoretically be coupled with a decrease in price.

When considering historic research conducted to document the true nature of parking elasticity, it is no wonder that there are very few definitive conclusions. With numerous outlying factors defining and contributing to parking decisions and behavior, the true elasticity is hard to measure, and will vary widely from city to city, or even within a city on a neighborhood by neighborhood level, and will be obscured by other factors affecting parking behavior such as the general health of the economy, the weather, building construction and detours, special events, pedestrian routing and access.

The *Victoria Transport Policy Institute* provides a good summary of parking elasticity research.²

A summary of some of the more interesting findings is provided below. The numerical values presented as elasticity factors (e.g. -0.3) are ratios that would have been derived from the mathematical equation on the previous page.

- When compared to other out-of-pocket transportation expenses, parking fees typically have the highest impact on trip decision, usually by a factor of 1.5 to 2.0. The example provided states that a \$1.00 per hour parking increase is likely to have the same effect in trip reduction as a fuel price increase of \$1.50 to \$2.00 per gallon (USEPA, 1998). *Note that this data is more than ten years old and the current economic impacts of fuel prices may sway these numbers in the opposite direction.*
- Several studies conducted between 2000 and 2005 indicated that parking price elasticity is in the range of -0.1 to -0.3, with the variation caused by demographics, geography, mode choice, and overall trip characteristics (Vaca and Kuzmyak 2005; Kuzmyak, Weinberger and Levinson 2003).
- Several studies cited higher elasticities (-0.9 to -1.2) in reference to commercial parking operations, indicating that motorists ability to reduce parking duration, find cheaper locations, and reduce overall trips were direct contributors to increased ability to respond and adapt to raising rates. Another study found that the elasticity of parking was smaller than the elasticity of vehicle duration (-0.11 vs. -0.20), indicating that motorists chose to park for shorter durations in response to parking pricing changes. (Pratt 1999; Clinch and Kelly 2003)

A study on commuter mode choice and parking demand in Portland, Oregon, concluded that with the provision of free parking trips would be distributed in the following manner: 62% drive alone, 16% carpool, and 22% on transit. With the implementation of a \$6.00 daily parking charge, the same trips would be distributed in the following manner: 46% drive alone, 4% carpool, and 50% on transit

- The table on the following page provides a breakdown of elasticities and corresponding cross-elasticities for related mode options within a Central Business District (CBD) setting. For example, an increase in prices within the preferred CBD area will reduce parking car trips within the preferred CBD, while increasing demand in the less preferred areas of the CBD the fringe, Park & Ride usage, and increasing public transit trips, and reducing overall trips to the CBD. This table provides a better understanding of how the provision of multiple options and parking areas can vary the diversion of trips. It should be noted that the table below includes elasticity values for both on-street and off-street facilities.

² Parking elasticity research information from VTPI can be found at: http://www.vtpi.org/tdm/tdm11.htm#_Toc161022578



	Preferred CBD	Less Preferred CBD	CBD Fringe
Car Trip, Preferred CBD	-0.541	0.205	0.035
Car Trip, Less Preferred CBD	0.837	-0.015	0.043
Car Trip, CBD Fringe	0.965	0.286	-0.476
<i>Park & Ride</i>	<i>0.363</i>	<i>0.136</i>	<i>0.029</i>
<i>Ride Public Transit</i>	<i>0.291</i>	<i>0.104</i>	<i>0.023</i>
Forego CBD Trip	0.469	0.150	0.029

TABLE 2 – EXAMPLE ELASTICITIES OF A CBD (Hensher & King 2001)

The Elasticity of Seattle’s On-Street Parking System

As part of the 2011 rate-setting effort, SDOT developed a parking rate model using measured occupancy data from the November 2010 study, elasticity assumptions, and a target occupancy tied to the city’s new rate setting policy. The model projected how various parking rate changes (both increase and decrease) would affect occupancy in all areas with paid parking.

Following implementation of the new parking rates, SDOT collected occupancy data to measure any changes and inform future rate setting. In addition to comparison with the November 2010 results, the data can be used to estimate elasticities for each neighborhood and provide guidance for future rate changes.

The following table (Table 3) provides a summary of effects of the 2011 rate changes, including using November 2010 occupancy levels, November 2010 parking rates, June 2011 occupancy levels, and June 2011 rates. These are actual occupancy recorded through hand-counts of observing vehicles parked on street, regardless of whether vehicles are parked legally or paid for parking. Estimating elasticities using paid parking transaction data may yield different results depending on the difference between actual and paid transaction levels. Using this information, the elasticity of parking pricing for each area is calculated using the formula found on page 3-3.

TABLE 3 – SEATTLE NEIGHBORHOOD PARKING ELASTICITY CALCULATIONS

Neighborhood	2010 Rate	2010 Occupancy	2011 Rate	2011 Occupancy	Measured Elasticity
Areas Where Rates Went Up					
1st Hill	\$2.00	100%	\$4.00	82%	-0.2
Capitol Hill	\$2.00	89%	\$3.00	86%	-0.1
Commercial Core	\$2.50	97%	\$4.00	83%	-0.2
Pioneer Square	\$2.50	91%	\$3.50	80%	-0.3
Areas Where Rates Went Down					
Ballard	\$2.00	68%	\$1.00	66%	0.1
Belltown North	\$2.50	46%	\$2.00	37%	0.4
Belltown South	\$2.50	65%	\$2.00	67%	-0.1
Denny Triangle North	\$2.50	42%	\$2.00	31%	0.6
Fremont	\$1.50	80%	\$1.00	83%	-0.1
Greenlake	\$1.50	64%	\$1.00	68%	-0.1
Roosevelt	\$1.50	67%	\$1.00	49%	0.5
South Lake Union (2-hour)	\$2.00	58%	\$1.50	55%	0.1
U-District	\$2.00	64%	\$1.50	91%***	-1.1
Uptown	\$2.00	52%	\$1.00	48%	0.1
Uptown Triangle	\$2.00	29%	\$1.00	32%	-0.1
Westlake Avenue N	\$1.50	61%	\$1.00	54%	0.2
Areas Where Rates Stayed the Same					
12 th Avenue	\$1.50	80%	\$1.50	71%	--
Chinatown/ID	\$2.50	80%	\$2.50	78%	--
Cherry Hill	\$1.50	85%	\$1.50	87%	--
Denny Triangle South	\$2.50	71%	\$2.50	77%	--
Pike-Pine	\$2.00	85%	\$2.00	79%	--
South Lake Union (10-hour)	\$1.25	73%	\$1.25	88%	--

*Occupancy data provided in the table above for 2010 represent the November 2010 rate setting seasonally adjusted value. This value was used in the 2010-2011 rate setting analysis. Some of the areas represent peak hours for a core of the study area, which represents the primary areas of demand for that area

**Occupancy data provided in the table above for 2011 represents peak observations from the June 2011 data collection process.

*** 2010 and 2011 studies in the U-District were of different blockfaces



Table 3 shows that elasticity of parking rate changes vary significantly from neighborhood to neighborhood. The range varies from -0.3 to 0.6 (discounting the U-District). This suggests that changes in parking pricing may not be directly attributable in many circumstances to changes in occupancy. There does not appear to be any specific patterns in the data or correlation between demand reactions and the actual price of parking.

For areas where the parking rates saw an increase, all the elasticity calculations indicate that there was some level of utilization reduction and the elasticity measurements range from -0.1 to -0.3. This finding is fairly consistent with the national research findings provided in the previous section and indicates that raising prices may be effective in reducing overall utilization and freeing up spaces along a block face.

For areas where the rates went down, elasticity varied a little more between areas. However, the expectation was for all areas to increase in occupancy, when, in fact, seven areas decreased in occupancy and only five increased. For example, both the Roosevelt area and Green Lake saw a \$0.50 reduction in parking prices. However, Roosevelt saw a reduction in utilization by 18% and Green Lake saw an increase in utilization by 4%. The result of this comparison is that the reduction in parking prices probably has less to do with changing demands than the actual destinations and demands in the observed area.

Out of the eleven areas that saw a reduction in price, only five saw an increase in occupancy. The remainder were either stable or saw a decrease. Of particular note with this group, the average elasticities were ranged from 0.1 to -0.1, indicating that there was not a lot of variability within the compared utilizations. This data serves to provide a general finding that the elasticity of parking in Seattle varies by area and demand type.

For those areas with a parking price increase, each sub-area saw a reduction in overall demand. However, the magnitude with which the parking demand changed varied between areas did not exhibit a linear relationship based on the level of increase. Again, the type of destination and overall socioeconomic variability of the area played a large role in the change in parking demand.

The conclusion of this exercise is that elasticity depends on many variables, including destination, proximity to alternative transportation modes, socioeconomic characteristics, and geographic characteristics. The city should continue to monitor parking occupancy on a neighborhood by neighborhood level, in an effort to understand how parking management decisions impact each area specifically.

At this early stage where data sets are still limited, there is limited opportunity to look at trends over time. Realistically, changes in occupancy may not have much of a direct relationship to changes in price based upon what these initial numbers show. Once the city has a more developed history of parking data, a more accurate and defined elasticity will be apparent, especially on a more granular level of the specific sub-areas in Seattle's community.



The Price of Parking and Its Impact on Business

One of the driving questions related to the impacts of parking pricing changes is “How will this impact the communities’ businesses?” Many times, the decision is made (or not made) to alter parking pricing or management policies with the direct consequences to the communities’ businesses and economic health in mind. In nearly every community throughout the country, parking managers, city staff, city councils, and downtown leaders must weigh the aspects of additional revenue and better management of parking against the perception or fear that an incremental change in parking pricing can have a tremendous affect on a community or neighborhoods business climate.

Many industry leaders in parking and transportation recognize that there may be a link (whether direct or indirect) between parking pricing and downtown viability as measured by something such as sales tax. The primary issue is that no one has quantified the relationship, or done extensive enough research to document the results of a study. Several smaller studies have provided some insight, but there is no definitive result that states that if parking rates are increased by “x” amount, that sales tax will be impacted by “y” amount.

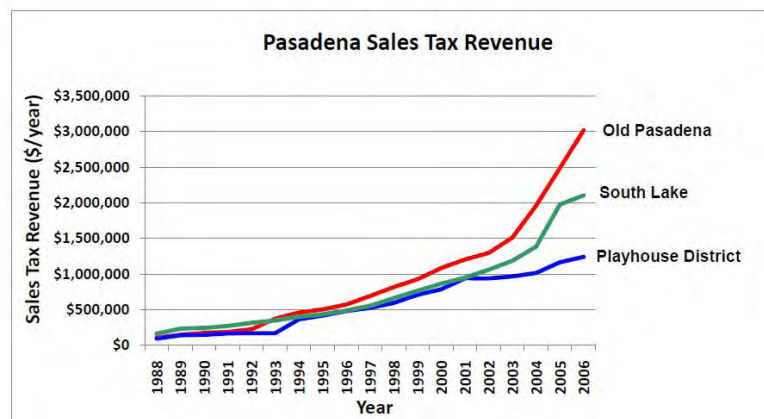
Research Summary

A review of these smaller studies is described in the following sub-sections.

Small Change Turning into Big Changes

Douglas Kolozvari and Donald Shoup (2003) -- <http://www.walkablestreets.com/meter.htm>

In an article published in 2003, Kolozvari and Shoup write about the benefits of parking benefit districts and returning revenue from parking meter collections to the neighborhood with which they are located. While this is the overall theme of the article, there are some interesting insights on how the implementation of parking meters in Old Pasadena were a catalyst for business development, by creating needed turnover which allowed more customers to access area businesses. The article indicates that the installation of parking meters in 1993 provided a spur in sales tax revenue, which pushed the retail area in the Old Pasadena’s downtown to greater heights, quickly outpacing the rest of the city. The chart below (which is part of Dr. Shoups research cited later in this chapter) provides a graphic depiction of the change.

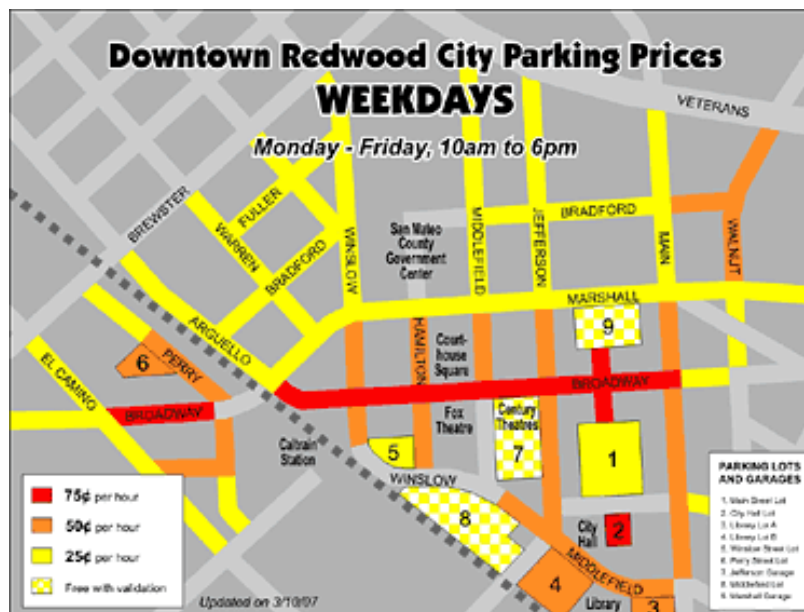


The article also provides a comparison of Old Pasadena's success with the decline in the Los Angeles business district, Westwood Village. The article states that the two areas are directly comparable in size, context, and general demographics. The primary difference is their parking policy. Old Pasadena set rates high enough to manage parking demand, while also providing some level of revenue return to the community. Westwood Village, on the other hand, kept rates low, even reducing rates from \$1.00 to \$0.50 in 1994, which was in direct response to merchant outcry. The result was overcrowding at the curb, which led to the perception that there was no parking in that district. The article states that the business district began to have trouble generating revenue, which led to the decline of its infrastructure (sidewalks and roads, primarily) and eventually a decline in demand for business services.

Redwood City's Free Market Parking Meters

Laurence Aurbach -- <http://pedshed.net/?p=105>

In blog article for the site PedShed.net, the author describes implementation of Redwood City's performance-based pricing system. The article provides interesting feedback from then downtown development coordinator Dan Zack. Below is a map representing the initial pricing implementation.



Following are a few quotes from Mr. Zack from that article that describe the local context of the implementation:

Regarding the reason for implementation:

"We never had an overall parking shortage, but our prime areas were always chronically congested, with the frustration, cruising, and complaints of "this place has no parking" that parking congestion entails.

However, within a few blocks there were always plenty of spaces. We had an odd system in which Broadway (the main drag) was free, while side streets and garages were metered. So people were actually given no incentive to walk a little bit — they were actually penalized for it”

Regarding the initial reaction to the implementation:

“So far, Broadway has decongested quite a bit. You can now find a spot at most times in prime areas. Many people, especially long term parkers and bargain hunters, have shifted to cheaper parking on the edges of Downtown and off the street. Seventy-five cents isn't a lot of money, but you would be amazed at how frugal people are when it comes to parking, even if they are driving \$50,000 BMWs filled with \$3/gallon gas. After the system has been in place for a few more months and behaviors have really adapted I plan on writing a paper that will summarize our findings.”

Regarding the initial merchant acceptance:

“At first the merchants went crazy about the cost increase. When we told them about how there will be no time limits, that we'll be power-washing the sidewalks, they were in. When we had a City Council meeting, merchants came to support it.”

How did Redwood City fare after the initial price increase and implementation of performance-based parking pricing?

While the initial response to the implementation of performance-based pricing for the City was good, in recent years the parking management has come under fire from business owners. The City reduced parking rates in some areas and rolled back enforcement hours in response to criticism from downtown businesses and users. Within the past few months, the City has tried again to raise rates, which met continued outcry from business owners. While there was no provision of statistical sales tax data, the response from businesses could be taken as an indication that the program has not stimulated additional downtown revenue.

Conclusion

The two articles cited above provide differing insight into the overall review of parking policies and their effects on the local business climate. The first, from Old Pasadena, shows definite benefit from paid parking and overall better management of the on-street parking system. But, the article fails to note that the area itself was going through a major transition from a self-defined slum to a vibrant, artistic community. Perhaps the increased sales tax had more to do with the destination, rather than the means of managing transportation demand. The second article highlighted some initial perceived success in Redwood City, but the follow-up indicates that the long-term success has been limited by business owner outcry.

There are other articles and studies that provide the same results. Some indicate that parking policies are the direct cause of major changes in downtown or community success. Still, other research indicates that parking pricing and management decisions are the direct cause of economic downfall and poor business success. Perhaps the true answer is “It Depends....”

- Success of businesses depends on draws to that business. If a business does not have demand, no level of parking will provide that demand.
- If parking management decisions are made for an area with high demand, pricing policies in place will most likely be accepted as the cost to do business in that area. For areas with low demand, parking management decisions will not provide the catalyst to draw more visitors.

While it would be convenient for this report to provide some simple mathematical equation that says that Parking Decision “X” will provide Economic Catalyst “Y”, there is no known direct correlation. There is most definitely a relationship between parking management and pricing and business vitality, but it is much more dynamic than the hoped for straight line correlation.

The city will have to monitor impacts of ongoing parking management decisions on a neighborhood-by-neighborhood basis. As parking pricing goes up in certain areas, it is imperative that the business community understand why prices are changing and ongoing monitoring should be done to ensure that the pricing changes have the desired effects. Additionally, pricing changes should be incremental enough that the change does not cause a dramatic change in area use.



SDOT Rate-Setting Model Recommendations

Using the understanding of economic impacts described in the previous sections, it is possible to provide input and guidance for the development of the 2012 rate setting model, so that 2012 and beyond efforts are inclusive of principles outlined in this chapter. This section presents a brief overview of the model review process and recommended changes for the 2012 model.

The model review process kicked off with an initial meeting between Kimley-Horn and SDOT staff to discuss model inputs, elasticity factors and equations used in the existing model, and expanded parameters for the future model. After that meeting, SDOT provided a copy of the 2011 model for review and discussion during the review process.

The following are recommendations that can be incorporated into the design of the 2012 rate-setting model. The purpose is not to design the 2012 model but to present recommendations for evaluation criteria. These recommendations are based on conversations about the ongoing study and desired outcomes, and how this dynamic rate modeling tool can be adjusted and calibrated to meet the needs of the future on-street parking system.

Study Areas

The areas to be included in the rate model are those neighborhoods with paid on-street parking. In the previous rate model, Ballard Locks was included in Ballard. For the 2012 model, Ballard Locks and Ballard should be evaluated separately.

Recommended Rate Ranges

A rate range needs to be established to keep rates within a practical range. The minimum rate should remain at \$1.00 per hour. Over the last sixty years, the City had installed paid parking in each area to ensure parking availability and turnover, typically where areas are pressured by large employment sites. Currently, the City of Seattle has a \$4.00 per hour cap for on-street parking. The new parking rates will not exceed this cap. However, the model should be designed to identify appropriate rates in each area, regardless of the cap. This will allow the City to track actual parking rate needs by area and to test other parking performance measures.

Recommended Determination of Target Occupancy

The target occupancy is to have one or two spaces open per block face on average throughout the day. In the 2011 model, a citywide average of spaces per block face was calculated to determine the occupancy to achieve one or two spaces of availability. This average assumed seven spaces per block face. Since block sizes vary within and across neighborhoods, the citywide average created potentially unrealistic occupancies for some neighborhoods. The 2012 model should calculate the average number of spaces per block face by neighborhood to determine the appropriate occupancy necessary to achieve the goal of one or two spaces of availability per block face.



Recommended 2012 Model Changes to Determine Rate Changes

The purpose of a performance-based pricing system is to acknowledge that different areas have different parking patterns and needs. As such, the rates should be determined through a series of evaluations based on occupancy information unique to each neighborhood.

Step 1 – Identification of Sub-Areas

The first step will be to determine whether a neighborhood exceeds or is below the target occupancy range during the peak time period set at the top three hours of peak occupancy between 8 am and 3 pm (using the weekday data results). Using parking occupancy data collected both on an annual basis and in any additional data collection efforts, the City should evaluate areas to determine whether rate changes should occur throughout a neighborhood or on a smaller sub-area by sub-area basis. If areas of high demand are consistently located throughout the area, rate changes should occur on an area-wide basis. However, as the city maintains and analyzes parking occupancy, if specific areas of contiguous and clustered high demand are located within an area, a specific sub-area should be defined.

Step 2 – Block Face Contiguity

The second step will determine whether a sub-area should experience a rate change, if the blocks that exceed the target occupancy range are contiguous. If the block faces are contiguous then a higher rate should be suggested for the sub-area and the rate for the remainder of the neighborhood should remain the same or be evaluated to have a lower rate or different time limits. If the block faces exceeding the target occupancy range are not generally concentrated (i.e. the block faces are proximal to one another), then a sub-area should not be created and the neighborhood should be evaluated for a rate change as a whole.

Step 3 – Determining Actual Rates

The purpose of the model is to objectively identify which neighborhoods and sub-areas should experience a rate change and which should remain the same. However, other factors must be accounted for. The results of the model will need to be examined further to:

- Refine the rate so it is within the established limits (\$1.00/hour minimum and \$4.00/hour maximum)
- Determine if other parking management strategies could be used as an alternative to raising the rate (e.g., changing or eliminating time limits)
- Ensure that adjacent neighborhoods will have a similar rate

Other model inputs necessary to determine rate changes include the following:

- Current Rate – The current rate used in the 2012 model will be the 2011 rates



- Rate Change Increments - \$0.50 increments (this results in seven total outcomes considering the \$1.00 minimum and the \$4.00 maximum)
- Elasticity – A very low elasticity should be used to be consistent with the \$0.50 rate change increment. Using the data in the previous section, the city should evaluate and develop local elasticity factors for use in the model, rather than national historic trends. Elasticity trends should be developed on a neighborhood by neighborhood basis over time and used to monitor and predict peak parking usage based on performance based parking pricing decisions.

Unfortunately, there is not a lot of research that can provide a foundation for the city to base elasticity decisions on. The best approach for the city is to continue to monitor occupancy data annually and update the analysis conducted in the previous section. By defining and maintaining elasticity values for each neighborhood, the city will be better positioned to make rate setting decisions on a neighborhood-by-neighborhood basis.

Additional Thoughts

Beyond these questions and suggested changes, as the recommendations, strategies, and policies in the ongoing study are defined, the rate model may need to be reevaluated to match these strategies. For example, if the preferred strategy is to develop time-of-day pricing strategies (time bands), the model will need to be adjusted to evaluate specific time intervals and define rates for each interval for each area.

If the preferred strategy is progressive pricing, the city will need to modify the model to define specific turnover characteristics and define time thresholds for rate increases. All of these strategies will take the overall model structure and assumptions in a different direction, and these changes will need to be reevaluated at that time.



Performance-Based Pricing Supporting Documentation

As part of the city study, supporting research was developed by one of the parking industries foremost experts on parking management. While considered valuable in the development and validation of policies, this is an opinion piece and is not to be considered city policy or consultant recommendations. .

Contributing Author

Donald Shoup, FAICP, Ph.D. in Economics, Yale

Dr. Shoup is professor of urban planning at the University of California, Los Angeles. He has written many books and articles on parking, including *The High Cost of Free Parking* (Planners Press, 2005), which explains the theory and practice of parking management.

Donald Shoup has extensively studied parking as a key link between transportation and land use, with important consequences for cities, the economy, and the environment. His influential book, *The High Cost of Free Parking*, is leading a growing number of cities to charge fair market prices for curb parking, dedicate the resulting revenue to finance public services in the metered districts, and reduce or remove off-street parking requirements. His research on employer-paid parking led to passage of California's parking cash-out law and to changes in the Internal Revenue Code to encourage parking cash out.

Professor Shoup is a Fellow of the American Institute of Certified Planners. He has been a visiting scholar at Cambridge University and the World Bank, and has served as Director of the Institute of Transportation Studies and Chair of the Department of Urban Planning at UCLA. He is the Editor of ACCESS magazine.

The Economics of Curb Parking

What is the right price for curb parking? How do curb parking prices affect business conditions on the metered streets? Answers to these two questions will help Seattle to manage its curb parking supply effectively.

1. What Is The Right Price For Curb Parking?

The price of curb parking may be too high if many curb spaces are vacant and too low if no spaces are vacant. But if one or two curb spaces are usually open on each block so that drivers can reliably find convenient parking at their destinations, the price is just right. This is the Goldilocks principle of parking prices.

Cities should charge the right price for curb parking because the wrong prices can do so much harm. If the price is too high and many curb spaces are vacant where customer demand likely otherwise exists, adjacent businesses will lose potential customers. If the price is too low and no curb spaces are vacant, a surprising share of cars in the traffic flow may be searching for a place to park. Sixteen studies conducted between 1927 and 2001 found that, on average, 30% of the cars in congested downtown traffic were cruising for parking. More recently, when researchers interviewed drivers stopped at traffic signals in New



York City in 2006 and 2007, they found that 28% of the drivers on a street in Manhattan and 45% on a street in Brooklyn were cruising for curb parking.

In another study in 2008, the average time it took to find a curb space in a 15-block area of the Upper West Side of Manhattan was 3.1 minutes and the average cruising distance was 0.37 miles. For each individual driver, 3.1 minutes is not a long time, and 0.37 miles is not a long distance, but because there are so many drivers, the cumulative consequences are staggering. In a year, cruising for underpriced parking on these 15 blocks created about 366,000 excess vehicle miles of travel (equal to 14 trips around the earth) and 325 tons of carbon dioxide.

Performance Parking Prices

Free curb parking in a congested city gives a small, temporary benefit to a few drivers who are lucky on a particular day, but it imposes high costs on everyone else every day. To manage curb parking and avoid the problems caused by cruising, some cities have begun to adjust their curb parking prices by location and time of day. These cities do not employ a complicated pricing model, or try to estimate price elasticities, or aim to raise a certain amount of revenue. Instead, they have established a target occupancy: they aim to produce about an 85% occupancy rate for curb parking, which on a typical block with eight curb spaces corresponds to one open spot.

Some cities refer to the policy of setting prices to produce one or two open curb spaces on every block as performance pricing. This pricing strategy can improve performance in three ways. First, curb parking will perform more efficiently. If all but one or two curb spaces are occupied on every block, parking will be well used but also readily available. Second, the transportation system will perform more efficiently because cruising for curb parking will not congest traffic, waste fuel, pollute the air, and waste drivers' time. Third, the local economy will perform more efficiently. In business districts, drivers will park, buy something, and leave promptly, allowing other customers to use the spaces. A few cities have adopted performance pricing policies for their curb parking spaces, and the best example is San Francisco.

SFpark

San Francisco has embarked on an ambitious pilot program, called *SFpark*, to adjust curb parking prices to achieve a target occupancy rate. With substantial funding through a federal transportation grant, the city has installed meters that charge variable prices and sensors that report the occupancy of each space in real time. The City thus has information on curb occupancy rates and the ability to adjust prices in response to the occupancy rates. The City adjusts prices once a month, never by more than \$0.50 an hour. By nudging prices up or down in a trial-and-error process, the City seeks a structure of prices that vary by time and location throughout the City, yielding one or two open spaces on every block face.



SFpark embodies two important ideas. The first is that you cannot set the right price for curb parking without observing the occupancy. The goal is to set the price that will yield one or two open spaces on every block face on average over the course of the day; this is the lowest price the City can charge without creating a parking shortage. The second is that small changes in parking prices and location choices can lead to big improvements in transportation efficiency. **Figure 1** shows that nudging up the price on crowded block face A by enough to shift only one car to less crowded block face B can significantly improve the performance of the transportation system. This shift will eliminate cruising on block A and take advantage of the empty spaces on block B. Even if all the curb spaces are occupied on all the nearby blocks, shifting only one car per block from a curb space to nearby off-street parking can also eliminate cruising.

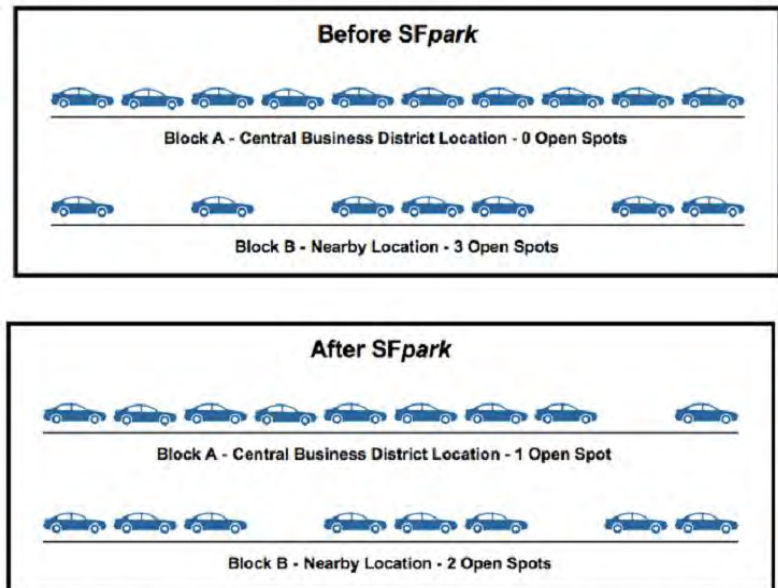


Figure 1. Performance prices create open spaces on every block.

SFpark's first price changes took place in July 2011, and the meter rates now vary by block, time of day, and day of the week. Results highlighting impacts of these changes may not be available until later this year. **Figure 2** shows the changes for the period of noon to 3 pm on Monday–Friday in the Civic Center, one of the eight pilot areas. All blocks initially had a price of \$3.00 per hour, and the prices increased on some blocks while decreasing on adjacent blocks. **Table 1** shows the occupancy rates that determined the price changes. Meter prices in the entire SFpark pilot area increased for 32% of curb spaces, decreased for 31%, and were unchanged for 37%. The fine-grained pattern of price changes strongly suggests that predicting the right price for curb parking on any block is almost impossible without good occupancy data.

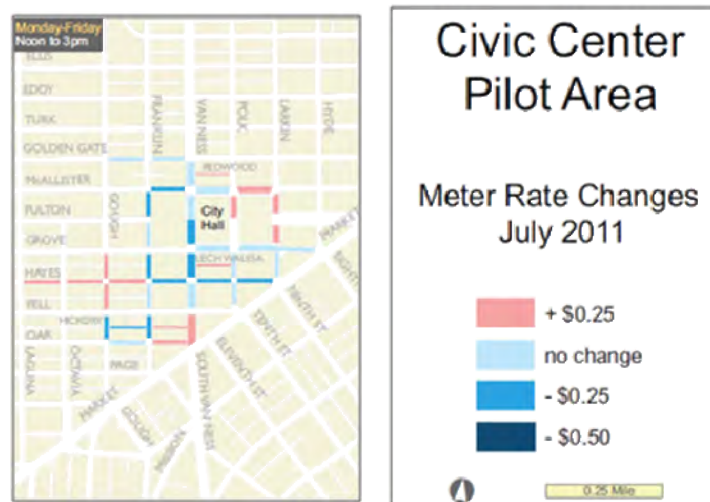


Figure 2

SFMTA SFpark July 2011 Parking Meter Rate Adjustments

BLOCK	PILOT AREA	Mon-Fri noon to 3 p.m.	Mon-Fri noon to 3 p.m.	Mon-Fri noon to 3 p.m.	Mon-Fri noon to 3 p.m.
		PARKING OCCUPANCY	CURRENT RATE	NEW RATE	ADJUSTMENT
Franklin St 100	Civic Center	48%	\$3.00	\$2.75	-\$0.25
Franklin St 200	Civic Center	64%	\$3.00	\$3.00	\$0.00
Franklin St 300	Civic Center	56%	\$3.00	\$2.75	-\$0.25
Franklin St 400	Civic Center	74%	\$3.00	\$3.00	\$0.00
Franklin St 500	Civic Center	56%	\$3.00	\$2.75	-\$0.25
Golden Gate 0	Civic Center	76%	\$2.00	\$2.00	\$0.00
Golden Gate Ave 700	Civic Center	76%	\$3.00	\$3.00	\$0.00
Gough St 200	Civic Center	48%	\$2.00	\$1.75	-\$0.25
Gough St 300	Civic Center	81%	\$2.00	\$2.25	\$0.25
Gough St 400	Civic Center	82%	\$2.00	\$2.25	\$0.25
Grove St 0	Civic Center	80%	\$3.00	\$3.00	\$0.00
Grove St 100	Civic Center	79%	\$3.00	\$3.00	\$0.00
Hayes St 0	Civic Center	56%	\$3.00	\$2.75	-\$0.25
Hayes St 100	Civic Center	36%	\$3.00	\$2.75	-\$0.25
Hayes St 200	Civic Center	44%	\$3.00	\$2.75	-\$0.25
Hayes St 300	Civic Center	85%	\$2.00	\$2.25	\$0.25
Hayes St 400	Civic Center	88%	\$2.00	\$2.25	\$0.25
Hayes St 500	Civic Center	90%	\$2.00	\$2.25	\$0.25
Hickory St 0	Civic Center	83%	\$3.00	\$3.25	\$0.25
Hickory St 100	Civic Center	54%	\$2.00	\$1.75	-\$0.25
Larkin St 100	Civic Center	81%	\$3.00	\$3.25	\$0.25
Larkin St Ave 200	Civic Center	86%	\$3.00	\$3.25	\$0.25
Larkin St St 0	Civic Center	74%	\$3.00	\$3.00	\$0.00

Table 1

San Francisco has established a formula to govern the price changes in response to the parking occupancy rates:

“In order to achieve the goal of at least one available parking space per block, meter rates will be adjusted with the goal of maintaining no more than 80% occupancy on any given block. Rates will be adjusted using the following formula:

- When occupancy is 80-100%, the hourly rate will be raised by \$0.25.
- When occupancy is 60-80%, the hourly rate will not be changed.
- When occupancy is 30-60 %, the hourly rate will be lowered by \$0.25.
- When occupancy is less than 30%, the hourly rate will be lowered by \$0.50.”

Most meters in the City operate from 9 am to 6 pm. The rates for these meters have been split into three periods: 9 am to noon, noon to 3 pm, and 3 pm to 6 pm. A driver who arrives at a meter at 11 am and wishes to park until 1 pm must pay for one hour at the 9 am to noon rate and one hour at the noon to 3 pm rate. SFMTA notifies the public no less than seven calendar days before any change in prices. The pricing policy is described at this link:

http://sfpark.org/wp-content/uploads/2011/06/SFpark_Pricing_OnStreetPolicy_110608.pdf

Beyond managing the curb parking supply, *SFpark* can help depoliticize parking by stating a clear principle used to set the prices for curb spaces: the demand for parking will set the prices. After shifting from a revenue goal to an outcome goal and choosing the occupancy rate for the desired outcome, the city council will no longer have to vote on parking prices. If too many curb spaces are vacant, the price will go down, and if no curb spaces are vacant, the price will go up. Wanting more revenue will no longer justify raising prices. Relying on the power of an impersonal market test to set prices makes an end run around the politics of parking.

Redwood City, California

In 2005, Redwood City, south of San Francisco, adopted legislation establishing a performance parking policy and returning the meter revenue to the metered district. The city council set a performance goal for curb parking—a target occupancy rate of 85%—and gave City staff the responsibility for adjusting prices to achieve the target occupancy. The council thus sets parking *policies*, not parking *prices*. The council also dedicated the meter revenue to pay for public improvements in the metered zone. The City had free parking along its main thoroughfare, but paid parking along side streets and garages were paid. Initially there was outcry from the business owners, but once the merchants understood that the revenue would remain in the metered district, they strongly backed the proposal, and the members of the city council voted for it unanimously.

When Redwood City began to charge performance prices for curb parking, it also removed the time restrictions at meters, and this has been the program's most popular feature. Because curb parking prices are higher than the adjacent off-street prices, most drivers who want to park for a long time naturally choose the off-street spaces.

Removing time limits for curb parking is especially important if meters operate in the evening. A one-hour time limit can make the curb spaces almost useless for people who want to dine in a restaurant or go to a movie. As an example of this policy gone wrong, in 2009 the City of Los Angeles, desperate for new revenue, extended the hours of meter operation to 8 p.m. in business districts but left many of the one-hour time limits in place. As a result, many spaces remain empty in the evening and most revenue comes from tickets for overtime parking. The time limits harm the adjacent businesses by making it difficult for restaurant or theater patrons to park and by irritating customers who get tickets.

Washington, D.C.

In 2008, Washington, D.C. established a performance parking pilot project near a new baseball park that has 41,000 seats but only 1,300 off-street parking spaces.³ Through special pilot legislation, the District of Columbia's Department of Transportation is authorized to adjust meter rates to achieve vacancy rates between 10% and 20% for the curb spaces, to adjust the days and hours during which the meters

³"Performance Parking Pilot Zone Act of 2008." Available at:
<http://ddot.dc.gov/DC/DDOT/On+Your+Street/Traffic+Management/Parking/Performance+Based+Parking+Pilots>



operate, and to adjust fines to dissuade illegal parking. As part of the ordinance defining the performance-based parking policy, the revenue that is generated by the program is split the following ways:

- 20% to the general purposes of the DDOT operating fund
- Up to 60% used to repay the cost of procurement and maintenance of new meters and related signage for the pilot program in that zone
- Once the cost of procurement is paid in full in that zone, up to 5% shall be used to pay for meter maintenance and related signage in that zone
- The remaining balance of curbside parking revenues shall be used solely for the purpose of non-automobile transportation improvements in that zone

On game days, the meter rates are \$8.00 an hour during events at the ballpark and \$2.00 an hour during the rest of the day. On nongame days, the meter rates are \$1.00 or \$1.50 per hour.⁴ In addition to the paid parking, the area has a large residential parking zone for the many residential streets that surround the ballpark.

Ventura, California

Ventura, north of Los Angeles, adopted a performance parking program in 2010, including installation of paid parking for the first time. The municipal code language is simple: “The City Transportation Manager may adjust pay station and meter rates up or down 50 cents per hour in twenty-five-cent increments based on average occupancy rates in order to achieve a target occupancy rate of 85 percent.”⁵ The code also specifies, “All moneys collected from parking pay stations . . . shall be devoted exclusively to purposes within the geographic boundaries of the parking district from which the revenue is collected.”⁶ Time limits were removed for all metered spaces.⁷

Ventura has been especially creative in using its performance pricing program to provide benefits to the metered area. The multi-space meters use Wi-Fi to communicate with City Hall, and the Wi-Fi channels have considerable excess capacity beyond what is needed for the meters alone. The City uses this excess capacity to provide free Wi-Fi service throughout the metered district, courtesy of the Downtown Parking Management program. Many restaurants and coffee shops that had paid to provide their own Wi-Fi for customers have discontinued their individual Wi-Fi service and now rely on the public Wi-Fi service.

Parking meters have a natural source of opposition—the drivers who pay for curb parking. That is why it is so important to create support for the meters by using at least some of the meter money to pay for local public investments. If residents and merchants and property owners can see the public investments on the metered streets, they form a natural source of support for the meters. Without this local public spending financed by the meters, it is harder to see the meters’ benefits. Drivers who have an easier time finding a curb space don’t know it is because of the meters. Drivers who suffer less traffic congestion

⁴District Department of Transportation (2009, 7) Available at: <http://ddot.dc.gov/DC/DDOT/On+Your+Street/Traffic+Management/Parking/Performance+Based+Parking+Pilots> .

⁵Section 16.225.010 of the San Buenaventura Municipal Code.

⁶Section 16.225.050 of the San Buenaventura Municipal Code

⁷Ventura's program is explained at www.cityofventura.net/pw/transportation/parking



don't know it is because there is less cruising for free parking. People who breathe cleaner air don't know it is because less cruising produces less pollution. And so on. Showing the meter money at work can help to convince many people that parking meters are a good idea.

The Right Occupancy Rate for Curb Parking

A performance pricing policy requires a parking occupancy goal. Should that goal be 85%, or something different? The answer depends on the value of having a few more spaces occupied and on the resulting costs associated with more cruising for scarcer vacancies. A rate of 95% occupancy, for example, would still leave a few vacant spaces, but it would increase the number of occupied spaces by only 12%, while reducing the number of open spaces by 67%.⁸ The higher occupancy rate would increase the difficulty of finding an open space, so drivers would have to spend more time cruising and would have to walk farther from their cars to their destinations and back.

Perhaps Seattle's goal of one to two empty spaces on each side of every block is the most sensible policy. Given the random nature of arrivals and departures, cities that adopt performance pricing will need to accept some time with two or more vacancies so there will be less time with no vacancies. Instead of aiming for an average of 85% occupancy over an hour, a city can aim for a target share of the hour with at least one to two vacancies on each block. A city will have two goals in setting a target for the number of minutes during an hour with an open space on the block:

Ready availability (Turnover). Availability is defined as the share of an hour with at least one vacant space on the block. Ready availability means that drivers can usually find a convenient open space.

High occupancy. Occupancy is the average share of spaces that are occupied during the hour. High occupancy is defined when the curb spaces are well used and serve many customers.

In addition, there is a third metric of revenue that depends on both the meter price and the occupancy rate. Revenue results from good management and can be a metric to track trends.

Cities face a trade-off between ready availability and high occupancy. These two goals will often conflict, because raising the meter rates to ensure at least one vacant space during a greater share of an hour will reduce the average occupancy rate. Suppose, for example, a city sets prices to ensure a vacant space on each block for at least 45 minutes during each hour. If at least one vacant space is available on that block for only 30 minutes in an hour, the availability target is not met, and the price should increase. This price increase, however, means that the average occupancy during the hour will decline.

Curb parking is a perishable good, which means its costs are fixed and it cannot be stored. (Airline seats are another example of a perishable good—an empty seat on a flight cannot be resold later.) Private off-street parking operators set prices of perishable goods to maximize revenue, but a city's goal for curb parking should be different. Full occupancy of curb parking produces unwanted cruising, while low occupancy means the curb spaces are not delivering customers to the adjacent businesses. A city must balance the competing goals of reliable availability and high occupancy. The greater the random variation

⁸The increase in occupancy from 85 to 95 cars per 100 spaces adds only 10 cars, or 12 percent ($10 \div 85$), to the number of parked cars, while it reduces vacant spaces from 15 to 5, or by 67 percent ($10 \div 15$).



in demand during a time period, the greater the conflict between the two goals. Nevertheless, it seems sensible to focus on a driver's probability of finding an open space upon arrival as a key measure in setting prices.

If cities eliminate cruising by charging performance prices for curbside parking, where will the cruising cars go? Because drivers will no longer have to arrive at their destinations five to ten minutes early to search for a curbside space, their vehicle trips will be five to ten minutes shorter. The reduction in traffic will come not from fewer vehicle trips but from shorter vehicle trips. Conversely, in areas with occupancies consistently well above the target range, without shoulder time or geography to move people to, the reduction would have to come from reduction of trips that end with parking on street at the curb.

2. How Do Curb Parking Prices Affect Business Conditions on the Metered Streets?

Proposals to increase parking prices or run the meters later in the evening usually provoke vehement complaints like, "If this city operates its parking meters in the evening, I will never drive downtown to eat in a restaurant again." This threat to boycott downtown restaurants would be a convincing argument if many curbside spaces remained empty after the meters began operating in the evening. But this threat ignores the key feature of performance prices: *If the meters are priced right, cars will fill most of the curbside spaces, leaving only one or two vacant spaces on each block.* If most curbside spaces are filled, parking meters cannot be chasing all the customers away.

Meters *will* chase away some drivers on some trips, but the curbside spaces these drivers would have occupied will become available to customers who are willing to pay for parking if they can easily find a convenient curbside space. Because the curbside spaces will remain almost fully occupied, merchants shouldn't worry that performance prices will harm their businesses. And who is likely to leave a bigger tip for the waiters in a restaurant? Drivers who are willing to pay for convenient curbside parking if they can always find an open curbside space? Or drivers who will come only if they can park free after circling the block a few times to find free parking?

Both common sense and empirical research suggest that performance-priced curbside parking will motivate more people to carpool, because carpoolers can share the cost of parking while a solo driver pays the full cost. Drivers who pay to park may arrive with two, three, or four customers in a car. Performance prices will also promote faster turnover because drivers will pay as long as they park. If a curbside space turns over twice during the evening, each space can deliver two groups of diners to a restaurant. For both reasons—higher-occupancy vehicles and faster turnover—performance prices for curbside parking will attract more customers to a business district. With more customers, restaurants can expand and hire more waiters and pay more in sales taxes. Charging performance prices to manage curbside parking can thus benefit many people.

A further advantage of performance prices is that they will decline when demand declines during a recession. The price of curbside parking will automatically fall to keep the customers coming. The cheaper curbside parking will help businesses survive and prevent job losses. But if curbside parking prices remain high during a recession, curbside spaces will be under occupied, resulting in fewer customers for stores, and fewer jobs.



Sales tax revenues provide the best evidence of how parking meters affect business conditions. Although cities rarely collect data on sales taxes for parking districts, Pasadena, California, did so when it installed parking meters in Old Pasadena in 1993. Old Pasadena has done well compared with the rest of the City since then. Its sales tax revenue increased rapidly after 1993 and is now higher than in other retail districts in the City (Figure 3). Old Pasadena's sales-tax revenue quickly surpassed that of South Lake Avenue, formerly the City's premier shopping district. The merchants on South Lake Avenue petitioned to install parking meters in 2008. These data make it difficult to argue that parking meters are bad for business.

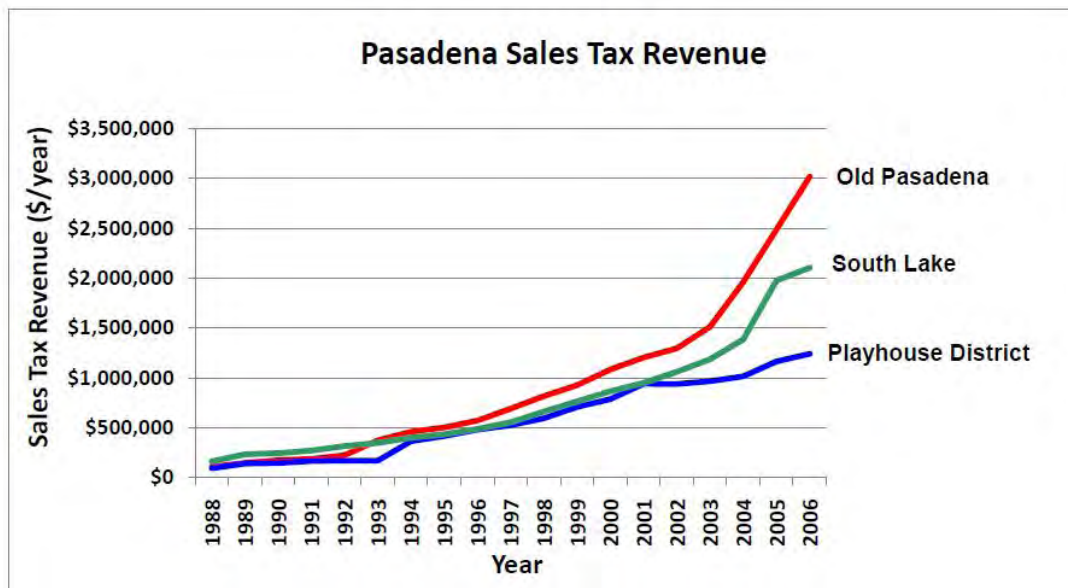


Figure 3

The parking meter was invented in 1935, and in the 1930s many cities introduced their first parking meters on one side of the street at a time, to show everyone how the meters improved parking and reduced congestion. When one side of the street had meters, merchants on the other side demanded them. Cities can now introduce performance-priced curb parking in a similar way, to show merchants that it is good for business. If one district has performance prices, so that it always has a few vacancies and high turnover, everyone who wants to shop in that district can park quickly. Comparing the sales tax revenue in the performance-priced district with sales tax revenues in nearby districts with free parking can quickly uncover the effects of performance-priced curb parking on business conditions.

San Francisco is now collecting data on sales tax revenues in the *SFpark* pilot districts, and will compare it with the sales tax revenues in otherwise-similar comparison districts without *SFpark*. When these data become available, they will provide the best possible evidence on how performance prices for curb parking affect business conditions on the metered streets.

CHAPTER 4

Public Involvement

INTRODUCTION

This document summarizes the public outreach and stakeholder involvement efforts that occurred throughout the course of the City of Seattle Performance-Based Parking Pricing Study. Throughout the project, several meetings were held with community stakeholders to understand the issues, constraints, and opportunities associated with the project. Additionally, a panel of parking and downtown development experts was assembled to provide guidance and support throughout the development of policies and strategies for performance-based parking management principles. Finally, an electronic survey was developed to obtain information and opinions about parking from the Seattle parkers and business owners. The following methods were used to solicit input from stakeholders, experts, and the public:

- Expert Advisory Panel
- Parking Sounding Board
- Public and Business Owner Surveys

These efforts are described in greater detail in the following sections.

EXPERT ADVISORY PANEL

The Expert Advisory Panel was assembled to provide oversight and guidance for best management practices and the development of innovative parking strategies for the City of Seattle. The panel included a team of former and current parking professionals and downtown leaders with varying backgrounds in parking demand management, technology innovation, communications strategies, implementation, sustainability, and downtown development. The purpose was to provide insight into real world experiences related to the implementation of performance-based pricing strategies, analyze parking management alternatives, and help develop solutions for the City of Seattle. The following pages provide a list of the expert panel members along with a brief biography and description of why they were chosen for this panel.

The Expert Advisory Panel initially met on May 23 and 24 at the 2011 International Parking Institute (IPI) Conference. The focus of this meeting was to introduce the panel members to the City and consultant team, to educate panelists about the project, and to solicit initial input from the panelists pertaining to the following:

- Appropriate occupancy ranges
- Data needs
- Rate setting methodologies
- Dynamic pricing experiences and strategies
- Strategies on revenue forecasting
- Communication strategies
- Methodologies for implementation (pilot programs)
- Evaluation of other parking technologies



Mr. Chad Lynn, CAPP, Director Parking Services, City of Beverly Hills, CA



Mr. Lynn is a certified administrator of public parking and is very well respected in the field of municipal parking management. Mr. Lynn is a member of an advisory board overseeing the new LA Express Park program in Los Angeles. The LA Express Park project is one of two major federally funded programs being developed to pilot new on-street parking strategies and technologies including the implementation of performance-based parking pricing..

Mr. David Feehan, President, Civitas Consultants, LLC



Mr. Feehan is the former President of the International Downtown Association and has managed numerous downtown management associations (including the development of some very innovative and ground-breaking parking management programs). Mr. Feehan brings a special perspective on how effectively managed parking programs can contribute to urban space management goals and help create economic benefits to downtowns.

Ms. Diane Cunningham, President, Cunningham Parking Consultants



Ms. Cunningham ran the City of Los Angeles parking program for two decades and brings a world of municipal parking operations know-how specific to large US cities. Since her retirement from the City of Los Angeles, Ms. Cunningham has worked for parking technology firms and is familiar with the latest innovations on the technology front.

Mr. Todd Pierce, President, PICTOFORM



Mr. Pierce is one of the country's leading designers of parking facility signage and graphic communications, but his expertise is much broader. Mr. Pierce is currently engaged with the *SFpark* program in San Francisco. *SFpark* is the other federally funded program to pilot new on-street technologies including the implementation of performance-based parking pricing strategies. Todd is designing and manufacturing the signage for the *SFpark* program as well as advising *SFpark* on matters relating to program branding and communications.

Mr. David Hill, CAPP, Senior Planner, MMM Consultants



Mr. Hill was, until recently, the COO of the Winnipeg Parking Authority. In five short years Mr. Hill took a floundering parking program and transformed it into one of the best municipal parking programs in North America. Mr. Hill was named the “Parking Professional of the Year” by the International Parking Institute in 2010. Winnipeg is also looking at variable parking pricing and is a leader in leveraging mobile license plate recognition technology as a tool in this effort.

Mr. Casey Jones, CAPP, Director of Parking and Transportation Services, Boise State University



Mr. Jones is one the nation's transportation and parking industry leaders in “sustainable parking and transportation policy” development. He is currently the Chair of the International Parking Institute. His previous employment experience includes managing Portland, Oregon's “Smart Park” program before being recruited to be Director of Transportation and Parking Services for the University of Colorado.

The Expert Advisory Panel met again on June 23, 2011 in Seattle at the Seattle Municipal Tower. The purpose of this meeting was to continue discussing, in greater detail, feasibility, technology, and implementation logistics. Based on the discussions had during this meeting, the Panel provided feedback on the City's efforts and recommendations that are summarized below.

“One to two spaces available per block”

The Panel first discussed the validity of the occupancy goal of “one to two spaces available per block”. The common response from the Panel was that this is a good policy statement, but it may not take into consideration other parking components and issues. For instance, there are certain areas within the city that experience consistently high demand and may never achieve that occupancy goal of one to two available spaces unless the price is made much higher than the current cap. The same can be true for areas with very low demand. Another point the Panel made, was that it may not matter unless the issue of disabled parking permit abuse is not addressed.

Parking Strategies

The Panel discussed two pricing strategies in detail, Progressive Rate Pricing and Time of Day. With Progressive Rate strategy, rates are set in increasing hourly amounts to both allow longer parking times, but still encourage turnover. This strategy is best implemented in high demand areas, and it can be combined with changes to time limits (4-hour time limits or no time limits). With this strategy, the City must consider how to effectively communicate the changes in rates to the public, since they will be change with duration of stay.

The Time of Day strategy sets rates in certain time zones or bands (San Francisco uses 9 a.m. – Noon; Noon – 3 pm; 3 pm – 7 pm; 7 pm – 11 pm). The appropriate time zones to use are based on an area's activity level and the market in the area. The City can create different time bands that cater to the specific needs in each neighborhood, or they can establish a citywide time band for consistency and ease of customer use.

In combination with the two above strategies, event rates, possible elimination of time limits, and disabled parking were discussed.

Technology

Choosing the right technology is essential to achieving the City's goals. Technology can provide the City with real-time or near real-time data that can inform how to set pricing rates and to improve the system. With that said, the technology must be reliable, and there is a relationship between the cost of technology and the reliability of the data. In-space sensors that detect vehicle presence have the potential to provide real-time, space specific data, but the technology is very expensive. Additionally, the technology is relatively untested and might not be at the highest level of reliability yet. The Panel advised the City to wait on this technology and let other cities test it first. In regards to assisting the customer, technology can provide means to make parking easier, such as pay by cell and Smartphone parking applications.

Understanding On-street Parking

It is common to think that on-street parking is simply about providing space to “store cars” on the street. In reality, it is much more involved because parking is interrelated to access and mobility, and therefore should be coordinated with other transportation demand measures. In this regard, parking professionals should include access managers, accommodators, and service providers, not just regulators. In this regard, to create a successful parking system, the City must understand the customers, the market, and specific community needs. Part of that includes understanding that parking alone cannot create demand. Demand is based on the services and goods provided in the neighborhood. Parking is not why people come to an area and therefore, lowering the rates will not make an area more desirable. However, parking must support the services available in a neighborhood and should be managed to serve the customer to provide an overall positive experience.

Communication Strategies

As stated previously, communicating the parking strategy to the customer is a vital component of ensuring success. The City should be clear about what they are trying to achieve with the parking strategy and should communicate that goal with the public often. Customers, business owners, property owners, and visitors all have to be able to understand how to use the system. Whichever strategy is implemented, the City should keep things simple for better understanding by the public and involve businesses and other stakeholders along the way in the communication process. They are the link between the City and the general public, and can aid customers and visitors on how to understand and use the system.



Creating a Successful Parking Brand

One of the off-shoots of the panel process was a discussion of the need to create positive perceptions of parking in Seattle, with successful branding program. The Panel suggested five key ingredients to creating a successful parking brand:

- Be memorable and have positive identification – a creative name creates a more lasting impression
- Appear to be affordable and understandable – establish a clear rate structure that is easily communicated to the public, advertise areas or times that are more affordable
- Appear to be convenient – parking is not the destination for customers, it is part of the experience. Therefore, parking information must be readily available and easily understood. (e.g. use of website for relaying information, clearly marking pay stations, etc.)
- Create the perception of being clean and safe – pay stations should be clearly marked, well-lit, and the area kept clean to enhance the positive experience
- Be easy – placement and design signage and wayfinding has to consider both drivers and pedestrians because drivers transition to pedestrians and vice versa



PARKING SOUNDING BOARD

As the primary measure of local public outreach, the Seattle Department of Transportation assembled a Sounding Board that represented the businesses, neighborhoods, and other organizations in the city. The Sounding Board began meeting in June and will continue to meet after completion of the Performance-Based Parking Pricing Study.

City of Seattle Parking Sounding Board

Katherine MacKinnon	Downtown Seattle Association (DSA)
Francine Fielding	Wright-Runstad
Laura Larson	Republic Parking
Ed Danyluk	Imperial Parking Corporation (IMPARK)
Mike Fuda	Diamond Parking Service
Josh McDonald	Washington Restaurant Association
Leslie Smith	Alliance for Pioneer Square
Chip Wall	Pike/Pine Urban Neighborhood Council
Doug Campbell	University District Business Owner, Bulldog News
Beth Miller	Ballard Chamber of Commerce
Don Blakeney	Chinatown/International District BIA
Jessica Vets	Fremont Chamber of Commerce
Susan Ranf	Seattle Mariners
Eric de Place	Sightline Institute
Erica Sekins	Seattle Commission for People with Disabilities
Jerry Everard	Seattle Nightlife and Music Association

The primary purpose of the Sounding Board is to provide a forum for two-way information exchange. The key goals for the Sounding Board included:

- Providing perspective on effects of paid parking policies
- Representing constituency perspectives
- Reviewing and commenting on potential performance-based pricing strategies and implementation options

There were four Sounding Board meetings as part of the City Performance-Based Parking Pricing Study, with meetings between June and August. The following are the summaries from those meetings.

Sounding Board Meeting #1 – June 9, 2011

The purpose of the first Sounding Board meeting was to introduce the project and expectations of the Sounding Board and to start generating ideas and discussing concerns regarding dynamic pricing strategies. A copy of the meeting PowerPoint presentation is included in the Appendix. The following were in attendance at this meeting:

SOUNDING BOARD MEMBERS IN ATTENDANCE:

- | | |
|-----------------------|---|
| ▪ Katherine MacKinnon | Downtown Seattle Association (DSA) |
| ▪ Francine Fielding | Wright-Runstad |
| ▪ Laura Larson | Republic Parking |
| ▪ Ed Danyluk | Imperial Parking Corporation (IMPARK) |
| ▪ Mike Fuda | Diamond Parking Service |
| ▪ Josh McDonald | WA Restaurant Association |
| ▪ Doug Campbell | U District Business Owner, Bulldog News |
| ▪ Beth Miller | Ballard Chamber of Commerce |
| ▪ Susan Ranf | Seattle Mariners |
| ▪ Eric de Place | Sightline Institute |

CITY STAFF IN ATTENDANCE:

- SDOT: Peter Hahn, Charles Bookman, Mike Estey, Cristina VanValkenburgh, Margo Polley, Mary Catherine Snyder, Ruth Harper, Allison Schwartz
- Councilmember Tom Rasmussen
- Mayor's Office: David Hiller, Rebecca Deehr

Other: Kris Effertz (Office of Economic Development), Felicia Yearwood-Murrell (Office for Civil Rights)



CONSULTANT TEAM IN ATTENDANCE:

- Kimley-Horn and Associates, Inc.: Dennis Burns, CAPP
- Rick Williams Consulting: Rick Williams

The meeting began with introductions and a discussion of key parking issues. Members of the Sounding Board expressed the following concerns:

- On-street parking (and curb lane space in general) is a public asset. It is important to remember that we have a choice in how to use that space. Parking may not always be the best and highest use.
- Unmanaged parking can effectively limit business potential. I found myself closing my business earlier and earlier due to the lack of on-street space turnover.
- We need to be extremely aware that we have a long (15 – 25 year) period within which parking will remain a vital asset until we get beyond having a transit system that is merely a commuter service focused on peak ingress and egress time periods and get to a true 24/7 transit system that can adequately support evening-oriented businesses and large event venues. The current trend is an escalating reduction in parking with little replacement. This trend is unsustainable.
- In the Ballard District, we have more concern over having adequate parking supply; we are not as concerned about price at this point. Inadequate transit (hours of services) is creating more demand for parking. Development is reducing available surface parking. This creates a problem with regard to limited district access, which stifles business growth. I would like to explore more creative “shared parking” arrangements (specifically are there ways to better utilize condo parking spaces that sit empty most of the day?)
- The Downtown Seattle Association’s (DSA’s) primary goal is to promote a healthy and vibrant urban core. DSA manages the “Commute Seattle” program. Key issue: Creating an appropriate mix of parking options for the diverse downtown user groups.
- As a private parking management firm we are concerned with escalating parking taxes which can be as much as 25% of a patron’s parking fee. We are also concerned with street traffic as it can be a limiting factor on parking garage peak loading and unloading.
- As a property management professional in the Pioneer Square District, we are concerned with the price of parking and lack of parking (at King Street Station in particular).
- As parking manager for a major parking management firm, some of our key issues include: Parking taxes (which are approximately 25% of patron parking charges, on-street availability/turnover and employee parking.
- I represent both a major parking management firm and the Denny Triangle Neighborhood Association. I am most interested in the parking policies that this study will recommend.

There was a desire expressed by Councilmember Rasmussen and Charlie Bookman to extend this Sounding Board beyond the strategy development phase and into pilot program implementation.

Rick Williams, Assistant Project Manager, began the presentation with a summary of the importance and purpose of the Sounding Board as a key project element. Rick also reviewed the project background and context issues. He spoke on the importance of managing parking as one tool to promote a healthy urban community. Parking plays a significant role in helping to build walkable, bikable, and transit friendly cities. Specifically, managed parking is important in these four key areas:



- **Neighborhood Vitality:** Parking policies promote short-term parking turnover for customers and limit spillover impacts onto residential streets to make neighborhoods vital as well as to support walking, biking, and transit.
- **Economic Vitality:** Businesses see parking as critical to their success in this economy. Businesses want loading and dependable customer parking access. With better management, we can reduce congestion caused by people circling for that last free parking spot.
- **Healthy Environment:** Research shows that free parking is one of the biggest determinants for people's mode choice; therefore, managing parking is critical to addressing greenhouse gas emissions.
- **Equity:** SDOT is committed to ensuring that parking solutions are implemented in an equitable fashion. One example is how we have incorporated multiple languages into our documents and community outreach processes.

Mary Catherine Snyder, the SDOT Project Manager for this project, provided an overview of the City of Seattle's parking program (on-street space inventory, permit programs, parking kiosks, single space meters, parking enforcement program, etc.). In February/March 2011, changes were made to the parking rates based on a new parking policy established by the City Council during the November 2010 budget process:

"SDOT shall establish on-street parking rates...based on measured occupancy so that approximately one or two open spaces are available on each block face throughout the day"

Mary Catherine also presented an overview of the "Performance-Based Parking Pricing Study." Highlights included:

- Project Purpose
 - Assess performance-based parking pricing strategies and implementation options for Seattle that contribute to a vibrant and thriving city.
- Project Goals
 - Price and manage on-street parking to:
 - Enable customers to find parking within easy walking distance of their destination, while ensuring spaces are well used
 - Conserve fuel, reduce air emissions, and lessen traffic congestion from drivers circling looking for parking
 - Increase access to businesses by ensuring turnover
 - Use clear communication to increase ease of use and enhance the customer experience
- Project Objectives
 - Engage and educate stakeholders
 - Establish data-driven outcomes and performance metrics
 - Develop a phased implementation plan

The presentation portion of the meeting concluded with Rick Williams providing an overview of major project scope elements, an overview of the project schedule, and a specific discussion of the project Sounding Board schedule of meetings. An overview of public outreach strategies includes:



- An online survey to the business community and other stakeholders
 - Help us reach your customers and other users
 - Promote survey
 - Review results
- Attend business association meetings
- Project website

Following the presentation, Dennis Burns led the Sounding Board in an “Open Discussion.” The following three questions were used to stimulate discussion:

- From your perspective, what are the top three on-street paid parking issues?
- Thinking specifically about this project, what concerns or suggestions would you like to share?
- How do you envision the on-street parking system functioning?

The following are the comments made during the Open Discussion portion of the meeting:

Top 3 On-Street Paid Parking Issues

- Implementation and electronic pay station limitations – slow, recent difficulties
- What can existing pay stations do?
- Clear communication – how to use
- How to help people understand rates and hours of operation as system becomes more complex; challenges to user understanding
- Smartphone app is one part
- Opportunity to create positive experience
- LPR not well communicated, implications of time limits/report on block
- Load/unload needs, used by public (for take-out coffee)
- Challenges to using pay stations; credit card not intuitive like Orca card
- Calculating end of payment time for peak hour restrictions
- Abuse of disabled placards
- Maintain equity; mobility impaired require longer time
- Employees parking on-street is a key issue
- Bring small retailers together to work on TDM solutions
- Long transit rides can be cumbersome
- How to encourage use
- Tap into existing capacity in creative ways
- Unique challenge for restaurants that close at 2AM, wait staff carrying cash, etc.
- Talk to private garages for restaurant employee parking options?
- Paid parking 6-8 PM concern for restaurant customers
- 1st time warning for evening parking non-payment
- Make customers want to come back
- Pay by cell could include notice – how to park legally as well as Groupon coupon
- Ask “How has your business done in last 6 months? How have parking rate changes affected you?”
- Can we use sales tax revenue (or sales) by neighborhood to help understand impacts of parking?
- DSA tracks for downtown. Look at 6-8 PM Happy hour – are we harming or helping?



- “Parkers” only part of universe of restaurant users, particularly in downtown
- Availability of taxi cabs is an issue. Illegal to hail a cab
- Nighttime retail issues different than day time. Is one size fits all appropriate? Variable time structure – longer for evening... maybe 4 hour limit
- Employees using nighttime space
- Need partnership of all user needs>Solutions
- Develop and launch together
- Vacant lots – can we use for employee parking?
- Centralized valet service to use existing spaces in buildings garages typically closed
- Vacant spaces in Pioneer Square – Are people choosing not to come?
- Structure parking pricing according to peaks? Averages? Other options?
- Ballard locks different than Ballard
- Look at rates differently – seasonal may make a lot of sense. Off season use for employees?
- Focus on customer experience – want people to want to come back
- 520 tolling may create issues

Thinking specifically about this project, what concerns or suggestions would you like to share?

- Close business earlier and earlier as parking fills up without turnover
- Challenged by loss of parking (AWV)
- Commuting transit to overall transit system 15-25 year gap
- Worried about quantity of parking – Ballard
- Transit between neighborhoods difficult
- Shared parking...Condo parking empty during day
- Types of parking for various users
- Parking taxes
- Displaced waterfront parkers
- Exiting cars from garages
- Lack of parking at train station
- Greater turnover of on-street parking
- Move long-term employees into off-street leaving on-street for short trips
- Study and create policy to make it work
- Data collection – key to good policy
- Importance of business organizations
- Demographics of neighborhoods
- Parking revenues returned to neighborhoods now go to general fund
- Not “use price to force people out of cars” but to encourage vital, vibrant neighborhoods
- Businesses get complaints about price of parking

How do you envision the on-street parking system functioning?

- Parking price is giant feedback loop to neighborhood vitality-equity-sustainability
- Parking revenues to neighborhood could make people feel a part of the system
- Connect parking revenues to specific outcomes (flowers, cleanliness, transit passes...)
- Can't raise rates, reduce capacity, inadequate transit, say “Have a great experience”
- As we look at other cities, can't look at Portland – look at cities similar to Seattle



Sounding Board Meeting #2 – June 23, 2011

The purpose of the second Sounding Board meeting was to exchange information between the Expert Advisory Panel and the Sounding Board. Part of the role of the Expert Advisory Panel was to educate the Sounding Board on the different parking management strategies available and to relay experiences in implementing dynamic pricing strategies. The following were in attendance at this meeting:

SOUNDING BOARD MEMBERS IN ATTENDANCE:

- | | |
|-----------------------|---|
| ▪ Katherine MacKinnon | Downtown Seattle Association (DSA) |
| ▪ Francine Fielding | Wright-Runstad |
| ▪ Laura Larson | Republic Parking |
| ▪ Ed Danyluk | Imperial Parking Corporation (IMPARK) |
| ▪ Mike Fuda | Diamond Parking Service |
| ▪ Josh McDonald | WA Restaurant Association |
| ▪ Leslie Smith | Alliance for Pioneer Square |
| ▪ Chip Wall | Pike/Pine Urban Neighborhood Council |
| ▪ Doug Campbell | U District Business Owner, Bulldog News |
| ▪ Beth Miller | Ballard Chamber of Commerce |
| ▪ Jessica Vets | Fremont Chamber of Commerce |
| ▪ Susan Ranf | Seattle Mariners |
| ▪ Eric de Place | Sightline Institute |
| ▪ Jerry Everard | Seattle Nightlife and Music Association |

EXPERT ADVISORY PANEL MEMBERS IN ATTENDANCE:

- Chad Lynn, Director Parking Services, City of Beverly Hills, CA
- David Feehan, President, Civitas Consultants, LLC
- Diane Cunningham, President, Cunningham Parking Consultants
- Todd Pierce, President, PICTOFORM
- David Hill, Senior Planner, MMM Consultants
- Casey Jones, CAPP, Director of Parking and Transportation Services, Boise State Univ.

CITY STAFF IN ATTENDANCE:

- SDOT: Peter Hahn, Charles Bookman, Tracy Krawczyk, Mike Estey, Cristina VanValkenburgh, Margo Polley, Mary Catherine Snyder, Allison Schwartz
- Mayor's Office: David Hiller

CONSULTANT TEAM IN ATTENDANCE:

- Kimley-Horn and Associates, Inc.: Dennis Burns, CAPP, Brett Wood, P.E.

This meeting was divided into two sessions: a question and answer session with the Expert Advisory Panel followed by break-out groups for more intimate discussions. The groups were reassembled and the discussions summarized.



Expert Panel Question and Answer Session

Mary Catherine Snyder led the introductions and gave a general overview of the project. Dennis Burns followed with an introduction of the parking Expert Advisory Panel. In the interest of time, three members of the expert panel were selected to share their backgrounds and experience with the Sounding Board. These three were Chad Lynn, Diane Cunningham, and Dave Hill. There was a brief overview of the *SFpark* and LA Express Park systems. *SFpark* is moving to a program of variable rates on the block face level and LA Express Park is considering truly dynamic pricing in real time. The following summarizes some of the Sounding Board questions and discussion.

- How do customers in these cities respond to changes?
 - Chad Lynn – There is not enough data yet. The federal government is providing funding to determine this answer. Occupancy is shifting, but it is not clear why.
 - Diane Cunningham – The roll-out of the package/technology was important. Marketing was heavily emphasized.
 - Chad Lynn – There are measurable benefits to the citizens related to new technology (meters, pay-by-cell phone, etc.)
 - Dave Hill – Cultural and generational shift in technology usage is shifting to parking.
 - Chad Lynn – San Francisco expects success because its customer base is more technologically savvy
- Use of personal smartphones makes it more accessible and convenient
- Every transit user in Seattle uses “one bus away.” That concept will work for parking
- How have communities absorbed cost of roll-out, operations, capital, and maintenance?
 - Diane Cunningham – A number of opportunities such as revenue sharing, outsourcing, PPP, etc.
- The City has made management changes without infrastructure changes (example implementing a change in meter hours from “4pm - 8pm” without changing out the “4pm - 6pm” signs).
 - Mike Estey – Sign changes have been made – SDOT will double-check on the area in question.
 - Dave Hill – Technology associated with these changes is on a grand scale; we have to use the right tools to help communities make the “right parking decisions.”
 - Low tech – signage, communications
 - Important to communicate goal of “available parking” to the community. It helps drive home why we are doing this.
- *SFpark* “Parker” app is a great communication tool
- What is “enough” parking for a city like Seattle?
 - Chad Lynn – At what level? There is never enough free parking. San Francisco sets parking capacity low to drive transportation decisions. In LA, every development requires parking, which creates an expansive system.
 - Todd Pierce - In Vancouver, 53% of circulating traffic is looking for parking
- How to define vehicles looking for parking?



- Dennis Burns – Generally, there is enough parking; it's just not as convenient as people want. Sensors and "heat-map" parking availability information are examples of tools that can provide information for making better parking and transportation decisions.
- In my area, there is never enough parking. Can off-street be integrated with the system to support needs?
 - Dennis Burns – Charlotte Parking Management Collaborative is an example of a program that was designed to coordinate and communicate off-street parking availability. Seattle's "E-Park" has some similar element such as the on-street parking guidance signage and the outreach program to private parking owners and managers. Creating a program that also integrates the promotion of transit and transportation alternative is important. The goal is a more integrated access management system.
- Have studies looked at promoting compact vehicle size to increase capacity?
- Have studies been done to determine how lost parking has impacted retail shopping cores?
 - Dave Hill – People make decisions based on destination rather than cost. Measure impact "with feet." Are people still going there?
 - Dave Feehan – Parking is not about storing cars, it's about people. Our parking management decisions need to be flexible and respond to new economic trends such as the "she-conomy". People are creatures of habit and will still go if the destination draws them.
 - Chad Lynn – Parking supports destination, not the other way around. Suburban facilities have the luxury of "over-built" parking. In Beverly Hills, raising rates increased turnover and increased revenue but due to high demand did not create increased "availability." This may be the case in certain areas of Seattle where the goal of using price to create one to two spaces per block face may not be achievable due to the level of demand. However, in this scenario, achieving increased turnover is an acceptable outcome.

On the backs of each name badge yellow and blue stickers were randomly affixed. The larger group was asked to divide into two smaller groups based on the color assignments for more intimate and engaged discussions. The following is a summary of each group's discussions.

"Yellow" Break-out Group Discussion

- How realistic are these options with the current climate?
 - There are interesting financing options. Pay stations are reaching critical life. New implementation will provide a "capital platform."
 - New technology requires a changing, evolving implementation strategy.
 - There are "high" and "low" cost technology solutions. Industry as a whole is evolving and prices are falling. Use of smartphones puts the "platform cost" in the user's hands.
- In Seattle, I don't need that much information.
- Many people don't have "the platform"?
 - In other countries, this type of rollout has worked. In America, we have to be cognizant of needs. Industry needs to evolve with evolving technology (movement to the smart phone).
 - Technology is a means of achieving goals. Give people the goals and let them decide. (Seattle is at 82% credit card usage).



- No downside to technology, as long as it works and is reliable. Transit not integrated. Need for “car storage.” Growth in businesses means there is a need to ensure areas have adequate parking.
- Most progressive parking professionals don’t think about “building parking,” but rather “access management” (TDM, price, and demand management).
- Other choices are not convenient. Cost does not impact my decision to drive. “Lost time” does.
 - Perfect example of price sensitivity. The decision to pay a certain price will rest with every driver, commuter, employee, etc.
 - All businesses want to be on Ballard Avenue (free parking) rather than Market Street where you have to pay to park.
 - It’s not really the parking, but rather the destination on Ballard Avenue.
- Why not activate pedestrian space and build parking structures?
 - The City is opposed to building structures.
 - The “TDM” concept is social engineering. New policies increase density without increasing transit or transportation options.
 - The City uses parking minimums as a tool, but does not require parking
- Enforcement has a punitive aspect and affects people’s decision to come back.
 - Many times demand studies show that the most popular spots are taken, but spaces are available within walking distance.
 - This is the issue in Fremont.
- Explain the parking issues on Ballard.
 - It’s a historic area with minimal space. Businesses turnover and nightlife are new issues that could be better managed through technology. The area needs better management, better education, and some tangible results from parking meter implementation.
- Do any communities do a “give back”?
 - Pasadena, Beverly Hills (sort-of). In Pasadena, suburban mall parking is paid by merchant in some way (masked and packaged). In a downtown setting, one or three people pay: 1) resident (taxes), 2) merchants (taxes), or 3) user (rates). If a merchant community wants free parking, who pays for it?

“Blue” Break-out Group Discussion

- What does the City want to do?
 - Dennis Burns – Described the study scope, enabling technologies, and how performance-based pricing parking applies to different areas.
 - Part of the struggle is variability where parking is paid and where it is free. How to get people over the hurdle of having to pay for parking.
 - When looking at “pure policy,” note that Pioneer Square is affected by the Alaska Way Viaduct project and other construction, plus government exempt fire/police station.
 - Trying to determine a strategy that works for you and business districts.
- Comment about the use of disabled placard permits and how it affects communication.



- On game day events and other Safeco/Quest events, paid parking in the evening makes sense. But it's a "ghost town" on non-game days.
- Issue of residential/business district mix without a Residential Parking Permit Zone downtown.
- Lack of transit service especially at night to get home.
- Discussion of pay by cell – why not? Who has an argument against it, as long as it's on top of other options?
- People are concerned that credit charge gets double charged.
- Want to see highest quality of technology used.
- Pay-by-cell – pay remotely – Brilliant.
- Pay-by-cell as game changer with parking application.
 - Include special disabled placard permit by cell or government vehicle for discount?
 - Pay-by-cell is very tested – Finland 70% of people pay by cell phone.
 - Seattle is very tech savvy. See so many people walking down the street with a phone.
 - Evening activities
 - Is the pay-by-cell option available for employees?
 - Concern for late-night employees where bus is not an option.
 - Reserve additional time – extend time after dinner or before a show.
- Want to see program that is financially sustainable with O-M covered.
- Restaurants definitely have peak and off peak times, so variable rates sounds ok with predictability/consistency as a key.
- What's the relationship between parking rates – zoning/types of businesses on each street?
- How much variability is there?
 - A great deal by day, month, and weather (snow)
- Comment about how restaurant activity has changed. How price sensitive?
- Comment about public safety concern, especially from outer suburbs. People not willing to ride bus, especially at night.
- Destination restaurants where people seek out the Tom Douglas, etc. People do go out for lunch.
- All about getting the return customer. Keep in mind the "experience." I had a good time, easy, want to come back.
- Parking as one component of the experience.
- Think about parking as a unique neighborhood issue – different issue in different areas.
- U-District – evening parking is helpful for keeping students out of spaces all night.

Summary

The following are the main themes that resulted from the Sounding Board discussions.

- We need to compare ourselves to other cities including close-by cities
- Interesting to monitor metrics (transit, demographics, sales tax, etc.). Also need to be cognizant of rising transportation costs.
- Also need to be cognizant of how these costs affect businesses.
- Request for the Sounding Board to review the draft parking survey.
- Does nearby free parking affect destination decision?

Sounding Board Meeting #3 – July 14, 2011

The purpose of the third Sounding Board meeting was to introduce and discuss performance-based parking technology and strategies that have been evaluated and are considered reasonable options for helping the City obtain its program goals. The following were in attendance at this meeting:

SOUNDING BOARD MEMBERS IN ATTENDANCE:

- | | |
|-----------------------|---|
| ▪ Katherine MacKinnon | Downtown Seattle Association (DSA) |
| ▪ Laura Larson | Republic Parking |
| ▪ Josh McDonald | WA Restaurant Association |
| ▪ Leslie Smith | Alliance for Pioneer Square |
| ▪ Doug Campbell | U District Business Owner, Bulldog News |
| ▪ Don Blakeney | Chinatown/International District BIA |
| ▪ Jessica Vets | Fremont Chamber of Commerce |
| ▪ Susan Ranf | Seattle Mariners |
| ▪ Erica Sekins | Seattle Commission for People with Disabilities |

CITY STAFF IN ATTENDANCE:

- SDOT: Peter Hahn, Charles Bookman, Tracy Krawczyk, Mike Estey, Cristina VanValkenburgh, Margo Polley, Mary Catherine Snyder, Allison Schwartz
- Mayor's Office: David Hiller

CONSULTANT TEAM IN ATTENDANCE:

- Kimley-Horn and Associates, Inc.: Dennis Burns, CAPP, Brett Wood, P.E.
- Rick Williams Consulting: Rick Williams

The meeting began with introductions by Dennis Burns and a brief recap of the previous meeting with the Expert Advisory Panel led by Tracy Krawczyk and Charlie Bookman. The key themes highlighted in this recap included:

- On-street parking is a downtown experience. People don't come downtown to just to park.
- 1-2 available spaces do not tell the whole story. In high-demand spaces, price may be too high. Additionally, the City has to be cognizant of disabled parking and its effects.
- Different strategies discussed: progressive pricing and time-of-day.
- Enabling strategies discussed: technology (pay stations), pay-by-cell phone.
- Collaboration with business owners and other stakeholders is critical.

Following the introduction and recap was a presentation by Rick Williams on technologies and strategies. The following were mentioned in his presentation:

Technologies

- Implementing pay-by-cell phone citywide

Strategies

- Define geographic sub-areas based on parking demand
- Time of day pricing



- Potential Pilot Study – combine progressive pricing with the elimination of time limits
- Day of the pricing
- Develop an event overlay parking pricing strategy

The presentation was followed by an open discussion. Highlights of this discussion are presented below:

- Day of week pricing
 - Have to be careful not to set policies that drive away businesses or are restrictive to tourist use.
 - How does this strategy compete with other policies (transit incentives)?
- Event overlay parking strategy
 - Concern that this cannot be accomplished when the City does not allow for principle use garages for events.
 - Garages are empty outside of influence area (combined with free bus)
 - People won't walk more than two blocks – varies by use.
- General Discussion Comments
 - The strategy has to make sense and must easily communicate rates and changes
 - People have difficulty understanding parking messages now. One bad experience will create a negative perception.
 - The system wouldn't be truly dynamic. Rate setting would be predictive (will change monthly, quarterly, etc.), which will allow users to learn and adapt.
 - Concern for the occasional user. Frequent users will adapt quicker, but the occasional user
 - Cell phone applications will be important for the occasional user and Seattle is a pretty wired city
 - Will time-of-day/day-of-week in some locations and not in others be confusing?
 - Time bands seem reasonable, but could be very confusing.
 - Will pay-by-cell and credit card usage prohibit “cash paying” customers from coming downtown?
 - Having the ability to add time with a cell phone is helpful, but prices should be progressive.
 - Define expectations – parking can't be free in a “world class city.”
 - Communication is important. The high use of technology could be very prohibitive.
 - Concerned about abuse of placards. Doctors should be monitored, note the highest provision of permits.
 - Seasonal pricing – restaurant income moves with the season. It would help bring people in during off-season (winter).

The meeting concluded with a presentation of data collection activities and preliminary results, led by Brett Wood. The following is an overview of what was covered in the presentation:

- Data collection periods – May and June
- Data collected – overall occupancy of paid spaces; disabled permit usage; residential permit usage; and government exempt vehicles.
- Examples from the preliminary analysis were shown.



Sounding Board Meeting #4 – August 4, 2011

The purpose of the fourth Sounding Board meeting was to present data findings and recommended implementation strategies and to obtain feedback from the board. The following were in attendance at this meeting:

SOUNDING BOARD MEMBERS IN ATTENDANCE:

- | | |
|-----------------------|---|
| ▪ Katherine MacKinnon | Downtown Seattle Association (DSA) |
| ▪ Francine Fielding | Wright-Runstad |
| ▪ Laura Larson | Republic Parking |
| ▪ Josh McDonald | WA Restaurant Association |
| ▪ Leslie Smith | Alliance for Pioneer Square |
| ▪ Doug Campbell | U District Business Owner, Bulldog News |
| ▪ Beth Miller | Ballard Chamber of Commerce |
| ▪ Don Blakeney | Chinatown/International District BIA |
| ▪ Jessica Vets | Fremont Chamber of Commerce |
| ▪ Susan Ranf | Seattle Mariners |
| ▪ Erica Sekins | Seattle Commission for People with Disabilities |
| ▪ Jerry Everard | Seattle Nightlife and Music Association |
| ▪ Tom Klainer | Harborview Hospital, First Hill Improvement Association |

CITY STAFF IN ATTENDANCE:

- SDOT: Peter Hahn, Charles Bookman, Tracy Krawczyk, Mike Estey, Cristina VanValkenburgh, Margo Polley, Mary Catherine Snyder, Allison Schwartz, Ruth Harper
- Office of Economic Development: Kris Effertz

CONSULTANT TEAM IN ATTENDANCE:

- Kimley-Horn and Associates, Inc.: Dennis Burns, CAPP, Brett Wood, P.E.
- Rick Williams Consulting: Rick Williams

MEMBERS OF THE PUBLIC:

- Eugene Wasserman
- Josh Kavanaugh

The meeting began with introductions led by Mary Catherine Snyder. Following the introduction of those in attendance, Allison Schwartz led a discussion on the business and customer surveys (discussed in greater detail in the next section of this chapter). The survey is trying to obtain information on four key areas:

- 1) Business and customer behavior
- 2) On-street decision process
- 3) On-street experience
- 4) How to improve the experience



The survey is expect to go live on Monday, August 8, 2011 and will be available until September 15, 2011. Links to the survey will be distributed through email and business cards (described later in this chapter). The following are comments from the Sounding Board on the survey:

- Some structural problems – Allison is working with Sounding Board to address
- Events questions should be included
- Survey doesn't reach out to tourists or folks who don't necessarily come into Seattle.
- Counter display to get people who are from out of town or just visiting

Following the discussion on the survey, Dennis Burns and Rick Williams presented an overview of the Draft Final Report, focusing on the nine recommended strategies:

- 1) Neighborhood engagement strategy
- 2) Investment in data collection and analysis
- 3) Open access to city parking data
- 4) Pay by cell
- 5) Demand and Geographic-based pricing
- 6) Time-of-day Pilot
- 7) Seasonal rate adjustments
- 8) Progressive pricing pilot

Along with the nine recommendations, two other overarching points that were made; 1) Seattle does not have the same funds as SFPark and LAExpress, which are receiving Federal funds for their program improvements, and 2) the City needs to be cognizant of goals (i.e. congestion/environmental benefits).

The following is a summary of discussion and questions during the presentation.

Pay by Cell

- What is the typical market penetration for pay-by-cell? Typical communities see rates in the range of 20-25%. Most communities begin with about 10% and increase as time goes on.
- Introduction of on-street pay-by-cell has the potential to make the usage of off-street pay-by-cell (already in place in many off-street facilities) penetration rate more consistent.

Demand and Geographically-Based Rates

- If I didn't know that rates were different from street to street, I would think that the whole area was expensive. This makes it confusing.
- The upcoming central waterfront parking loss will likely push parkers into Pioneer Square. How does this plan affect the loss of parking, and other unintended consequences?
- User information is primary challenge and also an opportunity.
- Varying time limits is better than varying rates. Different rates label a neighborhood as expensive. High demand areas need more parking capacity.
- We don't have enough areas with shorter time limits. Loading zones are used now for short term parking. Need half hour and one hour zones



Time of Day

- You could set the rate lower in the morning shoulder, which is the same incentive as no rates.
- Highest rate is going to define neighborhood. People don't understand variable rates.
- Complex system means complex communications.

Seasonal Rates

- Areas where it might be applicable
- Ballard Locks, Green Lake, Seattle Center, Waterfront
- People would understand this better than variable, geographic, or time of day

Event Overlay

- Need to change the discussion to supply and demand and communicate that these changes are not intended to make parking harder, but rather to improve the experience.
- Seattle has significant impediments (density, transportation capacity, lack of off-street parking, combinations of events)
- University of Washington football will be downtown for a year – need to be aware of those impacts

Progressive Parking Strategy

- Can this be combined with pay-by-cell? Can a structure be defined to allow progressive in times of day with less demand?
 - Probably available, but communication would be hard
 - Not with our current equipment
- If we had more paid parking areas, we could have more opportunity to educate
- Could be very interesting in downtown. You can still promote turnover, but allows flexibility
 - Could set prices lower to promote short-term or raise them to limit all-day parking
- Oppose variable pricing, but could get on board with this because you are getting what you pay for
- Takes away the punitive aspect
- Being able to add more time may be bad for employee parking in neighborhoods in First Hill
- May be hard to define a complex system that will appeal to non-Seattle residents

Pilot Studies

- How would people feel about multiple pilots?
 - Mixed approaches will confuse even locals.
 - Look to other cities to see how they piloted – One at a time to determine effects
 - Perhaps do one pilot at a time to determine effects
 - People depend on their cars. Need more capacity. We could open avenues to pedestrians and bicyclists with private/public partnerships
 - On-street and off-street need to work in concert. Multiple pilots would allow us to implement faster and use resources for education and communication



Other Strategies and Thoughts

- Competing interests (e.g. longer time limits in U-District may promote more long term student parking on-street)
- Neighborhoods need to be involved in the development of recommendations so they fit the context of the area
- How is the handicap parking problem being managed?
 - Extend time limits, define abuse problem
 - It is a problem throughout the state, not just in Seattle
- 1-hour limit on Avenue and 4-hour parking outside (U-District). Simpler is better
- Can Business Improvement Areas set the rates in their areas and share revenue?
 - Needs are so different, maybe define a pilot where BIA drives decision
- Optimistic that Seattle-ites will understand. Are the strategies feasible with our technology?
 - Our report evaluates technology
 - The Strada can do some, but Citypal can do much more
 - 1500 = older model (not able)
 - 2200 total

Closing and Next Steps

Mary Catherine Snyder closed the meeting with some other topics for consideration.

- Disabled
- Parking tax
- Revenue sharing/benefit districts (helps promote payment because it improves the area)

Other Thoughts from the SB

- Fremont should provide off-street surface parking
- What percentage of profits would go to the neighborhoods?
- Difficulty is taking money from the general fund
- Is there a way to help educate our employees not to abuse primary parking?

Next Steps

- Final report and Statement of Legislative Intent (SLI) response due to City Council – September 1
- September Sounding Board Meeting – September 15
 - Preliminary survey results
 - SLI report summary
- Mayor submits proposed City budget to City Council – September 26
- October Sounding Board Meeting – October 27



PUBLIC COMMENTS:

Time of Day

- Why not just start meters at 11 am? Revenue approach versus business approach.
- Starting meters late is variable. Legibility – need to define new communication tools to help neighborhoods and customers understand.
- Neighborhoods doesn't equal downtown. Downtown users are savvy.

Seasonal Rates

- Like this idea to help promote off-season interest in low-demand area

Event Overlay

- How is this working in Portland?
 - 20 day event overlay
 - 90 minute limits on game days
 - Communicate next game information at current game
 - Impetus is to provide parking for businesses and neighborhoods

Progressive Parking Strategy

- Making parking complicated – we're not LA, New York, or San Francisco. What is the gain here?
- Is there a more appropriate use by time-of-day – maybe better served in the evening?

Pilot Studies

- How would people feel about multiple pilots?
 - Look to other cities to see how they piloted – One at a time to determine effects
- These recommendations are going to be detrimental to the economy of downtown and neighborhoods. Need to take meters out in some locations

Other Thoughts

- Fremont should provide off-street surface parking
- What percentage of profits would go to the neighborhoods?

NEXT STEPS

- Final report and Statement of Legislative Intent (SLI) response due to City Council – September 1
- September Sounding Board Meeting – September 15
 - Preliminary survey results
 - SLI report summary
- Mayor submits proposed City budget to City Council – September 26
- October Sounding Board Meeting – October 27



SURVEY PURPOSE AND DESCRIPTION

Along with the Sounding Board and Expert Panel, an additional outreach component of this study was to solicit public opinions on previous and future parking management decisions. Two surveys were created to identify the decision-making factors that determine why and where people park and how parking management can influence parking behaviors and decisions. The survey objectives were to:

- Understand the relationship between business owner perceptions and experiences about the role of parking in customer decisions, versus customer perceptions and behavior
- Identify key factors associated with customer parking decisions
- Understand existing customer on-street parking experience
- Identify what customers and businesses would like to improve about the on-street parking experience

Business Owner Survey

The business owner survey included general questions about the type and location of business and hours of operation. These questions established parameters necessary for comparing responses and determining location and business specific needs. The remainder of the survey focused on parking needs that are essential for business operation. These questions asked business owners to consider aspects of customer parking needs and how the relationship between these needs and parking have impacted their business. Examples of collected information includes:

- Typical and peak hours of operation
- Customer trip and parking information
- Typical time duration of customer parking needed
- Employee trip and parking information
- Preference for parking provided (e.g., convenience versus availability versus cost)
- Perception of common parking issues
- Opinion of performance-based parking pricing strategies

Customer Survey

The customer survey began with a series of questions about the user's last trip (by car) to a neighborhood with paid parking. Additional questions addressed the parking decision-making process, with emphasis on the effect of pricing on actual and potential behavior. These questions were designed to get participants to think about what elements of on-street parking are most important to them when deciding to make a trip. Examples of collected information include:

- Trip origin
- Parking characteristics (e.g., day of week, time of day, duration, cost)
- Preference for parking provided (e.g., convenience versus availability versus cost)
- Effects of parking pricing on travel and destination decisions
- Opinion of performance-based parking pricing strategies
- Preferred trip planning and communication tools

Both surveys were administered using SurveyMonkey, an online survey tool that enables fluid design, administration, and analysis. Information about the survey was posted on the general project website. The survey link was also distributed through email lists, postings in neighborhood blogs and other media



outlets, and business cards with a QR code that could be scanned by smartphones to take the participant directly to the survey website (see images below). These business cards were distributed by SDOT staff, Sounding Board members, downtown ambassadors, and parking enforcement officers.

The results of this survey will be provided in an Addendum to the Final Report. SDOT will consider the survey results in gauging how the general public and business community perceive and use on-street parking.

