CITY *of* **BOSTON**

PERFORMANCE PARKING
Final Report

1. INTRODUCTION

In GoBoston 2030, the City of Boston set out ambitious goals to improve transportation and mobility for all of Boston's residents. Better curb management policy is a key ingredient to reach those goals. When effectively managed, parking supports local economic development, creates safer and less congested streets, and incentivizes multiple modes of transportation.

Boston currently faces many challenges related to its parking. Despite the fact that car ownership in Boston has been plummeting, the demand for on-street parking has continued to grow.

There also has been a tremendous increase in the use of ride-hailing companies and delivery services. In many neighborhoods, there is a significant mismatch between the available parking spaces and the number of cars and delivery vehicles looking to park. This causes Boston's roads to be clogged by vehicles circling for parking and by double-parked vehicles blocking travel lanes. The lack of open parking spots hurts local businessowners when customers cannot find parking near their business. It also slows down traffic. By some estimates, 30 percent of congestion in cities comes from cars looking for parking.

30% of street traffic is caused by drivers circling for parking

Recent Curb Management and Mobility Initiatives

Over the last two years, the City of Boston has implemented a number of initiatives focused on solving Boston's curb management challenges and creating new mobility options.

Curb management initiatives include:

- The development of the **ParkBoston** app where drivers can pay for their meters by using their mobile phones. Currently, 30 percent of all parking meter transactions use the app.

- The City piloted **Ticketzen,** an app that allowed people to pay parking tickets using their smartphones. After a successful trial, the City switched to the **Paytix** app to provide this service to all residents.

- In 2015, the City began rolling out credit-card enabled **"smart" parking meters** that made it easier to purchase time at meters, provided data on parking usage, and allowed City staff to remotely program parking meters.

- Starting in 2012, the City ran three pilots that experimented with a variety of **sensor technologies** to determine the occupancy and turnover of curb spaces to assist in making parking policy decisions based on data.

New mobility options include:

- The creation of **DriveBoston,** a pilot program where car share operators are licensed to use dedicated parking spaces in city owned municipal lots and on-street parking spaces.

- The expansion of the **Hubway Bike-share system** from 60 stations to 130 stations in Boston. The Hubway system is now in the process of expanding to 200 stations

Performance Parking Pilot

On January 3rd, 2017, the City of Boston launched its **performance parking pilot** in the Back Bay and Seaport neighborhoods. The City designed the pilot to test whether raising meter rates in Boston's most-congested areas would encourage motorists to use other modes of transportation, or park on less busy streets or off-street locations.

The City's objectives for the performance parking pilot were to:

- **Improve the parking experience** by opening up more spaces for residents and business customers in our busiest neighborhoods. The City's specific goal was to have one to two spaces open on each block of the pilot area at any given time. This would correspond to a neighborhood parking occupancy of 60 to 80 percent.

- **Lower congestion** by decreasing illegal double parking and circling for spaces.

- **Increase road safety** by decreasing distracted drivers looking for parking.

- **Learn how to implement** a performance parking program in Boston.

The City tested different approaches in our two pilot sites.

In the **Back Bay,** the City used a zone-based static pricing model. We increased the hourly price of parking meters from $1.25 to $3.75 for the entire Back Bay neighborhood. We kept the price constant throughout the whole pilot year.

In the **Seaport**, the City used a block-based approach with a more dynamic pricing model. The City priced each blockface in the Seaport differently based upon the number of parking spaces available. Every two months, the City changed the price of each blockface to try to reach our goal of having one to two spots open. If the block had higher than 80% occupancy, the City increased the hourly price by 50 cents. If the block had occupancy lower than 60%, the City decreased the price by 50 cents. The highest price a meter could be was $4 an hour and the lowest price was $1. As of December 1st, 2017, meters in the Seaport ranged between $1 and $4 an hour.

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When parking is priced correctly, there is on average **1** open space per block
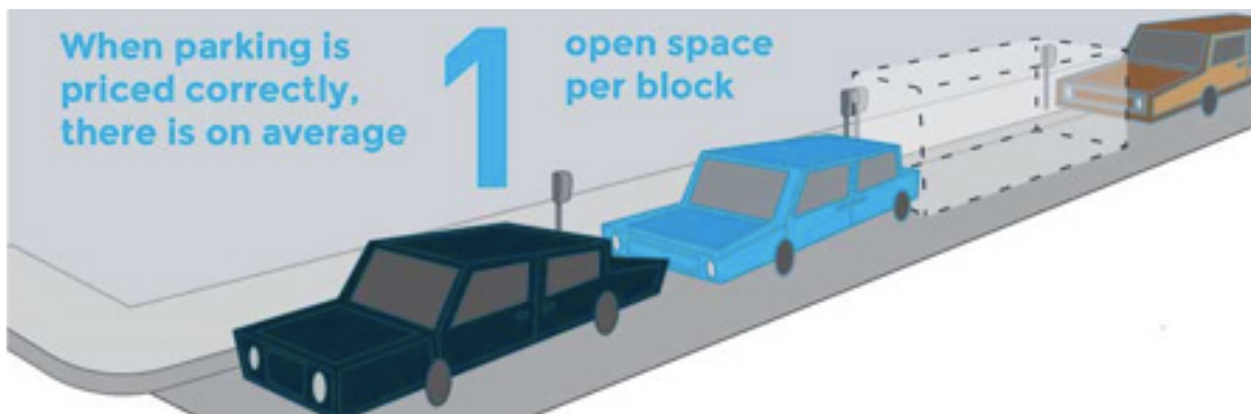
2. RESULTS

Results from the Back Bay Pilot

Since starting the pilot, there have been more open spaces for business customers, more parking opportunities for residents, and fewer double parked cars.

Illegal parking that causes congestion has been significantly reduced. Double parking decreased by 14 percent and illegal parking in a loading zone decreased by 33 percent. Both measures are useful proxies for an overall decrease in congestion.

Metered parking spots are opening up more quickly. The average stay at a meter decreased from one hour and twenty-two minutes in 2016 to one hour and eight minutes in 2017.

More spots are open in the Back Bay. Overall, there was a 11 percent decrease in the number of cars parking in metered spots.

We found that the pilot policies had different effects in the commercial area of the Back Bay versus the residential area of the Back Bay. In the commercial Back Bay (Stuart Street to Commonwealth Ave including all ladder streets):

- There were more open spots. We have moved from an average of zero spaces per block available in 2016 to approximately one-in-ten spaces available per block in 2017.
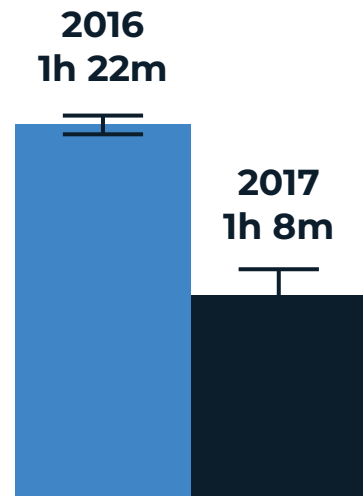
In the residential Back Bay (Commonwealth Ave to Beacon Street including all ladder streets):

- There are now one to two spaces open per block. This is an increase from less than one space open per block in 2016.

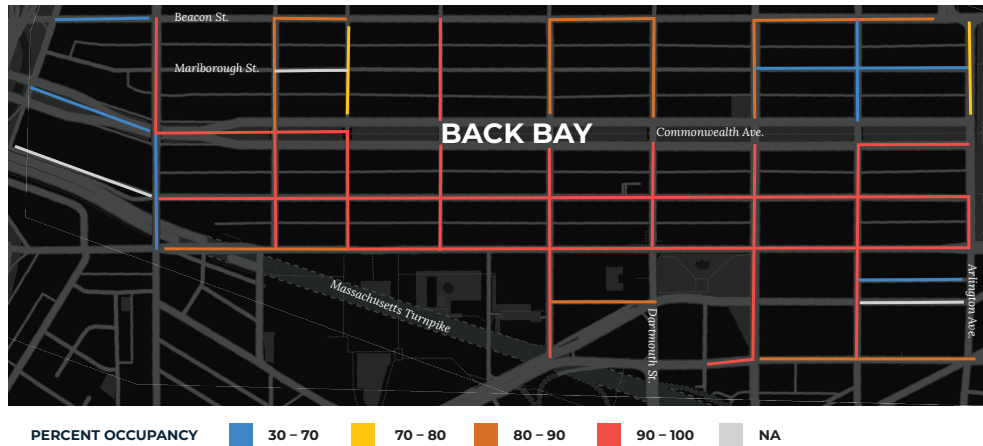- Illegal parking in a resident spot is down by 12 percent.

ILLEGAL PARKING IN THE BACK BAY
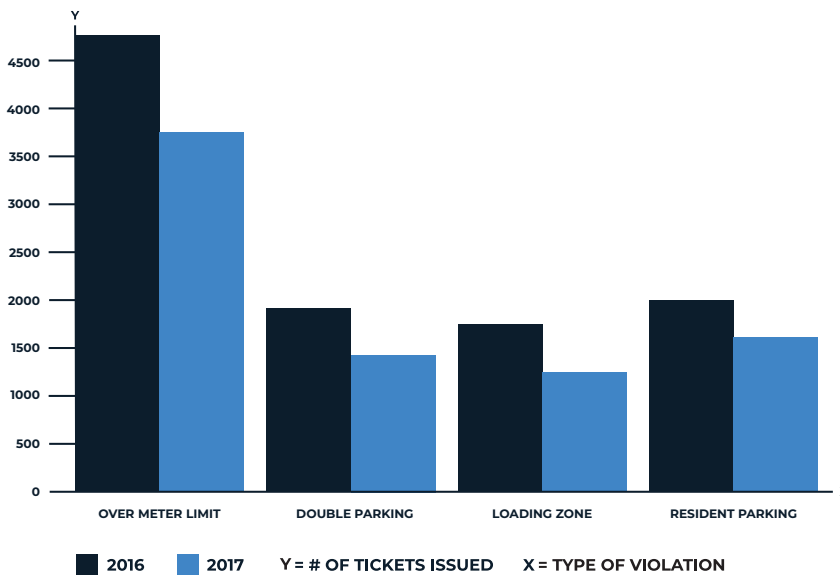
AVERAGE METER TRANSACTION LENGTH - BACK BAY

2016
1h 22m

2017
1h 8m

OCCUPANCY SNAPSHOT - BACK BAY OCTOBER AND NOVEMBER 2017

| PERCENT OCCUPANCY | 30 – 70 | 70 – 80 | 80 – 90 | 90 – 100 | NA |

Results from the Seaport Pilot

The performance parking pilot in the Seaport had little impact on the number of available parking spaces.

During most of 2017, occupancy in many zones increased despite prices being raised repeatedly. For example, 29 out of 35 block in the pilot area had an increase in occupancy through October. The average increase was 4.6 percent. Occupancy did decrease significantly in November and December. It is possible that near the end of the pilot year, as more blocks reached the $3 to $4 range, driver behavior began to change. However, more time is needed to confirm this hypothesis.

The number of parking meter transactions decreased in the Seaport by 1 percent over the pilot period. This is in contrast to the 11 percent decrease in the Back Bay. There likely would have been a small increase in the number of parking meter transactions if construction projects had not temporarily removed so many parking spaces.

The amount of illegal parking in the Seaport decreased significantly during the pilot. Illegal parking in a loading zone dropped 44 percent, double parking decreased 24 percent, and parking in resident permit parking without a sticker declined 35 percent. It is not clear what is driving the large decrease in illegal parking.

ILLEGAL PARKING IN THE SEAPORT

2016   2017   X = # OF TICKETS ISSUED   Y = TYPE OF VIOLATION
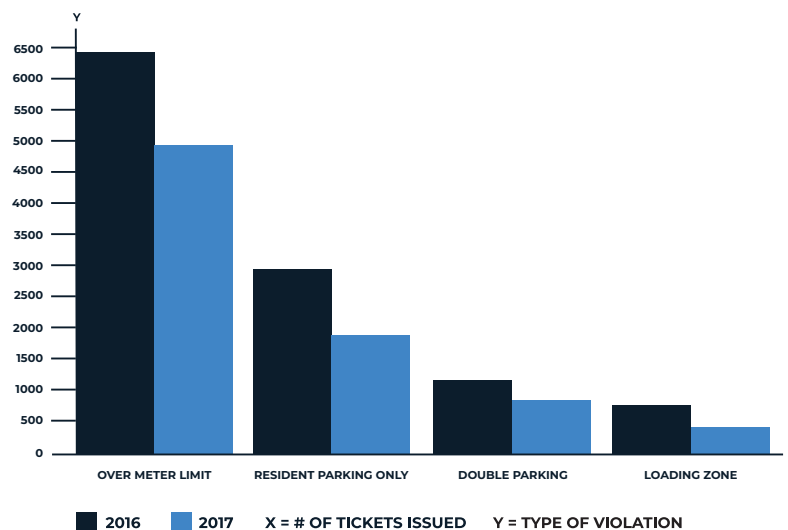
Through the pilot year, two clear zones of occupancy emerged in the Seaport. Summer street, D Street, and A street had an average occupancy of 63 percent while Congress Street, Seaport Boulevard, Northern Avenue and their cross streets had an average occupancy of 83 percent.

There are a number of potential reasons for the lack of measurable impact of the Seaport performance parking pilot. There has been significant new development in the Seaport and Fort Point over the last year which has brought additional cars to the area. At times, construction sites took away parking spots for extended periods of time which led to temporary decreases in supply. There are also seasonal changes in parking occupancy in the Seaport district.

Block-based pricing is also much harder to communicate to drivers than a zone-based approach. Drivers in the Seaport did not have easy access to pricing information to inform their decision. A driver would either have to check meters at multiple locations to "shop" for the best price, or look on the performance parking website. The lack of price transparency likely meant that few drivers changed theiparking behavior based on the pilot.

Revenue from the pilot

In the Back Bay, there was a significant increase in parking meter revenue during the pilot year. There was a $5.7 million increase over 2016 revenue from Back Bay meters. In the Seaport, there was a $350,000 increase in revenue over 2016. The City intends to use this revenue to fund road and sidewalk improvements in the Back Bay and Seaport. In addition, the City will use the funds for citywide improvements in road infrastructure, bus service, new protected bike lanes, city-owned bridges and other transportation enhancements that provide residents with more reliable and high-quality mobility options.

OCCUPANCY SNAPSHOT - SEAPORT OCTOBER 2017*

PERCENT OCCUPANCY			
	50 - 60	60 - 70	70 - 80
	80 - 90	90 - 100	NA
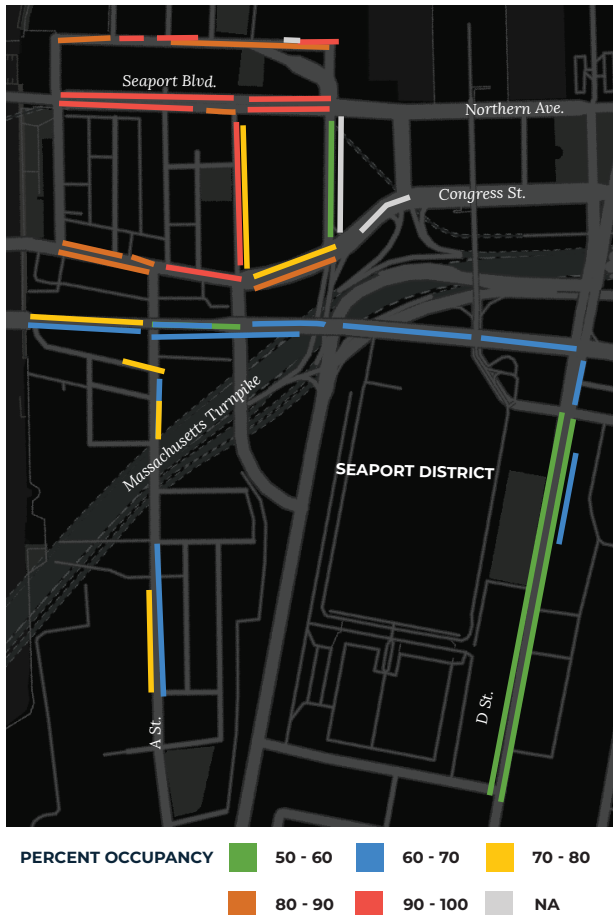
*average October occupancy including both weekday and weekend

Feedback on performance parking pilot

The City of Boston received a large volume of feedback from residents and business owners about the performance parking program. In the Back Bay, the City received feedback during community meetings in December 2016 and June 2017. In the Seaport, the City held a community meeting in March 2017. We also received feedback through our 311 system as well as direct emails and letters sent to the Boston Transportation Department. The feedback included both positive and negative reactions to the pilot.

In the Back Bay, residents voiced concern that the pilot created financial hardships for volunteers, home healthcare aides, and other service employees working in Back Bay residences. There were also complaints about construction contractors passing on the higher parking costs to residents. Back Bay residents mentioned that there were not adequate permit parking spaces for permitted residents' vehicles. Because of this, some residents said they were forced to park in metered spaces until the meters turned off at 6pm. This practice costs more because of the pilot. After hearing concerns about resident parking, the City began to collect data about the number of Back Bay resident permit holders parking in metered spots. We found that, on average, resident parking permit holders parked in 14 metered spaces per day. This represents less than a half percent of total Back Bay permit holders.

The City also received feedback from both residents and business owners who strongly supported the program. They stated that they have noticed the decrease in congestion, double parking, and even honking. They also outlined the benefit of their customers being able to find a parking space outside their businesses.

In the Seaport, the City did not hear significant feedback from residents or commercial tenants. In the performance parking community meeting, artists voiced concerns about the high price of parking in the Fort Point area.

3. KEY LEARNINGS FROM THE PILOT

Key Takeaway

Performance parking is an effective tool to increase parking availability, lower congestion, and improve road safety. In the Back Bay, the performance parking pilot led to measurable improvements in all of the City's metrics.

Program Design Learnings

Zone-based pricing is more effective at changing driver behavior than block-based pricing. In the Seaport, block-based pricing coupled with pricing changes every two months likely did not give a transparent signal to drivers about the costs associated with parking. In contrast, pricing the whole Back Bay neighborhood at $3.75 per hour for an entire year was easier to understand and led to a much larger change in behavior.

It is unclear if bi-monthly changes in the price of parking in the Seaport led to lower occupancy. During the pilot, there was some evidence that the block-by-block price changes every two months led to a specific meter rate that incentivized our occupancy goals. However, it was challenging to understand the direct effect of the price changes on driver behavior There were so many other factors influencing parking demand in the Seaport, including new development, construction, and seasonal changes in demand, that the pilot's specific impact was hard to define.

Breaking neighborhoods into multiple sub-zones based on occupancy will likely lead to more effective pricing decisions. Parking occupancy is not uniform across neighborhoods. Both in the Seaport and Back Bay, there were clearly zones of higher and lower occupancy. For example, in the Back Bay, there was a delineation in occupancy between the residential section of the neighborhood and the commercial section. It would be preferable to divide both the Back Bay and the Seaport into multiple zones that would be priced differently. In this way, pricing strategies could

be more fine tuned towards reaching the City's occupancy goals. Moreover, if communicated clearly, this would also likely incentivize some drivers to park in abutting lower occupancy zones.

Different prices throughout the day could be an effective strategy towards reaching the City's occupancy goals. Both the Seaport and Back Bay had different parking occupancy levels during different times of the days. In the Seaport, there was noticeably higher occupancy in the morning hours. In the Back Bay, the morning and afternoon had higher occupancy than the evening.

It is possible that the clearing price in the Seaport and the commercial Back Bay was not within the pilot's price range. In the Seaport, the City capped block-based pricing at $4 per hour. In the commercial Back Bay, the zone was set at $3.75. It is possible that in both areas the demand for parking outstrips the supply by so much that driver demand was very price-inelastic. For example, the rate for private garages in the high occupancy areas of the Seaport and the commercial Back Bay have hourly rates far exceeding those of the pilot.

Operational Learnings

Current sensor technology does not give plug-and-play reliably high-quality occupancy data. In the Seaport, the City used sensors mounted on parking meters as one method to count occupancy. However, the City found many problems with the data's accuracy and it took significant staff time to calibrate the equipment and confirm the data's accuracy. To scale the performance parking pilot, the City would need to rely on data collection techniques other than a sensor at every meter.

There were significant operational challenges to frequently changing meter prices in the Seaport. The City of Boston uses three different vendors for its parking payments. Boston Transportation Department staff found it difficult to coordinate the price changes with the different technology systems that vendors use. The Boston Transportation Department had to send out staff to manually check the meters to confirm the new prices were shown.

The lack of an exact census of parking meter spaces makes implementing a performance parking pilot time-consuming. The City does not currently demarcate individual parking spaces at locations with multispace meters, and therefore does not know the exact number of vehicles that can fit onto a block at these locations. As a result, staff spent significant time counting the number of parking spaces on each block in these areas. This count gave us the ability to compute occupancy in the pilot areas.

4. CHALLENGES TO SCALING PILOT TO OTHER NEIGHBORHOODS

Staff capacity: Managing the program takes a project manager and time dedicated from one data analyst. Expansion to other zones would require additional staff time. Running the performance parking program with three to five zones would likely require one full-time project manager as well as a part-time data analyst.

Street closures and occupancy permits: It is challenging to keep up-to-date information on which parking spaces are no longer in service because of street closures, occupancy permits, new Hubway stations, or changes in parking regulations. An integrated system needs to be developed to automatically alert the performance parking team of changes in the number of available spaces. Currently, this has to be done manually and would require additional staffing to complete at a large scale.

Resident and business owner engagement: It is critical that the community is engaged in the process, has the opportunity to ask questions on the methodology behind the program, and receives clear feedback on progress. Intercept surveys and additional data, such as sales tax revenue and neighborhood mobility trends, helps tell a more holistic picture of the impact of the program.

Back-end technology integration: It was challenging to extract the needed data to analyze the results of the pilots from the different back-end systems of the City's three parking payment vendors. It was also difficult to publish new meter prices and times with the City's vendors. Scaling to other neighborhoods would mean resolving the back-end technology issues for the new sites.

5. CONCLUSION

Over the last year, the City of Boston tested the effectiveness of changing parking meter rates as a tool to better manage the City's streets and curb space. In the Back Bay, the City clearly found that raising the price of meters increased parking availability and decreased congestion. For a variety of reasons, the results in the Seaport were less conclusive. Comparing the two pilot sites, the City learned that a simpler, static zone-based pricing framework has a larger impact on drivers' decisions than a more dynamic block-based pricing model. A zone-based framework is also much easier to administer.