

# Houstonfirst<sup>SM</sup>

COMPREHENSIVE PARKING SURVEY  
FOR THE  
GEORGE R. BROWN CONVENTION CENTER DISTRICT



SUBMITTED BY:  
REPUBLIC PARKING SYSTEM  
MARCH 2016

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## 1. TRANSMITTAL LETTER

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March 2016

Christophe Malsang  
Director of Parking  
Houston First Corporation  
1001 Avenidas de las Americas  
Houston, Texas 77010

RE: Convention District Parking Survey

Mr. Malsang:

As the parking operator of the Houston First Corporation Parking Facilities, which includes but is not limited to the North Garage, Convention District Garage, Hilton Garage and Toyota Tundra Garage and surrounding lot (s), Republic Parking System has been asked to conduct a parking survey on behalf of the Houston First Corporation.

To develop a plan, our team thoroughly researched parking patterns from our experience in the management of the Convention District and identified current parking availability, existing peak demand or parking adequacy, occupancy survey (s) and future parking demand to clearly identify future deficits and or surpluses of spaces. The data was analyzed by user groups and facility to understand when and where parking challenges may arise.

In addition, future infrastructure on Avenidas de las Americas and expansion of the George R. Brown Convention Center as a whole was examined to explore the parking impact and the breadth of approaches and solutions that provide the most feasible benefits which can be applied and or birthed from a preliminary assessment at this point in time. Clear understanding and feedback and communication from all pertinent parties and stakeholders (people affected by planning decisions) will further improve the customer experience from the “revitalized east end” of Downtown Houston.

Republic Parking System manages a finite number of parking spaces (7,000) at the Convention District on behalf of the Houston First Corporation and is responsible for managing the allocation of that scarce resource carefully.

The main focus of our plan is the management of current, mixed used Houston First Parking Facilities and parking requirements for existing and development. Our chief objective or goal is to coordinate parking decisions with strategic objectives reflective of the overall vision of the Houston First Corporation and the George R Brown Master Plan 2025.

Sincerely,

Republic Parking System

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## 2. SHARED PARKING STUDY METHODOLOGY

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The Shared Parking concept is defined as parking spaces that can be used to serve two or more parking demand generators without conflict or encroachment. One of the fundamental principles of downtown planning from the earliest days of the automobile has always been to share parking resources rather than to have each use or building have its own parking. In addition, mixed-use districts in many different settings have also benefited from shared parking. Shared parking offers numerous benefits to a community at large, not the least of which is the environmental benefit of significantly reducing the square footage of parking provided to serve commercial development.

The ability to share parking spaces is the result of two conditions:

- Variations in the occupancy of vehicles by hour, by day or by season at the individual generators.
- Relationships among the land uses that result in visiting multiple land uses on the same trip.

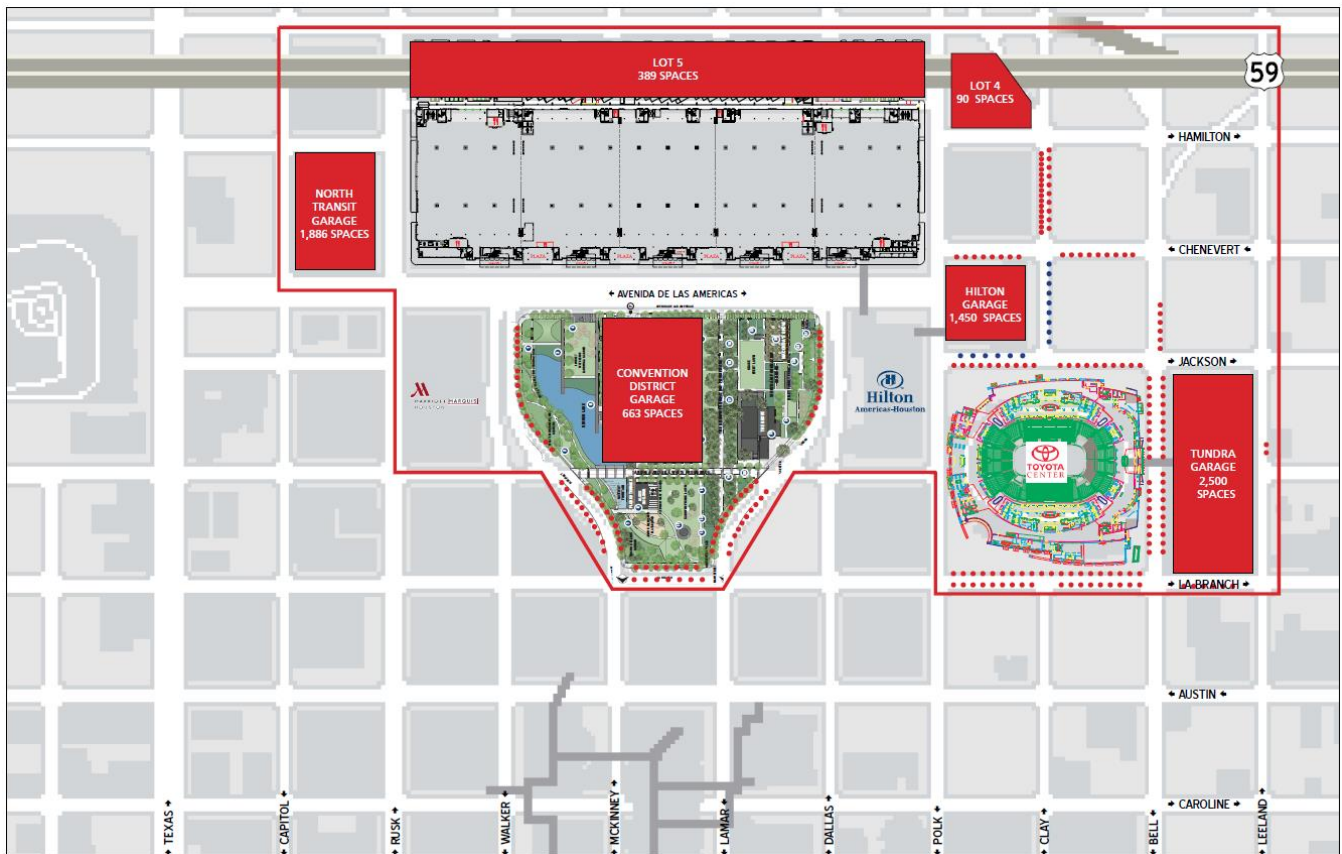
For example, a substantial percentage of patrons at one business (Hotel) or event venue may be users of another venue (Convention Center). This is referred to as the “effects of the captive market.” These patrons are already parking and contribute only once to the number of peak hour parkers. In other words, the parking demand ratio for individual land uses should be factored downward in proportion to the captive market support received from neighboring land uses.

Although the cross sharing of land uses can reduce the overall demand, it should be noted that there are limits imposed by proximity of land uses to each other and to parking facilities. While "shared parking" by definition is capitalizing on the different demand period for a combination of land uses, it is not logical to assume that a hotel (with peak demand in the evening) can share with an office building (with peak demand during the day) if the two land uses are too far apart. Human behavior restricts shared parking opportunities by limiting the distance users are willing to walk from a parking facility to their final destinations.

For example, in the Convention Center District rarely would the Tundra Garage ever accommodate a Minute Maid Stadium event or the Hilton Garage accommodate a BBVA Compass Stadium event. Only on extreme peak multi-event days would these demand generators cross over, outside their core areas.

### 3. CONVENTION DISTRICT SURVEY AREA

For the purposes of this study we focused only on those facilities that area directly controlled by Houston First. It was not in our scope to allow for the provision of parking spaces for BBVA Stadium (MLS) or Minute Maid Park (MLB). We will certainly get parking customers from Minute Maid and BBVA but this will just be additional revenue stream for the garage when the spaces are available to be sold to the public. Our first goal will always be to service the Convention Center District parking customers.



On days when there are multiple events or concurrent events at different venues the Houston First parking facilities will not be able to meet all the parking demand that is generated in the Convention Center District. However, there are private parking operations that do provide parking to help alleviate the demand at peak times.

#### 4. CONVENTION DISTRICT PARKING SUPPLY

As pointed out in the GRB Master Plan the parking near the GRBCC is designed for peak events. On most days, there is a surplus of parking, both surface and structured. The Hilton Americas Garage, Tundra Garage and underground parking at Discovery Green are heavily used during major events at the GRBCC, Toyota Center and the Hilton Americas. It may also have some use during BBVA Arena (Houston Dynamo) events.

Parking Space Supply	North Transit Center Garage	Hilton Garage	Discovery Green	Tundra Garage	Lot 4	On Street	Total
Total Spaces	1,886	1,450	663	2,500	90	254	6,843
<b>Dedicated Users</b>							
Employees		350		303	90		653
Allocated Monthly	240		174	391			805
HC (ADA)	41	26	14	35		15	116
Valet	364						364
Hotel	502						502
Reserved	12	110		372			494
Space Commitments	1,159	486	188	1,101	90	15	2,934
Space Available to Be Sold	727	964	475	1,399	0	239	3,909

##### A. NORTH TRANSIT GARAGE

The garage is located on the North end of the Convention Center and will be primarily used for Office (Houston First, Houston Convention & Visitors Bureau, Greater Houston Partnership), Marriott Marquis Hotel parking and visitor parking for the George R Brown and Minute Maid events. The garage is designed to have 1,886 spaces and replaces Lot 1 which had 128 spaces.



##### B. GEORGE R. BROWN CONVENTION CENTER PARKING OPERATION

The George R. Brown parking operation consists of (1) garage and one (1) lot used for staging large vehicles. The two lots previously used were decommissioned recently and replaced by one lot.

- Discovery Green Garage – The Discovery Green Garage is located below Discovery Green Park and serves the Convention Center, Park visitors and Restaurant Guests.
- Lot 2 – Lot 2 has recently been leased out for Restaurant spaces and has been removed from the parking supply totals.



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- Lot 5 – The lot is located directly behind the Convention Center and has 282 spaces. This lot is utilized for exhibitor parking only with limited visitor parking. Therefore, we have excluded this lot from the study totals due to the fact that it is not used for Convention attendees.

### C. HILTON GARAGE

The Hilton Garage is used for an array of parking purposes. These purposes include:

- Hilton hotel overnight valet and self / guest parking
- Transient guest parking e.g. hotel visitors, meeting attendees
- Restaurant patrons e.g. Pappasitos, Lobby Bar
- Toyota Center events e.g. NBA Rockets, Concerts, various entertainment events e.g. Cirque du Soleil
- Convention District Parking
- Discovery Green Event Parking
- The Garage also accommodates many employees of the Hotel and Pappasitos.



### D. TOYOTA TUNDRA GARAGE

Toyota Center features a dedicated 2,500-space, seven story parking garage. The Toyota Tundra Garage includes a private sky bridge entrance for premium guests and it is located at 1515 Jackson Street.

The 7-story garage covers two blocks in Downtown Houston. In order to accommodate the various uses, high-speed ramps are used for parking during the day, but are kept open to facilitate quick exiting during events. One-way traffic flow and angled parking spaces keep traffic flowing smoothly through the garage.



Elevators and escalators provide pedestrian's convenient access to the upper floors, and a pedestrian bridge provides direct access for premium customers into Toyota Center.

### E. ON STREET PARKING

There are many on street spaces in the area that are sufficient for the normal day-to-day short term parking. During normal hours there are spaces available within 2 blocks of most destinations. However, as with all the facilities, these spaces fill fast during events.

Due to the large amount of construction in the district many of the existing on street spaces are currently "closed" for use by the public. Once these spaces are reopened they will help alleviate the short term space demand, for normal hourly use.

## 5. ESTIMATED PARKING DEMAND

### A. SHARED PARKING DEMAND METRICS

The source table below is the Urban Land Institute’s publication “Shared Parking – Second Edition” and outlines the parking demand metrics for various types of venues. This table forms the basis of our demand forecasts that follow.

**Table 2-2** Summary of Recommended Base Parking Ratios (Spaces per Unit Land Use)

Land Use	Weekday		Weekend		Unit	Source
	Visitor	Employee	Visitor	Employee		
Community Shopping Center (<400,000 sq. ft.)	2.9	0.7	3.2	0.8	/ksf GLA	1
Regional Shopping Center (400,000 to 600,000 sq. ft.)	Sliding scale between 400,000 and 600,000 sq. ft.				/ksf GLA	1
Super Regional Shopping Center (>600,000 sq. ft.)	3.2	0.8	3.6	0.9	/ksf GLA	1
Fine/Casual Dining	15.25	2.75	17.0	3.0	/ksf GLA	2, 3
Family Restaurant	9.0	1.5	12.75	2.25	/ksf GLA	3
Fast-Food Restaurant	12.75	2.25	12.0	2.0	/ksf GLA	2
Nightclub	15.25	1.25	17.5	1.5	/ksf GLA	3
Active Entertainment	Custom to each tenant					
Cineplex	0.19	0.01	0.26	0.01	/seat	3, 2
Performing Arts Theater	0.3	0.07	0.33	0.07	/seat	2
Arena	0.27	0.03	0.3	0.03	/seat	3
Pro Football Stadium	0.3	0.01	0.3	0.01	/seat	3
Pro Baseball Stadium	0.31	0.01	0.34	0.01	/seat	3
Health Club	6.6	0.4	5.5	0.25	/ksf GFA	3, 4
Convention Center	5.5	0.5	5.5	0.5	/ksf GLA	3
Hotel—Business	1.0	0.25	0.9	0.18	/room	2, 3
Hotel—Leisure	0.9	0.25	1.0	0.18	/room	2, 3
Restaurant/Lounge	10.0	—	10.0	—	/ksf GLA	2, 3, 5
Conference Center/Banquet (20 to 50 sq. ft./guest room)	30.0	—	30.0	—	/ksf GLA	2, 3, 5
Convention Space (>50 sq. ft./guest room)	20.0	—	10.0	—	/ksf GLA	2, 3, 5
Residential, Rental	0.15	1.5 <sup>2</sup>	0.15	1.5 <sup>2</sup>	/unit	2
Residential, Owned	0.15	1.7 <sup>2</sup>	0.15	1.7 <sup>2</sup>	/unit	2
Office (<25,000 sq. ft.)	0.3	3.5	0.03	0.35	/ksf GFA	2
Office (25,000 to 100,000 sq. ft.) Sliding scale between					/ksf GFA	2
25,000 sq. ft.:	0.3	3.5	0.03	0.35		
100,000 sq. ft.:	0.25	3.15	0.03	0.32		
Office (100,000 to 500,000 sq. ft.) Sliding scale between					/ksf GFA	2
100,000 sq. ft.:	0.25	3.15	0.03	0.32		
500,000 sq. ft.:	0.2	2.6	0.02	0.26		
Office >500,000 sq. ft.	0.2	2.6	0.02	0.26	/ksf GFA	2
Data Processing Office	0.25	5.75	0.03	0.58	/ksf GFA	2, 3
Medical/Dental Office	3.0	1.5	3.0	1.5	/ksf GFA	2, 3
Bank, Branch with Drive-in	3.0	1.6	3.0	1.6	/ksf GFA	2

**Notes**  
Ratios based on peak parking spaces required with virtually 100% auto use and typical ridesharing for suburban conditions.  
<sup>1</sup>/ksf = per thousand sq. ft.  
<sup>2</sup>1.0 spaces reserved for residents' sole use, 24 hours a day; remainder shared with visitors and other uses.

**Sources:**  
1. *Parking Requirements for Shopping Centers*, 2nd ed. (Washington, D.C.: ULI—the Urban Land Institute, 1999).  
2. *Parking Generation*, 3rd ed. (Washington, D.C.: Institute of Transportation Engineers, 2004).  
3. Data collected by team members.  
4. John W. Dorsett, "Parking Requirements for Health Clubs," *The Parking Professional*, April 2004.  
5. Gerald Salzman, "Hotel Parking: How Much is Enough?" *Urban Land*, January 1988.



## B. CONVENTION DISTRICT PARKING DEMAND

The demand for parking in the study area is extremely difficult to quantify with complete accuracy. As mentioned before the demand for parking in the area is largely determined by the activity in the parking generators. We have made our demand estimates based on the best information available and what we believe are reasonable assumptions pertaining to a rapidly changing environment in and around the study area.

The primary parking demand generators in the area are considered to be the George R Brown Convention Center, Hilton Americas Hotel, Toyota Center, Minute Maid Field and Discovery Green. We do not anticipate a great demand from the Central Business District for daily or contract parking, as this would require a walk of approximately four blocks. Our experience is that the typical parker in the Houston market prefers to park within two blocks of their ultimate destination. In this regard, it is important to note that the current demand for daily or contract parking generated by office complexes in the Central Business District stops at La Branch Street.

We have used these venues to forecast a typical parking demand using the Urban Land Institute’s publication “Shared Parking – Second Edition”.

The table below uses those metrics for the Convention Center District venues.

Parking Demand Worksheet

Ranges of Generation Factors				Project Metrics		Space Demand			Spaces	
Land Use	Peak Space Factor		Unit	Metric	Unit	Low	Medium	High	Existing / Planned	
<b>GRB Convention Center District</b>										
George R Brown Convention Center	2.50	to 5.00	Spaces	Per 1,000 Sq. Ft. GLA	1,800,000	sq. ft.	4,500	6,750	9,000	753
GRB Employees	0.50	to 0.75	Spaces	Per 1,000 Sq. Ft. GLA	1,800,000	sq. ft.	900	1,125	1,350	
Toyota Center (NBA)	0.27	to 0.30	Spaces	Per Seat	18,043	Seat	4,872	5,142	5,413	2,500
TC / Rockets Employees	0.03	to 0.03	Spaces	Per Seat	18,043	Seat	541	541	541	
Hilton Americas - Houston Hotel	0.90	to 1.00	Spaces	Per Room	1,200	Rooms	1,080	1,140	1,200	1,450
Hilton Americas - Meeting Space	2.50	to 5.00	Spaces	Per 1,000 Sq. Ft. GLA	91,500	sq. ft.	229	343	458	
Hilton Employees	0.18	to 0.25	Spaces	Per Room	1,200	Rooms	216	258	300	
Pappasitos Restaurant	3.00	to 12.75	Spaces	Per 1,000 Sq. Ft. GLA	8,200	sq. ft.	25	65	105	
Pappasitos Employees	1.50	to 2.25	Spaces	Per 1,000 Sq. Ft. GLA	8,200	sq. ft.	12	15	18	
The Grove Restaurant	3.00	to 12.75	Spaces	Per 1,000 Sq. Ft. GLA	10,000	sq. ft.	30	79	128	
The Grove Employees	1.50	to 2.25	Spaces	Per 1,000 Sq. Ft. GLA	10,000	sq. ft.	15	19	23	
Marriott Marquis Houston Hotel	0.90	to 1.00	Spaces	Per Room	1,000	Rooms	900	950	1,000	
Marriott Marquis Meeting Space	2.50	to 5.00	Spaces	Per 1,000 Sq. Ft. GLA	100,000	sq. ft.	250	375	500	
Marriott Employees	0.18	to 0.25	Spaces	Per Room	1,000	Rooms	180	215	250	
Houston First Office Tower	3.15	to 3.40	Spaces	Per 1,000 Sq. Ft. GLA	110,000	sq. ft.	347	360	374	1,886
<b>Total Spaces Needed</b>							14,096	17,377	20,659	
<b>Off Street Spaces</b>							(6,589)	(6,589)	(6,589)	
<b>On Street Spaces</b>							(254)	(254)	(254)	
<b>Spaces Needed from Other Parking</b>							7,253	10,534	13,816	

Obviously due to the nature of the parking demand generators there will never be full demand so the total spaces need to meet the demand will never be reached. Each generator should be evaluated on an individual basis.

It can also be said that very rarely does any individual venue reach maximum capacity and thus reach maximum parking demand. Therefore, the total spaces needed from outside sources will be less than the tables suggest. Typically, it will be on the low side of the peak demand.

## C. EVENT PARKING DEMAND

### Minute Maid Events (MLB)

Based on numerous studies completed pertaining to parking demand generated by Minute Maid Field we can safely assume that approximately 10,000 to 12,000 parking spaces are needed to accommodate the demand for each home game. Before construction of the Marriott and Partnership Tower there were 13,000 parking spaces within a six block radius of Minute Maid Field. To the surprise of many, those spaces have adequately satisfied the parking demand for Minute Maid Field. In fact, we have firsthand experience with several parking sites within four blocks of Minute Maid Field that experience extremely low volume for the majority of the home games. Lower than anticipated attendance, efficient public transportation and an unexpected willingness to park in the Central Business District are the primary contributing factors for the reduced parking demand.

As the parking operator for the George R Brown Convention Center we are extremely familiar with the parking demand in the study area generated by Minute Maid Field. Before the surface lots were removed we realized approximately 500 parkers, on average, in the surface lots on the north side of the George R Brown Convention Center for each home game. Although we have spaces on the east and south side of the convention center, these locations are outside of the desired parking area for attendees of Minute Maid Field.

Given the typical parker's preference for surface lot parking as opposed to garage parking, we would not anticipate a great increase for Minute Maid Field's parking demand in the Convention District simply because garage parking is available.

### George R Brown Convention Center

Land Use	Ranges of Generation Factors		Project Metrics		Space Demand			
	Peak Space Factor	Unit	Metric	Unit	Low	Medium	High	
<b>GRB Convention Center District</b>								
George R Brown Convention Center	2.50 to 5.00	Spaces	Per 1,000 Sq. Ft. GLA	1,800,000	sq. ft.	4,500	6,750	9,000
GRB Employees	0.50 to 0.75	Spaces	Per 1,000 Sq. Ft. GLA	1,800,000	sq. ft.	900	1,125	1,350

As detailed earlier, the Convention Center demand can be quite high for large events. However, it is rare when the entire convention center is fully occupied using both the convention space and meeting space. Only during multiple events coupled with high occupancy does the parking demand overreach the supply.

The Convention Center is currently under expansion and will undergo even more expansion within the next 10 years. As it grows in accommodating larger events it is important to note the availability of more hotel rooms within walking distance of the convention center coupled with the increase in exhibit areas qualify this particular venue for conventions of a "national" nature.

As it relates to parking, this means a decrease in the ratio of cars to attendees as the new clientele will be more likely to fly to Houston and arrive via taxi or shuttle as opposed to the traditional local conventions where most attendees drive and park in the available spaces. However, at extreme peak times there will still be a large contingent of drive in customers.

Based on our experience, their parking choices for peak events, over and above the Hilton Garage, would be the Tundra Garage, and the surface lots outside the Convention District. Obviously, there

are a tremendous number of variables in this equation with the availability of parking spaces in the Tundra Garage being the most important. Without question, the locations of the Discovery Green Garage, Hilton Garage and the Tundra Garage are much more convenient than any of the surface lots.

These are the first to fill and have considerably higher occupancy during peak events. The demand for these spaces are so high, especially for the Hilton Garage during concurrent events with the Convention Center and the Hotel. During those periods we must relocated employees and non-Hotel customers.

### Hilton America’s Hotel & Restaurants

The Hilton Hotel has multiple demand generators with Hotel Guest demand, Meeting Room demand, Luncheons and a very popular Pappasitos location. Each of these generators combine to create a very high parking demand just as the Convention Center. Since the demands for the Hotel events often coincide with Convention traffic it is quite often that the valet parking service helps satisfy the parking needs of these specialty events. In many cases the parking is prearranged and we set up an event specific valet service separate from the Hotel Guest Valet service.

Ranges of Generation Factors				Project Metrics		Space Demand		
Land Use	Peak Space Factor		Unit	Metric	Unit	Low	Medium	High
<b>GRB Convention Center District</b>								
Hilton Americas - Houston Hotel	0.90	to 1.00	Spaces Per Room	1,200	Rooms	1,080	1,140	1,200
Hilton Americas - Meeting Space	2.50	to 5.00	Spaces Per 1,000 Sq. Ft. GLA	91,500	sq. ft.	229	343	458
Hilton Employees	0.18	to 0.25	Spaces Per Room	1,200	Rooms	216	258	300

Additionally, the employee parking demand is quite high for a high service Hotel. As mentioned previously, during peak periods we must relocated employees and non-Hotel customers to accommodate Hilton Hotel parking demand.

We would recommend, when it is possible to find a permanent, alternate site for the employees of Hilton to park on a regular day by day basis such as the vacant grass lot a block south of the convention center.

We would recommend that Houston First expedite the acquisition of this property and prepare this lot for every day parking to help alleviate the peak period parking shortage. This could solve a lot of problems until the south expansion occurs. Placing the Hilton employees there would free up the Hilton garage and allow us to better serve the event clients of the convention center.

### Toyota Center Events

Toyota Center hosts many events over and above the Houston Rockets NBA events. Many of these events generate maximum capacity and thus maximum parking demand. Again, this is not usually a problem except for the times when there are concurrent events in the Convention Center District.

Most Houston Rockets parking demands are met with sufficient spaces since many parking customers are drawn to the multiple surface parking lots in the area. Based on our observations the Tundra Garage rarely fills to capacity. However, as the area develops further with the Convention Center expansion the Tundra Garage will need to absorb more of the parking demand in the area.

Ranges of Generation Factors				Project Metrics		Space Demand			
Land Use	Peak Space Factor		Unit	Metric	Unit	Low	Medium	High	
<b>GRB Convention Center District</b>									
Toyota Center (NBA)	0.27	to 0.30	Spaces	Per Seat	18,043	Seat	4,872	5,142	5,413
TC / Rockets Employees	0.03	to 0.03	Spaces	Per Seat	18,043	Seat	541	541	541

### Marriott Marquis Hotel

The Marriott Marquis will present similar challenges as the Hilton Americas Hotel does. There will be times when multiple events are occurring and the parking demand on the north side of the area will be a challenge.

Added into the parking mix on the north side of the Convention Center District is the BBVA Compass Stadium hosting the Houston Dynamo MLS soccer events and Minute Maid Stadium hosting the Houston Astros MLB events. The Houston First Garage will accommodate the Marriott Marquis parking demand first but pressure will be put on the parking needs during these peak events.

Ranges of Generation Factors				Project Metrics		Space Demand			
Land Use	Peak Space Factor		Unit	Metric	Unit	Low	Medium	High	
<b>GRB Convention Center District</b>									
Marriott Marquis Houston Hotel	0.90	to 1.00	Spaces	Per Room	1,000	Rooms	900	950	1,000
Marriott Marquis Meeting Space	2.50	to 5.00	Spaces	Per 1,000 Sq. Ft. GLA	100,000	sq. ft.	250	375	500
Marriott Employees	0.18	to 0.25	Spaces	Per Room	1,000	Rooms	180	215	250

### D. EVENT PARKING RATES

Currently the Houston First facilities in the Convention District area compete for Event Parking customers based on location and price. Clearly the Houston First facilities have a location advantage over the outlying facilities. However, the prices we are advertising are sometimes much lower than the competing lots outside the District. For example, during the week of February 8 – 14 we had a number of Hotel Events along with a large multiday convention. Our rate of \$12.00 was much lower than the competition’s rate of \$20.00.

We would recommend a much more flexible pricing strategy to maximize the revenues generated for the parking spaces that are in the highest demand.

### E. DAILY

Outside of event generated parking there is a limited amount of daily parking demand. Most of this is related to Discover Green visitors, restaurant visitors and general visitors for the local area. However, this is limited and most of this demand is covered by the venue specific demand generators.

### Discovery Green Park & Restaurants

Ranges of Generation Factors				Project Metrics		Space Demand			
Land Use	Peak Space Factor		Unit	Metric	Unit	Low	Medium	High	
<b>GRB Convention Center District</b>									
Pappasitos Restaurant	3.00	to 12.75	Spaces	Per 1,000 Sq. Ft. GLA	8,200	sq. ft.	25	65	105
Pappasitos Employees	1.50	to 2.25	Spaces	Per 1,000 Sq. Ft. GLA	8,200	sq. ft.	12	15	18
The Grove Restaurant	3.00	to 12.75	Spaces	Per 1,000 Sq. Ft. GLA	10,000	sq. ft.	30	79	128
The Grove Employees	1.50	to 2.25	Spaces	Per 1,000 Sq. Ft. GLA	10,000	sq. ft.	15	19	23

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## **F. MONTHLY PARKING DEMAND**

Monthly Parking demand in the Convention District is relatively light compared to a pure Central Business District area. This will change slightly when the Houston First Tower is complete and the monthly parking component of the North Transit Center Garage greatly increases the ratio.

Currently most of the monthly parking customers are employees, vendors and contractors. These specific parking customers are outlined in the revenue section (8.B) that breaks out the total number of parkers and the average number per shift.



## 6. PARKING SPACE OCCUPANCY

### A. DAILY OCCUPANCY

As mentioned in other publications the normal daily parking occupancy of the Convention District area is not close to capacity. The Hilton Garage handles the Hilton’s needs. The Discovery Green handles the smaller events and daily visitors to the Park and Restaurants.

### B. PEAK OCCUPANCY

Peak Event occupancy is when the parking is stressed and spaces are in short supply.

For example, during the week of February 8 – 14 we had a number of Hotel Events along with a large multiday convention. During this week the NAPE Summit was held at the Convention Center. During this same period there were multiple lunches and meetings held at the Hilton Hotel. During the afternoon and evening hours there were multiple performances by Cirque du Soleil – Toruk.

This created demand that required us to relocate Hilton Employees and re-route selected NAPE attendees to the Tundra Garage. This was necessary to make spaces available for Hilton Hotel Guests and Event attendees. The occupancy for the various facilities are outlined below.

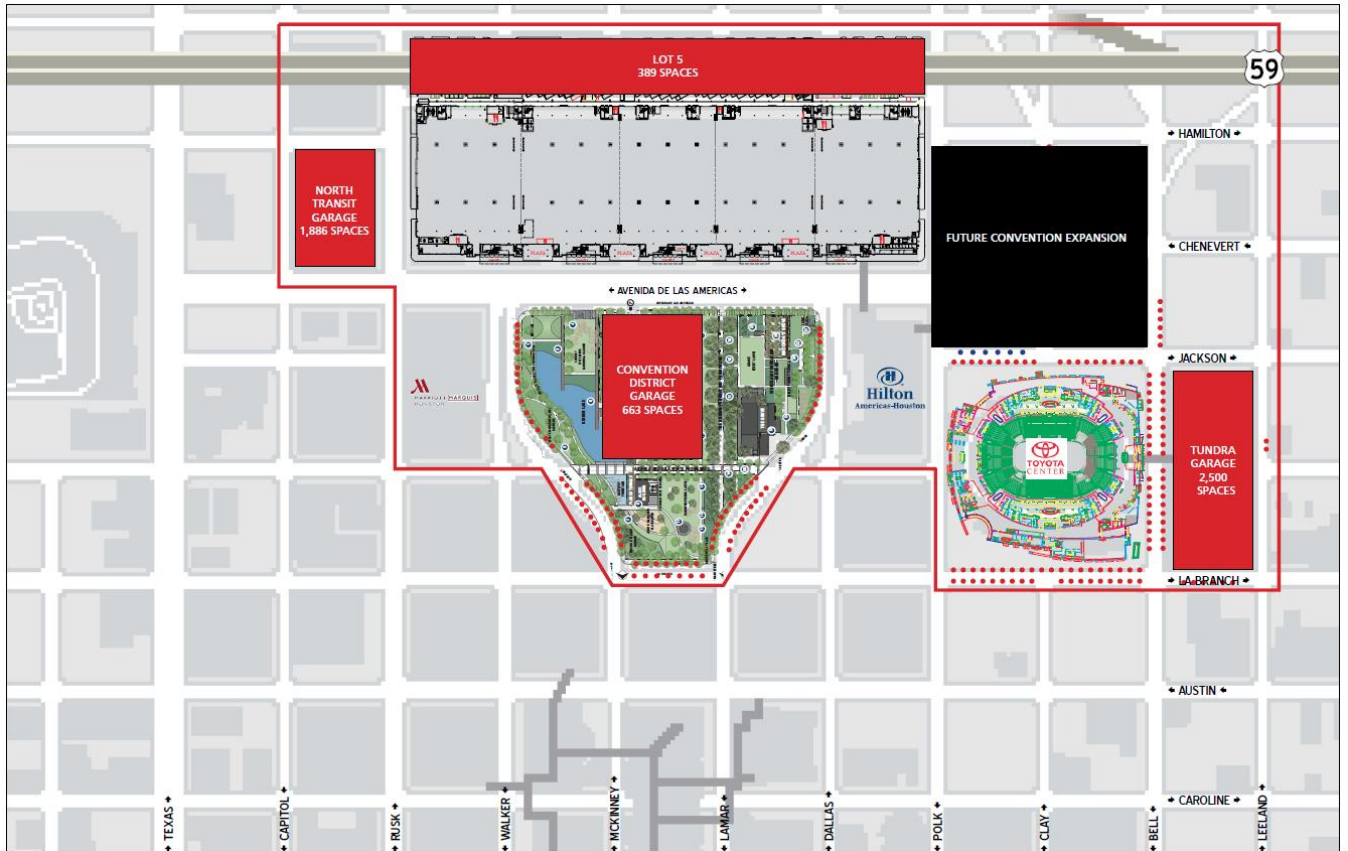
Parking Space Occupancy	North Transit Center Garage	Hilton Garage	Discovery Green	Tundra Garage	Lot 4	On Street
Monday, February 8, 2016	N/A	1,063		691		254
Occupancy		73.31%		27.64%		100.00%
Tuesday, February 9, 2016	N/A	1,158		718		254
Occupancy		79.86%		28.72%		100.00%
Wednesday, February 10, 2016	N/A	1,502		688		254
Occupancy		103.59%		27.52%		100.00%
Thursday, February 11, 2016	N/A	1,655	856	2,439	25	254
Occupancy		114.14%	129.11%	97.56%	27.78%	100.00%
Friday, February 12, 2016	N/A	2,098	835	2,002	11	254
Occupancy		144.69%	125.94%	80.08%	12.22%	100.00%
Saturday, February 13, 2016	N/A	2,027	911	1,728		254
Occupancy		139.79%	137.41%	69.12%	0.00%	100.00%
Sunday, February 14, 2016	N/A	1,763	628	1,832	14	254
		121.59%	94.72%	73.28%	15.56%	100.00%

As you can see we exceeded 100% occupancy at the very peak demand periods. We were able to accommodate most of this demand in the Convention District by relocating employees and all day parkers and “turning” the Hotel spaces for multiple events.

There were times, however, when the Hilton, Discovery Green and Street parking were entirely full. At these times, all customers had to park in the adjacent private lots or in the Tundra Garage. While we were able to meet our customers’ needs we nearly filled the Tundra Garage during the busiest peak periods.

## 7. ESTIMATED FUTURE PARKING SUPPLY

The future supply of parking spaces in and around the study area will be affected primarily by two developments. These development projects include the new Marriott Marquis Hotel consisting of approximately 1,000 rooms and the GRBCC expansion.



### A. CONVENTION CENTER MARRIOTT MARQUIS HOTEL

The 1,000 Room Hotel will have over 100,000 square feet of meeting space, will be across the street and connected via skyway to the George R. Brown Convention Center. In addition, there will be 20,000 square feet of ground floor retail in the hotel, according to a press release from Marriott Marquis.

The hotel will have a coffee shop, a sports bar and two restaurants. The Marriott Marquis will offer a 5,000-square-foot spa with seven treatment rooms and a 5,000 square-foot fitness center. The outdoor area will include an infinity edge pool, a Texas-shaped lazy river and seven event lawns.

### B. CONVENTION CENTER EXPANSION

The 2025 plan outlines the Phase III expansion to include 350,000 square feet of exhibition space, 211,000 square feet of meeting/ballroom/program space and up to 114,000 square feet of light exhibit/food & beverage space (provided by the bridge connection to the existing facility).

**C. EXPANSION PARKING CHANGES**

The 2025 plan outlines the Phase III expansion to include 257,500 SF for the new below-grade parking below the expansion will accommodate roughly 800 parking spaces. The existing Hilton Garage includes 1,450 spaces. Under this plan the District will lose 650 spaces on the south side. These spaces will need to be replaced at another site, or they will need to be used from outside sources.

Some of these spaces can be made up with the new spaces in the North Transit Center Garage. As you can see from the inventory tables many of the North Transit Center garage will be allocated out to the Office Building Tenants and the Marriott Hotel. However, the North Transit Center Garage will still be able to accommodate some of the convention generated parking shortfall.

<b>Parking Space Supply</b>	<b>North Transit Center Garage</b>	<b>Hilton Garage</b>
Total Spaces	1,886	1,450
<b>Dedicated Users</b>		
Employees		350
Allocated Monthly	240	
HC (ADA)	41	26
Valet	364	
Hotel	502	
Reserved	12	110
	-----	-----
Space Commitments	1,159	486
	-----	-----
Space Available to Be Sold	727	964





## D. POST EXPANSION PARKING DEMAND

Using the same demand methodology under the existing conditions, projected forward, we find that post 2025 expansion that parking demand has increased by over 1,700 spaces and parking supply has decreased by 650 spaces.

Given the fact that the Convention Center District must utilize outside parking supply to meet existing demand at peak periods, this will be even greater if no additional spaces are added to the future expansion plans.

Under the current expansion scenario, the outside parking market will be needed to meet the parking demands.

Ranges of Generation Factors				Project Metrics		Space Demand			Spaces
Land Use	Peak Space Factor		Unit	Metric	Unit	Low	Medium	High	Existing / Planned
<b>GRB Convention Center District</b>									
George R Brown Convention Center	2.50 to 5.00	Spaces	Per 1,000 Sq. Ft. GLA	1,800,000	sq. ft.	4,500	6,750	9,000	753
GRB Employees	0.50 to 0.75	Spaces	Per 1,000 Sq. Ft. GLA	1,800,000	sq. ft.	900	1,125	1,350	
Toyota Center (NBA)	0.27 to 0.30	Spaces	Per Seat	18,043	Seat	4,872	5,142	5,413	2,500
TC / Rockets Employees	0.03 to 0.03	Spaces	Per Seat	18,043	Seat	541	541	541	
Hilton Americas - Houston Hotel	0.90 to 1.00	Spaces	Per Room	1,200	Rooms	1,080	1,140	1,200	1,450
Hilton Americas - Meeting Space	2.50 to 5.00	Spaces	Per 1,000 Sq. Ft. GLA	91,500	sq. ft.	229	343	458	
Hilton Employees	0.18 to 0.25	Spaces	Per Room	1,200	Rooms	216	258	300	
Pappasitos Restaurant	3.00 to 12.75	Spaces	Per 1,000 Sq. Ft. GLA	8,200	sq. ft.	25	65	105	
Pappasitos Employees	1.50 to 2.25	Spaces	Per 1,000 Sq. Ft. GLA	8,200	sq. ft.	12	15	18	
The Grove Restaurant	3.00 to 12.75	Spaces	Per 1,000 Sq. Ft. GLA	10,000	sq. ft.	30	79	128	
The Grove Employees	1.50 to 2.25	Spaces	Per 1,000 Sq. Ft. GLA	10,000	sq. ft.	15	19	23	
Marriott Marquis Houston Hotel	0.90 to 1.00	Spaces	Per Room	1,000	Rooms	900	950	1,000	
Marriott Marquis Meeting Space	2.50 to 5.00	Spaces	Per 1,000 Sq. Ft. GLA	100,000	sq. ft.	250	375	500	
Marriott Employees	0.18 to 0.25	Spaces	Per Room	1,000	Rooms	180	215	250	
Houston First Office Tower	3.15 to 3.40	Spaces	Per 1,000 Sq. Ft. GLA	110,000	sq. ft.	347	360	374	1,886
<b>Total Spaces Needed</b>						14,096	17,377	20,659	
<b>Off Street Spaces</b>						(6,589)	(6,589)	(6,589)	
<b>On Street Spaces</b>						(254)	(254)	(254)	
<b>Spaces Needed from Other Parking</b>						7,253	10,534	13,816	

Ranges of Generation Factors				Project Metrics		Space Demand			Spaces
Land Use	Peak Space Factor		Unit	Metric	Unit	Low	Medium	High	Existing / Planned
<b>Post Expansion GRB Convention Center District</b>									
George R Brown Convention Center	2.50 to 5.00	Spaces	Per 1,000 Sq. Ft. GLA	2,150,000	sq. ft.	5,375	8,063	10,750	753
GRB Employees	0.50 to 0.75	Spaces	Per 1,000 Sq. Ft. GLA	2,150,000	sq. ft.	1,075	1,344	1,613	
Toyota Center (NBA)	0.27 to 0.30	Spaces	Per Seat	18,043	Seat	4,872	5,142	5,413	2,500
TC / Rockets Employees	0.03 to 0.03	Spaces	Per Seat	18,043	Seat	541	541	541	
Hilton Americas - Houston Hotel	0.90 to 1.00	Spaces	Per Room	1,200	Rooms	1,080	1,140	1,200	800
Hilton Americas - Meeting Space	2.50 to 5.00	Spaces	Per 1,000 Sq. Ft. GLA	91,500	sq. ft.	229	343	458	
Hilton Employees	0.18 to 0.25	Spaces	Per Room	1,200	Rooms	216	258	300	
Pappasitos Restaurant	3.00 to 12.75	Spaces	Per 1,000 Sq. Ft. GLA	8,200	sq. ft.	25	65	105	
Pappasitos Employees	1.50 to 2.25	Spaces	Per 1,000 Sq. Ft. GLA	8,200	sq. ft.	12	15	18	
The Grove Restaurant	3.00 to 12.75	Spaces	Per 1,000 Sq. Ft. GLA	10,000	sq. ft.	30	79	128	
The Grove Employees	1.50 to 2.25	Spaces	Per 1,000 Sq. Ft. GLA	10,000	sq. ft.	15	19	23	
Marriott Marquis Houston Hotel	0.90 to 1.00	Spaces	Per Room	1,000	Rooms	900	950	1,000	
Marriott Marquis Meeting Space	2.50 to 5.00	Spaces	Per 1,000 Sq. Ft. GLA	100,000	sq. ft.	250	375	500	
Marriott Employees	0.18 to 0.25	Spaces	Per Room	1,000	Rooms	180	215	250	
Houston First Office Tower	3.15 to 3.40	Spaces	Per 1,000 Sq. Ft. GLA	110,000	sq. ft.	347	360	374	1,886
<b>Total Spaces Needed</b>						15,146	18,909	22,671	
<b>Off Street Spaces</b>						(5,939)	(5,939)	(5,939)	
<b>On Street Spaces</b>						(254)	(254)	(254)	
<b>Spaces Needed from Other Parking</b>						8,953	12,716	16,478	
						1,700	2,181	2,663	

## 8. PARKING REVENUE ANALYSIS

### A. REVENUE PER SPACE COMPARISON

The fluctuations in parking revenues are dependent on the scheduled events at venues within the GRBCC District, and whether or not event parking is accepted in the Hilton garage. The frequency in which Hilton employees are relocated to alternate sites is increasing, and when that occurs the Hilton Garage is not accepting revenue generating parkers. This was the case in February for the APAC and in March for the CAMEX event. The location could have generated revenue for the event in the GRB Convention Center, but we had to deny access in order to have availability for the Hilton luncheon. The Discover Green Garage is primarily event driven with very few monthly customers. The Tundra recognizes additional revenue for overflow parking from Hilton, and when that parking inventory is being secured for luncheons and galas booked at the Hilton hotel.

<b>Parking Revenue Summary (2015)</b>	<b>North Transit Center Garage</b>	<b>Hilton Garage</b>	<b>Discovery Green</b>	<b>Tundra Garage</b>	<b>Hilton Valet</b>
January-15	N/A	\$120,794	\$78,352		\$49,478
February-15	N/A	\$125,767	\$120,304		\$48,911
March-15	N/A	\$143,411	\$108,310		\$48,662
April-15	N/A	\$147,144	\$115,921		\$52,353
May-15	N/A	\$151,349	\$138,305		\$77,062
June-15	N/A	\$124,764	\$112,320		\$37,274
July-15	N/A	\$136,536	\$126,849	\$90,392	\$33,467
August-15	N/A	\$107,278	\$84,694	\$85,790	\$35,626
September-15	N/A	\$156,358	\$135,434	\$104,325	\$59,167
October-15	N/A	\$170,356	\$165,157	\$60,648	\$71,184
November-15	N/A	\$160,396	\$162,707	\$64,832	\$52,255
December-15	N/A	\$94,646	\$137,297	\$72,767	\$37,002
Average		\$136,567	\$123,804	\$79,792	\$50,203
Revenue Per Visitor Space		\$141.67	\$254.22	\$55.64	\$137.92

## B. COMPLIMENTARY PARKING

There are many complimentary parking arrangements for the GRBCC District. The tables below outline all the various complimentary parking allowances that exist for the facilities. Many are for Employees or Tenants of the District that required a parking concession.

### Convention District Complementary Parking

<b>Hilton Garage:</b>		<b>AVE/SHIFT</b>	<b>Lot 4:</b>		<b>AVE/SHIFT</b>
Hilton	709	220	Freeman	50	29
Papasitos	153	32	Fern	20	10
HFC	46	40	Andy Frain	25	12
Republic Parking	15	9	Kay resources	5	2
Sovereign	51	25	5 Star Security	3	1
GRB Retails	60	40	Union Carpenter	3	1
Janitorial	2	1	SCN	1	1
Rustic Employees	55	35	AEX Texas Expo	10	4
GRB Contractors	133	100	Spirit Deco	5	2
Andy Frain	6	3	Shepard	15	8
Hilton Total	1,230	505	GES	20	10
			Local 988	5	2
			ERS	5	3
<b>Tundra Garage:</b>			TDI	30	20
Toyota	200	180	Smart City	12	10
Republic Parking	3	3	EDH Plumber	3	1
Andy Frain	4	2	Joe Shoeshine	3	1
Janitorial	2	1	Lot 4 Total	215	118
Tundra Total	209	186			
<b>Convention District Parking:</b>			<b>Employee Lot:</b>		
HFC	22	5	GRB	200	90
COH Library	5	3			
Republic Parking	21	7			
Janitorial	2	1			
Dynamo	4	3			
Retails	60	40			
Convention Total	114	59			
<b>North Garage:</b>					
HFC/GHCVB/GHP	300	250			
North Tower Retail	40	25			
Board/City Official	50	15			
North Total	390	290	<b>GRAND TOTAL:</b>	2,358	1,248

It is understandable that many of these concessions are necessary, but they should be limited any time that is possible. It is usually possible to accommodate these concessions in a remote, or unused facility on the day of the event. Future considerations about parking concessions should be made in consideration of moving Employees, Vendors, and other non-revenue generating parkers to parking locations that do not affect the event attendees. This will result in more revenue and better customer service.