



Memorandum

To: Robert Reber, City of Hercules

From: Anne Spevack and Bill Hurrell, CDM Smith

Date: October 14, 2019

Subject: Hercules Waterfront Shared Parking Demand Analysis

Introduction and Background

In 2008, the City of Hercules completed the Hercules Waterfront District Master Plan, which envisioned mixed use development along the waterfront anchored by a new transit center served by rail and ferry routes. An overview of the site is shown in **Figure 1**. The master plan outlined a parking management strategy which included sharing off-street parking between uses and regulating parking to achieve a minimum occupancy, as well as establishing a residential parking permit (RPP) program. The first phases of development in the district are currently underway, and accordingly, a shared parking and parking management plan needs to be developed and implemented.

Figure 1: Hercules Waterfront District Site Overview



Source: Hercules Waterfront District Master Plan, City of Hercules 2008.

To inform a forthcoming plan for shared parking and parking management, this memo projects the parking demand by time of day for planned uses in the district. A shared parking model is used to estimate the cumulative parking demand for all uses for each hour during the day. This demand is compared to the planned parking supply to determine if additional supply or management strategies will be necessary.

Note: The properties within the waterfront area are owned by two different developers. Blocks F and H are owned by a different developer (Bayfront Hercules Partners, represented by David Cury) than the remaining blocks, which are owned by Ledcor Properties. Ledcor provided details on their plans for their blocks, but information on the other parcels was not available. For analysis purposes herein, the type and amount of land uses assumed for Blocks F and H are the same allowed by the Waterfront Initiative and assumed in the Bayfront Environmental Impact Report. For the purposes of this report, it is assumed that the two developers will follow the same rules for providing public parking and that all public parking will be combined into a single public parking district for all users.¹

Methodology

A shared parking model was developed for the Hercules Waterfront Area based upon the Urban Land Institute (ULI) shared parking methodology, which estimates the total parking demand by time of day using factors based on case studies, data collection, and other observations regarding multi-use developments and shared parking alternatives to segregated parking requirements.² The concept of shared parking relies on the fact that various uses within a single shopping center, downtown, or other small geographic area can improve the efficiency of their parking facilities by making them available to all users, as demand will differ by time of day for different uses. Following this concept, the resulting spreadsheet parking model determines the peak demand based on the peak hour for the cumulative demand of all uses in the study area, rather than totaling each land use's individual peak parking demand, which usually results in an oversupply of parking.

The 2010 Institute of Transportation Engineers (ITE) parking demand generation rates were used as the starting point for the parking demand estimation analysis.³ The ITE estimates rely on parking generation data from suburban, auto-oriented contexts. As the Hercules Waterfront area is planned to be a mixed-use, relatively urban area with high-quality transit connections, the parking generation rate of uses within the area may be lower than the default. People living in the area may at first still be dependent on their cars, as behavior changes slowly and the project will be built in phases, but at ultimate buildout the walkability and transit access is intended to reduce trips to and within the development. For this reason, the parking demand estimates generated based on the ITE

¹ All Bayfront properties are subject to the Waterfront District Master Plan, but only those properties currently owned by Ledcor (all Blocks except Blocks F & H) are subject to the Implementing Development Agreement for the Hercules Bayfront Project).

² Shared Parking, 2nd Edition, Urban Land Institute, 2005.

³ Parking Generation, 4th Editions, Institute of Transportation Engineers, 2010.

numbers should be considered a high-end estimate, and that as new transit is implemented, the demand may be lower.

The base parking generation rates were then adjusted based on time-of-day factors developed by ULI, so that the maximum parking demand for each use is equivalent to the parking generation rate, but for most of the day demand for each use is lower. This produces a shared parking demand estimation that fluctuates throughout the day based on demand for each use.

The ULI model provides time-of-day factors for weekdays or weekends. Because the Hercules Waterfront area is likely to have high demand during the day from transit center users and lunch visitors, and high demand in the evening from diners and shoppers, it was determined that a Friday is likely to be the worst-case parking scenario. To model a typical Friday, the weekday factors were used from 6 am to 5pm, and weekend factors were used from 5pm to midnight (demand from midnight to 6am is well below supply and is not shown in the graphs below).

The only use in the model that did not use ITE values as a baseline was for Transit Center users. The demand for parking at the Transit Center was previously estimated based on ridership forecasts for the potential rail and ferry service that would serve the waterfront. Based on these estimates, the parking demand at the Transit Center was estimated to be 286 spaces. Based on the planned ferry schedule and existing Capital Corridor Schedule, drivers are assumed to arrive uniformly from 6 am to 9 am, and to depart uniformly from 4 pm to 7 pm.

Model Inputs

The shared parking model takes the number of residential units and the square footage of non-residential land uses within the study area as inputs. The type and amount of each land use assumed for the model was gathered from a combination of the existing uses on Railroad Avenue, plans from the developer for the Village and Bayfront Boulevard, and assumed buildout for the remainder of parcels based on the Environmental Impact Report (EIR) for the Bayfront Project. Residential uses and associated parking in the Crescent Heights area, or blocks A, B, C, and D, would not be included in the public parking district because these blocks are assumed to have sufficient parking contained within those blocks, and thus not contribute to demand in the public parking areas. These blocks are included in the parking model to illustrate the full parking demand within the study area, but the planned parking is not included in the public parking supply, and is instead assumed to be entirely reserved for residential uses. Existing residential uses surrounding the study area are excluded from the model. While they will not be considered a part of the public parking district, the effects of parking demand and management, such as spillover, in the existing neighborhoods and Crescent Heights will be considered as a part of the results of this analysis.

Table 1 details the number of residential units and square footage for all land uses input into the parking model. The numbers for planned blocks are based on project phases already approved and the developers' anticipated build-out for the remaining blocks. These numbers also represent the maximum amount of residential units (1,526), retail space (90,000 sf), and flex space (134,000 sf, converted to 134 residential units) allowed by the Waterfront District Master Plan and assumed for

the Bayfront Environmental Impact Report. This analysis assumes the developer's anticipated 35,000 sf of office space, which is less than the 90,000 allowed by the WDMP and assumed for the Bayfront EIR. The total retail and flex floor area was combined, then split between the ITE categories "Shopping Center" and "High-Turnover (Sit-Down) Restaurant" assuming that 60% of the space would be retail and 40% would be restaurant uses. This is a conservative estimate intended to reflect the potential for the Waterfront to be an experience-based destination, rather than the current uses which are almost exclusively retail, and this assumption of 40% restaurant results in a very high parking demand during the peak.

Table 1: Hercules Waterfront Baseline Development Assumptions

Block	Residential			Retail Square Footage	Office Square Footage	Flex Square Footage
	Number of Units	Number of Bedrooms	Square footage			
Existing (not part of planned development)						
Railroad Ave	18	54	37,000	2,064	0	8,064
Planned ¹						
A, B, C, and D	155	(2)	(2)	0	11,000	0
E	80	99	73,000	20,600	0	0
F	25	(2)	22,000 ³	11,000	0	0
G	105	131	94,000	25,000	0	0
H	25	(2)	22,000 ³	11,000	0	0
I (Transit Center)	0	N/A	N/A	3,000	0	0
J	0	N/A	N/A	8,400	24,000	0
K	143	198	130,000	0	0	0
L	113	139	99,000	0	0	0
M + P	325	395	267,000	0	0	0
N	172	264	165,000	14,000	0	0
O	151	151	105,000	0	0	0
Q + R	232	297	208,000	0	0	0
Total	1,544	1,728	1,218,000	95,064	35,000	8,064

¹Planned development square footage and number of bedrooms were provided by the developer for blocks E, G, and K through R.

²The number of bedrooms for blocks A, B, C, D, F, and H and residential square footage for blocks A through D have not yet been planned or were not available from data sources for these blocks.

³The residential square footage of blocks F and H was not provided by the developer, and was estimated based on the average unit size for the remaining blocks E through R.

Parking Supply

The demand estimate resulting from the model is compared to an estimated parking supply to determine if there would be sufficient public parking provided within the district. The total parking supply in the study area, detailed in **Table 2**, is the combination of existing on-street parking, estimated parking spaces provided by Ledcor in a draft parking concept, and assumed parking for additional parcels based on the parking requirements.

Table 2: Waterfront District Estimated Parking Supply

Block	On-Street Parking	Residential Parking	Commercial/Office Parking
Existing			
Railroad Ave	40	28	0
Planned¹			
A, B, C, D	0	310	29
E	0	109	38
F ²	0	33	22
G	0	147	50
H ²	0	33	22
I (transit Center)	0	0	93
J	0	0	17
K	0	217	0
L	0	148	0
M + P	0	405	0
N	0	213	25
O	0	151	0
Q + R	0	304	0
On Street - Bayfront	72	0	0
On Street - John Muir	38	0	0
On Street - Village Loop	48	0	0
Totals	198	2,098	296³

¹The Hercules Master Plan Parking Concept was provided by Ledcor Properties as an estimate of the parking to be provided on most lots within the development, and is considered a conceptual draft subject to changes.

²The planned parking on blocks F and H was not provided by the developer. Estimates were based on the average number of parking spaces per unit being provided on the other blocks with residential units in the district.

³The overall Bayfront commercial/office parking ratio is 2.28 spaces per 1,000 sf of non-residential use (296 spaces for 130,064 sf of combined retail and office space). This is within the Waterfront District Master Plan parking requirements that stipulate a minimum of 2 spaces and a maximum of 3 spaces per every 1,000 sf of non-residential uses.

The Hercules Bayfront Implementing Development Agreement (IDA) states that “all parking for the Owner’s project shall be accommodated by a Public Parking District designed to accommodate both public and private parking needs, except for: (i) spaces served for residential use per code, excluding guest parking; and (ii) some minimum portion of office parking required also to be reserved for key tenants, but not more than 10 percent of all office parking.” The City interprets this to mean that all residential parking provided above the minimum parking requirements for residential units (one parking space per 1,500 sf residential space) will be included in a public parking district to be managed consistently with the public parking. Because the developer has planned to provide more parking than required by the code, this would make public a large proportion of the planned parking at residential developments within the waterfront area. The developer has proposed an alternate strategy which would allow 10 percent of the residential parking to be used as public parking during the day, but remain reserved for residents in the evening.⁴ In this proposal the remaining 90 percent of parking spaces in the area will not be available for all users. The breakdown of parking supply based on these two strategies is shown in **Table 3**. In both scenarios, the parking reserved for residents is assumed to be separated in a secured area at all times, and inaccessible to all other users. This means that some parking spaces may go unused during the day when residents are at work. All non-residential parking is assumed to be available to the public, but if in reality spaces are reserved for employees or customers of a specific business, the effective supply will be limited at times when those spaces are unused.

Table 3: Parking Supply Alternatives

Type of Parking	Waterfront District Master Plan (55% of residential parking shared)	Developer Proposal (10% of residential parking shared)
Dedicated Residential parking	1,128	1,922
Shared Residential/Public Parking	970	176
Public parking (On-Street and dedicated commercial)		
On-Street (City-owned)	198	198
Commercial (Privately-Owned, off-street)	296	296
Total	2,592	2,592

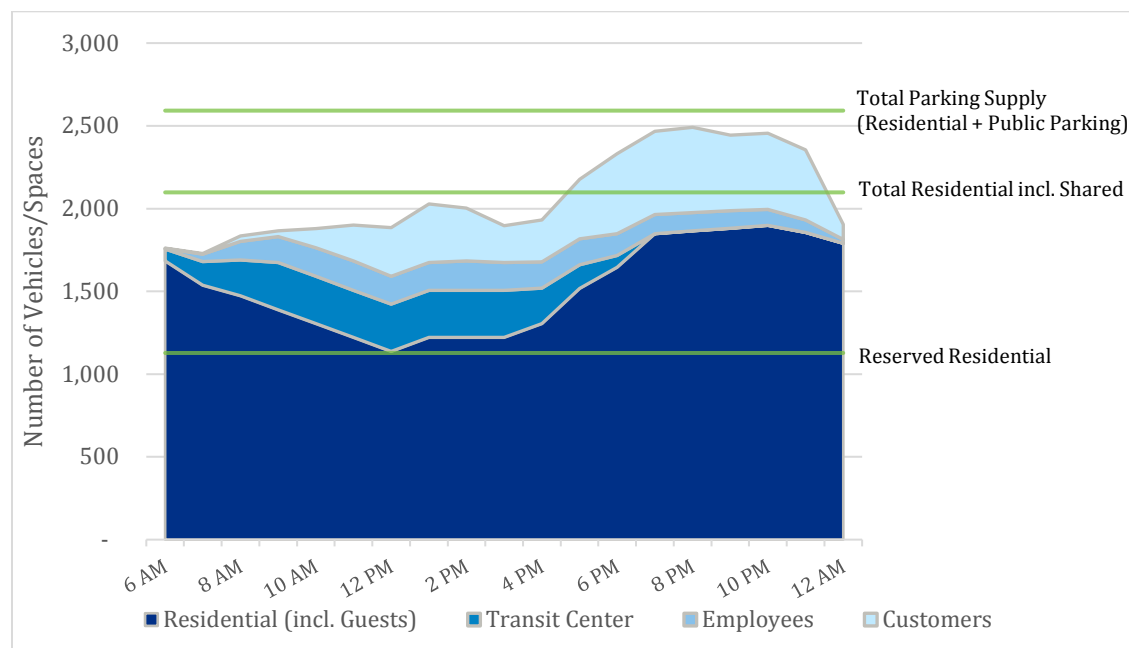
Model Results

Figure 2 and **Figure 3** below show the estimated Friday parking demand in relation to the parking supply for both of the shared parking options described above. Both figures include all planned and existing on-street and off-street parking as detailed in **Table 2**. Note that for each of the following

⁴ The developer bases its 10% shared parking proposal on its own estimate of economic feasibility for the project to meet lender demands and residential tenant expectations.

scenarios, it was assumed that the two developers within the waterfront development would follow the same rules for supplying public parking.

The first graph, **Figure 2**, shows the demand relative to supply based on the shared parking requirements in the master plan. Under this option, there is ample parking available during the middle of the day, as departing residents leave a large number of shared parking spaces free for employees and customers. In the evening, demand rises closer to supply but does not exceed it.



The second graph in **Figure 3** shows the developer proposal. Under this option, the effective parking supply lowers during the day due to the fact that a majority of the residential parking is reserved for residents only, and thus should not be counted in the total supply of public parking. The results under this option indicate that residents leaving in the morning would leave enough room for most of the transit commuters to park, but that the remaining public parking would not be sufficient for employees and customers during the midday, which would result in spillover into the residential neighborhoods. During the midday peak, demand exceeds the public supply by approximately 140 spaces. The demand is approximately the same as supply from the midday to the evening.

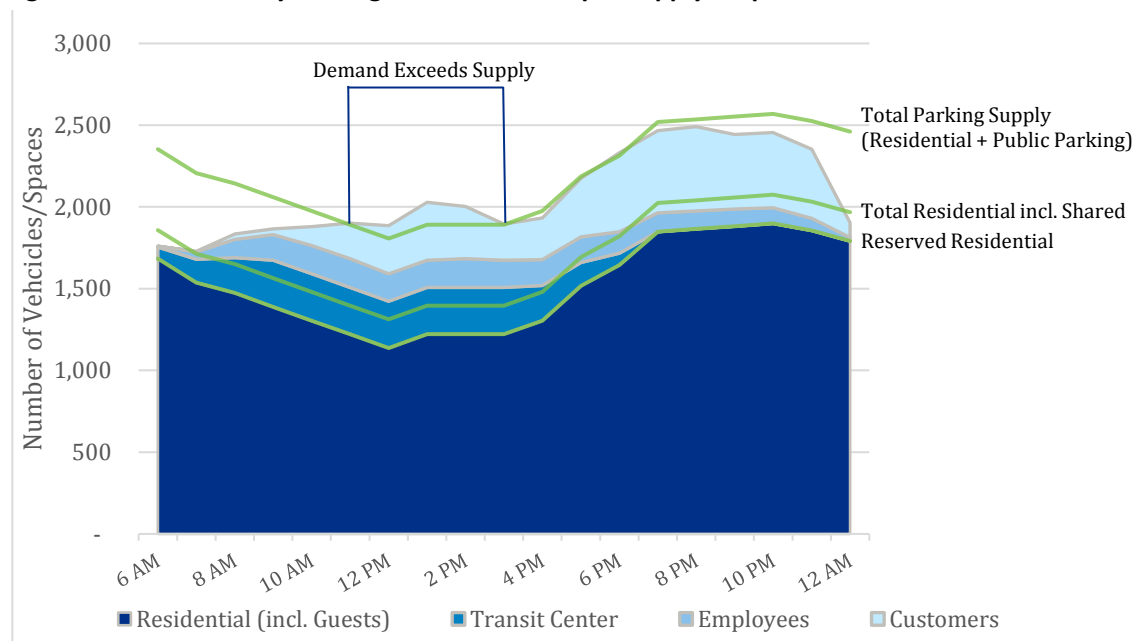
Parking demand can be affected by a number of additional factors. The amount and type of development can have a large effect on parking demand. For example, restaurant uses have very highly concentrated demand during peak hours, so if the proportion of space used for restaurants is different than that assumed, the peak parking demand may vary. Each 10% increase in presumed restaurant share of retail space would result in additional peak-hour demand of 114 parking spaces; conversely, each 10% decrease in presumed restaurant share would result in a 114 space reduction in restaurant parking demand.

Two other scenarios of interest include:

- Replace 134 residential units with 134,000 sf of flex space, presumed to be standard retail (not restaurant) – This would increase the peak parking demand by 758 spaces
- Replace 134 residential units with the maximum amount of office space (an additional 55,000 sf) - This would result in a 464 space increase in the peak parking demand,

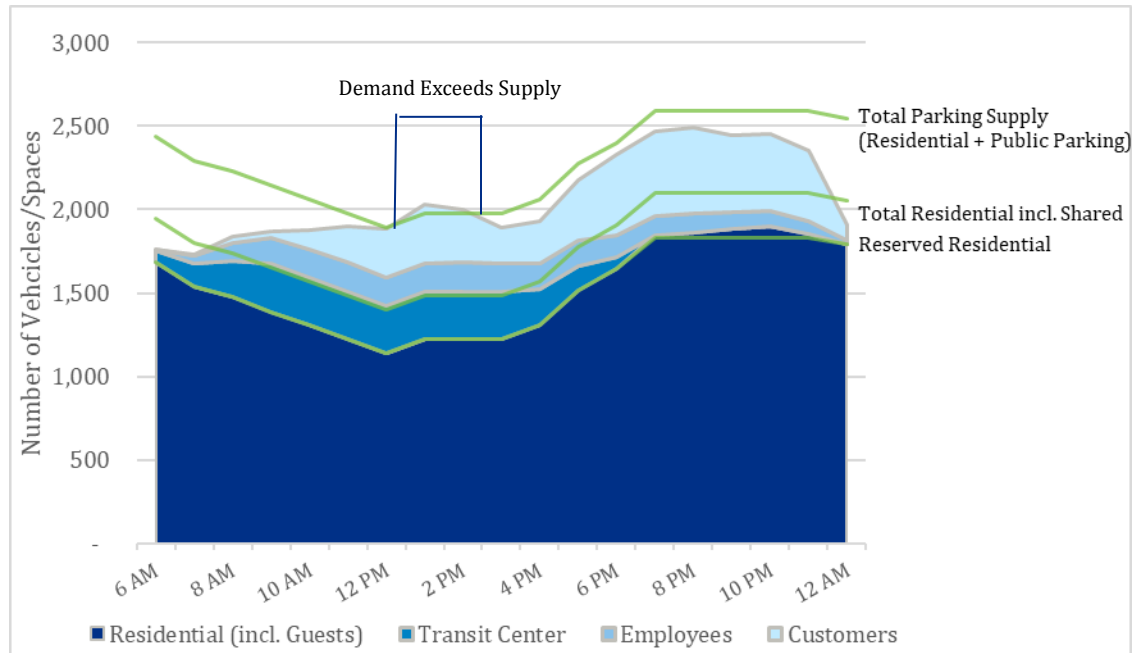
If either the rail or ferry transit is not implemented at the Transit Center, parking demand at the transit center will go down, and parking demand for other uses may go up due to the lack of transit access. Additionally, parking management can affect parking demand by encouraging transit use or “park once and walk” behavior.

Figure 3: Baseline Friday Parking Demand, Developer Supply Proposal



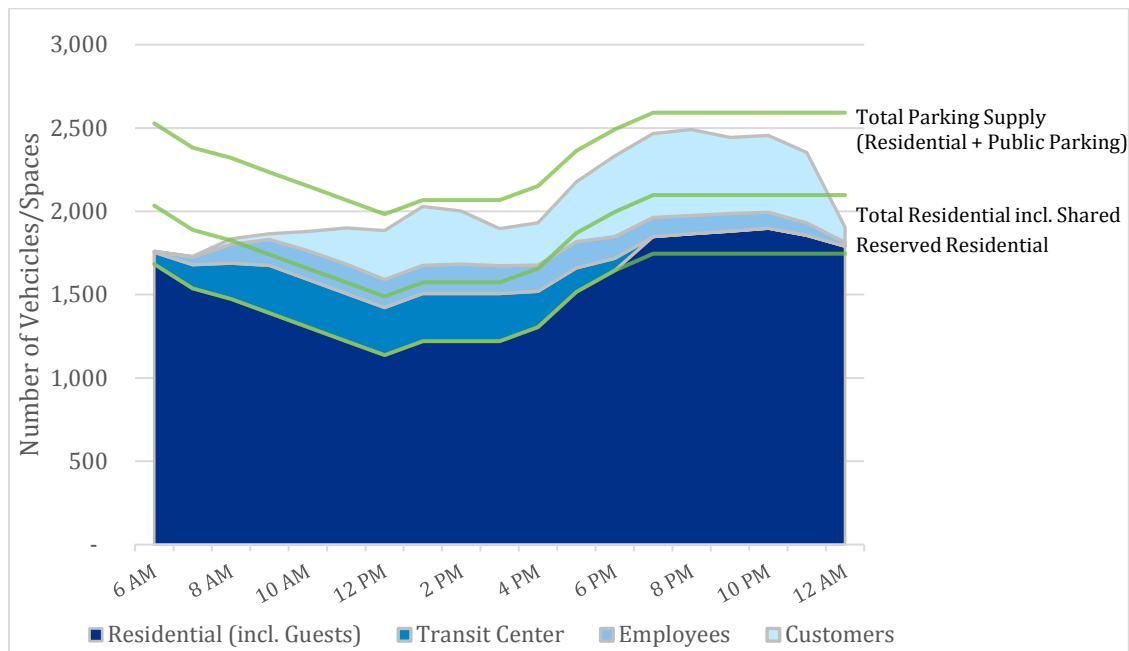
In additions to this scenario, options with 15 and 20 percent of the residential parking designated as shared were evaluated as shown in **Figure 4** and **Figure 5**, respectively.

Figure 4: Baseline Friday Parking Demand, 15 Percent Shared Residential Parking



Under the 15 percent shared parking scenario, the period of time in which demand exceeds supply and the magnitude of the exceedance is much reduced as compared with developers' proposal. With the 20 percent shared parking scenario, there would not be a time in which the demand exceeds the supply.

Figure 5: Baseline Friday Parking Demand, 20 Percent Shared Residential Parking



High Parking Supply Scenario

Because the development plans for the whole Waterfront District are not finalized, several alternative land use and parking supply options remain to be decided. The parking supply may be increased by implementing on-street parking around Block K and by building two levels of underground parking at the Transit Center (Block I).

The loop drive around Block K was originally intended to be a bus access route to the transit center, but this option would have required building an additional bridge, which was cost prohibitive. Instead, buses will be taking an alternate route. This opens up the street for parking uses. The south and east sides of the block need to be two-way due to the locations of the development access points, but the north and west sides of the block could be one-way, allowing for diagonal parking. Adding two blocks of parallel parking and two blocks of diagonal parking would result in approximately 100 additional parking spaces.

An alternate development option for Block I includes an expanded underground parking garage. Preliminary designs for a two-level facility total 158 spaces, 65 spaces more than is assumed in the baseline scenario.

Figure 6 and 7 show the results if both on-street parking around block K and additional parking on block I were implemented. The higher parking supply is higher than demand at all times of the day in both scenarios.

Figure 6: High Supply Scenario Friday Parking Demand, Developer Supply Proposal

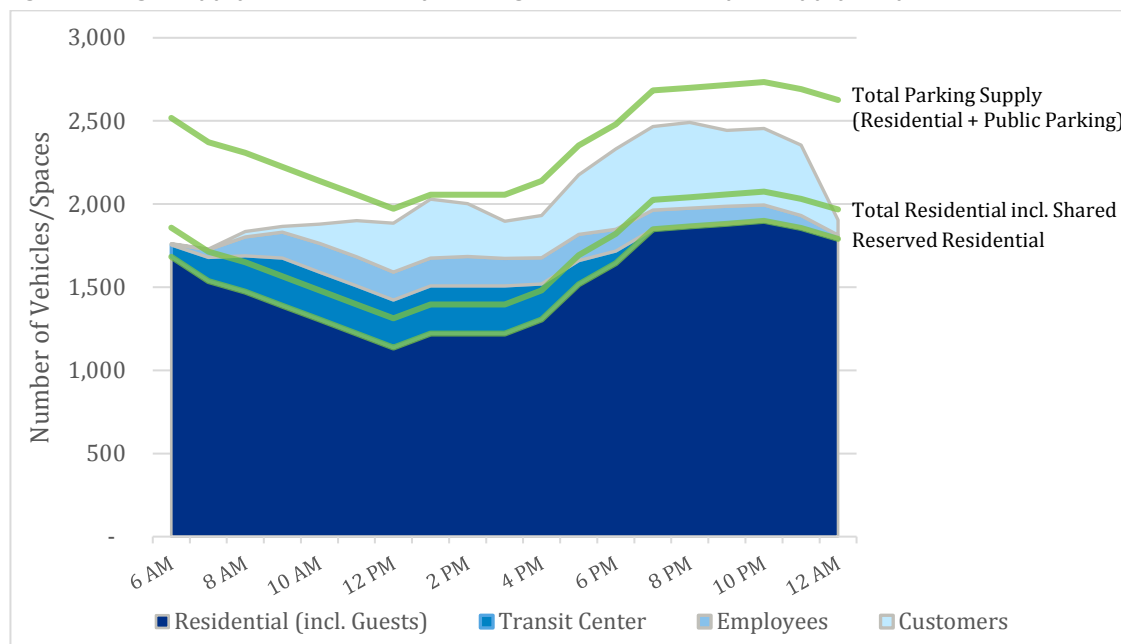
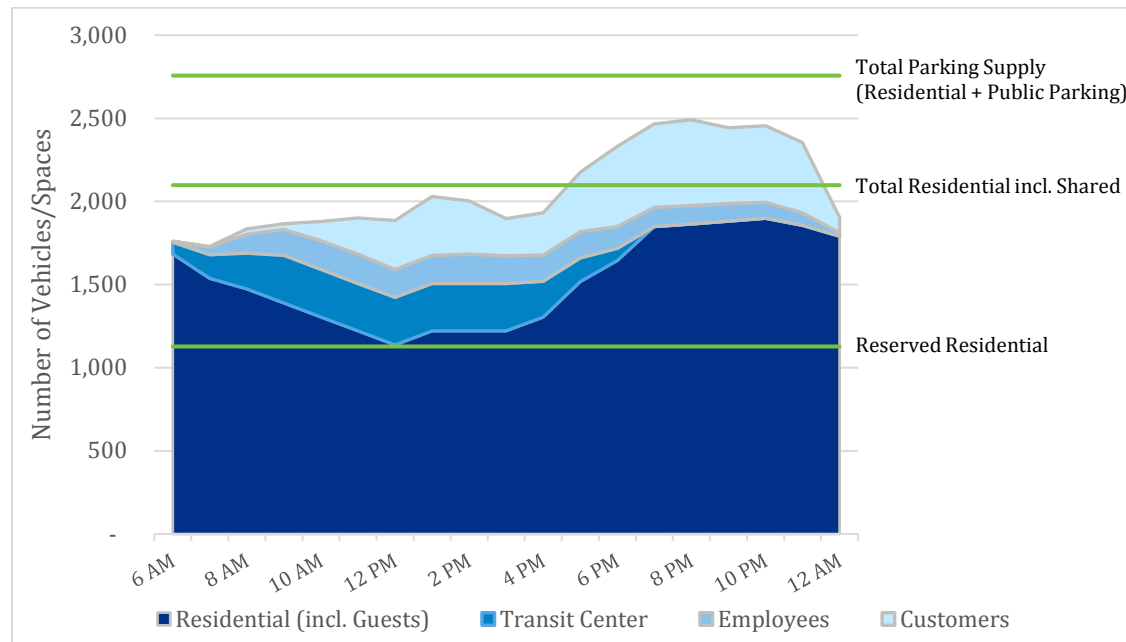


Figure 7: High Supply Scenario Friday Parking Demand, Waterfront Masterplan Supply



Near-Term and Mid-Term Scenarios

The parking demand scenarios described above assume full buildout of the Waterfront District, including implementation of both ferry and rail service. This is a long-term scenario, and there may be intermediate phases in which not all development is completed and/or not all transit connections are in service. This section details the estimated parking demand for two potential scenarios: a near-term scenario in which neither rail or ferry service has been implemented and only the Village has completed construction, and a mid-term scenario in which all parcels in the district have been developed but only rail service has been implemented and ferry service has not yet been implemented.

The potential parking demand under the near-term scenario is illustrated in **Figure 8** and **Figure 9**. Under this scenario, parking demand has been increased slightly to account for the reduced transit access when compared with the long-term scenarios estimated above. Under this scenario, only the Village area of development is assumed to be completed. The blocks within this area are primarily residential with a few retail and office spaces, and make up almost 75 percent of the residential units planned for the Waterfront. It is also assumed that the ferry and rail transit services would not be in place yet. Thus, the figures below show no demand for transit center parking (as there will be no regional transit service) and low demand for employee and customer parking. The demand for parking for residents and their guests makes up almost all of the parking demand in this scenario. For both parking supply options, the demand for parking remains below the supply,

indicating that the amount of parking provided in the near-term would be more than enough to meet the demand.

Figure 8: Near-Term Scenario Friday Parking Demand, Waterfront Masterplan Supply

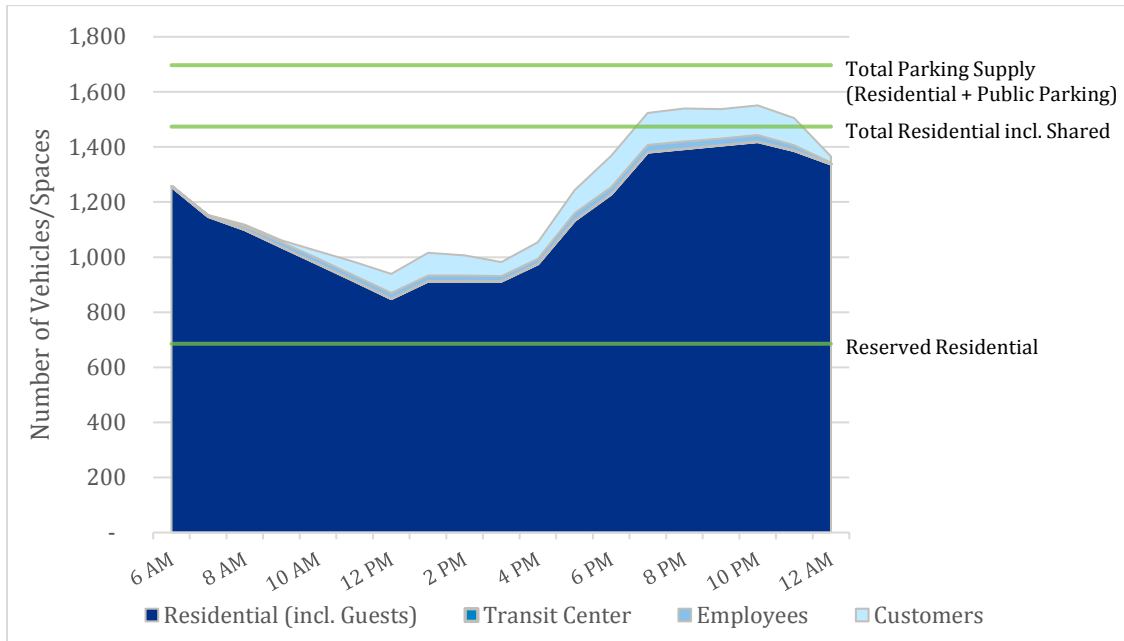
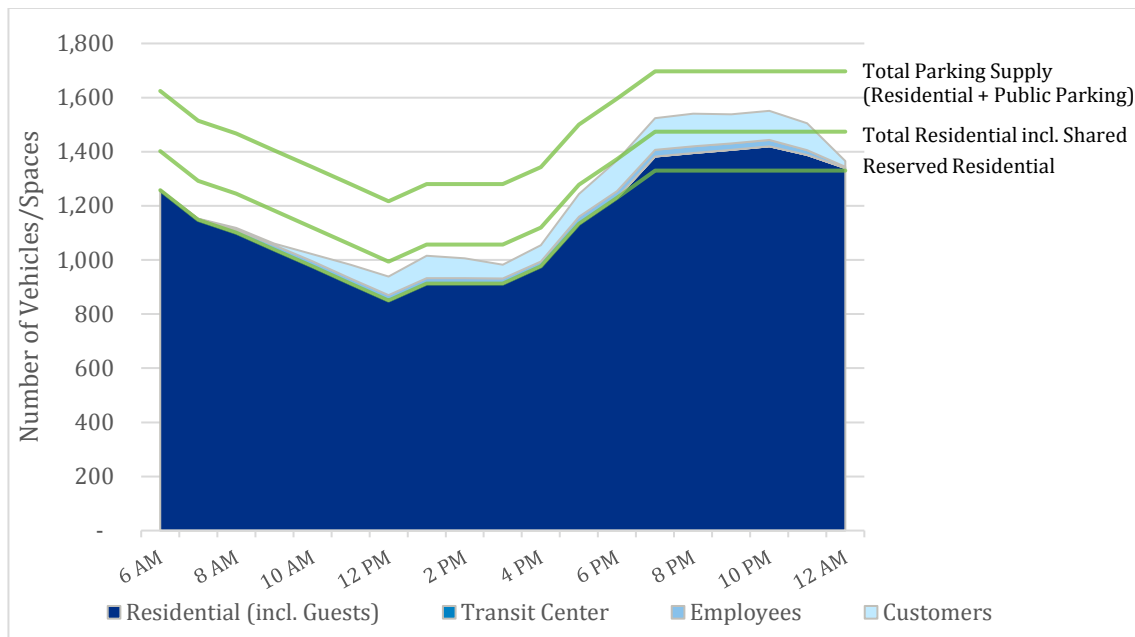


Figure 9: Near-Term Scenario Friday Parking Demand, Developer Supply Proposal



The mid-term scenario assumes all development has been completed, so levels of parking demand are similar to those under the long-term scenario, with a slight increase due to availability of only one mode of regional transit. The exception is demand for parking at the Transit Center, which is lower due to the lack of ferry service. In this scenario, under the developer's supply proposal, the demand is approximately equal to the effective supply during the midday and evening peaks. Under the supply indicated in the Waterfront Master Plan, the demand is below the supply at all times during the day.

Figure 10: Mid-Term Scenario Friday Parking Demand, Waterfront Masterplan Supply

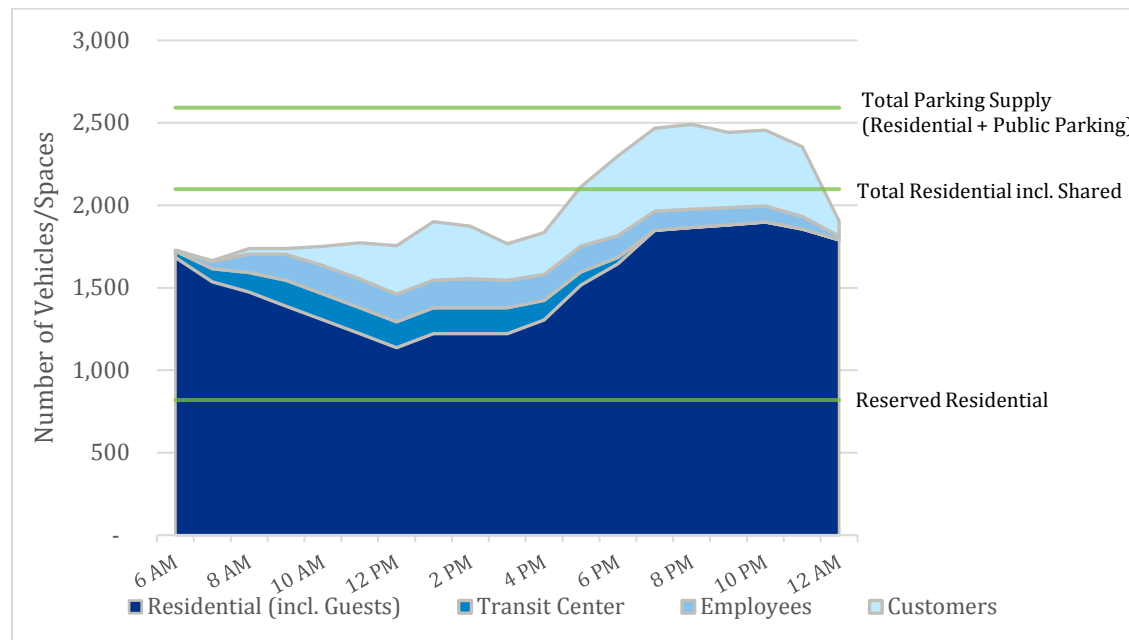


Figure 11: Mid-Term Scenario Friday Parking Demand, Developer Supply Proposal

