Date: September 11, 2015

To: Karl Gulier – City of Boulder

From: Carlos Hernandez – Fox Tuttle Hernandez Transportation Group
Bill Fox - Fox Tuttle Hernandez Transportation Group
Drew Willsey – Fox Tuttle Hernandez Transportation Group

RE: 2015 Parking Study Results

This memo summarizes the results of a parking study conducted in the City of Boulder between Spring and Fall 2015. This study is an extension of a prior study that was conducted in Summer 2014. The purpose of these studies is to provide the Transportation Advisory Board, Planning Board, and the AMPS project with actual parking data from selected sites around the city. The attached summary presentation provides specific details. The key findings from the 2015 parking study are summarized in Table 1 below. The ranges shown in the table include sites studied in 2014 as well as the ones studied in 2015. A detailed list of all sites studied and when their peak demands occurred can be found at the end of this document.

Table 1: Parking Supply and Demand Rate Ranges (2014 & 2015) by Land Use Type (Not Including On Street)

Land Use Type	Observed Supply Range		Observed Demand Range		Units
	Lowest	Highest	Lowest	Highest	
Residential	0.48	1.72	0.43	1.27	(Spaces per DU)
Commercial	2.57	5.92	1.96	4.39	(Spaces/1000 sq. ft.)
Office	1.92	4.15	0.92	2.79	(Spaces/1000 sq. ft.)
Mixed-use (Residential)	0.82	1.58	0.42	1.17	(Spaces per DU)
Mixed-use (Commercial)	1.69	2.89	1.3	2.22	(Spaces/1000 sq. ft.)

2015 Study Details

In April and early May of 2015, Fox Tuttle Hernandez (FTH) staff conducted a comprehensive city-wide parking study of 6 commercial sites, 5 office/light industrial sites, 8 residential sites, and 3 mixed-use sites. The data-gathering phase of this study was completed before the end of the spring semester at the University of Colorado. Additional follow-up mid-week counts were conducted at selected commercial retail sites in August and September.

Sites were chosen in the interest of obtaining a representative sample of the entire city. Therefore, sites adjacent to the Community Transit Network and bike network were evaluated as well as sites with fewer destinations and higher reliance on motor vehicle access. A visual survey of building occupancy and resident occupancy was also conducted, and only commercial and residential sites that appeared to be near or at full occupancy were studied. Finally, follow-up calls to some of the residential sites were made to determine the ratio of students to non-students for those complexes to enable better understanding of parking patterns of university students.

For all commercial sites, parking demand was sampled 3 times: weekday afternoons between noon and 2 pm, Friday evenings between 5:30 and 7:30 pm, and Saturday afternoons between noon and 2 pm. For all residential sites, parking demand was sampled once on weekdays after 8 pm. For all office sites, parking demand was sampled once on weekday afternoons between 2 and 3 pm. Mixed-use sites were sampled 4 times in order to ensure the peak demand was captured considering the unique and more complex demand fluctuations at those sites. These samples were taken on Friday afternoons between noon and 2 pm, Friday evenings between 5:30 and 7:30 pm, Saturday afternoons between noon and 2 pm, and Saturday evenings between 5:30 and 7:30 pm. Additional mid-week samples were conducted at four commercial retail sites in August and September. These additional samples were taken on Tuesday afternoons between noon and 2 pm and Tuesday evenings between 5:30 and 7:30 pm. Parking supplies were determined at the time of the first demand observation at all sites, and any significant changes in supply that occurred during subsequent samples were noted and taken into account. FTH staff photographed peak demand at all sites when possible (i.e., when peak demand occurred during daylight hours). Supply rates were observed in the field on study days and adjusted when necessary for temporary supply constraints such as special events taking place in the lot.

Results, once entered, were then used in conjunction with gross square footage figures and/or residential unit counts that city planning staff provided to determine the observed supply rates and peak demand rates for all sites (spaces per 1000 square feet for commercial and office sites and spaces per dwelling unit for residential sites). Rates were calculated both including and excluding any applicable on-street parking.

Chart 1: Parking Supply & Highest Demand Rates for Residential Sites (Excluding On Street)

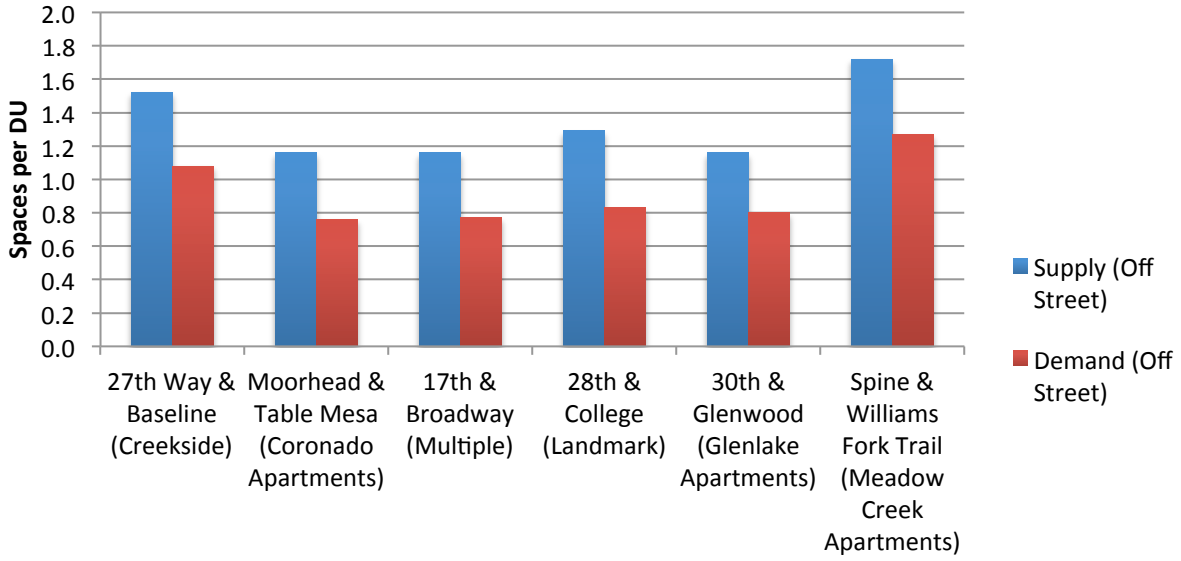


Chart 2: Parking Supply & Highest Demand Rates for Residential Sites

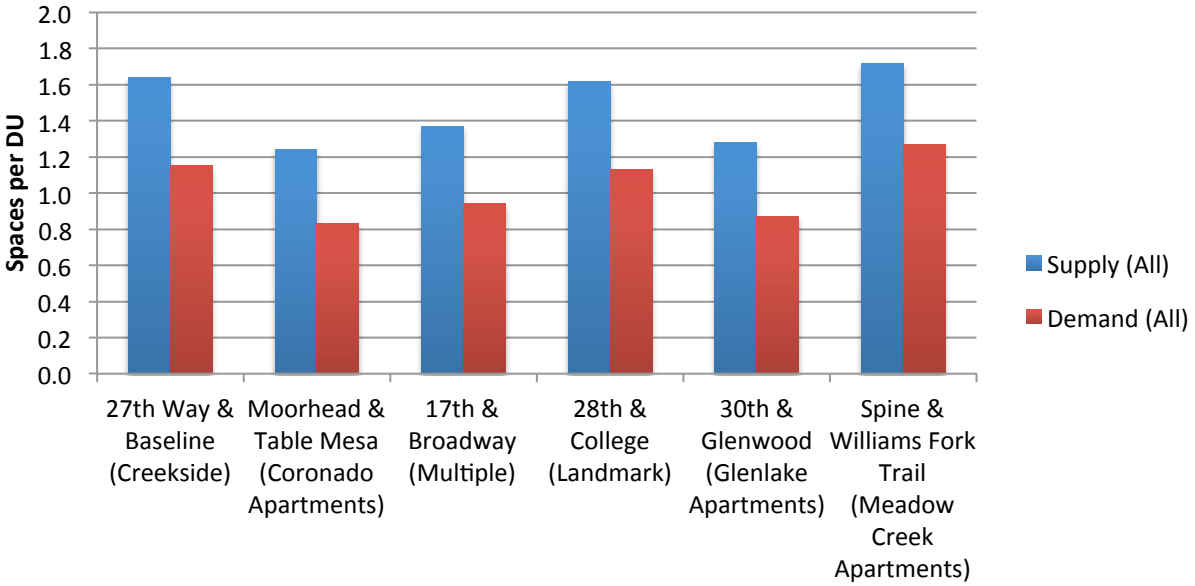


Chart 3: Parking Supply & Highest Demand Rates for Commercial Sites (Excluding On Street)

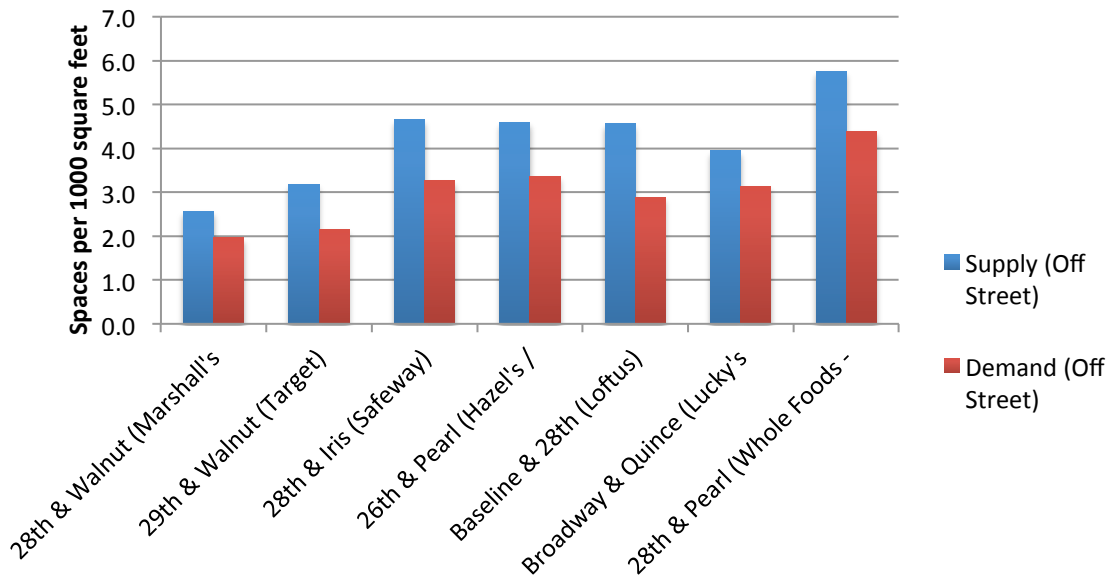


Chart 4: Parking Supply & Highest Demand Rates for Commercial Sites

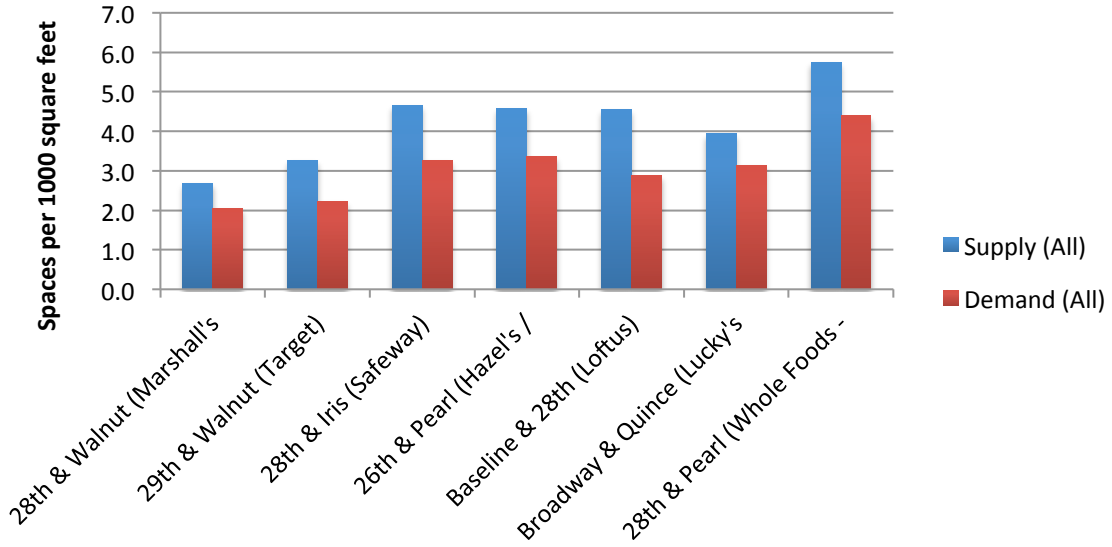


Chart 5: Parking Supply & Highest Demand Rates for Office Sites (Excluding On Street)

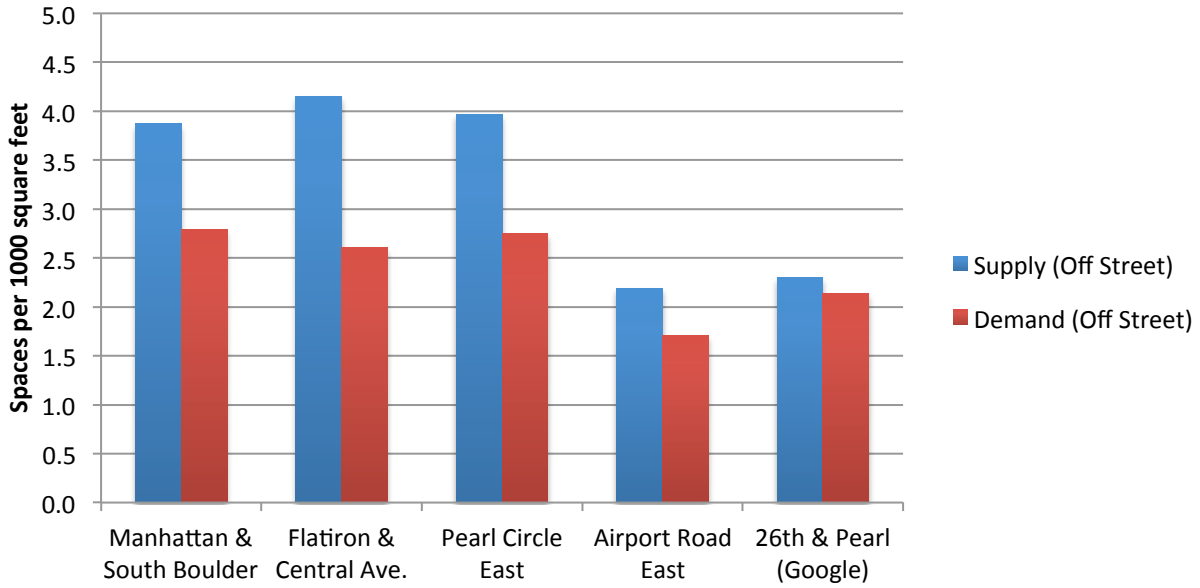


Chart 6: Parking Supply & Highest Demand Rates for Office Sites

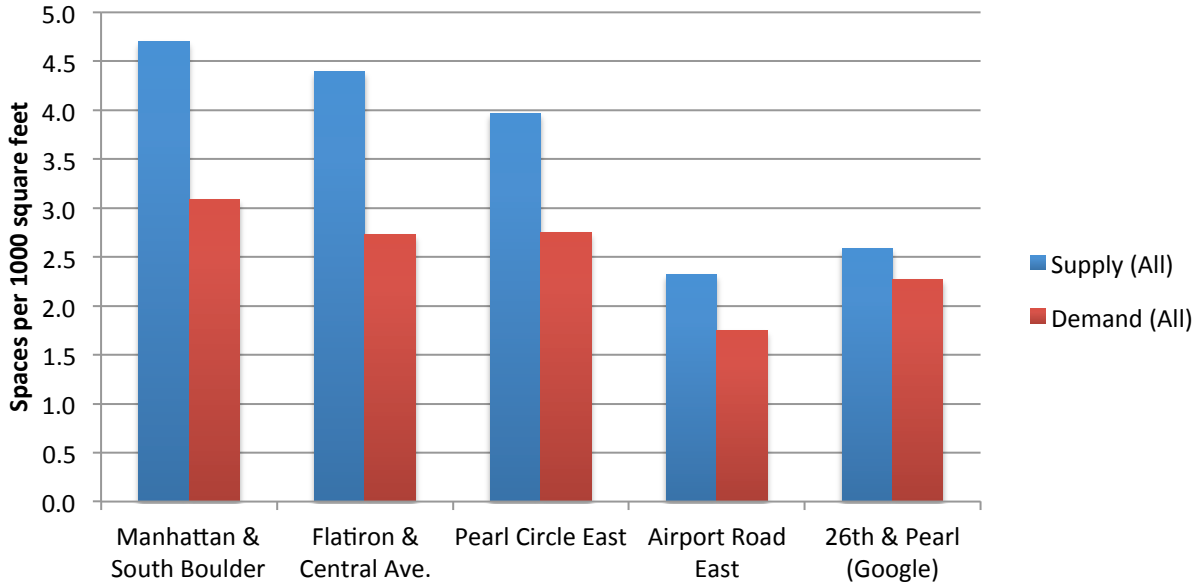


Chart 7: Parking Supply & Highest Demand Rates for Mixed-Use (Residential) Sites (Excluding On Street)

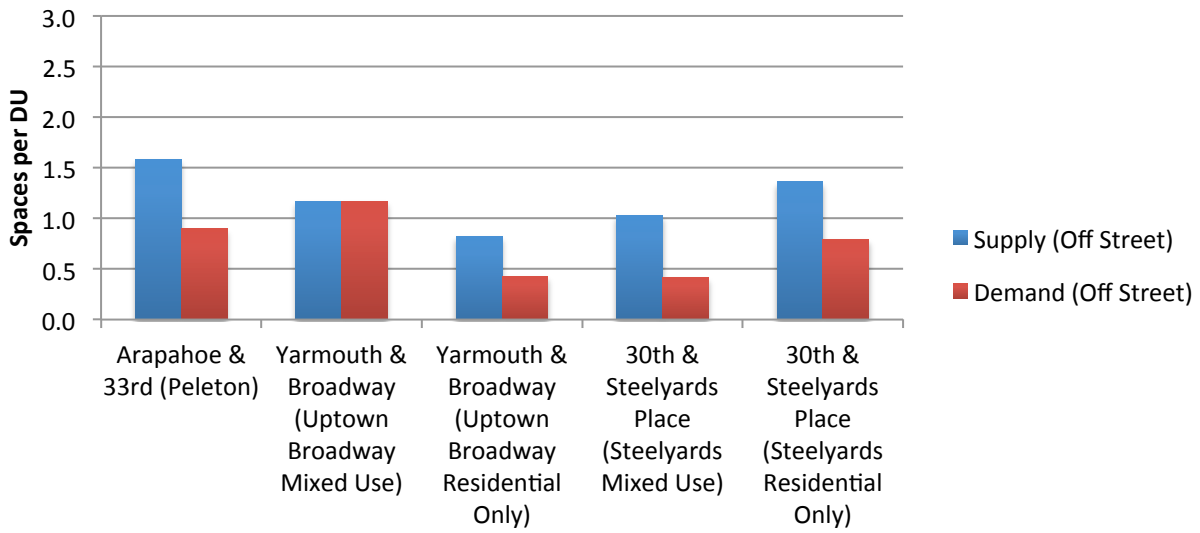


Chart 8: Parking Supply & Highest Demand Rates for Mixed-Use (Residential) Sites

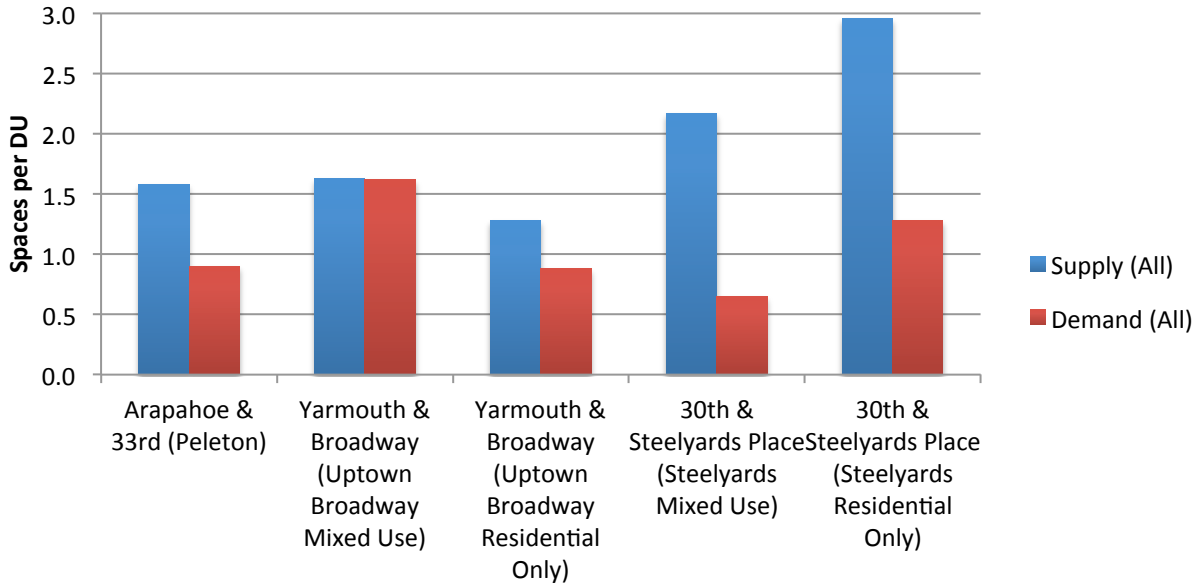


Chart 9: Parking Supply & Highest Demand Rates for Mixed-Use (Commercial) Sites (Excluding On Street)

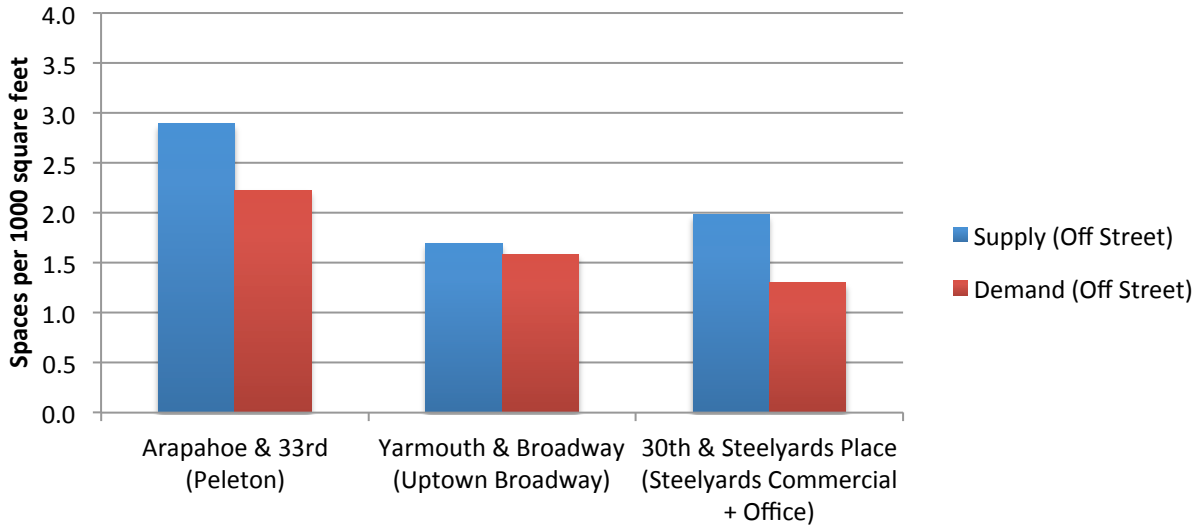
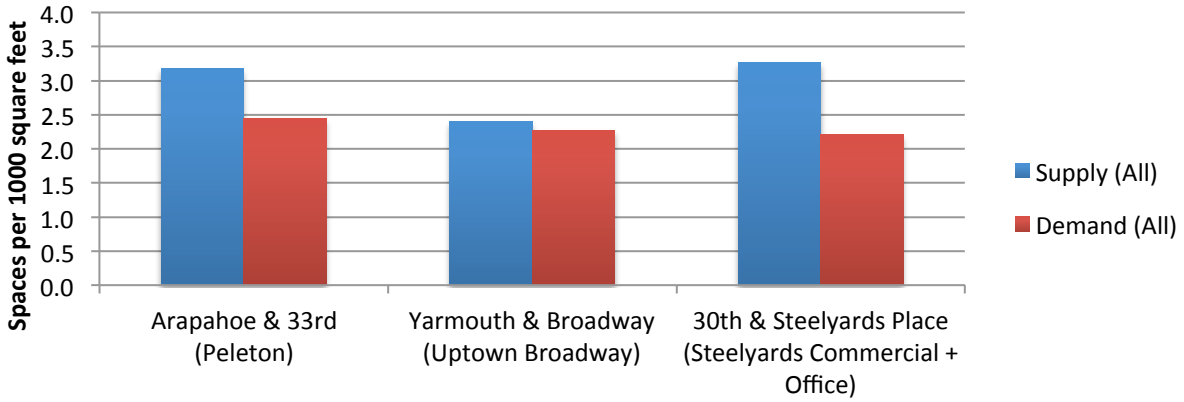


Chart 10: Parking Supply & Highest Demand Rates for Mixed-Use (Commercial) Sites



Comparison to Peer Cities

In order to gather perspective on and context to Boulder's existing parking code, FTH staff reviewed the parking rate requirements of three other selected cities: Davis, CA; Walnut Creek, CA; and Portland, OR. Tables summarizing how Boulder's code compares to these peer cities are given below.

Table 2: Summary of Basic Rate Requirements Across Selected Cities by Major Land Use Type

Use Type	Davis, CA	Portland, OR	Walnut Creek, CA	Boulder, CO
Detatched Dwellings	1 covered space, 1 uncovered space for 0 - 4 bedrooms; 1 additional uncovered space per additional bedroom.	Typically, 1 space per DU.	2 covered spaces per DU.	Typically, 1 space per DU; 0 for MU-4 or RH-7.
Attached Dwellings	1 covered space, 1 uncovered for 0 - 3 bedrooms, 1 additional space per additional bedroom.		1 additional space per DU compared to detatched dwelling requirement.	Minimum: Varies by zoning. Either 1 space per DU; 1 for 1 - 2 bedrooms, 1.5 for 3 bedrooms, and 2 for 4 + bedrooms; or 1 for 1 bedroom, 1.5 for 2 bedrooms, 2 for 3 bedrooms, and 3 for 4 + bedrooms. No minimum for MU-4 or RH-7. Maximum: typically, no maximum except for MU-4 and RH-7 (1 space per DU maximum).
Multi-family Dwellings	1 space for 0 - 1 bedrooms, 1.75 for 2 bedrooms, 3 for for 3+ bedrooms.		1.25 spaces per studio, 1.5 per 1 bedroom, 2 per 2 bedrooms, 2.25 per 2+ bedrooms. At least one space must be covered.	
Retail	1 space per 300 sqare feet of gross area.	Minimum: 1 space per 500 square feet of net building area. Maximum: 1 per 196 square feet.	1 space per 250 square feet of RFA.	Minimum: Varies by zoning. No minimum for RH-3, RH-6, RH-7, MU-4; 1 space per 400 square feet of floor area for BCS, MR-1, IS, IG, IM, A; 1 per 400 sq. ft. if residential is less than 50% of FA (otherwise 1 per 500 sq. ft.) for RMX-2, MU-2, IMS, BMS; 1 per 300 sq. ft. if residential is less than 50% of FA (otherwise 1 per 400 sq. ft.); 1 per 300 sq. ft. of FA for all other zones. Maxiumm: typically, no maximum except for RH-3, RH-6, RH-7, and MU-4 (1 space per 400 sq. ft. of FA if residential is less than 50% of FA, otherwise 1 space per 500 sq. ft.).
Restaurants (Dine-in)	1 space per 3 seats.	Minimum: 1 space per 250 square feet of net building area. Maximum: 1 per 63 square feet.	1 space per 5 seats and 1 per 75 square feet of floor area for portable seats or tables.	
Mixed Use	1 space per 350 square feet of gross commercial area; 1 per DU.	N/A	1 space per 200 square feet of rentable floor area up to 50,000 square feet, 1 per 250 square feet after 50,000. Residential requirement determined on case-by-case basis.	

*** Requirements listed are minimums unless otherwise noted**

Table 3: Examples of Space Requirements per Parking Code by Selected City and Land Use Type (Not Including Reductions)

Example Number of DU's or Amount of Square Feet	Davis, CA	Portland, OR	Walnut Creek, CA	Boulder, CO****
Detatched Dwellings				
1BR DU	2	1	2	1
2BR DU	2	1	2	1
3BR DU	2	1	2	1
4+BR DU	2	1	2	1
Attached Dwellings				
1BR DU	2	1	3	1
2BR DU	2	1	3	1.5
3BR DU	2	1	3	2
4+BR DU	3	1	3	3
Multi-family Dwellings				
1BR DU	1	1	1.5	1
2BR DU	1.75	1	2	1.5
3BR DU	3	1	2.25	2
4+BR DU	3	1	2.25	3
Retail				
5,000 SF	17	10	20	17
15,000 SF	51	30	60	51
40,000 SF	133	80	160	133
Restaurants (Standalone Dine-In)**				
5,000 SF	67	20	40	67
10,000 SF	133	40	80	133
15,000 SF	200	60	120	200
Mixed Use***				
10,000 SF with 10 DU	39	40	60	0 - 43
25,000 SF with 40 DU	111	90	165	0 - 123
50,000 SF with 200 DU	343	300	400	0 - 367

*** Requirements listed are minimums**
**** Assuming 200 seats per 5,000 sq. ft. of restaurant space**
***** Assuming 1 space per DU for Walnut Creek, CA and Boulder, CO mixed-use residential (actual requirement determined on case-by-case basis)**
****** Assuming typical suburban zoning type (highest minimum possible listed; minimums may be lower depending on other criteria)**

Correlations to Transit Network Accessibility and Bicycle Facilities

In addition to comparing Boulder's parking code to that of selected peer cities, FTH staff researched each 2015 study site's proximity to transit routes, both on and off the Community Transit Network (CTN), as well as proximity to existing bicycle facilities, and related those proximities to parking demand in order to ascertain if any correlations exist. These correlation graphs are depicted below.

Chart 11: Commercial Demand versus All Nearby Transit Routes

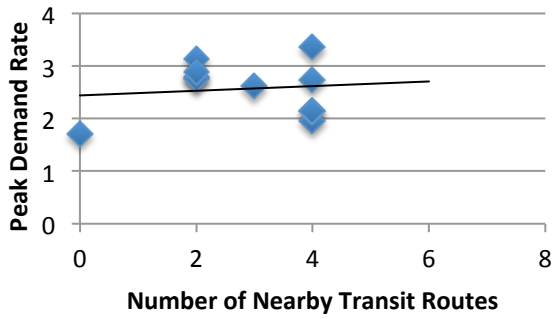


Chart 12: Commercial Demand versus Nearby CTN Routes

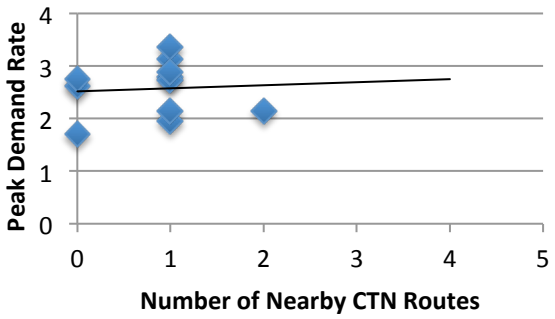


Chart 13: Commercial Mixed Use Demand versus All Nearby Transit Routes

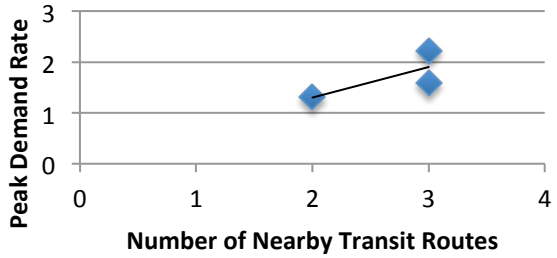


Chart 14: Commercial Mixed Use Demand versus Nearby CTN Routes

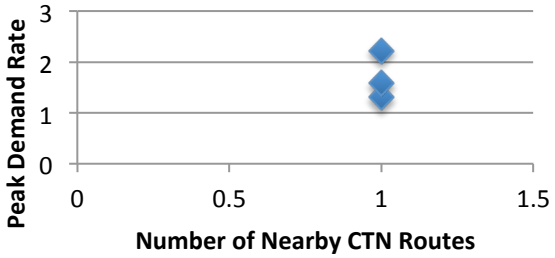


Chart 15: Residential Demand versus All Nearby Transit Routes

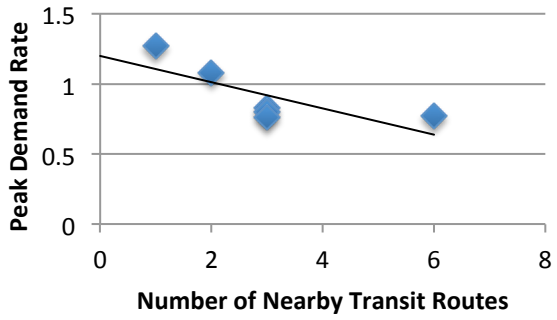


Chart 16: Residential Demand versus Nearby CTN Routes

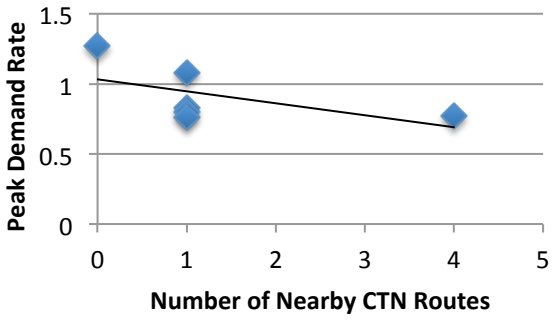


Chart 17: Residential Mixed Use Demand versus All Nearby Transit Routes

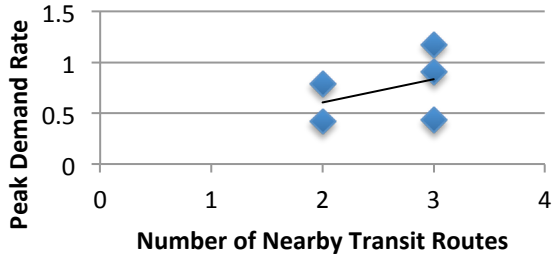


Chart 18: Residential Mixed Use Demand versus Nearby CTN Routes

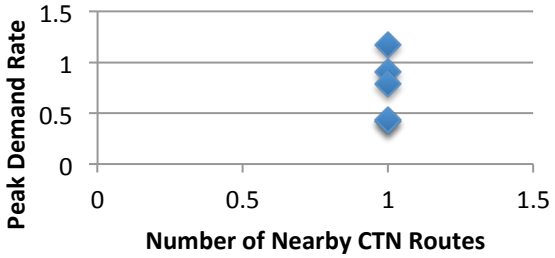


Chart 19: Commercial Demand versus Nearby Bike Facilities

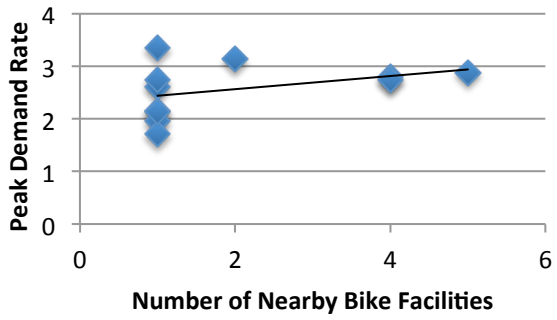


Chart 20: Residential Demand versus Nearby Bike Facilities

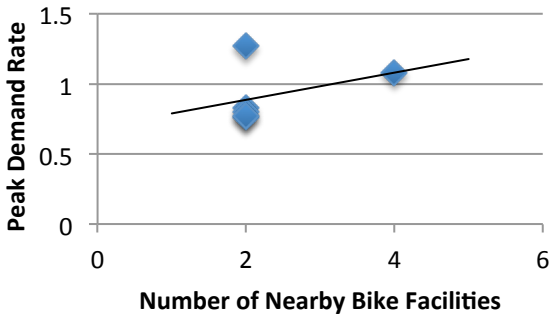


Chart 21: Commercial Mixed Use Demand versus Nearby Bike Facilities

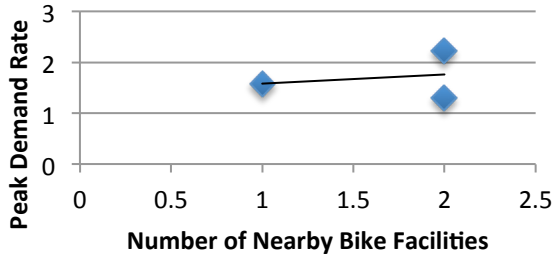
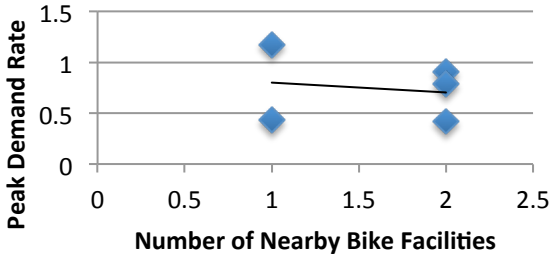


Chart 22: Residential Mixed Use Demand versus Nearby Bike Facilities



Key Questions To Consider

The following questions can be considered as part of upcoming conversations with Transportation Advisory Board and Planning Board regarding parking code adjustments:

- Should new requirement be a parking minimum, parking maximum, or both?
    - If no minimum, should parking reductions be eliminated?
    - If maximum, should a new exception process be created to allow for more parking in certain circumstances and/or when requested?
- Should different parking requirements be created depending on zoning district/typology or by land use type, or a combination of the two?
    - If by typology, should proximity to multi-modal networks or CTN routes be considered?
- If parking reductions are kept, should the criteria for obtaining a reduction be more stringent or more lenient?
- What methodology should be used to determine option ranges (i.e., conservative, moderate, progressive)?
- Can the data determine automatic percentage parking reductions that should apply under certain scenarios?
- How do other AMPS components factor into any proposed code changes (e.g., TDM, district parking enforcement, et cetera)?
- Where should, if at all, unbundled parking be required outside of Boulder Junction?
- Should special considerations be made in the updated code for electric vehicles (EVs)?
    - If so, how many EV stations should be required?
    - What type(s) of EV stations should be required?

Table 4: Summary of Days Observed in 2014 & 2015 by Site

2015 Sites

Site ID Number	Site	Highest Commercial Demand Rate Observed (Excluding On Street)	Highest Residential Demand Rate Observed (Excluding On Street)	Days Studied (Highlighted Indicates Peak Demand Observed)									
				Weekday Afternoon 2 - 3 PM (Tuesday thru Thursday)	Weekday Late Night 8 - 11 PM (Tuesday thru Thursday)	CU Move-in Tuesday Afternoon 12 - 2 PM	CU Move-in Tuesday Evening 5:30 - 7:30 PM	Tuesday Afternoon 12 - 2 PM	Tuesday Evening 5:30 - 7:30 PM	Friday Afternoon 12 - 2 PM	Friday Evening 5:30 - 7:30 PM	Saturday Afternoon 12 - 2 PM	Saturday Evening 5:30 - 7:30 PM
Residential													
2	28th & College (Landmark)		0.83		X								
9	20th & Glenwood (Glenlake Apartments)		0.8		X								
10	27th Way & Baseline (Creekside Apartments)		1.08		X								
14	Spine & Williams Fork Trail (Meadow Creek Apartments)		1.27		X								
16	Moorhead & Table Mesa (Coronado Apartments)		0.76		X								
19	17th & Broadway (Multiple)		0.77		X								
22	20th & Steelyards Place (Residential Only)		0.79		X								
23	Yarmouth & Broadway (Uptown Broadway Residential Only)		0.43		X								
Commercial/Retail													
3	Arapahoe & 33rd (Peleton)	2.22	0.9							X	X	X	X
6	26th & Walnut (Marshall's Plaza)	1.96						X	X	X	X	X	
7	20th & Steelyards Place (Mixed Use Portion)	1.3	0.42							X	X	X	X
8	29th & Walnut (Target)*	2.15				X	X			X	X	X	
12	Broadway & Quince (Lucky's Market/Nomad)	3.14				X	X			X	X	X	
13	Yarmouth & Broadway (Uptown Broadway Mixed Use Portion)	1.58	1.17							X	X	X	X
15	26th & Pearl (Hazel's/Wahoo's)	3.36								X	X	X	
17	28th & Iris (Safeway)	3.26						X	X	X	X	X	
20	Baseline & 28th (Loftus)	2.88								X	X	X	
Office													
1	Manhattan & South Boulder (Multiple)	2.79		X									
4	Flatiron & Central Ave. (Multiple)	2.61		X									
5	Pearl Circle East (Multiple)	2.75		X									
11	Airport Road East	1.71		X									
21	26th & Pearl (Google Campus - Largest Two Buildings)	2.14		X									

* Peak demand (2.61 rate) that occurred on CU move-in day is noted in red highlight. Typical peak demand is highlighted in yellow.

2014 Sites

Site ID Number	Site	Highest Commercial Demand Rate Observed (Excluding On Street)	Highest Residential Demand Rate Observed (Excluding On Street)	Days Studied (Highlighted Indicates Peak Demand Observed)									
				Weekday Afternoon 2 - 3 PM (Tuesday thru Thursday)	Weekday Late Night 8 - 11 PM (Tuesday thru Thursday)	CU Move-in Tuesday Afternoon 12 - 2 PM	CU Move-in Tuesday Evening 5:30 - 7:30 PM	Monday Afternoon 12 - 2 PM	Monday Evening 5:30 - 7:30 PM	Friday Afternoon 12 - 2 PM	Friday Evening 5:30 - 7:30 PM	Saturday Afternoon 12 - 2 PM	Saturday Evening 5:30 - 7:30 PM
Residential													
A	Walnut & 9th (Multiple)		0.43		X								
B	18th & Marine (Multiple)		1.04		X								
C	21st & Goss (Multiple)		0.53		X								
Commercial/Retail													
D	28th & Pearl (Whole Foods Shopping Center)	4.39								X			
E	Broadway & Baseline (Basemar)	3.36								X			
F	Broadway & Table Mesa (King Soopers)	2.77						X					
G	28th & Arapahoe (The Village)	2.77									X		
H	28th & Iris (Willow Springs Shopping Center)	3.16								X			
I	29th & Arapahoe (29th Street)	2.09										X	
Industrial/Office													
J	Pearl & Foothills Northwest Side (Multiple)	1.73		X									
K	Pearl & Foothills Southwest Side (Multiple)	0.92		X									

Table 5: Site Transit & Bike Route Access Analysis

Site	Highest Commercial Demand Rate Observed (Excluding On Street)	Highest Residential Demand Rate Observed (Excluding On Street)	Transit													Bike Facilities								Walkability Rating	Walkability Rating Index
			Boulder Community Transit Network							Other Transit			Total Proximate Boulder Transit Routes	Total Proximate Numbered Transit Routes	Total Proximate Transit Routes (All)	Designated Bike Route	Multi-use Path	On Street Bike Lane	Paved Shoulder	Sidewalk Connection	Soft Surface Multi-use	Street with Single Bike Lane	Total Proximate Bike System Features		
			Existing				Future																		
			1	2	3	4	1	2	3	1	2	3													
1	2.79		DASH				LEAP			206			1	1	2	1		1	1		1		4	36	3
2		0.83	STAM				ORBIT			201	J		1	2	3		1	1					2	36	3
4	2.61						LEAP			206	208	S	0	3	3		1						1	15	1
5	2.75						LEAP			206	S		0	2	2		1						1	15	1
6	1.96		HOP				LEAP	ORBIT	DART	205	F/H/T	206	1	3	4			1					1	70	6
8	2.15		HOP	BOUND			ORBIT	LEAP		205	206		2	2	4		1						1	70	6
9		0.8	BOUND							205	208		1	2	3	1		1					2	57	5
10		1.08	BOUND							204			1	1	2	1	1	1				1	4	57	5
11	1.71												0	0	0		1						1	0	0
12	3.14		SKIP							M			1	1	2	1		1					2	46	4
14		1.27								205			0	1	1	1				1			2	36	3
15	3.36		HOP				ORBIT	DART		205	206	F/H/T	1	3	4			1					1	70	6
16		0.76	DASH				LEAP			204	206		1	2	3			1	1				2	57	5
17	2.73		BOUND				ORBIT			205	208	F/H/T	1	3	4		1	1	1	1			4	70	6
19		0.77	HOP	SKIP	DASH	STAM				203	204		4	2	6	1	1						2	57	5
20	2.88		BOUND							203			1	1	2	1	1	1	1	1			5	70	6
21	2.14		HOP				ORBIT	DART		205	206	F/H/T	1	3	4			1					1	70	6
Mixed Use Sites																									
3	2.22	0.9	JUMP							S	J		1	2	3	1	1						2	57	5
7	1.3	0.42	BOUND							208			1	1	2		1	1					2	70	6
13	1.58	1.17	SKIP							M	204		1	2	3			1					1	57	5
22		0.79	BOUND							208			1	1	2		1	1					2	57	5
23		0.43	SKIP							M	204		1	2	3			1					1	57	5