

MEMORANDUM

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FROM: F. Giles Ham, P.E. *and*
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DATE: November 9, 2020

RE: 8716

SUBJECT: Parking and Traffic Assessment - Proposed Residential Development
2072 Massachusetts Avenue, Cambridge, Massachusetts

Vanasse & Associates, Inc. (VAI) has completed a Parking and Traffic Assessment of a proposed 49-unit 100% affordable residential development with 1,040 square feet (sf) or ground floor retail to be located at 2072 Massachusetts Avenue in Cambridge, Massachusetts (Project). This is a revised study of the October 13, 2020 memorandum. The entire study was redone due to some Somerville streets being included in the October study area. Two short-term drop-off/pick-up spaces and three handicap spaces are proposed on-site. Contained within this memorandum is a parking supply and demand analysis within a quarter mile radius of site, estimated trip generation by mode split and a recommended a Travel Demand Management plan (TDM) for the proposed project.

PARKING SUPPLY AND DEMAND ANALYSIS

A comprehensive field inventory of the existing parking supply within approximately a quarter-mile radius of the Project was conducted in September 2020. While residents want to park as close as possible to their residence, the study area radius established by the city is a relatively short walk (5 minutes). Figure 1 depicts the study area. The field inventory consisted of on-street parking by quantity and type (handicapped, permit only and regulations). The study area was subdivided into twenty-seven (27) parking zones in order to identify parking trends occurring within the study area. Figure 2 identifies the parking regulations and number of parking spaces (928) in the area. Figure 3 depicts the residential permit parking spaces, handicap spaces, and spaces with no regulations which total 806 of the 928 spaces.

In order to determine the availability of parking spaces, a parking demand survey was conducted during a typical weekday (Tuesday October 20, 2020). The parking observations were conducted every 2 hours from 10:00 AM to 10:00 PM. Table 1 and Figure 4 summarize the parking demand observations for the available resident parking.

Parking and Traffic Assessment - Proposed Residential Development - Cambridge, Massachusetts

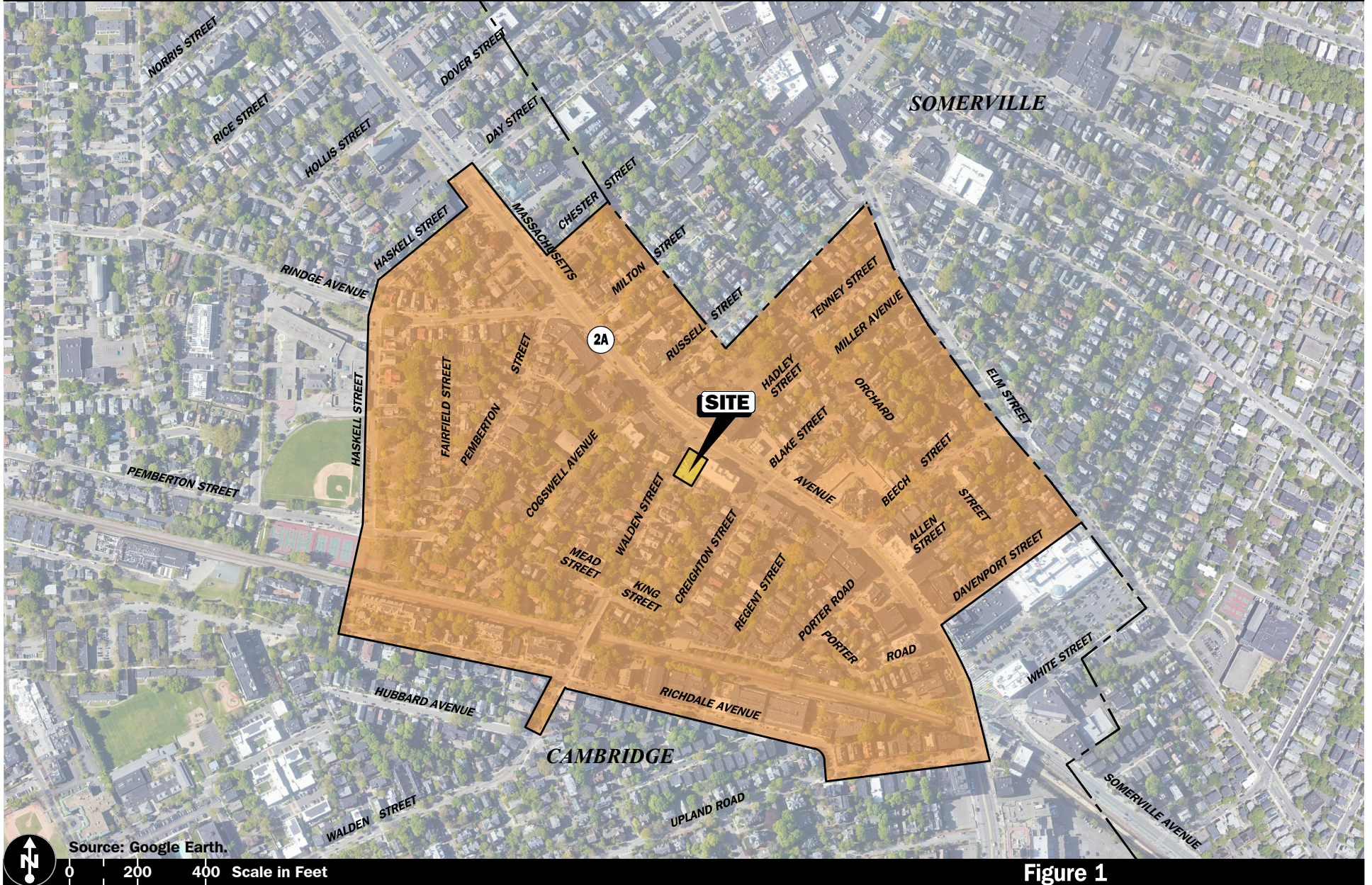
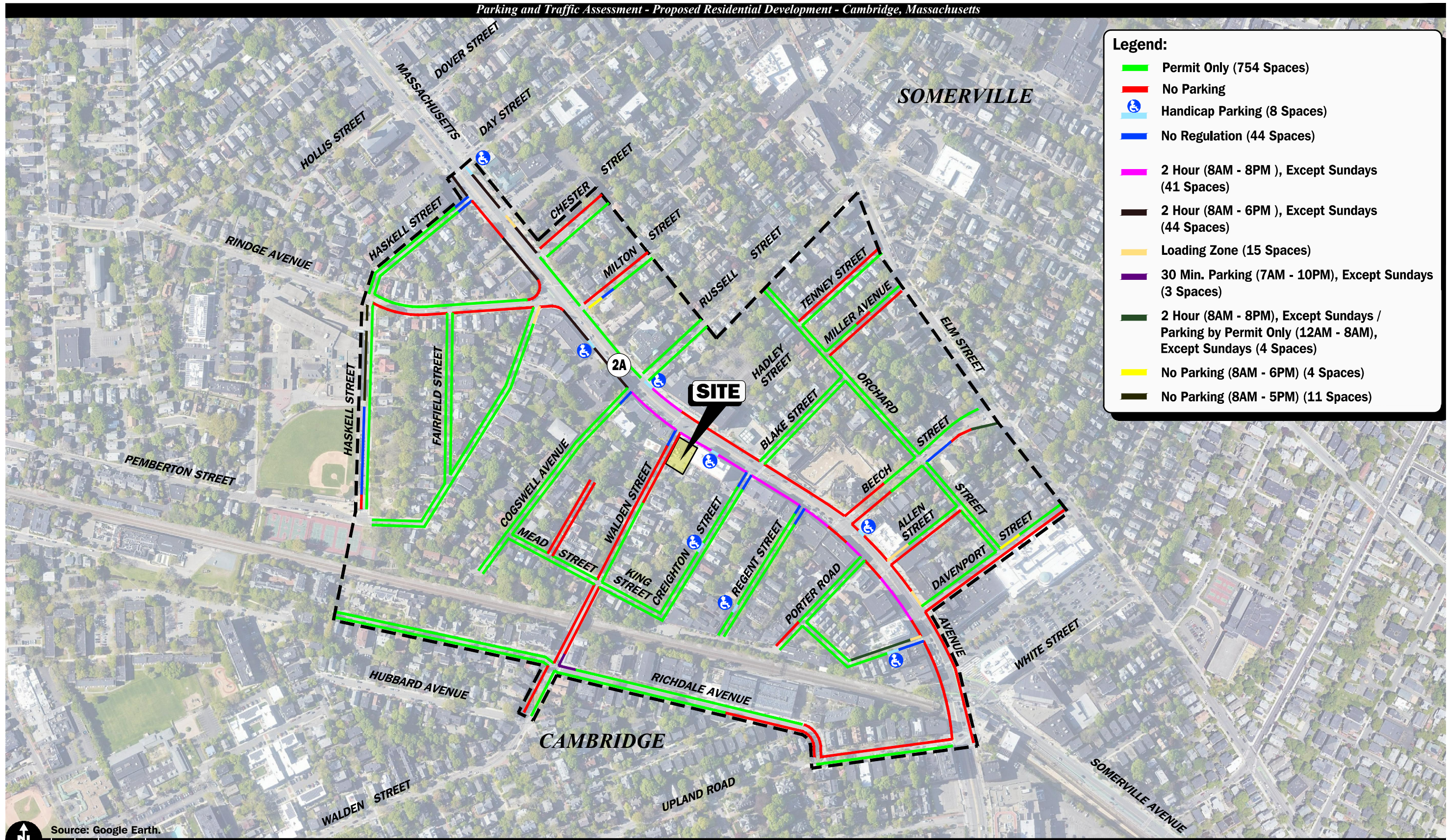


Figure 1
Parking Supply Area



Legend:

- █ Permit Only (754 Spaces)
- █ No Parking
- █ Handicap Parking (8 Spaces)
- █ No Regulation (44 Spaces)
- █ 2 Hour (8AM - 8PM), Except Sundays (41 Spaces)
- █ 2 Hour (8AM - 6PM), Except Sundays (44 Spaces)
- █ Loading Zone (15 Spaces)
- █ 30 Min. Parking (7AM - 10PM), Except Sundays (3 Spaces)
- █ 2 Hour (8AM - 8PM), Except Sundays / Parking by Permit Only (12AM - 8AM), Except Sundays (4 Spaces)
- █ No Parking (8AM - 6PM) (4 Spaces)
- █ No Parking (8AM - 5PM) (11 Spaces)

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Source: Google Earth.
 0 175 350 Scale in Feet



Figure 2
 Existing Parking Regulations

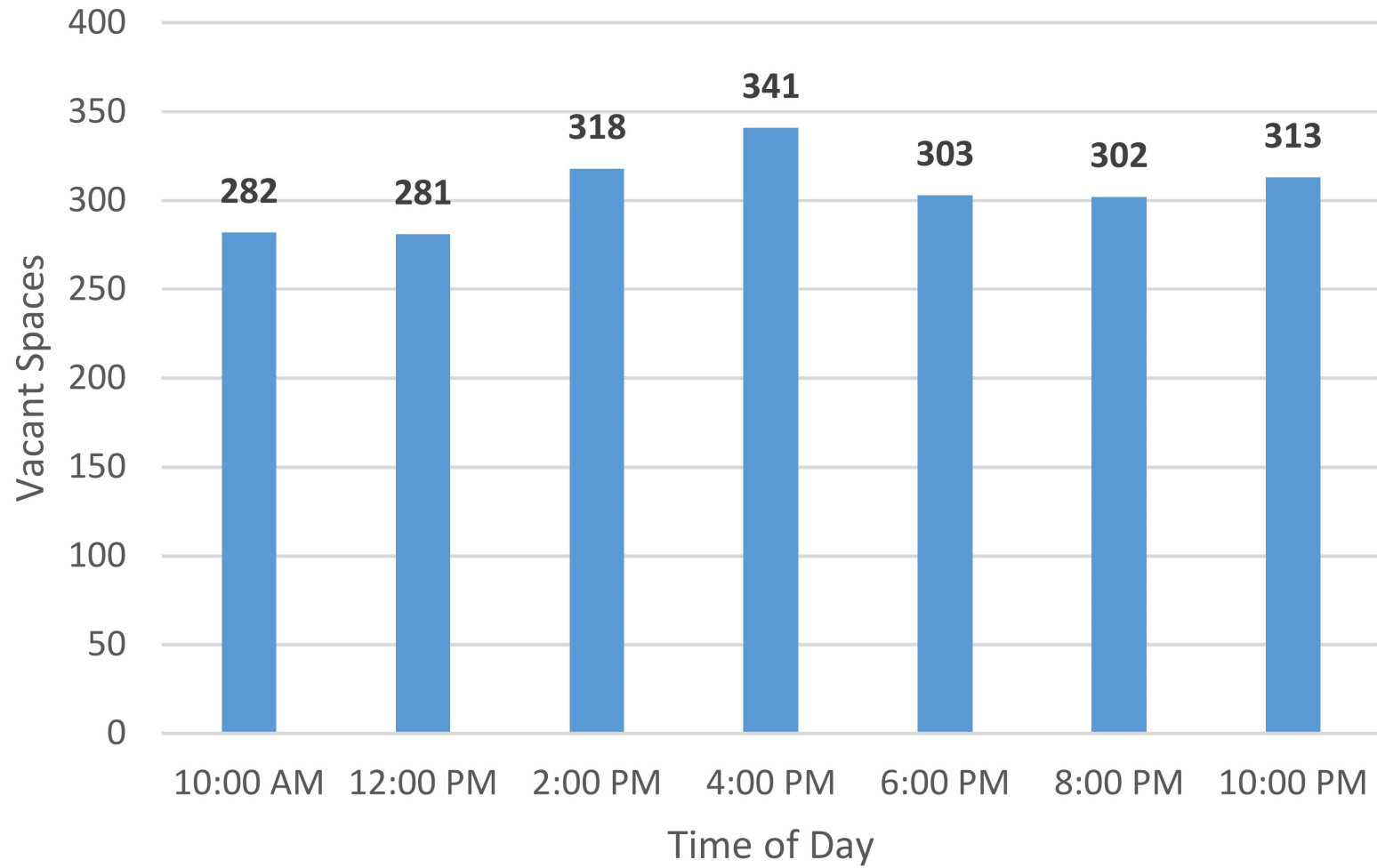


Figure 4
Parking Chart



Table 1
PARKING OBSERVATIONS
October 20, 2020

Zone	Parking Supply	Vacant Spaces						
		10:00 AM	12:00 PM	2:00 PM	4:00 PM	6:00 PM	8:00 PM	10:00 PM
1	20	5	3	8	7	11	10	16
2	6	0	1	1	1	2	1	2
3	30	3	4	6	6	4	6	3
4	23	13	10	11	7	7	7	6
5	22	4	4	4	5	1	6	4
6	8	2	3	3	3	2	2	2
7	9	1	1	2	2	4	0	0
8	15	6	5	6	6	3	3	3
9	12	6	7	7	8	4	6	7
10	92	21	19	18	20	12	14	15
11	41	13	10	9	17	7	9	11
12	70	18	28	30	25	27	30	26
13	41	13	11	13	15	12	9	6
14	19	4	6	9	8	10	10	11
15	66	16	17	14	23	13	13	14
16 ^a	20	7	5	6	4	11	10	8
17 ^a	23	7	6	5	4	5	7	6
18 ^a	44	21	20	24	23	19	14	12
19	14	1	0	0	0	0	0	0
20	35	6	4	6	13	9	9	8
21	15	1	1	1	3	3	1	1
22 ^a	37	11	9	14	10	9	8	9
23 ^a	41	2	4	2	5	8	6	7
24	93	47	43	55	60	61	63	82
25	64	25	27	27	26	26	28	23
26	52	20	24	28	29	24	24	21
27 ^a	16	9	9	9	11	9	6	10
TOTAL	928	282	281	318	341	303	302	313

^aHighlighted rows include zones within two block of the site.

As shown in Table 1 and Figure 4 the peak demand occurs at 12:00 PM when 281 spaces were vacant. The Project has proposed only 2 short-term drop-off/pick-up spaces and 3 handicap spaces on-site and all other parking will be on-street. By not providing parking, the Project impact will be minimized as auto ownership will be discouraged. An auto ownership of 0.50 vehicles per unit equates to 25 vehicles. Zoning requires one space per unit. U.S. Census and 2018 American Community Survey data for Census Tract 3547, the tract in which the Project is located, indicates that 32 percent of trips are automobile trips. This suggests that the affordable residential unit ownership may be lower than the 50 percent. The 50 percent auto ownership is conservative. Residents of the site will want to park as close to the site as possible. Focusing on Zones 15, 16, 17, 22, 23, and 27 which are all 2 blocks from the site, there is a minimum of 50 spaces available during the peak parking demand at 12:00 PM. At 10:00 PM there are 54 spaces available in close proximity to the site. Based upon the parking analysis, there is more than adequate on-street parking to accommodate the Project.

PROPOSED SITE TRIP GENERATION

Traffic volumes expected to be generated by the Project were determined by using the ITE *Trip Generation*¹ manual and utilized Land Use Code (LUC 221), Multifamily Housing (Mid-Rise) and LUC 820, Shopping Center. It should be noted that the project is proposing affordable housing units which have lower vehicle trip rates than market rate units therefore the actual trip increases due to the development will be less than what is estimated by LUC 221. In addition, it is expected that a significant portion of the residents of the Project will utilize alternative modes of transportation other than automobiles. Based upon the U.S. Census and 2018 American Community Survey data for Census Tract 3547, the tract in which the Project is located, the mode split characteristics of the Project are estimated as follows: 32 percent automobile trips; 43 percent transit; 10 percent walk; 6 percent bicycle, and 9 percent other trips.

The Project trip generation by mode is summarized in Table 2.

As can be seen in Table 2, the Project is expected to generate approximately 98 vehicle trips on an average weekday (49 entering/49 exiting), with approximately 6 vehicle trips (2 entering/4 exiting) expected during the weekday morning peak-hour. During the weekday evening peak hour, the Project is expected to generate approximately 9 new vehicle trips (5 entering/4 exiting).

¹*Trip Generation*, 10th Edition; Institute of Transportation Engineers; Washington, DC; 2017.

Table 2
PROJECT TRIP GENERATION SUMMARY

Time Period/Direction	Person Trips										
	ITE LUC 221 (A) ^a	ITE LUC 820 (B) ^b	ITE Total Vehicle Trips (C=A+B)	Vehicle Occupancy Rate (D) ^c	Total Trips (E=C*D)	Auto Trips ^d (F=E*0.32)	Transit Trips ^e (G=E*0.43)	Walk Trips ^f (H=E*0.10)	Bicycle Trips ^g (I=E*0.06)	Other Trips ^h (J=E*0.09)	Total Vehicle Trips (K=F/D)
<i>Weekday Daily:</i>	266	40	306	1.07	328	104	142	32	20	30	98
<i>Weekday Morning Peak Hour:</i>											
Entering	4	1	5	1.07	5	2	2	1	0	0	2
Exiting	<u>13</u>	<u>0</u>	<u>13</u>	1.07	<u>14</u>	<u>4</u>	<u>7</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>4</u>
Total	17	1	18	1.07	19	6	9	2	1	1	6
<i>Weekday Evening Peak Hour:</i>											
Entering	13	2	15	1.07	16	5	7	2	1	1	5
Exiting	<u>9</u>	<u>2</u>	<u>11</u>	1.07	<u>12</u>	<u>4</u>	<u>5</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>4</u>
Total	22	4	26	1.07	28	9	12	3	2	2	9

^aBased on ITE LUC 221 Multifamily (Mid-Rise), 49 units.

^bBased on ITE LUC 820 Shopping Center, 1,040 sf.

^cSource: United States Census and American Community Survey 2018 5-year estimates; Census Tract 3547.

^dAutomobile trips are 32 percent of total person trips, Census Tract 3547.

^eTransit trips are 43 percent of total person trips, Census Tract 3547.

^fWalking trips are 10 percent of total person trips, Census Tract 3547.

^gBicycle trips are 6 percent of total person trips, Census Tract 3547.

^hOther trips are 6 percent of total person trips, Census Tract 3547. Includes work from home.

TRANSPORTATION DEMAND MANAGEMENT (TDM)

Reducing the amount of traffic generated by the Project is an important component of the development plan. The goal of the TDM plan is to reduce the use of Single Occupant Vehicles by encouraging car/vanpooling, bicycle commuting, the use of public transportation and pedestrian travel. The following measures will be implemented as a part of the proposed project management team in an effort to reduce the number of vehicle trips generated:

- Designate an on-site employee as the site's Transportation Coordinator to oversee marketing and promoting of transportation options at the site.
- Provide new residents transportation information packets with information on getting around Cambridge sustainably.
- Install a real-time transit display screen in the lobby to make it simpler for residents, visitors, and employees to access real-time transit and Bluebikes availability information in the area. The screens will also post other useful information on single occupancy modes of travel, such as carpool/vanpool to supermarkets, etc.
- Subsidize 100 percent of the cost of a MBTA T pass for employees (building property managers/maintenance staff) or \$240 annual reimbursement for bike maintenance for employees who choose to commute by bike.
- Organize orientation sessions with residents to teach biking rules, safe biking measures, basic maintenance and repairs and help identify bike routes to various locations.
- Bicycle racks and a bicycle "Fix-it" station will be provided on-site.
- Annually, upon initial move-in and lease renewal, residents will be offered the choice of: (1) annual Bluebikes membership (including one-time discounted helmet through bluebikes), (2) \$90 credit for ride share service; (3) 1-month adult MBTA Monthly LinkPass, and/or (4) 3-month Student or Senior Monthly LinkPass. This will be provided PER RESIDENT (not per household) on an annual basis.

The above strategies will encourage non-auto travel by the residents.

SUMMARY

In summary, a detailed parking survey was completed in the area of the Project and based upon this data it can be concluded that there is more than sufficient availability of on-street parking to accommodate the Project. The Project proponent is committed to implementing a Travel Demand Management plan which promotes alternatives modes of transportation and will minimize the Project's impact on available on-street parking and traffic in the area.

APPENDIX

TRIP GENERATION CALCULATIONS

TRIP GENERATION CALCULATIONS

Institute of Transportation Engineers (ITE)
Trip Generation, 10th Edition
Land Use Code (LUC) 221 - Multifamily Housing (Mid-Rise)

Average Vehicle Trips Ends vs: Dwelling Units
Independent Variable (X): 49

AVERAGE WEEKDAY DAILY

$$T = 5.45 * (X) - 1.75$$

$$T = 5.45 * 49 - (1.75)$$

$$T = 265.30$$

$$T = 266 \text{ vehicle trips}$$

with 50% (133 vpd) entering and 50% (133 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$\ln T = 0.98 * \ln(X) - 0.98$$

$$\ln T = 0.98 * \ln 49 - (0.98)$$

$$\ln T = 2.83$$

$$T = 17.01$$

$$T = 17 \text{ vehicle trips}$$

with 26% (4 vph) entering and 74% (13 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$\ln T = 0.96 * \ln(X) - 0.63$$

$$\ln T = 0.96 * \ln 49 - (0.63)$$

$$\ln T = 3.11$$

$$T = 22.33$$

$$T = 22 \text{ vehicle trips}$$

with 61% (13 vph) entering and 39% (9 vph) exiting.

Institute of Transportation Engineers (ITE)
Trip Generation, 10th Edition
Land Use Code (LUC) 820 - Shopping Center

Average Vehicle Trips Ends vs: 1,000 Square Feet Gross Leasable Area
Independent Variable (X): 1.040

AVERAGE WEEKDAY DAILY

$$T = 37.75 * X$$

$$T = 37.75 * 1.040$$

$$T = 39.26$$

$$T = 40 \text{ vehicle trips}$$

with 50% (20 vpd) entering and 50% (20 vpd) exiting.

WEEKDAY MORNING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 0.94 * (X)$$

$$T = 0.94 * 1.040$$

$$T = 0.98$$

$$T = 1 \text{ vehicle trips}$$

with 62% (1 vph) entering and 38% (0 vph) exiting.

WEEKDAY EVENING PEAK HOUR OF ADJACENT STREET TRAFFIC

$$T = 3.81 * X$$

$$T = 3.81 * 1.040$$

$$T = 3.96$$

$$T = 4 \text{ vehicle trips}$$

with 48% (2 vph) entering and 52% (2 vph) exiting.



COMMUTING CHARACTERISTICS BY SEX

Note: This is a modified view of the original table produced by the U.S. Census Bureau. This download or printed version may have missing information from the original table.

Census Tract 3547, Middlesex County, Massachusetts					
Label	Total		Male		
	Estimate	Margin of Error	Estimate	Margin of Error	Estimate
Workers 16 years and over	1,752	±232	865		
MEANS OF TRANSPORTATION TO WORK					
Car, truck, or van	31.6%	±6.9	32.8%		
Drove alone	27.9%	±6.6	28.9%		
Carpooled	3.8%	±2.2	3.9%		
In 2-person carpool	3.3%	±2	3.0%		
In 3-person carpool	0.0%	±2	0.0%		
In 4-or-more person carpool	0.5%	±0.7	0.9%		
Workers per car, truck, or van	1.07	±0.05	1.07		
Public transportation (excluding taxicab)	42.9%	±6.8	41.3%		
Walked	9.5%	±3.9	5.3%		
Bicycle	5.8%	±3.7	6.4%		
Taxicab, motorcycle, or other means	1.7%	±1.3	3.4%		
Worked at home	8.6%	±3.9	10.9%		
PLACE OF WORK					
Worked in state of residence	99.0%	±1.2	98.8%		
Worked in county of residence	64.4%	±6.2	63.2%		
Worked outside county of residence	34.5%	±6	35.6%		
Worked outside state of residence	1.0%	±1.2	1.2%		
Living in a place	100.0%	±2	100.0%		
Worked in place of residence	42.2%	±7.3	41.3%		
Worked outside place of residence	57.8%	±7.3	58.7%		
Not living in a place	0.0%	±2	0.0%		
Living in 12 selected states	100.0%	±2	100.0%		
Worked in minor civil division of residence	42.2%	±7.3	41.3%		
Worked outside minor civil division of residence	57.8%	±7.3	58.7%		
Not living in 12 selected states	0.0%	±2	0.0%		
Workers 16 years and over who did not work at home	1,602	±237	771		
TIME LEAVING HOME TO GO TO WORK					
12:00 a.m. to 4:59 a.m.	2.8%	±2.8	2.5%		
5:00 a.m. to 5:29 a.m.	0.0%	±2.2	0.0%		
5:30 a.m. to 5:59 a.m.	0.0%	±2.2	0.0%		
6:00 a.m. to 6:29 a.m.	1.1%	±1.2	1.2%		
6:30 a.m. to 6:59 a.m.	6.2%	±3.4	6.0%		
7:00 a.m. to 7:29 a.m.	16.6%	±4.4	19.8%		
7:30 a.m. to 7:59 a.m.	14.9%	±5.7	8.8%		
8:00 a.m. to 8:29 a.m.	21.4%	±5.1	24.3%		
8:30 a.m. to 8:59 a.m.	10.4%	±4.0	10.0%		