Section 4

4.0 TRANSPORTATION

4.1 Introduction

This section provides a summary of the 2013 Boston University Medical Center (BUMC) IMP Amendment/Large Project Review and the BUMC Campus from a transportation perspective, and provides an overview of the area's existing transportation infrastructure including:

- a brief discussion of the transportation characteristics of the BUMC campus and the Project;
- the existing transportation infrastructure surrounding the site, including descriptions of public transportation, area roadways, parking and patient valet operations, loading activities, and bicycle storage;
- an evaluation of future No-Build conditions and Build conditions with the Project in place, including future parking and bicycle storage, loading activities, and trip generation; and
- a discussion of anticipated transportation-related construction management actions and transportation demand management (TDM) measures that are expected to be employed in connection with the Project.

4.1.1 Project Description

4.1.1.1 Existing Campus Description

Boston University Medical Center is located in the South End neighborhood of Boston. See **Figure 4-1**. Regional vehicular access to the BUMC Campus via the north and south is provided directly via the Massachusetts Avenue Connector. At Massachusetts Avenue, the Connector joins Melnea Cass Boulevard, which provides a direct connection to the Longwood Medical and Academic Area. Local vehicular access is primarily form Harrison Avenue, Massachusetts Avenue and Albany Street. East Concord Street and East Newton Street provide connections from the primary campus parking facilities, the 710 Albany Street and 610 Albany garages, to other facilities within the campus. A campus plan is provided in **Figure 4-2.**

4.1.1.2 IMP Projects

As noted above, the purpose of the BUMC IMP Amendment is to obtain approval for modifications to projects previously approved in the BUMC 2010 IMP and the addition of new projects necessary for critical campus realignment and growth, to reduce the impact of ambulance and material deliveries on Albany Street and to eliminate the yellow utility tube across Albany Street.

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Figure 4-1
Locus Map

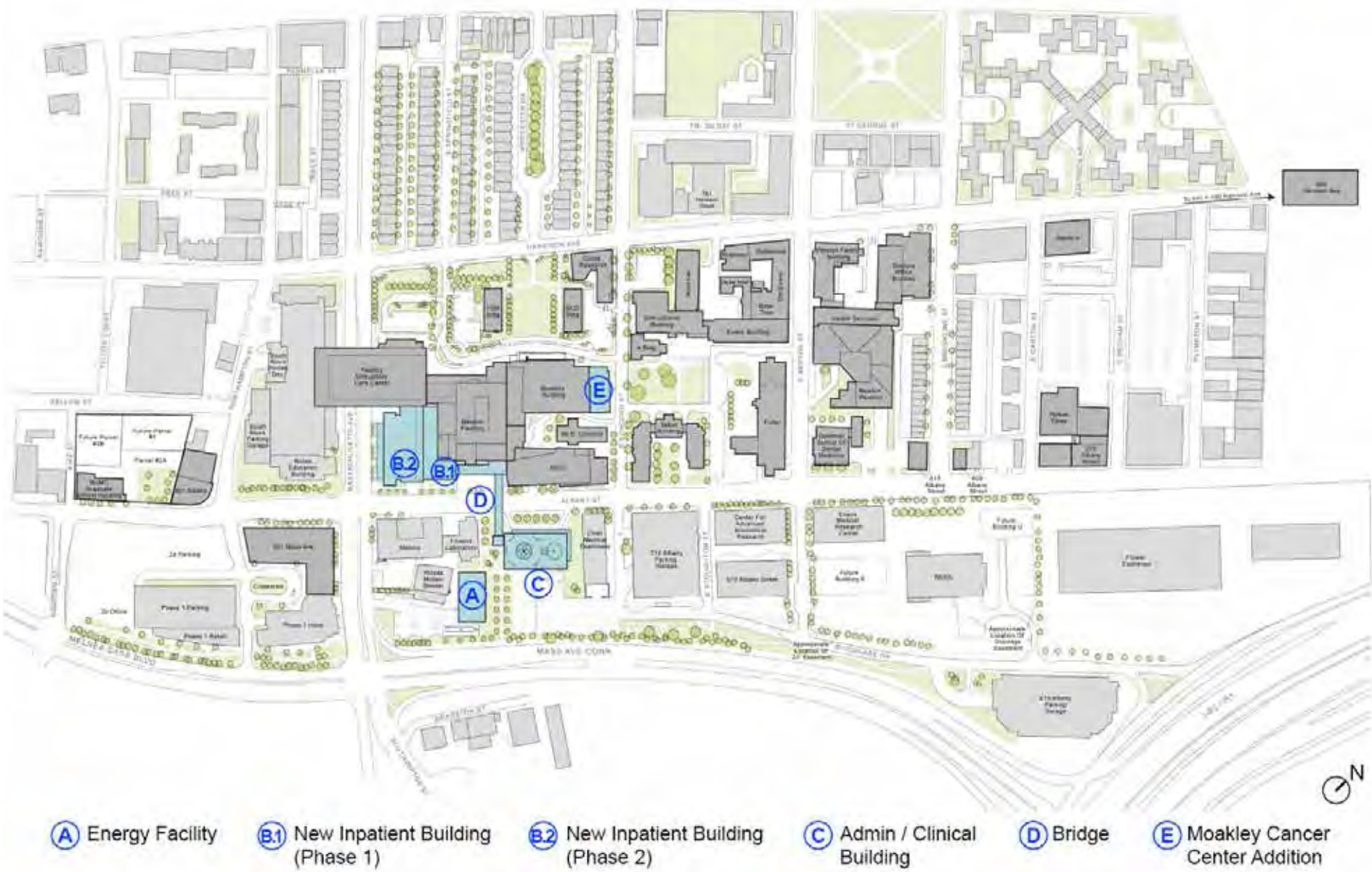

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Figure 4-2
Campus Site Plan

By 2019, the original time frame for the IMP, Boston Medical Center may:

- construct a 27,800 square foot addition to the Moakley Cancer Center on existing open space located to the east of the Moakley Cancer Center along East Concord Street;
- relocate the Emergency Room entrance for pedestrians and passenger vehicles to the northwest corner of the Shapiro Building courtyard;
- construct the proposed 38,500 sf Energy Facility previously located on the existing surface parking lot to the east of the existing Power Plant to a new location west of the existing Power Plant;
- demolish the existing yellow utility tube across Albany Street and replace it with a 7,100 sf new bridge for patient transport and materials handling including a connector corridor at grade providing covered access for Med Flighht patients from the helipad to the new bridge;
- make minor modifications to the previously approved New Inpatient Building footprint and massing, and construct Phase 1 of the New Inpatient Building totaling 78,800 square feet including a connector wing providing vital connections to adjacent campus buildings;
- change the status of the Perkin Elmer site from leased to ownership, incorporating the entire site, amounting to 92,937 additional square feet of administrative office space beyond the 36,524 sf of space that was leased by BUMC in 2010; and
- create an interim central location for materials handling at the existing Power Plant on Albany Street.

In later phases of the IMP, Boston Medical Center may:

- construct Phase 2 of the New Inpatient Building - approximately 323,000 square feet;
- construct the New Administrative/Clinical Building – approximately 219,000 square feet; and
- demolish the existing 64,064 sf Power Plant.

BMC is also submitting this Large Project Review filing under Article 80 with the following components:

- Moakley Cancer Center Addition (new construction only): 27,800 sf
- New Inpatient Building Phase 1: 78,800 sf
- New Patient Transport Bridge: 7,100 sf
- Energy Facility: 38,500 sf

TOTAL 152,200 sf

4.1.2. Study Area

As shown in **Figure 4-3**, the study area has been expanded from that of the 2010 IMP to include parking lot entrances and driveways that will be affected by internal circulation changes anticipated in association with IMP projects, as discussed under Build conditions below. The study area includes the following intersections and site driveways:

- Massachusetts Avenue/Albany Street;
- East Concord Street/Albany Street;
- East Newton Street/Albany Street;
- Massachusetts Avenue/Harrison Avenue;
- East Concord Street/Harrison Avenue;
- East Newton Street/Harrison Avenue;
- BMC entrance on Harrison Avenue and exit on East Concord Street;
- Shapiro Building Courtyard entrance on Albany Street and exit on East Concord Street;
- Power Plant entrance;
- Boston Public Health entrance; and
- Shelter entrances on Albany Street and Mass. Avenue (3 locations).

4.2 Existing Conditions

4.2.1 Roadway Network

The study area includes the following roadways, which are categorized according to the Massachusetts Department of Transportation Office of Transportation Planning functional classifications:

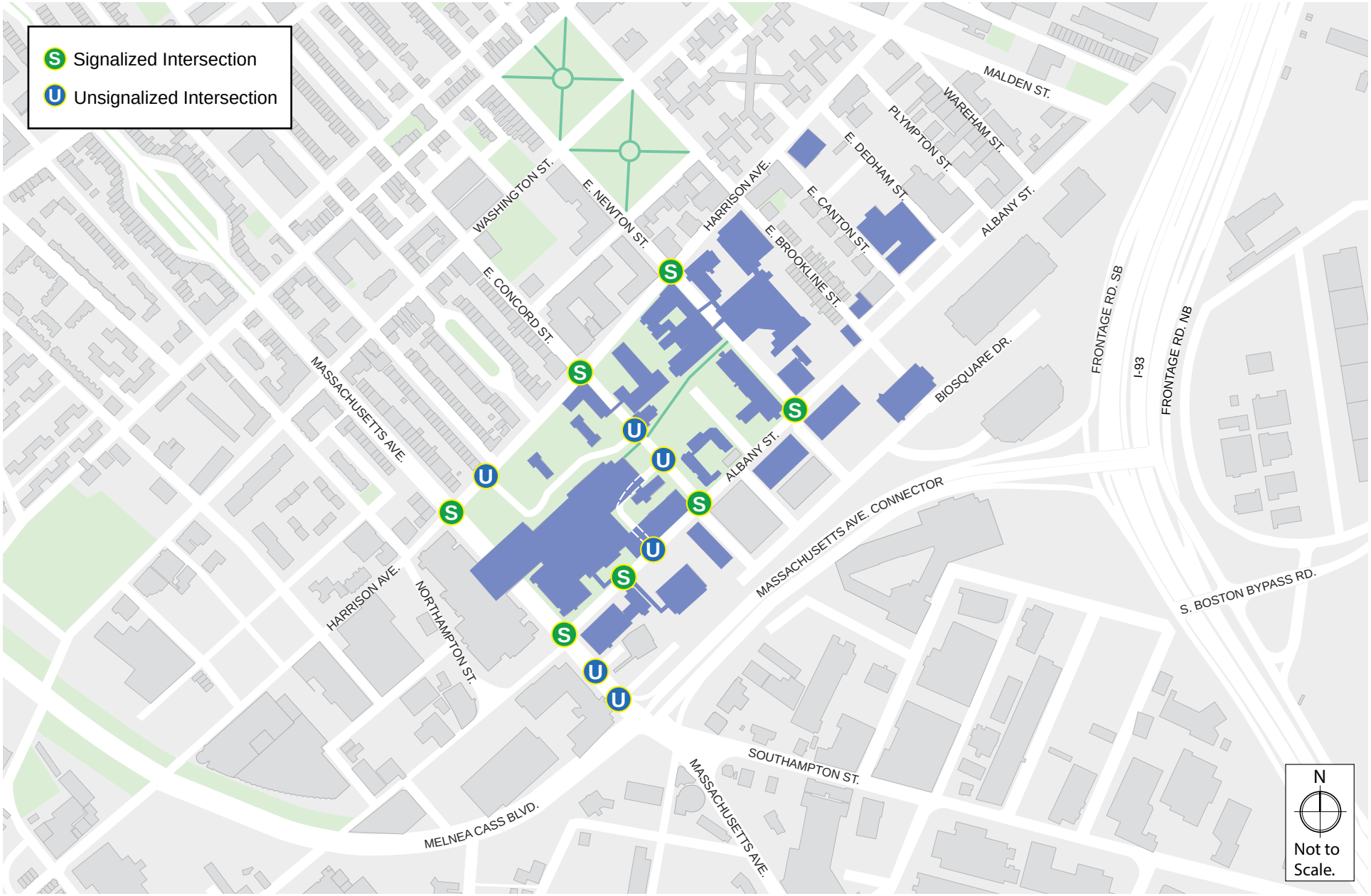

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Figure 4-3
Study Area Intersections

Massachusetts Avenue is an urban principal arterial, running north–south from Cambridge and the northwestern part of the Boston metropolitan area to Columbia Road to the southeast. Massachusetts Avenue carries about 40,000 vehicles total in both directions on an average weekday. Within the study area, Massachusetts Avenue features two travel lanes in each direction, divided by a narrow concrete median. Additional turning lanes are provided at the intersections with Harrison Avenue and Albany Street. Metered on-street parking is provided in the northbound direction between Albany Street and Harrison Avenue, while resident parking is found in both directions of Massachusetts Avenue west of Harrison Avenue. Bus stops are located regularly on both sides of Massachusetts Avenue serving several MBTA routes and the Boston University Medical Center shuttle routes within the campus. Sidewalks on each side range in width from 7 to 23 feet. Near the site, the mix of land uses includes medical, retail, office, and residential.

In early 2013, the City of Boston is nearing the end of construction on a $14.5 million improvement program for Massachusetts Avenue from 150 feet south of Albany Street to 100 feet north of St. Botolph Street. The project includes repaving the roadway and fully modernizing all traffic signal equipment and interconnecting it with the City's traffic management center via a new fiber optic connection. Left turn bays have been installed at certain intersections to reduce congestion and improve traffic safety. New curbing, sidewalks, street lighting and trash receptacles are being installed and landscaping enhanced with trees and shrubbery. A critical element of the plan, as discussed below, is bike accommodations in the corridor.

As signal timing improvements have not been finalized by the City, analyses below are based on the existing signal timings.

Albany Street is an urban minor arterial roadway that runs east-west parallel to Harrison Avenue within the study area from Herald Street in the east to Eustis Street in the west. Albany Street provides one travel lane in each direction near the site with no median. Approximately 11,500 vehicles use Albany Street east of Massachusetts Avenue daily, according to March 2013 ATR data, reduced from about 16,000 vehicles per day counted in 2008. Parking is allowed on both sides of the street, with various uses from metered to special use vehicles only (e.g., EMS vehicles) to no restrictions. The BUMC Campus is located on the north side of the street and the BioSquare site on the south side. Sidewalks on each side range in width from 8 to 35 feet. Land uses along Albany Street include a mix of research, educational, city services, medical uses, and in and outpatient medical uses. Field observations showed that due to congestion in the BUMC Campus driveways, some cars drop off or pick up patients in the through lanes on Albany Street.

East Concord Street is a local street running one-way south. Parking is prohibited on both sides of the street. Two bus shelters—one near Harrison Avenue and one near Albany Street—serve several MBTA routes and the Boston University Medical Center shuttle routes within the campus. Sidewalks on each side range in width from 8 to 24 feet. BUMC Campus buildings are located along both sides of the street.

East Newton Street is an urban minor arterial running one-way north, with parking on both sides of the street. Bus stops are located along East Newton Street with a bus shelter on

Atrium Plaza on the north side of the street between Harrison Avenue and Albany Street. Sidewalks on each side range in width from 8 to 30 feet. BUMC Campus buildings are located along both sides of the street.

Harrison Avenue is an urban minor arterial running northeast-southwest, providing access between Essex Street in the east to Warren Street in Roxbury. Harrison Avenue provides one travel lane in each direction near the BUMC Campus. Parking is permitted on both sides of the street, and additional travel lanes are provided at the intersection with Massachusetts Avenue. Bus stops are located regularly on both sides of Harrison Avenue. Sidewalks on each side range in width from 9 to 11 feet. Harrison Avenue is a boundary between the BUMC Campus on its south side and the primarily residential areas along the north side.

East Springfield Street is a local street running one-way south from Washington Street to Harrison Avenue where it turns into Boston Medical Center Place. There is 8 foot designated residential parking on both sides of the road. Sidewalks on each side range in width from 8 to 9 feet. Residential buildings are located along both sides of the street.

Boston Medical Center Place is a 20-foot wide local street running one-way south-southeast from Harrison Avenue to East Concord Street. There is no parking on either sides of the road and sidewalks ranging in width from 7 to 8 feet. Boston Medical Center Place provides access to the BUMC Campus with a bus stop located on the southeast corner of Harrison Avenue and Boston Medical Center Place. BUMC Campus buildings and green space are located along both sides of the street.

Boston Health Commission Driveway is a gated 17.5-foot wide exit only driveway. This driveway accesses a parking lot for the Boston Health Commission with the entrance located on Public Health Building Street off Albany Street.

Woods-Mullen Service Driveway is a 27-foot wide service driveway. It services the Woods-Mullen Shelter and functions as two lanes, one in each direction.

Public Health Building Roadway is a two lane, one in each direction, driveway separated by a median, which contains the structural support for the overhead utility tube. Each roadway is 16-feet wide. There is no parking permitted or sidewalks on either side of the driveway.

Power Plant Driveway is a gated 30-foot wide entrance and exit driveway. This driveway gives access to the surface lot for the Power Plant Building and the Chief Medical Examiner's Office. The signage specifies that permit/authorized parking only and No Trespassing. There are no parking permitted or sidewalks on either side of the driveway.

Shapiro Driveway is a 20-foot wide entrance only driveway for the Shapiro Ambulatory Care Center. The 18-foot wide exit driveway is located on East Concord Street. The signage specifies that this is a drop-off and pick-up only driveway and mentions that parking is available at the 710 Albany Garage. There is no parking on either side of the

driveway; sidewalks range in width from a narrow point of about 12′ at the building entrance to about 35 feet at the rear of the building. The Shapiro Ambulatory Care Center is located on the east and the Menino Pavilion along the west of the driveway.

4.2.2 Intersection Conditions

The following intersections are included in the study area:

4.2.2.1 Signalized Intersections

Massachusetts Avenue/Albany Street is a four-approach signalized intersection. The eastbound approach on Albany Street provides an 11-foot shared left-turn/through lane, a 12-foot exclusive through lane, and a 12-foot exclusive right-turn lane. The westbound approach on Albany Street provides an 11-foot left-turn-only lane, a 12-foot through lane, and a 12-foot shared through/right-turn lane. The northbound Massachusetts Avenue approach provides two 12-foot through lanes and one 11-foot right-turn-only lane. The southbound Massachusetts Avenue approach provides one 10-foot left-turn-only lane, one 11-foot through lane, and one 11-foot shared through/right-turn lane. Crosswalks, wheelchair ramps, pedestrian pushbuttons and indications are provided on all approaches.

Public Health Driveway/Albany Street is a four-approach signalized intersection. The eastbound Albany Street approach provides one 12-foot shared left-turn/through lane and one 15-foot shared through/right-turn lane. The westbound Albany Street approach provides one 11-foot shared left-turn/through lane and one 10-foot shared through/right-turn lane. The northbound and southbound approaches are both driveways. The northbound approach is approximately a 31-foot driveway to the Public Health building with one 16-foot accepting lane and one 15-foot left-turn/through/right turn lane. These two lanes are separated by a raised median which accommodates the structural support for the overhead utility tube. The southbound approach is a 28-foot driveway for ambulances only to enter the emergency room. Crosswalks and wheelchair ramps are provided for the northbound, southbound, and westbound approaches with pedestrian pushbuttons and indications on the northbound and westbound approaches only.

East Concord Street/Albany Street is a four-approach signalized intersection. The eastbound Albany Street approach provides one 12-foot through lane and one 12-foot exclusive right-turn lane. The westbound Albany Street approach provides one 11-foot shared left-turn/through lane and one 11-foot exclusive through lane. East Concord Street is one-way southbound and operates with one exclusive left-turn lane and one through/right-turn lane. Wheelchair ramps and crosswalks are provided for all approaches. Pedestrian pushbuttons and indicators are provided across the eastbound, westbound, and southbound approaches. An exclusive pedestrian phase is provided.

East Newton Street/Albany Street is a four-approach signalized intersection. At this intersection, the eastbound approach on Albany Street provides one 10-foot left-turn-only lane and 12-foot one through lane. The westbound Albany Street approach provides one 11-foot through lane and one 16-foot exclusive right-turn lane. East Newton Street, which runs one-way northbound, provides one 12-foot exclusive left-turn lane and one 13-foot

through/right-turn lane. Crosswalks, wheelchair ramps, pedestrian pushbuttons and indications are provided on all approaches. Both pedestrian phases are concurrent with vehicular movements and exclusive.

East Newton Street/Harrison Avenue is a four-approach signalized intersection**.** The eastbound approach on Harrison Avenue provides one 12-foot shared left-turn/through lane. The westbound Harrison Avenue approach provides one 12-foot through/right-turn lane. East Newton Street is one-way in the northbound direction, with one 16-foot shared left-turn/through/right-turn lane. Crosswalks, wheelchair ramps, pedestrian pushbuttons and indications are provided on all approaches.

East Concord Street/Harrison Avenue is a four-approach signalized intersection. The eastbound approach on Harrison Avenue provides one 12-foot through/right-turn lane. The westbound Harrison Avenue approach provides one 12-foot left-turn/through lane. East Concord Street is one-way in the southbound direction with one 16-foot left-turn/through/right-turn lane. Crosswalks, wheelchair ramps, pedestrian pushbuttons and indications are provided on all approaches.

Massachusetts Avenue/Harrison Avenue is a four-approach signalized intersection. The eastbound approach on Harrison Avenue provides one 20-foot left-turn/through/right-turn lane that functions as one 10-foot left-turn/through lane and one 10-foot through/right-turn lane. Both the northbound and southbound Massachusetts Avenue approaches provide three travel lanes; a 10-foot exclusive left-turn lane, a 12-foot exclusive through lane, and an 18-foot shared through/right-turn lane. Crosswalks, wheelchair ramps, pedestrian pushbuttons and indications are provided on all approaches.

4.2.2.2 Unsignalized Intersections

Shapiro Entrance Driveway/Power Plant Driveway is a four-approach unsignalized intersection. The northbound Power Plant stop-controlled approach provides a 15-foot accepting and a 15-foot exiting lane. Both lanes are gated and are accessed via a permit only. The southbound Shapiro Entrance approach provides a 20-foot accepting lane for drop-off and pick-up of patients only. The eastbound and westbound Albany Street approaches both have two 11-foot through lanes with 5-foot bicycle lanes on both sides of the roadway. There is metered parking on the south side of Albany Street but it ends at the Power Plant driveway. There are no crosswalks at this intersection but field observations showed that multiple pedestrians cross this roadway. Field observations also showed that cars used the outside through lane and bicycle lane in both directions as pick-up and drop-off of patients.

Shapiro Exit Driveway/East Concord Street is an unsignalized T intersection. East Concord Street is one-way free control southbound with metered parking on both sides of the 18-foot through lane. The eastbound Shapiro Exit approach is a stop controlled one-way exiting driveway that measures 12-feet wide and tapers to 18-feet. There are no crosswalks at this intersection, although field observations showed that multiple pedestrians cross at this location.

Boston Medical Center Place /East Concord Street is an unsignalized T intersection. The westbound Boston Medical Center Place driveway is a stop controlled one-way out driveway that measures 17-feet wide. The southbound East Concord Street approach is a one-way street that provides one 18-foot through lane with free control and metered parking on both sides of the roadway. A 12.5-foot wide raised crosswalk is provided on the south side of the intersection crossing East Concord Street and an 8-foot wide crosswalk is provided across Boston Medical Center Place.

East Springfield Street/Boston Medical Center Place/Harrison Avenue is a four-approach unsignalized intersection. The eastbound Harrison Avenue approach provides a 20-foot left-turn/through/right-turn lane. The westbound Harrison Avenue approach provides one 13-foot left-turn/through/right-turn lane with metered parking. East Springfield Street is a one-way in the southbound direction; one 18-foot left-turn/through/right-turn lane is provided. A crosswalk is provided on the north and east side of the intersection crossing Harrison Avenue, 7-foot and 11-foot respectively. Wheelchair ramps are provided on all approaches.

Woods-Mullen Service Driveway/Massachusetts Avenue is an unsignalized two approach intersection. The eastbound Woods-Mullen approach provides a 27-foot wide unstriped driveway, which operates as a right-in/right-out. The northbound Massachusetts Avenue approach has two 10-foot through lanes, a 5-foot bicycle lane and an 11-foot through lane that turns into a right-turn lane after the Woods-Mullen Service Driveway.

Boston Health Commission Exit Driveway/Massachusetts Avenue is an unsignalized two approach intersection. The eastbound Boston Health Commission approach provides a gated 17.5-foot wide driveway, which operates as an exit only. The northbound Massachusetts Avenue approach has two 10-foot through lanes, a 5-foot bicycle lane and an 11-foot through lane that turns into a right-turn lane after the Woods-Mullen Service Driveway.

4.2.3 Traffic Volumes

Howard/Stein-Hudson Associates (HSH) collected a 48-hour Automatic Traffic Recorder (ATR) count on Albany Street as well as morning (7:30–9:30 a.m.) and afternoon (3:30–5:30 p.m.) manual turning movement count data at the study area intersections in March, 2013. Based on these data, HSH determined the morning and evening peak one-hour traffic volumes for analysis are 7:45–8:45 a.m. and 3:30–4:30 p.m. See **Figure 4-4** and **Figure 4-5.**

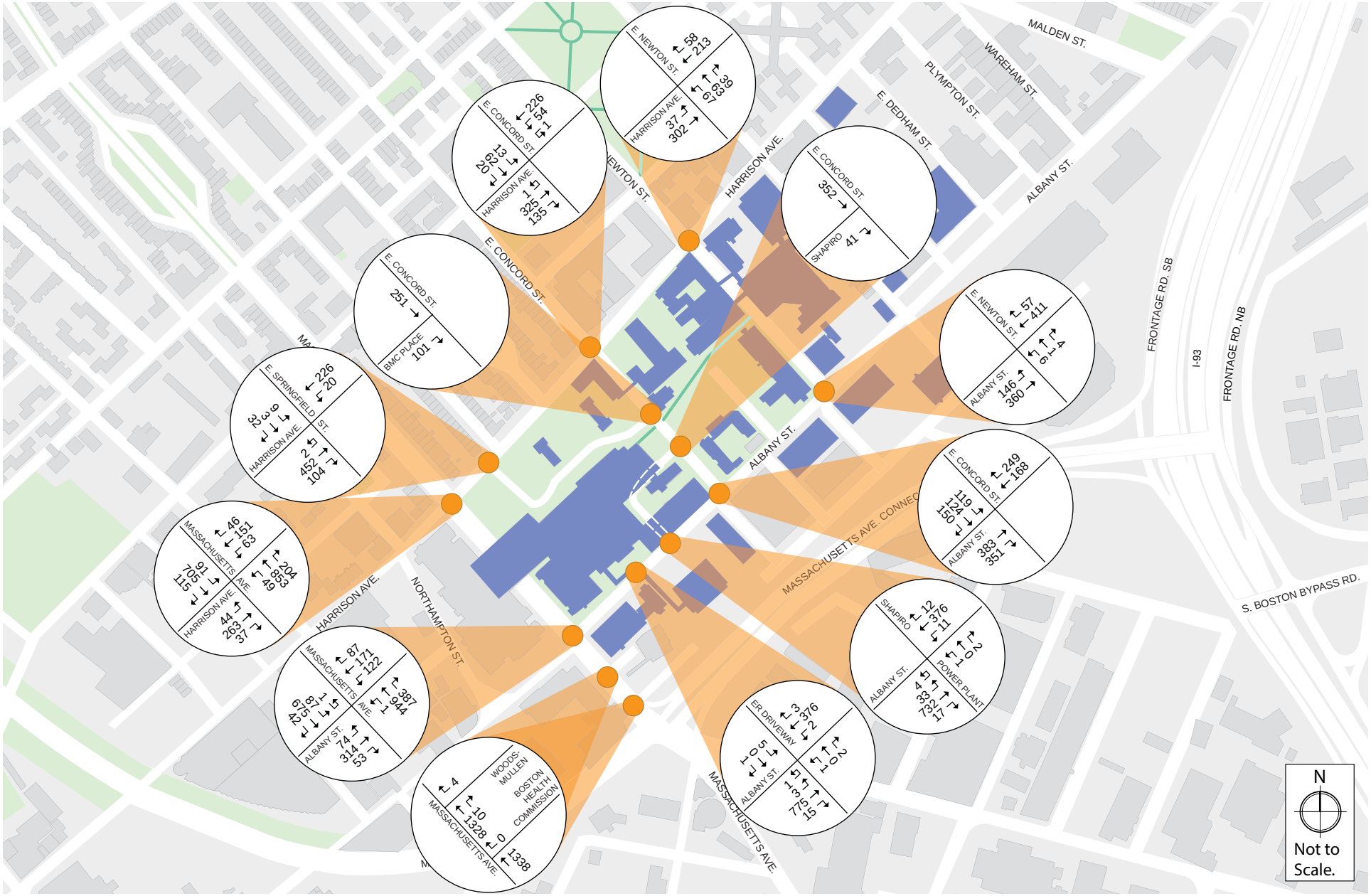

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Figure 4-4
Existing Conditions (2013) Traffic Volumes,
a.m. Peak Hour

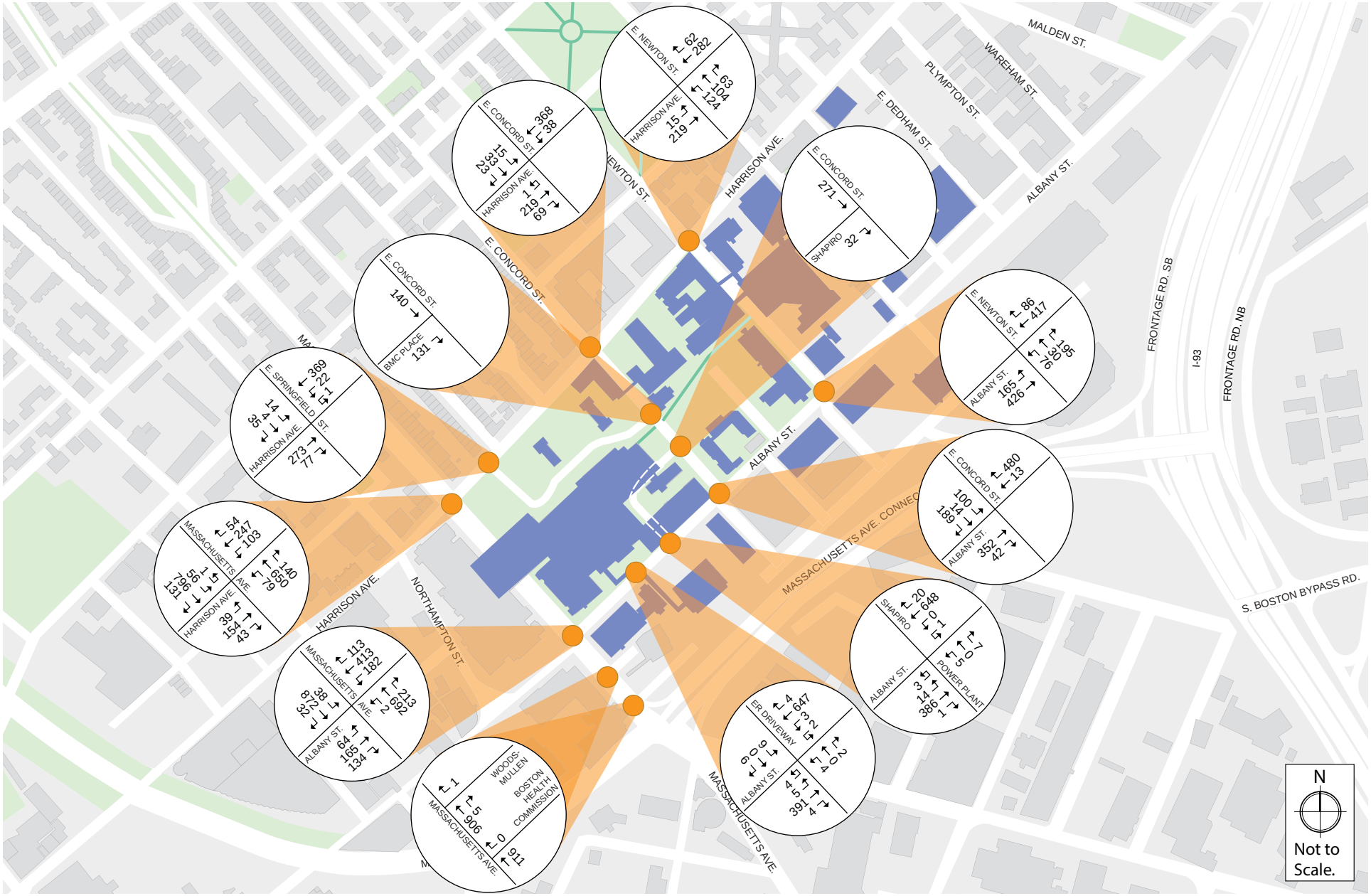

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Figure 4-5
Existing Conditions (2013) Traffic Volumes,
p.m. Peak Hour

4.2.4 Traffic Operations

Traffic operations are determined through an analysis of intersection Level of Service (LOS). LOS and delay at the intersections were analyzed using the Synchro software developed by Trafficware. Synchro 6 was used to evaluate the effects that closely spaced intersections may have on one another. Synchro is based on the traffic operational analysis methodology of the Transportation Research Board's *2000 Highway Capacity Manual* (HCM); LOS and delay (in seconds) are determined based on intersection geometry and available traffic data for each intersection. Signal timings and phasing used in this analysis were provided by BTD. **Table 4-1,** derived from the HCM, provides LOS criteria for signalized and unsignalized intersections. LOS A defines the most favorable condition, with minimum traffic delay. LOS F represents the worst condition (unacceptable), with significant traffic delay. LOS D is generally considered acceptable in an urban environment.

Table 4-1: Level of Service (LOS) Criteria (HCM Excerpt)

Level of Service	Average Stopped Delay (sec./veh.)	
	Signalized Intersection	Unsignalized Intersection
A	≤ 10	≤ 10
B	> 10 and ≤ 20	> 10 and ≤ 15
C	> 20 and ≤ 35	> 15 and ≤ 25
D	> 35 and ≤ 55	> 25 and ≤ 35
E	> 55 and ≤ 80	> 35 and ≤ 50
F	> 80	> 50

The ***v/c ratio*** is a measure of congestion at an intersection approach. A v/c ratio of one or greater indicates that the traffic volume on the intersection approach exceeds capacity.

The ***95th percentile queue length***, measured in feet, represents the farthest extent of the vehicle queue (to the last stopped vehicle) upstream from the stop line during 5% of all signal cycles. The 95th percentile queue will not be seen during each cycle. The queue would be this long only 5% of the time and would typically not occur during off-peak hours.

Field observations were performed by Howard/Stein-Hudson Associates, Inc. (HSH) to establish intersection geometry (i.e., number of turning lanes, lane length, and lane width). Signal timing and phasing used in this analysis were obtained from BTD and through field observations conducted by HSH.

To evaluate existing intersection operations, the study team calibrated the level of service analysis based on field observations of actual queues and delays on March 18, 2013. Uncalibrated, the analysis can show exaggerated queues and delays. **Table 4-2** and **Table 4-3** summarize the existing morning and evening intersection LOS, delay, v/c ratio, and 95th percentile queue length analysis results for the Project. Detailed Synchro reports are provided in **Appendix B**.

Table 4-2: Existing Conditions (2013) LOS Summary, a.m. Peak Hour (7:45-8:45 a.m.)

Intersection	LOS	Delay (seconds)	V/C Ratio	95% Queue Length (ft)
Signalized Intersections				
Massachusetts Avenue/Albany Street	**C**	**32.0**		
Albany EB left/thru | thru	D	43.8	0.67	211
Albany EB right	D	35.2	0.24	68
Albany WB left	F	>80.0	0.82	#205
Albany WB thru | thru/right	B	12.2	0.28	92
Mass Ave NB thru | thru	D	35.5	0.75	453
Mass Ave NB right	C	20.8	0.49	293
Mass Ave SB left	E	67.3	0.61	129
Mass Ave SB thru | thru/right	B	18.0	0.43	228
Albany Street/Public Health Driveway	**A**	**9.6**		
Albany EB left/thru /right	B	12.0	0.57	598
Albany WB left/thru | thru/right	A	4.6	0.17	6691
Public Health NB left/thru/right	D	38.7	0.06	319
ER Driveway SB	N/A	-	-	-
Albany Street/East Concord Street	**C**	**21.0**		
Albany EB thru	C	25.8	0.54	352
Albany EB right	B	11.2	0.54	175
Albany WB left/thru | thru	A	7.1	0.43	43
E. Concord SB left	E	63.4	0.65	149
E. Concord SB thru	D	54.9	0.54	157
E. Concord SB right	B	13.6	0.60	25
Albany Street/East Newton Street	**B**	**16.1**		
Albany EB left	B	19.0	0.47	106
Albany EB thru	A	9.6	0.32	214
Albany WB thru | thru/right	B	18.4	0.31	233
E. Newton NB left	D	47.8	0.13	11
E. Newton NB thru/right	C	23.6	0.17	22
Harrison Avenue/East Newton Street	**B**	**19.4**		
Harrison EB left/thru	A	7.5	0.34	88
Harrison WB thru/right	B	10.0	0.28	165
E. Newton NB left/thru/right	D	51.0	0.80	124
Harrison Avenue/East Concord Street	**B**	**11.0**		
Harrison EB thru/right	A	6.2	0.40	230
Harrison WB left/thru	A	3.7	0.35	m66
E. Concord SB left/thru/right	D	45.7	0.62	94
Massachusetts Avenue/Harrison Avenue	**C**	**31.8**		
Harrison EB left/thru/right	E	60.6	0.92	#408
Harrison WB left/thru/right	E	70.1	0.94	#339
Mass Ave NB left	A	9.6	0.21	26
Mass Ave NB thru | thru/right	C	25.2	0.79	390
Mass Ave SB left	B	11.3	0.33	45
Mass Ave SB thru | thru/right	B	17.1	0.52	254

Intersection	LOS	Delay	V/C Ratio	95% Queue Length (ft)
Unsignalized Intersections				
Albany Street/Shapiro Entrance Driveway/Power Plant Driveway				
Albany EB left/thru | thru/right	A	1.1	0.24	6
Albany WB left/thru | thru/right	A	0.5	0.14	2
Power Plant NB left/thru/right	D	29.7	0.08	6
East Concord Street/Shapiro Exit Driveway				
Shapiro EB right	B	11.6	0.10	8
E. Concord SB thru	A	0.0	0.24	0
East Concord Street/Boston Medical Center Place				
Boston Medical EB right	C	16.5	0.29	30
E. Concord SB thru	A	0.0	0.17	0
Harrison Avenue/East Springfield Street				
Harrison EB thru/right	A	0	0.36	0
Harrison WB left/thru	A	1.4	0.04	3
E. Springfield SB left/thru/right	C	17.6	0.21	19
Massachusetts Avenue/Woods-Mullen Service Driveway				
Woods-Mullen WB right	C	17.0	0.03	2
Mass Ave NB thru | thru | thru/right	A	0.0	0.34	0
Massachusetts Avenue/Boston Health Commission Exit Driveway				
Boston Health Commission WB right	-	-	-	-
Mass Ave NB thru | thru | thru	A	0.0	0.28	0

# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
N/A = The ER Driveway SB does not operate with the signal timing. The ambulances exiting the driveway have their emergency lights on therefore stopping all conflicting traffic. There is no signal head facing the SB traffic.
Grey shading indicates LOS below D.

Table 4-3: Existing Conditions (2013) LOS Summary, p.m. Peak Hour (3:30-4:30 p.m.)

Intersection	LOS	Delay (seconds)	V/C Ratio	95% Queue Length (ft)
Signalized Intersections				
Massachusetts Avenue/Albany Street	**C**	**30.7**		
Albany EB left/thru | thru	D	40.0	0.50	122
Albany EB right	D	41.9	0.49	154
Albany WB left	E	66.2	0.72	205
Albany WB thru | thru/right	A	7.8	0.38	56
Mass Ave NB thru | thru	D	37.6	0.63	358
Mass Ave NB right	B	15.8	0.28	151
Mass Ave SB left	E	55.6	0.29	67
Mass Ave SB thru | thru/right	C	27.8	0.63	408
Albany Street/Public Health Driveway	**A**			
Albany EB left/thru /right	A	9.2	0.36	230
Albany WB left/thru | thru/right	A	1.5	0.30	m10
Public Health NB left/thru/right	D	38.2	0.06	25
ER Driveway SB	N/A	-	-	-
Albany Street/East Concord Street	**C**	**25.3**		
Albany EB thru	B	17.2	0.48	264
Albany EB right	B	12.3	0.10	42
Albany WB left/thru | thru	A	9.9	0.36	50
E. Concord SB left	D	41.9	0.37	121
E. Concord SB thru	C	35.0	0.06	23
E. Concord SB right	E	70.0	0.84	231
Albany Street/East Newton Street	**C**	**30.8**		
Albany EB left	C	34.7	0.54	187
Albany EB thru	C	23.8	0.40	374
Albany WB thru | thru/right	C	30.6	0.46	#312
E. Newton NB left	D	44.8	0.34	86
E. Newton NB thru/right	C	34.8	0.85	33
Harrison Avenue/East Newton Street	**C**	**24.7**		
Harrison EB left/thru	A	9.1	0.30	103
Harrison WB thru/right	B	12.0	0.38	249
E. Newton NB left/thru/right	D	53.0	0.88	197
Harrison Avenue/East Concord Street	**A**	**8.2**		
Harrison EB thru/right	A	4.4	0.27	127
Harrison WB left/thru	A	3.8	0.34	m109
E. Concord SB left/thru/right	D	39.5	0.52	72
Massachusetts Avenue/Harrison Avenue	**D**	**38.9**		
Harrison EB left/thru/right	D	35.0	0.63	232
Harrison WB left/thru/right	F	>80.0	>1.00	#548
Mass Ave NB left	B	12.5	0.36	41
Mass Ave NB thru | thru/right	B	18.6	0.55	239
Mass Ave SB left	A	10.0	0.21	32
Mass Ave SB thru | thru/right	B	19.6	0.62	310

Intersection	LOS	Delay	V/C Ratio	95% Queue Length (ft)
Unsignalized Intersections				
Albany Street/Shapiro Entrance Driveway/Power Plant Driveway				
Albany EB left/thru | thru/right	A	0.8	0.13	3
Albany WB left/thru | thru/right	A	0.1	0.23	0
Power Plant NB left/thru/right	C	19.0	0.07	6
East Concord Street/Shapiro Exit Driveway				
Shapiro EB right	B	10.8	0.08	6
E. Concord SB thru	A	0.0	0.19	0
East Concord Street/Boston Medical Center Place				
Boston Medical EB right	B	14.8	0.33	36
E. Concord SB thru	A	0.0	0.09	0
Harrison Avenue/East Springfield Street				
Harrison EB thru/right	A	0.0	0.24	0
Harrison WB left/thru	A	0.9	0.03	2
E. Springfield SB left/thru/right	C	15.6	0.20	18
Massachusetts Avenue/Woods-Mullen Service Driveway				
Woods-Mullen WB right	C	20.5	0.02	1
Mass Ave NB thru | thru | thru/right	A	0.0	0.25	0
Massachusetts Avenue/Boston Health Commission Exit Driveway				
Boston Health Commission WB right				
Mass Ave NB thru | thru | thru	A	0.0	0.21	0

# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
N/A = The ER Driveway SB does not operate with the signal timing. The ambulances exiting the driveway have their emergency lights on therefore stopping all conflicting traffic. There is no signal head facing the SB traffic.
Grey shading indicates LOS below D.

With existing volumes and existing geometry, during the a.m. and p.m. peak hours, typically LOS D or better is considered acceptable in an urban environment such as this Project. During the peak periods, all of the signalized and unsignalized intersections operate at an overall LOS D or better. The following descriptions explain specifically which approaches operate at LOS E or worse.

- Albany Street/Massachusetts Avenue operations are actually improved from conditions documented in the 2010 IMP, probably due to the Massachusetts Avenue improvement project. At that time, the intersection operated at LOS F both morning and evening. Although the overall intersection operates today at a much improved LOS C both morning and evening, the westbound Albany Street approach at Massachusetts Avenue operates at a LOS F in the a.m. peak and a LOS E in the p.m. peak. The approach of Massachusetts Avenue southbound left operates at a LOS E in the a.m. peak and the p.m. peak. This is due to the new signal phasing which limits SB left turns to one protected phase. Currently Massachusetts Avenue

traffic signals are still being optimized at the end of the improvement contract, although no completion time has been determined.

- Overall LOS at Massachusetts Avenue/Harrison Avenue has improved from LOS D in 2009 to C in the a.m. peak hour and from LOS E in 2009 to D in the p.m. peak hour. However, the Harrison Avenue eastbound and westbound left/thru/right approaches continue operate at LOS E during the a.m. peak hour. The approach of Harrison Avenue westbound left/thru/right operates at a LOS F during the p.m. peak hour. This is due to the high number of vehicles traveling northbound and southbound on Massachusetts Avenue taking away green time from the Harrison Avenue eastbound and westbound phase. Currently, as noted above, Massachusetts Avenue traffic signals are being optimized, although no completion time has been determined.

- At Albany Street, the East Concord southbound left operates at a LOS E during the a.m. peak and the approach of East Concord southbound right operates at a LOS E during the p.m. approach, unchanged from 2009 existing conditions. Overall, LOS at this location has improved from LOS D to C in the a.m. peak and from LOS E to D in the p.m. peak.

4.2.5 Parking

This section documents the existing on-street and off-street parking facilities in the study area. The parking inventory comprises off-street parking on the BUMC campus, distinguished between spaces for Boston University Medical Center employees and Boston University Medical Center visitors and patients.

4.2.5.1 Existing Off-Street Parking

Figure 4-6 illustrates the locations of the existing off-street Boston University Medical Center owned and leased parking garages and surface lots. Currently, Boston University Medical Center owns three (3) parking garages and four (4) surface parking lots and leases parking in two (2) parking garages and one (1) surface parking lot.

In March 2013, HSH studied supply and midday (11:00 a.m. to 1:00 p.m.) occupancy of all parking facilities on the campus. Capacities and occupancies were verified by Boston University Medical Center's Office of Parking Transportation Services. The study determined an overall occupancy rate of 85%. Approximately 500 spaces were available mid-day, according to the data. Capacity and occupancy of each facility are shown in **Table 4-4.**

As shown, Boston University Medical Center operates 3,422 spaces today, of which almost all – 92% -- are owned, and only 8% leased off-site. Of the total, 2,940 spaces are found in garages, and 482 in lots. Over the years, BUMC has transitioned its parking lots into garages as buildings have replaced the surface parking. The parking facilities serve a total of 3,643,516 square feet of space, including 520,000 square feet of occupied BioSquare space.

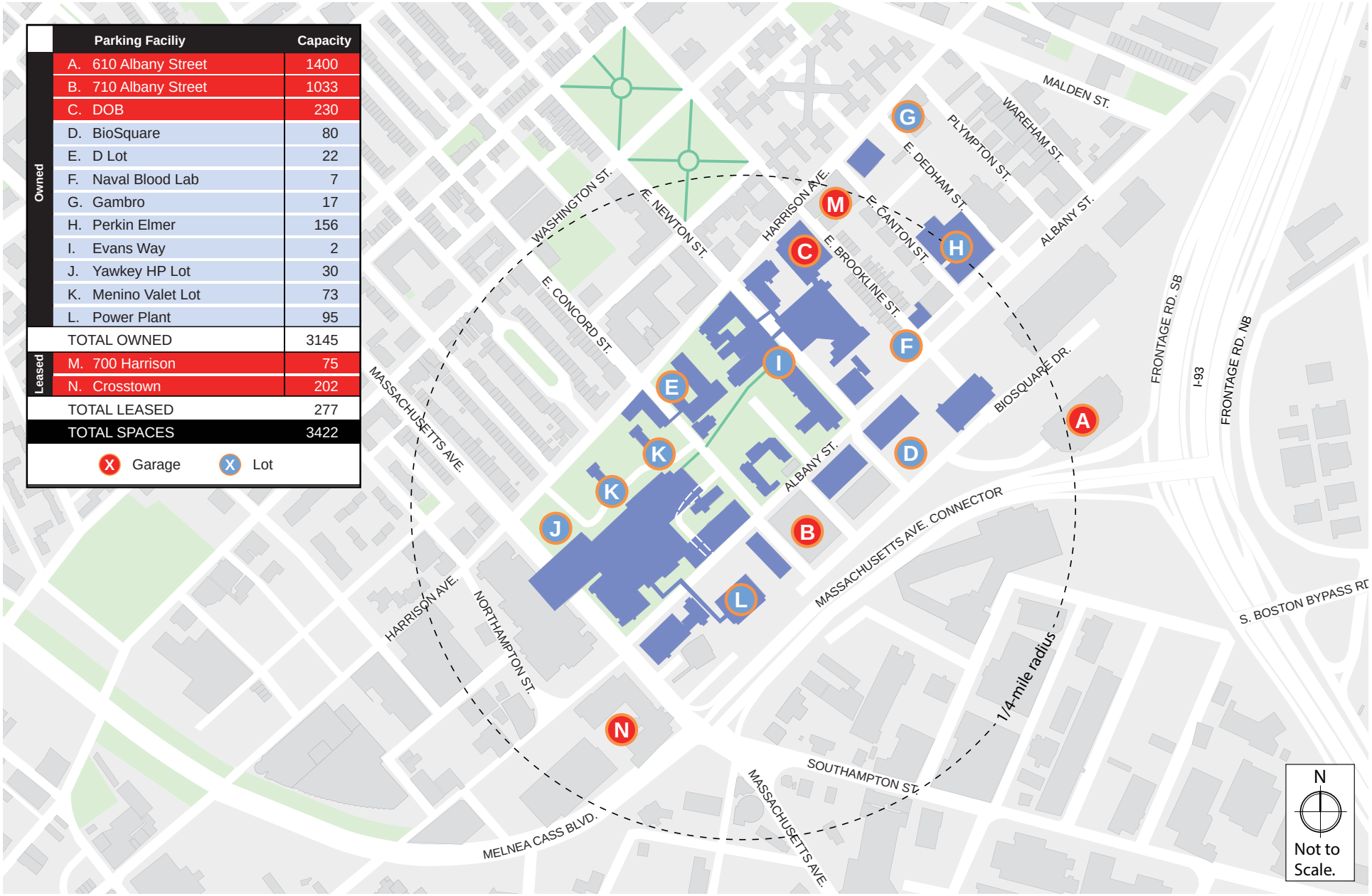

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Figure 4-6
Off-Street Parking

The on-campus parking ratio is 0.94 spaces per 1,000 square feet, in line with suggested BTD ratios of 0.75 to 1.0 spaces per 1,000 square feet.

Of the owned, on-campus spaces, approximately 941 are currently public spaces, available for patients and visitors of the campus. The Doctors' Office Building and the 710 Albany Garage are open to the public on a market rate, hourly basis, although around 325 staff permits are issued for spaces in those garages as well. The 610 Albany Garage is for medical center employees who pay market rate for spaces on a monthly basis.

Table 4-4 Campus Parking Supply and Occupancy

Map Key	Facility	Lot/ Garage	Own/ Lease	Existing Spaces	Midday Occupancy	%Occupied	User
	Owned Parking						
A	610 Albany	G	O	1,400	1,329	95%	Staff
B	710 Albany (including 14 reserved spaces outside garage)	G	O	1,033	859	83%	Primarily patients.
C	DOB	G	O	230	157	68%	Patients. Staff after 5:30 p.m.
D	BioSquare Lot E	L	O	80	36	45%	Staff
E	D Lot	L	O	22	10	45%	Staff
F	Naval Blood Lab	L	O	7	6	86%	Staff
G	Gambro	L	O	17	7	41%	Staff
H	Perkin Elmer	L	O	156	119	76%	Staff
I	Evans Way	L	O	2	2	100%	BUMC Provost, BU Senior Faculty
J	Yawkey HP Lot	L	O	30	25	83%	HP
K	Menino Valet Lot	L	O	73	54	74%	Patient/Valet
L	Power Plant	L	O	95	83	87%	Staff
	Leased Parking						
M	700 Harrison	G	L	75	51	68%	Staff
N	Crosstown	G	L	202	184	91%	Staff
	Summary			**Existing Spaces**	**Occupied Spaces**	**Occupancy**	
	Total Owned			3,145	2,687	**85%**	
	Total Off-site Leased			277	235	**85%**	
	Total Parking			**3,422**	**2,922**	**85%**	

Source: BUMC 3-13

Boston University Medical Center issues 2,916 staff permits for the 3,422 total spaces. The largest staff garage at 610 Albany Street accommodates 2028 employee permits within its 1,400 space capacity, due to part-time schedules, shift workers, etc. which allow each space to serve more than one employee over the course of the day. Other garages accommodate fewer employee permits, freeing up spaces for patients and visitors. At the 710 Albany Garage, for example, only 297 permits are issued for the 1,019 total spaces, allowing for patient parking.

A midday (11:00 a.m. to 1:00 p.m.) occupancy check of off-street on Wednesday, March 6, 2013 indicated that overall occupancy of all facilities was 85% -- with a surplus of only 500 spaces. As shown in the table above, however, several facilities did have available spaces, primarily those geared toward patient/visitor parking. As a matter of policy, patients and visitors have priority in this hospital setting.

4.2.5.2 Existing On-street Parking

Figure 4-7 illustrates the City of Boston on-street parking supply in the study area along with regulations within the campus.

As shown, parking in the quarter-mile surrounding the project site can be thought of in three large segments. The segment between Harrison Avenue and Washington Street is composed primarily of South End resident parking. The segment between Harrison Avenue and Albany Street consists primarily of metered and unrestricted parking. East Brookline Street and East Canton Street are signed for South End Resident Parking. There are several areas within this zone that cannot be used for parking for a variety of reasons including MBTA bus stops, loading zones and construction. The third segment, south of Albany Street is dominated by Melnea Cass Boulevard and the Massachusetts Avenue Connector. Parking is not permitted on either of these major roads.

4.2.6 Public Transportation

This section highlights the transportation routes, schedules, and capacity of public transportation within the medical center.

4.2.6.1 MBTA Bus Service

As shown in **Table 4-5** and **Figure 4-8,** seven Massachusetts Bay Transportation Authority (MBTA) bus route and the Silver Line Bus Rapid Transit currently provide public transit service to the site and the medical area as a whole. The bus and bus rapid transit routes connect the BUMC Campus area with Cambridge, Longwood Medical and Academic Area (LMA), South Boston, Back Bay/South End, Lower Roxbury, and Downtown, as well as with MBTA subway stations, including the Red Line (Broadway, Andrew, and JFK/UMass) and the Orange Line (Massachusetts Avenue, Back Bay, and Ruggles). Major bus stops with shelters on the BUMC Campus are located on East Newton Street and East Concord Street between Harrison Avenue and Albany Street. Buses also stop along Albany Street, Harrison Avenue, and Massachusetts Avenue.

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Figure 4-7
On-Street Parking

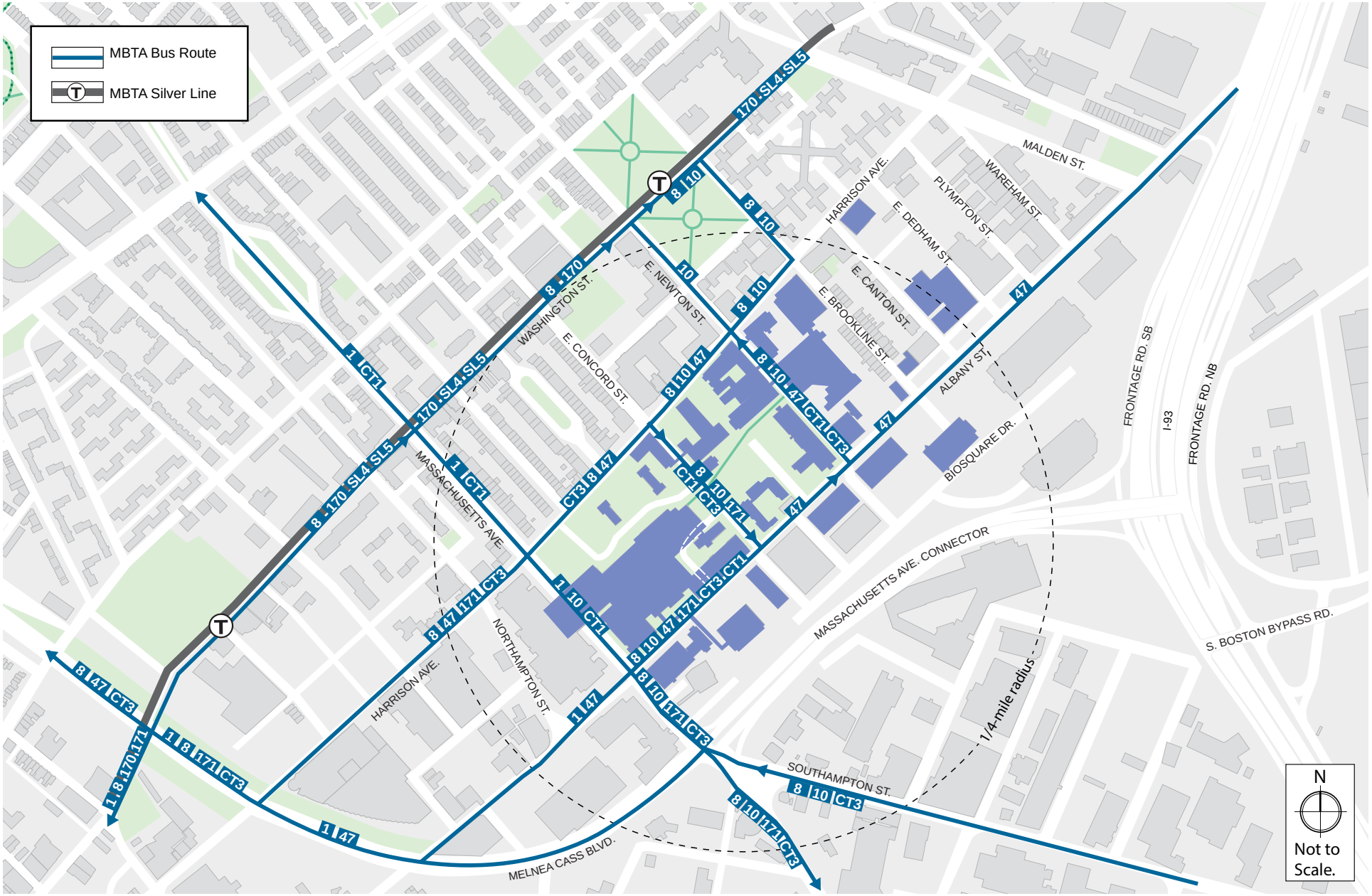

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Figure 4-8
Public Transportation in the Study Area

Table 4-5 Existing MBTA Bus Service in the Study Area

Bus Route	Origin–Destination	Rush-hour Frequency (min)
CT #1	Central Square (Cambridge)–BUMC	20
CT #3	Beth Israel Hospital–Andrew Station	20
1	Harvard–Dudley Square	8-11
8	UMass–Kenmore	15–20
10	City Point–Copley Square	20
47	Central Square–Broadway	8-10
170 (PM)	Central Sq., Waltham – Dudley Square	60
171 (AM)	Dudley Station - Logan Airport via Andrew Station	30

Sources: www.mbta.com

4.2.6.2 MBTA Silver Line

In July 2002, Boston's first Bus Rapid Transit service, the "Silver Line", opened along Washington Street between Dudley Square and Downtown Crossing. In the fall of 2009, the route was extended and now runs between Dudley Square, Downtown Crossing, and South Station. A transit priority lane is provided in each direction between Melnea Cass Boulevard and the Massachusetts Turnpike along Washington Street (the lane is shared with general traffic turning right). The Silver Line replaces the existing Route #49 bus, which previously operated on Washington Street, and operates at 8-10minute headways during peak periods. The Silver Line stop closest to the campus is on Washington Street at East Newton Street, approximately a five-minute (one-quarter mile) walk, or two blocks from the intersection of Albany Street and East Newton Street.

4.2.6.3 MBTA Commuter Rail Service

The closest existing commuter rail station to the medical area is found at South Station. However, the MBTA is in the process of upgrading the Fairmount commuter rail line, which runs from Readville in Hyde Park into South Station, with a new stop under construction at NewMarket Square. According to the MBTA website, the proposed NewMarket Station will be located just north of the Massachusetts Avenue Bridge and directly adjacent to the South Bay Shopping Center. The actual site location is between the bridges at Southampton Street and Massachusetts Avenue. Given its proximity to jobs within NewMarket Square as well as Boston University Medical Center the NewMarket Station has a unique characteristic of being considered a destination station.

The station will consist of approximately 800-foot long high-level platforms in order to facilitate direct platform-to-coach boarding. The platforms will include detectable warning strips, new canopies, passenger shelters, benches/windscreens, wayfinding signage, graphic panels, and a train approach warning system, variable message signs, and high non-glare lighting. The station will also be equipped with closed circuit television (CCTV) video surveillance cameras, police emergency call box systems, and public telephones. There are no available parcels of land in the immediate area so parking and a drop-off/pickup area are not incorporated into the design. Constructing new concrete ramps and sloped walkways will provide full access to both the inbound and outbound platforms for all passengers.

The construction work commenced in January 2011 and is expected to be completed by Summer, 2013. The opening of this station will enhance public transportation options for the Boston University Medical Center community, particularly from neighborhoods to the south.

4.2.6.4 TranSComm Shuttle Services

Founded in 1991 as one of the first organizations of its kind in Boston, Boston University Medical Center's Transportation Management Association (TMA) is called Transportation Solutions for Commuters, Inc. (TranSComm). TranSComm's members include the Boston University Medical Campus (the BU Schools of Medicine, Public Health, Graduate Medical Science and Dental Medicine), Boston Medical Center, BioSquare, and Boston Health Care for the Homeless Program.

TranSComm works to bring more frequent and accessible public transportation to the Medical Center community and provides information on transportation services in the area (see www.transcomm.org). Additional information on TranSComm programs is found in Section 4.6.

With its dedicated bus and shuttle program Boston University Medical Center through TranSComm can significantly reduce the number of inter campus vehicle trips. The radial routes can reduce the number of vehicle trips made by patients.

TranSComm operates the following 15- to 30-passenger shuttles:

- VA Shuttle for employees and students travels from Boston Veterans Administration Medical Center (VA) in Jamaica Plain to the BUMC Campus several times per day on the hour, from 10:00 a.m. to 5:00 p.m., leaving the BUMC Campus.

- Evening Shuttle travels on request from a central stop at 710 Albany Street on the BUMC Campus to MBTA subway stations at Andrew, Broadway, Ruggles, Back Bay and Copley stations, nearby South End neighborhood locations, and Boston University Medical Center parking lots and garages from 5:15 p.m. to 12:15 a.m.

- Inner Campus Shuttle, primarily for patients, travels on a continuous loop between institutions from 9:00 a.m. to 5:00 p.m. Arrival and departure times vary according to the number and disposition of patients taking the shuttle. Specific pick-up times can be scheduled by phone.

- Healthnet Shuttle, a free service primarily for patients, travels from Boston neighborhoods to Boston Medical Center (for patients only). Centers served include the Mattapan Community Health Center, Harvard Street Neighborhood Health Center, Greater Roslindale Medical & Dental Center, Whittier Street Health Center, Roxbury Comprehensive Health Center, South End Community Health Center, Codman Square Health Center, East Boston Neighborhood Health Center and Uphams Corner Health Center.

- Charles River Campus Shuttle travels from the BU Charles River Campus hourly from 7:00 a.m. to 9:30 p.m. and hourly at 10:00 and 11:00. This schedule is modified during the summer months.

- TranSComm allows South End residents to use its shuttle services at no cost. This includes the all-day campus shuttle stopping at St. Helena House, a facility for elderly and disadvantaged South End residents.

4.2.7 Pedestrian Conditions

The medical campus, with its treatment and academic functions, generates a significant number of pedestrian trips throughout the study area, including trips along and across many of the study area roadways. Generally speaking, the sidewalks on Albany Street are in good condition and are of adequate width. Most sidewalks are 8–10 feet wide.

Pedestrian conditions within the medical center are acceptable along the most heavily traveled roadways; Massachusetts Avenue, Harrison Avenue, Albany Street, and the mid-block East Concord Street crossing that connects the Moakley Building to the educational programs of the medical center. Four study area intersections have exclusive pedestrian phases: East Concord Street/Albany Street, East Newton Street/Albany Street, East Concord Street/Harrison Avenue, and East Newton Street/Harrison Avenue. During the exclusive pedestrian phase, all vehicular traffic is stopped to allow pedestrians to cross.

Pedestrian pathways are shown in **Figure 4-9**. A.m. and p.m. peak hour pedestrian volumes are shown **in Figure 4-10.**

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Figure 4-9
Pedestrian Pathways

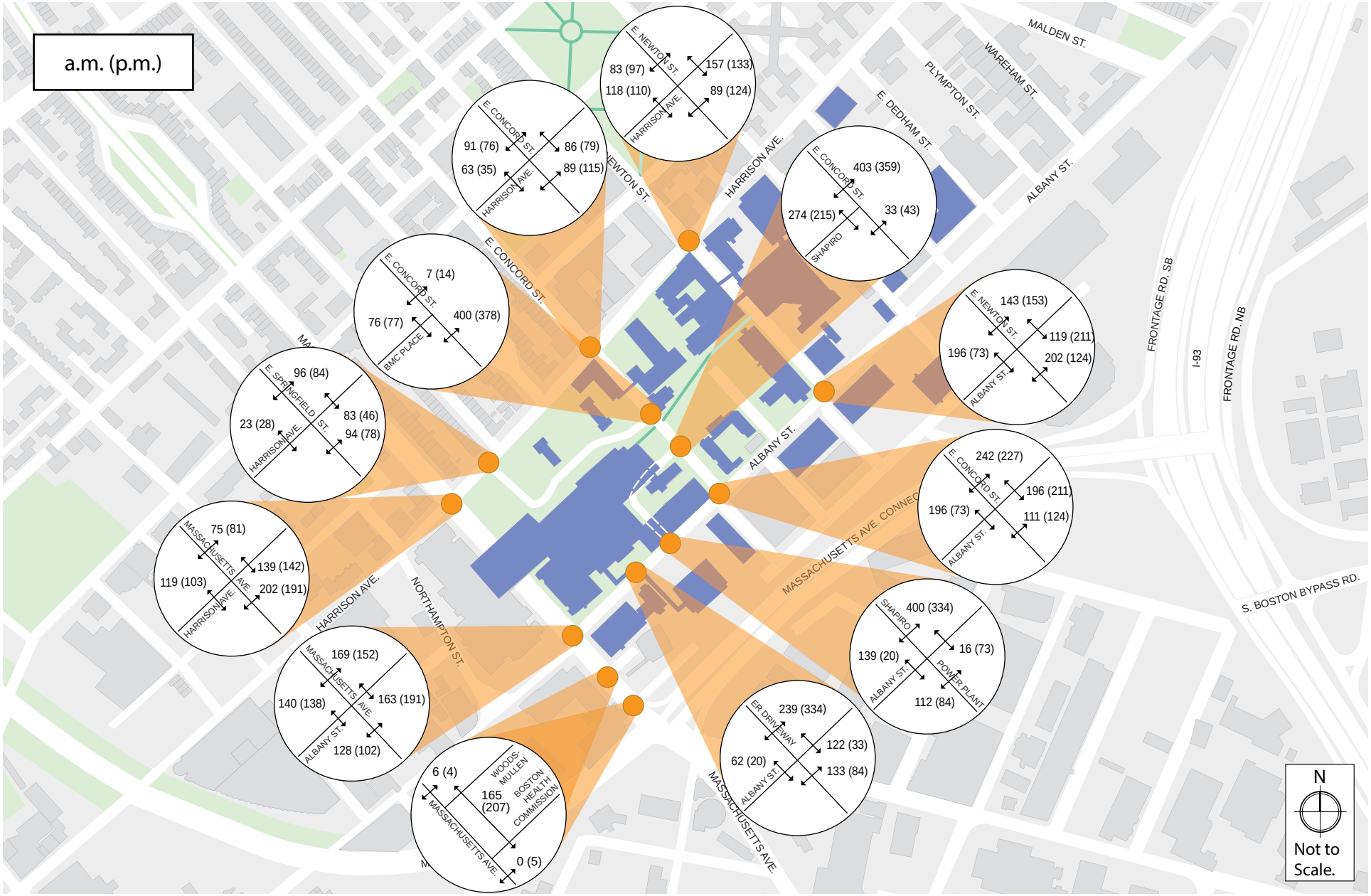

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Figure 4-10
Existing Conditions (2013) Pedestrian Volumes, a.m. and p.m. Peak Hours

4.2.8 Bicycle and Scooter Facilities

Albany Street, Massachusetts Avenue, Harrison Avenue, and East Newton Street are generally considered on-street bicycle routes in this area. In recent months, the City of Boston has created marked bike lanes and marked shared-travel bike lanes (where space does not allow an exclusive bike lane) between parked cars and the outside travel lanes on Massachusetts Avenue between Albany Street and St. Botolph Street as part of a major improvement project, extending lanes already in place from Huntington Avenue across the Harvard Bridge into Cambridge. The Southwest Corridor bike path can be reached via Massachusetts Avenue or Melnea Cass Boulevard. According to a 2002 survey of Boston University Medical Center employees conducted by TranSComm, about 1% of employees rode bicycles to work at Boston University Medical Center (most of the cyclists are likely students). TranSComm continues to encourage cycling as a healthy, inexpensive, and environmentally positive alternative to driving alone and provides many amenities and programs, including:

- Installing three secure, weather protected bike cages. The first one, installed in March, 2006, is located on East Newton Street between the Newton Pavilion and the School of Dental Medicine and houses approxinmately132 bicycles. The second one, installed in October 2006, is located at the Menino Pavilion. It was expanded in 2012 from 87 to 138 spaces. Both cages are well utilized. As a result, a third bike cage with room for 70 bicycles was added early in 2013 in the 710 Albany garages, bringing the total spaces in bike cages up to 340 spaces. In 2012 there were 376 registered bike cage cyclists.

- Providing a bicycle lock loan program for cyclists;

- Providing showers for cyclists in the basement of the School of Medicine building;

- Providing umbrellas for walkers and cyclists if it rains;

- Organizing free bike safety and mechanical check-ups, twice per year: TranSComm works with local bike shops to bring this popular event to the Medical Center to encourage cyclists to bike to work/school.

- Registering bikes on-line: For students and Boston University Medical Center employees, bike registration continues to be offered on-line.

- Installing new racks and repairing existing bike racks located throughout the campus.

- Boston University Medical Center will work with Boston's Director of Bike Programs to identify ways to improve bicycle use.

- Motorcycles may park at the BUMC Campus garages at regular parking rates.

- Six gas-powered scooter parking spaces are provided for employees in the 610 Albany Garage. All gas powered scooters must have a $20 annual Boson University Medical Center sticker issued by TranSComm.

- Electric scooters must park in the bike cages located at the Menino and East Newton Pavilions for a $20 annual fee. The scooters must park along the sides of the bike cages so that they do not take up additional bike parking spaces or obstruct movement of other bicycles/scooters.

Hubway, a bicycle sharing system in Metro Boston launched in July 2011, now has more than 100 stations with 1,000 bicycles available throughout Boston, Brookline, Cambridge, and Somerville. Hubway bicycles are available during the spring, summer, and fall seasons (the system is shut down in the winter). Near the Project site, there are four Hubway stations:

- at the Boston Medical Center FGH Building at 820 Harrison Avenue;

- at the corner of Washington Street and Rutland Street;

- at the corner of Washington Street and Lenox Street; and

- at the corner of Washington Street and Waltham Street.

Each Hubway station accommodates between 15 and 20 bicycle docks. All four stations are within a half-mile of the BUMC Campus.

4.2.9 Car Sharing Availability

Car sharing, predominantly provided by Zipcar in the Boston area, supplies easy short-term access to vehicular transportation for those who do not own cars. Vehicles are rented on an hourly or daily basis with all vehicle costs (gas, maintenance, insurance, and parking) included in the rental fee. Vehicles are checked out for a specific time period and returned to their designated location. Approximately twenty-six Zipcars are located at six locations within one-quarter mile of the Project site. Also, Hertz On-Demand car sharing options are available on the Northeastern Campus, which is located outside of the one-quarter mile radius. In 2012 there were 521 students and 146 employees enrolled in the Zipcar program – 667 total members.

Bicycle, Scooter, and Zipcar facilities on campus are shown in **Figure 4-11.** **Figure 4-12** shows a.m. and p.m. peak hour bicycle volumes.

4.2.10 Loading and Service

Boston University Medical Campus is served by two primary loading docks, serving the west and east sides of the campus. A weekly schedule of deliveries at each location was provided by BMC. Truck activity at each location is summarized in **Table 4-6.** Only one delivery per day at each loading dock is made by a 53' truck, at either 9:00 or 10:00 a.m.

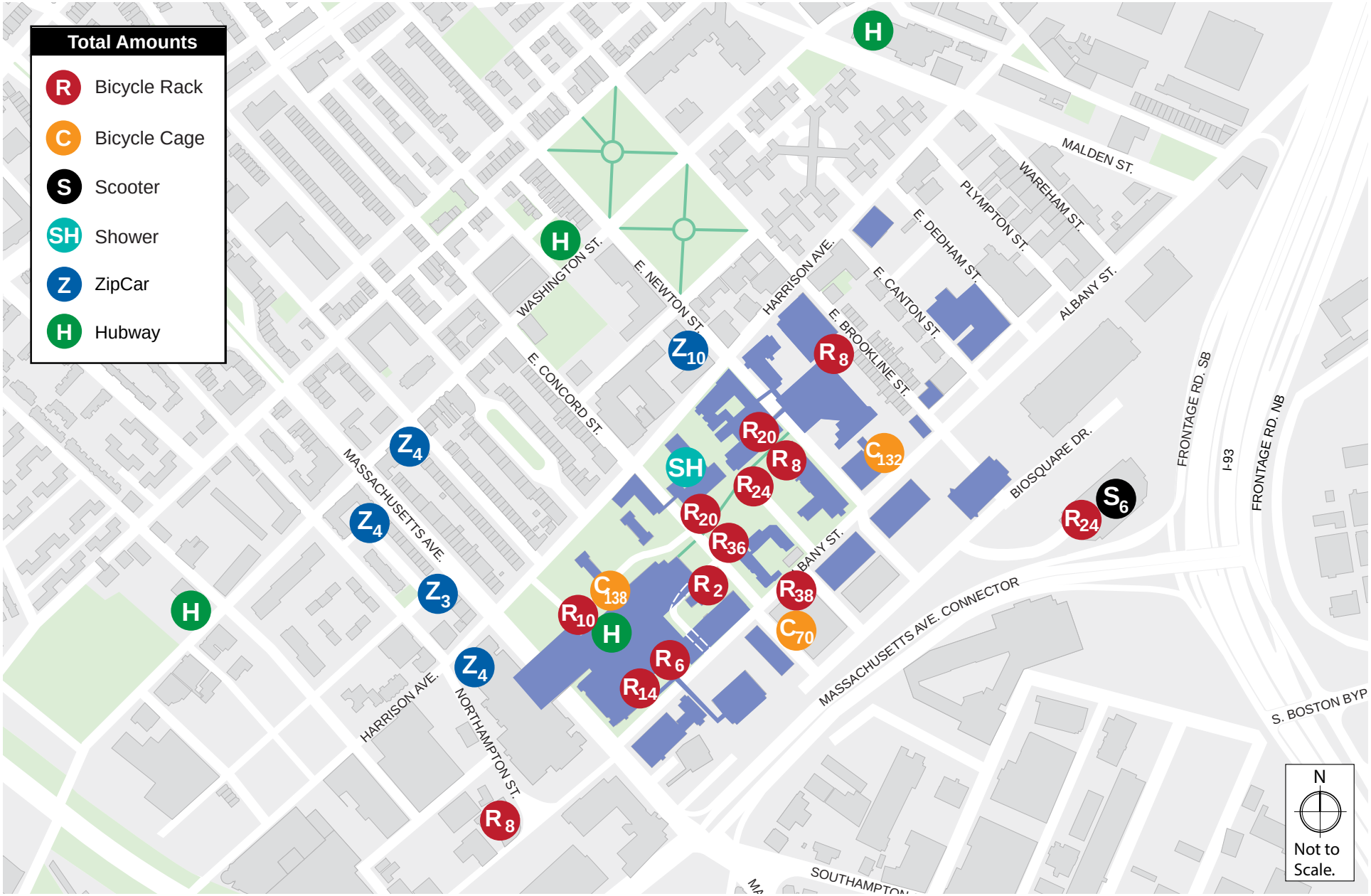

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Figure 4-11
Bicycle, Scooter, and ZipCar Locations

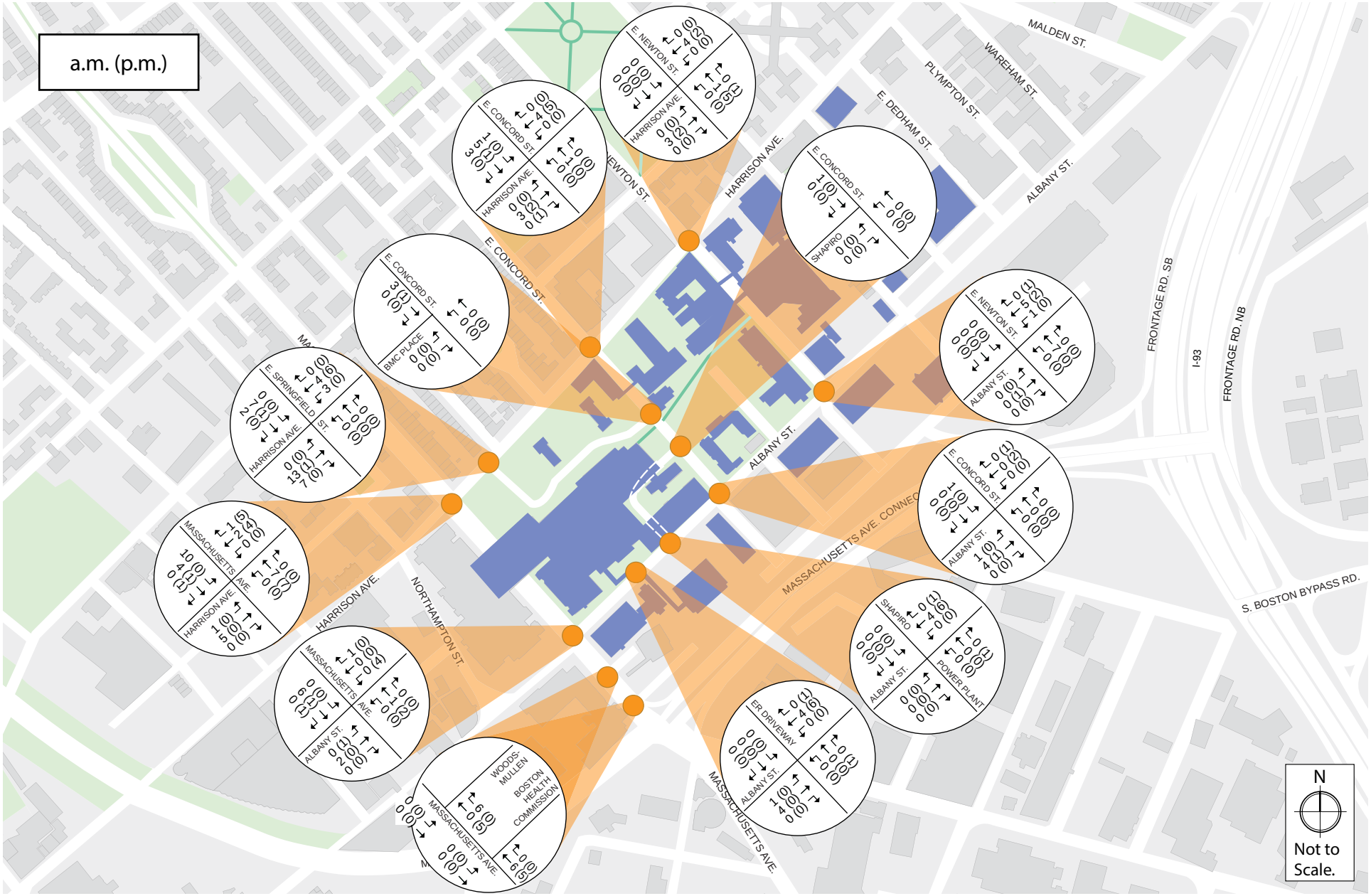

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Figure 4-12
Existing Conditions (2013) Bicycle Volumes, a.m. and p.m. Peak Hours

Table 4-6 Existing (2013) Average Weekday Truck Activity: Menino and Newton Loading Docks

	Menino Dock	Newton Dock	Total
Vehicle Type	**Vehicles Observed**	**Vehicles Observed**	
Car/Van/Pick-up	9	5	14
27′ Truck	17	7	24
48′ Truck	4	5	9
53′ Truck (Tractor Trailer)	1	1	2
Total	**31**	**18**	**49**

A graph showing weekday activity at each loading dock by hour is provided in **Figure 4-13.** As shown, the peak hour for deliveries at Newton is 8:00 to 9:00 AM, when six vehicles enter. At Menino, the peak hours occur at 5:00-6:00 AM, 6:00-7:00 AM and 10:00-11:00 AM, when four vehicles enter.

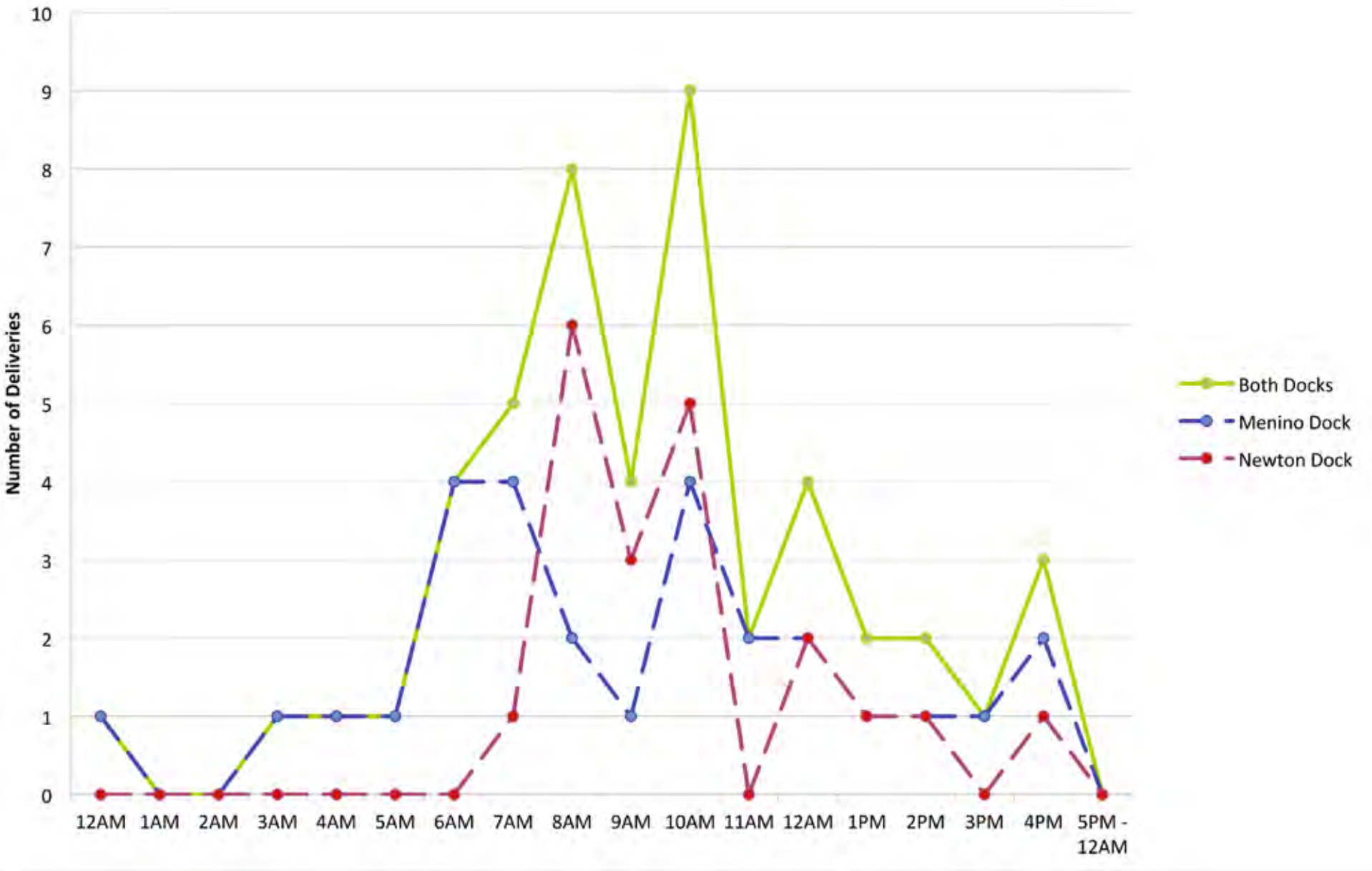
4.2.10.1 Menino Loading Dock

The main campus loading dock at 751 Albany Street (Menino dock) has three dedicated bays, with occasional loading for small vehicles occurring in front of the trash compactors. Trucks access the loading dock from Albany Street; larger trucks must back in from the street. This facility serves the BMC West Campus – the Menino Pavilion, the Yawkey Ambulatory Care Center, the Dowling Building, and the Moakley Building. Its operating hours are 12:00 a.m. to 5:00 p.m., Monday through Friday, although there are three deliveries at 12:00 a.m., 9:00 a.m. and 11:00 a.m. on Saturday and Sunday. The Menino dock accommodates vehicles ranging from a small van to a 53′ truck. The docks carry approximately 31 vehicles on an average weekday day; the typical duration at the dock is 36 minutes, according to a nine-hour survey conducted on September 27, 2012.

The peak hour for deliveries is 10:00 a.m. on Wednesdays and Fridays, when 4 vehicles arrive at the loading dock.

4.2.10.2 Newton Loading Dock

The Newton Pavilion loading dock, serving 88 E. Newton Street, is located on Albany Street midblock between East Newton and East Brookline Streets, with three dedicated bays. This facility serves the east side of the campus, including the Newton Pavilion, the Evans Building and the Doctors Office Building. This loading dock is open from 7:00 a.m. to 5:00 PM Monday through Friday, although there are two deliveries per day at 10:00 a.m. and 4:00 p.m. on Saturday and Sunday. Again, most of the deliveries are made by smaller vehicles. This dock accommodates 18 vehicles per average weekday. The peak hour for deliveries is Wednesdays and Fridays at 10:00 a.m., when 5 vehicles arrive at the loading dock.


10
9
8
7
6
5
4
3
2
1
0
Number of Deliveries
12AM
1AM
2AM
3AM
4AM
5AM
6AM
7AM
8AM
9AM
10AM
11AM
12AM
1PM
2PM
3PM
4PM
5PM - 12AM
Both Docks
Menino Dock
Newton Dock

4.3 Evaluation of Long-term Impacts

Long-term transportation impacts were estimated for 2019, to reflect the initial term of the Institutional Master Plan.

4.3.1 No-Build Scenario 2019

The no-build scenario models traffic operations for a horizon year without considering any IMP project traffic estimates. No-Build traffic volumes were developed by applying a general traffic growth factor, along with specific study area traffic added to the street network by individual projects.

4.3.1.1 Background Growth Factor

A background growth factor of 1% per year is assumed for the project, consistent with BTD approved rates for current development projects in the area. All existing traffic volumes are increased by 1% per year for a period of 6 years. Given the fact that trips from projects nearby are specifically included in the network, this is extremely conservative.

4.3.1.2 Projects Included in the No-Build Scenario

To provide a conservative analysis, the no-build scenario also adds traffic contributions from specific projects approved and/or under construction. These projects are shown in **Figure 4-14.** Traffic volumes from the following projects were specifically traced through the study area traffic network:

- BioSquare Building E – The proposed project includes 160,000 square feet of research and development space. Although its traffic has been added to the No-Build network, it is not anticipated that this project will be built within the 10-year term of the IMP.
- BioSquare Building G – The proposed project includes 215,000 square feet of research and development space (approved, not constructed). Although its traffic has been added to the No-Build network, it is not anticipated that this project will be built within the 10-year term of the IMP.
- NEIDL Building – The proposed project includes 250 additional employees (built, not fully occupied).
- 275 Albany Street – The proposed project includes the redevelopment of the former Teradyne parking lot into a hotel consisting of 325 hotel rooms and 220 apartments. Most of the vehicle trips will be accessing the regional roadways north of East Berkeley Street.

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Figure 4-14
Area Projects

- 35 Northampton Street – The proposed project includes the rehabilitation of the existing 29-story, 165,000 square feet residential building. The existing office space within the building will be converted to 11 handicap accessible residential units, for a total of 245 affordable units.

- Ink Block (300 Harrison Avenue) – The proposed project includes 471 units, 85,000 square feet of retail, including a supermarket and 411 parking spaces.

In addition, traffic added from the projects below was considered to be reflected in the area-wide growth factor of 1% per year:

- Albany Fellows Phase 2 - to encompass approximately 358,500 square feet of above-grade building space and up to 322 parking spaces. Potential uses for these future facilities may include: housing ground level retail, office, backstreets, research & development, and academic space.

- 5-10 St. George Street - The proposed project includes 33 residential units and approximately 22 underground parking spaces. Traffic from this project was included in the overall growth factor.

- 199 West Brookline Street – The proposed project includes an adaptive reuse and rehabilitation of the existing Concord Baptist Church, which will include approximately nine residential units and 21 below grade parking spaces. Traffic from this project was included in the overall growth factor.

- Alexandra Hotel Rehab - The proposed project includes renovating the existing building to accommodate the Church of Scientology's new 45,000 square foot headquarters including ground floor retail. Traffic from this project was included in the overall growth factor.

In addition, the following infrastructure improvements were taken into account in developing the No-Build network:

Southbound Frontage Road Connection. The BioSquare Phase II project permitting included a connection from BioSquare Drive to the Frontage Road Southbound, which was approved, and also included a long-term goal of a connection to the Massachusetts Avenue Connector from East Concord Street.

Currently, BioSquare Drive has been constructed just short of its intersection of Frontage Road Southbound and the right-turn in/right-turn out intersection is anticipated to be completed prior to the completion of IMP projects. Although traffic generally operates at an acceptable level without either connection, the Frontage Road connection is expected to relocate traffic from Albany Street to BioSquare Drive and improve the roadway capacity and traffic operations within Boston University Medical Center. For this project, we have estimated that 17% of employee vehicle trips are expected to access the site from the Frontage Road Southbound Connection, as well as 29% of employee exiting vehicle trips.

MBTA Urban Ring. As noted in prior filings, Boston University Medical Center is located within the corridor of the MBTA's planned "Urban Ring" or circumferential transit project. At the present time, bus routes CT1 and CT3 serve as circumferential routes through the campus. Boston University Medical Center has worked with the MBTA over the years on long-term plans for the Urban Ring. At present, the locally preferred alternative for the Urban Ring Phase 2 is outlined in the November 2008 *Revised Draft Environmental Impact Report/Draft Environmental Impact Statement* (DEIR/DEIS) and expanded upon in a June, 2009 *Notice of Project Change* (NPC). This option calls for Bus Rapid Transit in both mixed traffic and exclusive lanes travelling through the BUMC Campus on Albany Street between Broadway Station and a new Crosstown Station. A new BU Medical Center Station would also be provided between E. Newton Street and E. Concord Street. In January 2010, the Massachusetts Department of Transportation notified the Executive Office of Environmental Affairs that it was suspending further environmental review of the Urban Ring Phase 2 project. Thus, no changes to MBTA transit services were assumed to be implemented by 2019.

MBTA Indigo Line. The MBTA is improving the Fairmount Branch of the commuter rail that runs from South Station to Readville in Hyde Park, calling it the "Indigo Line." BUMC and TranSComm have been advocating with the MBTA to build a new station at NewMarket Square, which will increase transit options to BMC for a densely populated area in Boston. Construction of Phase 1 of the "Indigo Line" is under construction now. This will rebuild Uphams Corner and Morton St stations so they are ADA compliant, with high level platforms, and better shelter from the elements. Phase 2 will construct new stations along the route at NewMarket, Five Corners, Talbot Ave, and Blue Hill Ave. The MBTA estimates that service to the new NewMarket Station will begin in Summer, 2013. No increased transit mode share was estimated as a result of this new service in the interest of a conservative analysis.

City of Boston Melnea Cass Boulevard Improvement Project. The Boston Transportation Department is working with the Roxbury community to redesign Melnea Cass Boulevard with the goal of making it a neighborhood friendly corridor. The scope includes the development of roadway and streetscape designs that create a pedestrian friendly environment, ensure efficient traffic flow, accommodate transit vehicles and bicycles and promote economic development. The redesign plans will include dedicated bus lanes that can accommodate existing transit and future BRT service. As a final design has not yet been adopted, traffic analyses reflect current geometry and signal timing.

The design is progressing in collaboration with Roxbury and other surrounding communities and with all relevant City and state agencies, neighborhood groups and corridor abutters. The BTD, as lead agency on the project, aims to incorporate the city's new "Complete Streets" strategy as well as the goals of the Roxbury Strategic Master Plan (RSMP) and the state-devised Urban Ring project. The Complete Streets approach focuses on the needs of pedestrians, bicyclists and transit users as well as drivers, and on environmentally sustainable design.

4.3.1.3 No-Build Traffic Impacts 2019

No-Build traffic volumes were calculated by factoring the existing volumes up by a .05 percent annual growth rate over 10 years and totaling the project-added trips for each development described above. The No-Build street networks, shown in **Figure 4-15** and **Figure 4-16**, include the Frontage Road Southbound connection to BioSquare Drive east of Albany Street, which has been approved by the City. Morning peak hour overall intersection traffic operations under No-Build conditions are shown in **Table 4-7.**

Evening peak hour overall intersection traffic operations under No-Build conditions are shown in **Table 4-8.**

Under No-Build Conditions, most signalized intersections continue to operate at the same overall level of service in both the morning and afternoon peak hours as the Existing Conditions. The intersections and approaches that decreased to an LOS E or worse are listed below:

- At Massachusetts Avenue/Albany Street, the LOS for Massachusetts Avenue southbound left turn decreased from LOS E to LOS F during the a.m. peak hour. However, the overall LOS, while reduced from LOS C to LOS D, is still within the acceptable range.

- At Albany Street/East Concord, LOS for the East Concord Street southbound through movement decreased from LOS D to LOS E during the a.m. peak hour, although overall LOS remains at C.

- At Albany Street/East Newton Street, the LOS for East Newton Street northbound decreased from LOS C to LOS E during the a.m. peak hour, although overall LOS remains at LOS D.

- At Albany Street/Shapiro Entrance Driveway/Power Plant Driveway, the Power Plant approach decreased from LOS D to LOS E during the a.m. peak hour. This decrease is due mainly to the increased volume on Albany Street making it difficult to make an unsignalized left turn out of the driveway.

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Figure 4-15
No-Build Conditions (2019) Traffic Volumes,
a.m. Peak Hours

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Figure 4-16
No-Build Conditions (2019) Traffic Volumes,
p.m. Peak Hours

Table 4-7: No-Build Conditions (2019) LOS Summary, a.m. Peak Hour (7:45 – 8:45 a.m.)

Intersection	LOS	Delay (seconds)	V/C Ratio	95% Queue Length (ft)
Signalized Intersections				
Massachusetts Avenue/Albany Street	**D**	**31.8**		
Albany EB left/thru | thru	D	46.8	0.69	232
Albany EB right	C	34.6	0.21	73
Albany WB left	F	>80.0	0.91	#257
Albany WB thru | thru/right	C	23.6	0.27	113
Mass Ave NB thru | thru	D	37.4	0.80	491
Mass Ave NB right	C	27.6	0.66	446
Mass Ave SB left	F	>80.0	0.84	#227
Mass Ave SB thru | thru/right	B	18.9	0.48	266
Albany Street/Public Health Driveway	**B**	**17.3**		
Albany EB left/thru /right	C	22.5	0.75	#1127
Albany WB left/thru | thru/right	A	4.9	0.18	103
Public Health NB left/thru/right	D	38.0	0.03	11
ER Driveway SB	N/A	-	-	-
Albany Street/East Concord Street	**C**	**23.3**		
Albany EB thru	C	27.4	0.52	382
Albany EB right	B	16.7	0.67	335
Albany WB left/thru | thru	B	11.0	0.56	97
E. Concord SB left	E	62.8	0.66	160
E. Concord SB thru	E	57.6	0.63	191
E. Concord SB right	B	12.4	0.53	62
Albany Street/East Newton Street	**B**	**18.0**		
Albany EB left	C	21.1	0.48	m126
Albany EB thru	B	10.2	0.35	250
Albany WB thru | thru/right	B	19.8	0.36	287
E. Newton NB left	D	49.9	0.21	58
E. Newton NB thru/right	C	32.0	0.22	37
Harrison Avenue/East Newton Street	**B**	**18.0**		
Harrison EB left/thru	A	6.90	0.34	81
Harrison WB thru/right	A	9.20	0.29	163
E. Newton NB left/thru/right	D	5.19	0.78	165
Harrison Avenue/East Concord Street	**A**	**9.20**		
Harrison EB thru/right	A	6.00	0.44	265
Harrison WB left/thru	A	3.40	0.35	m66
E. Concord SB left/thru/right	D	42.7	0.54	100
Massachusetts Avenue/Harrison Avenue	**C**	**31.6**		
Harrison EB left/thru/right	E	60.5	0.92	#407
Harrison WB left/thru/right	E	66.2	0.92	#330
Mass Ave NB left	A	9.60	0.20	29
Mass Ave NB thru | thru/right	C	27.3	0.83	430
Mass Ave SB left	B	13.4	0.41	58
Mass Ave SB thru | thru/right	B	17.6	0.57	300

Intersection	LOS	Delay	V/C Ratio	95% Queue Length
Unsignalized Intersections				
Albany Street/Shapiro Entrance Driveway/Power Plant Driveway				
Albany EB left/thru | thru/right	A	0.7	0.31	4
Albany WB left/thru | thru/right	A	0.4	0.15	2
Power Plant NB left/thru/right	E	437.6	0.03	2
East Concord Street/Shapiro Exit Driveway				
Shapiro EB right	B	11.6	0.18	6
E. Concord SB thru	A	0.0	0.26	0
East Concord Street/Boston Medical Center Place				
Boston Medical EB right	C	16.5	0.26	26
E. Concord SB thru	A	0.0	0.19	0
Harrison Avenue/East Springfield Street				
Harrison EB thru/right	A	0.0	0.39	0
Harrison WB left/thru	A	1.1	0.03	2
E. Springfield SB left/thru/right	C	16.4	0.14	12
Massachusetts Avenue/Woods-Mullen Service Driveway				
Woods-Mullen WB right	C	18.2	0.02	1
Mass Ave NB thru | thru | thru/right	A	0.0	0.39	0
Massachusetts Avenue/Boston Health Commission Exit Driveway				
Boston Health Commission WB right	-	-	-	-
Mass Ave NB thru | thru | thru	A	0.0	0.32	0

# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
N/A = The ER Driveway SB does not operate with the signal timing. The ambulances exiting the driveway have their emergency lights on therefore stopping all conflicting traffic. There is no signal head facing the SB traffic.
Grey shading indicated decreased LOS from existing conditions.

Table 4-8: No-Build Conditions (2019) LOS Summary, p.m. Peak Hour (3:30 – 4:30 p.m.)

Intersection	LOS	Delay (seconds)	V/C Ratio	95% Queue Length (ft)
Signalized Intersections				
Massachusetts Avenue/Albany Street	**C**	**33.6**		
Albany EB left/thru | thru	D	39.5	0.47	130
Albany EB right	D	41.4	0.47	162
Albany WB left	E	79.5	0.85	#363
Albany WB thru | thru/right	A	9.6	0.43	57
Mass Ave NB thru | thru	D	40.6	0.69	382
Mass Ave NB right	B	16.2	0.31	170
Mass Ave SB left	E	56.8	0.33	78
Mass Ave SB thru | thru/right	C	30.7	0.69	448
Albany Street/Public Health Driveway	**A**	**5.4**		
Albany EB left/thru /right	A	9.4	0.40	273
Albany WB left/thru | thru/right	A	3.1	0.40	59
Public Health NB left/thru/right	D	40.0	0.03	16
ER Driveway SB	N/A	-	-	-
Albany Street/East Concord Street	**C**	**24.6**		
Albany EB thru	B	17.6	0.51	290
Albany EB right	B	12.0	0.12	69
Albany WB left/thru | thru	B	14.1	0.51	m146
E. Concord SB left	D	42.4	0.37	127
E. Concord SB thru	C	35.0	0.06	33
E. Concord SB right	E	68.6	0.82	245
Albany Street/East Newton Street	**D**	**45.2**		
Albany EB left	D	46.2	0.61	205
Albany EB thru	C	34.6	0.58	432
Albany WB thru | thru/right	D	47.0	0.70	#358
E. Newton NB left	D	38.1	0.51	244
E. Newton NB thru/right	E	60.8	0.95	#379
Harrison Avenue/East Newton Street	**C**	**26.9**		
Harrison EB left/thru	A	9.30	0.26	94
Harrison WB thru/right	B	13.1	0.40	256
E. Newton NB left/thru/right	D	52.9	0.90	#325
Harrison Avenue/East Concord Street	**A**	**6.90**		
Harrison EB thru/right	A	3.90	0.26	121
Harrison WB left/thru	A	4.10	0.37	m128
E. Concord SB left/thru/right	D	35.9	0.43	74
Massachusetts Avenue/Harrison Avenue	**D**	**40.6**		
Harrison EB left/thru/right	C	34.5	0.61	259
Harrison WB left/thru/right	F	>80.0	>1.00	#579
Mass Ave NB left	B	12.6	0.36	44
Mass Ave NB thru | thru/right	C	20.0	0.62	282
Mass Ave SB left	B	10.3	0.23	34
Mass Ave SB thru | thru/right	C	20.2	0.65	332

Intersection	LOS	Delay	V/C Ratio	95% Queue Length
Unsignalized Intersections				
Albany Street/Shapiro Entrance Driveway/Power Plant Driveway				
Albany EB left/thru | thru/right	A	0.7	0.14	3
Albany WB left/thru | thru/right	A	0.0	0.28	0
Power Plant NB left/thru/right	C	22.1	0.06	5
East Concord Street/Shapiro Exit Driveway				
Shapiro EB right	B	11.0	0.05	4
E. Concord SB thru	A	0.0	0.19	0
East Concord Street/Boston Medical Center Place				
Boston Medical EB right	B	14.2	0.27	37
E. Concord SB thru	A	0.0	0.10	0
Harrison Avenue/East Springfield Street				
Harrison EB thru/right	A	0.0	0.24	0
Harrison WB left/thru	A	0.7	0.03	2
E. Springfield SB left/thru/right	C	15.4	0.15	13
Massachusetts Avenue/Woods-Mullen Service Driveway				
Woods-Mullen WB right	C	20.4	0.00	1
Mass Ave NB thru | thru | thru/right	A	0.0	0.25	0
Massachusetts Avenue/Boston Health Commission Exit Driveway				
Boston Health Commission WB right	-	-	-	-
Mass Ave NB thru | thru | thru	A	0.0	0.21	0

# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
N/A = The ER Driveway SB does not operate with the signal timing. The ambulances exiting the driveway have their emergency lights on therefore stopping all conflicting traffic. There is no signal head facing the SB traffic.
Grey shading indicated decreased LOS from existing conditions.

4.3.2 Build Conditions

4.3.2.1 Projects Analyzed

As previously described, the Build Scenario transportation analysis estimates the cumulative impacts of the proposed Institutional Master Plan projects. A summary of projects for which traffic analysis has been conducted by category of space for this IMP is found in **Table 4-9.**

Table 4-9. BUMC Projects for 2013 IMP

Project	SF	Analyze as:
Moakley Cancer Center Addition	27,280	ITE 610 Hospital
New Inpatient Building Phase 1	67,888	ITE 610 Hospital
New Inpatient Building Phase 2	322,600	ITE 610 Hospital
Total Hospital	**417,768**	
Admin/Clinical building	219,600	
Admin	175,680	ITE 715 Single Tenant Office
Clinical	43,920	ITE 720 Medical-Dental Office
Perkin Elmer (added space)	92,937	ITE 715 Single Tenant Office
Total Office/Medical Office	**312,537**	
TOTAL SPACE	**730,305**	
Patient Transport Bridge	7,100	
New Inpatient Building Phase 1 Connector Wing	10,800	
Energy Facility	38,500	
Power Plant demolition	(64,064)	
TOTAL: Additional Projects with No Impacts	**(7,664)**	

4.3.2.2 Additional IMP Projects

The following projects will be undertaken to improve traffic operations along Albany Street and to create a significantly improved pedestrian environment for patients, employees and visitors to Boston University Medical Center. Traffic impacts for the following projects were not specifically analyzed as they will not have any noticeable impact on area traffic operations.

- ***New Patient Transport Bridge.*** It is of note that the new Bridge and will have a positive effect on area traffic operations and the pedestrian environment. Creation of this new connector will eliminate the need for ambulance trips to transfer patients across Albany Street between the helipad and the hospital emergency room. The curb cut that currently exists under the yellow utility tube will be reduced in half, minimizing vehicle conflicts on Albany Street. Shuttle buses from the Woods Mullen Shelter that now use the driveway will be relocated to new one-way entrance and exit driveways on Massachusetts Avenue and use right-in/right-out only curb cuts. These shuttles typically run early in the morning and later in the evening, with no peak period impacts.

- ***Energy Facility/Power Plant Demolition.*** The Energy Facility and Power Plant demolition similarly will have no traffic impacts, as these buildings are predominantly mechanical space, with very few employees involved.

- ***Relocation of Emergency Department Entrance.*** The relocation of the Emergency Department entrance for pedestrians and passenger vehicles will not affect traffic

volumes but will change local circulation patterns. Passenger vehicles headed for the Emergency Department will now be directed to the Shapiro Courtyard instead of the wide curb openings along Albany Street. At the new entrance, drivers will be met by a valet who will transfer their vehicle via East Concord Street and across Albany Street to a valet-only parking lot to be created in adjacent to the Power Plant.

The relocation of the passenger vehicle pick-up and drop-off along with modifications to campus loading will enable closure of three curb cuts in front of the current Emergency Department entrance. The resulting one-way circulation scheme will reduce traffic conflicts on the north side of Albany Street and will enlarge the space available for ambulances.

- ***Interim Facility for Consolidation of Loading Operations.*** One of the primary goals of the BUMC IMP is to begin the effort to relocate all campus loading from its current locations on the north side of Albany Street— locations that negatively impact traffic operations and affect pedestrians. Boston Medical Center will create consolidated materials management facilities in proximity to the existing Power Plant. The new facilities will utilize the proposed Bridge to efficiently distribute materials for the entire campus. As planning for the facilities continues, Phase 1 of the IMP will provide an interim loading dock at the Power Plant to realize the traffic benefits of the final materials management configuration. The interim loading dock will be a significant improvement because it will allow trucks to enter from Albany Street and maneuver to and from the loading dock on campus property. Currently trucks sometimes queue and often have to back into the loading dock from Albany Street

4.3.2.3 Mode Use

Separate mode shares were developed for patients and employees. This approach provides a more accurate representation because of the extremely low auto use by Boston University Medical Center employees and students. Sources for the mode share assumptions are discussed below.

Patient Trips

Boston Transportation Department (BTD) mode split data for the Medical Area (BTD Area 15) The "All Purposes" category was used to capture the travel patterns of patients. Daily mode shares, shown in **Table 4-10,** vary during peak hours.

Table 4-10 BTD Area 15 Daily Mode Shares

Mode	Percentage
Auto	56%
Public Transportation	17%
Walk/Bike/Other	27%
Total	**100%**

Employee/Student Trips

Boston University Medical Center employee and student mode shares, derived from 2012 Rideshare Survey data of its employees and students are shown below in **Table 4-11**. The survey is conducted to determine travel patterns at Boston University Medical Center, as required by the Massachusetts Department of Environmental Protection. As the table indicates, existing employees and students have a significantly lower auto use than reflected by the BTD mode share rates—only approximately 28%. Overall employee vehicle occupancy, taking into account the 5% of commuters on campus who rideshare, is 1.2.

Table 4-11. Boston University Medical Center Employee Daily Mode Shares

Mode	Percentage
Auto	28%
Public Transportation	52%
Walk/Bike/Other	20%
Total	**100%**

The survey results reflect the strong transportation demand management program and low auto use in effect at Boston University Medical Center.

4.3.2.4 Trip Generation

It is important to note that although standard methodology for trip generation estimates has been employed for the IMP, a significant amount of the construction will be to right-size and update outdated building space for existing programs. Therefore, some of the building area to be constructed will not generate additional traffic and the actual transportation impact may be less.

Land Use Codes

The Institute of Transportation Engineers (ITE) *Trip Generation 9th Edition* (2012) was used as the basis for trip generation estimation. The following ITE land use codes were used:

ITE Land Use Code 610 - Hospital. A hospital is any institution where medical or surgical care and overnight accommodations are provided to non-ambulatory and ambulatory patients. This code was applied to the Moakley and Menino additions.

ITE Land Use Code 715 – Single Tenant Office Building. A single tenant office building generally contains offices, meeting rooms and space for file storage and data processing of a single business or company and possibly other service functions including a restaurant or cafeteria. This code was applied to the administrative space in the Administrative/Clinical Building.

ITE Land Use Code 720 - Medical Office Building. A medical-dental office building is a facility that provides diagnoses and outpatient care on a routine basis, but is unable to provide prolonged in-house medical and surgical care. One or more private physicians or dentists generally operate this type of facility. This code was applied to the clinical space in the Administrative/Clinical Building.

Using the ITE *Trip Generation* 7th edition and applying the mode share, **Table 4-12** summarizes the total projected trip generation estimates for the IMP projects within the 2019 time frame.

Table 4-12 IMP Project Trip Generation Summary

	Vehicle Trips	Transit Trips	Bike/Walk Trips
Daily			
Total	**4,482**	**4,992**	**3,749**
In	2,241	2,496	1,875
Out	2,241	2,496	1,875
a.m. Peak Hour			
Total	**409**	**634**	**330**
In	298	500	243
Out	111	134	87
p.m. Peak Hour			
Total	**431**	**550**	**354**
In	133	86	107
Out	298	463	246

4.3.2.5 Trip Distribution

Trip distribution describes the different roadways used for trips originating or destined to Boston University Medical Center. The roadways that vehicles are assigned to are based on BTD trip origin/destination information for this district and from Boston University Medical Center employee data.

With the exception of employee trips associated with space in the Perkin Elmer building, employee trips were assigned to the 610 Albany garage, and all patient/visitor trips were assigned to the 710 Albany garage. Trip distribution for employee and patient/visitor vehicle trips entering and leaving the campus is shown in **Figure 4-17** and **Figure 4-18**

4.3.2.6 Build Conditions Traffic Operations

Build conditions turning movement counts are illustrated in **Figures 4-19** and **4-20**. Intersection levels of service for the a.m. and p.m. peak hours are summarized in **Tables 4-13** and **4-14,** below.

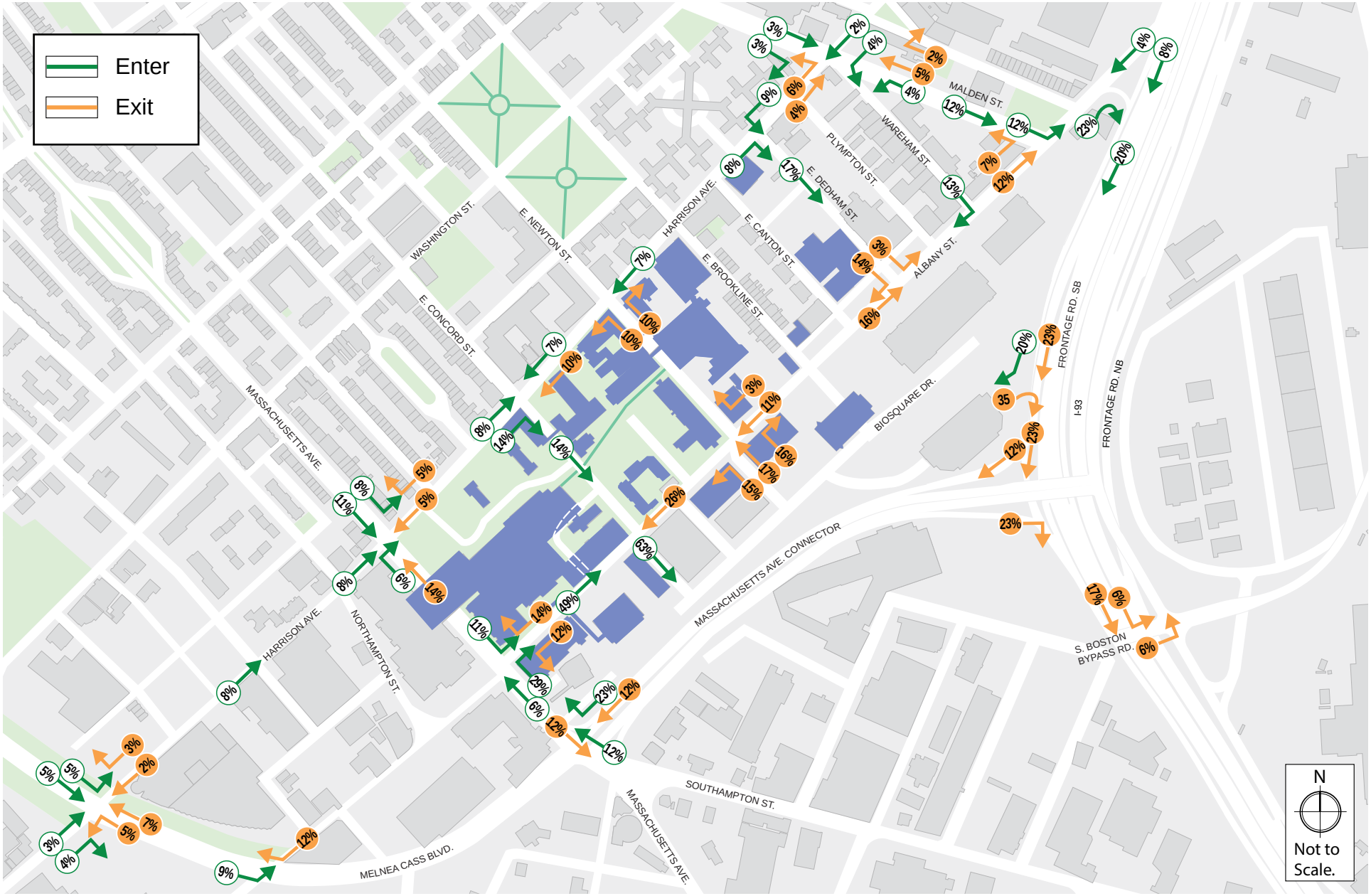

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Figure 4-17
Trip Distribution (Employees)

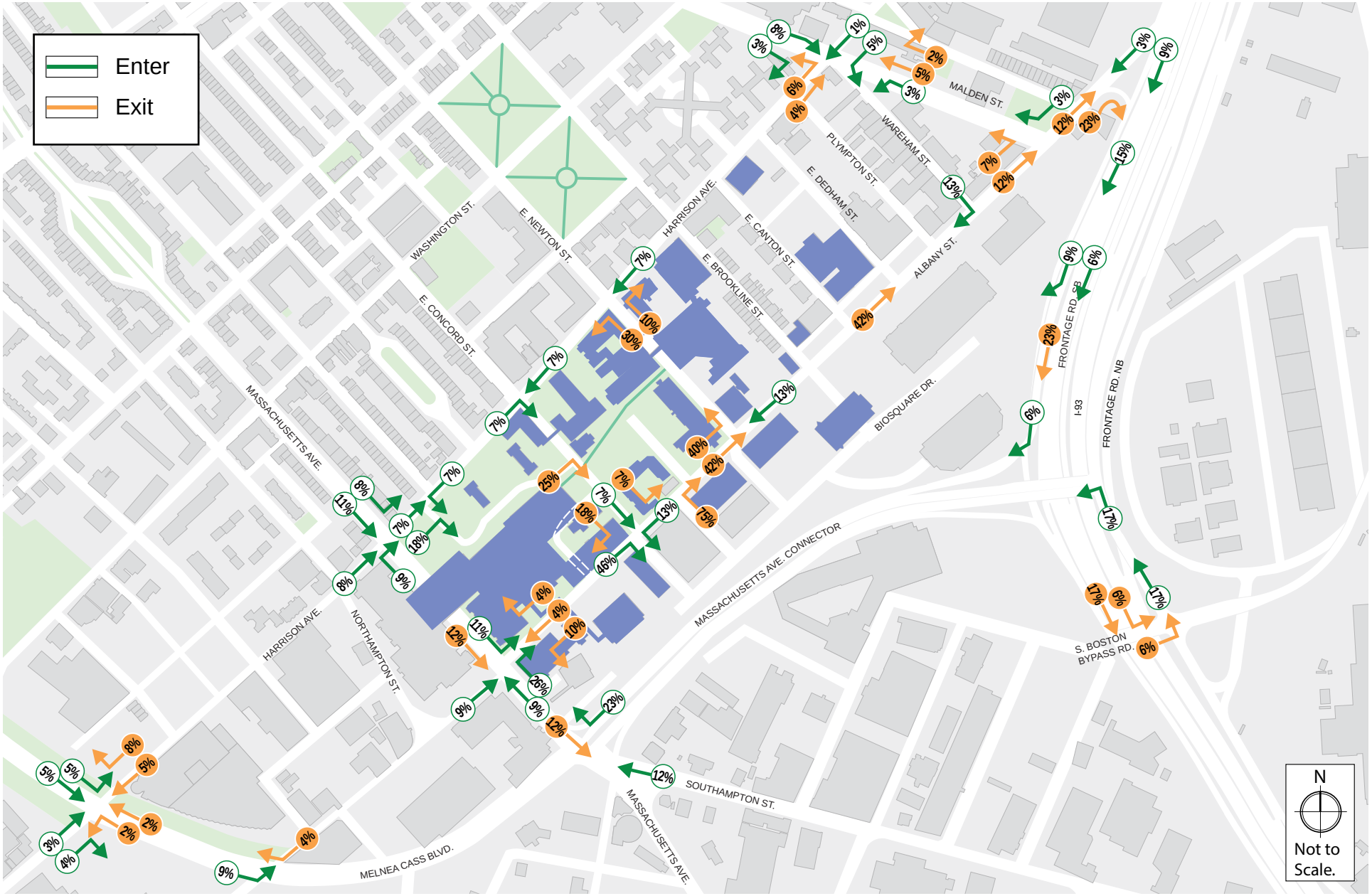

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Figure 4-18
Trip Distribution (Patients)

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Figure 4-19
Build Conditions (2019) Traffic Volumes,
a.m. Peak Hours

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Figure 4-20
Build Conditions (2019) Traffic Volumes, p.m. Peak Hours

Table 4-13: Build Conditions (2019) LOS Summary, a.m. Peak Hour (7:45-8:45 p.m.)

Intersection	LOS	Delay (seconds)	V/C Ratio	95% Queue Length (ft)
Signalized Intersections				
Massachusetts Avenue/Albany Street	**D**	**49.0**		
Albany EB left/thru | thru	D	51.2	0.72	247
Albany EB right	C	34.6	0.21	73
Albany WB left	F	>80.0	0.98	#283
Albany WB thru | thru/right	C	23.7	0.28	117
Mass Ave NB thru | thru	D	38.5	0.82	506
Mass Ave NB right	D	48.9	0.78	578
Mass Ave SB left	F	>80.0	>1.00	#298
Mass Ave SB thru | thru/right	B	19.0	0.49	267
Albany Street/Public Health Driveway	**C**	**29.9**		
Albany EB left/thru /right	D	39.7	0.86	#1387
Albany WB left/thru | thru/right	A	4.90	0.19	109
Public Health NB left/thru/right	D	38.0	0.03	11
ER Driveway SB	N/A	-	-	-
Albany Street/East Concord Street	**C**	**27.1**		
Albany EB thru	C	28.9	0.53	388
Albany EB right	C	26.9	0.83	#576
Albany WB left/thru | thru	B	12.6	0.88dl	100
E. Concord SB left	E	58.0	0.62	163
E. Concord SB thru	E	59.9	0.71	229
E. Concord SB right	B	11.5	0.53	62
Albany Street/East Newton Street	**B**	**19.8**		
Albany EB left	C	25.2	0.55	156
Albany EB thru	B	11.0	0.37	292
Albany WB thru | thru/right	C	20.7	0.38	296
E. Newton NB left	D	50.7	0.26	68
E. Newton NB thru/right	C	34.2	0.33	51
Harrison Avenue/East Newton Street	**C**	**20.1**		
Harrison EB left/thru	A	8.20	0.35	90
Harrison WB thru/right	B	10.6	0.30	179
E. Newton NB left/thru/right	D	51.5	0.81	187
Harrison Avenue/East Concord Street	**A**	**9.60**		
Harrison EB thru/right	A	6.70	0.50	318
Harrison WB left/thru	A	4.60	0.43	m85
E. Concord SB left/thru/right	D	42.7	0.54	100
Massachusetts Avenue/Harrison Avenue	**C**	**33.8**		
Harrison EB left/thru/right	E	62.9	0.94	#449
Harrison WB left/thru/right	E	70.5	0.95	#365
Mass Ave NB left	A	9.80	0.21	29
Mass Ave NB thru | thru/right	C	28.9	0.86	#451
Mass Ave SB left	C	20.7	0.56	#94
Mass Ave SB thru | thru/right	B	18.7	0.61	315

Intersection	LOS	Delay	V/C Ratio	95% Queue Length
Unsignalized Intersections				
Albany Street/Shapiro Entrance Driveway/Power Plant Driveway				
Albany EB left/thru | thru/right	A	0.90	0.36	4
Albany WB left/thru | thru/right	A	0.50	0.15	2
Power Plant NB left/thru/right	E	42.5	0.04	3
East Concord Street/Shapiro Exit Driveway				
Shapiro EB right	B	12.2	0.08	7
E. Concord SB thru	A	0.00	0.29	0
East Concord Street/Boston Medical Center Place				
Boston Medical EB right	C	18.0	0.31	33
E. Concord SB thru	A	0.00	0.21	0
Harrison Avenue/East Springfield Street				
Harrison EB thru/right	A	0.00	0.43	0
Harrison WB left/thru	A	1.40	0.04	3
E. Springfield SB left/thru/right	C	19.2	0.17	15
Massachusetts Avenue/Woods-Mullen Service Driveway				
Woods-Mullen WB right	C	19.1	0.02	1
Mass Ave NB thru | thru | thru/right	A	0.00	0.41	0
Massachusetts Avenue/Boston Health Commission Exit Driveway				
Boston Health Commission WB right	-	-	-	-
Mass Ave NB thru | thru | thru	A	0.00	0.35	0

# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
N/A = The ER Driveway SB does not operate with the signal timing. The ambulances exiting the driveway have their emergency lights on therefore stopping all conflicting traffic. There is no signal head facing the SB traffic.
Grey shading indicated decreased LOS from No-Build conditions.

Table 4-14: Build Conditions (2019) LOS Summary, p.m. Peak Hour (3:30-4:30 p.m.)

Intersection	LOS	Delay (seconds)	V/C Ratio	95% Queue Length (ft)
Signalized Intersections				
Massachusetts Avenue/Albany Street	**D**	**35.7**		
Albany EB left/thru | thru	D	40.0	0.49	137
Albany EB right	D	41.3	0.47	162
Albany WB left	F	>80.0	0.89	#437
Albany WB thru | thru/right	A	8.70	0.45	54
Mass Ave NB thru | thru	D	42.7	0.74	388
Mass Ave NB right	B	16.7	0.35	197
Mass Ave SB left	E	60.4	0.43	97
Mass Ave SB thru | thru/right	C	32.0	0.72	448
Albany Street/Public Health Driveway	**A**	**6.30**		
Albany EB left/thru /right	A	9.90	0.44	92
Albany WB left/thru | thru/right	A	4.00	0.43	93
Public Health NB left/thru/right	D	40.0	0.03	10
ER Driveway SB	N/A	-	-	-
Albany Street/East Concord Street	**C**	**25.4**		
Albany EB thru	B	18.1	0.52	304
Albany EB right	B	13.5	0.24	122
Albany WB left/thru | thru	B	15.4	0.61	m154
E. Concord SB left	D	42.0	0.38	134
E. Concord SB thru	D	35.2	0.09	47
E. Concord SB right	E	30.6	0.85	#286
Albany Street/East Newton Street	**D**	**54.3**		
Albany EB left	E	64.3	0.83	#278
Albany EB thru	C	34.8	0.70	400
Albany WB thru | thru/right	E	56.4	0.85	#396
E. Newton NB left	C	34.6	0.49	270
E. Newton NB thru/right	F	>80.0	>1.00	#518
Harrison Avenue/East Newton Street	**C**	**32.7**		
Harrison EB left/thru	A	9.5	0.28	89
Harrison WB thru/right	B	14.8	0.44	263
E. Newton NB left/thru/right	E	60.9	0.96	#444
Harrison Avenue/East Concord Street	**B**	**11.9**		
Harrison EB thru/right	A	5.30	0.30	145
Harrison WB left/thru	A	6.80	0.40	m162
E. Concord SB left/thru/right	D	47.1	0.63	125
Massachusetts Avenue/Harrison Avenue	**D**	**46.1**		
Harrison EB left/thru/right	D	35.9	0.65	#243
Harrison WB left/thru/right	F	>80.0	>1.00	#619
Mass Ave NB left	B	14.9	0.46	54
Mass Ave NB thru | thru/right	C	20.6	0.65	297
Mass Ave SB left	B	11.0	0.27	38
Mass Ave SB thru | thru/right	C	21.8	0.68	340

Intersection	LOS	Delay	V/C Ratio	95% Queue Length
Unsignalized Intersections				
Albany Street/Shapiro Entrance Driveway/Power Plant Driveway				
Albany EB left/thru | thru/right	A	0.60	0.16	3
Albany WB left/thru | thru/right	A	0.00	0.31	0
Power Plant NB left/thru/right	D	25.1	0.07	5
East Concord Street/Shapiro Exit Driveway				
Shapiro EB right	B	10.9	0.05	4
E. Concord SB thru	A	0.00	0.21	0
East Concord Street/Boston Medical Center Place				
Boston Medical EB right	C	15.0	0.32	34
E. Concord SB thru	A	0.00	0.11	0
Harrison Avenue/East Springfield Street				
Harrison EB thru/right	A	0.00	0.25	0
Harrison WB left/thru	A	0.90	0.03	2
E. Springfield SB left/thru/right	C	18.3	0.18	17
Massachusetts Avenue/Woods-Mullen Service Driveway				
Woods-Mullen WB right	C	20.9	0.00	0
Mass Ave NB thru | thru | thru/right	A	0.00	0.26	0
Massachusetts Avenue/Boston Health Commission Exit Driveway				
Boston Health Commission WB right	-	-	-	-
Mass Ave NB thru | thru | thru	A	0.00	0.22	0

# = 95th percentile volume exceeds capacity. Queue may be longer. Queue shown is the maximum after 2 cycles.
m = Volume for the 95th percentile queue is metered by the upstream signal.
N/A = The ER Driveway SB does not operate with the signal timing. The ambulances exiting the driveway have their emergency lights on therefore stopping all conflicting traffic. There is no signal head facing the SB traffic.
Grey shading indicated decreased LOS from No-Build conditions.

Under Build Conditions, all new and relocated driveways affected by the various curb cut closures and relocations will operate at acceptable Levels of Service.

Most of the signalized intersections will continue to operate at the same overall level of service in both the morning and afternoon peak hours as the Existing and No-Build Conditions. Three intersection approaches show reductions in LOS, including:

- At Albany Street/Massachusetts Avenue, the Albany Street left turns went from LOS E to LOS F, with a slight increase in delay, although the overall intersection continues to operate at LOS D.

- At Albany Street/East Newton Street, the LOS for Albany Street eastbound left turns and the Albany Street westbound approach decreased from LOS D to LOS E during the p.m. peak hour, and the East Newton northbound through/right approach decreased from LOS E to LOS F, although overall operations remained at LOS D.

- At Harrison Avenue/East Newton Street, the E. Newton northbound approach decreased from LOS D to LOS E, although overall operations remained at LOS C.

A summary of traffic operations under Existing, No-Build and 2019 IMP Build conditions is included in **Tables 4-15** and **4-16**, below.

Table 4-15: LOS Comparison Table, a.m. Peak Hour (7:45-8:45 a.m.)

Intersection	Existing	No-Build	Build
Signalized Intersections			
Massachusetts Avenue/Albany Street	**C**	**D**	**D**
Albany EB left/thru | thru	D	D	D
Albany EB right	D	C	C
Albany WB left	F	F	F
Albany WB thru | thru/right	B	C	C
Mass Ave NB thru | thru	D	D	D
Mass Ave NB right	C	C	D
Mass Ave SB left	E	F	F
Mass Ave SB thru | thru/right	B	B	B
Albany Street/Public Health Driveway	**A**	**B**	**C**
Albany EB left/thru /right	B	C	D
Albany WB left/thru | thru/right	A	A	A
Public Health NB left/thru/right	D	D	D
ER Driveway SB	N/A	N/A	N/A
Albany Street/East Concord Street	**C**	**C**	**C**
Albany EB thru	C	C	C
Albany EB right	B	B	C
Albany WB left/thru | thru	A	B	B
E. Concord SB left	E	E	E
E. Concord SB thru	D	E	E
E. Concord SB right	B	B	B
Albany Street/East Newton Street	**B**	**B**	**B**
Albany EB left	B	C	C
Albany EB thru	A	B	B
Albany WB thru | thru/right	B	B	C
E. Newton NB left	D	D	D
E. Newton NB thru/right	C	C	C
Harrison Avenue/East Newton Street	**B**	**B**	**C**
Harrison EB left/thru	A	A	A
Harrison WB thru/right	B	A	B
E. Newton NB left/thru/right	D	D	D
Harrison Avenue/East Concord Street	**B**	**A**	**A**
Harrison EB thru/right	A	A	A
Harrison WB left/thru	A	A	A
E. Concord SB left/thru/right	D	D	D
Massachusetts Avenue/Harrison Avenue	**C**	**C**	**C**
Harrison EB left/thru/right	E	E	E
Harrison WB left/thru/right	E	E	E
Mass Ave NB left	A	A	A
Mass Ave NB thru | thru/right	C	C	C
Mass Ave SB left	B	B	C
Mass Ave SB thru | thru/right	B	B	B

Intersection	Existing	No-Build	Build
Unsignalized Intersections			
Albany Street/Shapiro Entrance Driveway/Power Plant Driveway			
Albany EB left/thru | thru/right	A	A	A
Albany WB left/thru | thru/right	A	A	A
Power Plant NB left/thru/right	D	E	E
East Concord Street/Shapiro Exit Driveway			
Shapiro EB right	B	B	B
E. Concord SB thru	A	A	A
East Concord Street/Boston Medical Center Place			
Boston Medical EB right	C	C	C
E. Concord SB thru	A	A	A
Harrison Avenue/East Springfield Street			
Harrison EB thru/right	A	A	A
Harrison WB left/thru	A	A	A
E. Springfield SB left/thru/right	C	C	C
Massachusetts Avenue/Woods-Mullen Service Driveway			
Woods-Mullen WB right	C	C	C
Mass Ave NB thru | thru | thru/right	A	A	A
Massachusetts Avenue/Boston Health Commission Exit Driveway			
Boston Health Commission WB right	-	-	-
Mass Ave NB thru | thru | thru	A	A	A

N/A = The ER Driveway SB does not operate with the signal timing. The ambulances exiting the driveway have their emergency lights on therefore stopping all conflicting traffic. There is no signal head facing the SB traffic.
Grey shading indicates decreased LOS from prior condition.

Table 4-16: LOS Comparison Table, p.m. Peak Hour (3:30 p.m. – 4:30 p.m.)

Intersection	Existing	No-Build	Build
Signalized Intersections			
Massachusetts Avenue/Albany Street	**C**	**C**	**D**
Albany EB left/thru | thru	D	D	D
Albany EB right	D	D	D
Albany WB left	E	E	F
Albany WB thru | thru/right	A	A	A
Mass Ave NB thru | thru	D	D	D
Mass Ave NB right	B	B	B
Mass Ave SB left	E	E	E
Mass Ave SB thru | thru/right	C	C	C
Albany Street/Public Health Driveway	**A**	**A**	**A**
Albany EB left/thru /right	A	A	A
Albany WB left/thru | thru/right	A	A	A
Public Health NB left/thru/right	D	D	D
ER Driveway SB	N/A	N/A	N/A
Albany Street/East Concord Street	**C**	**C**	**C**
Albany EB thru	B	B	B
Albany EB right	B	B	B
Albany WB left/thru | thru	A	B	B
E. Concord SB left	D	D	D
E. Concord SB thru	C	C	D
E. Concord SB right	E	E	E
Albany Street/East Newton Street	**C**	**D**	**D**
Albany EB left	C	D	E
Albany EB thru	C	C	C
Albany WB thru | thru/right	C	D	E
E. Newton NB left	D	D	C
E. Newton NB thru/right	C	E	F
Harrison Avenue/East Newton Street	**C**	**C**	**C**
Harrison EB left/thru	A	A	A
Harrison WB thru/right	B	B	B
E. Newton NB left/thru/right	D	D	E
Harrison Avenue/East Concord Street	**A**	**A**	**B**
Harrison EB thru/right	A	A	A
Harrison WB left/thru	A	A	A
E. Concord SB left/thru/right	D	D	D
Massachusetts Avenue/Harrison Avenue	**D**	**D**	**D**
Harrison EB left/thru/right	D	C	D
Harrison WB left/thru/right	F	F	F
Mass Ave NB left	B	B	B
Mass Ave NB thru | thru/right	B	C	C
Mass Ave SB left	A	B	B
Mass Ave SB thru | thru/right	B	C	C

Intersection	Existing	No-Build	Build
Unsignalized Intersections			
Albany Street/Shapiro Entrance Driveway/Power Plant Driveway			
Albany EB left/thru | thru/right	A	A	A
Albany WB left/thru | thru/right	A	A	A
Power Plant NB left/thru/right	C	C	D
East Concord Street/Shapiro Exit Driveway			
Shapiro EB right	B	B	B
E. Concord SB thru	A	A	A
East Concord Street/Boston Medical Center Place			
Boston Medical EB right	B	B	C
E. Concord SB thru	A	A	A
Harrison Avenue/East Springfield Street			
Harrison EB thru/right	A	A	A
Harrison WB left/thru	A	A	A
E. Springfield SB left/thru/right	C	C	C
Massachusetts Avenue/Woods-Mullen Service Driveway			
Woods-Mullen WB right	C	C	C
Mass Ave NB thru | thru | thru/right	A	A	A
Massachusetts Avenue/Boston Health Commission Exit Driveway			
Boston Health Commission WB right		-	-
Mass Ave NB thru | thru | thru	A	A	A

N/A = The ER Driveway SB does not operate with the signal timing. The ambulances exiting the driveway have their emergency lights on therefore stopping all conflicting traffic. There is no signal head facing the SB traffic.
Grey shading indicates decreased LOS from prior condition.

As shown, all overall intersection LOS remains at acceptable levels under Build conditions, with minimal changes from No-Build conditions.

4.3.2.7 Build Conditions Parking Supply and Demand

The IMP projects will result in a net addition of 730,305 square feet to the campus. At the current on-campus parking ratio of 0.86 parking spaces per 1,000 sf, this new space would result in a potential added demand for 628 total employee and patient/visitor parking spaces. The Moakley Cancer Center Addition and the Phase 1 New Inpatient Building will add 95,168 square feet in the short-term, with an added potential demand of 82 spaces.

At current peak occupancy, there are 500 available owned and leased off-street spaces available for Boston University Medical Center parking, sufficient to meet added short-term demand. At present, no new on-campus parking is anticipated to be added. As a result, the overall on-campus ratio in the short-term will decline to 0.84 spaces per 1,000 square feet, within the BTD recommended range. In the long-term at full-build, if no new parking is built on-campus, the on-campus ratio will decline to 0.72 spaces per 1,000 square feet, slightly below BTD's minimum recommended ratio of 0.75 spaces per 1,000 square feet for this area.

Over the years, the parking ratio for Boston University Medical Center and BioSquare has steadily decreased as development has increased. At the same time, BUMC has employed active parking management to monitor space use and preserve patient/visitor parking availability, as well as a hierarchy of employee parking fees that makes the most convenient spaces the most expensive. The combination of the constrained supply and increased fees, along with transit service improvements and active demand management, has allowed the medical area to accommodate growth while limiting project-generated traffic increases.

The existing 710 and 610 Albany garages will continue to operate as the major parking facilities for the campus, supplemented by off-site leased parking spaces as needed. Valet parking will continue to be provided in the Menino Valet lots; valet parking for the relocated passenger vehicle emergency room entrance in the Shapiro Courtyard will be provided in the reconfigured L lot in front of the power plant.

As the IMP period unfolds, Boston University Medical Center will continue to actively manage both its on-campus owned spaces and its off-campus leased supply in order to meet new demand, while continually working to encourage the use of alternate modes such as transit, walking and bicycling. In the short-term, about 500 existing spaces are vacant at peak occupancy today. In the longer term, the total parking demand for up to 628 spaces will be met through a combination of on-campus spaces and leased off-site facilities. As each project is advanced, Boston University Medical Center will continue its parking management strategies, and, if needed, evaluate off-site employee parking options to preserve the most convenient spaces for patients and visitors on the campus.

4.3.2.8 Build Conditions Transit, Pedestrian and Bicycle Impacts

The IMP projects will generate about 2,580 patient, visitor and employee transit riders entering and leaving the campus over the course of a day and almost 2,000 people who come and go by walking or cycling. Added transit riders, cyclists and pedestrians will use existing pathways along Melnea Cass Boulevard and the Southwest Corridor Park as well as improved sidewalks and pathways through the campus. In the long-term, the South Bay Harbor Trail will provide a new shared-use path along the outer perimeter of the BioSquare site. New transit service by the MBTA in the area and the improvements planned along Melnea Cass Boulevard will continue to improve transit access to Boston University Medical Center.

4.3.2.9 Build Conditions Loading and Service

As noted above, the current loading facility for the West Campus is located close to the Emergency Department and Trauma Center entrance at the Menino Pavilion and is not large enough to allow trucks to maneuver off-street (trucks currently have to back in from Albany Street). This disrupts Albany Street vehicular and pedestrian traffic. The Newton Pavilion loading facility involves a wide curb cut along Albany Street as well. The IMP includes consolidation of these loading areas into a single loading dock to be located in front of the existing Power Plant on the opposite site of Albany Street. This will have the benefit of shortening existing curb cuts and moving truck activity further away from the

hospital buildings and the residential neighborhood. It also will have the benefit of allowing direct truck access from the Southbound Frontage Road via BioSquare Drive. Accommodated by the proposed new Bridge, materials will be transferred across the street from the loading facility to the campus. These improvements will improve existing loading operations and provide the capacity to support future growth.

Until the Administrative / Clinical Building is constructed, Boston Medical Center is proposing an interim relocation of the consolidated Menino and Newton Pavilion loading docks to a site in front of the existing Power Plant, as discussed above. The new location will enable trucks to be accommodated without the need to back up into Albany Street, improving safety for pedestrians and traffic and removing vehicular conflicts. It will also enable expansion of the ambulance area behind the Menino Building, reducing the need for ambulances to wait on-street or maneuver within the lot.

4.3.2.10 Removal of Ambulance Trips

When the new Bridge is constructed, patients arriving at the helipad will no longer need to be transported by ambulance across Albany Street to the Emergency Department. They will instead travel through the new bridge and move directly across to the new connector at the Menino Pavilion and into the hospital. Closure of the one of the two lanes allowing reduction in this existing curb cut by half under the yellow utility tube will reduce vehicle conflicts on Albany Street and improve the pedestrian experience on the south side of the street.

4.4 Transportation Demand Management

Boston University Medical Center has consistently worked to reduce the number of drive-alone trips to the medical area, both through efforts of the individual institutions and through TranSComm, the area's very active Transportation Management Association. TranSComm, founded in 1991, is in its 20th year of operation on the campus. TranSComm, BMC and BUMC have won several awards in recent years – the 2012 Mayor's Silver Award for Bike Friendly Business, a Silver Aware from the prestigious National League of American Cyclists and the "Pinnacle Award" for excellence in commuter options. They participate in several member sustainability committees including BMC's Green Committee, BUMC's Sustainability Committee and Boston University's Sustainability Committee (Charles River Campus).

As indicated in Section 4.3.2.3, existing employees and students at Boston University Medical Center have a significantly lower auto use than the BTD mode share rates, at only 28%. This rate reflects the strong transportation demand management program in effect. Through TranSComm, Boston University Medical Center will continue to encourage and assist its employees, students, as well as patients and visitors to use many of the demand management and trip reduction programs offered. These are listed below.

- Boston Medical Center offers a 35% transit subsidy through payroll deduction to full-time employees who do not have parking permits.

- BU students can enroll in the MBTA's semester pass program through TranSComm and save 11%.
- Full-time BU employees who work on the Medical Campus may sign up for monthly MBTA passes through pre-tax payroll deduction. Up to $230 per month is tax deductible.
- On-site non-discounted transit pass sales and schedules are provided.
- On-line transit and rideshare information is provided on the TranSComm Web site.
- A transit rider "read and ride" library is provided for commuters in the TranSComm office lobby.
- TranSComm works with the MBTA and BTD to improve bus service, wayfinding, and pedestrian safety around the campus.
- Boston University Medical Center provides 6 free shuttle services:
  - Inner Campus Shuttle for patients and visitors;
  - All-Day Medical Campus Shuttle for employees (which can also be used by neighbors in the South End)s;
  - VA/Medical Center Shuttle (patients, medical staff);
  - Evening Shuttle (to T stations and neighborhood for staff and students);
  - Boston University Shuttle (the BUS), ten minute weekday service and fifteen minute weekend service for students, staff and faculty; and
  - 610 Albany Shuttle to the employee parking garage.
- Since June 2007, preferential parking is provided for Carpool/Hybrid program participants on the first level of the 610 Albany Garage.
- TranSComm is developing a new Guaranteed Ride Home program for carpoolers in 2013, ensuring that carpoolers will have a ride home in case of emergency.
- TranSComm participates in NuRide, a free website and tool provided by MassDOT to reward travelers for taking "green" trips – i.e. walk, bike, telecommute, carpool, vanpool, subway, train, bus, or ferry trips, or even working a compressed week. Travelers log their transit, bus or walk trips to work on the website and are rewarded with discounts to stores, restaurants, entertainment, etc. NuRide also serves as the state's rideshare database for finding carpool partners.
- Gas-powered scooter parking for six scooters is provided in the 610 Albany Garage. Electric-powered scooters can park in the bike cages.

- TranSComm offers sheltered and secured bicycle parking at several locations, participation on the Annual Bike to Work/School week, a free Cyclists' Luncheon and a free Bike Safety Checkup.

- Boston University Medical Center provides an on-site car-sharing service and two dedicated parking spaces for shared-use vehicles.

- TranSComm installed two electric vehicle (EV) charging stations on the ground floor of the 710 Albany Garage in Spring 2012, one 120-volt and one 240-volt station. The stations are open to the public in return for paying the appropriate parking fee. TranSComm was one of 22 organizations to receive an EV grant offered by the Green Communities Division. The BMC/BUMC community can charge vehicles with free electricity until February 2014. In 2013, TranSComm has received funding to upgrade its one 120-volt station to 240-volts and to add two 240-volt stations so that there will be a total of four 240-volt stations in the garage. There are currently eight regular users, and the stations are also used by patients and visitors.

- TranSComm publishes a medical area walking map and offers neighborhood walks for the South End's medical history and South of Washington Area (SOWA) at lunchtime for employees and others. Besides designating short and long "neighborhood walking" loops covering areas like the Southwest Corridor Park, Discover Roxbury, Medical History, and the SOWA arts district, this map shows restaurants and community services such as ATM's and dry cleaners, as well as the mileage from BUMC to the neighboring MBTA stations.

- Boston University Medical Center, through TranSComm, publishes a periodic transportation newsletter and holds events to encourage its employees and students to use the alternative commuter transportation system. TranSComm also contributes a column in the Masscommuter newsletter once a year.

4.5 Summary of IMP Transportation Impacts

The impetus for the IMP projects is to right-size clinical and support services to support new trends in health care delivery. The proposed Moakley Cancer Center Addition, the New Inpatient Building and the Administration/Clinical Building will allow for consolidation of departments, improvement of operational adjacencies, and improvement of the patient care environment by modernizing current uses in outdated facilities on campus. Although there is new program space created, a portion of it will replace current uses on the campus and is not expected to generate additional trips. Furthermore, there are no transportation related impacts associated with the Energy Facility and New Patient Transport Bridge projects.

4.5.1 Summary of Findings

The IMP Amendment analyzes impacts to the original 2019 horizon year from the 2010 IMP. For a more accurate understanding of how the IMP projects will impact traffic, it is important to note that the largest traffic generator – the New Inpatient Building – will not be completed until near the expiration of the IMP. IMP traffic and parking analyses currently show that there exist approximately 500 spaces within the current supply of owned and leased parking spaces to accommodate the parking demand for additional development over the second half of the IMP. Additionally, the traffic analysis shows there is no significant degradation in intersection operations.

Within the 10-year time frame of the IMP, growth not associated with the medical area combined with IMP developments on the BUMC Campus and the BioSquare campus will impact operations only at a few intersections. However, of the intersections studied in the Build condition, all will have overall peak hour operations at acceptable levels (above LOS D), with only a few approaches operating below that level. Although the IMP developments will place further demands on existing parking resources, the campus parking ratio will still be generally in line with BTD ratios at 0.72 spaces per 1,000 s.f. Boston University Medical Center will continue to implement parking management strategies that have proven to be effective as evidenced by steadily decreasing auto use. Boston University Medical Center's goal is to ensure that BUMC Campus parking needs do not encroach on the available supply of on-street parking in the neighborhood.

Recognizing the potential of these impacts, Boston University Medical Center proposes to review each project in detail as the programs are more clearly defined and as they move into design review through the Article 80 Large Project Review process. This process will also allow new traffic data to be collected and recalibrated to existing conditions and new projects so that traffic impacts can be accurately assessed and planned.

4.5.2 Proposed Mitigation and Long Term Sustainability

Boston University Medical Center realizes the effect of the IMP development to its campus roadways and knows it is necessary to manage transportation demand while improving the transportation network in order to maintain good access for its employees and patients, and maintain access to its high level of care.

When addressing the transportation impacts in the study area for projects associated with the IMP, our recommended approach is to evaluate the project impacts and the transportation networks as individual projects advance. As each project is permitted and implemented, Boston University Medical Center will identify and mitigate individual project impacts while considering the overall transportation operations in the study area.

Because the IMP horizon year is distant and development needs and goals of the Medical Center change depending on public need, this project based mitigation approach will ensure that the measures used to offset impacts are administered efficiently and at the most effective locations.

To accomplish this, Boston University Medical Center, through the Article 80 Large Project Review process, will present detailed building programs, design options, and measures to mitigate impacts as the programs for each project are advanced through planning and design. It is believed that this approach will be an effective collaboration of design development and City and Community review that will allow for the most efficient project mitigation measures.

Boston University Medical Center has identified transportation improvement goals for the master plan time frame and will continue to advance important mitigation commitments made previously in the form of policies and management actions. **Table 4-17** lists transportation mitigation elements that Boston University Medical Center is proposing to pursue in order to ensure that future development can be sustained at the BUMC Campus with minimal impact to the neighborhood.

Table 4-17 Proposed Transportation Improvement and Mitigation Plan

	IMPROVEMENT ELEMENT	DESCRIPTION	PURPOSE/BENEFIT
Traffic Management Plan / Local Street Network Improvements			
1	Relocation of West Campus Central Loading Dock	Consolidation and interim relocation of the Menino Pavilion and Newton Pavilion loading docks on the north side of Albany Street to the south side of Albany Street in front of the existing Power Plant.	Access will occur from BioSquare Drive removing trucks from Albany Street. This will improve roadway operations and pedestrian movement along Albany Street.
2	Relocation of Emergency Department walk-in and passenger vehicle (non-ambulance) pick-up and drop-off	Relocation from the rear of the Menino Pavilion to the northwest corner of the Shapiro Building courtyard.	Allows more room for ambulances at Dowling Building and facilitates valet parking for emergency department drop-off and pick-up.
3	Reduction in Curb cuts	Goal to reduce number of curb cuts in front of the Emergency Department and Trauma Center entrance along Albany Street upon development of the New Inpatient Building.	Improve pedestrian experience along edge of Albany Street. Improve vehicular access and safety reduces confusion and traffic back-ups into the roadway.
4	Sidewalk and Streetscape Improvements	Additional improvements along Albany Street including installing new sidewalk paving, street trees, lighting, signage, etc. as each new development project is advanced.	Establish a unified streetscape to assist patients and visitors in wayfinding. This will improve pedestrian safety and movement and create better connectivity to future developments across Massachusetts Avenue.
5	Regional Highway Access	Implement the Southbound Frontage Road connection, continue to support additional access and connectivity from the BUMC Campus to the regional highway system.	Allows access for vehicles from the regional roadway network to access at BioSquare Drive removing traffic from Albany Street and the local street network.
6	Improved Access to Bus Stops	Continue to work with the MBTA to provide improved bus shelters and pedestrian connections to the MBTA bus stops within the Medical Center	Will encourage shift in employee and student mode share from auto to transit use.
Parking Management Plan			
1	Employee Parking Pricing	Continue to evaluate and charge market rates for employee parking.	Encourages transit use and will reduce parking demand.
2	Off-site Employee Parking Options	Continue to evaluate off-site locations for employee parking as needed.	Encourages transit use and removes employee vehicles from medical area roadways.

Transportation Demand Management Plan

1	Maintain active role in TransComm	Continue to encourage and assist BUMC Campus employees, students, patients and visitors as well as other area institutions and businesses to use many of the demand management programs offered.	Will encourage shift in employee and student mode share from auto to alternative modes such as transit, bicycle, and walk.
2	Employee Transit Subsidy	35% transit pass subsidy to employees .	Will encourage shift in employee mode share from auto to transit.
4	Bicycle Parking	Continue to install bicycle racks and cages throughout the campus where feasible. Will install short-term bicycle racks for new projects where feasible.	Will encourage shift in employee and student mode share from auto to bicycle.
5	Zip-Car	Coordinate with Zip-Car representatives to continue discounted membership for BU Medical Campus, BMC and its affiliates. Maintain 1 vehicle as a hybrid vehicle.	Will encourage shift in employee and student mode share from auto to transit and improve air quality.

City Planning Initiatives / Community Benefits

1	Community Parking Benefit	Provide reduced rate evening public parking, and free evening public parking during snow emergencies.	Will continue to offer this benefit to resident neighbors and the local community.
2	Support Transit Service Improvements	Through TranSComm, continue to work with the MBTA to promote transit service improvements such as the Urban Ring project, and the Indigo Commuter Rail Line.	Will improve access for employees and student to transit service at the Medical Center and encourage shift in auto use to transit.
3	South Bay Harbor Trail	Continue campus planning to accommodate connections to the City's South Bay Harbor Trail project.	Will encourage walking and bicycling as an alternative mode of transportation for the surrounding community with connections to other city neighborhoods along the Boston Harbor.

Sustainability

1	Bicycle User Group	Through TranSComm, a network of cyclists work together to improve biking on the campus.	Will encourage employee, student as well as patient and visitor shift in auto use to bicycle. Helps promote bicycling as an important health benefit.
2	Carpool and Hybrid Program	Offer designated and priority parking for carpool and hybrid cars.	Will encourages employees to not drive alone and relieves traffic congestion and improves air quality.
3	Walking Initiative	Continue to promote walking programs in coordination with WalkBoston	Will encourage employee, student, patient and visitor shift from auto use to transit and walking. Encourage walking as an important health benefit.
4	Electric Car Charging Stations	Two implemented, two to be added	Encourages use of alternative modes by employees, patients and visitors