Transportation Impact Study

300 Massachusetts Avenue

Cambridge, Massachusetts

Submitted to: City of Cambridge
Traffic, Parking and Transportation Department

Submitted by: Forest City Commercial Development, Inc.

Prepared by: ***VHB*/Vanasse Hangen Brustlin, Inc.**
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June 11, 2013

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Introduction & Project Overview

On behalf of Forest City Commercial Development, Inc. (Forest City), Vanasse Hangen Brustlin, Inc. (VHB) has conducted a Transportation Impact Study (TIS) for the proposed development on Massachusetts Avenue in Central Square Cambridge, Massachusetts. The proposed Project includes the redevelopment of the 300 Massachusetts Avenue Parcel including approximately 242,500 sf of Office and R&D with 15,000 sf of ground floor retail (the "Project").

The TIS responds to the scope dated February 19, 2013 defined by the City of Cambridge Traffic, Parking and Transportation (TP&T) Department in response to VHB's Request for Scoping dated January 16, 2013. A copy of the City's scoping letter is included in the Appendix. The TIS has been prepared in conformance with the current City of Cambridge Guidelines for Transportation Impact Study required under the Article 19 Special Permit Project Review. This document comprises three components, as follows:

Introduction and Project Overview, describing the framework in which the transportation component of this Project was evaluated;

Transportation Impact Study, presenting the technical information and analysis results as required under the guidelines; and,

Planning Board Special Permit Criteria, summarizing the evaluation of the proposed Project as defined under the guidelines.

The required TIS Summary Sheets and Planning Board Criteria Performance Summary are included. Supplementary data and analysis worksheets are provided in a technical appendix. Electronic files for Automatic Traffic Recorder (ATR) counts, Turning Movement Counts (TMC), and Synchro analyses are included on an accompanying CD.

Project Overview

The Project includes the redevelopment of the 300 Massachusetts Avenue site totaling approximately 257,500 sf, supported by existing University Park parking garages as described below and illustrated in the relevant figures.

- **Figure A** presents a site location map
- **Figure B** presents an aerial view of the proposed site and its context
- **Figure C** presents the existing site
- **Figure D** presents the proposed project site

- **Figure E** presents the on-site parking summary
- **Figure F** presents the proposed bicycle parking layout
- **Figure G** presents the TIS study area

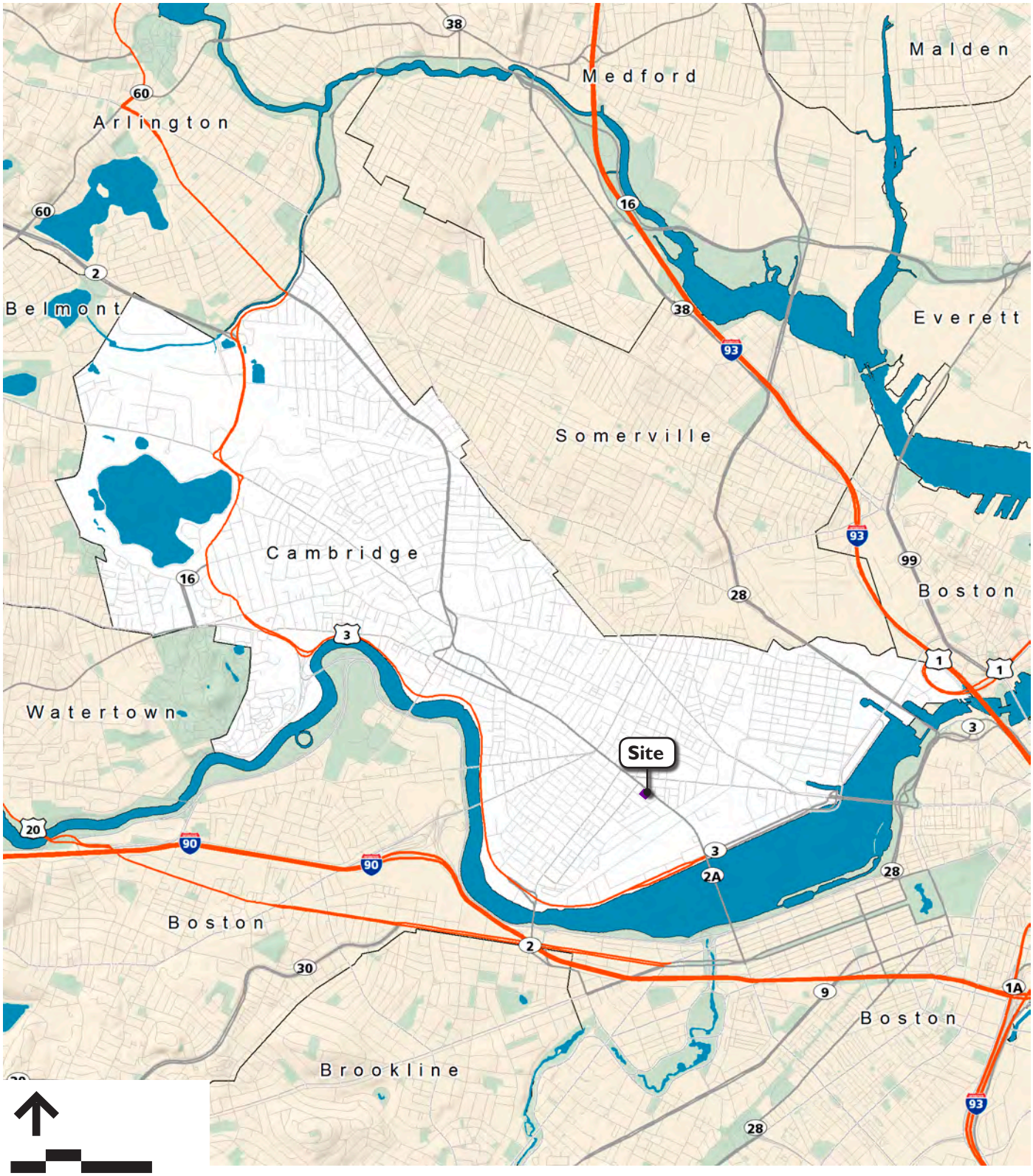
As shown in Figures A and B, the Project site is located between Central Square and Kendall Square on Massachusetts Avenue just east of Lafayette Square and Jill Brown Rhone Park. The Project's building parcel is bounded by Massachusetts Avenue to the north, a residential MIT building to the east, Green Street to the south and Blanche Street to the west.

The existing 300 Massachusetts Avenue Parcel recently contained approximately 7,000 sf of restaurant space, 3,000 sf of retail space, 2,300 sf of auto service space, and 35,000 sf of MIT fleet maintenance space. These retail uses have been phasing out over the course of the past few years. Currently, the All Asia bar and the Thai Restaurant remain tenanted. It is proposed that the current and previously existing land uses totaling 12,300 sf of retail and 35,000 sf of Fleet Maintenance space cancel out the proposed 15,000 sf of retail due to the similar size and nature of the land use in terms of traffic generation. Therefore, this replacement ground floor retail has not been included in the trip generation calculation. No trip generation credit has been taken for the uses on the existing parcel.

The conceptual site plan is presented in Figure D. The proposed Project development program studied for the TIS includes 242,500 sf of Office and R&D. Parking will be provided at the nearby existing 55 Franklin Street Garage and other University Park garages. The existing parking supply is illustrated in Figure E and indicates the amount and location of each parking facility. The parking analysis for the Project and the entire University Park is presented in Section 9 of the TIS including the supply, users and utilization of the three parking garages.

Bicycle Parking will be provided in one covered and secure room inside of the first floor in the Proposed 300 Massachusetts Avenue site. This bike storage room will contain 49 bicycle parking spaces as laid out in Figure F. In front of the building along Massachusetts Avenue, 16 short-term bicycle parking spaces will be provided for retail and office visitors. An additional 12 short-term bicycle parking spaces will be provided adjacent to the building on the Green Street sidewalk for a total of 77 new bicycle parking spaces.

The TIS study area for the proposed Project, as defined by the City of Cambridge, is shown in Figure G.



0 2000 4000 Feet

Source: ArcMAP Street Map dataset

Vanasse Hangen Brustlin, Inc.

Site Location Map

Figure A

300 Massachusetts Avenue TIS
Cambridge, MA

0 1000 2000 Feet

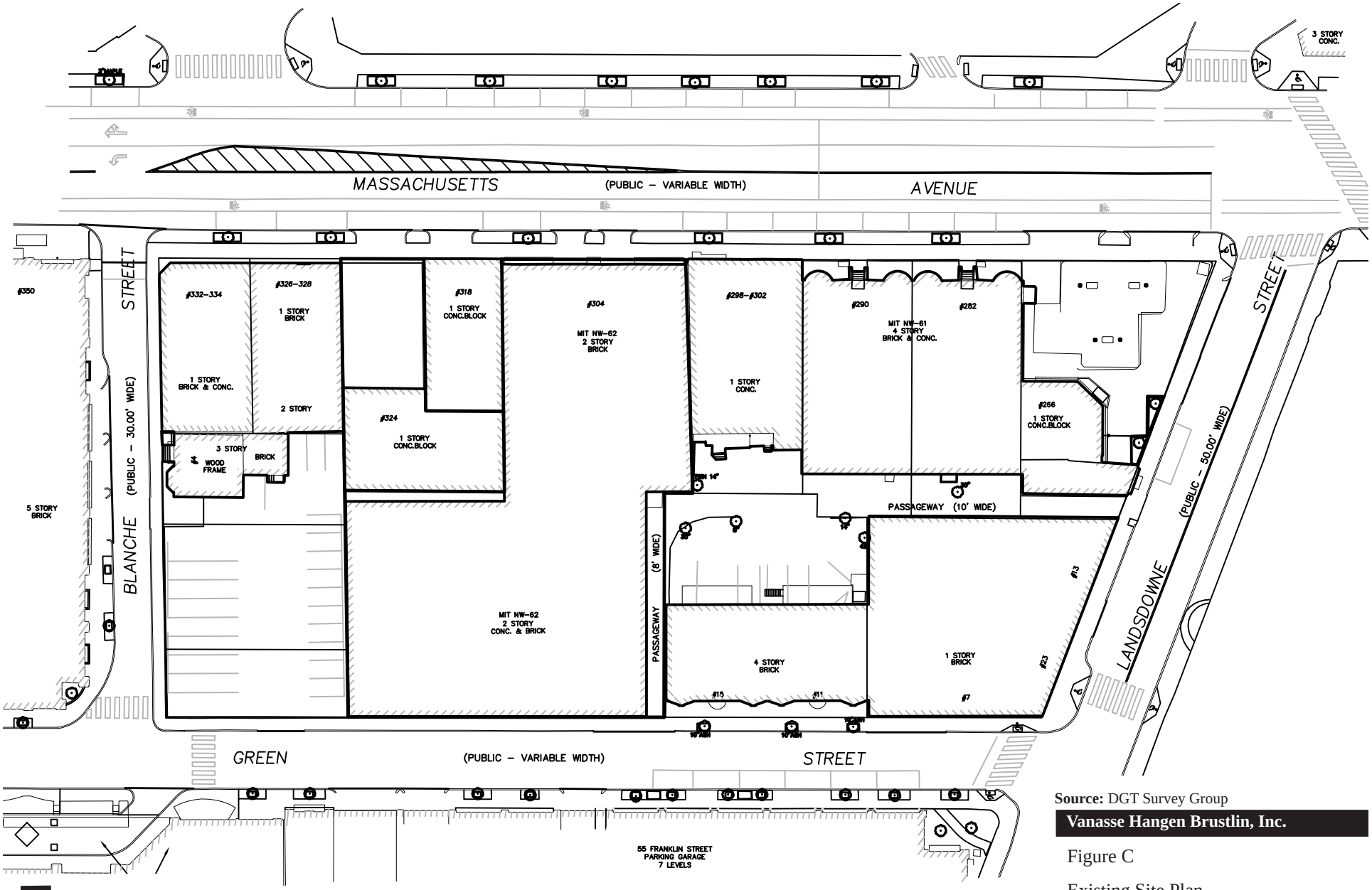
Source: MassGIS 2008 aerial

Vanasse Hangen Brustlin, Inc.

Neighborhood Context

Figure B

300 Massachusetts Avenue TIS
Cambridge, MA



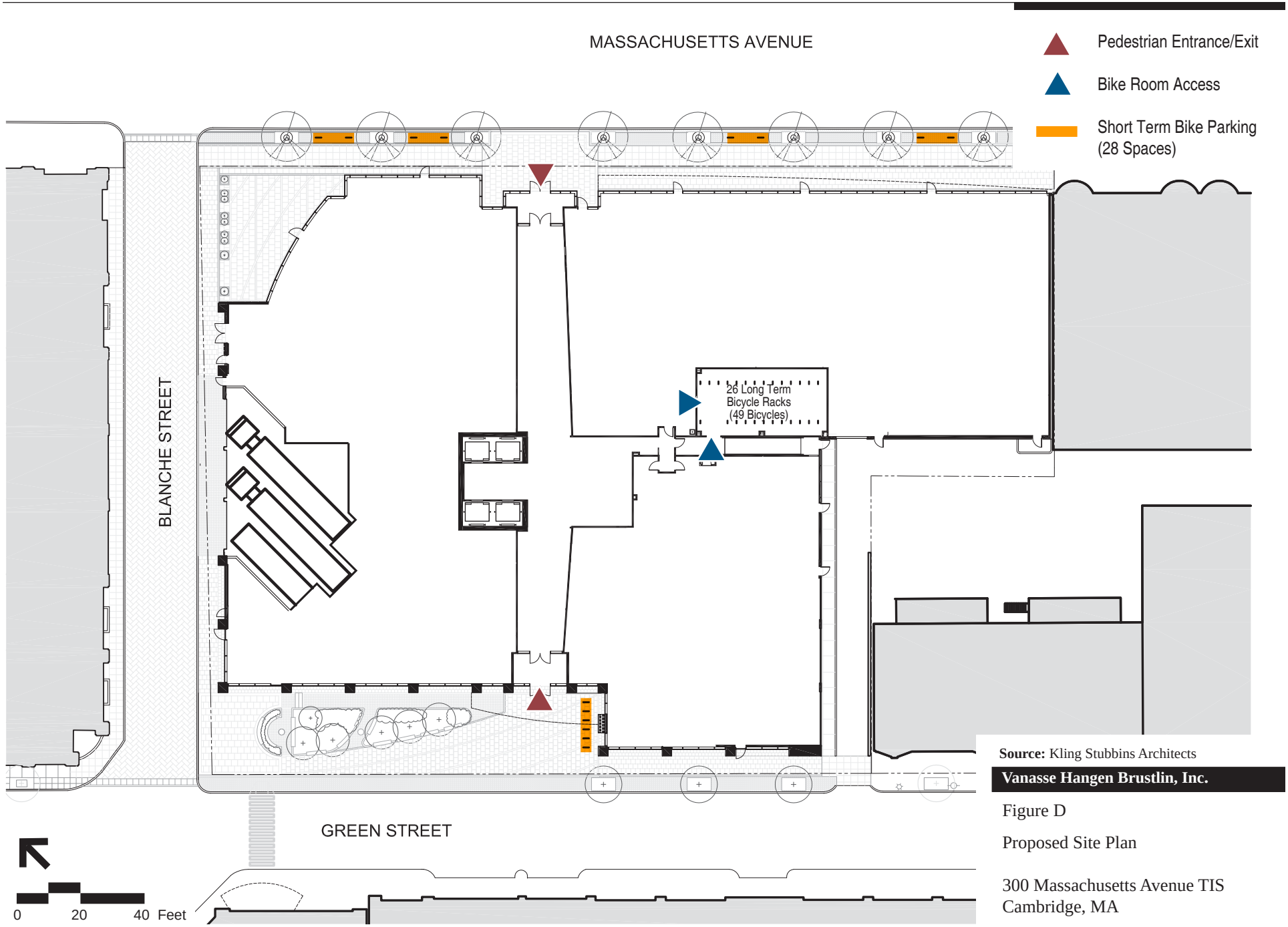
Source: DGT Survey Group

Vanasse Hangen Brustlin, Inc.

Figure C

Existing Site Plan

300 Massachusetts Avenue TIS
Cambridge, MA



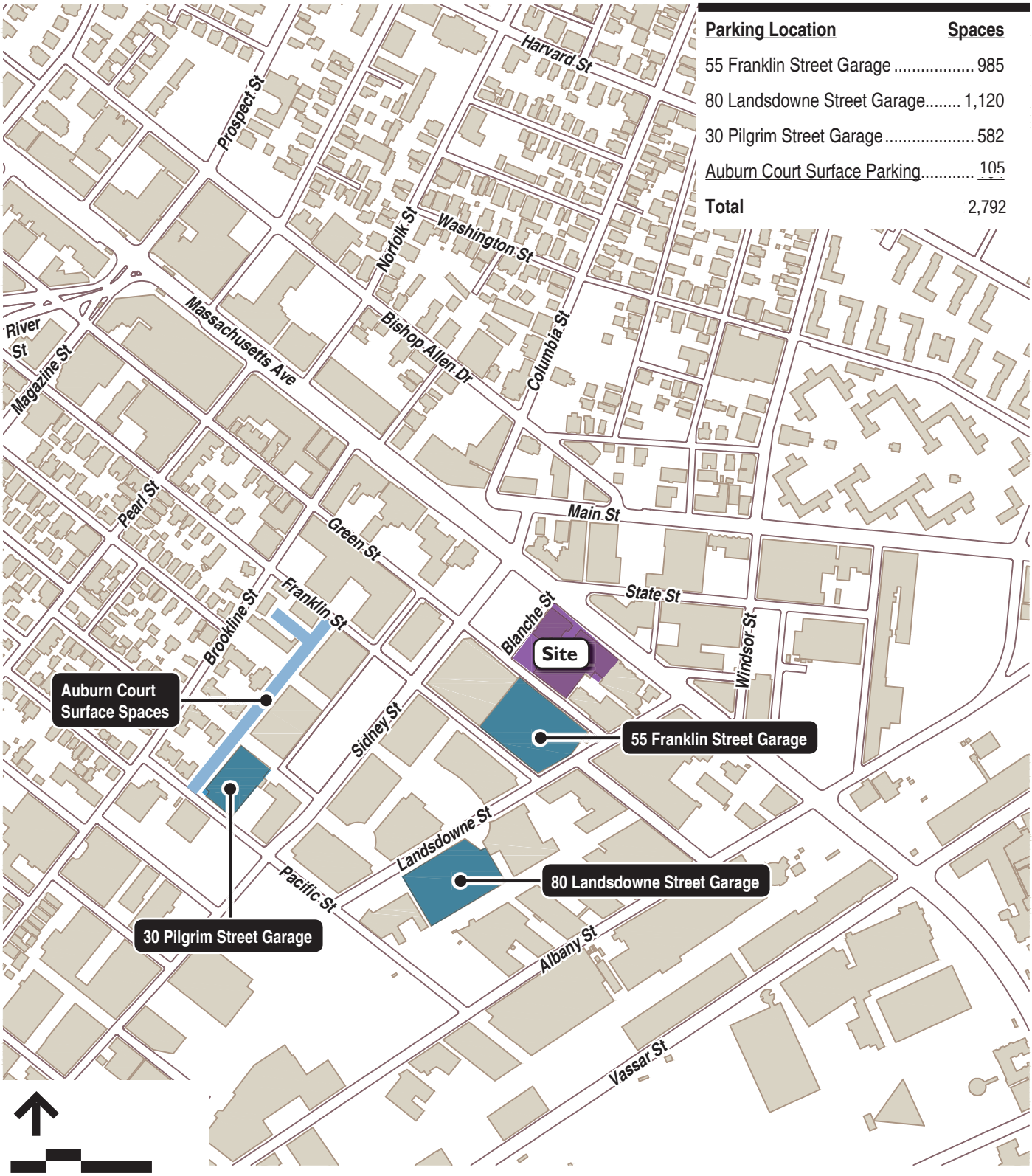
Source: Kling Stubbins Architects

Vanasse Hangen Brustlin, Inc.

Figure D

Proposed Site Plan

300 Massachusetts Avenue TIS
Cambridge, MA



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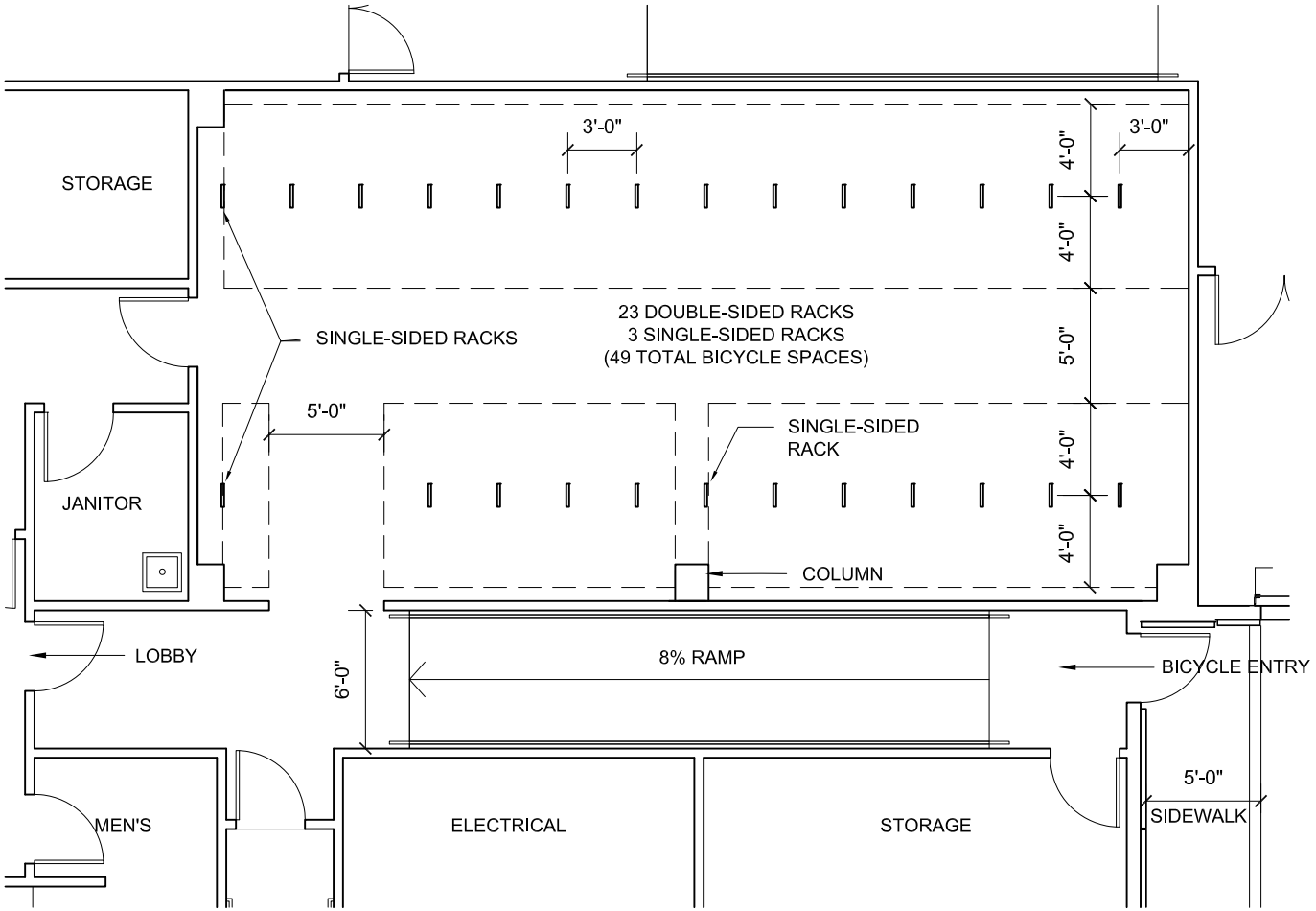
On-Site Parking Summary

Figure E

300 Massachusetts Avenue TIS
Cambridge, MA



0 4 8 Feet

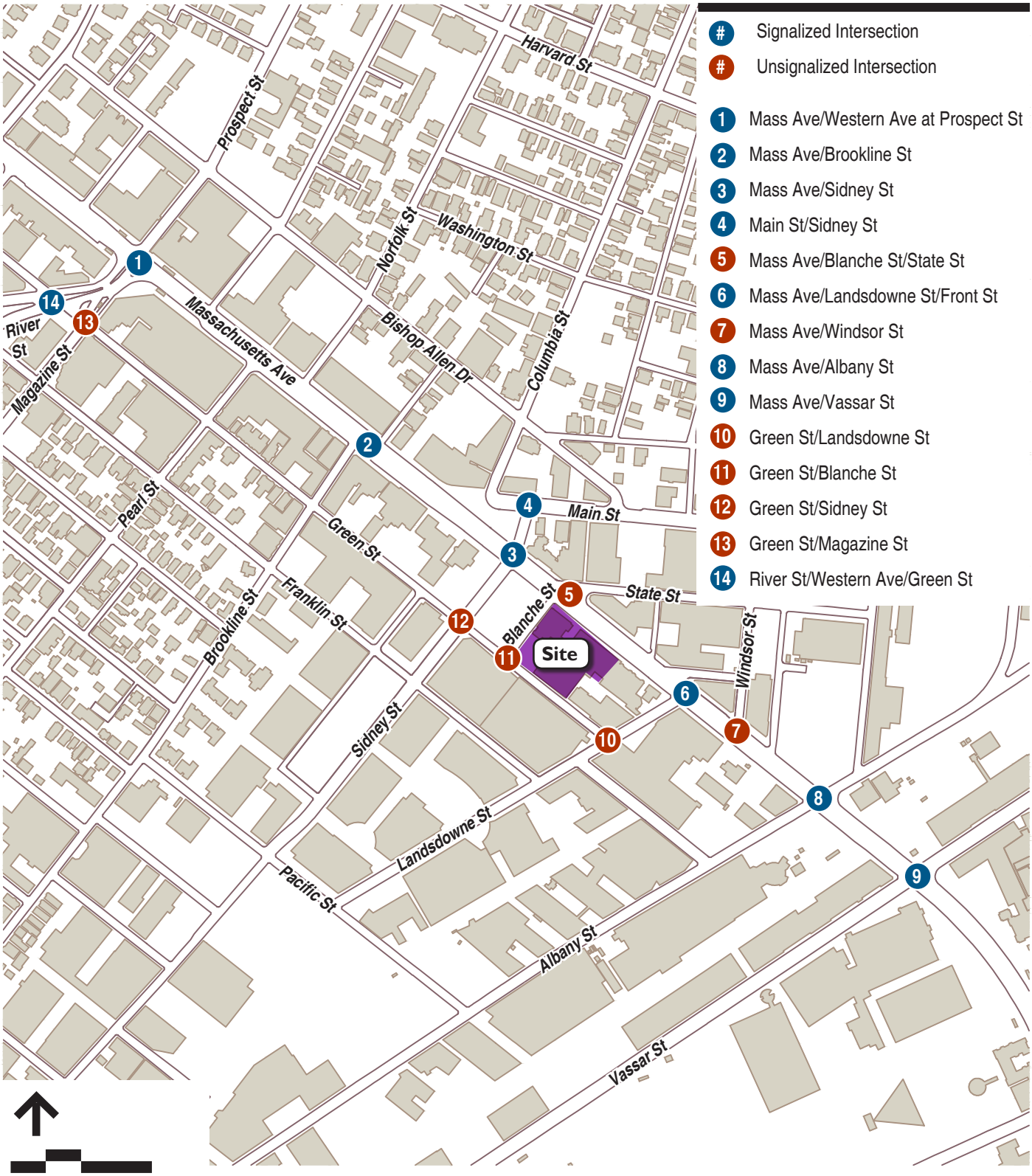
Source: Kling Stubbins Architects

Vanasse Hangen Brustlin, Inc.

Figure F

Proposed Bicycle Parking Layout Plan

300 Massachusetts Avenue TIS
Cambridge, MA



Vanasse Hangen Brustlin, Inc.

TIS Study Area

Figure G

300 Massachusetts Avenue TIS
Cambridge, MA

Planning Board Criteria Summary

Based on the TIS analysis, the Project has been evaluated within the context of the Planning Board Criteria to determine if the Project has any potential adverse transportation impacts. The Build scenario has been evaluated against the Planning Board Criteria. Exceeding one or more of the Criteria is indicative of a potentially adverse impact on the City's transportation network. However, the Planning Board will consider mitigation efforts, their anticipated effectiveness, and other information that identifies a reduction in adverse transportation impacts.

The Planning Board Criteria consider the Project's vehicular trip generation, impact to intersection level of service and queuing, as well as increase of volume on residential streets. In addition, pedestrian and bicycle conditions are considered. A discussion of the Criteria set forth by the Planning Board is presented in the final section of the TIS, and the Planning Board Criteria Performance Summary is presented below.

CITY OF CAMBRIDGE Planning Board Criteria Performance Summary
Special Permit Transportation Impact Study (TIS)

Planning Board Permit Number: _____

PROJECT NAME: 300 Massachusetts Avenue

Address: 300 Massachusetts Avenue Cambridge MA 02139
Owner/Developer Name: Forest City Commercial Development, Inc.
Contact Person: Peter Calkins
Contact Address: 38 Sidney Street
Cambridge, MA 02139-4169
Contact Phone: 617-914-2508

SIZE:

ITE sq. ft.: 257,500
Land Use Type: Office/Research & Development, and Retail

PARKING:

Total Existing Parking Spaces: 2,687 Use: Commercial/Accessory
Total Future Parking Spaces: 2,687 Use: Commercial/Accessory
Net New Parking Spaces 0

Date of Parking Registration Approval: N/A

TRIP GENERATION:

	Daily	AM Peak Hour	PM Peak Hour
Total Trips	2,901	409	394
Vehicle	1,454	206	198
Transit	1,009	142	137
Pedestrian	155	22	21
Bicycle	283	40	38

MODE SPLIT (PERSON TRIPS):

Vehicle (SOV): 44.5% Bicycle: 9.4%
Rideshare (HOV): 7.6% Pedestrian: 5.1%
Transit: 33.4% Work at Home: 0%

TRANSPORTATION CONSULTANT:

Company Name: Vanasse Hangen Brustlin, Inc.
Contact Name: Susan Sloan-Rossiter
Phone: 617.728.7777

Date of Building Permit Approval: _____

CITY OF CAMBRIDGE Planning Board Criteria Performance Summary
Special Permit Transportation Impact Study (TIS)

Planning Board Permit Number: _____

Project Name: 300 Massachusetts Avenue

Total Data Entries = 239 **Total Number of Criteria Exceedances = 6**

1. Project Vehicle Trip Generation

Time Period	Criteria (trips)	Build 2013	Exceeds Criteria?
Weekday Daily	2,000	1,454	N
Weekday AM Peak Hour	240	206	N
Weekday PM Peak Hour	240	198	N

2. Level of Service (LOS)

	AM Peak Hour				PM Peak Hour			
Intersection	Existing Condition	Build Condition	Traffic Increase	Exceeds Criteria?	Existing Condition	Build Condition	Traffic Increase	Exceeds Criteria?
Mass Ave at Western Ave / Prospect St	D	D	4%	N	C	C	2%	N
Mass Ave at Brookline St / Douglass St	C	C	7%	N	B	B	3%	N
Massachusetts Ave at Sidney St	D	D	6%	N	C	C	1%	N
Sidney St at Main St / Columbia St	D	D	2%	N	C	C	1%	N
Mass Ave at Front St / Landsdowne St	B	B	7%	N	C	D	7%	N
Massachusetts Ave at Albany St	C	D	4%	N	C	C	4%	N
Massachusetts Ave at Vassar St	C	C	3%	N	C	C	3%	N
Green St at Western Ave / River St	C	C	2%	N	C	C	3%	N

3. Traffic on Residential Streets

Roadway	Reviewed Segment	Amount of Residential	AM Peak Hour			PM Peak Hour		
			Existing 2013*	Project Trips	Exceeds Criteria?	Existing 2013*	Project Trips	Exceeds Criteria?
Western Avenue	Jay Street to Soden Street	1/2 or more	399	4	N	539	26	N
	Soden Street to Franklin Street	1/2 or more	399	4	N	539	26	N
River Street	Howard Street to Kinnaird Street	1/2 or more	696	12	N	750	3	N
	Kinnaird Street to William Street	>1/3 but <1/2	696	12	N	750	3	N
	William Street to Franklin Street	>1/3 but <1/2	696	12	N	750	3	N
Prospect Street	Bishop Allen Drive to Harvard Street	>1/3 but <1/2	960	1	N	1071	5	N
Columbia Street	Bishop Allen Drive to Washington Street	>1/3 but <1/2	359	15	N	303	3	N
	Washington Street to Harvard Street	1/2 or more	359	15	N	303	3	N
Windsor Street	School Street to Harvard Street	1/2 or more	185	9	N	293	8	N
Green Street	Magazine to Brookline Street	>1/3 but <1/2	160	8	N	406	51	N
	Brookline Street to Sidney Street	1/2 or more	86	12	N	212	74	Y
Brookline Street	Chestnut Street to Allston Street	1/2 or more	231	14	N	359	3	N
	Allston Street to Erie Street	1/2 or more	231	14	N	359	3	N
	Erie Street to Emily Street	1/2 or more	231	14	N	359	3	N
Sidney Street	Putnam Avenue to Hamilton Street	>1/3 but <1/2	219	2	N	305	14	N
	Tudor Street to Pilgrim Street	1/2 or more	219	2	N	305	14	N
Pacific Street	Sidney Street to Albany Street	>1/3 but <1/2	na	14	N	na	3	N

* volume interpolated from nearest data available in study area

4. Lane Queue (for signalized intersections)

		AM Peak Hour			PM Peak Hour		
Intersection	Movement	Existing	Build	Exceeds Criteria?	Existing	Build	Exceeds Criteria?
Massachusetts Avenue at Western Avenue and Prospect Street	Eastbound Thru	8	9	N	7	7	N
	Eastbound Right	1	1	N	0	0	N
	Westbound Thru	5	5	N	6	7	N
	Westbound Right	2	2	N	2	2	N
	Northbound Thru	13	13	N	13	13	N
	Northbound Right	4	5	N	4	4	N
	Southbound Thru/Right	7	7	N	8	8	N
Massachusetts Avenue at Brookline Street	Eastbound Left/Thru	9	11	N	9	9	N
	Westbound	4	4	N	1	1	N
	Northbound Left	2	2	N	3	3	N
	Northbound Right	3	3	N	5	5	N
Massachusetts Avenue at Sidney Street	Eastbound Left	2	2	N	2	2	N
	Eastbound Thru/Right	9	10	N	6	6	N
	Westbound Left	4	4	N	2	2	N
	Westbound Thru/Right	10	9	N	9	9	N
	Northbound Right	2	2	N	2	2	N
	Southbound Left/Thru	3	3	N	3	3	N
	Southbound Right	0	0	N	0	0	N
Main Street at Sidney Street	Eastbound Thru	0	0	N	0	0	N
	Eastbound Right	7	7	N	4	4	N
	Westbound Left/Thru	4	4	N	4	4	N
	Northbound Left/Right	4	4	N	3	3	N
Massachusetts Avenue at Landsdowne Street and Front Street	Eastbound Left/Thru/Right	4	6	N	6	6	N
	Westbound	7	8	N	4	5	N
	Northbound Left/Thru/Right	0	0	N	4	7	N
	Southbound Left Thru/Right	2	2	N	2	1	N
Massachusetts Avenue at Albany Street	Eastbound	5	6	N	7	8	N
	Westbound	7	12	N	9	10	N
	Northbound Left	0	0	N	1	1	N
	Northbound Thru/Right	7	7	N	8	8	N
	Southbound Left	2	2	N	3	3	N
	Southbound Thru/Right	7	7	N	4	4	N
Massachusetts Avenue at Vassar Street	Eastbound	7	7	N	7	9	N
	Westbound	8	9	N	7	8	N
	Northbound Left	1	1	N	1	1	N
	Northbound Thru/Right	7	7	N	4	4	N
	Southbound Left	4	4	N	5	5	N
	Southbound Thru/Right	5	5	N	7	7	N
Western Avenue/ River Street/ Green Street	Westbound Left/Thru	1	1	N	3	4	N
	Westbound Thru/Right	3	3	N	9	9	N
	Northbound Left	2	2	N	4	4	N
	Northbound	4	4	N	4	4	N
	Southbound Left/Thru/Right	10	10	N	3	3	N

5. Pedestrian and Bicycle Facilities

Signalized Intersections

Intersection	Crosswalk	AM Peak Hour			PM Peak Hour		
		Existing 2013	Build 2013	Exceeds Criteria?	Existing 2013	Build 2013	Exceeds Criteria?
Massachusetts Avenue at Western Avenue and Prospect Street	East	B	B	N	B	B	N
	West	B	B	N	B	B	N
	North	C	C	N	C	C	N
	South	C	C	N	C	C	N
Massachusetts Avenue at Brookline Street and Douglass Street	East	C	C	N	C	C	N
	North	B	B	N	B	B	N
	South	B	B	N	B	B	N
Massachusetts Avenue at Sidney Street	East	C	C	N	B	B	N
	West	C	C	N	B	B	N
	North	D	D	N	D	D	N
	South	D	D	N	D	D	N
Main Street at Sidney Street and Columbia Street	East	B	B	N	B	B	N
	West	B	B	N	B	B	N
Massachusetts Avenue at Landsdowne Street and Front Street	East	C	C	N	C	C	N
	North	C	C	N	C	C	N
	South	C	C	N	C	C	N
Massachusetts Avenue at Albany Street	East	C	C	N	C	C	N
	West	C	C	N	C	C	N
	North	B	B	N	B	B	N
	South	B	B	N	B	B	N
Massachusetts Avenue at Vassar Street	East	C	C	N	C	C	N
	West	C	C	N	C	C	N
	North	B	B	N	B	B	N
	South	B	B	N	B	B	N
Western Avenue/ River Street/ Green Street	East	B	B	N	B	B	N
	West	B	B	N	A	A	N
	North	C	C	N	C	C	N
	South	C	C	N	C	C	N

CITY OF CAMBRIDGE Planning Board Criteria Performance Summary
Special Permit Transportation Impact Study (TIS)

Unsignalized Intersections

Intersection	Crosswalk	AM Peak Hour			PM Peak Hour		
		Existing 2013	Build 2013	Exceeds Criteria?	Existing 2013	Build 2013	Exceeds Criteria?
Massachusetts Avenue at Blanche Street/State Street	North	A	A	N	A	A	N
	South	A	A	N	A	A	N
Massachusetts Avenue at Windsor Street	North	A	A	N	B	B	N
Green Street at Landsdowne Street	West	A	A	N	A	A	N
	North	B	C	Y	C	C	N
	South	C	C	N	C	C	N
Green Street at Blanche Street	East	A	B	Y	A	A	N
	North	A	A	N	A	A	N
Green Street at Sidney Street	East	A	B	Y	A	A	N
	West	A	A	N	A	A	N
	North	C	D	Y	C	C	N
	South	C	C	N	C	D	Y
Green Street at Magazine Street	East	A	A	N	B	B	N
	West	A	A	N	C	C	N
	North	A	A	N	A	A	N
	South	A	A	N	A	A	N

Sidewalk and Bicycle Facilities

Adjacent Street	Link (between)	Sidewalks or Walkways Present?	Exceeds Criteria?	Bicycle Facilities or Right of Ways Present?	Exceeds Criteria?
Blanche St	Green St to Massachusetts Ave	Y	N	Y	N
Massachusetts Ave	Landsdowne St to Blanche St	Y	N	Y	N
	Blanche St to Sidney St	Y	N	Y	N
	Landsdowne St to Albany St	Y	N	Y	N
Green St	Sidney St to Blanche St	Y	N	Y	N
	Blanche St to Landsdowne St	Y	N	Y	N

Transportation Impact Study

This Transportation Impact Study for the proposed development of the 300 Massachusetts Avenue Project in Central Square Cambridge, MA (the Project) describes existing and future transportation conditions in the study area in accordance with the City of Cambridge Fifth Revision (April 27, 2004) of the Transportation Impact Study Guidelines. The study area for the TIS includes eight (8) signalized intersections and six (6) unsignalized intersections as previously shown in Figure G.

This section includes inventories of physical and operational conditions in the study area including roadways, intersections, crosswalks, sidewalks, on-street and off-street parking, transit facilities, and land uses in the study area. Transportation data that were collected and compiled are presented, including automatic traffic recorder counts, intersection turning movement counts, pedestrian and bicycle counts, vehicle crash data, and transit service data.

1. Inventory of Existing Conditions

a. Roadways

The Project site is comprised of one parcel located between Massachusetts Avenue and Green Street. Massachusetts runs along the north face of the Project site in the southeast/northwest direction from the Massachusetts Avenue Bridge that connects Boston and Cambridge to the east of the site and to Arlington towards the west. Green Street runs in the northwest/southeast direction parallel to Massachusetts Avenue which dead ends near Putnam Street to the west and Landsdowne Street to the east. Landsdowne Street runs in the northeast/southwest direction between Massachusetts Avenue and Pacific Street. Blanche Street runs in the northeast/southwest direction adjacent to the site between Massachusetts Avenue and Green Street.

Figure C, previously presented, shows the roadway layout surrounding the Project site.

b. Intersections

The Project study area includes the following fourteen study intersections which are presented in Figure G and illustrated in Figures 1.b.1 through 1.b.13.

1) Mass Ave/Western Ave at Prospect St
2) Mass Ave/Brookline St
3) Mass Ave/Sidney St
4) Main St/Sidney St
5) Mass Ave/Blanche St/State
6) Mass Ave/Landsdowne St/Front Street
7) Mass Ave/Windsor St
8) Mass Ave/Albany St
9) Mass Ave/Vassar St

10) Green St/Landsdowne St
11) Green St/Blanche St
12) Green St/Sidney St
13) Green St/Magazine St
14) River Street/Western Ave/Green Street

c. Parking

Vehicular Parking

300 Massachusetts Avenue Site

On the existing 300 Massachusetts Avenue site, there are approximately 26 parking spaces located on the surface lot on the corner of Green Street and Blanche Street. This lot is accessed from Green Street via a gate. Budget-Avis Rental cars are parked in this surface lot and will likely be moved to the University Park parking garages.

Short term parking is permitted on some of the streets in the vicinity of the Project site, including both metered and time restricted spaces. Along the front of the site on Massachusetts Avenue, there is two hour metered parking. No Parking is permitted along Blanche Street or Green Street adjacent to the site.

University Park – On-Site Parking

University Park contains three shared parking garages for the employees, residents, and visitors to the park totaling in 2,687 parking spaces.

- *The 55 Franklin Street Garage* which contains a total of 985 parking spaces is a commercial parking facility that provides parking for monthly R&D/Office tenants, residents, Budget Avis rental cars, hotel guests, fire department parking and retail patrons. Eight Zipcars are available for Zipcar members in this parking garage.
- *The 80 Landsdowne Street Garage*, the largest parking facility, contains 1,120 spaces for monthly R&D/Office tenants and residents of University Park and is an accessory parking garage. Three spaces are allocated to electric charging vehicles and 113 spaces are dedicated to carpool and vanpool spaces.
- *The 30 Pilgrim Street Garage*, the smallest of the three, contains 582 spaces for monthly R&D/Office tenants and residents of University Park and is also accessory parking. There are 58 carpool/vanpool spaces available in this parking facility.

These three garages comprise a shared parking system where parking permits are shifted among the three garages to accommodate parkers at University Park. This shared parking approach provides flexibility for managing tenant needs. In addition, there are 105 surface parking spaces located at Auburn Court that provide parking for residents. The parking supply is summarized in Table 1.c.1 and is also illustrated in Figure E.

Table 1.c.1
Existing University Park - Parking Supply Inventory

Parking Garage	Total # Parking Spaces	#of Dedicated Zipcar Spaces	# of Carpool /Vanpool Spaces	# of Electric Charging Spaces	# of Budget-Avis Rental Cars
55 Franklin Street Garage	985	8	0	0	38
80 Landsdowne Street Garage	1,120	0	113	3	0
30 Pilgrim Street Garage	582	0	58	0	0
Total	2,687	8	171	3	38
Resident Surface Parking					
Auburn Court Surface Parking	105	-	-	-	-

Source: Forest City

Per the scoping letter dated February 19, 2013 defined by the City of Cambridge Traffic, Parking and Transportation (TP&T) Department, an inventory and peak utilization study of existing parking was conducted during April 9-11, 2013 for the three parking garages.

The observed occupancy and utilization is summarized in Table 1.c.2. The peak of all three garages combined occurred at 1PM on Wednesday April 10, 2013. The attached technical memorandum titled "*University Park Traffic Mitigation Agreement Compliance Report – 2013 Update*" provides an analysis of yearly parking data to determine the percentile of parking activity throughout the last year. Since this data from April 10, 2013 represents the 86th percentile of parking data throughout the year, this is assumed to be the peak and worst case scenario.

Table 1.c.2
Existing University Park – Peak Parking Occupancy

Parking Garage	# Parking Spaces	Peak Utilization (# of spaces)	% Utilization
55 Franklin Street Garage	985	854	87%
80 Landsdowne Street Garage	1,120	1040	93%
30 Pilgrim Garage	582	453	78%
Total	2,687	2347	87%

Bicycle Parking

Bicycle Parking for University Park is provided in each of the three parking garages. These spaces are covered and secured. Table 1.c.3 summarizes the bicycle parking at University Park. There are several short-term bicycle parking spaces located along Massachusetts Avenue and a few on Green Street near the site.

Table 1.c.3
Existing University Park – Bicycle Parking

Parking Garage	# Bicycle Parking Spaces
55 Franklin Street Garage	40
80 Landsdowne Street Garage	100
30 Pilgrim Garage	140
Total	280

Additionally, Forest City has partnered with Zagster a bike share company to provide tenants of University Park and the public with bicycles at $9/day, $29.95/month or $49.95/year. There are 15 bicycles available at University Park and five are located in the 55 Franklin Street Garage, five in the 80 Landsdowne Street Garage and five in the 30 Pilgrim Street Garage. Zagster is currently negotiating with existing University Park tenants to subsidize this service for their employees.

d. Transit Services

The Project site is well served by public and private transit companies in the area as shown in Figure 1.d. The Central Square T Station on the Massachusetts Bay Transportation Authority's (MBTA) Red Line is located a seven minute walk to the west of the Project site. In addition, the Kendall Square Red Line Station is located within a 15 minute walk to the east of the site. The site is most easily accessible via the EZ Ride shuttle service via Landsdowne Street and Albany Street which connects to the Kendall Square Red Line Station, Lechmere Green Line Station and North Station Commuter Rail, Green Line and Orange Line. The following services are located within close proximity to the site:

Public Services

Red Line

The Red Line provides service to/from Alewife to the northeast and both Braintree and Ashmont to the south with 9-minute headways during peak hours on each branch, however 4.5 minute headways when combined. The Red Line connects with the Green Line at Park Street and the Orange Line and Silver Line at Downtown Crossing. Connections to all southern commuter rail lines and the Silver Line (to Logan Airport) are made at South Station. In addition, the Fitchburg commuter rail line connects with the Red Line at Porter Square. The closest Red Line stop to the site is at Central Square, a 7 minute walk. The Red Line runs between 5:15 AM to 12:30 AM on weekdays.

#1: Harvard/Holyoke Gate – Dudley Station via Mass. Ave.

This route connects Harvard Square and Dudley Square, travelling along Massachusetts Ave with stops located adjacent to the site in both directions at Landsdowne Street and Sidney Street.

#47: Central Square, Cambridge – Broadway Station via BU Medical Center, Dudley Station & Longwood Medical Area

This route connects the nearby Central Square to Broadway in South Boston, via Pearl Street/Brookline Street and the BU Bridge connecting Boston to Cambridge. The closest stops are located at Brookline Street/Green Street and Pearl Street/Franklin Street (outbound and inbound respectively).

#64: Oak Square – University Park, Cambridge or Kendall/MIT via North Beacon St.

This route connects Oak Square in Brighton to University Park in Cambridge. Near the site, the route travels inbound on Magazine Street and outbound on Western Avenue. The nearest bus stops are located at Western Avenue at Green Street (outbound) and Magazine Street at Green Street (inbound).

#70A/70: Cedarwood, No. Waltham or Watertown Sq – University Park Via Central Sq. Cambridge, Arsenal St. & Western Ave.

This route connects Waltham with University Park in Cambridge. Near the site, this route travels inbound on Massachusetts Avenue with a stop at Sidney Street/Franklin Street. On the outbound route, the bus travels via Green Street to Western Avenue with the closest stop also at Franklin Street/Sidney Street.

#83: Rindge Avenue – Central Sq. Cambridge via Porter Sqaure
This route connects North Cambridge with Central Square traveling through Porter Square. Nearby the site, the route travels north via Prospect Street from Central Square stopping at Green Street/Magazine Street.

#91: Sullivan Sq Sta. – Central Sq. Cambridge via Washington St.
This route connects Sullivan Square in Boston to Central Square. The route travels towards the north of Central Square on Prospect Street. The closest stop is on Green Street at Magazine Street.

CT1: Central Square, Cambridge - BU Medical Center/Boston Medical Center via MIT
Route CT1 is a limited stop, cross-town route providing service from Central Square to the B.U. Medical Center. This route travels along Massachusetts Avenue in front of the site and stops at Sidney Street.

CT2: Sullivan Square Station - Ruggles Station via Kendall/MIT Station
Route CT2 is a limited stop, cross-town route that operates between Sullivan Square in Boston and Ruggles Station. The closest bus stop to the site is located at Massachusetts Avenue/Vassar Street.

Privately-Operated Services
University Park is an active member in the Charles River Transportation Management Association (TMA) which operates the EZRide shuttle service between North Station, Lechmere, Kendall Square, University Park, and Cambridgeport. This shuttle provides connections to the Green Line at Lechmere Station and the northern MBTA commuter rail services, as well as the Green Line and Orange Line, at North Station. This shuttle traverses Landsdowne Street in the outbound direction and Albany Street during the inbound direction during the morning peak period (6:20 AM – 10:52 AM) near the site. During the evening peak period (3:00 PM-8:00 PM) the route travels inbound along Landsdowne Street and outbound along Albany Street. Headways are eight to ten minutes during the morning peak period and nine minutes during the evening peak period. Weekend services are not provided.

e. Land Use

Figure 1.e illustrates land uses in the area surrounding the 300 Massachusetts Avenue Project Site. University Park comprises R&D, Office, Retail, Hotel and Residential land uses. Most of the residential uses in the neighborhood are located to the southwest and to the north. Additional R&D/Office and MIT campus buildings are located to the east of the Proposed Site. A fire station is located on Massachusetts Avenue to the west of the site.

2. Data Collection

a. ATR Counts

Automatic traffic recorders (ATR) were installed on April 3, 2013 for 48 consecutive hours at locations near the site.

Traffic volume summaries for these ATR locations are presented in Tables 2.a.1 through 2.a.3. These data, representing the averages of data collected over two weekdays, indicate the variations of traffic volume and the directional distribution of

traffic over the course of an average weekday. Count data sheets are included in the Appendix.

Table 2.a.1
Existing 2013 Traffic Volume Summary

		Weekday AM Peak Hour			Weekday PM Peak Hour		
Location	Daily [a]	Volume [b]	K [c]	Peak Direction	Volume [b]	K [c]	Peak Direction
Massachusetts Avenue *West of Albany Street*	14,711	803	5%	53% WB	804	5%	51% WB
Massachusetts Avenue *East of Sidney Street*	13,566	798	6%	51% EB	952	7%	63% WB
Sidney Street *South of Massachusetts Avenue*	4,918	411	8%	91% SB	369	8%	76% SB
Landsdowne Street *North of Pilgrim Street*	2,868	264	9%	70% SB	292	10%	80% SB
Green Street *West of Pearl Street*	3,666	213	6%	100% WB	386	11%	100% WB
Franklin Street *West of Brookline Street*	2,318	235	10%	100% EB	162	7%	100% EB

a vehicles per day
b vehicles per peak hour
c percentage of daily traffic that occurs during the peak hour

The vehicle classification available from the count data is presented in Table 2.a.2 by roadway direction.

Table 2.a.2
Existing 2013 Percent Heavy Vehicles by Direction

Location	Northbound/Eastbound	Southbound/Westbound
Massachusetts Avenue *West of Albany Street*	10.7%	12.9%
Massachusetts Avenue *East of Sidney Street*	11.3%	7.7%
Sidney Street *South of Massachusetts Avenue*	4.8%	15.1%
Landsdowne Street *North of Pilgrim Street*	15.5%	10.4%
Green Street *West of Pearl Street*	n/a	16.4%
Franklin Street *West of Brookline Street*	10.2%	n/a

Table 2.a.3
Existing 2013 Average Daily Traffic Summary

	Massachusetts Avenue (West of Albany St)		Massachusetts Avenue (East of Sidney St)		Sidney Street (South of Mass Ave)	
Start Time	EB	WB	EB	WB	NB	SB
12:00	178	145	174	132	15	58
1:00	99	87	105	78	12	36
2:00	45	60	52	49	8	14
3:00	35	35	26	32	4	12
4:00	44	40	32	33	4	12
5:00	83	137	69	104	4	42
6:00	205	289	211	223	19	126
7:00	331	395	360	348	30	281
8:00	379	424	410	388	39	372
9:00	409	386	328	347	45	310
10:00	375	397	304	340	40	193
11:00	383	378	306	370	47	185
12:00	368	386	334	379	50	206
13:00	421	397	321	367	49	183
14:00	402	397	337	382	52	191
15:00	445	366	360	423	64	207
16:00	435	426	345	524	81	246
17:00	393	411	348	604	88	281
18:00	400	445	339	513	74	238
19:00	397	424	349	435	56	246
20:00	377	382	352	380	47	180
21:00	418	397	320	375	32	164
22:00	341	380	261	321	25	141
23:00	281	296	187	199	25	98
Total*	7,239	7,472	6,226	7,341	903	4,015

*Note: values represented in table are rounded numbers; therefore the "Total" row takes into consideration these decimals

Table 2.a.3 (continued)
Existing 2013 Average Daily Traffic Summary

	Landsdowne Street (North of Pilgrim St)		Green Street (West of Pearl St)	Franklin Street (West of Brookline St)
Start Time	NB	SB	WB	EB
12:00	16	23	34	21
1:00	8	13	21	16
2:00	7	8	12	11
3:00	6	9	6	9
4:00	2	6	13	8
5:00	7	18	37	14
6:00	24	67	85	74
7:00	62	138	163	157
8:00	79	185	213	235
9:00	71	130	196	193
10:00	44	75	188	113
11:00	35	85	165	117
12:00	49	96	188	112
13:00	40	89	165	108
14:00	47	98	166	111
15:00	46	111	227	108
16:00	49	207	316	146
17:00	57	235	386	162
18:00	45	153	324	158
19:00	42	98	254	154
20:00	26	75	187	92
21:00	26	59	146	100
22:00	26	44	109	61
23:00	17	26	69	43
Total*	825	2,043	3,666	2,318

*Note: values represented in table are rounded numbers; therefore the "Total" row takes into consideration these decimals

b. Pedestrian and Bicycle Counts

Peak hour pedestrian and bicycle movements at study-area intersections, collected during the vehicle turning movement counts, are presented in Figures 2.b.1 and 2.b.2, and Figures 2.b.3 and 2.b.4, respectively.

c. Intersection Turning Movement Counts

Manual turning movement counts, including pedestrians and bicycles, were conducted at study intersections on April 3, 2013. Detailed count sheets are included in the Appendix. The results of these counts indicate that the overall weekday peak traffic hours in the study area occur from 8:00 - 9:00 AM and 4:45 - 5:45 PM. Figures 2.c.1 and 2.c.2 summarize these counts for the AM and PM peaks, respectively.

d. Traffic Crash Analysis

Study-area crash data were obtained from Mass Highway records for the three-year period from January 2008 through December 2010 (the most recent data available). An analysis of the crash data is summarized in Table 2.d.1. A detailed summary by crash type is provided in Table 2.d.2.

Table 2.d.1
MassDOT Crash Analysis (2008 – 2010) Summary

Location	Total Crashes (3-year period)	Signalized or Unsignalized/ Average Crash Rate	Calculated Crash Rate
1) Mass Ave/Western Ave at Prospect St	31	Signalized/ 0.76	1.05
2) Mass Ave/Brookline St	31	Signalized/ 0.76	1.63
3) Mass Ave/Sidney St	22	Signalized/ 0.76	0.99
4) Main St/Sidney St	2	Signalized/ 0.76	0.31
5) Mass Ave/Blanche St/State	17	Unsignalized/ 0.58	0.99
6) Mass Ave/Landsdowne St/Front Street	10	Signalized/ 0.76	0.40
7) Mass Ave/Windsor St	15	Unsignalized/ 0.58	0.60
8) Mass Ave/Albany St	26	Signalized/ 0.76	0.69
9) Mass Ave/Vassar St	39	Signalized/ 0.76	0.93
10) Green St/Landsdowne St	0	Unsignalized/ 0.58	0.00
11) Green St/Blanche St	1	Unsignalized/ 0.58	0.96
12) Green St/Sidney St	3	Unsignalized/ 0.58	0.51
13) Green St/Magazine St	7	Unsignalized/ 0.58	1.31
14) River Street/Western Ave/Green Street	14	Signalized/ 0.76	0.84

Source: Massachusetts Department of Transportation

Table 2.d.2
MHD Crash Analysis (2008 – 2010) Details

	Massachusetts Avenue at								Main at	Green Street at			
	Prospect/ River/ Western	Brookline	Sidney	Blanche/ State	Landsdowne/ Front	Windsor	Albany	Vassar	Sidney	Blanche	Sidney	Magazine	River/ Western
Year													
2008	12	16	9	6	1	4	12	15	0	1	2	4	6
2009	14	5	8	9	4	5	6	13	2	0	1	1	2
2010	5	10	5	2	5	6	8	11	0	0	0	2	6
Total	31	31	22	17	10	15	26	39	2	1	3	7	14
Average	10.33	10.33	7.33	5.67	3.33	5.00	8.67	13.00	2.00	1.00	1.50	2.33	4.67
Collision Type													
Angle	5	16	4	7	2	7	15	11	1	0	0	3	3
Head-on	0	2	2	0	1	0	0	3	0	0	1	0	1
Rear-end	9	4	10	2	2	2	4	9	0	0	0	0	4
Rear-to-Rear	0	0	0	0	0	0	0	0	0	0	0	0	0
Sideswipe, opposite direction	0	0	0	0	0	1	0	0	0	1	0	0	1
Sideswipe, same direction	11	3	2	3	2	1	5	6	0	0	1	3	3
Single vehicle crash	4	2	1	4	3	3	2	7	0	0	1	1	2
Unknown	1	2	1	0	0	1	0	1	0	0	0	0	0
Not reported	1	2	2	1	0	0	0	2	1	0	0	0	0
Total	31	31	22	17	10	15	26	39	2	1	3	7	14
Crash Severity													
Fatal injury	2	0	0	0	0	0	0	0	0	0	0	0	0
Non-fatal injury	7	8	6	7	4	6	11	15	2	0	1	0	4
Property damage only	14	13	12	8	3	5	10	15	0	1	1	6	9
Not Reported	7	9	4	2	3	4	5	9	0	0	1	1	1
Unknown	1	1	0	0	0	0	0	0	0	0	0	0	0
Total	31	31	22	17	10	15	26	39	2	1	3	7	14
Time of Day													
Weekday, 7:00 AM - 9:00 AM	2	3	3	5	1	3	7	10	0	0	1	0	2
Weekday, 4:00 PM - 6:00 PM	3	5	2	3	2	2	4	9	1	0	0	1	3
Saturday, 11:00 AM - 2:00 PM	1	3	0	1	0	0	1	0	0	0	0	0	0
Weekday, other time	18	15	12	5	6	7	9	15	1	0	1	5	8
Weekend, other time	7	5	5	3	1	3	5	5	0	1	1	1	1
Total	31	31	22	17	10	15	26	39	2	1	3	7	14
Pavement Conditions													
Dry	26	24	14	14	6	8	21	32	1	1	2	7	10
Wet	2	2	6	2	3	5	5	5	0	0	0	0	4
Snow	2	0	0	0	0	0	0	0	0	0	0	0	0
Ice	0	0	0	0	0	0	0	0	0	0	0	0	0
Sand, mud, dirt, oil, gravel	0	0	0	1	0	0	0	0	0	0	0	0	0
Water (standing, moving)	0	0	0	0	0	0	0	0	0	0	0	0	0
Slush	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	1	0	0	0	0	0	0	0
Unknown	0	1	0	0	0	1	0	0	0	0	0	0	0
Not reported	1	4	2	0	1	0	0	2	1	0	1	0	0
Total	31	31	22	17	10	15	26	39	2	1	3	7	14
Non Motorist (Bike, Ped)													
Total	5	12	5	9	3	6	6	15	1	0	0	1	2
MassDOT Crash Rates	1.05	1.63	0.99	0.99	0.40	0.60	0.69	0.93	0.31	0 .96	0.51	1.31	0.84

Source: Massachusetts Department of Transportation

e. Public Transportation

Transit stops and stations closest to the site are shown in Figure 1.d. Operating hours, weekday daily ridership, and peak-hour headways for each MBTA service are presented in Table 2.e.

Table 2.e
MBTA Services

Route	Destination	Hours of Operation	Weekday Daily Ridership (person trips)	Peak-Hour Headways (minutes)
Bus				
1	Harvard/Holyoke Gate – Dudley Station via Mass. Ave.	4:37AM - 1:34AM	12,325	≤10
47	Central Square, Cambridge – Broadway Station via BU Medical Center, Dudley Station & Longwood Medical Area	5:15 AM - 1:31 AM	4,341	8-10
64	Oak Square – University Park, Cambridge or Kendall/MIT via North Beacon St.	5:31AM-1:13AM	1,268	15-30
70A/70	Cedarwood, No. Waltham or Watertown Sq – University Park Via Central Sq. Cambridge, Arsenal St. & Western Ave.	4:50AM – 1:19AM	2,032/4,654	8-25
83	Rindge Avenue – Central Sq. Cambridge via Porter Square	5:10AM – 1:20AM	2,154	20
91	Sullivan Sq Sta. – Central Sq. Cambridge via Washington St.	5:15AM – 1:10 AM	1,482	25-30
CT1	Central Square, Cambridge - BU Medical Center/Boston Medical Center via MIT	6:00AM – 7:40PM	2,014	20
CT2	Sullivan Square Station - Ruggles Station via Kendall/MIT Station	5:55AM – 7:37PM	2,110	20-25
Rail				
Red Line	Ashmont	5:16AM – 12:30AM	192,513*	9
	Braintree	5:15AM – 12:18AM		9

Source: MBTA Official Public Transit System Map/Schedule and 2010 Blue Book Thirteenth Edition
*Ashmont/Braintree Ridership Data is combined for Weekday Daily Ridership

The EZRide, operated by the Charles River TMA, provides shuttle service between North Station, Lechmere Station, Kendall Square and Cambridgeport during weekday morning and evening. A midday loop serves Kendall Square and MIT's NorthWest Campus from 10:44 AM – 3:02 PM. Service is provided at 8-minute headways in each direction between 7:30 – 8:50 AM, and at 10-minute headways from 6:20 – 7:30 AM, 8:50 – 10:20 AM. During the evening peak period, service is provided every 9-minutes at all times.

3. Project Traffic

a. Mode Share and Average Vehicle Occupancy

Mode-share and average vehicle occupancy (AVO) characteristics for the Project were derived from 2012 University Park (average of Phase III &IV) PTDM data. Trips categorized as "other" were then assigned to bicycle to account for projected City-wide mode shift goals for bicycling. Table 3.a presents mode-shares used as a basis for estimating Project trip generation. Drive-alone and rideshare were combined to

determine overall automobile mode share. The AVO of 1.13 was used to convert ITE vehicle trips to person trips (National Household Travel Survey 2009) and a local AVO of 1.08 (derived from 2012 PTDM data) was used to convert the adjusted person trips to vehicle trips.

Table 3.a
Mode-Share

Mode	Office/R&D
Automobile (SOV)	44.5%
Automobile (HOV)	7.6%
Transit	33.4%
Bicycle	9.4%
Walk	5.1%
Total	100.0%

Source: 2012 University Park PTDM Data (Average of Phase III & IV)

b. Trip Generation

Trip-generation estimates were developed based on Institute of Transportation Engineers (ITE) Trip Generation Manual (8th Edition) using the Average Rate method for Office land use code 710. Despite that up to forty percent of the proposed building could be built out as R&D, Office LUC 710 was assumed in order to provide the most conservative and flexible analysis. ITE vehicle-trip rates were converted to person-trip rates by application of a 1.13 AVO, to reflect the national basis for ITE data, based on the 2009 National Household Travel Survey. Once the mode shares were applied to the person-trip rates, the automobile-mode person-trips were converted back to vehicle trips assuming a local AVO of 1.08.

As discussed previously, no trip generation credit for the existing 300 Massachusetts Avenue Parcel was taken. It recently contained approximately 7,000 sf of restaurant space, 3,000 sf of retail space, 2,300 sf of auto service space, and 35,000 sf of MIT Fleet Maintenance space. These retail uses have been phasing out over the course of the past year. Currently, the All Asia bar and the Thai Restaurant remain tenanted. It is proposed that the current and previously existing land uses totaling 12,300 sf of retail and 35,000 sf of Fleet Maintenance space cancel out the proposed 15,000 sf of retail due to the similar size and nature of the land use. Therefore, this replacement ground floor retail has not been included in the trip generation calculation. No trip generation credit has been taken for the existing parcel.

The resulting Project trip generation by mode for the proposed Project is summarized in Table 3.b.1. The Project is expected to generate 206 morning peak hour vehicle trips and 198 evening peak hour vehicle trips.

Table 3.b.1
Project Trip Generation by Mode

	Automobile			Transit			Walk			Bicycle		
	Daily	AM Peak	PM Peak	Daily	AM Peak	PM Peak	Daily	AM Peak	PM Peak	Daily	AM Peak	PM Peak
Entering	727	181	34	504	125	23	77	19	4	142	35	7
Exiting	727	25	164	504	17	113	77	3	17	142	5	32
Total	1,454	206	198	1,009	142	137	155	22	21	283	40	38

Due to the availability of existing parking data at the 55 Franklin Street Garage, a projection of vehicle trips estimated to be generated by the 300 Massachusetts Avenue site during the morning and evening peak hours is presented in Table 3.b.2. This

analysis is based on existing arrival and departure data obtained from the existing 55 Franklin Street Garage. Projected parking demand as described in Section 9 of this TIS has also been assumed. The results of this analysis are compared to the ITE trip generation methodology in Table 3.b.2.

Table 3.b.2
Vehicle Trip Generation Comparison

	ITE Trip Generation Methodology		Site Specific Data Trip Generation Methodology	
	AM Peak	PM Peak	AM Peak	PM Peak
Entering	181	34	80	3
Exiting	25	164	4	69
Total	206	198	84	72

The comparison demonstrates how the site specific trip generation methodology is significantly lower than the ITE Trip Generation Methodology. However, since the ITE Trip Generation Methodology is expected to generate more trips, this has been assumed for the traffic analysis in order to be most conservative.

c. Site Access

As shown in Figure D, Proposed Site Plan, the building site will not contain any parking. Access to the loading docks will be provided via Blanche Street. Trucks will travel northbound on the one-way Blanche Street and then back into the angled loading docks. They will be able to exit the loading dock by traveling northbound on Blanche Street to access Massachusetts Avenue. Pedestrian access will be provided with a main entrance/exit on Massachusetts Avenue. Blanche Street is being reconstructed as a shared raised roadway containing space for vehicles, bicycles and pedestrians. Retail is proposed along the front of Massachusetts Avenue with pedestrian entry points directly into and out of the retail space. A pedestrian entrance/exit will also be provided on Green Street.

Covered indoor bicycle storage will be located inside the first floor and will be accessed via a corridor with a direct connection to a controlled exterior door off a sidewalk adjacent to a service alley. Additionally, direct access to the lockers, showers and changing rooms will be available from the bicycle storage room, and from the building lobby.

d. Trip Distribution and Assignment

The trip distribution was approved by TP&T on April 5 2013. Project-generated traffic was distributed based on 2012 University Park Zip Code data and supplemented by City of Cambridge Central Square Study assumptions. The results by town for people working in the study area that drive to work are presented in Table 3.d.

Table 3.d
2012 University Park Zip Code Data for Drivers

City/Town of Residence	Percent
Newton	5%
Cambridge	5%
Arlington	4%
Boston	3%
Somerville	3%
Waltham	3%
Lexington	2%
Medford	2%
Brighton	2%
Brookline	2%
Winchester	2%
Belmont	2%
Acton	2%
Watertown	2%
Malden	1%
Woburn	1%
Framingham	1%
Sudbury	1%
Wakefield	1%
Dorchester	1%
North Andover	1%
Salem	1%
Stoneham	1%
Charlestown	1%
Lowell	1%
Natick	1%
Roslindale	1%
Southborough	1%
West Roxbury	1%
Allston	1%
Andover	1%
Concord	1%
Jamaica Plain	1%
Saugus	1%
Weymouth	1%
Ashland	1%
Danvers	1%
South Boston	1%
Westborough	1%
Franklin	1%
Hopkinton	1%
Ipswich	1%
Melrose	1%
Milton	1%
Quincy	1%
Reading	1%
Salem NH	1%
Sharon	1%
Wayland	1%
Weston	1%
Other Towns/Cities < 1% each	25%
Total	100%

Source: 2012 University Park PTDM Zip Code Data

The assignment of Project trips to the study area roadway network is presented in the resulting Project trips at study intersections are presented for Build Conditions in Figures 3.d.1 through 3.d.5 for the AM and PM peak hours, respectively.

e. Servicing and Deliveries

The loading and service area for the proposed building will be located within the building footprint and will be capable of shuttering the openings for those uses. Trucks will access the loading area via Blanche Street which is a one-way connection in the northbound direction between Green Street and Massachusetts Avenue. The loading areas are planned to satisfy the day-to-day servicing of the building, based on experience with buildings of similar type and size in Cambridge. The buildings will have a minimum of two large loading bays in addition to one smaller bay and will be able to accommodate a 50' truck.

4. Background Traffic

Per the TP&T Scoping Letter, background traffic growth was assumed to occur at one-half a percent per year for a 5-year time horizon. Additionally, traffic associated with specific projects planned or under construction in the area were added to develop the Future 2018 traffic volumes. The following three developments were included in the background traffic growth:

- MIT's R&D building at 610-650 Main Street
- Novartis – 131 Main Street
- 240 Sidney Street

5. Traffic Analysis Scenarios

Traffic networks were developed, in accordance with the TIS Guidelines, for the following scenarios:

a. Existing Condition (2013)

The Existing Condition analysis is based on existing (2013) vehicle, bicycle and pedestrian counts at the study area intersections as previously presented in Section 2.

b. Build Condition (2013)

The Build Condition (2013) assumes full occupancy of the 300 Massachusetts Avenue Project. Project-generated traffic is added to the study area to create the Build networks, presented in Figures 5.b.1 and 5.b.2 for the AM and PM peak hours, respectively.

c. Future Condition (2018)

The Future Condition (2018) includes future background growth and other developments (as described above), as well as Project trips, and the traffic networks are presented in Figures 5.c.1 and 5.c.2**.**

6. Vehicle Capacity Analysis

a. Capacity Analysis

Synchro 7 software is used to determine the vehicle level of service (VLOS) for signalized and unsignalized study intersections. Synchro software is based on the 2000 Highway Capacity Manual. Results for the Existing (2013), Build (2013) and Future (2018) conditions are presented in Table 6.a.1 and Table 6.a.2 for signalized intersections and Table 6.a.3 and Table 6.a.4 for unsignalized intersections. A summary of the analysis results follows.

Table 6.a.1 Signalized Intersection Level of Service Results – AM Peak Hour

		Existing (2013) Condition			Build (2013) Condition			Future (2018) Condition		
Intersection	Approach	v/c	Delay	VLOS	v/c	Delay	VLOS	v/c	Delay	VLOS
Massachusetts Avenue at Western Avenue and Prospect Street	Massachusetts EB	0.79	37.0	D	0.87	44.3	D	1.00	66.9	E
	Massachusetts WB	0.55	35.7	D	0.55	35.7	D	0.60	36.5	D
	Western NB	0.81	48.8	D	0.81	51.3	D	0.84	54.8	D
	Prospect SB	0.63	24.5	C	0.63	24.5	C	0.65	25.0	C
	Overall	**0.80**	**38.5**	**D**	**0.84**	**41.3**	**D**	**0.91**	**48.8**	**D**
Massachusetts Avenue at Brookline Street	Massachusetts EB	0.63	14.4	B	0.72	16.6	B	0.82	18.2	B
	Massachusetts WB	0.27	28.0	C	0.27	28.0	C	0.30	27.3	C
	Brookline NB	0.30	24.0	C	0.30	24.0	C	0.31	24.2	C
	Overall	**0.50**	**21.3**	**C**	**0.56**	**22.0**	**C**	**0.63**	**22.4**	**C**
Massachusetts Avenue at Sidney Street	Massachusetts EB	0.74	25.3	C	0.95	39.1	D	>1.0	53.0	D
	Massachusetts WB	0.91	46.8	D	0.91	43.0	D	0.95	45.9	D
	Sidney NB	0.44	39.7	D	0.44	39.7	D	0.45	40.0	D
	Sidney SB	0.97	42.6	D	>1.0	49.0	D	>1.0	51.7	D
	Overall	**0.87**	**38.5**	**D**	**0.89**	**43.2**	**D**	**0.94**	**49.7**	**D**
Main Street at Sidney Street	Columbia EB	0.79	44.5	D	0.83	48.4	D	0.85	48.1	D
	Main WB	0.84	70.6	E	0.84	70.6	E	0.95	>80	F
	Sidney NB	0.53	14.8	B	0.53	15.0	B	0.61	17.3	B
	Overall	**0.67**	**39.3**	**D**	**0.68**	**41.1**	**D**	**0.75**	**46.1**	**D**
Massachusetts Avenue at Landsdowne Street and Front Street	Massachusetts EB	0.59	9.3	A	0.59	10.3	B	0.61	10.6	B
	Massachusetts WB	0.74	16.9	B	0.86	21.6	C	0.89	21.3	C
	Landsdowne NB	0.15	31.8	C	0.16	32.0	C	0.17	32.1	C
	Front SB	0.29	33.8	C	0.29	33.8	C	0.39	35.9	D
	Overall	**0.64**	**16.6**	**B**	**0.73**	**19.7**	**B**	**0.77**	**19.9**	**B**
Massachusetts Avenue at Albany Street	Massachusetts EB	0.60	17.9	B	0.64	19.9	B	0.74	23.4	C
	Massachusetts WB	1.00	48.0	D	>1.0	69.0	E	>1.0	>80	F
	Albany NB	0.66	27.8	C	0.66	27.8	C	0.69	29.0	C
	Albany SB	0.74	31.9	C	0.74	31.9	C	0.76	35.0	C
	Overall	**0.88**	**33.6**	**C**	**0.92**	**42.4**	**D**	**>1.0**	**>80**	**F**
Massachusetts Avenue at Vassar Street	Massachusetts EB	0.69	18.6	B	0.73	19.7	B	0.83	24.4	C
	Massachusetts WB	0.75	21.5	C	0.79	23.1	C	0.89	29.1	C
	Vassar NB	0.73	33.6	C	0.73	33.7	C	0.75	34.4	C
	Vassar SB	>1.0	58.3	E	>1.0	58.2	E	>1.0	66.1	E
	Overall	**0.85**	**29.3**	**C**	**0.87**	**30.1**	**C**	**0.96**	**34.8**	**C**
Western Avenue/ River Street/ Green Street	Green EB	0.40	26.2	C	0.40	26.2	C	0.41	26.4	C
	River NB	0.35	13.1	B	0.35	13.0	B	0.37	13.1	B
	Western SB	0.80	56.0	E	0.80	56.0	E	0.82	57.1	E
	Overall	**0.55**	**27.9**	**C**	**0.55**	**27.6**	**C**	**0.56**	**27.9**	**C**

v/c volume-to-capacity ratio
Delay average delay expressed in seconds per vehicle
VLOS vehicular level of service

Table 6.a.2 Signalized Intersection Level of Service Results – PM Peak Hour

		Existing (2013) Condition			Build (2013) Condition			Future (2018) Condition		
Intersection	Approach	v/c	Delay	VLOS	v/c	Delay	VLOS	v/c	Delay	VLOS
Massachusetts Avenue at Western Avenue and Prospect Street	Massachusetts EB	0.77	41.0	D	0.78	42.1	D	0.85	47.3	D
	Massachusetts WB	0.74	35.9	D	0.79	39.6	D	0.90	48.8	D
	Western NB	0.78	25.2	C	0.78	25.4	C	0.80	26.6	C
	Prospect SB	0.61	19.8	B	0.61	19.8	B	0.63	20.2	C
	Overall	**0.78**	**28.9**	**C**	**0.78**	**30.0**	**C**	**0.84**	**33.8**	**C**
Massachusetts Avenue at Brookline Street	Massachusetts EB	0.53	27.0	C	0.55	27.2	C	0.59	28.3	C
	Massachusetts WB	0.32	5.2	A	0.32	5.3	A	0.38	6.6	A
	Brookline NB	0.50	29.2	C	0.50	29.6	C	0.52	30.0	C
	Overall	**0.52**	**19.5**	**B**	**0.53**	**19.9**	**B**	**0.56**	**20.3**	**C**
Massachusetts Avenue at Sidney Street	Massachusetts EB	0.49	27.8	C	0.52	28.4	C	0.56	29.6	C
	Massachusetts WB	0.84	31.3	C	0.84	30.9	C	0.90	35.9	D
	Sidney NB	0.44	37.4	D	0.44	37.4	D	0.45	37.7	D
	Sidney SB	0.85	36.8	D	0.87	37.6	D	0.89	32.7	C
	Overall	**0.74**	**32.1**	**C**	**0.74**	**32.3**	**C**	**0.78**	**33.5**	**C**
Main Street at Sidney Street	Columbia EB	0.67	43.5	D	0.69	44.2	D	0.70	44.7	D
	Main WB	0.73	52.4	D	0.73	52.4	D	>1.0	>80	F
	Sidney NB	0.36	11.3	B	0.36	11.2	B	0.38	11.4	B
	Overall	**0.52**	**34.6**	**C**	**0.52**	**34.9**	**C**	**0.61**	**68.0**	**E**
Massachusetts Avenue at Landsdowne Street and Front Street	Massachusetts EB	0.47	14.0	B	0.47	13.9	B	0.48	14.2	B
	Massachusetts WB	0.41	14.6	B	0.43	15.2	B	0.45	15.9	B
	Landsdowne NB	0.87	66.8	E	>1.0	>80	F	>1.0	>80	F
	Front SB	0.20	32.2	C	0.21	32.4	C	1.0	>80	F
	Overall	**0.56**	**27.1**	**C**	**0.60**	**41.1**	**D**	**0.64**	**57.7**	**E**
Massachusetts Avenue at Albany Street	Massachusetts EB	0.60	17.3	B	0.70	20.0	C	0.78	22.0	C
	Massachusetts WB	0.75	19.2	B	0.77	19.9	B	0.86	24.1	C
	Albany NB	0.78	36.2	D	0.78	36.2	D	0.81	38.2	D
	Albany SB	0.75	33.9	C	0.75	33.9	C	>1.0	>80	F
	Overall	**0.76**	**24.3**	**C**	**0.77**	**25.1**	**C**	**>1.0**	**43.7**	**D**
Massachusetts Avenue at Vassar Street	Massachusetts EB	0.78	24.8	C	0.92	36.0	D	>1.0	73.0	E
	Massachusetts WB	0.72	21.6	C	0.73	22.0	C	0.78	23.9	C
	Vassar NB	0.42	25.6	C	0.42	25.6	C	0.43	26.2	C
	Vassar SB	0.85	41.3	D	0.85	41.4	D	0.88	43.8	D
	Overall	**0.81**	**27.7**	**C**	**0.89**	**31.6**	**C**	**>1.0**	**46.4**	**D**
Western Avenue/ River Street/ Green Street	Green EB	0.90	44.6	D	0.90	43.8	D	0.92	46.7	D
	River NB	0.78	19.7	B	0.78	19.7	B	0.80	20.2	C
	Western SB	0.66	14.1	B	0.66	14.1	B	0.67	14.6	B
	Overall	**0.76**	**26.4**	**C**	**0.76**	**26.7**	**C**	**0.78**	**28.5**	**C**

v/c volume-to-capacity ratio
Delay average delay expressed in seconds per vehicle
VLOS vehicular level of service

Table 6.a.1 and Table 6.a.2 show the results for the Existing (2013), Build (2013), and Future (2018) conditions for signalized intersections.

Comparing Existing and Build results for overall intersection level of performance, indicates that the Build Program has minimal impacts on traffic operations in the study area.

Comparing the Existing condition to Build condition, all study area intersections maintain the same overall level of service (LOS) except for the intersection of Massachusetts Avenue at Albany Street during the morning peak hour and Massachusetts Avenue at Front Street/Landsdowne Street during the evening peak

hour. Massachusetts Avenue at Albany Street declines from a LOS C to LOS D with an approximately 10 second increase in delay during the morning peak hour. The intersection of Massachusetts Avenue at Front Street/Landsdowne Street declines from an LOS C to LOS D during the evening peak hour. The incremental change in delay can be attributed to the increase in volume arriving from the south on Landsdowne Street and turning right onto Massachusetts Avenue eastbound.

Table 6.a.3
Unsignalized Intersection Level of Service Results – AM Peak Hour

		Existing (2013) Condition			Build (2013) Condition			Future (2018) Condition		
Intersection	Approach	Demand	Delay	Critical VLOS	Demand	Delay	Critical VLOS	Demand	Delay	Critical VLOS
Massachusetts at State and Blanche	EB	470	0.8	A	470	0.8	A	521	2.1	A
	NB	28	32.2	D	28	32.5	D	43	>50	F
Massachusetts at Windsor	EB	496	0.6	A	507	0.6	A	529	0.7	A
	SB	105	>50	F	113	>50	F	116	>50	F
Green at Landsdowne	EB	96	14.0	B	107	16.2	C	109	16.5	C
Green at Blanche	EB	208	1.1	A	287	0.9	A	307	1.3	A
Green at Sidney	NB	219	1.9	A	231	2.5	A	250	2.4	A
	SB	411	3.1	A	490	5.0	A	502	5.1	A
Green at Magazine	WB	160	8.7	A	168	8.8	A	182	9.0	A
	NB	99	8.5	A	99	8.5	A	101	8.6	A

Demand vehicular demand on critical approach
Delay average delay expressed in seconds per vehicle
VLOS vehicular level of service

Table 6.a.4
Unsignalized Intersection Level of Service Results – PM Peak Hour

		Existing (2013) Condition			Build (2013) Condition			Future (2018) Condition		
Intersection	Approach	Demand	Delay	Critical VLOS	Demand	Delay	Critical VLOS	Demand	Delay	Critical VLOS
Massachusetts at State and Blanche	EB	440	1.3	A	440	1.3	A	458	1.7	A
	NB	49	43.1	E	49	44.8	E	53	>50	F
Massachusetts at Windsor	EB	620	2.6	A	696	2.8	A	751	3.0	A
	SB	102	>50	F	103	>50	F	106	>50	F
Green at Landsdowne	EB	174	22.6	C	250	39.1	E	254	43.2	E
Green at Blanche	EB	105	2.9	A	120	2.6	A	125	2.7	A
Green at Sidney	NB	305	5.2	A	379	6.7	A	390	6.8	A
	SB	291	1.8	A	306	2.2	A	321	2.2	A
Green at Magazine	WB	406	13.1	B	457	15.0	B	508	17.8	C
	NB	131	10.1	B	131	10.3	B	134	10.6	B

Demand vehicular demand on critical approach
Delay average delay expressed in seconds per vehicle
VLOS vehicular level of service

Table 6.a.3 and Table 6.a.4 show the results for the Existing (2013), Build (2013), and Future (2018) conditions for unsignalized intersections. The table presents the delay for each approach and the LOS for the most minor approach.

Of the six (6) unsignalized intersections, the only intersection that experiences a decrease in LOS during both the morning and evening peak hour is Green Street at Landsdowne Street in the eastbound direction. With a large percentage of the project generated trips exiting the 55 Franklin Street Garage onto Green Street approaching Landsdowne Street, the increase in volume results in a (still acceptable) delay of 16.2 seconds and 39.1 seconds during the morning and evening peak hours, respectively.

7. Queue Analysis

Queue analysis was performed in conjunction with the LOS analysis. Additionally, field observations of queuing at signalized intersections were performed in April 2013 during the traffic counts. Tables 7.a.1 and 7.a.2 present results for observed and modeled average queues for each scenario for the AM Peak and PM Peak hours, respectively.

Table 7.a.1
Signalized Intersection Queue Analysis - AM Peak Hour

Intersection	Lane	Average Queue in Vehicles 2013 Observed	2013 Modeled	2013 Build	2018 Future
Massachusetts Avenue at Western Avenue and Prospect Street	Eastbound Thru	4	8	9	11
	Eastbound Right	0	1	1	1
	Westbound Thru	3	5	5	6
	Westbound Right	1	2	2	2
	Northbound Thru	3	13	13	13
	Northbound Right	1	4	5	5
	Southbound Thru/Right	3	7	7	7
Massachusetts Avenue at Brookline Street	Eastbound Left/Thru	8	9	11	14
	Westbound	2	4	4	4
	Northbound Left	2	2	2	2
	Northbound Right	3	3	3	3
Massachusetts Avenue at Sidney Street	Eastbound Left	3	2	2	3
	Eastbound Thru/Right	9	9	10	13
	Westbound Left	2	4	4	4
	Westbound Thru/Right	3	10	9	9
	Northbound Right	1	2	2	2
	Southbound Left/Thru	3	3	3	4
	Southbound Right	1	0	0	0
Main Street at Sidney Street	Eastbound Thru	0	0	0	1
	Eastbound Right	7	7	7	7
	Westbound Left/Thru	3	4	4	4
	Northbound Left/Right	1	4	4	5
Massachusetts Avenue at Landsdowne Street and Front Street	Eastbound Left/Thru/Right	4	4	6	6
	Westbound	4	7	8	8
	Northbound Left/Thru/Right	1	0	0	0
	Southbound Left Thru/Right	1	2	2	2
Massachusetts Avenue at Albany Street	Eastbound	5	5	6	6
	Westbound	4	7	12	16
	Northbound Left	0	0	0	1
	Northbound Thru/Right	3	7	7	11
	Southbound Left	1	2	2	5
	Southbound Thru/Right	3	7	7	9
Massachusetts Avenue at Vassar Street	Eastbound	5	7	7	8
	Westbound	6	8	9	11
	Northbound Left	5	1	1	2
	Northbound Thru/Right	10	7	7	8
	Southbound Left	3	4	4	4
	Southbound Thru/Right	5	5	5	5
Western Avenue/ River Street/ Green Street	Westbound Left/Thru	2	1	1	2
	Westbound Thru/Right	2	3	3	3
	Northbound Left	2	2	2	2
	Northbound Thru	4	4	4	4
	Southbound Left/Thru/Right	5	10	10	10

Table 7.a.2
Signalized Intersection Queue Analysis - PM Peak Hour

Intersection	Lane	Average Queue in Vehicles 2013 Observed	2013 Modeled	2013 Build	2018 Future
Massachusetts Avenue at Western Avenue and Prospect Street	Eastbound Thru	8	7	7	8
	Eastbound Right	0	0	0	0
	Westbound Thru	7	6	7	8
	Westbound Right	2	2	2	2
	Northbound Thru	19	13	13	13
	Northbound Right	5	4	4	4
	Southbound Thru/Right	3	8	8	8
Massachusetts Avenue at Brookline Street	Eastbound Left/Thru	8	9	9	10
	Westbound	2	1	1	2
	Northbound Left	2	3	3	3
	Northbound Right	9	5	5	5
Massachusetts Avenue at Sidney Street	Eastbound Left	3	2	2	2
	Eastbound Thru/Right	4	6	6	6
	Westbound Left	2	2	2	2
	Westbound Thru/Right	9	9	9	13
	Northbound Right	2	2	2	3
	Southbound Left/Thru	2	3	3	4
	Southbound Right	2	0	0	1
Main Street at Sidney Street	Eastbound Thru	0	0	0	0
	Eastbound Right	3	4	4	5
	Westbound Left/Thru	6	4	4	8
	Northbound Left/Right	2	3	3	3
Massachusetts Avenue at Landsdowne Street and Front Street	Eastbound Left/Thru/Right	4	6	6	7
	Westbound	3	4	5	5
	Northbound Left/Thru/Right	6	4	7	7
	Southbound Left Thru/Right	1	2	1	4
Massachusetts Avenue at Albany Street	Eastbound	5	7	8	9
	Westbound	4	9	10	11
	Northbound Left	1	1	1	1
	Northbound Thru/Right	11	8	8	9
	Southbound Left	4	3	3	8
	Southbound Thru/Right	7	4	4	4
Massachusetts Avenue at Vassar Street	Eastbound	10	7	9	14
	Westbound	4	7	8	8
	Northbound Left	2	1	1	1
	Northbound Thru/Right	5	4	4	4
	Southbound Left	17	5	5	5
	Southbound Thru/Right	5	7	7	7
Western Avenue/ River Street/ Green Street	Westbound Left/Thru	2	3	4	6
	Westbound Thru/Right	2	9	9	9
	Northbound Left	3	4	4	4
	Northbound	6	4	4	4
	Southbound Left/Thru/Right	4	3	3	3

The queue analysis results presented in the tables above correspond to the level of service analyses conducted for the study area intersections. Actual queue observations performed in the field generally confirm the analysis results but varied slightly at times. Observed queue lengths were often shorter than modeled queue lengths which could be a result of more aggressive driving in reality, resulting in shorter queues. The Massachusetts Avenue at Vassar Street queue observations during the evening peak

hour indicated a high level of congestion in the Massachusetts Avenue eastbound approach which impacted the ability for vehicles to process through the intersection. Bus activity in front of MIT and traffic traveling towards the bridge seemed especially high during observations but do not seem to indicate a typical condition.

8. Residential Street Volume Analysis

Tables 8.a.1 and 8.a.2 present the peak hour traffic volumes on study-area roadways under Existing, Build and Future conditions, including the increase in two-way traffic volume for Build compared with Existing, expressed in project trips and as a percentage increase.

Of all of the roadway segments in the study area identified in Tables 8.a.1 and 8.a.2, a total of seventeen (17) segments are streets which have more than 1/3 of residential frontage, as determined by the existing first floor use. These segments are evaluated in the Planning Board Criteria for increased volume on residential streets. Roadways within the study area that will not experience an increase in traffic as a result of the Project were not included in the Residential Street Volume Analysis.

The impacts of the residential street analysis show a significant increase in traffic along Green Street during the evening peak hour. This is due to the large number of trips departing the garage and traveling towards I-90 and Storrow/Memorial Drive. The prohibition of left-turns from Massachusetts Avenue onto Western Avenue in Central Square results in heavier traffic utilization on Green Street in this neighborhood.

Table 8.a.1
Traffic on Study Area Roadways, AM Peak

Roadway	Reviewed Segment	Amount of Residential	Traffic Volumes and Increases						
			2013 Existing[1]	2013 Build	Increase (Project Trips)	% Increase	2018 Future	Increase	% Increase
Western Avenue	Jay Street to Soden Street	1/2 or more	399	407	4	1%	427	20	5%
	Soden Street to Franklin Street	1/2 or more	399	407	4	1%	427	20	5%
River Street	Howard Street to Kinnaird Street	1/2 or more	696	720	12	2%	750	30	4%
	Kinnaird Street to William Street	>1/3 but <1/2	696	720	12	2%	750	30	4%
	William Street to Franklin Street	>1/3 but <1/2	696	720	12	2%	750	30	4%
Prospect Street	Bishop Allen Drive to Harvard Street	>1/3 but <1/2	960	961	1	0%	986	25	3%
Columbia Street	Bishop Allen Drive to Washington Street	>1/3 but <1/2	359	374	15	4%	417	43	12%
	Washington Street to Harvard Street	1/2 or more	359	374	15	4%	417	43	12%
Windsor Street	School Street to Harvard Street	1/2 or more	185	194	9	5%	252	58	30%
Green Street	Magazine to Brookline Street	>1/3 but <1/2	160	168	8	5%	182	14	8%
	Brookline Street to Sidney Street	1/2 or more	86	98	12	14%	100	2	2%
Brookline Street	Chestnut Street to Allston Street	1/2 or more	231	245	14	6%	na	na	na
	Allston Street to Erie Street	1/2 or more	231	245	14	6%	na	na	na
	Erie Street to Emily Street	1/2 or more	231	245	14	6%	na	na	na
Sidney Street	Putnam Avenue to Hamilton Street	>1/3 but <1/2	219	221	2	1%	na	na	na
	Tudor Street to Pilgrim Street	1/2 or more	219	221	2	1%	na	na	na
Pacific Street	Sidney Street to Albany Street	>1/3 but <1/2	na	na	14	na	na	na	na

1. Based on closest count data available may not be precise given the distance and cross streets between intersections

Table 8.a.2
Traffic on Study Area Roadways, PM Peak

Roadway	Reviewed Segment	Amount of Residential	Traffic Volumes and Increases						
			2013 Existing[1]	2013 Build	Increase (Project Trips)	% Increase	2018 Future	Increase	% Increase
Western Avenue	Jay Street to Soden Street	1/2 or more	539	590	26	5%	644	54	9%
	Soden Street to Franklin Street	1/2 or more	539	590	26	5%	644	54	9%
River Street	Howard Street to Kinnaird Street	1/2 or more	750	755	3	0%	776	21	3%
	Kinnaird Street to William Street	>1/3 but <1/2	750	755	3	0%	776	21	3%
	William Street to Franklin Street	>1/3 but <1/2	750	755	3	0%	776	21	3%
Prospect Street	Bishop Allen Drive to Harvard Street	>1/3 but <1/2	1071	1076	5	0%	1104	28	3%
Columbia Street	Bishop Allen Drive to Washington Street	>1/3 but <1/2	303	306	3	1%	344	39	13%
	Washington Street to Harvard Street	1/2 or more	303	306	3	1%	344	39	13%
Windsor Street	School Street to Harvard Street	1/2 or more	293	302	8	3%	318	16	5%
Green Street	Magazine to Brookline Street	>1/3 but <1/2	406	457	51	13%	508	51	11%
	Brookline Street to Sidney Street	1/2 or more	212	286	74	35%	291	5	2%
Brookline Street	Chestnut Street to Allston Street	1/2 or more	359	362	3	1%	na	na	na
	Allston Street to Erie Street	1/2 or more	359	362	3	1%	na	na	na
	Erie Street to Emily Street	1/2 or more	359	362	3	1%	na	na	na
Sidney Street	Putnam Avenue to Hamilton Street	>1/3 but <1/2	305	319	14	5%	na	na	na
	Tudor Street to Pilgrim Street	1/2 or more	305	319	14	5%	na	na	na
Pacific Street	Sidney Street to Albany Street	>1/3 but <1/2	na	na	3	na	na	na	na

1. Based on closest count data available may not be precise given the distance and cross streets between intersections

9. Parking Analysis

As requested in the TP&T TIS Scoping Letter dated February 19, 2013, a parking study has been conducted for University Park which includes a shared parking analysis that demonstrates the existing and proposed parking activity in all three University Parking Garages using existing parking data. Hourly parking data was collected over a three day period from April 9-11, 2013 at 55 Franklin, 30 Pilgrim and 80 Landsdowne Street by various user types including office/R&D tenants, retail users, and residents of University Park. The parking needs of the proposed 300 Massachusetts Avenue building will be met in the 55 Franklin Street garage or other University Park parking.

a. Existing Parking Data

As previously noted, University Park contains three shared parking garages for the employees, residents, and visitors to the park totaling in 2,687 parking spaces.

- *The 55 Franklin Street Garage* which contains a total of 985 parking spaces is a commercial parking facility that provides parking for monthly R&D/Office tenants, residents, Budget Avis rental cars, hotel guests, and retail patrons. Eight Zipcars are available for Zipcar members in this parking garage.
- *The 80 Landsdowne Street Garage*, the largest parking facility, contains 1,120 spaces for monthly R&D/Office tenants and residents of University Park and is an accessory parking garage. Three spaces are allocated to electric charging vehicles and 113 spaces are dedicated to carpool and vanpool spaces.
- *The 30 Pilgrim Street Garage*, the smallest of the three, contains 582 spaces for monthly R&D/Office tenants and residents of University Park and is also accessory parking. There are 58 carpool/vanpool spaces available in this parking facility.

These three garages comprise of a shared parking system where parking permits are shifted among the three garages to accommodate parkers at University Park. This shared parking approach provides flexibility for managing tenant needs. In addition, there are 105 surface parking spaces located at Auburn Court that provide parking for Residents. The parking supply is summarized in Table 9.a.1 and is also illustrated in Figure E.

Table 9.a.1
Existing University Park - Parking Supply Inventory

Parking Garage	Total # Parking Spaces	#of Dedicated Zipcar Spaces	# of Carpool /Vanpool Spaces	# of Electric Charging Spaces	# of Budget-Avis Rental Cars
55 Franklin Street Garage	985	8	0	0	38
80 Landsdowne Street Garage	1,120	0	113	3	0
30 Pilgrim Street Garage	582	0	58	0	0
Total	2,687	8	171	3	38
Resident Surface Parking					
Auburn Court Surface Parking	105	-	-	-	-

Source: Forest City

Table 9.a.2 presents the existing peak occupancy of each garage. Chart 1 shows the existing occupancy for all three parking garages on Wednesday April 10, 2013 throughout the entire day by user type. None of the parking garages are currently over capacity based on the observations and counts in April.

Table 9.a.2
Existing University Park – Peak Parking Occupancy April 10, 2013

Parking Garage	# Parking Spaces	Peak Utilization (# of spaces)	% Utilization
55 Franklin Street	985	854	87%
80 Landsdowne Street Garage	1,120	1,040	93%
30 Pilgrim Garage	582	453	78%
Total	2,687	2,347	87%

b. 300 Massachusetts Avenue Project Parking Demand

In order to estimate parking demand throughout the day generated by the proposed 300 Massachusetts Avenue Project, the number of employees is estimated based on employee density. The vehicle mode share is then applied to the number of employees to determine the number of vehicles that will be parking at University Park on any given day. This analysis is presented in Table 9.b.1. Retail tenants shall be entitled to purchase parking in the 55 Franklin garage for their employees. The number is on a case by case basis for each retail tenant.

Table 9.b.1
300 Massachusetts Avenue Parking Demand

Land Use Break Down	SF	Density (employees/1,000 sf)	# of Employees	% Auto Mode Share*	Parking Demand
Office	169,750	3.0	509	48%	246
R&D	72,750	2.2	160	48%	77
Total	242,500	na	669	na	323

* auto mode share = drive alone % + ½ carpool %

The parking demand calculation results in a demand of 323 spaces throughout the day. Since this doesn't account for work at home, sick, etc. a 5 percent vacancy rate has been applied to this demand to use for the parking analysis calculations. Therefore the total parking space demand throughout the day is expected to be 307 vehicles.

In order to understand how these vehicles arrive, depart and cumulate throughout the day, existing data from monthly permit holders (employees) at the 55 Franklin Street Garage has been applied in order to distribute the future 300 Massachusetts Avenue vehicles. This distribution is summarized in Table 9.b.2. The parking demand peaks at 1PM with a parking occupancy of 245 spaces.

Table 9.b.2
300 Massachusetts Ave - Distribution of Vehicles Parking throughout Day

Beginning at	% In	%Out	300 Mass Ave Vehicles In	300 Mass Ave Vehicles Out	300 Mass Ave Occupancy
12:00 AM	1%	1%	2	3	1
1:00 AM	0%	0%	0	0	1
2:00 AM	0%	0%	0	0	1
3:00 AM	0%	0%	1	0	1
4:00 AM	0%	0%	0	0	2
5:00 AM	2%	0%	5	0	2
6:00 AM	12%	0%	37	1	6
7:00 AM	19%	1%	57	3	42
8:00 AM	26%	1%	80	4	96
9:00 AM	23%	2%	70	6	173
10:00 AM	5%	2%	16	6	236
11:00 AM	2%	2%	5	5	246
12:00 PM	2%	2%	7	7	246
1:00 PM	1%	3%	4	9	245
2:00 PM	2%	4%	5	12	241
3:00 PM	2%	9%	5	27	233
4:00 PM	0%	24%	1	74	211
5:00 PM	1%	23%	3	69	139
6:00 PM	1%	14%	3	43	72
7:00 PM	1%	5%	2	15	32
8:00 PM	0%	3%	1	10	19
9:00 PM	0%	2%	1	5	10
10:00 PM	0%	1%	0	4	6
11:00 PM	0%	0%	0	1	2
12:00 AM	1%	1%	2	3	1
Total	100%	100%	307	307	-

c. Future Build Parking Supply/Demand Analysis

In order to estimate the impacts of the 300 Massachusetts Avenue Project's parking demand on the existing parking supply, the projected parking demand from Table 9.b.2 has been added to the existing parking demand. If all of the 300 Massachusetts Avenue parkers utilize just the 55 Franklin Street parking garage it would be over capacity by approximately 12 percent based on existing use. However, the entire parking supply including all three garages would be adequate to accommodate the 300 Massachusetts Avenue Project parking needs therefore; internal shifts in parking location will occur prior to the project occupancy. It is expected that approximately 200 monthly employee permits will be moved from the 55 Franklin Street Garage to either the 30 Pilgrim Street Garage or the 80 Landsdowne Street Garage. This 200 monthly employee permit shift would provide an approximate occupancy of 95 percent in the 55 Franklin Street Garage.

The Vehicle Capacity Level of Service analysis conducted in section 6 does not take into account any internal shifting in existing parking. The traffic analysis assumes that all vehicle trips generated by the Project will park in the 55 Franklin Garage. Currently, University Park shifts permits among parking garages as part of their parking management operations. Assuming all vehicle project trips will enter and exit the 55 Franklin Street garage is a conservative analysis for the study area intersections. The 200 parking permits that will need to be shifted corresponds to approximately 55 morning peak hour vehicle trips and 47 evening peak hour vehicle trips that will be shifted on the University Park Campus.

In addition to the necessary shift in parking location for a portion of the 55 Franklin Street garage permits, it is important to note that current employees of Vertex allocated to the 30 Pilgrim Street garage will have moved to Boston by the time 300 Massachusetts Avenue is occupied. Vertex, the full-building tenant of 88 Sidney Street in University Park, has requested and currently is allocated more parking passes than would normally be allocated to this building. The analysis assumes that all Vertex space at University Park will be re-tenanted and will then have the same transportation characteristics and number of parking permits allocated with its lease as is typical of other tenants in University Park. However, the parking demand generated by the excess passes will be eliminated with Vertex's move to Boston. When this Vertex relocation is taken into account, the overall parking demand will decrease and the parking supply will adequately meet the parking demands of the proposed project. Chart 2 illustrates the parking demand of the existing uses, 300 Massachusetts Avenue (the Project) and the removal of Vertex from the parking garages. The overall parking demand of 2,430 spaces will be met by the current 2,687 parking supply with occupancy of 90 percent.

Table 9.c.1
Future University Park – Peak Parking Occupancy

Parking Garage	# Parking Spaces	Peak Utilization (# of spaces)	% Utilization
Existing 55 Franklin Street	985	854	87%
Existing 80 Landsdowne Street Garage	1,120	1040	93%
Existing 30 Pilgrim Garage	582	453	78%
Proposed 300 Massachusetts Avenue	-	*+245*	-
Removal of Non-Tenant Contract Permit Parkers	-	*-162*	-
Total	2,687	2,430	90%

10. Transit Analysis

The following section presents the capacities of the various MBTA transit services in the area. The first step in analyzing the public transit system availability is to quantify the capacity of existing transit services. The second step then adds the Project-generated trips to the system.

a. Existing Transit Ridership

The MBTA Ridership and Service Statistics, Thirteenth Edition 2010 does not provide hourly or stop-based ridership information. Therefore, data provided by the MBTA was used to determine hourly ridership. This data includes hourly line volumes from fall 2010 for the subway system.

This table also presents the volume-to-capacity, or availability, of passenger loads for the subway lines serving the site. The subway capacity used in the volume-to-capacity analysis is the fleet's policy capacity which assumes 167 passengers per Red Line car. Crush load capacity is actually much higher with 277 per Red Line car. For a conservative analysis the more comfortable policy capacity of 167 passengers was used in this analysis.

Table 10.a
MBTA Subway Peak Hour Utilization (2013 Existing Condition)

Route and Direction	Frequency (trains/hr)	Capacity* (riders/hr)	Existing Ridership		V/C Ratio (Utilization)	
			AM Peak	PM Peak	AM Peak	PM Peak
Red Line						
Inbound – Arriving Central Square	13	13,026	7,665	3,110	0.59	0.24
Inbound – Leaving Central Square	13	13,026	8,710	3,775	0.67	0.29
Outbound – Arriving Central Square	13	13,026	3,125	8,090	0.24	0.62
Outbound – Leaving Central Square	13	13,026	2,525	7,270	0.19	0.56

* Assumes passenger policy capacity of six-car trainsets on Red Line. This data assumes an evenly spaced out arrival and departure of trains operating at scheduled headways.

As shown in Table 10.a, there is adequate capacity on the Red Line to accommodate the peak hour loads today. This analysis assumes that all trains arrive on schedule and that passengers are evenly distributed throughout the hour. In reality, passenger loads can vary and some trains become more congested than others. As noted previously, the trains have a much higher "crush load capacity" than the capacity used in this analysis.

b. Bus System Capacity

Bus route capacity is a function of vehicle size and frequency of service. The peak hour capacities estimated in this table are based on a bus capacity of 60 passengers for a standard MBTA bus. Again, crush capacities are higher. The service rush-hour frequencies presented in Table 10.b are based on the most current schedules.
Load profiles by bus route collected in fall 2012 were provided by the MBTA. These load profiles detail the passenger loads by bus and by stop over a typical day. These bus loads are shown in Table 10.b. This table also presents ridership and utilization (percent occupancy).

Table 10.b
MBTA Bus Route Peak Hour Utilization (2013 Existing Condition)

Route and Direction		Frequency (buses/hr)	Capacity (buses/hr)	Hourly Ridership*		V/C Ratio (Utilization)	
				Arriving	Leaving	Arriving	Leaving
Weekday AM Peak							
1	Inbound	7	420	275	295	0.65	0.70
	Outbound	8	480	205	190	0.43	0.40
47	Outbound	3	180	45	40	0.25	0.22
64	Inbound	3	180	155	60	0.86	0.33
	Outbound	3	180	20	40	0.11	0.22
70	Inbound	3	180	15	5	0.08	0.03
	Outbound	3	180	N/A	10	N/A	0.06
70A	Inbound	2	120	30	20	0.25	0.17
	Outbound	2	120	N/A	10	N/A	0.08
83	Inbound	3	180	30	N/A	0.17	N/A
	Outbound	3	180	N/A	20	N/A	0.11
91	Inbound	2	120	20	N/A	0.17	N/A
	Outbound	2	120	N/A	20	N/A	0.17
CT1	Inbound	3	180	95	115	0.53	0.64
	Outbound	3	180	40	20	0.22	0.11
CT2	Inbound	3	180	115	110	0.64	0.61
	Outbound	3	180	90	70	0.50	0.39
Weekday PM Peak							
1	Inbound	8	480	220	250	0.46	0.52
	Outbound	8	480	325	310	0.68	0.65
47	Outbound	3	180	145	130	0.81	0.72
64	Inbound	2	120	40	10	0.33	0.08
	Outbound	2	120	55	90	0.46	0.75
70	Inbound	4	240	10	10	0.04	0.04
	Outbound	4	240	N/A	30	N/A	0.13
70A	Inbound	2	120	20	20	0.17	0.17
	Outbound	2	120	N/A	20	N/A	0.17
83	Inbound	3	180	25	N/A	0.14	N/A
	Outbound	3	180	N/A	55	N/A	0.31
91	Inbound	2	120	20	N/A	0.17	N/A
	Outbound	2	120	N/A	45	N/A	0.38
CT1	Inbound	3	180	30	50	0.17	0.28
	Outbound	3	180	75	55	0.42	0.31
CT2	Inbound	3	180	90	100	0.50	0.56
	Outbound	3	180	155	160	0.86	0.89

* MBTA Bus Route operations 2012

As shown in Table 10.b, the existing bus services have a volume-to-capacity ratio well under 1.0 with the Route 64 bus inbound having the highest morning v/c ratio of 0.86 and the CT2 bus outbound having the highest evening v/c ratio of 0.89.

c. EZ-Ride Capacity

EZ-Ride bus route capacity is a function of vehicle size and frequency of service. The peak hour capacities estimated in this table are based on a bus capacity of 40 passengers for a standard EZ-Ride bus. The service peak hour frequencies presented in Table 10.c. are based on ridership data provided by the Charles River Transportation Management Association for March 2013. The table shows the total number of passengers boarding the shuttles during the morning and evening peak hour over all stops and the specific number of passengers using the Massachusetts Avenue at Landsdowne Street stop that would likely be used by employees to the site. Boardings and alightings are constantly happening at all stops. Given the boardings in Table 10.c and descriptions of shuttle utilization and capacities provided by the Charles River TMA, the service is currently operating under capacity with heaviest passenger volumes traveling between North Station and Kendall Square.

Table 10.c
EZ-Ride Bus Route Peak Hour Utilization (2013 Existing Condition)

Route and Direction	Frequency (buses/hr)	Capacity (riders/hr)	Peak Hour Boardings*
Morning Peak			
Total Outbound Boardings	7	280	311
Mass Ave. at Landsdowne alightings		60	
Evening Peak			
Total Inbound Boardings	7	280	197
Mass Ave at Landsdowne boardings		54	

* Charles River Transportation Management Association – March 2013 Ridership

d. Future Capacities

As discussed previously, the transit mode share for the Project is 33.4 percent. Accordingly, the Project is expected to generate 142 new transit trips (125 entering, 17 exiting) during the AM peak-hour and 137 new transit trips (23 entering, 113 exiting) during the PM peak hour as shown in Table 10.d.1.

Table 10.d.1
Project Generated Transit Trips

	Morning Peak Hour		Evening Peak Hour	
	In	Out	In	Out
300 Massachusetts Avenue General Office Building	125	17	23	113

Project transit distribution was established for each user group. Transit distribution for people that will work at the site in the future was based on survey information provided by a 2012 survey of University Park employees. This survey information revealed which transit or bus line employees use to commute to work. The MBTA red line is utilized by the majority of employees, 75 percent. It was found that of the Red Line trips from the surveys, 59 percent were traveling to/from the south of the site; while 41 percent of the trips were traveling to/from the north of the site. In addition,

five percent responded that they use the EZ-Ride Shuttle. It is expected that new employees in the area will follow similar trends.

Employee transit distribution is summarized in Table 10.d.2.

Table 10.d.2
Transit Distribution

	Employees
Red Line	75%
Route 1	8%
Route 47	1%
Route 64	2%
Route 70/70A	3%
Route 83	1%
Route 91	1%
CT1	4%
CT2	1%
EZ-Ride	5%

Source: 2012 PTDM University Park

The transit distribution was next applied to the Project trips previously presented in Table 10.d.1 (Project Generated Transit Trips). Resulting Project generated transit trips per transit line are shown in Tables 10.d.3 and 10.d.4 for the AM and PM peak hours.

Table 10.d.3
AM Peak Hour Project Generated Transit Trips by Line

	AM Peak Trips	
	In	Out
Red Line	94	13
Route 1	10	1
Route 47	1	0
Route 64	3	0
Route 70/70A	4	1
Route 83	1	0
Route 91	1	0
CT1	5	1
CT2	1	0
EZ-Ride	6	1

Table 10.d.4
PM Peak Hour Project Generated Transit Trips by Line

	PM Peak Trips	
	In	Out
Red Line	17	85
Route 1	2	9
Route 47	0	1
Route 64	0	2
Route 70/70A	1	3
Route 83	0	1
Route 91	0	1
CT1	1	5
CT2	0	1
EZ-Ride	1	6

The transit trips per line were then added to the existing route volumes as shown in Tables 10.d.5 through 10.d.6. The number of transit trips being added to each line has minimal if any impact on the utilization of the line.

Table 10.d.5
MBTA Subway Peak Hour Utilization (2013 Build Condition)

Route and Direction	Frequency (trains/hr)	Capacity* (riders/hr)	Build Ridership		V/C Ratio (Utilization)	
			AM Peak	PM Peak	AM Peak	PM Peak
Red Line						
Inbound – Arriving Central Square	13	13,026	7,704	3,117	0.59	0.24
Inbound – Leaving Central Square	13	13,026	8,718	3,825	0.67	0.29
Outbound – Arriving Central Square	13	13,026	3,180	8,100	0.24	0.62
Outbound – Leaving Central Square	13	13,026	2,530	7,305	0.19	0.56

* Assumes passenger policy capacity of six-car trainsets on Red Line. This data assumes an evenly spaced out arrival and departure of trains operating at scheduled headways.

Although the MBTA Red Line is the transit service providing transportation to the greatest number of new passengers, the capacity and current utilization are not heavily impacted when compared to the existing volume to capacity ratios. The morning inbound train from Central Square continues to have the highest utilization, though it is still much below 1.0 at 0.67. It is important to note that this analysis may not represent true peak hour experiences due to the lack of availability of 2013 data and the inability to measure the bunching of trains and irregularity of arrivals throughout the peak hours. However, it is important to note the change in volume to capacity from the existing condition to build condition is not significant and the addition of 94 inbound and 85 outbound redline trips spread throughout the morning and evening peak hour respectively does not result in a significant impact to the system.

Table 10.d.6
MBTA Bus Route Peak Hour Utilization (2013 Build Condition)

Route and Direction		Frequency (buses/hr)	Capacity (riders/hr)	Hourly Ridership*		V/C Ratio (Utilization)	
				Arriving	Leaving	Arriving	Leaving
Weekday AM Peak							
1	Inbound	7	420	277	296	0.66	0.70
	Outbound	8	480	213	190	0.44	0.40
47	Outbound	3	180	46	40	0.26	0.22
64	Inbound	3	180	155	60	0.86	0.33
	Outbound	3	180	23	40	0.13	0.22
70	Inbound	3	180	17	5	0.09	0.03
	Outbound	3	180	N/A	11	N/A	0.06
70A	Inbound	2	120	32	20	0.27	0.17
	Outbound	2	120	N/A	11	N/A	0.09
83	Inbound	3	180	31	N/A	0.17	N/A
	Outbound	3	180	N/A	20	N/A	0.11
91	Inbound	2	120	21	N/A	0.18	N/A
	Outbound	2	120	N/A	20	N/A	0.17
CT1	Inbound	3	180	96	116	0.53	0.64
	Outbound	3	180	44	20	0.24	0.11
CT2	Inbound	3	180	115	110	0.64	0.61
	Outbound	3	180	91	70	0.51	0.39
Weekday PM Peak							
1	Inbound	8	480	220	258	0.46	0.54
	Outbound	8	480	327	311	0.68	0.65
47	Outbound	3	180	145	131	0.81	0.73
64	Inbound	2	120	40	12	0.33	0.10
	Outbound	2	120	55	90	0.46	0.75
70	Inbound	4	240	11	10	0.05	0.04
	Outbound	4	240	N/A	32	N/A	0.13
70A	Inbound	2	120	21	20	0.18	0.17
	Outbound	2	120	N/A	21	N/A	0.18
83	Inbound	3	180	25	N/A	0.14	N/A
	Outbound	3	180	N/A	56	N/A	0.31
91	Inbound	2	120	20	N/A	0.17	N/A
	Outbound	2	120	N/A	46	N/A	0.38
CT1	Inbound	3	180	30	54	0.17	0.30
	Outbound	3	180	76	56	0.42	0.31
CT2	Inbound	3	180	90	101	0.50	0.56
	Outbound	3	180	155	160	0.86	0.89

As shown, with the Project-generated bus trips, no additional MBTA services are expected to exceed the available capacity. The Route 64 morning inbound bus and the Route CT2 evening outbound bus continue to have the highest v/c ratios for the morning and evening peak hours, respectively. Neither route exceeds v/c ratio of 1.0.

The EZ-Ride shuttle shows an additional outbound demand during the morning peak hour of less than one person per shuttle arriving during each of the peak hours. Given that the service is currently operating under capacity the impacts to this service are negligible with the Project.

e. Future Transit Service Improvements

The transit and traffic analyses have not taken into consideration any transit service improvements since they will not be completed within the five year build out period. However, it is important to note and describe any significant long-term projects that are being planned for the study area. The Urban Ring and Green Line Extension are described as follows.

Urban Ring

As described in the Phase 2 Notice of Project Change submitted by the Executive Office of Transportation (now MassDOT) in June 2009, the Urban Ring is a proposed new bus rapid transit (BRT) system connecting the communities surrounding downtown Boston. There are three phases proposed for implementation of the Urban Ring.

Phase 1 has been completed and includes a set of limited-stop bus routes through the Urban Ring corridor including the CT1, CT2, and CT3. The Phase 2 would include BRT routes throughout the corridor and new transfer connections where the Urban Ring intersects commuter rail lines. The BRT routes would connect with major transit stops and bus hubs. The final Phase 3 would preserve the BRT route and add rail rapid transit service in the western section of the corridor. The Phase 3 rail service would travel through Assembly Square, Sullivan Square, North Point, Kendall Square, Cambridgeport, Kenmore/Boston University, Longwood Medical and Academic Area, Ruggles Station, and Dudley Square. There are currently three options for the final phase, which include either light rail or heavy rail transit options as well as various route alternatives.

The Phase 2 Urban Ring Notice of Project Change was submitted by the MassDOT-Transit Division in June 2009. The 300 Massachusetts Avenue Project area is part of both implementation stages, the Northern Tier and the Southern Tier. The Northern Tier connects from Logan West Garage at Logan Airport to Kendall Square, while the Southern Tier includes connections in Allston and Fenway/LMA and a Charles River crossing. Bus lanes on Albany Street and improvements at Kendall/MIT Station are proposed. Urban Ring Service would be available on two BRT routes as described below:

Urban Ring Routes:

- Route 1 – Airport Blue Line Station to Kendall Square (headways will be 10 minutes peak periods, 15 minutes midday and Saturday, and 20 minutes nighttime, Sunday and holidays); and
- Route 5 – Sullivan Square to Ruggles Station via Longwood Medical and Academic Area (headways will be 7 minutes peak period, 12 minutes midday and Saturday, and 15 minutes nighttime, Sunday and holidays).

On November 6, 2009, the Secretary of Environmental Affairs issued a letter seeking to clarify its position on the current status of the Urban Ring project under MEPA. The Secretary stated that the Phase 2 Notice of Project Change submitted in June 2009 is withdrawn, per then Secretary of Transportation and Construction, Secretary Aloisi's, request to MEPA in October 2009.

On January 22, 2010, the MassDOT notified the Executive Office of Energy and Environmental Affairs that it was suspending further environmental review for the Urban Ring Phase 2 Project.

Green Line Extension

The MassDOT-Transit Division and the MBTA are designing a Green Line Extension to improve transit service, mobility, and regional access for residents of Cambridge, Somerville, and Medford. The preferred light rail alternative includes relocating Lechmere Station and designing seven new stations (including Lechmere) to be located north of Lechmere to increase accessibility to these communities. The preferred alternative will introduce approximately five new service miles and ridership is expected to be 49,000 a year by 2030. The proposed headway is five to six minutes in the peak periods.

As part of the Green Line Extension, the MBTA will relocate Lechmere Station from its current location south of O'Brien Highway to a site north of O'Brien Highway. This will enable First Street to be extended northbound to O'Brien Highway which will improve traffic circulation in this area.

11. Pedestrian Analysis

The results of pedestrian level-of-service (PLOS) analysis at intersection crosswalks are presented in Tables 11.a.1 and 11.a.2 for signalized and unsignalized intersections respectively during both the morning and evening peak conditions. Equations 18-5 and 18-21 from the Highway Capacity Manual 2000 have been used to determine the delays at signalized and unsignalized intersections in the study area respectively.

Pedestrian level-of-service at signalized intersections is dictated by the portion of the signal cycle dedicated to pedestrian crossings. Accordingly, increasing pedestrian volumes does not alter pedestrian level of service at signalized intersections, and no changes in PLOS are projected under build or future conditions. The presence of concurrent pedestrian phases results in good PLOS at most locations.

Some existing pedestrian accommodation deficiencies in the study area include deteriorated sidewalks along Green Street between Blanche Street and Landsdowne Street, and divots in the roadway at the base of wheel chair ramps on either side of Front Street at Massachusetts Avenue. Sidewalks adjacent to the site will be repaired as part of the Project to improve pedestrian accessibility around the site.

Within and around the Project site, pedestrian facilities will be designed to meet appropriate safety and accessibility standards. From the Project Site, pedestrians will experience a 7 minute walk to the Red Line subway at Central Square and a 10 minute walk to the Red Line subway at Kendall Square. The Project includes reconstruction of Blanche Street to provide a raised shared roadway which will allow pedestrians, bicycles and vehicles to share the low volume roadway. Crosswalks across Blanche Street will be provided at Green Street and Massachusetts Avenue.

Table 11.a.1
Signalized Intersection - Pedestrian Level of Service Summary

Intersection	Crosswalk	AM Peak Hour			PM Peak Hour		
		Existing 2013	Build 2013	Future 2018	Existing 2013	Build 2013	Future 2018
Massachusetts Avenue at Western Avenue and Prospect Street	East	B	B	B	B	B	B
	West	B	B	B	B	B	B
	North	C	C	C	C	C	C
	South	C	C	C	C	C	C
Massachusetts Avenue at Brookline Street and Douglass Street	East	C	C	C	C	C	C
	North	B	B	B	B	B	B
	South	B	B	B	B	B	B
Massachusetts Avenue at Sidney Street	East	C	C	C	B	B	B
	West	C	C	C	B	B	B
	North	D	D	D	D	D	D
	South	D	D	D	D	D	D
Main Street at Sidney Street and Columbia Street	East	B	B	B	B	B	B
	West	B	B	B	B	B	B
Massachusetts Avenue at Landsdowne Street and Front Street	East	C	C	C	C	C	C
	North	C	C	C	C	C	C
	South	C	C	C	C	C	C
Massachusetts Avenue at Albany Street	East	C	C	C	C	C	C
	West	C	C	C	C	C	C
	North	B	B	B	B	B	B
	South	B	B	B	B	B	B
Massachusetts Avenue at Vassar Street	East	C	C	C	C	C	C
	West	C	C	C	C	C	C
	North	B	B	B	B	B	B
	South	B	B	B	B	B	B
Western Avenue/ River Street/ Green Street	East	B	B	B	B	B	B
	West	B	B	B	A	A	A
	North	C	C	C	C	C	C
	South	C	C	C	C	C	C

The determination of pedestrian level-of-service at unsignalized intersections differs from signalized intersections. In practice, under Massachusetts State Law, vehicles are required to stop for pedestrians in crosswalks. However, the unsignalized intersection pedestrian LOS summary analysis has been performed as required by the TIS Guidelines using HCM equation 18-21. The PLOS results provided in Table 11.a.2 assume that the pedestrian experiences delay due to waiting in the crosswalk, and therefore provides a significantly more conservative analysis than what is actually experienced in the field.

Table 11.a.2
Unsignalized Intersection - Pedestrian Level of Service Summary

Intersection	Crosswalk	AM Peak Hour			PM Peak Hour		
		Existing 2013	Build 2013	Future 2018	Existing 2013	Build 2013	Future 2018
Massachusetts Avenue at Blanche Street/State Street	North	A	A	B	A	A	A
	South	A	A	A	A	A	A
Massachusetts Avenue at Windsor Street	North	A	A	B	B	B	B
Green Street at Landsdowne Street	West	A	A	A	A	A	A
	North	B	C	C	C	C	C
	South	C	C	C	C	C	C
Green Street at Blanche Street	East	A	B	B	A	A	A
	North	A	A	A	A	A	A
Green Street at Sidney Street	East	A	B	B	A	A	A
	West	A	A	A	A	A	B
	North	C	D	D	C	C	C
	South	C	C	D	C	D	D
Green Street at Magazine Street	East	A	A	A	B	B	B
	West	A	A	A	C	C	C
	North	A	A	A	A	A	A
	South	A	A	A	A	A	A

12. Bicycle Analysis

As shown in Figure 12, the study area is well served by bicycle facilities, with bike lanes provided on several main corridors, including:

- Massachusetts Avenue
- Sidney Street
- Main Street
- Brookline Street
- Vassar Street (cycle track)

A shared pavement marking is planned along Albany Street north of Pacific Street while a bike path/multi use path is planned along the railroad adjacent to Albany Street within the study area.

Conflicting vehicle turning movements were identified at study area locations with bicycle facilities or peak hour bicycle volumes greater than 10 bikes. The conflicting movements at all study area intersections are presented in Table 12.a for existing, build and future conditions.

Table 12.a
Conflicting Bicycle/Vehicle Movements at Study Intersections

Intersection	Time Period	Bicycle Direction	Existing Peak Hour Bicycle Volume	Conflicting Vehicle Movements					
				Existing 2013		Build 2013		Future 2018	
				Right Turn[a]	Left Turn[b]	Right Turn[a]	Left Turn[b]	Right Turn[a]	Left Turn[b]
Massachusetts Avenue/ Western Avenue and Prospect Street	AM	EB	66	31	0	31	0	32	0
		WB	18	78	0	79	0	82	0
		NB	21	164	0	188	0	204	0
		SB	22	41	0	41	0	42	0
	PM	EB	35	25	0	25	0	26	0
		WB	70	97	0	102	0	106	0
		NB	8	180	0	185	0	191	0
		SB	10	46	0	46	0	47	0
Massachusetts Avenue/ Brookline Street and Douglass Avenue	AM	EB	78	0	0	0	0	0	0
		WB	15	27	11	27	11	28	11
		NB	3	53	0	53	0	54	0
	PM	EB	47	0	0	0	0	0	0
		WB	100	42	19	42	19	43	19
		NB	13	62	0	62	0	64	0
Massachusetts Avenue/ Sidney Street	AM	EB	51	83	121	147	121	151	124
		WB	15	81	115	81	115	83	140
		NB	5	55	137	55	137	56	140
		SB	20	67	0	67	0	81	0
	PM	EB	32	47	106	59	106	68	109
		WB	76	110	93	110	93	113	100
		NB	0	87	75	87	75	89	77
		SB	10	90	0	90	0	145	0
Main Street/ Sidney Street and Columbia Street	AM	EB	4	281	130	296	130	303	145
		WB	1	0	0	0	0	0	0
		NB	0	145	0	145	0	171	0
	PM	EB	0	167	136	170	136	174	192
		WB	7	0	0	0	0	0	0
		NB	0	87	0	87	0	94	0
Massachusetts Avenue/ State Street/Blanche Street	AM	EB	86	0	0	0	0	0	0
		WB	13	22	21	22	21	23	59
	PM	EB	55	0	0	0	0	0	0
		WB	95	10	28	10	28	10	35
Massachusetts Avenue/ Landsdowne Street and Front Street	AM	EB	73	57	189	57	263	58	268
		WB	14	0	0	0	0	0	0
	PM	EB	45	37	93	37	107	38	109
		WB	84	0	0	0	0	0	0
Massachusetts Avenue/ Windsor Street	AM	EB	88	0	0	0	0	0	0
		WB	13	68	12	68	13	123	13
		SB	0	38	0	46	0	47	0
	PM	EB	65	0	0	0	0	0	0
		WB	90	111	80	111	87	123	89
		SB	0	31	0	32	0	33	0

Intersection	Time Period	Bicycle Direction	Existing Peak Hour Bicycle Volume	Conflicting Vehicle Movements					
				Existing 2013		Build 2013		Future 2018	
				Right Turn[a]	Left Turn[b]	Right Turn[a]	Left Turn[b]	Right Turn[a]	Left Turn[b]
Massachusetts Avenue/ Albany Street	AM	EB	93	27	127	27	127	30	131
		WB	15	132	49	132	50	231	54
		NB	0	71	97	71	97	76	117
		SB	18	119	28	119	28	122	49
	PM	EB	57	8	51	8	51	16	56
		WB	90	84	57	84	66	106	68
		NB	8	100	132	100	132	105	222
		SB	10	40	34	40	34	44	39
Massachusetts Avenue/ Vassar Street	AM	EB	86	57	22	57	22	63	23
		WB	31	202	79	202	82	207	85
		NB	51	28	145	28	145	29	149
		SB	4	92	61	101	61	103	90
	PM	EB	49	56	27	56	27	80	28
		WB	106	144	69	144	89	148	91
		NB	6	32	197	32	197	33	202
		SB	25	45	65	47	65	48	72
Green Street /Sidney Street	AM	NB	10	132	95	132	174	149	176
		SB	20	54	32	54	44	55	45
	PM	NB	8	78	45	78	60	83	61
		SB	11	72	140	72	214	74	218
Green Street/ Magazine Street	AM	WB	3	4	0	4	0	4	0
	PM	WB	12	0	0	0	0	0	0
Green Street/ River Street/Western Avenue	AM	WB	5	76	0	76	0	78	0
		NB	31	0	0	0	0	0	0
		SB	16	27	107	27	107	28	110
	PM	WB	11	114	0	114	0	117	0
		NB	12	0	0	0	0	0	0
		SB	19	25	146	25	146	26	150

a advancing volume
b opposing volume

13. Transportation Demand Management Plan

Forest City currently supports transportation demand management (TDM) programs to reduce automobile trips generated by employees of University Park. The University Park TDM programs are available to all University Park tenant employees. Further, the 80 Landsdowne and 30 Pilgrim garages are subject to the Parking and Transportation Demand Management ordinance and tenants who have employees parking in either of the two garages provide the required PTDM plan programs to their employees. The PTDM programs required under the existing 80 Landsdowne and 30 Pilgrim garages will be available to the employees of the 300 Massachusetts Ave building. The goal of the University Park TDM plan is to reduce the use of single occupant vehicles (SOV's) by encouraging carpooling and vanpooling, bicycling, walking, and increased use of the area's public transportation system of employees.

Forest City has comprehensive TDM plans in place for University Park, and is an active participant in the Charles River TMA. The success of the existing TDM plans is reflected in the low average SOV rate of 44.5% overall for University Park; much lower than the Plan SOV Mode Split Commitment of 59 percent). Future tenants at the

proposed 300 Massachusetts Avenue development will utilize the existing shared parking supply and will comply with existing PTDM plans.

The following TDM programs will continue to be implemented to reduce SOV travel and encourage the use of alternative modes of transportation:

- Designation of a Transportation Coordinator

- Charles River Transportation Management Association Membership
  - EZRide Shuttle
  - Shuttle Bus stop at University Park (Landsdowne Street between Franklin and Pilgrim and Pacific Street at Landsdowne Street)
  - Marketing of shuttle bus schedule and services
  - Ridesharing and Guaranteed Ride Home programs
  - TMA promotional events and support services

- Parking
  - Carsharing parking spaces (8 Zipcars available at University Park)
  - Preferential carpool/vanpool spaces
  - Employees charged for parking
  - Electric vehicle charging stations (3 stations provided at University Park– one at each garage)

- Transit
  - On-site T pass sales
  - T pass subsidies
  - Pre-tax option for transit pass purchase
  - On-site marketing of T services

- Bicycle and Pedestrian Amenities
  - Bicycle facility accommodations (secured, covered bicycle parking)
  - Lockers and showers
  - Bikeshare stations (Zagster available at 55 Franklin Street Garage)
  - Non-SOV cash incentives
  - Pedestrian pathways and streetscape
  - Lighting for pedestrian pathways and bicycle areas
  - Enhanced pedestrian connections
  - Annual free bike maintenance days

- Marketing alternatives and information dissemination
  - New and relocating employee information packets
  - Tenant Websites/Bulletin Boards
  - Quarterly Newsletter on Transportation Options
  - Promotion through Transportation Fairs/Events

- Flexible Work Schedules (Variable work hours, compressed work week and telecommuting)

- Lease Language
  - Require tenant participation in PTDM monitoring surveys
  - Implement select TDM employee programs through tenants

- On-site/area amenities (grocery store, ATM/Bank, restaurants and other conveniences that enable employees not to drive)

14. Transportation Mitigation Agreement Update

As requested in the TP&T Scoping Letter dated February 19, 2013, an update to the 1988 "Agreement for Traffic Mitigation" between the City of Cambridge and Forest City has been conducted. In 2002, Forest City provided an analysis to demonstrate that the first phase of the build out of University Park generated less than 1,500 evening peak hour vehicle trips. Since this threshold of 1,500 evening peak hour trips was not exceeded, the remainder of University Park was then approved to proceed with the Full Build out.

The evening peak hour vehicle trip threshold for the full build out of University Park is 1,700 trips. Since the Zoning District for University Park has recently been extended to include 300 Massachusetts Avenue, TP&T requested the Traffic Mitigation Agreement required analysis be updated to demonstrate that the current uses at University Park and the projected uses at 300 Massachusetts Avenue will not generate more than 1,700 evening peak hour vehicle trips. The attached technical memorandum titled "University Park Traffic Mitigation Agreement Compliance Report – 2013 Update" provides a detailed summary of the analysis. The results of the update indicate that the existing University Park and the projected uses at 300 Massachusetts Avenue will result in 1,148 vehicle trips in the evening peak hour, far less than the 1,700 evening peak hour trip threshold.

Planning Board Special Permit Criteria

Consistent with Section IV, "*Guidelines for Presenting Information to the Planning Board*" of the City of Cambridge "*Transportation Impact Study Guidelines*," Fifth Revision dated April 27, 2004; this section presents a summary of potential impacts to the transportation network as a result of the proposed Project. The Build conditions have been analyzed against the Planning Board Special Permit Criteria.

According to the guidelines, not meeting one or more of the criteria shall be indicative of a potentially adverse impact on City's transportation network; however, the Planning Board will consider mitigation efforts, their anticipated effectiveness, and other information that identifies a reduction in adverse traffic impacts.

Criterion A - Project Vehicle Trip Generation

Table A-1 presents the Project vehicle trip generation criterion. Project vehicle trip generation is based on ITE trip rates, adjusted for local mode split and vehicle occupancy rates as discussed previously.

Table A-1
Project Vehicle Trip Generation

Time Period	Criteria (trips)	Build 2013	Exceeds Criteria?
Weekday Daily	2,000	1,454	N
Weekday AM Peak Hour	240	206	N
Weekday PM Peak Hour	240	198	N

The Project is not expected to exceed the Planning Board criteria for daily, morning peak and evening peak Project vehicle trip generation under the Build program.

Criterion B - Vehicular LOS

The criteria for a Project's impact to traffic operations at signalized intersections are summarized in Table B-1 below. These criteria are evaluated for each signalized study-area intersection and presented in Table B-2.

Table B-1
Criterion: Vehicular Level of Service

Existing	With Project
VLOS A	VLOS C
VLOS B, C	VLOS D
VLOS D	VLOS D or 7% roadway volume increase
VLOS E	7% roadway volume increase
VLOS F	5% roadway volume increase

Table B-2
Vehicular Level of Service

	AM Peak Hour				PM Peak Hour			
Intersection	Existing Condition	Build Condition	Traffic Increase	Exceeds Criteria?	Existing Condition	Build Condition	Traffic Increase	Exceeds Criteria?
Mass Ave at Western Ave / Prospect St	D	D	4%	N	C	C	2%	N
Mass Ave at Brookline St / Douglass St	C	C	7%	N	B	B	3%	N
Massachusetts Ave at Sidney St	D	D	6%	N	C	C	1%	N
Sidney St at Main St / Columbia St	D	D	2%	N	C	C	1%	N
Mass Ave at Front St / Landsdowne St	B	B	7%	N	C	D	7%	N
Massachusetts Ave at Albany St	C	D	4%	N	C	C	4%	N
Massachusetts Ave at Vassar St	C	C	3%	N	C	C	3%	N
Green St at Western Ave / River St	C	C	2%	N	C	C	3%	N

Criterion C – Traffic on Residential Streets

This criterion considers the magnitude of Project vehicle trip generation during any peak hour that may reasonably be expected to arrive and/or depart by traveling on a residential street. The criteria, based on a Project-induced traffic volume increase on any two-block residential street segment in the study area, are summarized in Table C-1.

Seventeen (17) roadway segments in the study area identified as street segments which have more than 1/3 of residential frontage, and are therefore evaluated against the traffic volume criteria. The results are presented in Table C-2.

Table C-1
Criterion: Traffic on Residential Streets

Parameter 1: Amount of Residential [1]	Parameter 2: Current peak Hour Street Volume (two-way vehicles)		
	< 150 VPH	150 – 400 VPH	> 400 VPH
1/2 or more	20 VPH [2]	30 VPH [2]	40 VPH [2]
> 1/3 but < 1/2	30 VPH [2]	45 VPH [2]	60 VPH [2]
1/3 or less	No Max.	No Max.	No Max.

1 Amount of residential for a two block segment as determined by first floor frontage
2 Additional Project vehicle trip generation in vehicles per lane, both directions
Vph vehicles per hour

Table C-2
Traffic on Residential Streets

Roadway	Reviewed Segment	Amount of Residential	AM Peak Hour Existing 2013*	AM Peak Hour Project Trips	AM Peak Hour Exceeds Criteria?	PM Peak Hour Existing 2013*	PM Peak Hour Project Trips	PM Peak Hour Exceeds Criteria?
Western Avenue	Jay Street to Soden Street	1/2 or more	399	4	N	539	26	N
	Soden Street to Franklin Street	1/2 or more	399	4	N	539	26	N
River Street	Howard Street to Kinnaird Street	1/2 or more	696	12	N	750	3	N
	Kinnaird Street to William Street	>1/3 but <1/2	696	12	N	750	3	N
	William Street to Franklin Street	>1/3 but <1/2	696	12	N	750	3	N
Prospect Street	Bishop Allen Drive to Harvard Street	>1/3 but <1/2	960	1	N	1071	5	N
Columbia Street	Bishop Allen Drive to Washington Street	>1/3 but <1/2	359	15	N	303	3	N
	Washington Street to Harvard Street	1/2 or more	359	15	N	303	3	N
Windsor Street	School Street to Harvard Street	1/2 or more	185	9	N	293	8	N
Green Street	Brookline Street to Magazine Street	>1/3 but <1/2	160	8	N	406	51	N
	Sidney Street to Brookline Street	1/2 or more	86	12	N	212	74	Y
Brookline Street	Chestnut Street to Allston Street	1/2 or more	231	14	N	359	3	N
	Allston Street to Erie Street	1/2 or more	231	14	N	359	3	N
	Erie Street to Emily Street	1/2 or more	231	14	N	359	3	N
Sidney Street	Putnam Avenue to Hamilton Street	>1/3 but <1/2	219	2	N	305	14	N
	Tudor Street to Pilgrim Street	1/2 or more	219	2	N	305	14	N
Pacific Street	Sidney Street to Albany Street	>1/3 but <1/2	na	14	N	na	3	N

*volume interpolated from nearest data available in study area

Criterion D – Lane Queue

The criteria for a project's impact to queues at signalized intersections are summarized in Table D-1 below. These criteria are evaluated for each lane group at study-area signalized intersections and presented in Table D-2.

Table D-1
Criterion: Vehicular Queues at Signalized Intersections

Existing	With Project
Under 15 vehicles	Under 15 vehicles, or 15+ vehicles with an increase of 6 vehicles
15 or more vehicles	Increase of 6 vehicles

Table D-2
Length of Vehicle Queues at Signalized Intersections

		AM Peak Hour			PM Peak Hour		
Intersection	Movement	Existing	Build	Exceeds Criteria?	Existing	Build	Exceeds Criteria?
Massachusetts Avenue at Western Avenue and Prospect Street	Eastbound Thru	8	9	N	7	7	N
	Eastbound Right	1	1	N	0	0	N
	Westbound Thru	5	5	N	6	7	N
	Westbound Right	2	2	N	2	2	N
	Northbound Thru	13	13	N	13	13	N
	Northbound Right	4	5	N	4	4	N
	Southbound Thru/Right	7	7	N	8	8	N
Massachusetts Avenue at Brookline Street	Eastbound Left/Thru	9	11	N	9	9	N
	Westbound	4	4	N	1	1	N
	Northbound Left	2	2	N	3	3	N
	Northbound Right	3	3	N	5	5	N
Massachusetts Avenue at Sidney Street	Eastbound Left	2	2	N	2	2	N
	Eastbound Thru/Right	9	10	N	6	6	N
	Westbound Left	4	4	N	2	2	N
	Westbound Thru/Right	10	9	N	9	9	N
	Northbound Right	2	2	N	2	2	N
	Southbound Left/Thru	3	3	N	3	3	N
	Southbound Right	0	0	N	0	0	N
Main Street at Sidney Street	Eastbound Thru	0	0	N	0	0	N
	Eastbound Right	7	7	N	4	4	N
	Westbound Left/Thru	4	4	N	4	4	N
	Northbound Left/Right	4	4	N	3	3	N
Massachusetts Avenue at Landsdowne Street and Front Street	Eastbound Left/Thru/Right	4	6	N	6	6	N
	Westbound	7	8	N	4	5	N
	Northbound Left/Thru/Right	0	0	N	4	7	N
	Southbound Left Thru/Right	2	2	N	2	1	N
Massachusetts Avenue at Albany Street	Eastbound	5	6	N	7	8	N
	Westbound	7	12	N	9	10	N
	Northbound Left	0	0	N	1	1	N
	Northbound Thru/Right	7	7	N	8	8	N
	Southbound Left	2	2	N	3	3	N
	Southbound Thru/Right	7	7	N	4	4	N
Massachusetts Avenue at Vassar Street	Eastbound	7	7	N	7	9	N
	Westbound	8	9	N	7	8	N
	Northbound Left	1	1	N	1	1	N
	Northbound Thru/Right	7	7	N	4	4	N
	Southbound Left	4	4	N	5	5	N
	Southbound Thru/Right	5	5	N	7	7	N
Western Avenue/ River Street/ Green Street	Westbound Left/Thru	1	1	N	3	4	N
	Westbound Thru/Right	3	3	N	9	9	N
	Northbound Left	2	2	N	4	4	N
	Northbound	4	4	N	4	4	N
	Southbound Left/Thru/Right	10	10	N	3	3	N

Criterion E – Pedestrian and Bicycle Facilities

1) Pedestrian Delay

Pedestrian delay is a measure of the pedestrian crossing delay on a crosswalk during the peak hour as determined by the pedestrian level of service analysis in the HCM 2000.

Table E-1 presents the indicators for this criterion. Tables E-2 and E-3 present the evaluation of PLOS criteria for each crosswalk at study area intersections under existing, full-build and future conditions.

Table E- 1
Criterion: Pedestrian Level-of-Service Indicators

Existing	With Project
PLOS A	PLOS A
PLOS B	PLOS B
PLOS C	PLOS C
PLOS D	PLOS D or increase of 3 seconds
PLOS E, F	PLOS D

Table E-2
Signalized Intersection Pedestrian Level-of-Service Summary

Intersection	Crosswalk	AM Peak Hour			PM Peak Hour		
		Existing 2013	Build 2013	Exceeds Criteria?	Existing 2013	Build 2013	Exceeds Criteria?
Massachusetts Avenue at Western Avenue and Prospect Street	East	B	B	N	B	B	N
	West	B	B	N	B	B	N
	North	C	C	N	C	C	N
	South	C	C	N	C	C	N
Massachusetts Avenue at Brookline Street and Douglass Street	East	C	C	N	C	C	N
	North	B	B	N	B	B	N
	South	B	B	N	B	B	N
Massachusetts Avenue at Sidney Street	East	C	C	N	B	B	N
	West	C	C	N	B	B	N
	North	D	D	N	D	D	N
	South	D	D	N	D	D	N
Main Street at Sidney Street and Columbia Street	East	B	B	N	B	B	N
	West	B	B	N	B	B	N
Massachusetts Avenue at Landsdowne Street and Front Street	East	C	C	N	C	C	N
	North	C	C	N	C	C	N
	South	C	C	N	C	C	N
Massachusetts Avenue at Albany Street	East	C	C	N	C	C	N
	West	C	C	N	C	C	N
	North	B	B	N	B	B	N
	South	B	B	N	B	B	N
Massachusetts Avenue at Vassar Street	East	C	C	N	C	C	N
	West	C	C	N	C	C	N
	North	B	B	N	B	B	N
	South	B	B	N	B	B	N
Western Avenue/ River Street/ Green Street	East	B	B	N	B	B	N
	West	B	B	N	A	A	N
	North	C	C	N	C	C	N
	South	C	C	N	C	C	N

Table E-3
Unsignalized Intersection Pedestrian Level-of-Service Summary

Intersection	Crosswalk	AM Peak Hour Existing 2013	AM Peak Hour Build 2013	AM Peak Hour Exceeds Criteria?	PM Peak Hour Existing 2013	PM Peak Hour Build 2013	PM Peak Hour Exceeds Criteria?
Massachusetts Avenue at Blanche Street/State Street	North	A	A	N	A	A	N
	South	A	A	N	A	A	N
Massachusetts Avenue at Windsor Street	North	A	A	N	B	B	N
Green Street at Landsdowne Street	West	A	A	N	A	A	N
	North	B	C	Y	C	C	N
	South	C	C	N	C	C	N
Green Street at Blanche Street	East	A	B	Y	A	A	N
	North	A	A	N	A	A	N
Green Street at Sidney Street	East	A	B	Y	A	A	N
	West	A	A	N	A	A	N
	North	C	D	Y	C	C	N
	South	C	C	N	C	D	Y
Green Street at Magazine Street	East	A	A	N	B	B	N
	West	A	A	N	C	C	N
	North	A	A	N	A	A	N
	South	A	A	N	A	A	N

2) Safe Pedestrian and Bicycle Facilities

The Project site is well connected to existing pedestrian facilities along the surrounding streets providing access to the proposed development. As previously mentioned, some existing pedestrian accommodation deficiencies in the study area include an imperfect sidewalk at the rear of the site along the north side of Green Street and minimal sidewalk width along Blanche Street adjacent to the site. These sidewalks will be improved with the proposed project. The Project proposes a raised shared Roadway on Blanche Street to allow pedestrians, bicycles and vehicles to share the surface. Further from the site, an inaccessible sidewalk is located on the south side of Front Street and poorly maintained ramps at some of the study area intersections.

The study area is served by several bicycle facilities with bike lanes provided on several corridors connecting through and beyond the area. Covered secure bike parking will be provided in the first floor of 300 Massachusetts Avenue providing 49 long-term bicycle parking spaces. In addition, 16 short-term bike parking spaces will be provided along Massachusetts Avenue, and 12 short-term bike parking spaces will be provided on Green Street near the back entrance. The Zagster bike program will continue to provide 15 bicycles on campus for shared use. Table E-4 summarizes the presence of pedestrian and bicycle facilities for all streets adjacent to the Project site.

Table E-4
Pedestrian and Bicycle Facilities

Adjacent Street	Link (between)	Sidewalks or Walkways Present?	Exceeds Criteria	Bicycle Facilities or Right of Ways Present?	Exceeds Criteria
Blanche St	Green St to Massachusetts Ave	Y	N	Y	N
Massachusetts Ave	Landsdowne St to Blanche St	Y	N	Y	N
	Blanche St to Sidney St	Y	N	Y	N
	Landsdowne St to Albany St	Y	N	Y	N
Green St	Sidney St to Blanche St	Y	N	Y	N
	Blanche St to Landsdowne St	Y	N	Y	N

Source: VHB observations 2013

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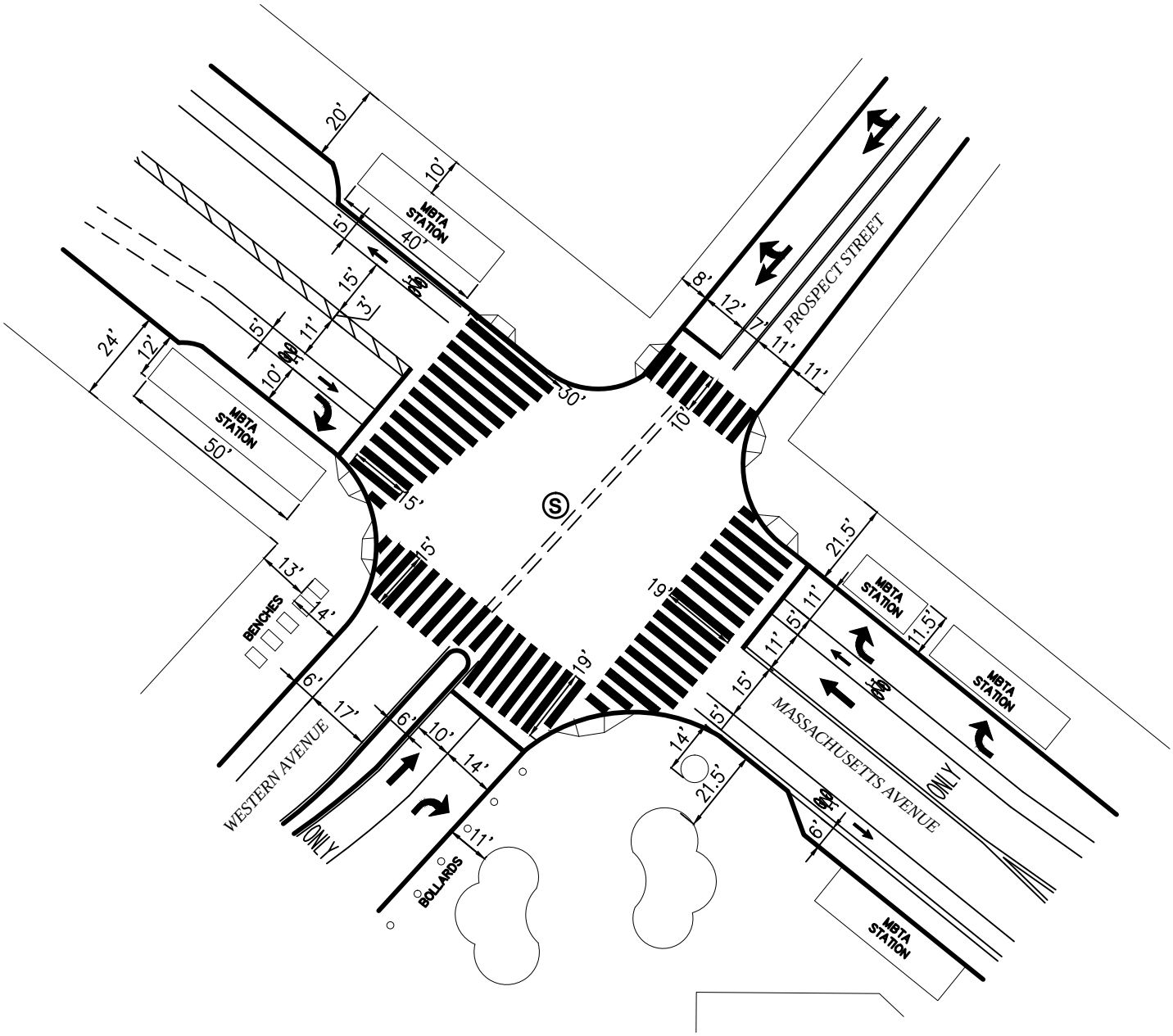
TIS Figures



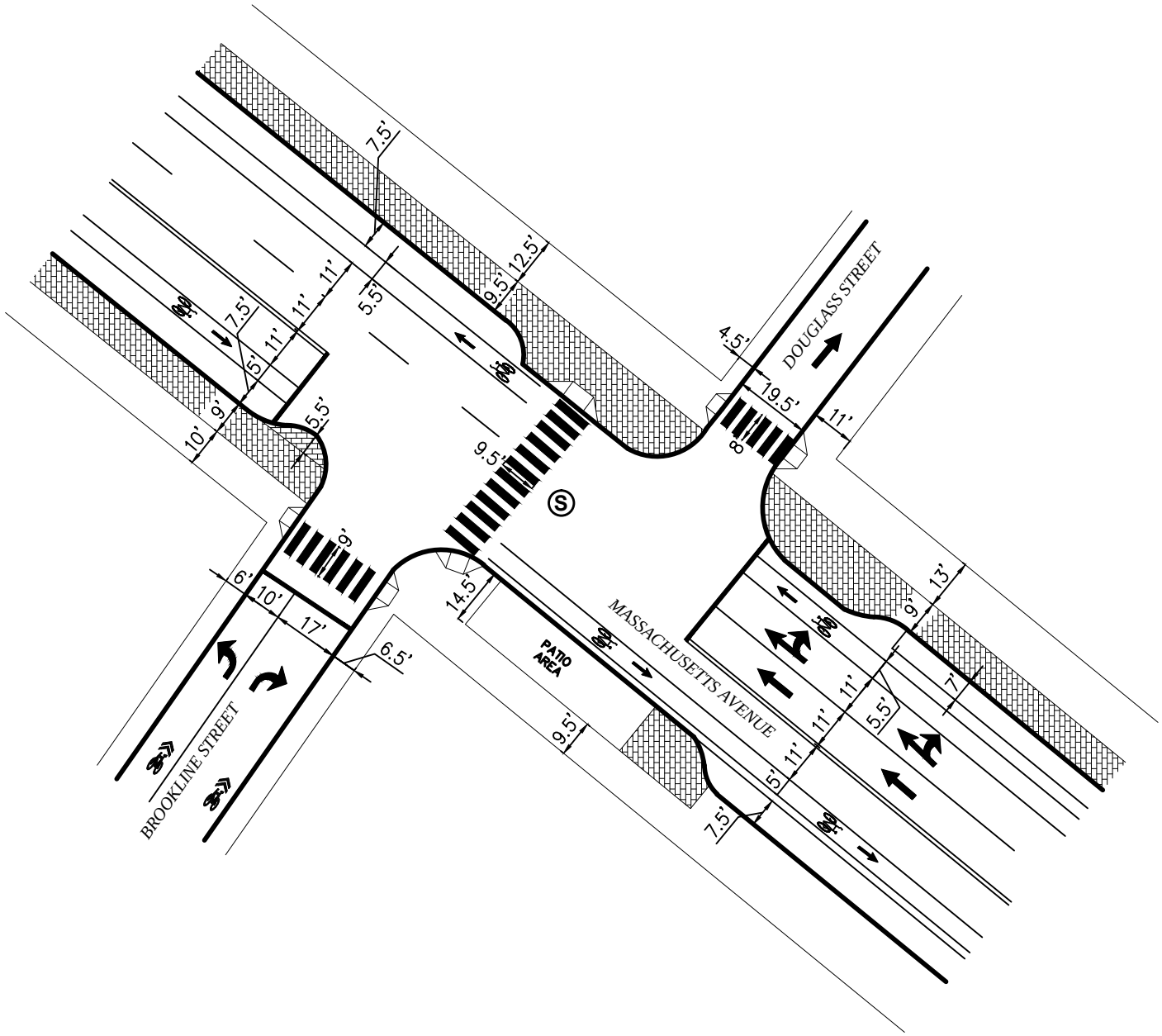
Vanasse Hangen Brustlin, Inc.

Existing Condition Intersection Geometry
Massachusetts Avenue at Western Avenue
and Prospect Street

Figure 1.b.1

300 Massachusetts Avenue TIS
Cambridge, MA

0 20 40 Feet

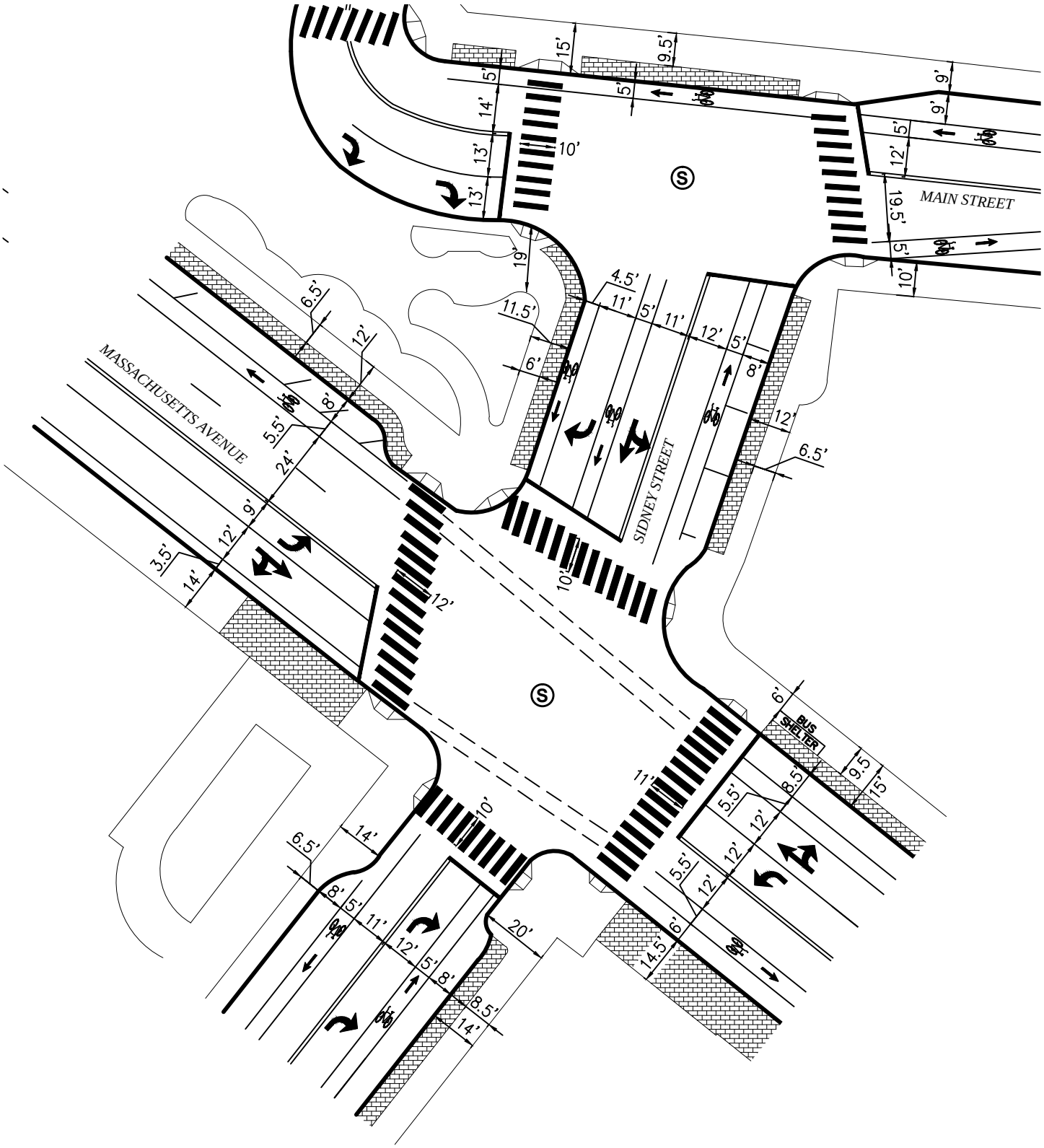


Vanasse Hangen Brustlin, Inc.

Existing Condition Intersection Geometry — Figure 1.b.2
Massachusetts Avenue at Brookline Street

300 Massachusetts Avenue TIS
Cambridge, MA

0 20 40 Feet



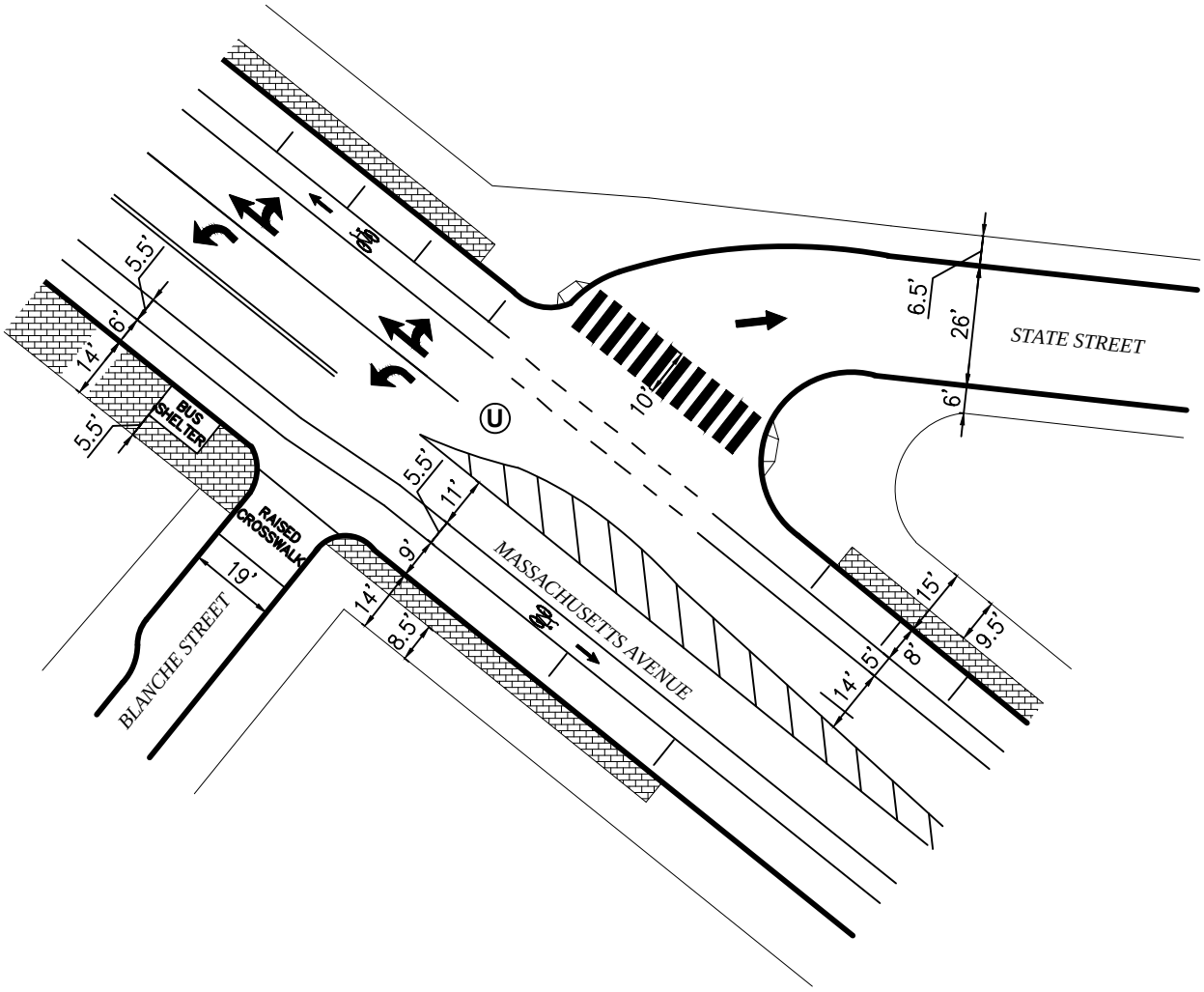
Vanasse Hangen Brustlin, Inc.

Existing Condition Intersection Geometry
Massachusetts Avenue at Sidney Street &
Main Street at Sydney Street

Figure 1.b.3

300 Massachusetts Avenue TIS
Cambridge, MA

0 20 40 Feet



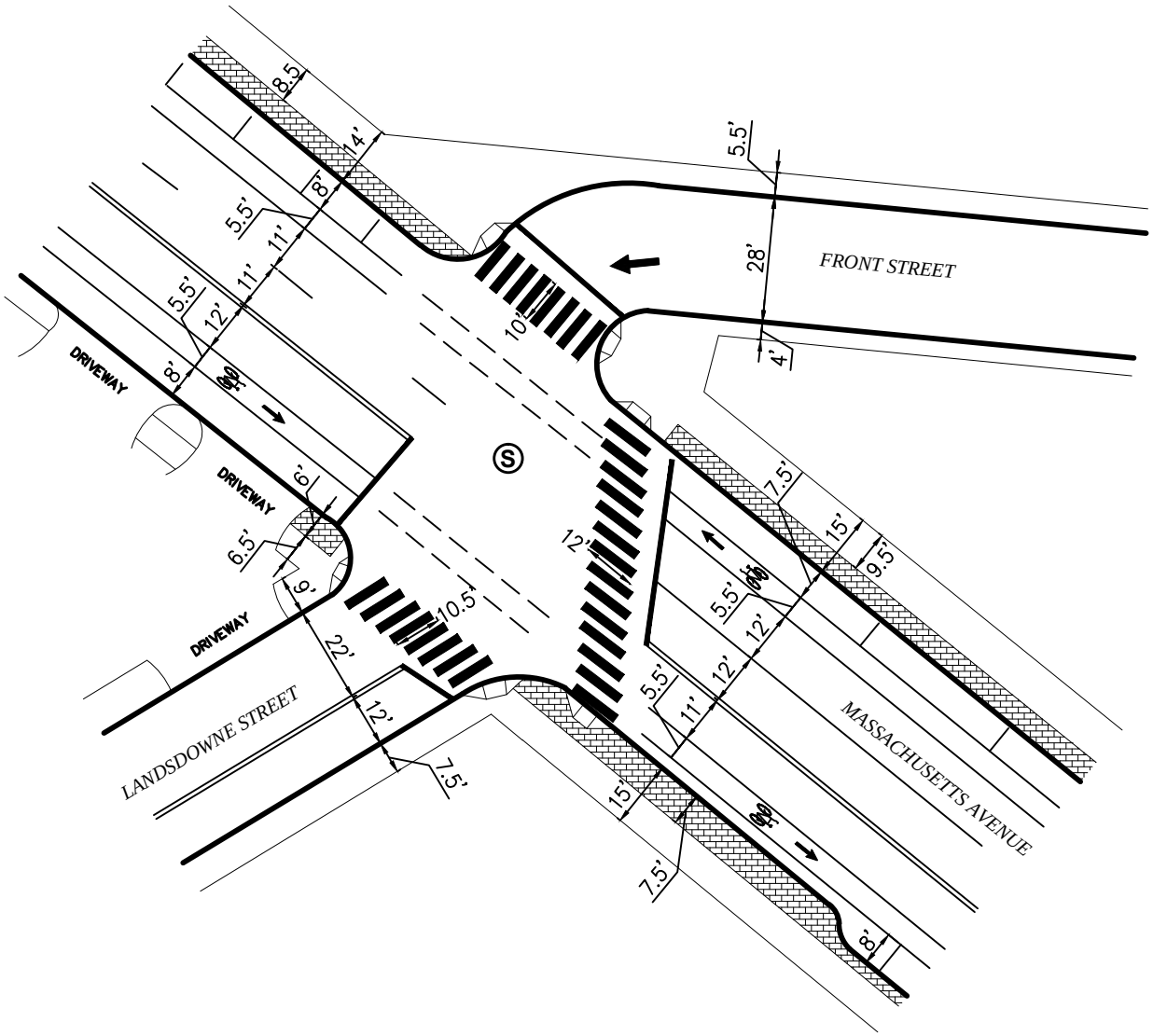
Vanasse Hangen Brustlin, Inc.

Existing Condition Intersection Geometry
Massachusetts Avenue at Blanche Street
and State Street

Figure 1.b.4

300 Massachusetts Avenue TIS
Cambridge, MA

0 20 40 Feet



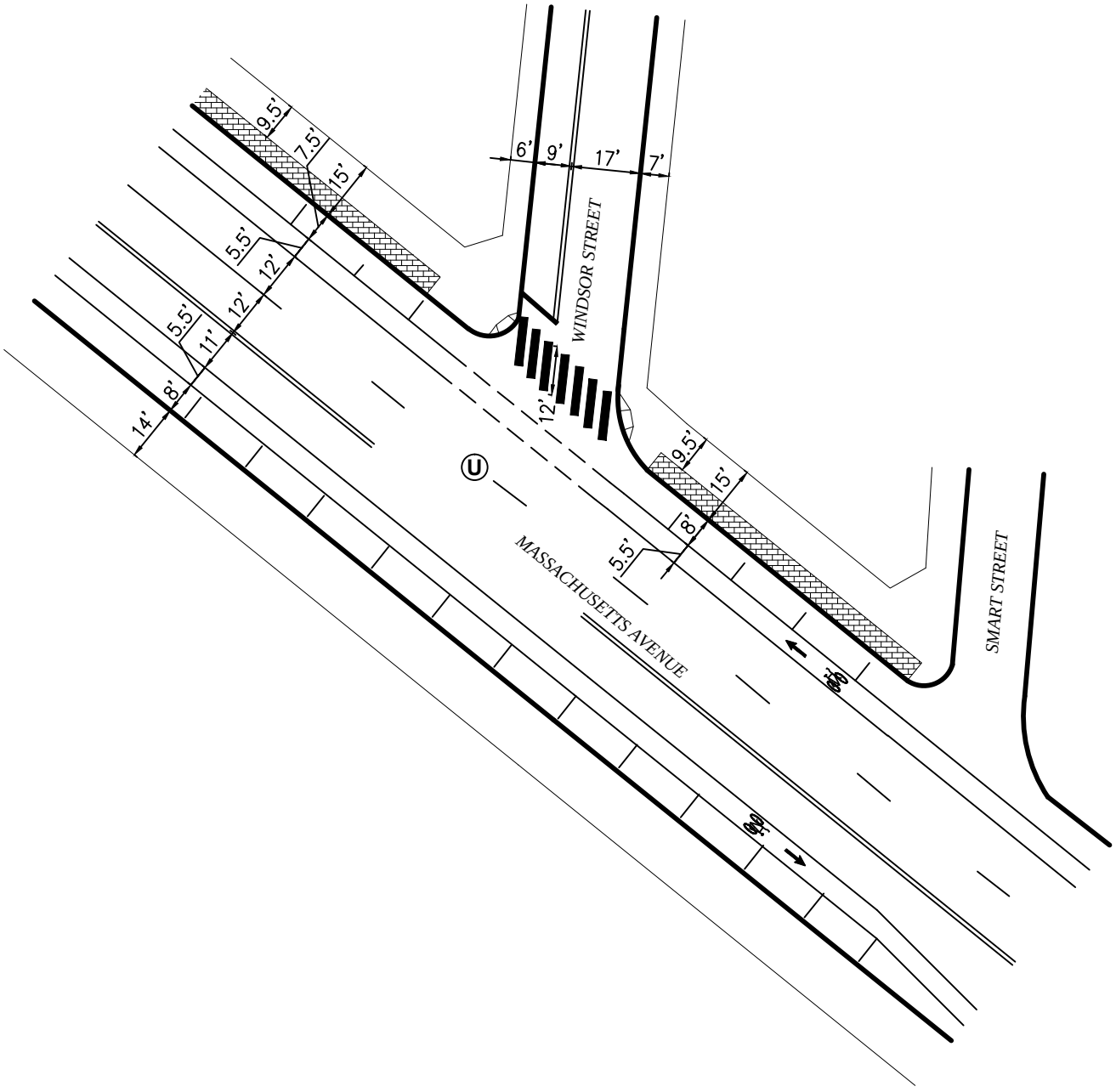
Vanasse Hangen Brustlin, Inc.

Existing Condition Intersection Geometry
Massachusetts Avenue at Landsdowne Street and Front Street

Figure 1.b.5

300 Massachusetts Avenue TIS
Cambridge, MA

0 20 40 Feet

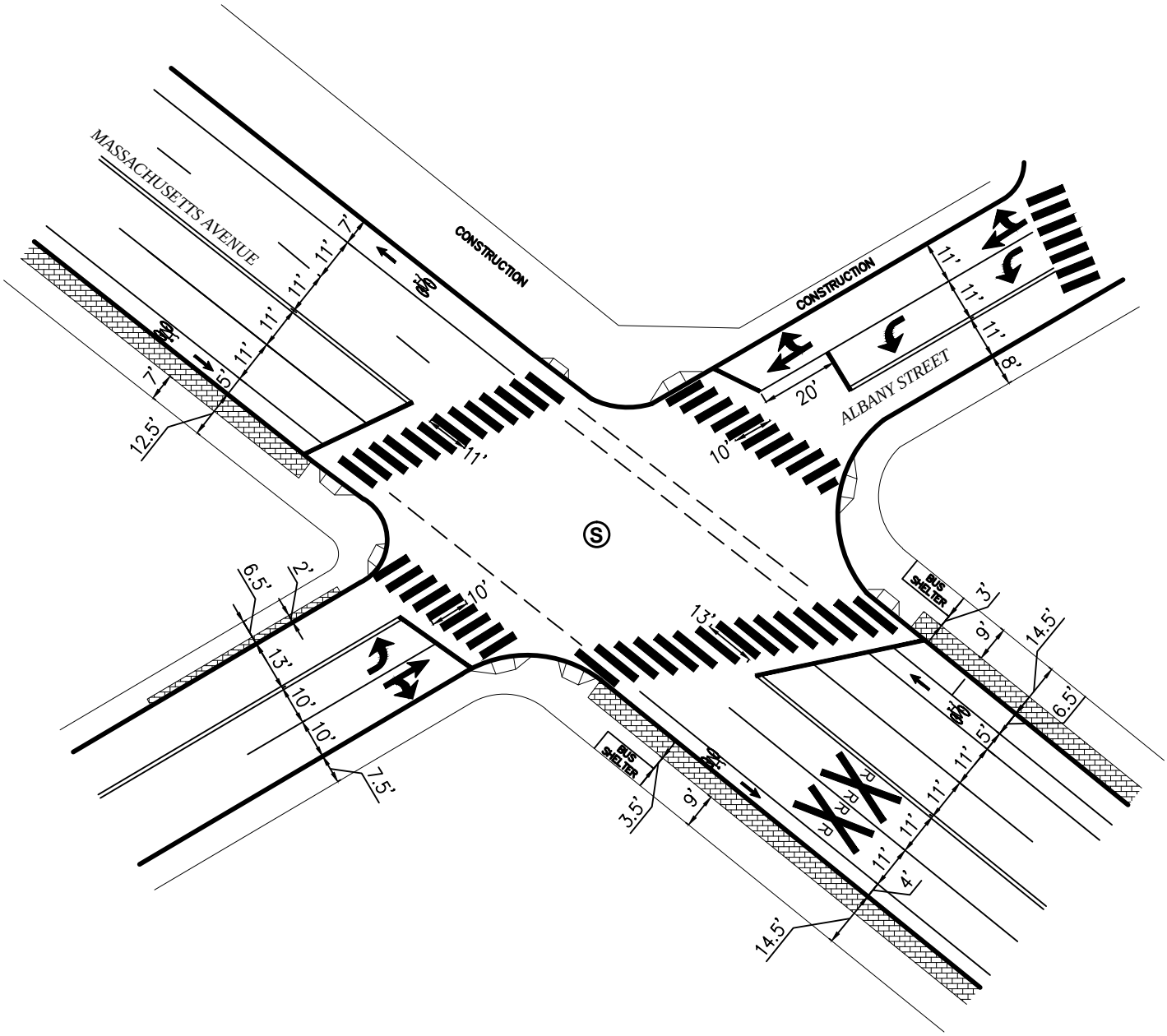


Vanasse Hangen Brustlin, Inc.

Existing Condition Intersection Geometry — Figure 1.b.6
Massachusetts Avenue at Windsor Street

300 Massachusetts Avenue TIS
Cambridge, MA

0 20 40 Feet

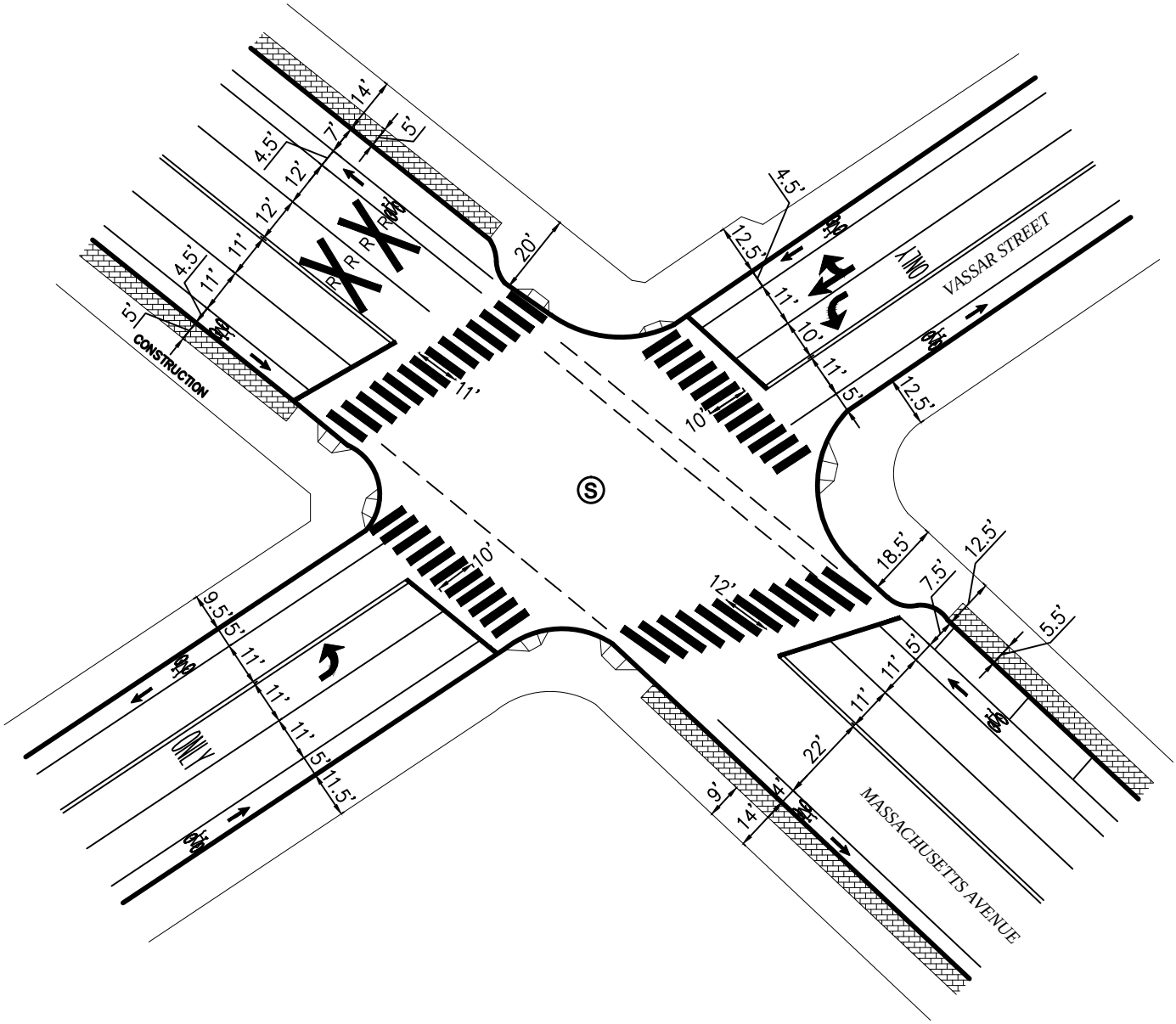


Vanasse Hangen Brustlin, Inc.

Existing Condition Intersection Geometry — Figure 1.b.7
Massachusetts Avenue at Albany Street

300 Massachusetts Avenue TIS
Cambridge, MA

0 20 40 Feet

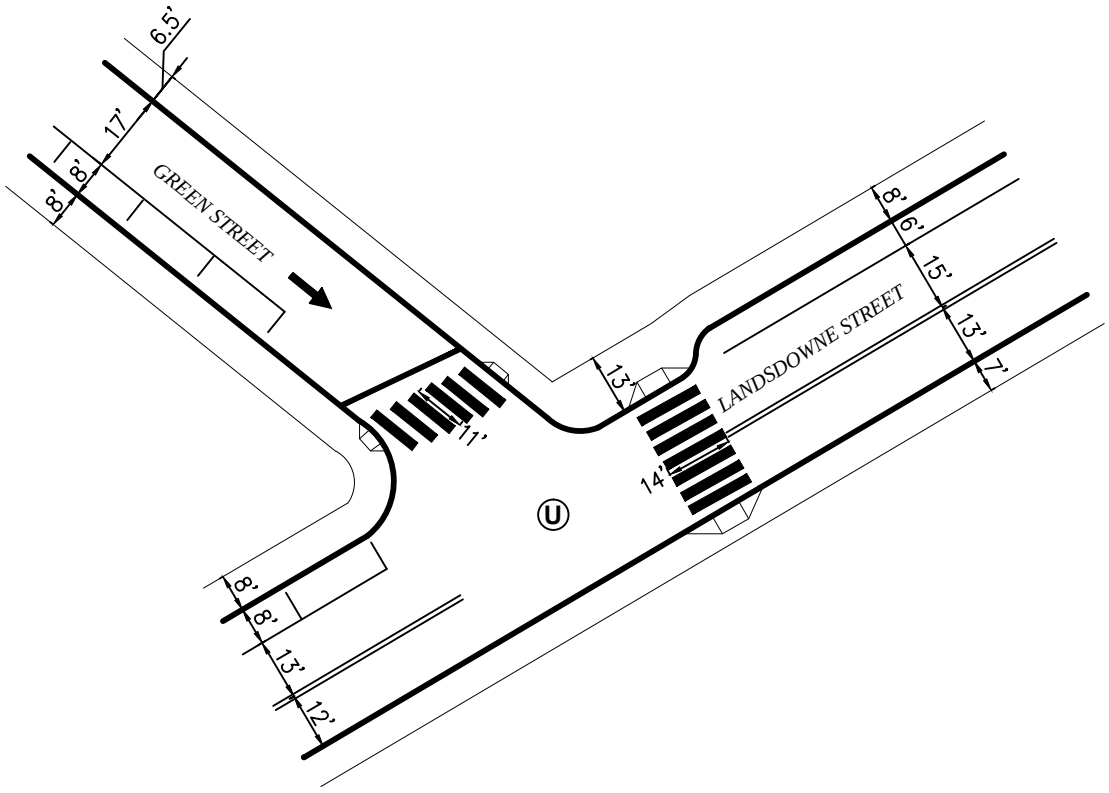


Vanasse Hangen Brustlin, Inc.

Existing Condition Intersection Geometry Figure 1.b.8
Massachusetts Avenue at Vassar Street

300 Massachusetts Avenue TIS
Cambridge, MA

0 20 40 Feet

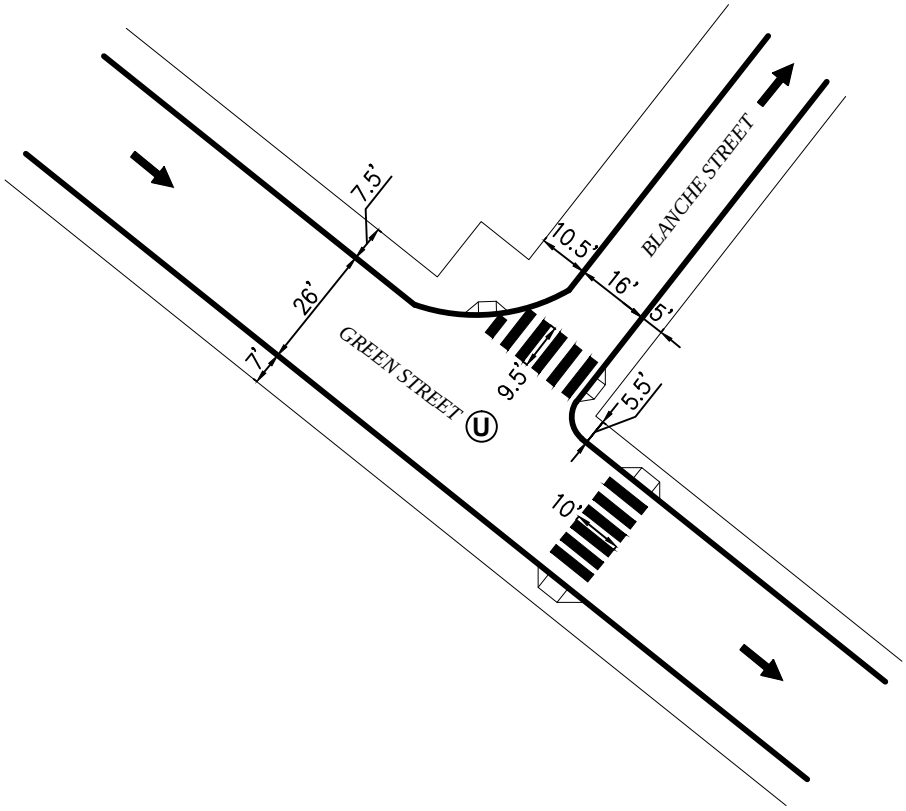


Vanasse Hangen Brustlin, Inc.

Existing Condition Intersection Geometry Figure 1.b.9
Green Street at Landsdowne Street

300 Massachusetts Avenue TIS
Cambridge, MA

0 20 40 Feet

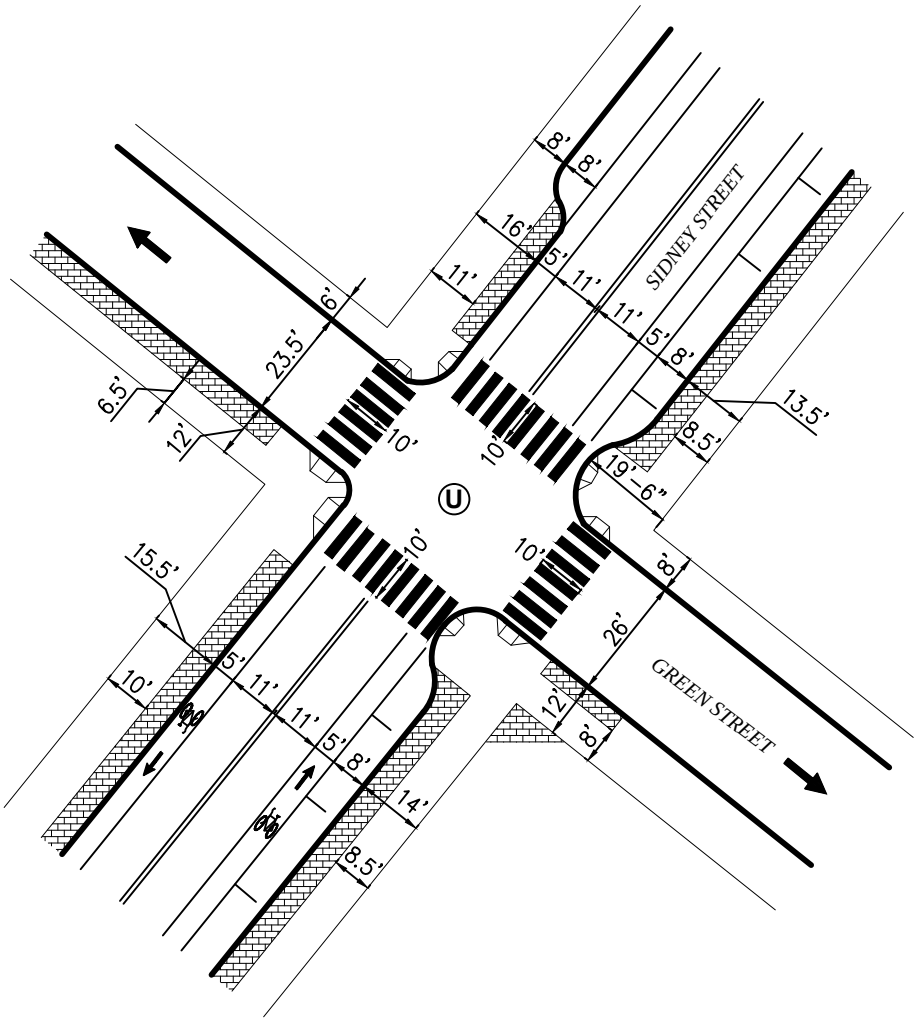


Vanasse Hangen Brustlin, Inc.

Existing Condition Intersection Geometry Figure 1.b.10
Green Street at Blanche Street

300 Massachusetts Avenue TIS
Cambridge, MA

0 20 40 Feet

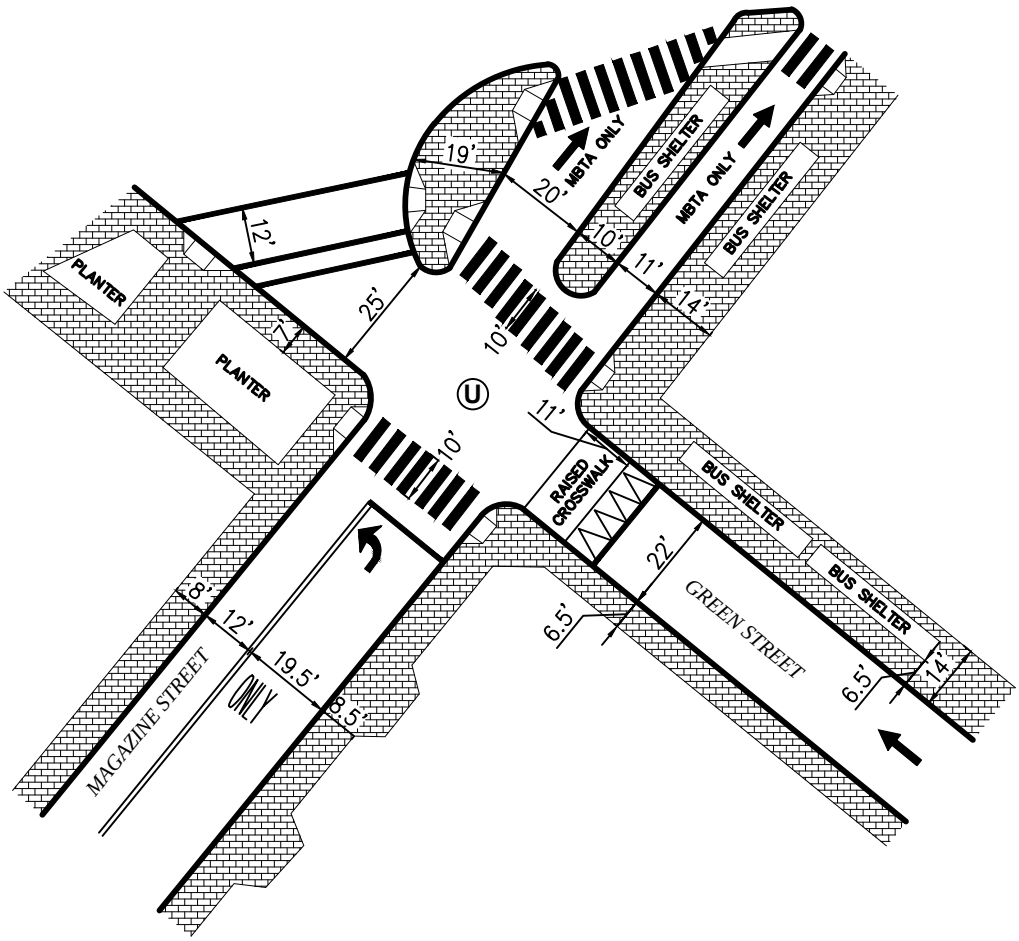


Vanasse Hangen Brustlin, Inc.

Existing Condition Intersection Geometry Figure 1.b.11
Green Street at Sindey Street

300 Massachusetts Avenue TIS
Cambridge, MA

0 20 40 Feet

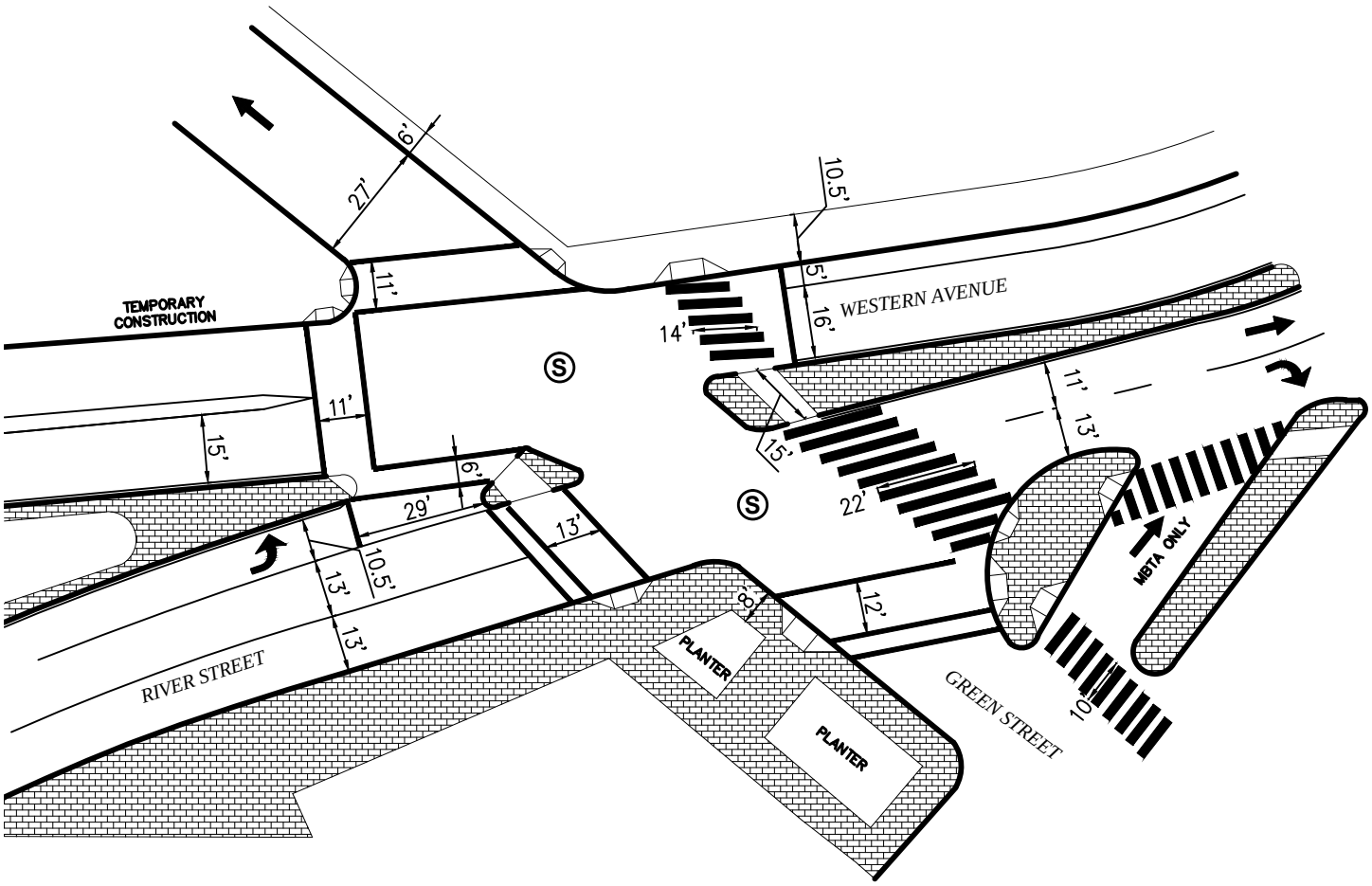


Vanasse Hangen Brustlin, Inc.

Existing Condition Intersection Geometry Figure 1.b.12
Green Street at Magazine Street

300 Massachusetts Avenue TIS
Cambridge, MA

0 20 40 Feet

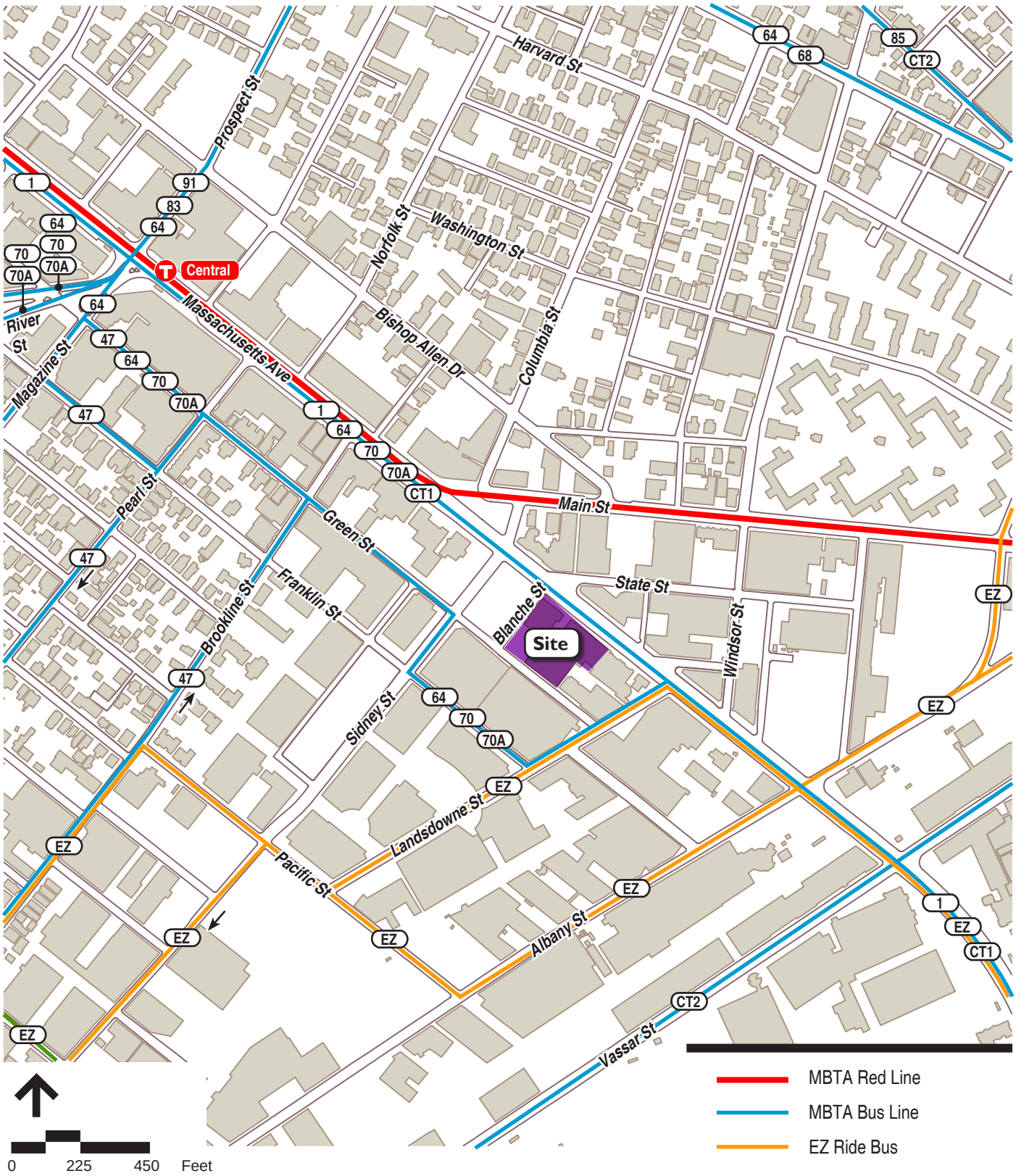


Vanasse Hangen Brustlin, Inc.

Existing Condition Intersection Geometry — Figure 1.b.13
Green Street at River Street
and Western Avenue

300 Massachusetts Avenue TIS
Cambridge, MA

0 20 40 Feet

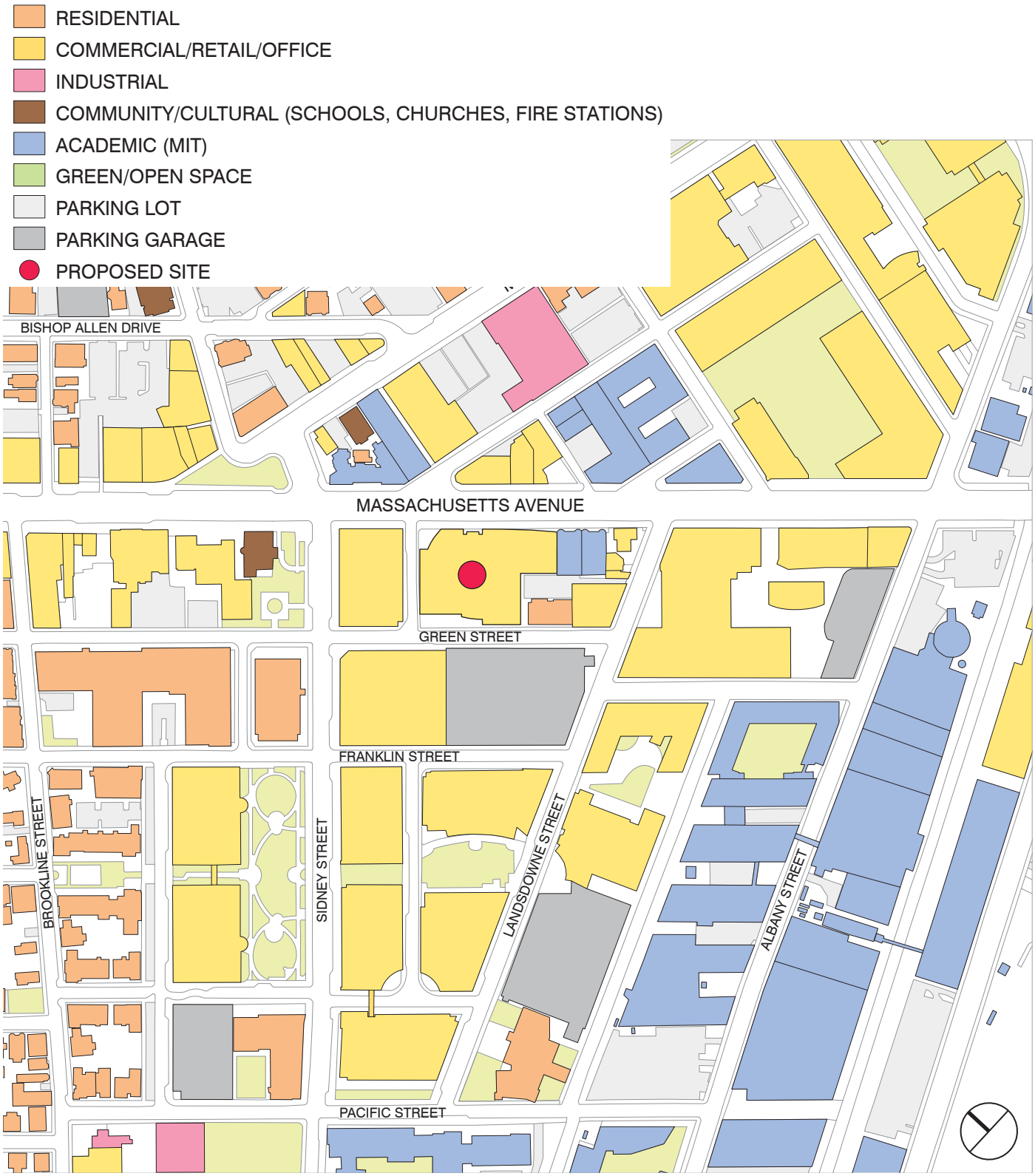


Vanasse Hangen Brustlin, Inc.

Public Transportation Map

Figure 1.d

300 Massachusetts Avenue TIS
Cambridge, MA



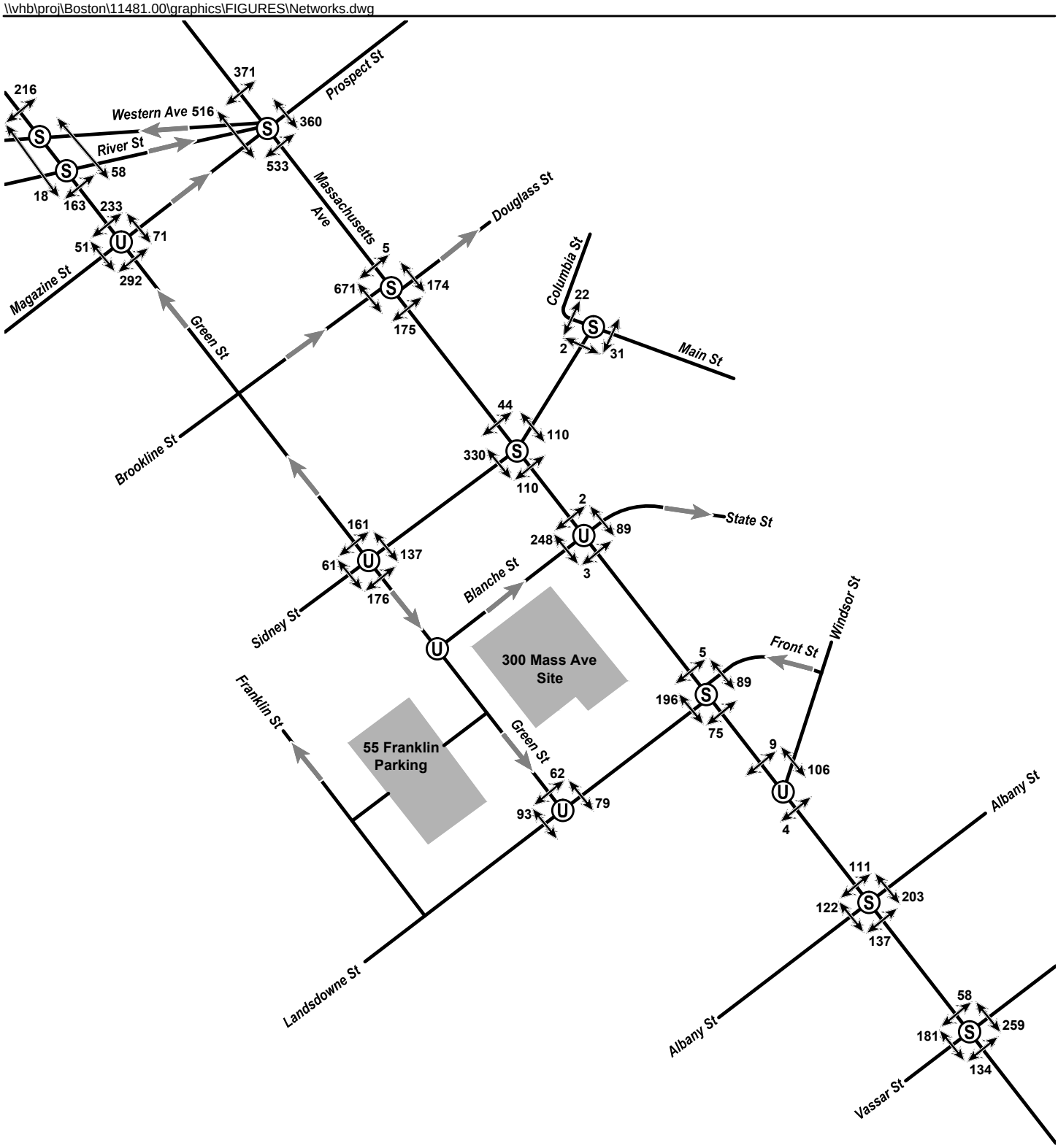
Source: Kling Stubbins Architects

Vanasse Hangen Brustlin, Inc.

Land Use

Figure 1.e

300 Massachusetts Avenue TIS
Cambridge, MA



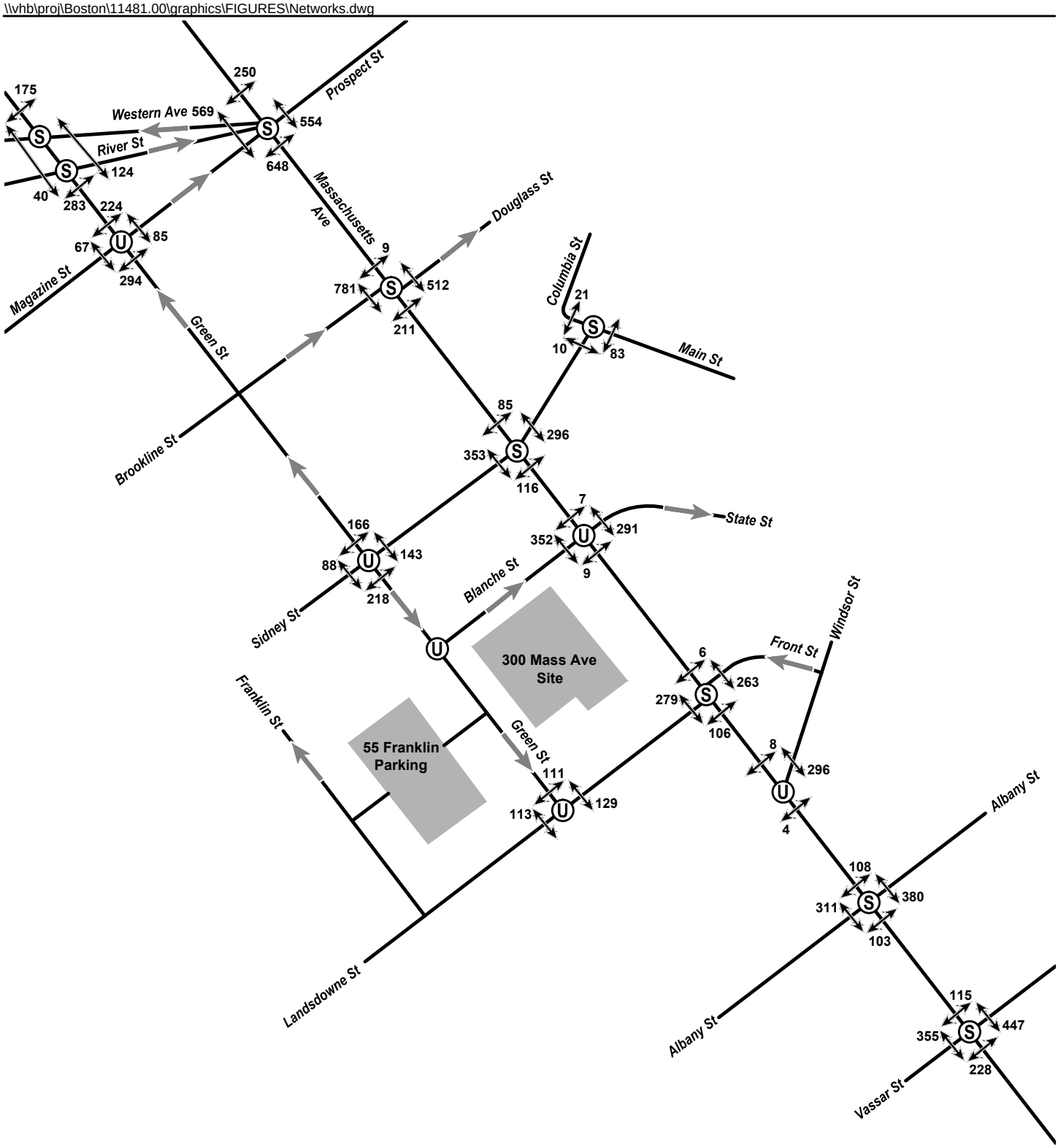
Counted: April 9, 2013

Not to Scale

Vanasse Hangen Brustlin, Inc.

2013 Existing Condition
AM Peak Hour Pedestrian Volumes
300 Massachusetts Avenue TIS
Cambridge, MA

Figure 2.b.1
8:00AM - 9:00AM



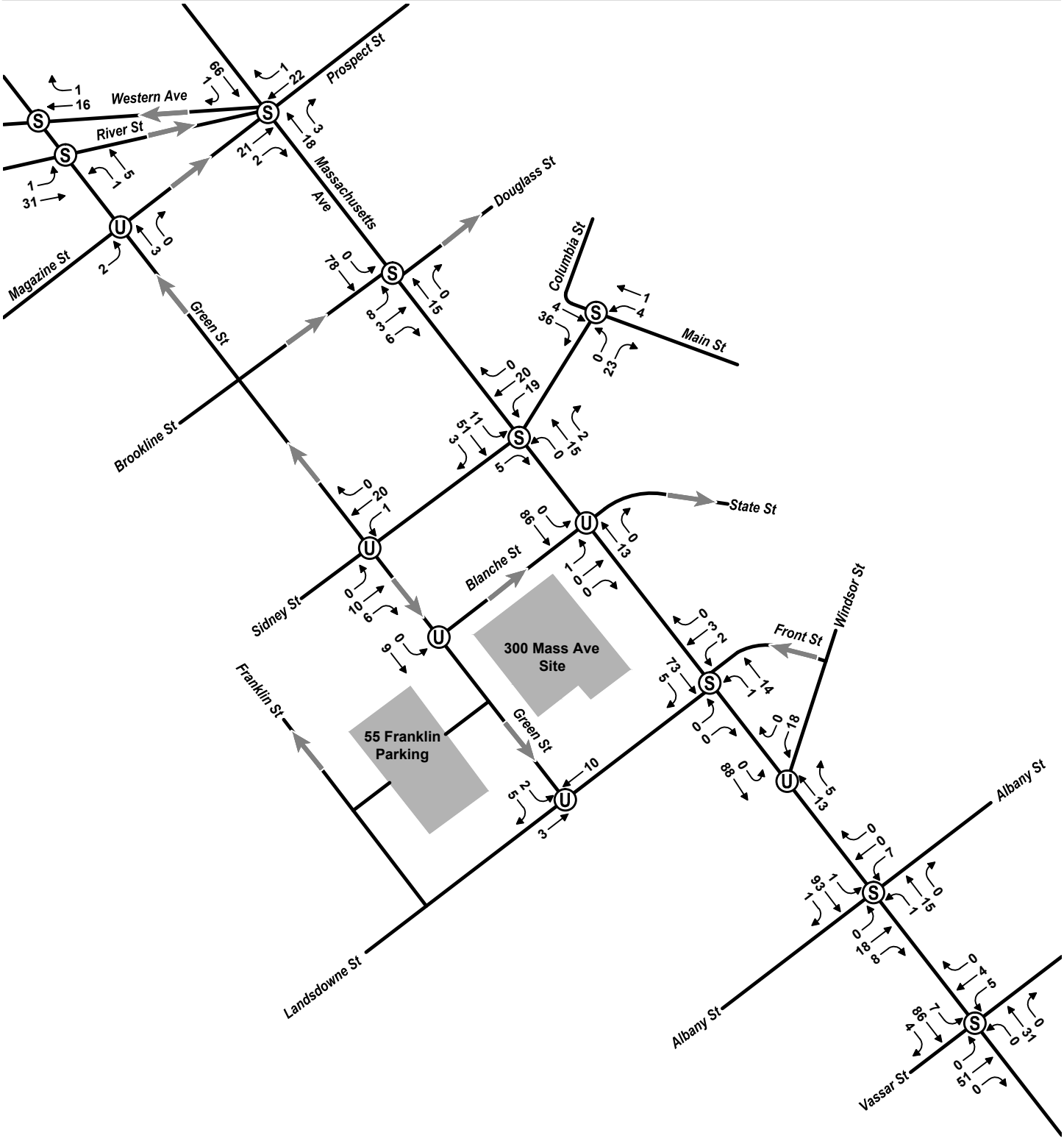
Counted: April 9, 2013

Not to Scale

Vanasse Hangen Brustlin, Inc.

2013 Existing Condition
PM Peak Hour Pedestrian Volumes
300 Massachusetts Avenue TIS
Cambridge, MA

Figure 2.b.2
4:45PM - 5:45PM



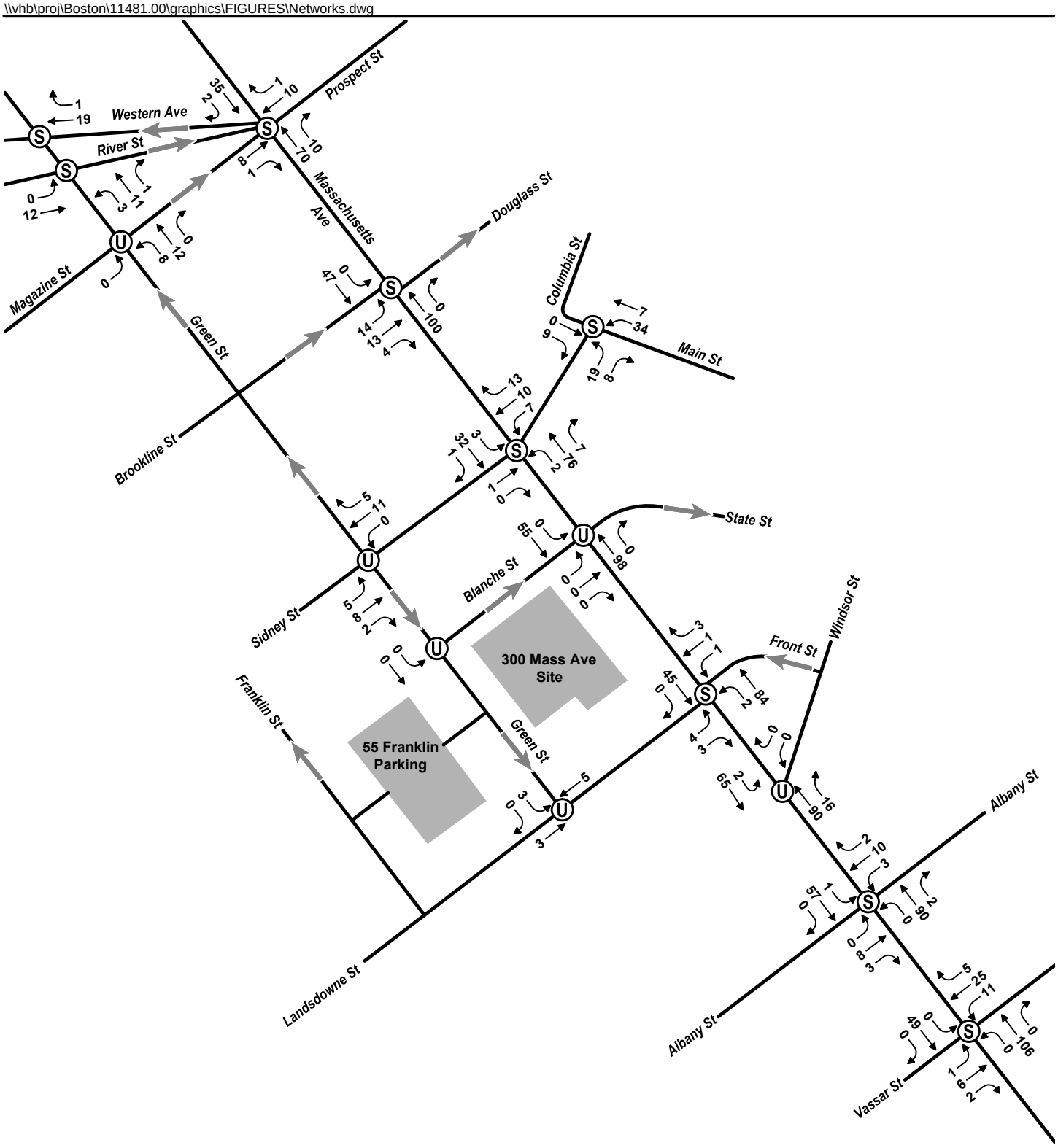
Counted: April 9, 2013

Not to Scale

Vanasse Hangen Brustlin, Inc.

2013 Existing Condition
AM Peak Hour Bicycle Volumes
300 Massachusetts Avenue TIS
Cambridge, MA

Figure 2.b.3
8:00AM - 9:00AM



Counted: April 9, 2013

Not to Scale

Vanasse Hangen Brustlin, Inc.

2013 Existing Condition
PM Peak Hour Bicycle Volumes
300 Massachusetts Avenue TIS
Cambridge, MA

Figure 2.b.4
4:45PM - 5:45PM

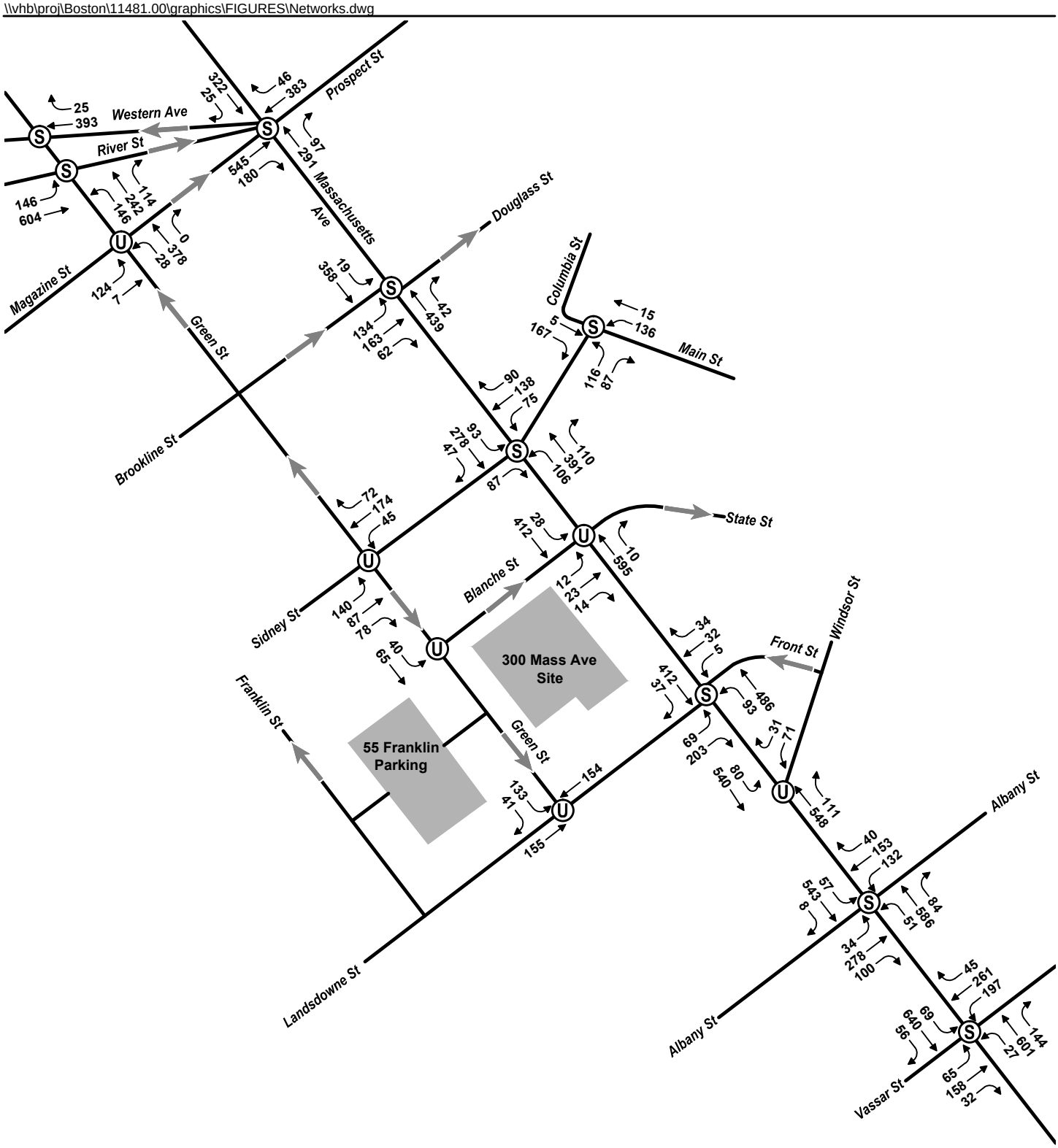
Counted: April 9, 2013

Not to Scale

Vanasse Hangen Brustlin, Inc.

2013 Existing Condition
AM Peak Hour Traffic Volumes
300 Massachusetts Avenue TIS
Cambridge, MA

Figure 2.c.1
8:00AM - 9:00AM



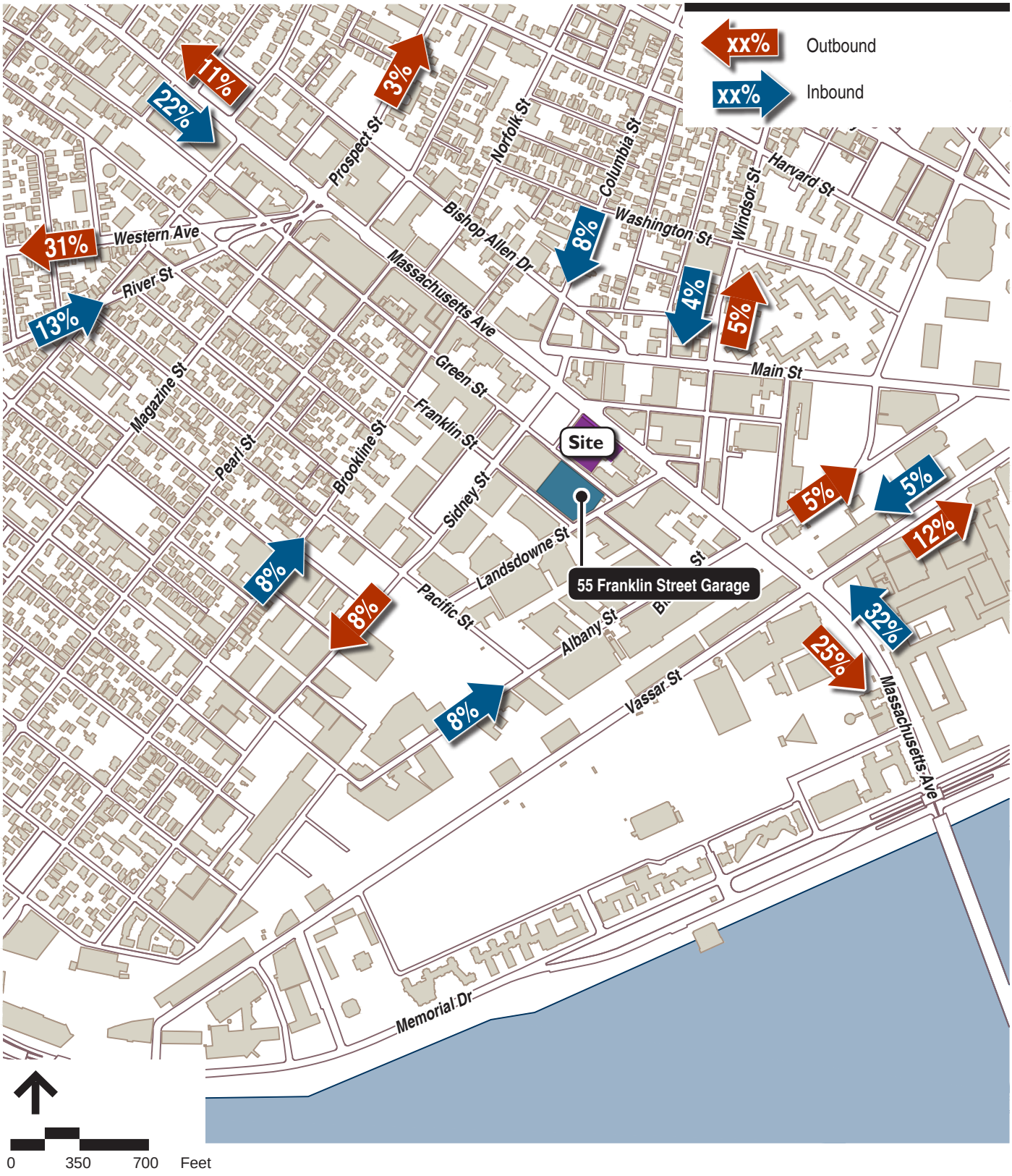
Counted: April 9, 2013

Not to Scale

Vanasse Hangen Brustlin, Inc.

2013 Existing Condition
PM Peak Hour Traffic Volumes
300 Massachusetts Avenue TIS
Cambridge, MA

Figure 2.c.2
4:45PM - 5:45PM

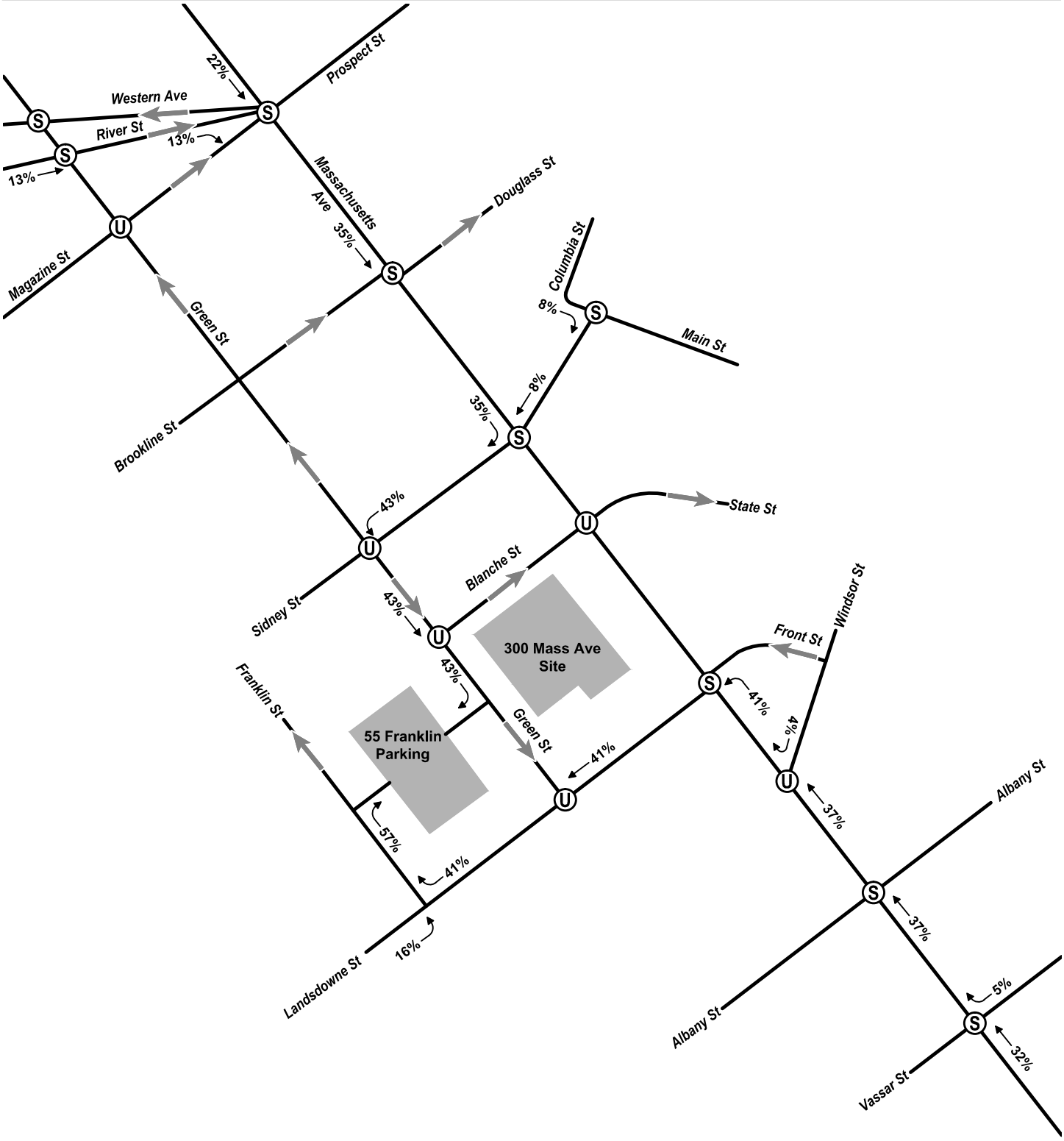


Vanasse Hangen Brustlin, Inc.

Project Trip Distribution

Figure 3.d.1

300 Massachusetts Avenue TIS
Cambridge, MA



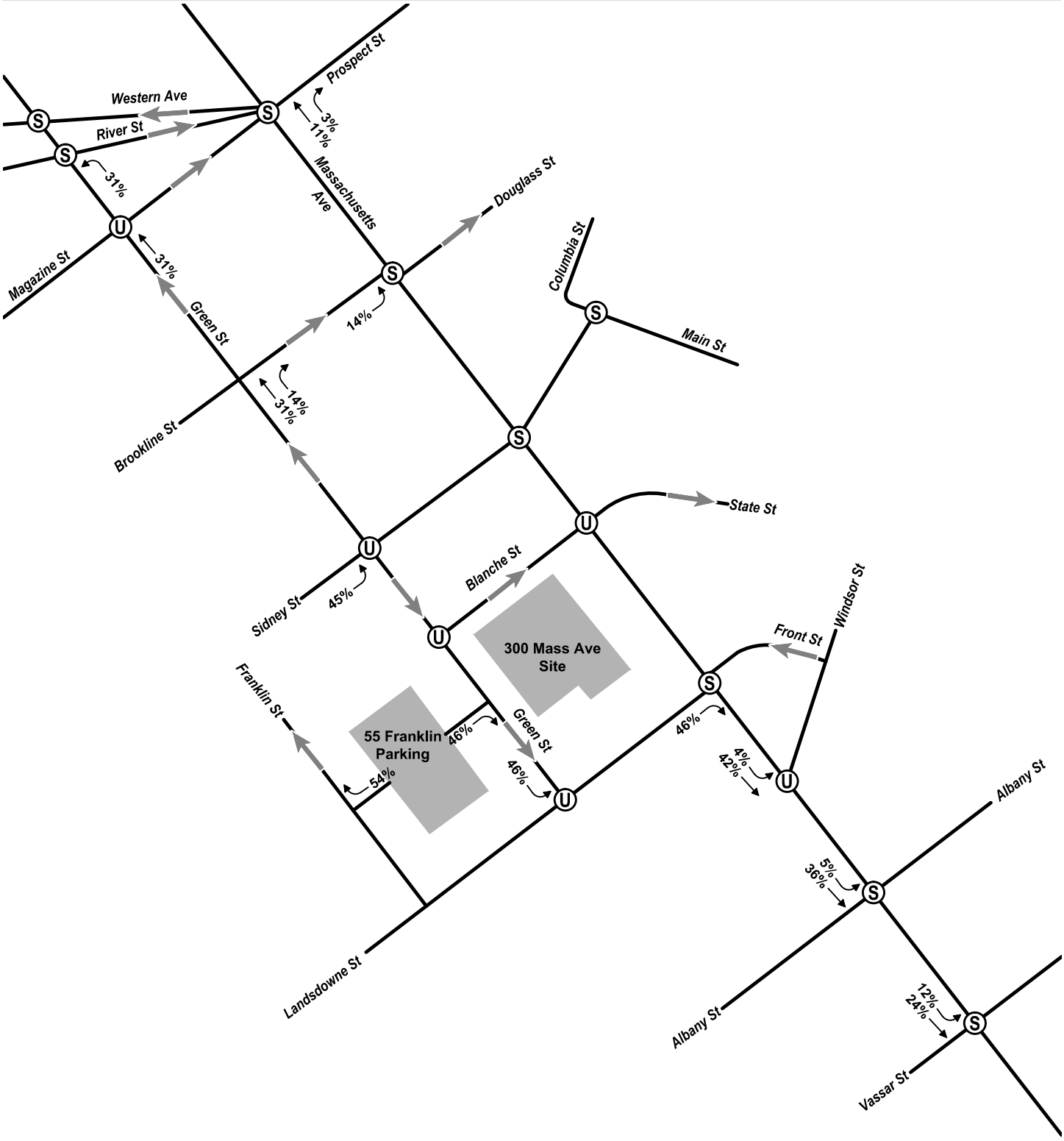
Not to Scale

Vanasse Hangen Brustlin, Inc.

Entering Trip Assignment

Figure 3.d.2

300 Massachusetts Avenue TIS
Cambridge, MA



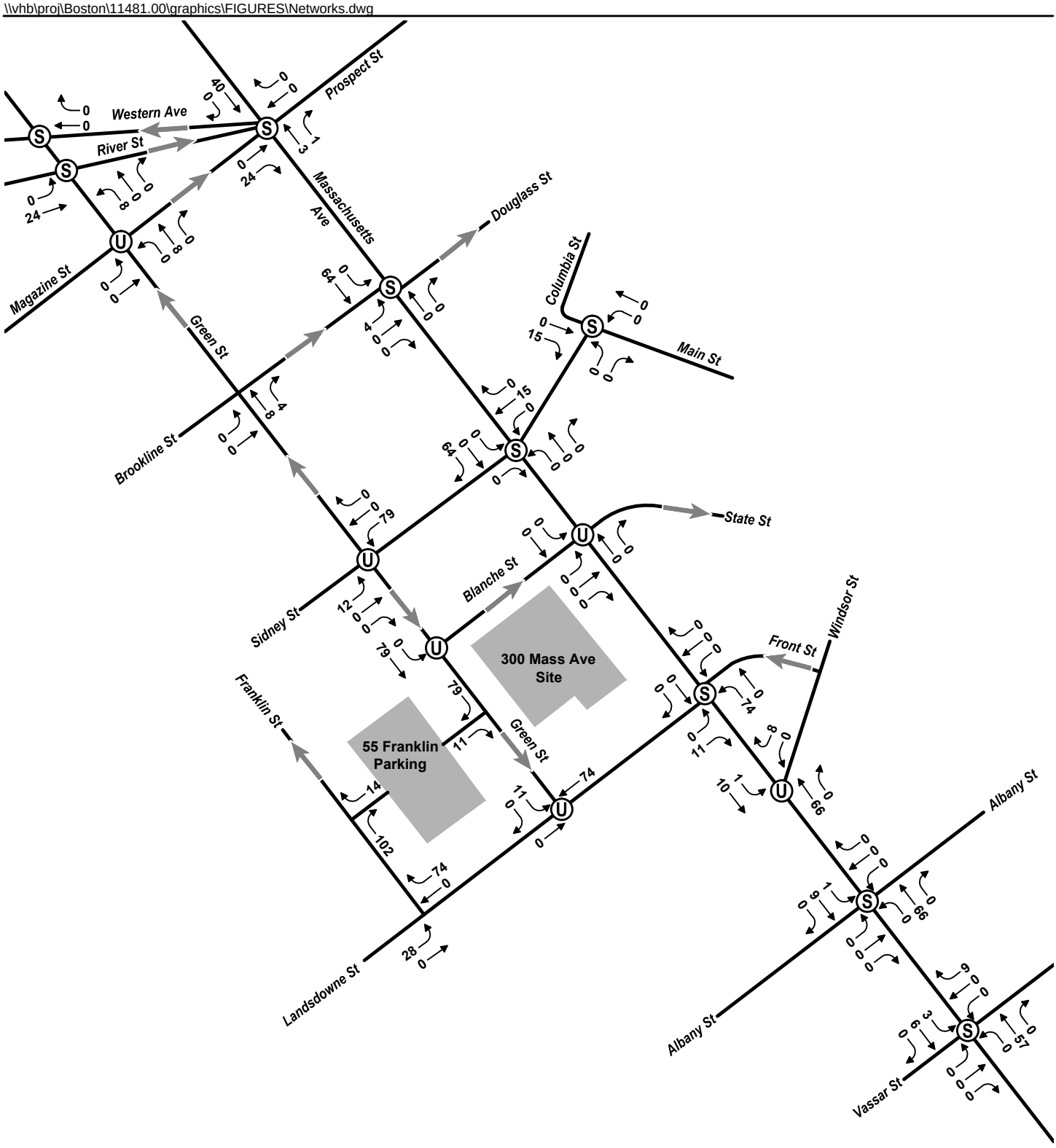
Not to Scale

Vanasse Hangen Brustlin, Inc.

Exiting Trip Assignment

Figure 3.d.3

300 Massachusetts Avenue TIS
Cambridge, MA

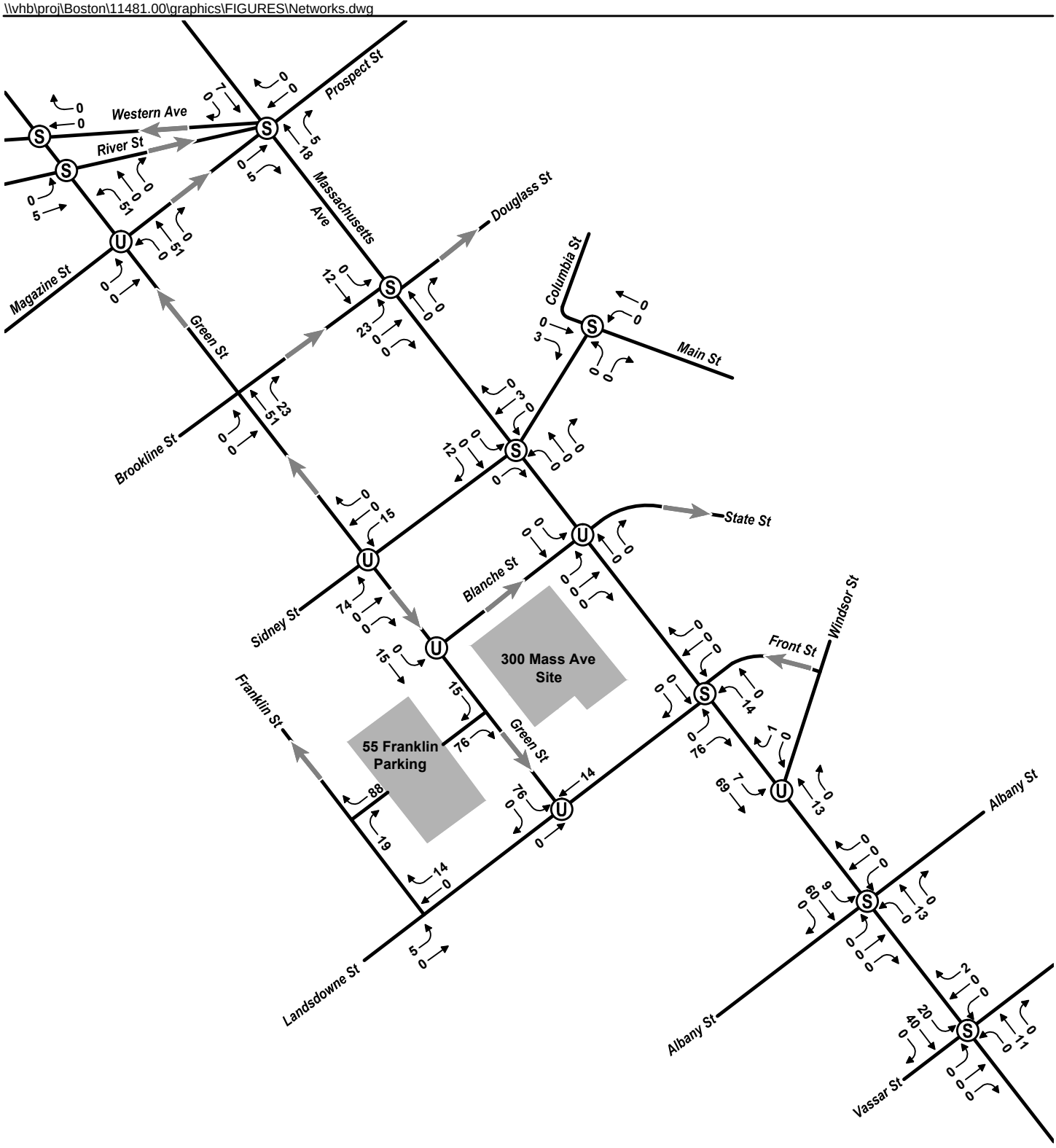


Not to Scale

Vanasse Hangen Brustlin, Inc.

Project Generated Trips
AM Peak Hour Traffic Volumes
300 Massachusetts Avenue TIS
Cambridge, MA

Figure 3.d.4

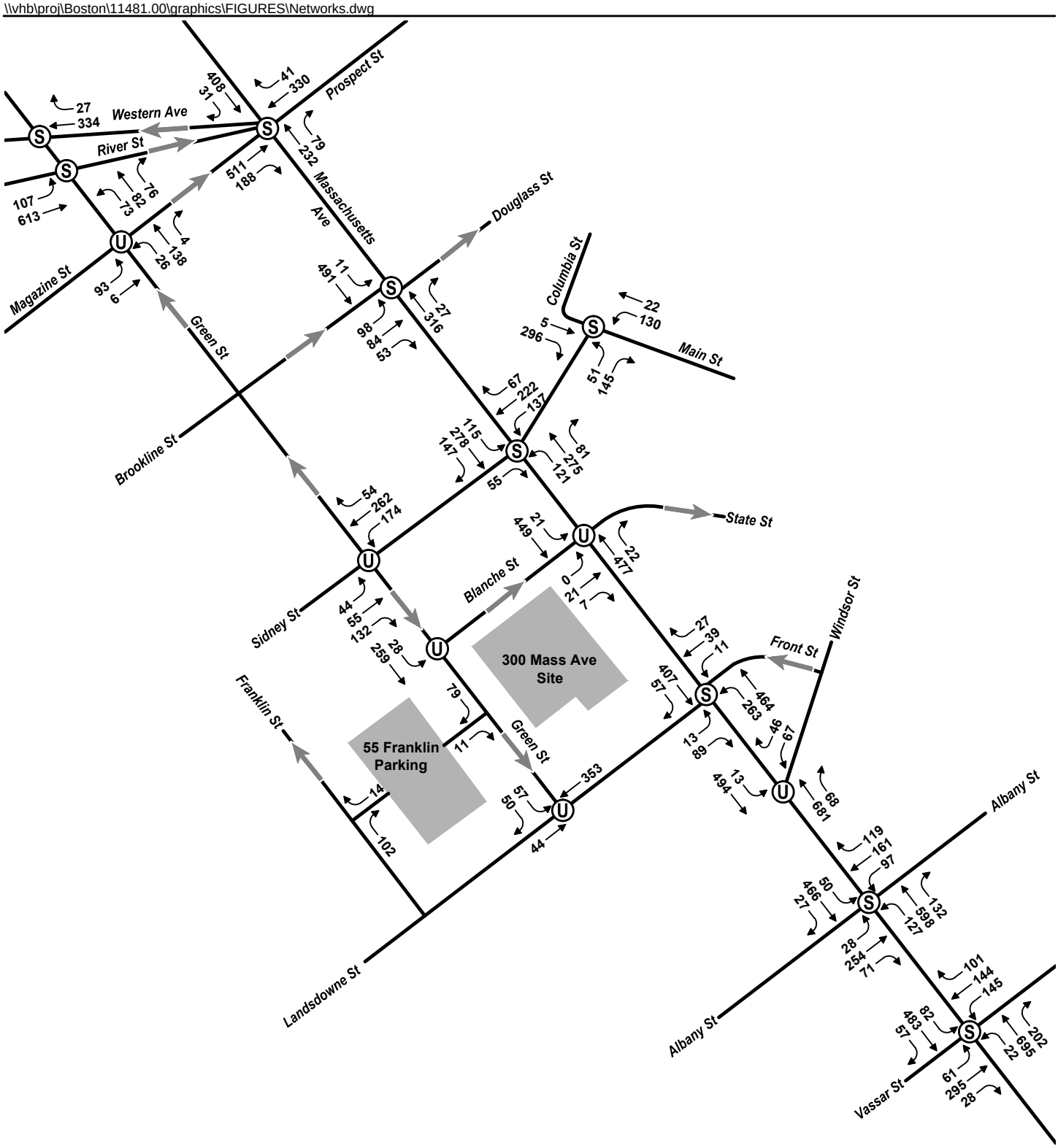


Not to Scale

Vanasse Hangen Brustlin, Inc.

Project Generated Trips
PM Peak Hour Traffic Volumes
300 Massachusetts Avenue TIS
Cambridge, MA

Figure 3.d.5



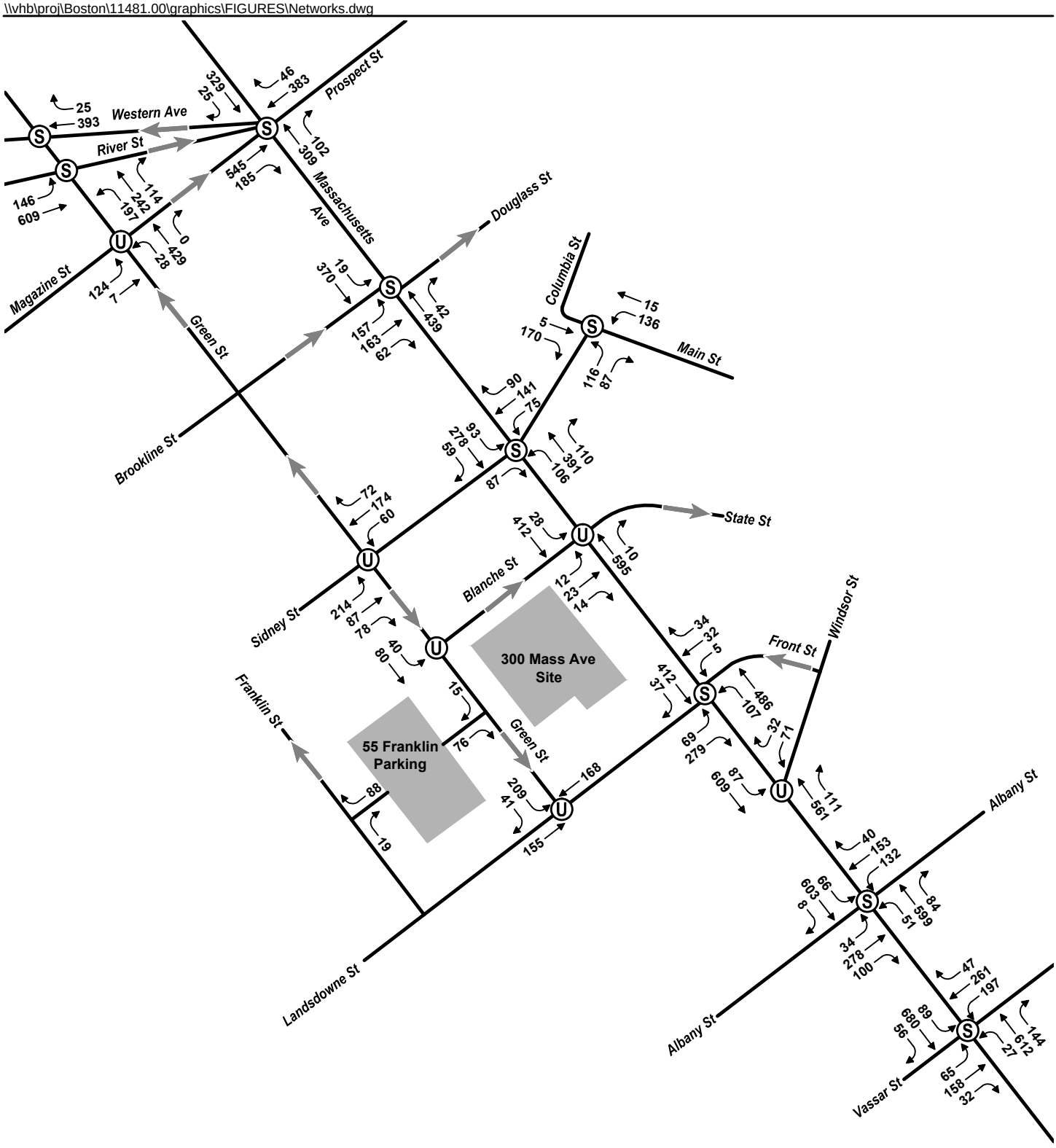
Note: driveway volumes only include 300 Massachusetts Avenue project trips

Not to Scale

Vanasse Hangen Brustlin, Inc.

2013 Build Condition
AM Peak Hour Traffic Volumes
300 Massachusetts Avenue TIS
Cambridge, MA

Figure 5.b.1
8:00AM - 9:00AM



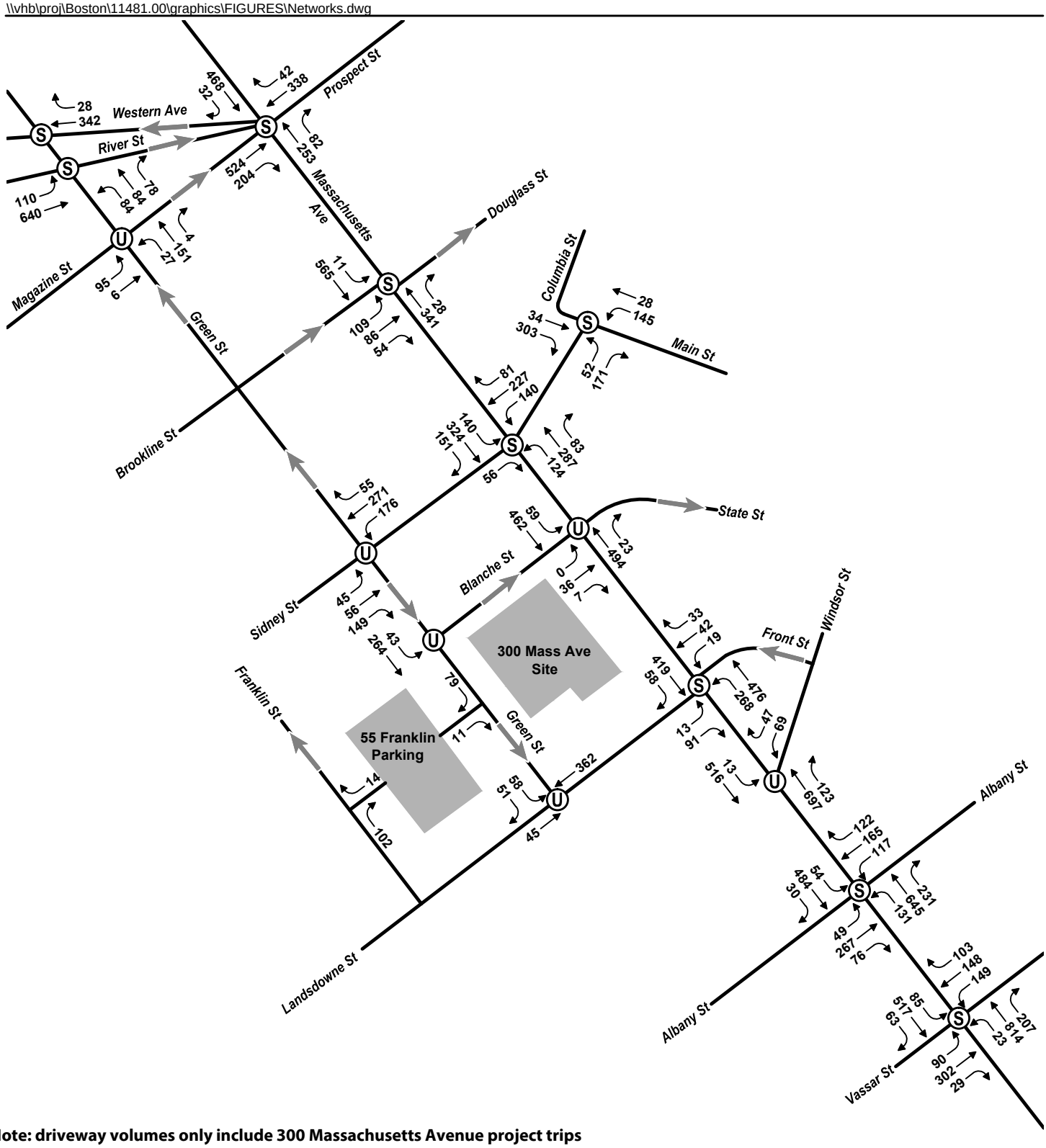
Note: driveway volumes only include 300 Massachusetts Avenue project trips

Not to Scale

Vanasse Hangen Brustlin, Inc.

2013 Build Condition
PM Peak Hour Traffic Volumes
300 Massachusetts Avenue TIS
Cambridge, MA

Figure 5.b.2
4:45PM - 5:45PM



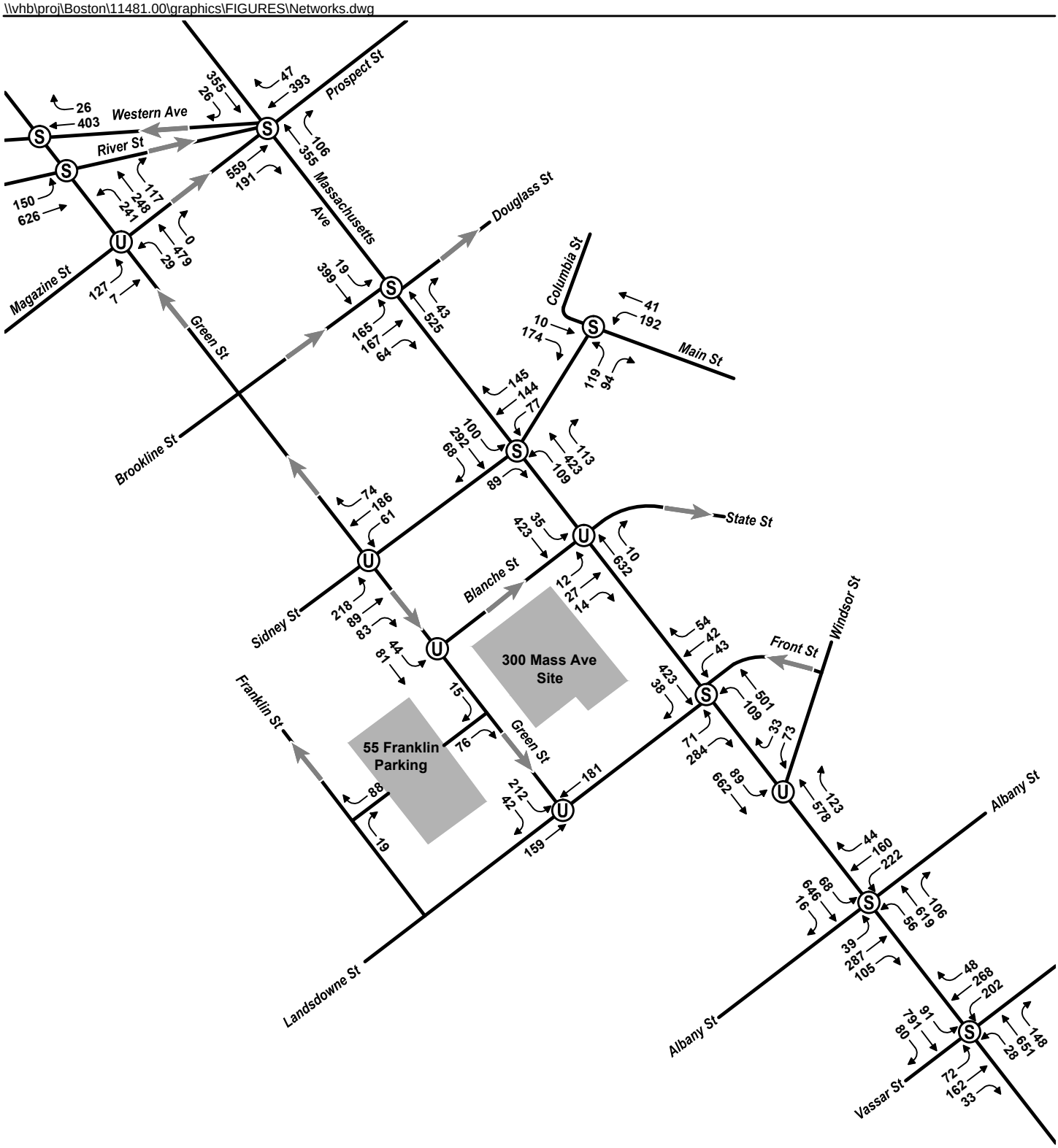
Note: driveway volumes only include 300 Massachusetts Avenue project trips

Not to Scale

Vanasse Hangen Brustlin, Inc.

2018 Future Condition
AM Peak Hour Traffic Volumes
300 Massachusetts Avenue TIS
Cambridge, MA

Figure 5.c.1
8:00AM - 9:00AM



Note: driveway volumes only include 300 Massachusetts Avenue project trips

Not to Scale

Vanasse Hangen Brustlin, Inc.

2018 Future Condition
PM Peak Hour Traffic Volumes
300 Massachusetts Avenue TIS
Cambridge, MA

Figure 5.c.2
4:45PM - 5:45PM

Chart 1

Existing Condition Parking Occupancy by Time of Day

Wednesday April 10, 2013

55 Franklin, 80 Landsdowne, 30 Pilgrim

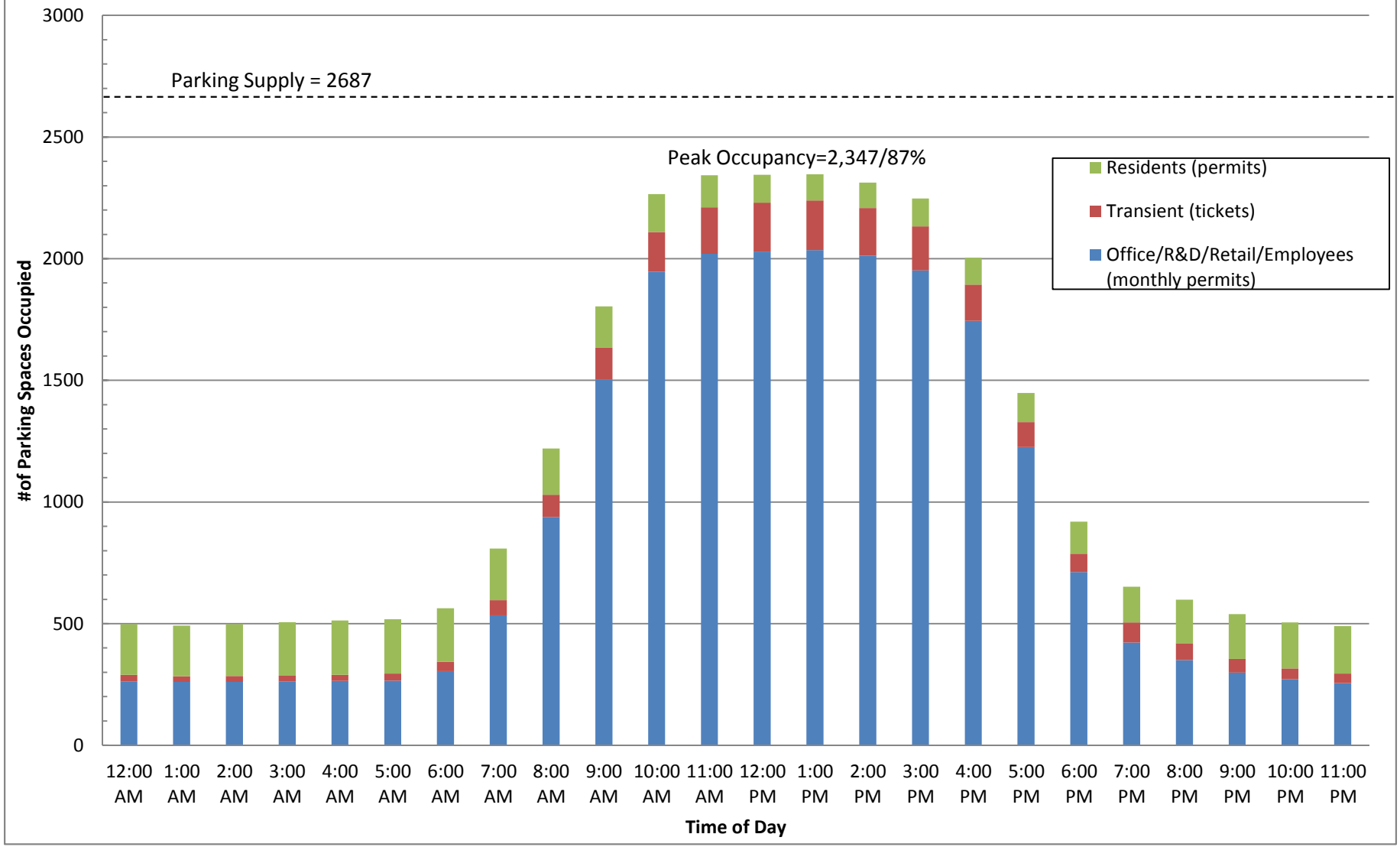
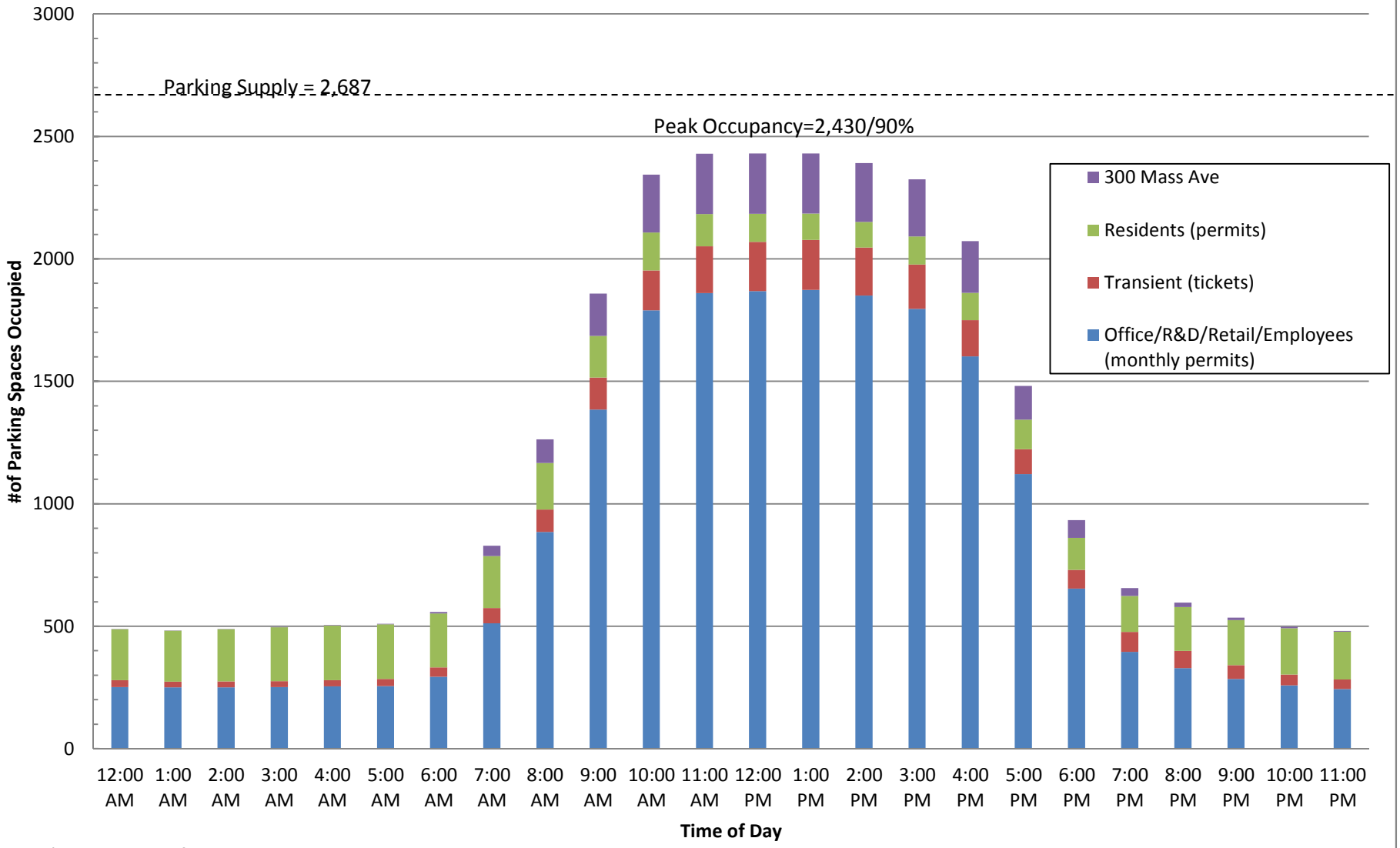


Chart 2

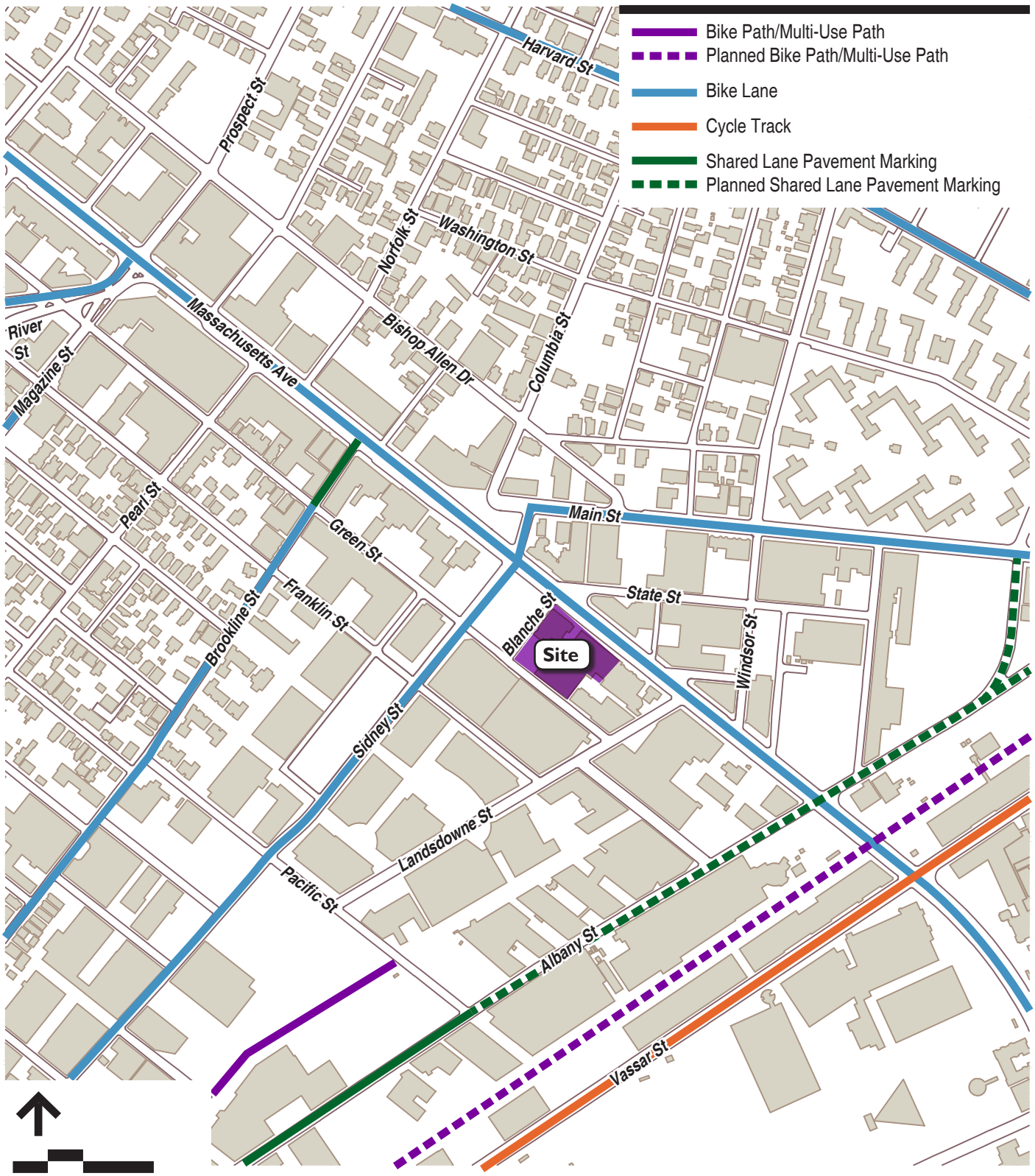
Build Condition Parking Occupancy by Time of Day*

Wednesday April 10, 2013

55 Franklin, 80 Landsdowne, 30 Pilgrim



* Relocation of Vertex employees to Boston; University Park space retenanted



Source: City of Cambridge, Community Development Department, updated February 21, 2013

Vanasse Hangen Brustlin, Inc.

Bicycle Facilities

Figure 12

300 Massachusetts Avenue TIS
Cambridge, MA