PROJECT NOTIFICATION FORM

Submitted Pursuant to Article 80B-2 of the Boston Zoning Code

SOUTH BOSTON HOTEL

Boston, Massachusetts

Submitted to

Boston Redevelopment Authority
One City Hall Square
Boston, Massachusetts 02201

Submitted by:

Sun Condos LLC
655 Summer Street
Boston, Massachusetts 02210

MLF CONSULTING LLC

Prepared by

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Newton, Massachusetts 02461

In Association with

McDermott, Quilty & Miller, LLP
VJAArchitects, Inc.
Landworks-Studio, Inc.
Consigli Construction Co. Inc.
Howard/Stein-Hudson Associates, Inc.
Rowan Williams Davies & Irwin Inc.
Tech Environmental, Inc.
Vanasse Hangen Brustlin, Inc.

August 2, 2013

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August 2, 2013

VIA HAND DELIVERY
Mr. Peter Meade, Director
Boston Redevelopment Authority
One City Hall Square
Boston, MA 02201

Re: South Boston Hotel
Project Notification Form

Dear Director Meade:

In accordance with the Article 80B Large Project Review requirements of the Boston Zoning Code (the "Code"), Sun Condos LLC (the "Proponent") is pleased to submit this Project Notification Form ("PNF") for its proposal for a new South Boston Hotel Project. This new development will involve the construction of a new 156 room hotel (approximately 87,000 gross square feet in accordance with the Code) with separate tenant-leased restaurant and retail space on the ground floor, second-level terrace, separate tenant-leased rooftop bar and exterior pool deck/outdoor lounge, hotel fitness center, meeting rooms, and conference rooms and a screening room all at the Project Site located at the intersection of Broadway and Dorchester Avenue in the South Boston neighborhood ("Proposed Project").

The Project Site is located within a highly commercialized area and is in the midst of a very active transportation node that includes the major MBTA Redline station at Broadway and Dorchester Avenue. In addition, the Fitzgerald Expressway (I-93) is located just to the west of the Project Site. Nearby uses include the Procter Gamble / Gillette Company's complex to the north, as well as ground level commercial and retail uses along Dorchester Avenue and Broadway. The Project Site is also across Dorchester Avenue from a residential complex that includes the Court Square Press development and Macallen Building residences which were developed by the Pappas Companies.
The Proposed Project details has been presented at an initial community meeting hosted by the West Broadway Neighborhood Association (the immediate neighborhood interest group), and at individual meetings with local elected officials and the key leadership of the nearby St. Vincent/Lower End Political Action Committee.

On behalf of the entire project team, we look forward to continuing to work with you and your staff on this Project, which we believe will be a positive addition to the South Boston neighborhood and the City of Boston.

Sincerely,

Joseph P. Hanley, Esq., Partner
On Behalf of Sun Condos LLC

cc: Lauren Williams, BRA
Richard McGuinness, BRA
Heather Campisano, BRA
Ted Schwartzberg, BRA
Sean Regan, Mayor's Office of Neighborhood Services
District City Councilor Bill Linehan
State Senator Linda Dorcena Forry
State Representative Nick Collins
Timothy Pappas

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

Sun Condos LLC (the "Proponent") is submitting, this Project Notification Form ("PNF") for the South Boston Hotel Project in accordance with the Article 80B Large Project Review requirements of the Boston Zoning Code ("Code"). The Project involves development for a new 156± room hotel (approximately 87,000 gross square feet in accordance with the Code) with separate tenant-leased restaurant and retail space on the ground floor, second-level terrace, rooftop bar and exterior pool deck/outdoor lounge, hotel fitness center, meeting rooms, and conference rooms and a screening room all at the project site located at the intersection of Broadway and Dorchester Avenue in the South Boston neighborhood ("Proposed Project"). Please see **Figures 1-1, 1-2,** and **1-3**. A Letter of Intent to File a Project Notification Form was filed with the Boston Redevelopment Authority for the proposed hotel project on May 25, 2013 (See **Appendix A**).

The Site is located at 6 West Broadway in South Boston within a highly commercialized area and is in the midst of a very active transportation node that includes a major MBTA Redline station at Broadway and Dorchester Avenue. In addition, the Fitzgerald Expressway (I-93) is located just to the west of the Site. Nearby uses include the Gillette Company complex to the north, as well as ground level commercial and retail uses along Dorchester Avenue and Broadway. A number of older brick buildings – many of them dating back to the 19th and early 20th century – are in the vicinity and they belie the significance of the South Boston community in the city's manufacturing history. The Site is also across from a residential complex that includes the Court Square Press development and the Macallen Building residences, which were also developed by the Proponent.

1.2 Proposed Project

1.2.1 Project Site and Surroundings

The Project Site, a highly commercialized area, is also in the midst of a very active transportation node. The Fitzgerald Expressway is just to the west of the Site and the Massachusetts Bay Transportation Authority's Red Line runs parallel to its northern boundary. The Broadway subway station is directly across from the Project Site at the West Broadway/Dorchester Avenue intersection. Surrounding uses include the Gillette complex to the north, as well as ground level commercial and retail uses along Dorchester Avenue and Broadway.

Figure 1-1.
Locus Map

Figure 1-2.
USGS Map

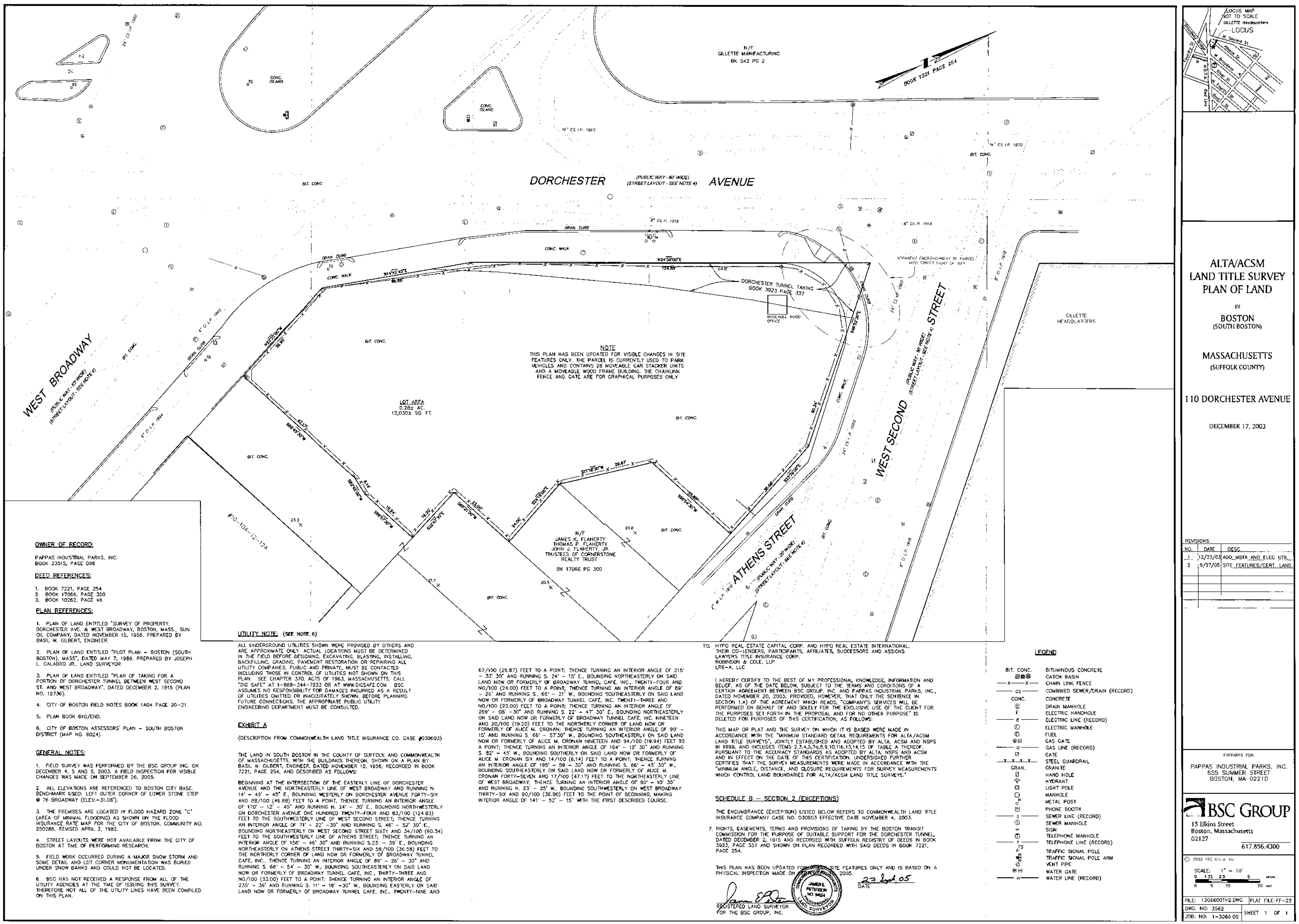


Figure 1-3.
Land Title Survey Plan

1.2.2 Detailed Project Description

The Proposed Project consists of the construction of approximately 87,000 gross square feet ("GSF") of hotel use (156± rooms) along with supporting uses including a separate tenant-leased restaurant and retail space on the ground floor; fitness center, meeting rooms, conference rooms, screening room, second level terrace, rooftop bar, and exterior pool deck/outdoor lounge.

The Site circulation plan is designed to create a safe and pleasant entry to the Proposed Project from Broadway with a porte- cochère front door drop off from Broadway. The access will include pedestrian amenities to strengthen the relationship between the Proposed Project and the Broadway MBTA station across West Broadway. Additional service vehicle access will be provided from West 2nd Street. Off-site parking is expected to be by arrangements with the Procter Gamble /Gillette Company's land within the vicinity of the site.

See below for approximate Project dimensions.

Table 1-1. Approximate Project Dimensions of Proposed Project

Lot Area:	0.28 +/- acres / 12,030 +/- square feet
Gross Building Footprint Area:	8,454 +/- square feet
Hotel Gross Square Feet:	87,000 +/- square feet
FAR:	7.22
Floors:	14
Height:	142 +/- feet

1.3 Summary of Project Impacts and Mitigation

1.3.1 Urban Design

The proposed South Boston Hotel is a fourteen-story hotel incorporating a total of 156± rooms. In addition to the guestrooms, the hotel includes tenant-leased restaurant and retail space, meeting rooms, film screening room, outdoor terrace, and rooftop pool and lounge. Located between West Broadway and West 2nd Street with its main facade along Dorchester Avenue, the hotel's massing negotiates between the small-scale buildings of South Boston and the larger urban context of Boston's Downtown Financial District. The Proponent has already made a number of presentations of the Proposed Project's conceptual design to the neighborhood and Boston Redevelopment Authority as it has continued to modify its schematic design plans.

1.3.2 Sustainable Design

The Proponent and the Project design team are committed to an integrated design approach and is using the LEED for New Construction 2009 rating system and intends to meet certification as presented in **Figure 3.5-35** in **Section 3.0.** This rating will meet or likely exceed Boston's Green Building standard. Significant green features of the Project include extensive alternative transportation initiatives, increased water and energy efficiency, recycled content and salvaged building materials, improved indoor air quality, and innovative design and operations strategies.

1.3.3 Pedestrian Wind Analysis

RWDI, the Project's wind engineer, provided a pedestrian wind assessment that is contained in **Appendix E.** The proposed building is sheltered from the northeast and southwest winds, but exposed to the prevailing northwest winds. The tower is designed on a podium, with building entrances under the tower overhang. As a result, the future wind conditions on and around the site will meet the effective gust criterion and suitable wind conditions are predicted at building entrances and sidewalks in general.

Conceptual wind control measures have been provided for the areas around the building entrances and tower corners, in order to enhance the wind conditions.

In the event of any significant changes to the design, construction or operation of the building or addition of surroundings in the future, the Project's wind engineer, could provide an assessment of their impact on the design considered in its full assessment.

1.3.4 Shadow Impact Analysis

VJAA, the Project's architects, prepared a shadow study to assess the potential shadow impacts of the Project on the surrounding area (see **Section 4.2**). Even with the proposed height extending to 14 floors, the Project's shadow impacts are generally not too extensive. New shadow is generally limited to the streets surrounding the Site with morning hour shadows extending to the Broadway Bridge. Although late afternoon and evening shadows will extend in an easterly/northeasterly direction toward the Procter Gamble/Gillette Buildings and to surface/open lots, most of these lots and areas are currently impacted by current shadow patterns from existing buildings. Overall, the Project's shadow impacts will be consistent with current patterns and will not adversely impact the Project Site and surroundings.

1.3.5 Daylight Analysis

VHB, the Project's daylight consultant, performed a daylight study to determine the extent to which the Project restricts the amount of daylight reaching streets or pedestrian ways in the immediate vicinity of the Project Site. An analysis of the obstruction of skyplane under the Existing and Build conditions is a requirement of the Article 80 Large Project Review (Section

80B-2(c) of the City of Boston Zoning Code). The daylight analysis was prepared using the BRA's Daylight Analysis Program (BRADA) and has been completed in accordance with the requirements of Article 80.

1.3.6 Air Quality Analysis

Tech Environmental, Inc., the Project's air quality consultant, conducted analyses to evaluate the existing air quality in the Project area, predict the worst-case air quality impacts from the Project's fuel combustion equipment and standby generator, and evaluate the potential impacts of Project-generated traffic on the air quality at the most congested local intersections (See **Section 4.4**).

Recent representative air quality measurements from the Massachusetts Department of Environmental Protection (DEP) monitors reveal that the existing air quality in the Project area is in compliance with Massachusetts and National Ambient Air Quality Standards (NAAQS) for all of the criteria air pollutants.

The worst-case air quality impacts from the Project's fuel combustion equipment and standby generator will not have an adverse impact on air quality. The maximum one-hour and eight-hour ambient CO impacts from the fuel combustion equipment and standby generator, at all locations around the Project site, including background CO concentrations, are predicted to be safely in compliance with the NAAQS for CO.

A microscale CO air quality analysis was conducted for the three intersections in the Project area that meet the Boston Redevelopment Authority (BRA)/DEP selection criteria. Three cases were analyzed: 2013 Existing, 2018 No-Build, and 2018 Build. The microscale air quality analysis indicates that the worst-case air quality impacts from motor vehicles operating at the two analyzed intersections will improve in 2018, for both the Build and No-Build cases, compared to the 2013 Existing case. The analysis shows that with mitigation the worst-case CO impacts for the 2008 Build case are lower than those predicted for the 2018 No-Build case and the worst-case impacts for all three cases are safely in compliance with the NAAQS for CO at all modeled receptors.

1.3.7 Noise Analysis

Tech Environmental, Inc., the Project's noise consultant, conducted a noise study to determine whether the operation of the proposed Project will comply with the Massachusetts DEP Noise Policy and City of Boston Noise Regulations (See **Section 4.5**).

This acoustical analysis involved five steps: (1) establishment of pre-construction ambient sound levels in the vicinity of the Site; (2) identification of potential major noise sources; (3) development of noise source terms based on manufacturer specifications (where available) and similar project designs; (4) conservative predictions of maximum sound level impacts at sensitive locations using industry standard acoustic methodology; and (5) the incorporation of mitigation measures to ensure compliance with applicable City of Boston noise regulations, ordinances and guidelines and with the DEP Noise Policy.

Nighttime ambient baseline sound level (L90) monitoring was conducted at two locations deemed to be representative of the nearby residential areas, during the time period when human activity is at a minimum and any future noise would be most noticeable. The lowest nighttime L90 measured in the Project area was 55 dBA.

The potential significant sources of exterior sound from the Project have been identified as:

- a 100-ton cooling tower;
- 13,000 cfm energy recovery unit (ERU);
- exhaust fans;
- rooftop return air units (RTUs); and
- a 300-kilowatt diesel-fired standby generator.

Noise Mitigation

The Proponent is committed to implementing the following sound level mitigation measures for the Project, as necessary, to comply with the applicable sound level limits:

- **Specification of low-noise mechanical equipment and silencers:** The ERU and RTUs will be of a low-noise design. The standby generator will be equipped with a critical exhaust silencer for sound reduction.
- **Acoustical shielding:** The 100-ton cooling tower will be partially enclosed with a 10-foot high L-shaped sound wall in order to meet the City of Boston Noise Ordinance octave band limits at the nearest residence at 21-22 West Broadway. The sound wall will be designed to meet a density of 5 lbs/sf. An alternative would be to replace the cooling tower with a low-noise chiller. The noise analysis is based on the cooling tower and L-shaped sound walls.
- **Operational restrictions:** The standby generator will only be operated when electrical service to the buildings is interrupted and for occasional brief daytime periods for the minimum acceptable amount of testing designated by the manufacturer.

With the mitigation outlined in this report, the South Boston Hotel project will not create a noise nuisance condition and will fully comply with the most stringent sound level limits set by the Massachusetts DEP Noise Policy, City of Boston Noise Regulations, and HUD's Residential Site Acceptability Standards.

1.3.8 Stormwater Management and Water Quality

The Proposed Project is expected to reduce the volume of stormwater runoff leaving the site as well as substantially improve the water quality (See **Section 4.6**). The project will meet the Department of Environmental Protection's (DEP) Stormwater Management Standards for redevelopment.

The volume of stormwater runoff leaving the site will be reduced as landscaped areas are proposed for the now completely impervious site. It is expected that rooftop runoff from the proposed building will be collected and conveyed to a subsurface infiltration system. The infiltration system will have an overflow tied into the combined sewer in Dorchester Avenue or West 2nd Street that will be used during large storm events. It is anticipated that the equivalent of 1 inch over the site's impervious area can be recharged as prescribed in BWSC's Site Plan Requirements.

Stormwater runoff will be treated through the use of deep sump catch basins and water quality treatment units. An operation and maintenance plan will be developed to support the long-term functionality of the proposed stormwater management system.

Erosion and sediment controls will be used during construction to protect adjacent properties, the municipal storm drain system and the on-site storm drain system. A pollution prevention plan, if required, will be prepared for use during construction including during demolition activity.

1.3.9 Geotechnical/Groundwater Impacts Analysis

It is anticipated that there will be little or no impact to the groundwater table due to the Proposed Project. Dewatering will be required inside the excavation to remove groundwater and surface water runoff or rainwater during excavation. The proposed construction is not anticipated to have adverse effects on long-term groundwater levels since the entire property has historically been capped. Any groundwater removed from the excavation will be discharged under a NPDES general or exclusion permit, if required. Construction mitigation measures will be incorporated into the Project to avoid the potential for ground movement and settlement during excavation, and potential impacts on adjacent buildings, utility lines and the roadways (See **Section 4.8**).

1.3.10 Construction Impacts Analysis

Section 4.9 describes impacts likely to result from the Proposed Project's construction and the steps that will be taken to avoid or minimize environmental and transportation-related impacts. The Proponent will employ a construction manager that will be responsible for developing a construction phasing and staging plan and for coordinating construction activities with all appropriate regulatory agencies. The Project's geotechnical consultant will provide consulting services associated with foundation design recommendations, prepare geotechnical specifications, and review the construction contractor's proposed procedures.

Construction is expected to commence in the fourth quarter 2013 and will require approximately 15 months to complete.

The Proponent will comply with applicable state and local regulations governing construction of the Project. The Proponent will require that the general contractor comply with the Construction Management Plan ("CMP") developed in consultation with and approved by the Boston Transportation Department ("BTD"), prior to the commencement of construction. The construction manager will be bound by the CMP, which will establish the guidelines for the duration of the Project and will include specific mitigation measures and staging plans to minimize impacts on abutters.

Most construction activities will be accommodated within the current site boundaries. Details of the overall construction schedule, working hours, number of construction workers, worker transportation and parking, number of construction vehicles, and routes will be addressed in detail in a Construction Management Plan to be filed with BTD in accordance with the City's transportation maintenance plan requirements. To minimize transportation impacts during the construction period, there will be limited construction worker parking on-site, carpooling will be encouraged, secure on-site spaces will be provided for workers' supplies and tools so they do not have to be brought to the site each day, and subsidies for MBTA passes will be considered. The Construction Management Plan to be executed with the City prior to commencement of construction will document all committed measures.

1.3.11 Historic Resources Component

According to files at the Massachusetts Historical Commission, there are no structures listed in the National or State Register of Historic Places, or the Inventory of Historical and Archaeological Assets of the Commonwealth on-site. It is not expected that the Project will cause adverse impacts on the historic or architectural elements of nearby historic resources outside the Project Site (see **Section 5.0**).

1.3.12 Infrastructure Systems Component

An infrastructure system's analysis (**Section 6.0**) was completed by Howard/Stein-Hudson Associates ("HSH"), the Project's Civil Engineer. The existing infrastructure surrounding the site appears sufficient to service the needs of the Proposed Project. This section describes the existing sewer, water, and drainage systems surrounding the site and explains how these systems will service the development. This analysis also discusses any anticipated Project-related impacts on the utilities and identifies mitigation measures to address these potential impacts.

1.3.13 Transportation Component

Section 7.0 presents the comprehensive transportation study completed by HSH for the proposed Project in conformance with the BTD Transportation Access Plan Guidelines (2001). The study analyzes existing conditions within the Project study area, as well as conditions forecast to be in place under the five-year planning horizon of 2018.

Vehicular access/egress will be provided by a porte-cochère that will intersect the easterly side of Dorchester Avenue and the southerly side of West 2nd Street. All vehicles entering and exiting the site will be served by either an on-site valet service or taxi service. Parking for valet service will be off-site and most likely in the area north and east of the Project site. The exact location, arrangement, and operations of valet activity and parking will be defined and codified in the Transportation Access Plan Agreement (TAPA).

The analysis employs mode use data for the area surrounding the Project site based on 2000 U.S. Census data and BTD data for Area 8, and identifies the number of trips generated by the Project. Based on published data, it is expected that 25 percent of the vehicular trips associated with the hotel use will be taxi trips. Due to the nature of the Project the guests of the hotel are generally not expected to travel to the site by personal vehicle. However, the trip generation estimates do account for some personal vehicle usage by the guests, providing a higher trip generation estimate and a more conservative traffic operations analysis than what will be expected for a hotel at this location.

The Project will add up to 1,260 vehicle trips on a daily basis, with 84 additional trips during the a.m. peak hour (56 entering/28 exiting) and 85 additional trips during the p.m. peak hour (39 entering/46 exiting) during the p.m. peak hour.

The Project will not provide parking on site. Parking for guests of the hotel and restaurant will be provided by an on-site valet service. An agreement between the Proponent and nearby landowners that can provide the parking supply for the valet service will be a requirement of the TAPA between the Proponent and BTD.

Loading and service operations will occur at an internal loading dock, with an access/egress curb cut provided along West 2nd Street, near the intersection with Athens Street. The loading dock will include one bay for single-unit trucks and smaller delivery vehicles. Vehicles will access the loading dock by traveling along West 2nd Street eastbound and backing into the bay. The location of the bay is ideally situated to limit the conflicts between vehicles and pedestrians and will allow vehicles to safely enter and exit the site.

The Proponent is committed to implementing a transportation demand management ("TDM") program that supports the City's efforts to reduce dependency on the automobile by encouraging alternatives to driving alone, especially during peak travel periods. Proposed measures include, but are not limited to, providing transit information (schedules, maps, and fare information) to guests and visitors and on-site bicycle storage, providing a guaranteed ride home program to employees, and providing a transit pass program to the employees. The Proponent will require the Hotel Operator to designate a full-time, on-site employee as the transportation coordinator for the site. The transportation coordinator will oversee all transportation issues including managing vehicular and valet operations, service and loading, valet parking, and TDM programs.

2.0 General Information

2.1 Applicant Information

2.1.1 Project Proponent

The Proponent is Sun Condos LLC.

2.1.2 Project Team

Project Name: South Boston Hotel	
Property Owner/Developer	**Sun Condos LLC** 655 Summer Street Boston, MA 02210 Tel: 617-330-9797 Timothy Pappas, tpappas@papent.com
Article 80 Permitting	**Mitchell L. Fischman Consulting LLC** 41 Brush Hill Road Newton, MA 02461 Tel : 781-760-1726 Mitchell Fischman, mitch.fischman@tetratech.com Margit Liander, liander.margit@gmail.com
Legal Counsel/Outreach	**McDermott, Quilty & Miller, LLP** 131 Oliver Street, 5th Floor Boston, MA 02210 Tel: 617-946-4600 Joseph Hanley, Esq., JHanley@mqmlip.com Eric Speed, Esq., ESpeed@mqmllp.com
Architect	**VJAArchitects, Inc. (VJAA)** 400 First Avenue North, Suite 410 Minneapolis, MN 55401 Tel: 612-872-6370 Vincent James, FAIA, vincent-james@vjaa.com Nathan Knutson, AIA, LEED AP, nathan-knutson@vjaa.com

Project Name: South Boston Hotel	
Landscape Architect	**Landworks-Studio, Inc.** 112 Shawmut Avenue, Studio 6B Boston, MA 02118 Tel: 617-426-3030 Mike Blier, mblier@landworks-studio.com Robyn Reed, RLA, rreed@landworks-studio.com
Transportation Planner/Engineer	**Howard/Stein-Hudson Associates, Inc.** 38 Chauncy Street, 9th Floor Boston, MA 02111 Tel: 617- 482-7080 Fax: 617- 482-7417 Guy Busa, P.E., gbusa@hshassoc.com Michael Santos, P.E., msantos@hshassoc.com
Civil Engineer	**Howard/Stein-Hudson Associates, Inc.** 38 Chauncy Street, 9th Floor Boston, MA 02111 Tel: 617- 482-7080 Fax: 617- 482-7417 Richard Latini, P.E., rlatini@hshassoc.com
Construction Manager	**Consigli Construction Co. Inc.** 72 Summer Street Milford, MA 01757 Tel: 508-458-0350 Dave Curry, LEED AP, DCurry@consigli.com James Hervol, JHervol@consigli.com
Wind Engineer	**Rowan Williams Davies & Irwin Inc.** 650 Woodlawn Road West Guelph, Ontario, Canada N1K 1B8 Tel: 519-823-1311 Hanging Wu, Ph.D, hanging.wu@rwdi.com Bill Smeaton, bill.smeaton@rwdi.com
Noise and Air Consultant	**Tech Environmental, Inc.** Hobbs Brook Office Park 303 Wyman Street, Suite 295 Waltham, MA 02451 Tel: 781-890-2220 Mark C. Wallace, QEP, MWallace@techenv.com

Project Name: South Boston Hotel	
Daylight Consultant	**Vanasse Hangen Brustlin, Inc.** 99 High Street 10th Floor Boston, MA 02110 Tel: 617-728-7777 Chris Gervais, cgervais@vhb.com
Construction Commencement	4th Quarter 2013 / 1st Quarter 2014
Construction Completion	1st Quarter 2015 / 2nd Quarter 2015
Status of Project Design	Schematic

2.1.3 Legal Information

Legal Judgments or Actions Pending Concerning the Proposed Project:

None.

History of Tax Arrears on Property Owned in Boston by the Applicant:

There is no current or past history of tax arrears on property owned by the Applicant.

Nature and Extent of Any and All Public Easements:

The Site is bounded by utility easements for sewer, electric, telephone and gas. Additionally, there are utilities that cross the Site.

2.2 Public Benefits

The Project will provide the following substantial benefits to the City and its residents:

- The hotel will complement and enhance a very active transportation node that includes the major MBTA Redline station at West Broadway and Dorchester Avenue, and the Fitzgerald Expressway (I-93) located just to the west of the Project Site;
- The nearby commercial and retail uses along Dorchester Avenue and West Broadway will be served by the hotel's tenant-leased restaurant and other hotel services;
- By replacing the surface parking lot, the Project will improve the view from the residential uses across Dorchester Avenue and West Broadway that includes Court Square Press, Macallen Building residences, and other nearby residential buildings.
- The pedestrian landscape and experience will be enhanced with street trees and other streetscape amenities;
- The hotel serves as an example of sustainable and environmentally responsible construction and development; and
- The project will create new construction jobs over a 15 month period.

2.3 Regulatory Controls and Permits

The Project is located within the Neighborhood Shopping Subdistrict (NS) of the Saint Vincent Neighborhood District (Article 57) as defined by the Boston Zoning Code. After conducting preliminary community outreach with neighbors and abutters of the Property, the Applicant recently filed a permit application with the City of Boston Inspectional Services Department ("ISD"). The Project will require variance, dimensional relief and potential conditional use permits from the City of Boston Board of Appeal (the "Board") for certain use, dimensional, parking, and other violations. Following receipt of refusal letters from ISD on the Applicant's Permit Application, needed appeals will be filed with the Board.

2.3.1 Boston Zoning Code – Use Requirements

The Project includes a number of principal uses including Hotel, Restaurant with Live Entertainment and Takeout and a ground floor Retail space. The Hotel use is forbidden within the NS Subdistrict and will require a variance from the Board for the principal use as well as certain accessory uses detailed above. Restaurant with Live Entertainment operating past 10:30 PM is a forbidden use as well and will require a variance and the Takeout use will be allowed as-of-right if the space does not exceed 2,500 square feet and is conditional above this square footage threshold. The ground floor Retail space is aan allowed use for a Local Retail category store.

2.3.2 Boston Zoning Code – Dimensional Requirements

Table 1-2 below summarizes the dimensional requirements in the Saint Vincent Neighborhood District, as set forth in Tables D of Article 57 of the Boston Zoning Code, and compares the requirements to the dimensions for the Proposed Project. Dimensional variances will be sought for: Maximum Floor Area Ratio, Maximum Building Height, Usable Open Space and Rear Yard Insufficient.

For a project that is subject to Large Project Review, required off-street parking spaces and off-street loading facilities are expected to be determined as a part of the Large Project Review in accordance with the provisions of Article 80 of the Boston Zoning Code. Design elements of the Project will also be reviewed pursuant to Large Project Review.

Table 1-2. South Boston Hotel (6 West Broadway): Dimensional Requirements

Dimensional Element	NS Subdistrict	Proposed Project[1]
Maximum Floor Area Ratio	1.0	7.22
Maximum Building Height	35'-0"	142 +/- Feet (14-Floors)
Minimum Lot Size	None	0.28 Acres (12,030 SF)
Minimum Lot Width	None	N/A
Minimum Lot Area Per Dwelling Unit	None	N/A
Minimum Lot Area Per Dwelling Unit	None	N/A
Minimum Lot Frontage	None	N/A
Minimum Usable Open Space (Square Feet Per Dwelling Unit)	50 sf/unit	N/A
Minimum Front Yard	(Align with Existing Abutters per §57-23.1)	At Property Line
Minimum Side Yard	None	At Property Line
Minimum Rear Yard	20'	At Property Line

1. The dimensions described in this above table may change as the Proposed Project undergoes design review with the BRA.

N/A = Not Available or Not Applicable

2.3.3 Preliminary List of Permits or Other Approvals Which May be Sought

Agency Name	Permit or Action*
Federal Agencies	
Federal Aviation Administration	Determination of No Hazard to Navigation (Crane Determination To Be Made if over 200 feet)
U.S. Environmental Protection Agency	Notice of Intent for EPA Construction Activities General Discharge Permit with associated SWPPP, If Required
State Agencies	
MA Department of Environmental Protection, Division of Water Pollution Control	Sewer Connection Self Certification
MA Department of Environmental Protection, Division of Air Quality Control	Fossil Fuel Permit, If Required
Local Agencies	
Boston Redevelopment Authority	Article 80 Review and Execution of Related Agreements
Boston Transportation Department	Transportation Access Plan Agreement; Construction Management Plan
Boston Department of Public Works Public Improvements Commission	Street/Sidewalk Repair Plan; Curb-Cut Permit; Street/Sidewalk Occupancy Permit; Earth Retention System Plan
Boston Zoning Board of Appeal	Variances / Conditional Use Permits, as Required
Boston Air Pollution Control Commission	Application for Exempt Spaces, If Required
Boston Public Safety Commission Committee on Licenses	Permit for Storage of Fuel in (Emergency Storage) Tanks, If Required
Boston Fire Department	Approval of Fire Safety Equipment
Boston Water and Sewer Commission	Approval for Sewer and Water and Connections; Construction Site Dewatering; and Storm Drainage
Boston Department of Inspectional Services	Building Permits; Certificates of Occupancy; Other Construction-Related Permits

*This is a preliminary list based on project information currently available. It is possible that not all of these permits or actions will be required, or that additional permits may be needed.

2.4 Public Review Process and Agency Coordination

Preliminary plans for the Proposed Project have been presented at an initial community meeting hosted by the West Broadway Neighborhood Association (the immediate neighborhood interest group), and at individual meetings with local elected officials and the key leadership of the nearby St. Vincent/Lower End Political Action Committee.

The Proponent has also discussed the Proposed Project with representatives of the Boston Redevelopment Authority ("BRA") prior to filing this Project Notification Form in order to identify issues/concerns as well as design requirements related to the Project.

In accordance with Article 80 requirements, an Impact Advisory Committee ("IAG") has been formed and neighborhood meeting will be scheduled to review the PNF and receive community comments on the Project during the PNF public review period.

The Proponent will continue to meet with public agencies, neighborhood representatives, local business organizations, abutting property owners, and other interested parties, and will follow the requirements of Article 80 pertaining to the public review process.

2.5 Development Impact Payment ("DIP") Status

Based on current schematic design plans, it is not anticipated that Development Impact Payments ("DIP"), in accordance with Article 80B-7 of the Code, will be required as the Proposed Project is expected to have approximately 87,000 gross FAR square feet, and be below the 100,000 gsf threshold where DIP is required.

3.0 URBAN DESIGN AND SUSTAINABILITY COMPONENT

3.1 Urban Design Overview

Playing a pivotal role in the continued urban revitalization of South Boston, the design of the South Boston Hotel requires an innovative design that is also financially feasible. Occupying a transitional site that mediates between I-93, an older residential fabric, and an industrial zone, the building's design is required to negotiate different scales and urban configurations. To the north and south, the hotel faces the Procter Gamble/Gillette manufacturing facility and the Broadway MBTA Redline station. To the west, the hotel faces I-93, the Downtown Financial District, and the Broadway Bridge entrance into South Boston. To the east, it faces the South Boston residential neighborhood.

The building design addresses multiple scales and the different edge conditions of the surrounding neighborhood context, different ways of reacting to public space, and accompanying material and façade articulations to reinforce the scales of these interactions. On the west side of the tower mass, the building responds with a building face composed of brick and glass surfaces that provides expansive views of the Boston skyline and an innovative, yet refined, façade which serves to greet those entering South Boston from the Broadway Bridge. The inflected surfaces of the west facade align with Procter Gamble/Gillette building to the north and bend slightly to respond to the street edge on the east side of Dorchester Avenue to the south of the hotel site. The textured and articulated brick, glass, and metal surface extend to the narrower north and south facades. On the east elevation, the materials will be maintained, providing a consistent yet varied surface of further visual interest on the inner block elevation of the hotel. Reflecting the pedestrian scale, the lower street frontage extends the concept of the storefront and pedestrian scale elements on the prominent west facade.

In order to maximize ceiling heights, large windows, and open floor plans, the economic ramifications of various structural systems were assessed in close collaboration with contractors and consultant members of the team. This effort resulted in a straightforward, post-tension concrete structural system. Given the slender proportion of the hotel, the floors span between only two rows of columns, allowing flexibility on the lower, more public levels. The mechanical solution avoids ventilation louvers on the exterior facades and the plumbing stacks are aligned vertically addressing the necessary economy and efficiency of this building type. The efficiency of the building design not only provides a larger budget for interesting architectural elements, but also sets aside funds for addressing sustainable design within the building.

The Urban Design and Sustainability figures, including the 2009 LEED Checklist, are included at the end of this section (**Figures 3.5-1** thru **3.5-34**)

3.2 Building Design

The proposed South Boston Hotel is a fourteen-story building incorporating a total of 156± hotel rooms. In addition to the guestroom floors, the building includes tenant-operated restaurant spaces, meeting rooms, screening room, outdoor terrace, and rooftop pool and lounge. Located between Broadway and 2nd Street, with its main facade along Dorchester Avenue facing the Broadway Bridge, the South Boston Hotel's massing negotiates between the small-scale buildings of South Boston and the larger urban context of the financial district. The Proponent has already made a number of presentations of the Project's conceptual design to the neighborhood and BRA as part of the refinements for its schematic design drawings.

The porte- cochère driveway entrance to the hotel mitigates further vehicle congestion where Dorchester Avenue narrows from four lanes to two lanes. The tall, open entrance will be landscaped to create a pleasant environment for guests and an attractive feature for pedestrians in the neighborhood. The ground surface and ceiling materials will extend through to the interior of the hotel lobby and restaurant space. The vehicle entrance and the two pedestrian entrances will help to animate the street level area with arrivals/departures of guests and visitors to the corner of Dorchester Avenue and West Broadway. Street trees and crosswalks also add to the pedestrian-friendly nature of the interior driveway. The loading dock is located on Athens Street and will provide for full interior access for delivery and other service vehicles.

The urban terrace is sited above the restaurant space and overlooks the corner of Dorchester and West Broadway. The landscape design of this area, to include thoughtfully calibrated planting densities, elevation transitions and carefully situated garden furniture, adds to the aesthetic experience of guests and neighborhood views, and establishes a gradient of privacy with regard to use. This urban terrace will be visible from the streets surrounding the hotel and will add a pocket of green for the surrounding neighborhood. Conference rooms and a film screening room will have direct access to the elevated urban terrace and garden. The rooftop pool and lounge will provide an exciting view of the Boston skyline for guests and an additional amenity for the neighborhood.

The Project Proponent is committed to adopting materials that are consistent with the surrounding context. The Dorchester Avenue elevation has been designed to match the height and scale of other buildings in the surrounding streetscape. The use of brick, potentially glazed white, as the primary building material, is in harmony with traditional building materials of the surrounding neighborhood. Further, rooftop decks for guests and neighbors of the building will provide a unique amenity among the roofscapes of the neighborhood. The Dorchester Avenue elevation will incorporate a more open enclosure to the street, with the remaining hotel mass providing a textural weave of large window openings and brick.

3.3 Sustainable Design/Energy Conservation

3.3.1 Introduction

Sustainability informs every design decision. Enduring and efficient buildings conserve embodied energy and preserve natural resources. The South Boston Hotel embraces the opportunity to positively influence the urban environment. Its urban location takes advantage of existing infrastructure while convenient access to mass transportation will reduce dependence on single occupant vehicle trips and minimize transportation impacts.

The Proponent and the Project design team are committed to an integrated design approach and is using the LEED for New Construction 2009 rating system and intends to meet certification as presented in **Figure 3.5-34** at the end of this section. This rating will meet or exceed Boston's Green Building standard. The LEED rating system tracks the sustainable features of the project by achieving points in following categories: Sustainable Sites; Water Efficiency; Energy and Atmosphere; Materials and Resources; Indoor Environmental Quality; and Innovation and Design Process.

3.3.2 Sustainable Sites

The development of sustainable sites is at the core of sustainable design. The sustainable sites credit category encourages development on previously developed land, minimizing a building's impact on ecosystems and waterways, regionally appropriate landscaping, smart transportation choices, stormwater runoff management, and reduction of erosion, light pollution, heat island effect, and pollution related to construction and site maintenance.

The previously developed site features connectivity to basic services in the community and is located in an urban setting that is well served by the existing utility infrastructure. The site's adjacency to basic services in the community and the development density of its urban context enable the project to satisfy available approaches to the Development Density and Community Connectivity credit. Access to the MBTA Redline and on-site bike storage/rental will offer hotel guests environmentally sound transportation alternatives. Coupled with alternative parking options, the Project will significantly reduce parking capacity below zoning requirements. Through these approaches, the Project also achieves many of the Alternative Transportation credits.

The planted, green roof system and the private gardens interspersed on the ground, terrace, and rooftop levels help to limit stormwater runoff to assist in meeting Stormwater Design- Quantity credit. To achieve Heat Island Effect credits and minimize the project's impact on the creation of urban heat islands, a combination of high-albedo roofing membrane and planted areas to maximize solar reflectance and minimize heat gain. The planted roof areas are located adjacent to rooftop terrace spaces that also serve as an amenity to occupants.

3.3.3 Water Efficiency

Buildings are major users of our potable water supply and conservation of water preserves a natural resource while reducing the amount of energy and chemicals used for sewage treatment. The goal of the Water Efficiency credit category is to encourage smarter use of water, inside and out. Water reduction is typically achieved through more efficient appliances, fixtures and fittings inside and water-wise landscaping outside. To satisfy the requirements of the Water Use Reduction Prerequisite and credit, the project will incorporate water conservation strategies that include low flow plumbing fixtures for water closets and faucets. Further, drought tolerant plant species will be specified in landscaped areas to eliminate the requirement for irrigation in most areas and satisfy the requirements for the Water Efficient Landscaping credit.

3.3.4 Energy and Atmosphere

According to the U.S. Department of Energy, buildings use 39% of the energy and 74% of the electricity produced each year in the United States. The Energy and Atmosphere credit category encourages a wide variety of energy strategies: commissioning; energy use monitoring; efficient design and construction; efficient appliances, systems and lighting; the use of renewable and clean sources of energy, generated on-site or off-site; and other innovative practices.

To meet the Optimize Energy Performance credit, the building envelope will include high performance glazing systems and insulated, brick cavity wall systems. The HVAC system will incorporate a multi variable refrigerant volume (VRV) split HVAC system, which utilizes energy recovery units and VRV heat pumps to maximize the building's energy performance. In addition, the large amount of glass used in each building reduces the daytime requirement for electrical lighting. LED, halogen or fluorescent bulbs are used in light fixtures throughout the property. These lights use much less energy, generate less heat and last much longer than incandescent bulbs. The Project is considering geothermal heat pumps using the Fort Point Channel (which Gillette uses).

The Project will meet or exceed the ASHRAE 90.1-2007 standard for Minimum Energy Performance through a variety of measures. Further, no chlorofluorocarbon (CFC) based refrigerants will be used in the project to reduce ozone depletion in the atmosphere and satisfy the Fundamental Refrigeration Management prerequisite. Fundamental Commissioning of Building Energy Systems will be performed to ensure that systems are operating at peak efficiency. In addition, Enhanced Commissioning will assess the performance of energy and water systems during the first days of building operation and can help to bring additional efficiency to the systems for the life of the building.

3.3.5 *Materials and Resources*

During both construction and operations, buildings generate a lot of waste and use a lot of materials and resources. This credit category encourages the selection of sustainable materials, including those that are harvested and manufactured locally, contain high-recycled content, and are rapidly renewable. It also promotes the reduction of waste through building and material reuse, construction waste management, and ongoing recycling programs.

The project includes recycling facilities within the building for the convenience of the occupants in accordance with the requirements of the Storage and Collection of Recyclables prerequisite. A Demolition and Construction Waste Management Plan will be implemented to divert construction waste material from landfills per the Construction Waste Management credit. Building materials will be specified based on their recycled content and proximity of extraction and manufacturing locations to the project site such that points will be achieved in each of the Recycled Content and Regional Materials credits.

3.3.6 *Indoor Environmental Quality*

The U.S. Environmental Protection Agency estimates that Americans spend about 90% of their day indoors, where the air quality can be significantly worse than outside. The Indoor Environmental Quality credit category promotes strategies that can improve indoor air through low emitting materials selection and increased ventilation. It also promotes access to natural daylight and views.

During construction, an indoor air quality management plan will be implemented to prevent contamination of mechanical systems and absorptive materials. Material specifications will include only low-emitting interior finishes for paints, carpets, and woods to preserve indoor air quality. Occupants will also have control over lighting and their thermal environment. The project shall be designed to meet or exceed the rates as per ASHRAE 62.1-2007 “Ventilation for Acceptable Indoor Air Quality” and rooms will have access to daylight and views.

3.3.7 *Innovation and Design Process*

The Innovation in Design and Innovation in Operations credit categories provide additional points for projects that use new and innovative technologies, achieve performance well beyond what is required by LEED credits, or utilize green building strategies that are not specifically addressed elsewhere in LEED. This credit category also rewards projects for including a LEED Accredited Professional on the team to ensure a holistic, integrated approach to design, construction, operations and maintenance. Four credits are being pursued and could include the following.

Training for staff in order for them to be able to implement the hotel’s sustainable practices effectively and understand them well enough to answer any guest questions. A series of strategically designed displays as well as regular building tours will educate guests about the hotel's environmental attributes.

Given the cost of hotel operation, operating strategies from LEED for Existing Buildings: Operations & Maintenance are being analyzed for incorporation into Innovation in Design credits. Sustainable operating practices include sustainable purchasing, an integrated pest management and landscape management program, and a green housekeeping program. These strategies limit the ongoing impact the hotel has on the environment. Sourcing of green cleaning products and reductions in the amount of fertilizers, fungicides, and pesticides used on the property minimize the exposure of guests, staff, and the local habitat to harsh chemicals. Environmentally Preferable Purchasing reduces environmental impact from the hotel's vendors and suppliers.

Increasing the cycles of concentration for water circulated through cooling tower units greatly reduces the amount of makeup water needed to replace water lost through evaporation, drift, and blowdown, so innovative cooling tower designs are being considered. Cycles of concentration could be increased by using acid injection to control the water's pH level occurring with additional cycles of concentration. Decreasing the system blowdown could result in a direct reduction in water usage. Additionally, less blowdown water is discharged to treatment, an economic and environmental benefit.

The Project will seek to use a "setback" switch to turn off all power in each room when occupants are not inside. This is a common feature in European hotel rooms and is gaining traction in the United States. This system essentially places a "master" electrical switch by the front door to each room and requires the occupant to place a room key into the switch slot to activate the electricity. When the occupant departs, the key is removed and power is shut off. The practice of turning off the power prevents a hotel guest from excessively heating or cooling the room during unoccupied periods.

3.4 Landscape Design

The proposed landscape for the South Boston Hotel addresses three scales of the urban landscape: the street and public realm at the Hotel entry, a garden at the Hotel's third floor break-out space, and a pool terrace for the Hotel's visitors and nearby neighbors. Vertically displaced into three layers, the scale, program, and materiality of each is determined by its particular adjacent condition.

The street landscape creates a unified and cohesive space that responds to the scale and activity along the Dorchester Avenue corridor and the Broadway Street Bridge. Through tree planting, lighting, vertical screens, and a composition of paving materials, scale and structure are given to the sidewalk to help define vehicular and pedestrian areas. The landscape proposed here creates a unified and cohesive space that emphasizes the indoor-outdoor connectivity between the streetscape and the hotel interior. By using a consistent pavement treatment both inside and out, the consistency of the ground plane serves to blur the boundaries of the entry area with the interior, so as to minimize the transition from the public realm into the semi-private one.

Proposed Princeton Elm trees along Dorchester Avenue help reinforce the street wall and provide a new stretch of shaded sidewalk for the neighborhood. At the southern and northern ends of the site, groves of Birch trees provide a more domestic feel and scale to the project. These trees also echo the existing Birch groves at the nearby Court Square Press Building on the other side of Dorchester Avenue, further creating a sense of cohesiveness for neighborhood. A third key element at the street level is a series of scrim-like vertical screens that run parallel to Dorchester Avenue. With fasteners that disappear into the soffit above and the pavement below, the scrims emphasize the connection between the ground plane and the ceiling. Through subtle lighting and planted vines, the screens act both as features and sculptural elements. Placed strategically both inside and out, the screens help extend the sense of landscape into the building interior. By directing surface run-off towards the bases of the exterior screens, these elements also play a role in helping to infiltrate stormwater.

Upstairs at the third floor, an urban garden terrace is proposed for the indoor/outdoor breakout space. Envisioned as a verdant space, the landscape extends from the interior, across the ground plane, and onto the vertical walls surrounding the space. Landscape elements such as vines, groundcovers, and grasses or small shrubs will be employed to create a lush environment while helping to provide visual screening from the adjacent mechanical systems. Ambient lighting and carefully placed planters will serve to break down the space and create a sense of intimacy.

The roof terrace landscape proposes a contemporary, sophisticated urban pool terrace, designed as an amenity for hotel guests, visitors, and local residents alike. A key feature of this terrace landscape is a pool at the southern corner of the space. By day the pool will provide opportunities for recreation and lounging, while by night it will bring a subtle glow to the terrace. Potential heating elements such as non-combustible fire features and heating lamps will help to extend the indoor/outdoor experience into the shoulder seasons. Eco-friendly materials such as composite lumber and light-colored concrete pavers will help define the space and will relate back into the building through a consistent ground plane, while helping to reduce the heat island effect.

While varied in texture and form, each of the three distinct landscapes at the South Boston Hotel allows for individually scaled and crafted spaces to respond articulately to their immediate adjacencies, creating varied and interesting places to be, while also providing a cohesive urban landscape.

3.5 Urban Design Drawings

Urban design drawings and renderings depicting the Project include:

Figure 3.5-1: Site Context Plan – Existing Condition
Figure 3.5-2: Site Context Plan – Proposed Condition
Figure 3.5-3: Site Photos – Existing Conditions
Figure 3.5-4: Site Photos – Existing Conditions
Figure 3.5-5: Ground Level – Illustrative Landscape Plan
Figure 3.5-6: Ground Level Perspectives – Proposed Condition
Figure 3.5-7: Ground Floor Paving Plan – Proposed Condition
Figure 3.5-8: Restaurant Terrace Landscape Plan – Proposed Condition
Figure 3.5-9: Pool Terrace Landscape Plan – Proposed Condition
Figure 3.5-10: Ground Floor Plan
Figure 3.5-11: Second Level Floor Plan
Figure 3.5-12: Third Level Floor Plan
Figure 3.5-13: Guestroom Level Floor Plan (4 thru 12)
Figure 3.5-14: Guestroom Level Floor Plan (13)
Figure 3.5-15: Roof Level Floor Plan (14)
Figure 3.5-16: Aerial Perspective from Southwest
Figure 3.5-17: Aerial Perspective from Northwest
Figure 3.5-18: Aerial Perspective from Southeast
Figure 3.5-19: Aerial Perspective from Northeast
Figure 3.5-20: West Elevation (Dorchester Avenue)
Figure 3.5-21: South Elevation (West Broadway)
Figure 3.5-22: East Elevation
Figure 3.5-23: North Elevation (West Second Street)
Figure 3.5-24: Building Section - North to South
Figure 3.5-25: Building Section - West to East
Figure 3.5-26: Project Rendering – Materials
Figure 3.5-27: Project Rendering – View from West
Figure 3.5-28: Project Rendering – View of Street Level Restaurant and Urban Terrace
Figure 3.5-29: Project Rendering – View of Skydeck Pool and Lounge
Figure 3.5-30: LEED 2009 Checklist for New Construction and Major Renovations

Figure 3.5 - 1
Site Context Plan - Existing Conditions

Figure 3.5 - 2
Site Context Plan - Proposed Conditions

View south from corner of Dorchester Avenue and West Broadway

View west from West Broadway

Figure 3.5 - 3
Site Photos - Existing Conditions

View east from Broadway Bridge

View of site toward north from corner of Dorchester Avenue and West Broadway

Figure 3.5 - 4
Site Photos - Existing Conditions

Figure 3.5 - 5
Ground Level - Illustrative Landscape Plan

Figure 3.5 - 6
Ground Level Perspectives - Proposed Condition

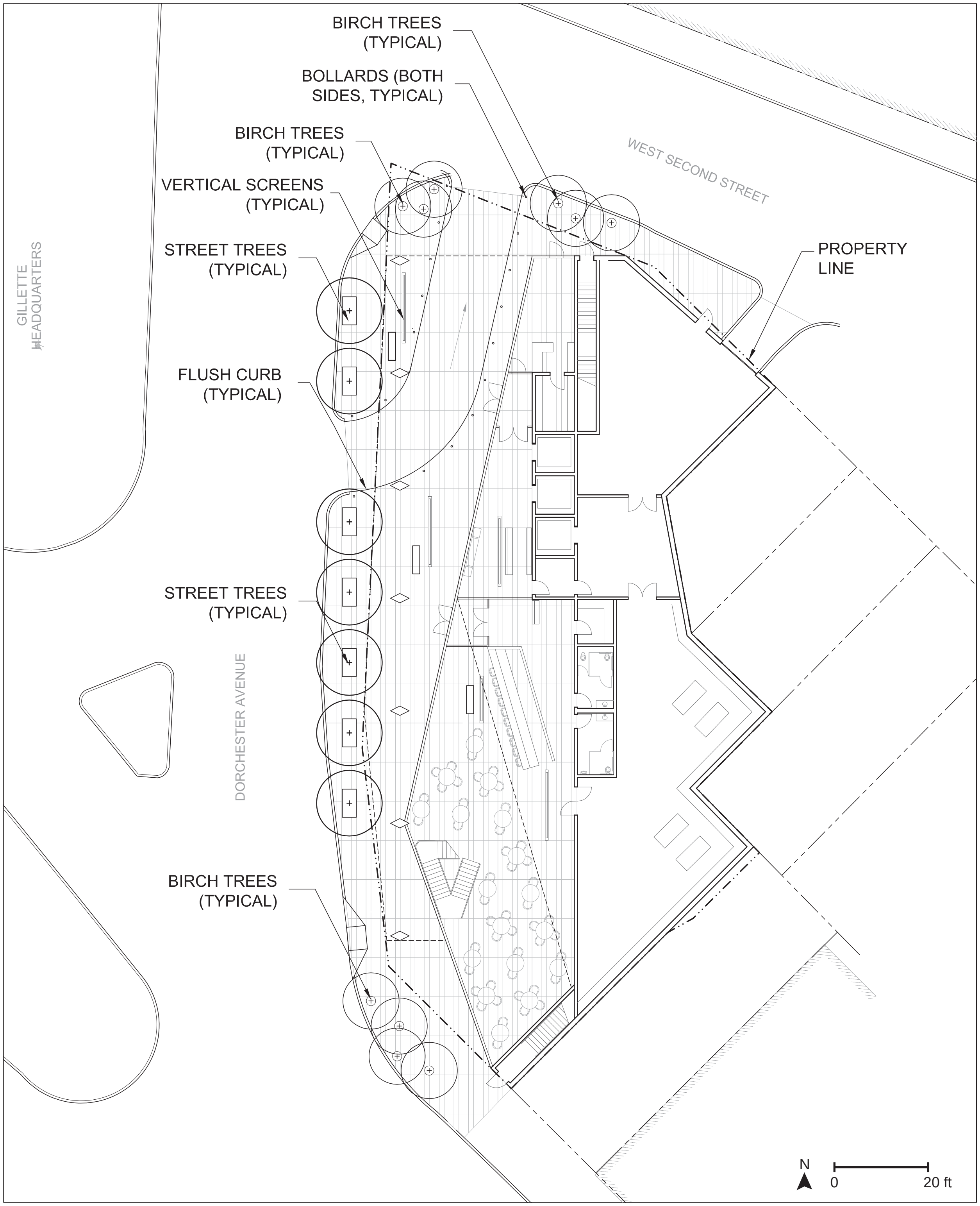


Figure 3.5 - 7
Ground Floor Paving Plan - Proposed Condition

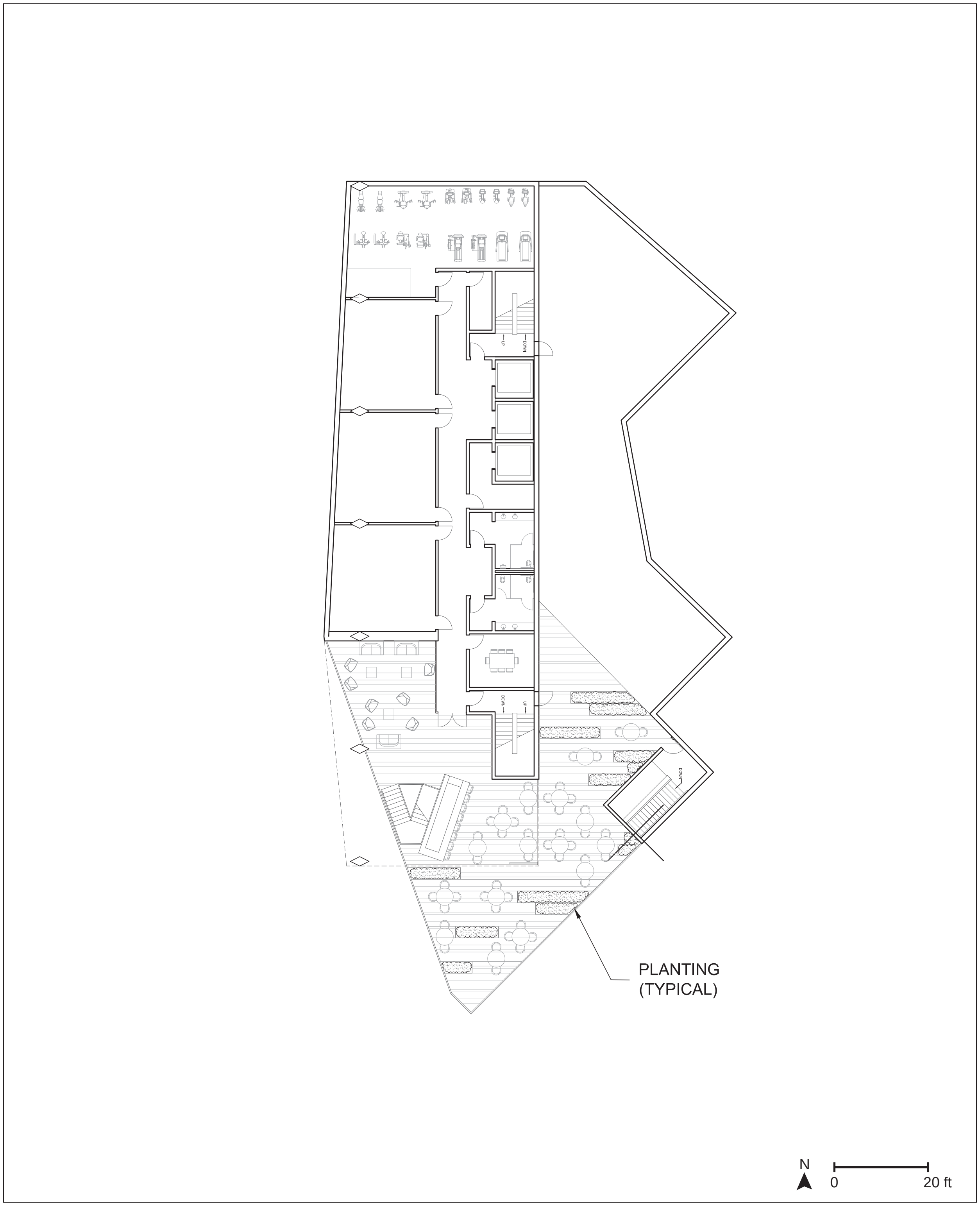


Figure 3.5 - 8
Restaurant Terrace Landscape Plan - Proposed Condition

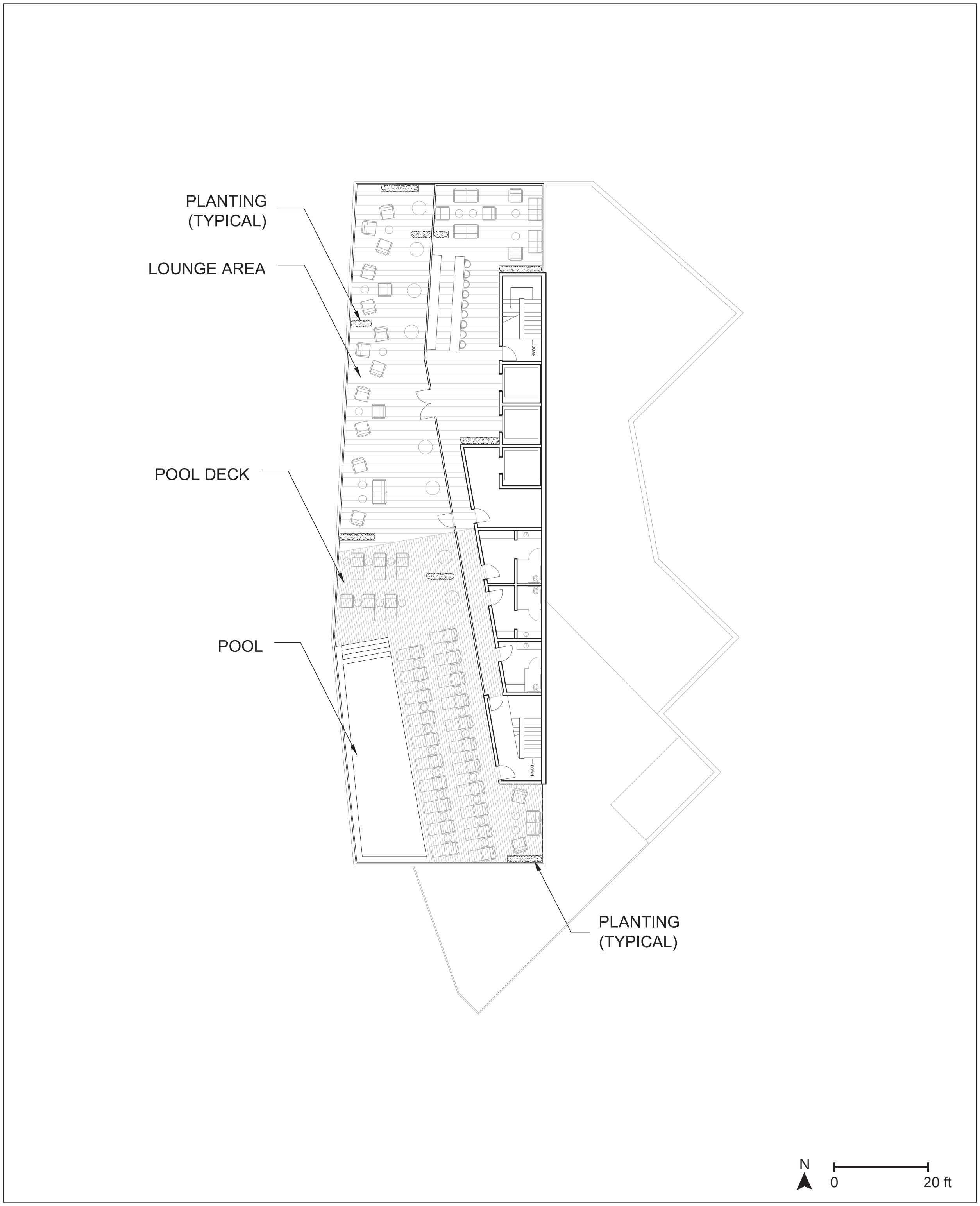


Figure 3.5 - 9
Pool Terrace Landscape Plan - Proposed Condition

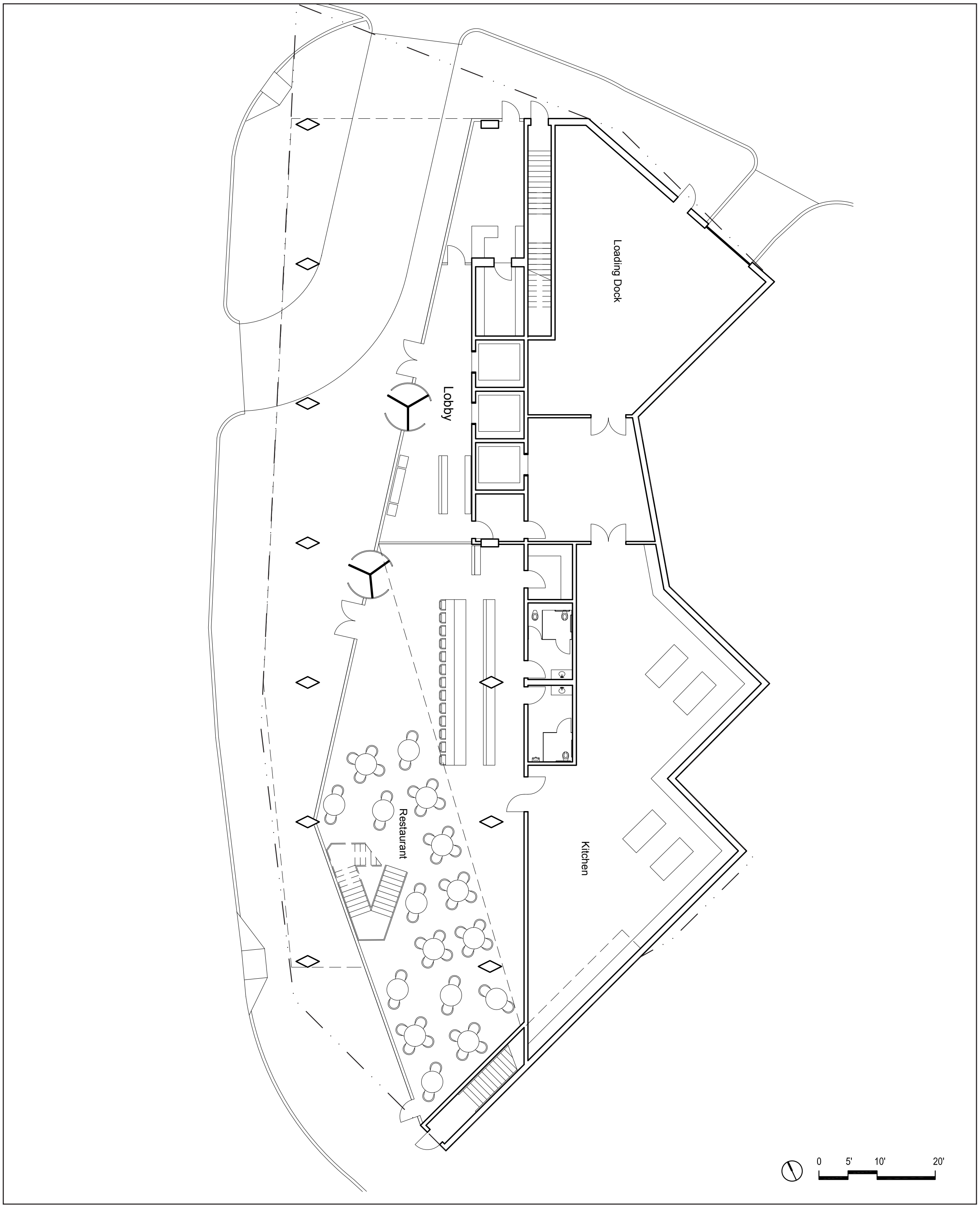


Figure 3.5 - 10
Ground Level Floor Plan

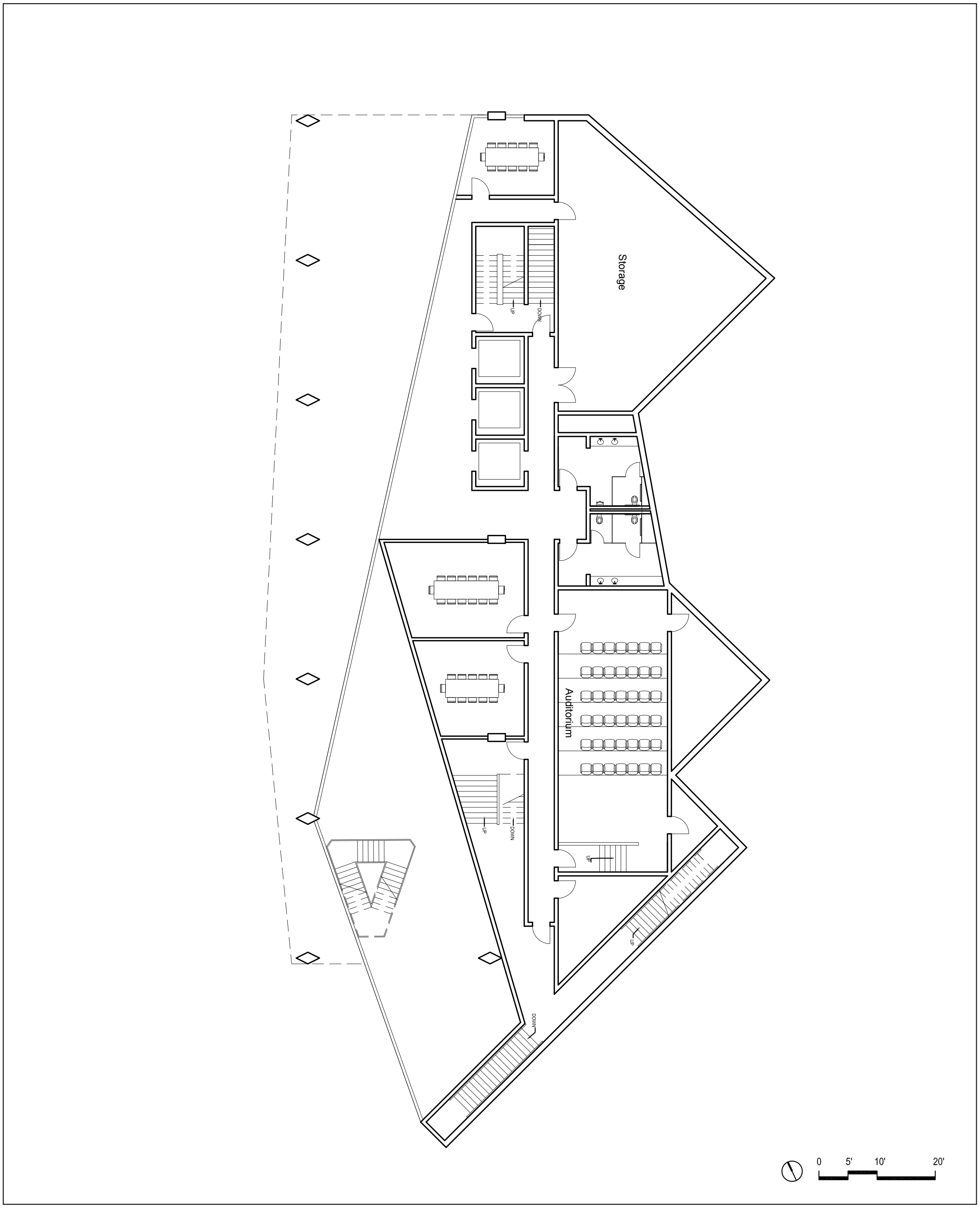


Figure 3.5 - 11
Second Level Floor Plan

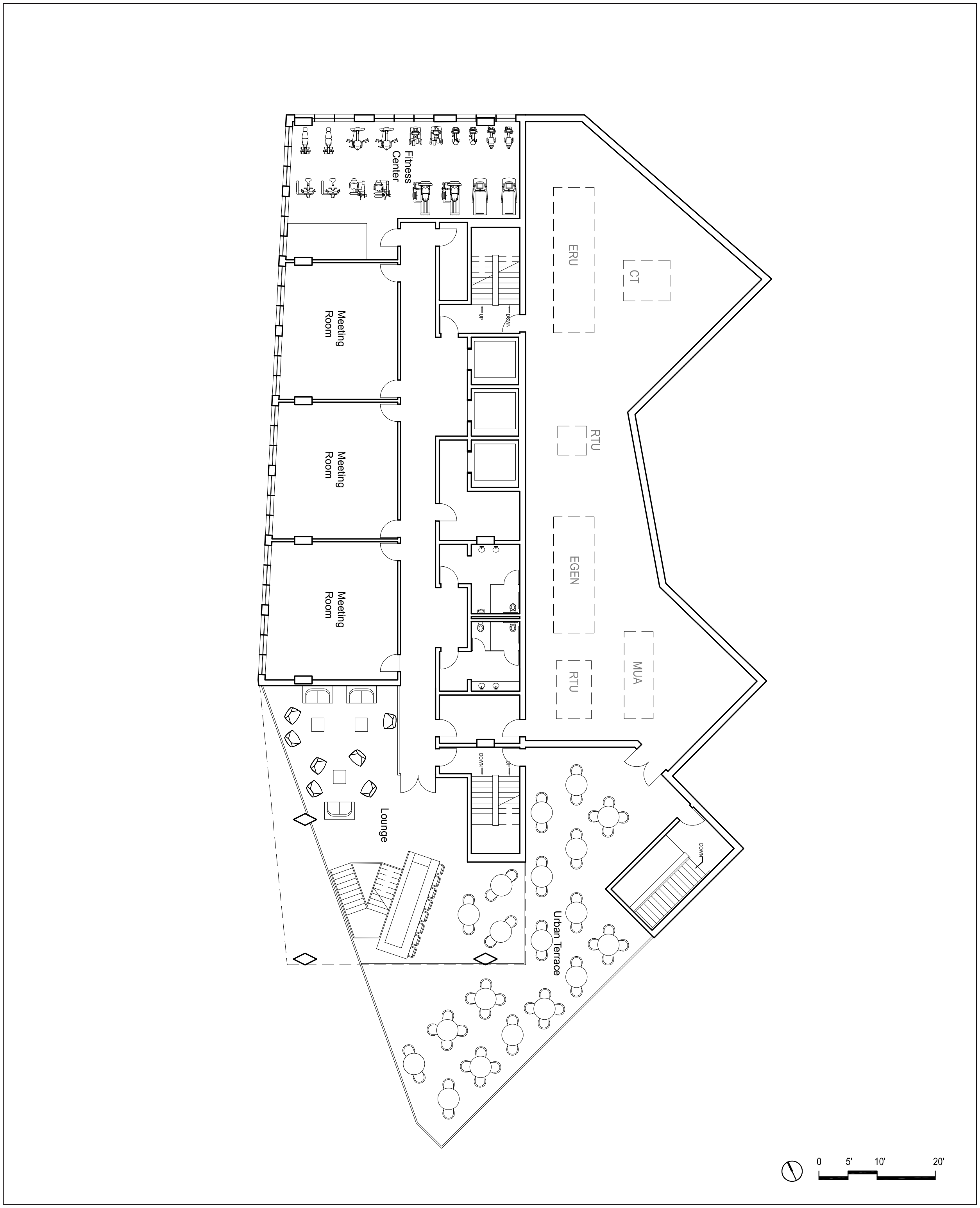


Figure 3.5 - 12
Third Level Floor Plan

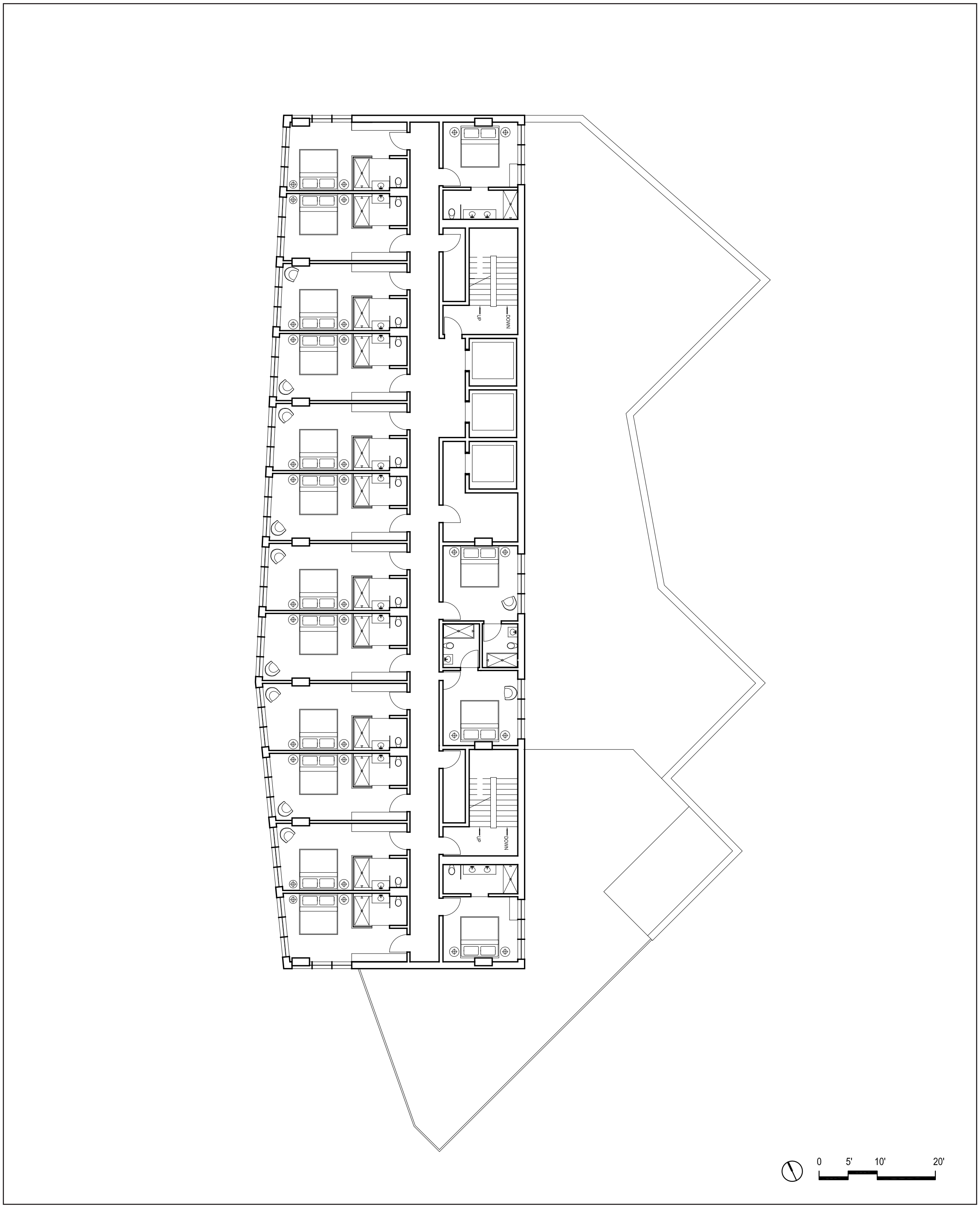


Figure 3.5 - 13
Guestroom Level Floor Plan (4 thru 12)

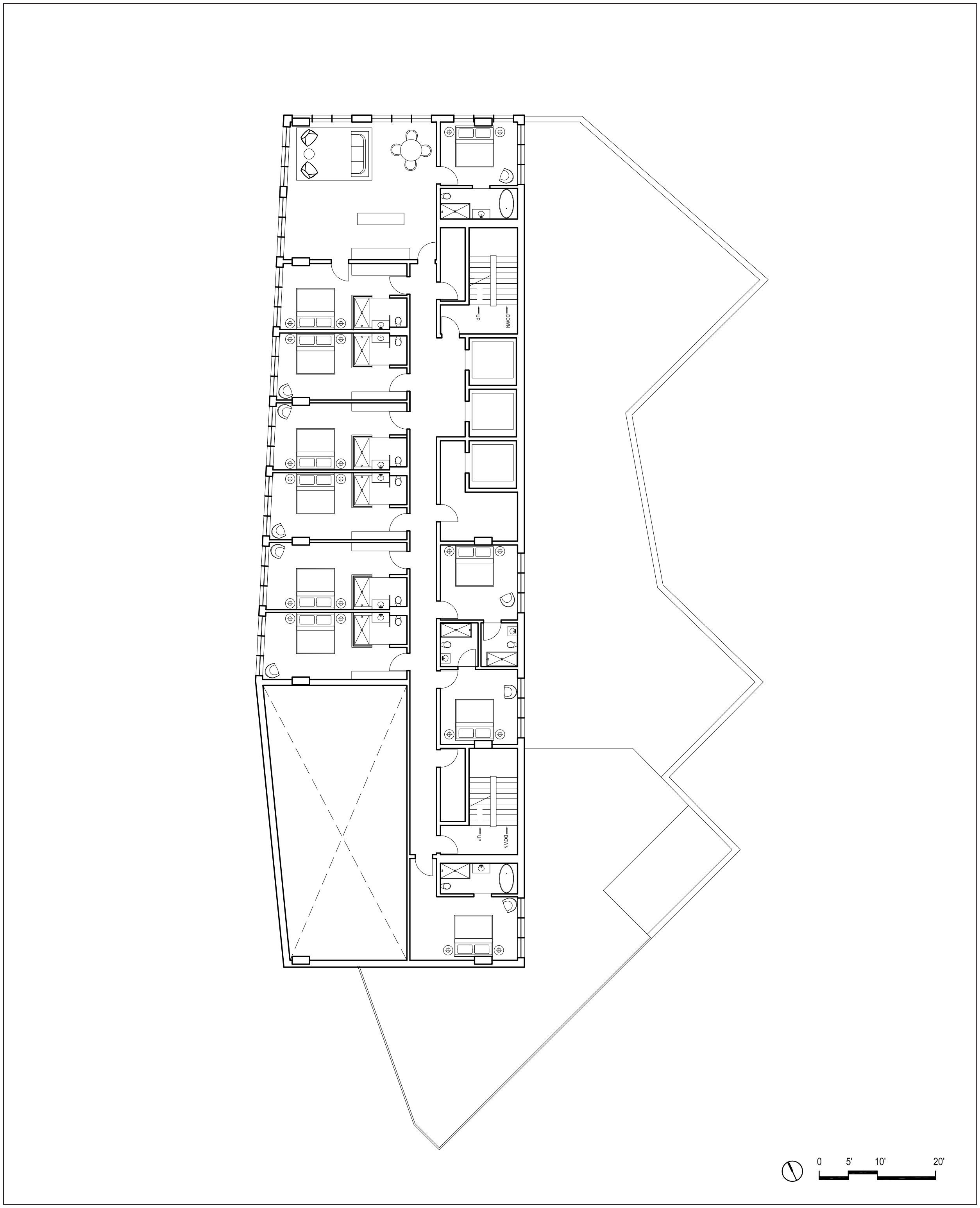


Figure 3.5 - 14
Guestroom Level Floor Plan (13)

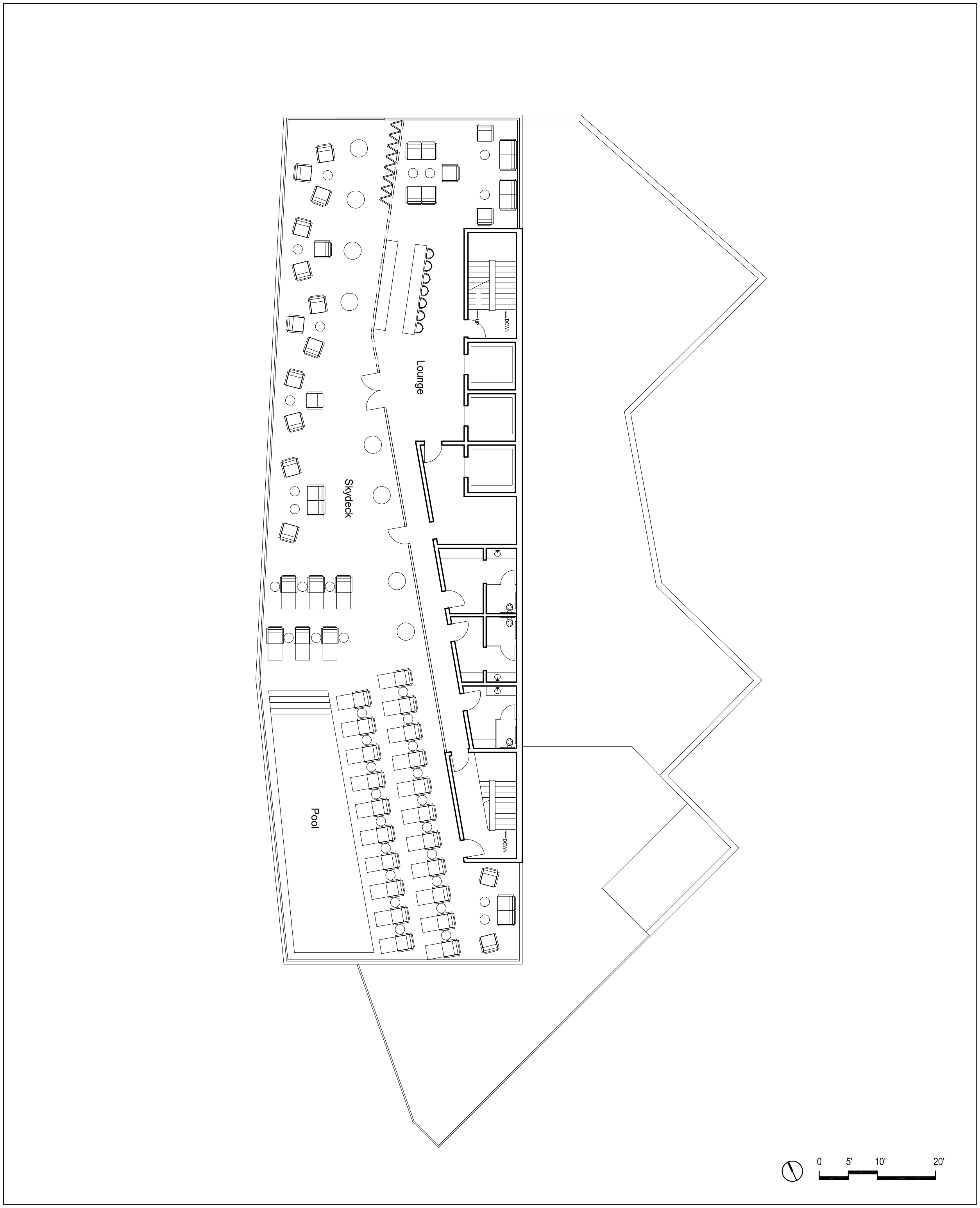


Figure 3.5 - 15
Roof Level Floor Plan (14)

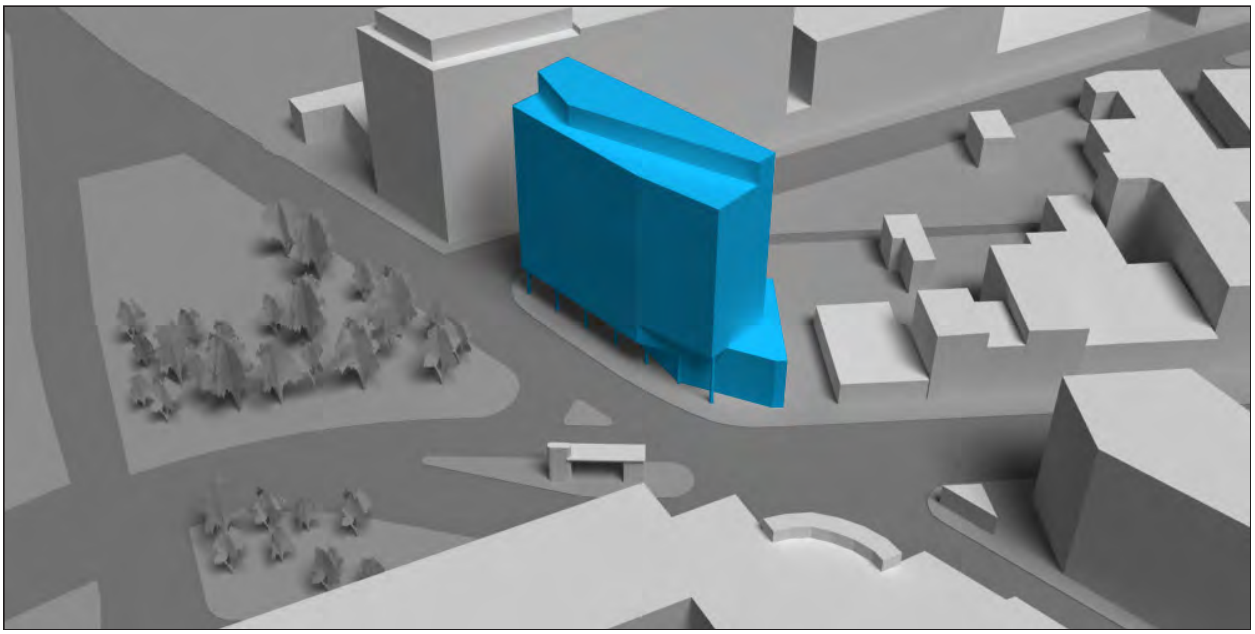


Figure 3.5 - 16
Aerial Perspective from Southwest

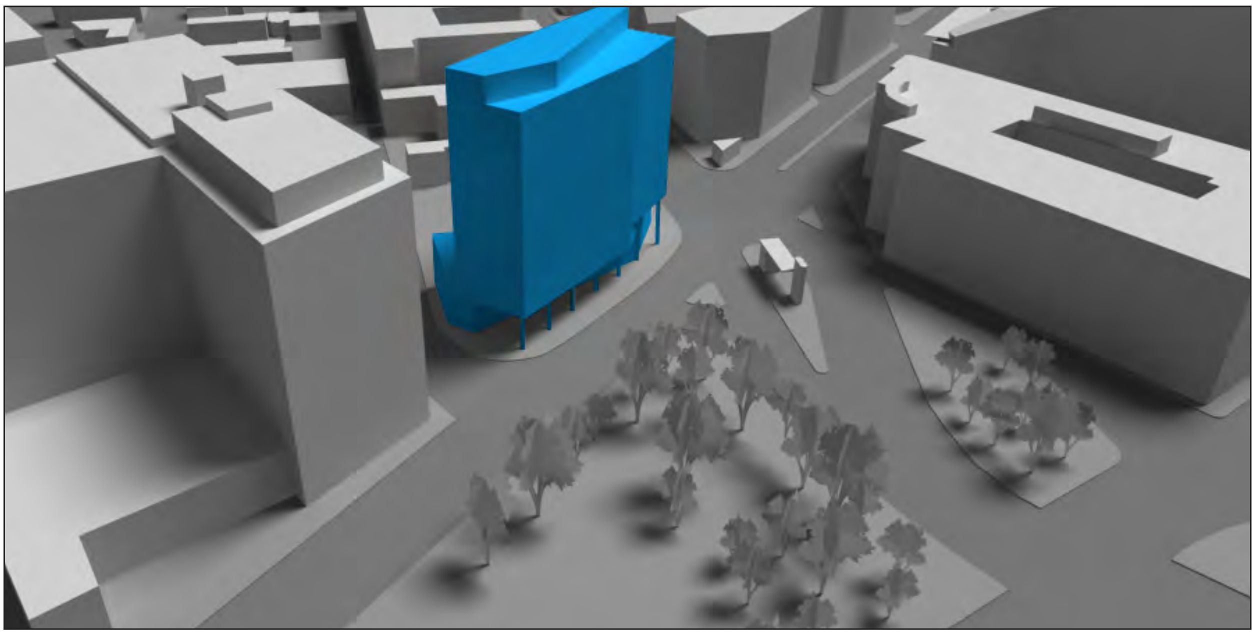


Figure 3.5 - 17
Aerial Perspective from Northwest

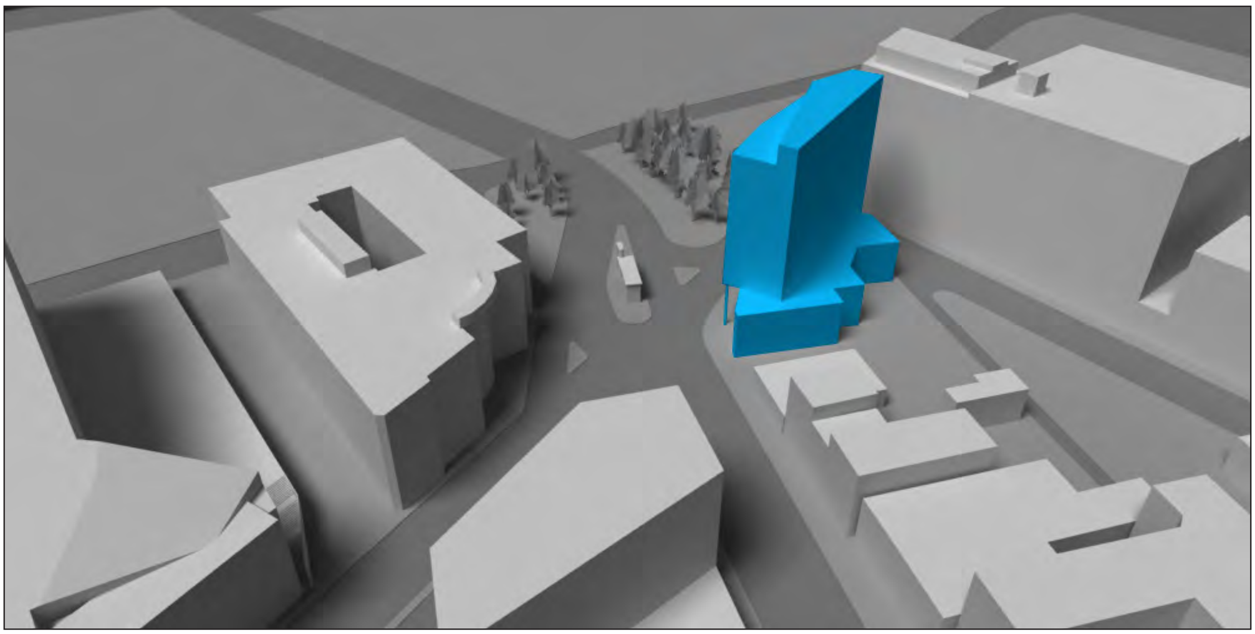


Figure 3.5 - 18
Aerial Perspective from Southeast

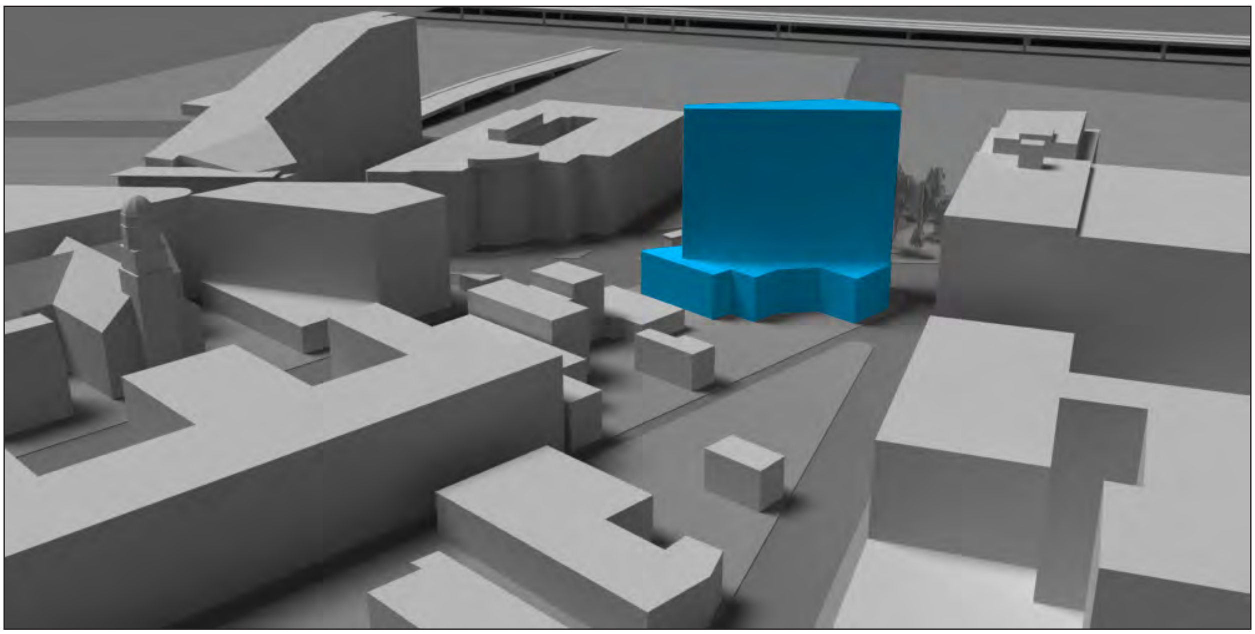


Figure 3.5 - 19
Aerial Perspective from Northeast

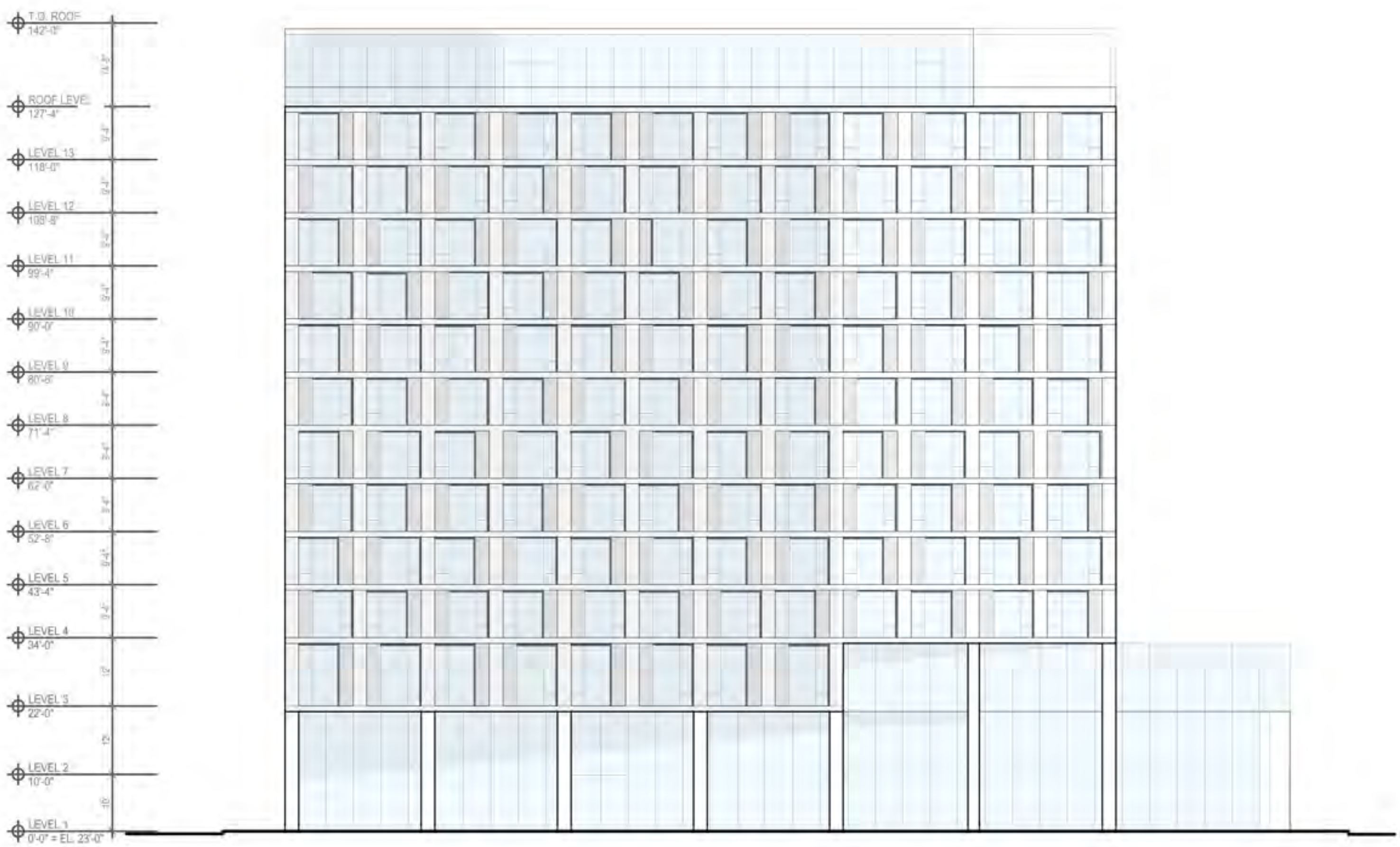


Figure 3.5 - 20
West Elevation (Dorchester Avenue)

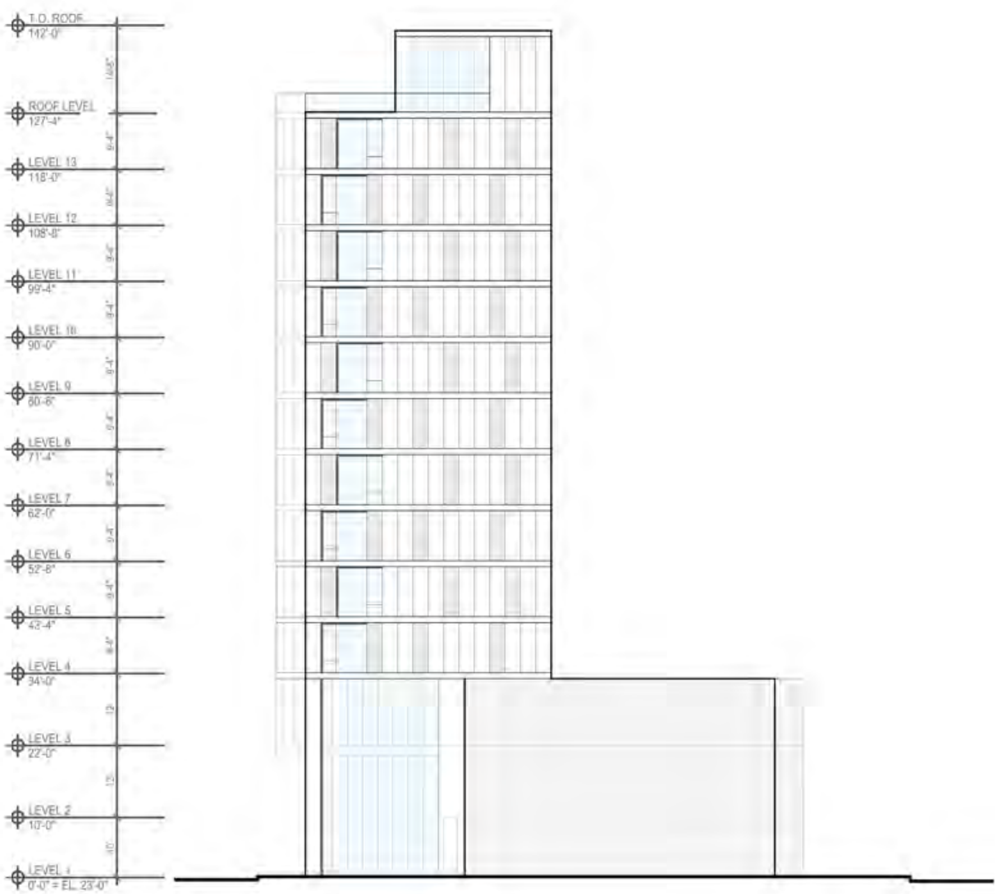


Figure 3.5 - 21
South Elevation (West Broadway)

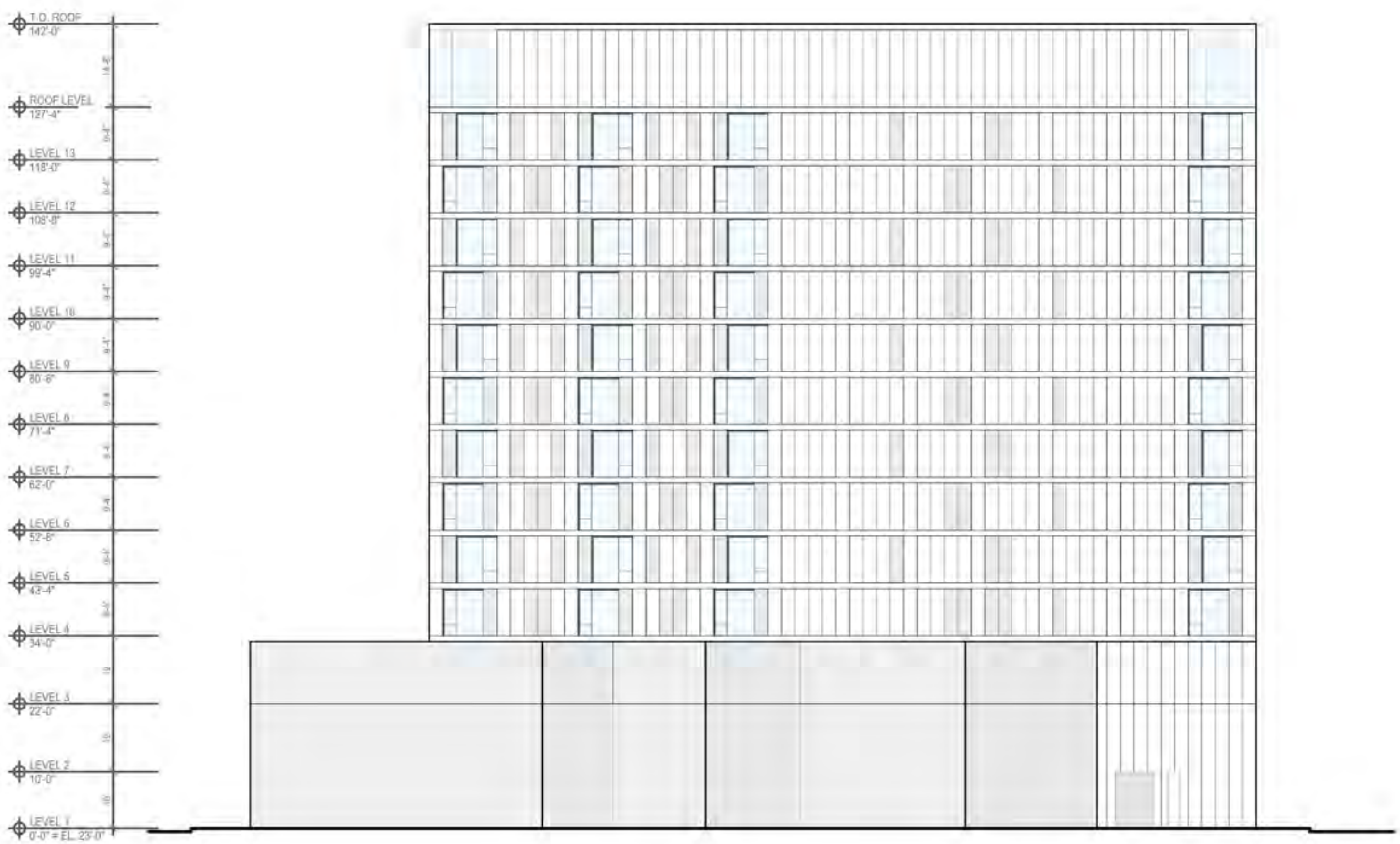


Figure 3.5 - 22
East Elevation

Figure 3.5 - 23
North Elevation (West Second Street)

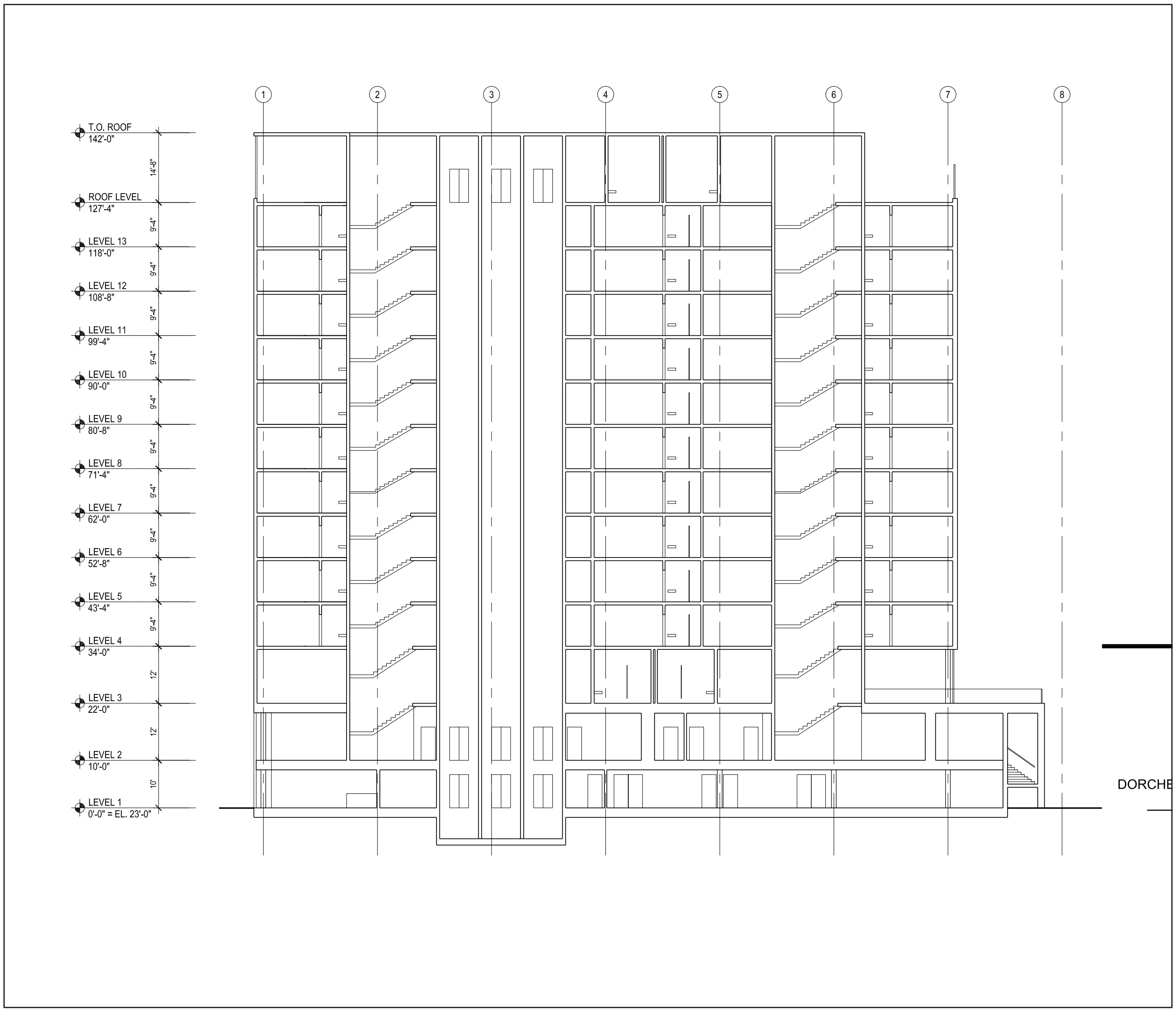


Figure 3.5 - 24
Building Section - North to South

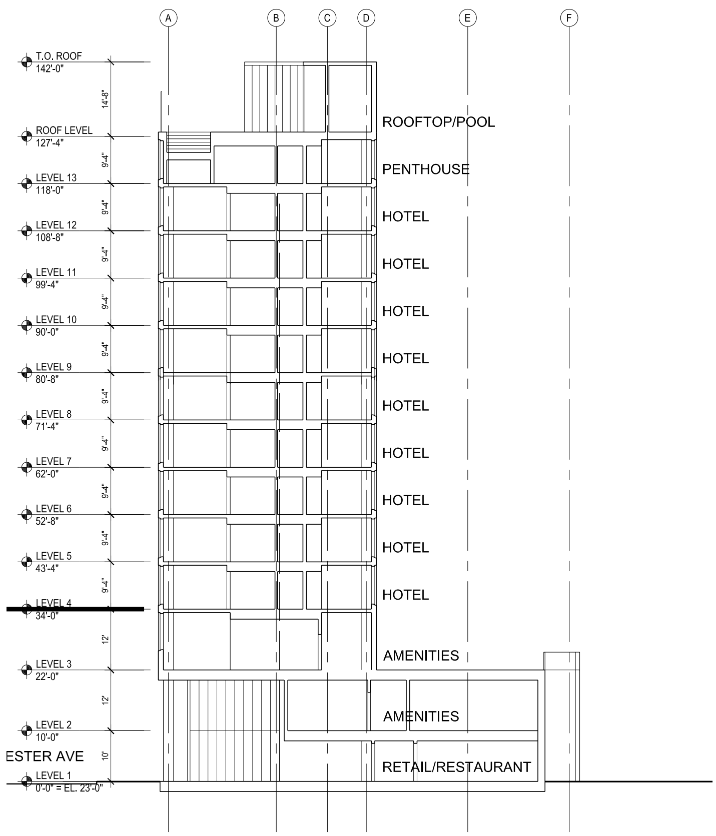


Figure 3.5 - 25
Building Section - West to East

Figure 3.5 - 26
Project Rendering - Materials

Figure 3.5 - 27
Project Rendering - View from West

Figure 3.5 - 28
Project Rendering - View of Street Level Restaurant and Urban Terrace

Figure 3.5 - 29
Project Rendering - View of Skydeck Pool and Lounge

LEED 2009 for New Construction and Major Renovations

Project Checklist

6 West Broadway Hotel, Boston, Massachusetts
July 23, 2013

Y	?	N	d/C		Sustainable Sites	Possible Points: 26
14	5	4				
Y			C	Prereq 1	Construction Activity Pollution Prevention	
1			d	Credit 1	Site Selection	1
5			d	Credit 2	Development Density and Community Connectivity	5
		1	d	Credit 3	Brownfield Redevelopment	1
6			d	Credit 4.1	Alternative Transportation—Public Transportation Access	6
	1		d	Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
		1	d	Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
1			d	Credit 4.4	Alternative Transportation—Parking Capacity	2
		1	C	Credit 5.1	Site Development—Protect or Restore Habitat	1
		1	d	Credit 5.2	Site Development—Maximize Open Space	1
1			d	Credit 6.1	Stormwater Design—Quantity Control	1
	1		d	Credit 6.2	Stormwater Design—Quality Control	1
	1		C	Credit 7.1	Heat Island Effect—Non-roof	1
	1		d	Credit 7.2	Heat Island Effect—Roof	1
	1		d	Credit 8	Light Pollution Reduction	1

Y	?	N			Water Efficiency	Possible Points: 10
0	8	0				
Y			d	Prereq 1	Water Use Reduction—20% Reduction	
	4		d	Credit 1	Water Efficient Landscaping	2 to 4
					[ ] Reduce by 50%	2
					[4] No Potable Water Use or Irrigation	4
	2		d	Credit 2	Innovative Wastewater Technologies	2
	2		d	Credit 3	Water Use Reduction	2 to 4
					[2] Reduce by 30%	2
					[ ] Reduce by 35%	3
					[ ] Reduce by 40%	4

Y	?	N			Energy and Atmosphere	Possible Points: 35
14	5	16				
Y			C	Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			d	Prereq 2	Minimum Energy Performance	
Y			d	Prereq 3	Fundamental Refrigerant Management	
10		9	d	Credit 1	Optimize Energy Performance	1 to 19
					[ ] Improve by 12% for New Buildings or 8% for Existing Building Renovations	1
					[ ] Improve by 14% for New Buildings or 10% for Existing Building Renovations	2
					[ ] Improve by 16% for New Buildings or 12% for Existing Building Renovations	3
					[ ] Improve by 18% for New Buildings or 14% for Existing Building Renovations	4
					[ ] Improve by 20% for New Buildings or 16% for Existing Building Renovations	5
					[ ] Improve by 22% for New Buildings or 18% for Existing Building Renovations	6
					[ ] Improve by 24% for New Buildings or 20% for Existing Building Renovations	7
					[ ] Improve by 26% for New Buildings or 22% for Existing Building Renovations	8
					[ ] Improve by 28% for New Buildings or 24% for Existing Building Renovations	9

					10	Improve by 30% for New Buildings or 26% for Existing Building Renovations	10
						Improve by 32% for New Buildings or 28% for Existing Building Renovations	11
						Improve by 34% for New Buildings or 30% for Existing Building Renovations	12
						Improve by 36% for New Buildings or 32% for Existing Building Renovations	13
						Improve by 38% for New Buildings or 34% for Existing Building Renovations	14
						Improve by 40% for New Buildings or 36% for Existing Building Renovations	15
						Improve by 42% for New Buildings or 38% for Existing Building Renovations	16
						Improve by 44% for New Buildings or 40% for Existing Building Renovations	17
						Improve by 46% for New Buildings or 42% for Existing Building Renovations	18
						Improve by 48%+ for New Buildings or 44%+ for Existing Building Renovations	19
		7	d	Credit 2		On-Site Renewable Energy	1 to 7
						1% Renewable Energy	1
						3% Renewable Energy	2
						5% Renewable Energy	3
						7% Renewable Energy	4
						9% Renewable Energy	5
						11% Renewable Energy	6
						13% Renewable Energy	7
2			c	Credit 3		Enhanced Commissioning	2
	2		d	Credit 4		Enhanced Refrigerant Management	2
	3		c	Credit 5		Measurement and Verification	3
2			c	Credit 6		Green Power	2

Y	?	N					
5	1	8			**Materials and Resources**		Possible Points: **14**
Y			d	Prereq 1	Storage and Collection of Recyclables		
		3	C	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof		1 to 3
						Reuse 55%	1
						Reuse 75%	2
						Reuse 95%	3
		1	C	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements		1
1		1	C	Credit 2	Construction Waste Management		1 to 2
					1	50% Recycled or Salvaged	1
						75% Recycled or Salvaged	2
		2	C	Credit 3	Materials Reuse		1 to 2
						Reuse 5%	1
						Reuse 10%	2
2			C	Credit 4	Recycled Content		1 to 2
						10% of Content	1
					2	20% of Content	2
1		1	C	Credit 5	Regional Materials		1 to 2
					1	10% of Materials	1
						20% of Materials	2
	1		C	Credit 6	Rapidly Renewable Materials		1
1			C	Credit 7	Certified Wood		1

Y	?	N				
12	3	0			**Indoor Environmental Quality**	Possible Points: **15**
Y			d	Prereq 1	Minimum Indoor Air Quality Performance	
Y			d	Prereq 2	Environmental Tobacco Smoke (ETS) Control	
1			d	Credit 1	Outdoor Air Delivery Monitoring	1
	1		d	Credit 2	Increased Ventilation	1
1			C	Credit 3.1	Construction IAQ Management Plan—During Construction	1
1			C	Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1			C	Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			C	Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			C	Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1			C	Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
	1		d	Credit 5	Indoor Chemical and Pollutant Source Control	1
1			d	Credit 6.1	Controllability of Systems—Lighting	1
1			d	Credit 6.2	Controllability of Systems—Thermal Comfort	1
1			d	Credit 7.1	Thermal Comfort—Design	1
	1		d	Credit 7.2	Thermal Comfort—Verification	1
1			d	Credit 8.1	Daylight and Views—Daylight	1
1			d	Credit 8.2	Daylight and Views—Views	1

Y	?	N				
4	2	0			**Innovation and Design Process**	Possible Points: **6**
1			d/C	Credit 1.1	Innovation in Design: Urban Density	1
1			d/C	Credit 1.2	Innovation in Design: Alternative Transportation	1
1			d/C	Credit 1.3	Innovation in Design: Education Program	1
	1		d/C	Credit 1.4	Innovation in Design: Specific Title	1
	1		d/C	Credit 1.5	Innovation in Design: Specific Title	1
1			d/C	Credit 2	LEED Accredited Professional	1

Y	?	N					
1	3	0			**Regional Priority Credits**	Possible Points:	**4**
1			d/C	Credit 1.1	Regional Priority: Specific Credit	1	
	1		d/C	Credit 1.2	Regional Priority: Specific Credit	1	
	1		d/C	Credit 1.3	Regional Priority: Specific Credit	1	
	1		d/C	Credit 1.4	Regional Priority: Specific Credit	1	
50	27	28			**Total**	Possible Points:	**110**

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

4.0 ENVIRONMENTAL PROTECTION COMPONENT

4.1 Pedestrian Wind Assessment

The proposed hotel building is sheltered from the northeast and southwest winds, but exposed to the prevailing northwest winds. The hotel tower is designed on a podium, with building entrances under the tower overhang. As a result, the future wind conditions on and around the site will meet the effective gust criterion and suitable wind conditions are predicted at building entrances and sidewalks in general. Conceptual wind control measures have been provided for the areas around the building entrances and tower corners, in order to enhance the wind conditions. Please see **Appendix E** for the detailed pedestrian wind assessment.

4.2 Shadow Impacts Analysis

4.2.1 Introduction

The following shadow study describes and graphically depicts anticipated new shadow impacts from the Project compared to shadows from existing buildings. The study presents the existing and built conditions for the proposed Project for the hours 9:00 AM, 12:00 Noon, and 3:00 PM for the vernal equinox, summer solstice, autumnal equinox, and winter solstice. In addition, shadows are depicted for 6:00 PM during the summer solstice and autumnal equinox.

4.2.2 Vernal Equinox (March 21)

Figures 4.2-1 through **4.2-3** depict shadows on March 21.

At 9:00 AM, shadows are cast in a westerly direction onto portions of Dorchester Avenue, the Broadway Bridge, and the wooded parcel that lies west of the Site. Minimal shadows are onto the head house of the MBTA station.

At 12:00 Noon, new shadow is cast in a northerly direction mostly onto the intersection of Dorchester Avenue and West 2nd Street.

At 3:00 PM, new shadow from the Project is cast in a northeasterly direction mostly onto West 2nd Street.

4.2.3 Summer Solstice (June 21)

Figures 4.2-4 through **4.2-7** depict shadow impacts on June 21.

At 9:00 AM, shadows are cast in a westerly direction onto portions of Dorchester Avenue, the Broadway Bridge, and the wooded parcel that lies west of the Site. Minimal shadows are onto the head house of the West Broadway MBTA station.

At 12:00 Noon, new shadow is cast in a northerly direction mostly onto the intersection of Dorchester Avenue and West 2nd Street.

At 3:00 PM, new shadow from the Project is cast in a northeasterly direction mostly onto West 2nd Street.

At 6:00 PM, new shadow from the Project is cast in an easterly direction onto the empty lots to the east of the project and West 2nd Street and Athens Street.

4.2.4 Autumnal Equinox (September 21)

Figures 4.2-8 through **4.2-11** depict shadow impacts on September 21.

At 9:00 AM, shadows are cast in a westerly direction onto portions of Dorchester Avenue, the Broadway Bridge, and the wooded parcel that lies west of the Site. Minimal shadows are onto the head house of the West Broadway MBTA station.

At 12:00 Noon, new shadow is cast in a northerly direction mostly onto the intersection of Dorchester Avenue and West 2nd Street.

At 3:00 PM, new shadow from the Project is cast in a northeasterly direction mostly onto West 2nd Street.

At 6:00 PM, new shadow from the Project is cast in an easterly direction onto the empty lots to the east of the project and West 2nd Street and Athens Street.

4.2.5 Winter Solstice (December 21)

Figures 4.2-12 through **4.2-14** depict shadow impacts on December 21. Winter sun casts the longest shadows of the year.

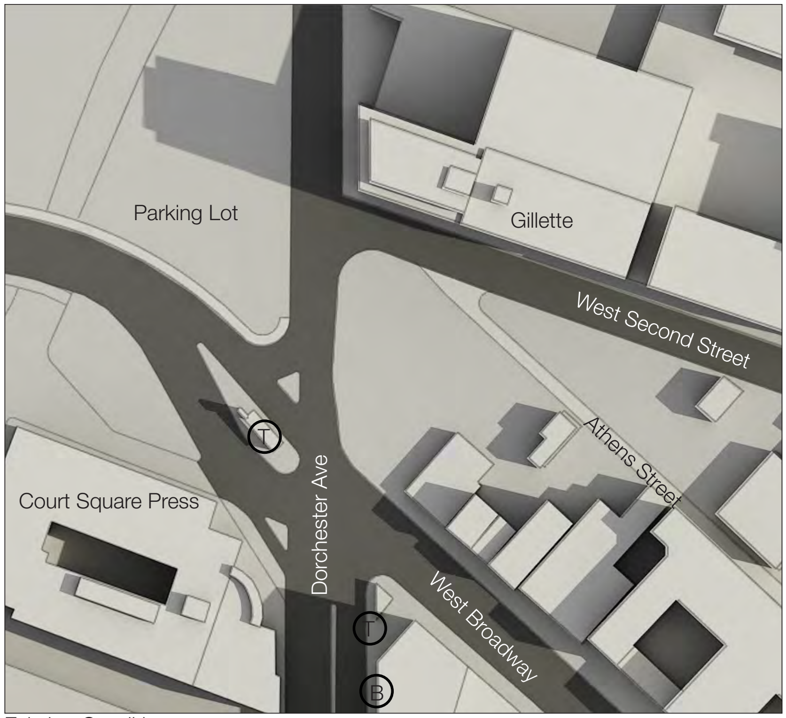
At 9:00 AM, shadows are cast in a westerly direction onto Dorchester Avenue, the Broadway Bridge, and the wooded/open space parcel owned by Procter Gamble that lies west of the Site.

At 12:00 Noon, new shadow is cast in a northerly direction onto Dorchester Avenue and the intersection of Dorchester Avenue and West 2nd Street.

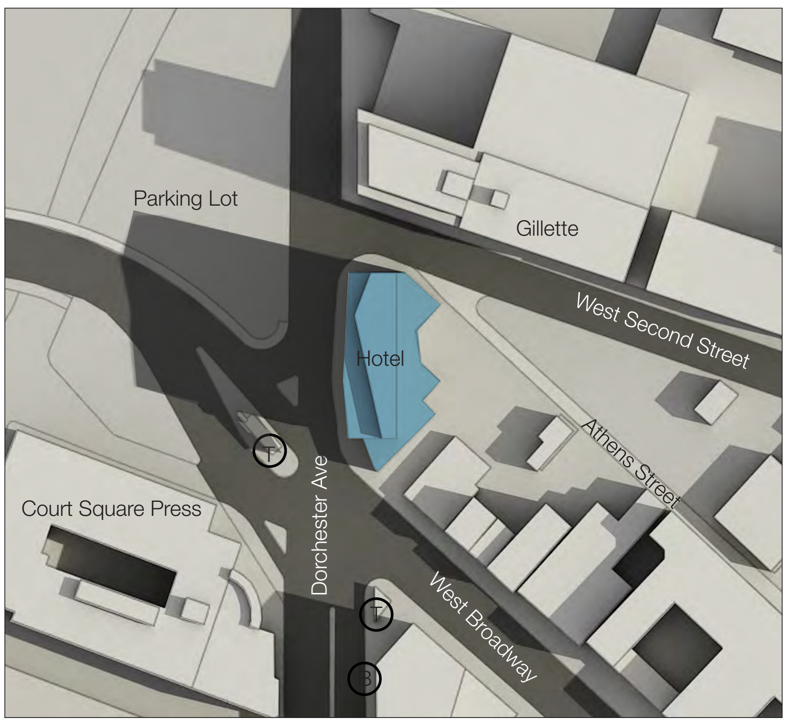
At 3:00 PM, new shadow from the Project is cast in a northeasterly direction mostly onto West 2nd Street and the façade of the Procter Gamble/Gillette Building.

4.2.5 Summary

Even with the proposed height extending to 14 floors, the Project's shadow impacts are generally not too extensive. New shadow is generally limited to the streets surrounding the Site with morning hour shadows extending to the Broadway Bridge. Although late afternoon and evening shadows will extend in an easterly/northeasterly direction toward the Procter Gamble/Gillette Building and to surface/open lots, most of these lots and areas are currently impacted by current shadow patterns from existing buildings. Overall, the Project's shadow impacts will be consistent with current patterns and will not adversely impact the Project Site and surroundings.



Existing Conditions

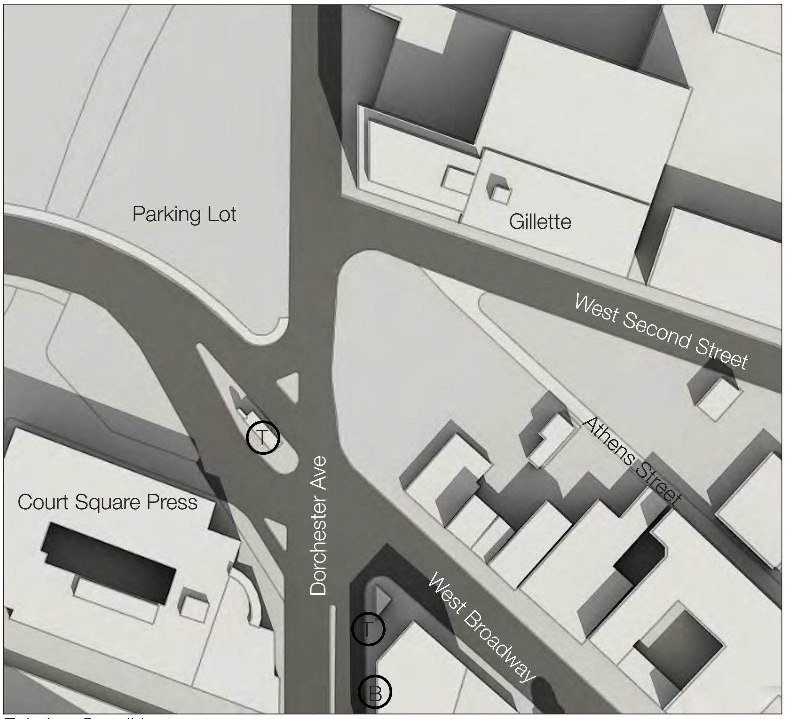


Proposed Conditions

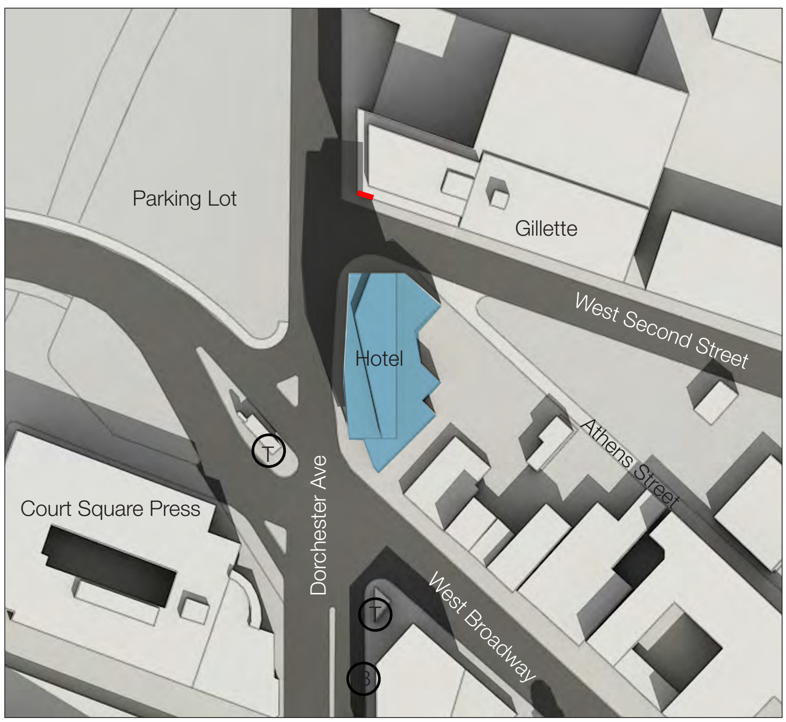
Proposed Building   Existing Shadow   New Shadow   New Shadow on Facade   (T) Rapid Transit   (B) Bus Stop

Figure 4.2 - 1
March 21 - 9:00 AM

Azimuth 125.7 Altitude 33.2



Existing Conditions

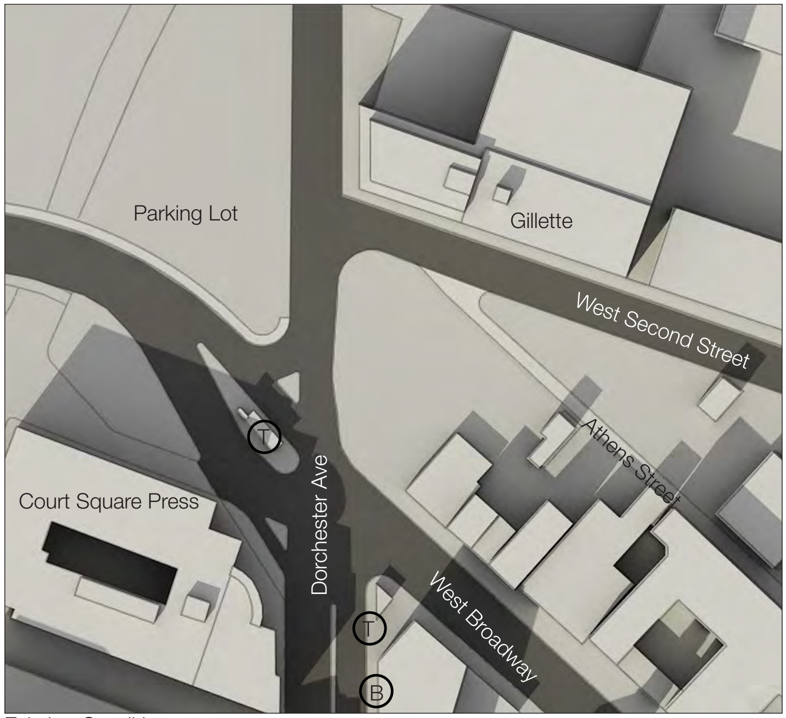


Proposed Conditions

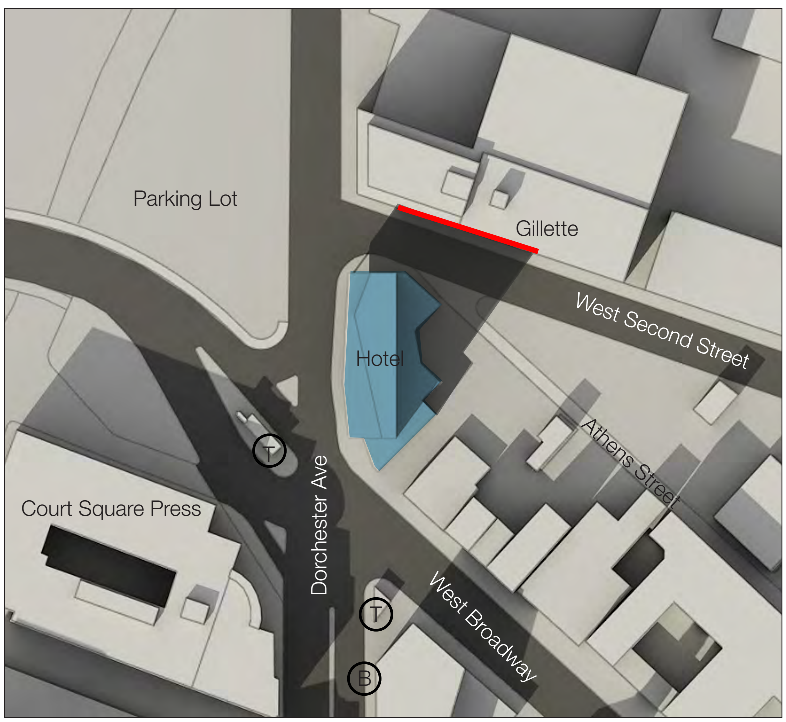
Proposed Building   Existing Shadow   New Shadow   New Shadow on Facade   (T) Rapid Transit   (B) Bus Stop

Figure 4.2 - 2
March 21 - 12:00 Noon

Azimuth 183.3 Altitude 48.1



Existing Conditions

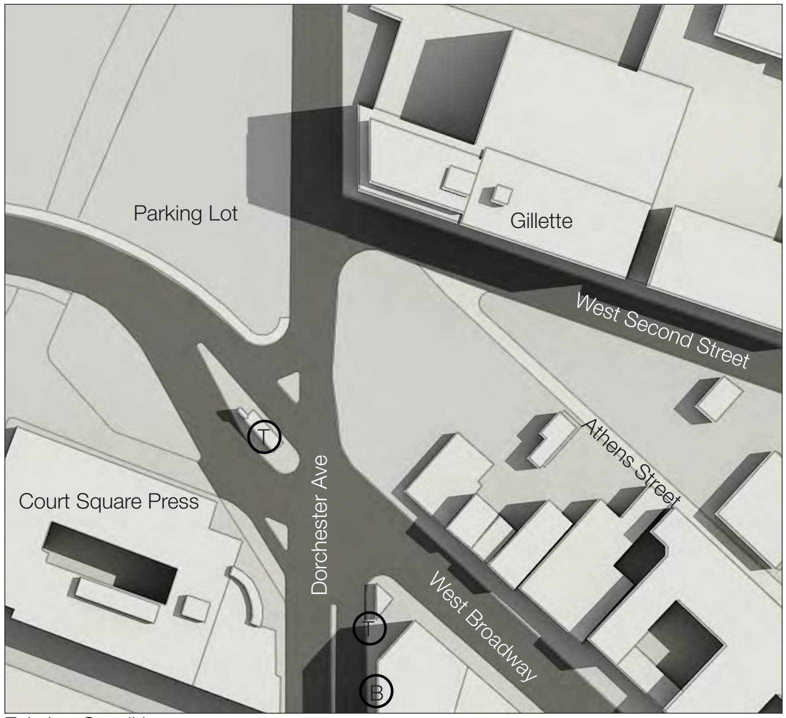


Proposed Conditions

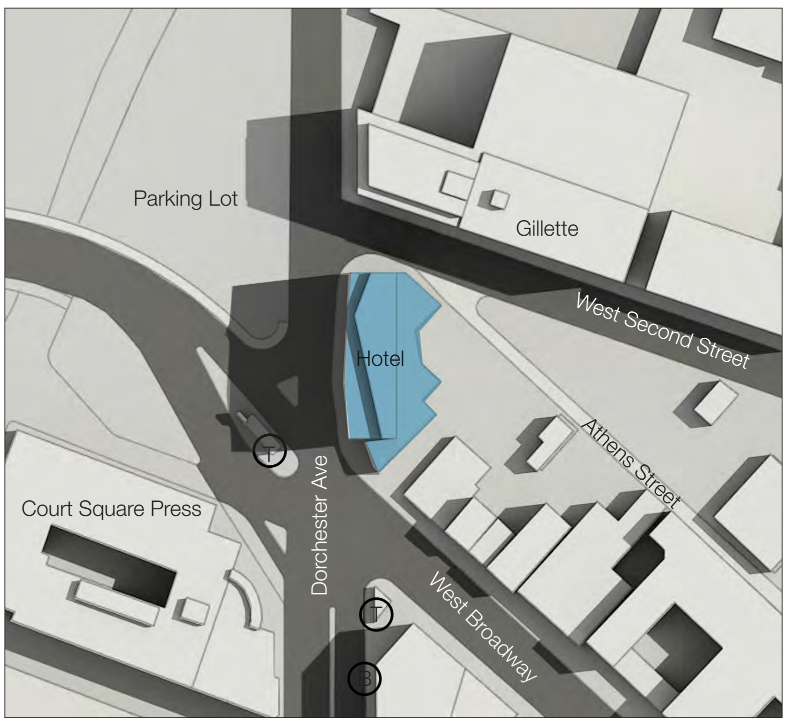
Proposed Building | Existing Shadow | New Shadow | New Shadow on Facade | (T) Rapid Transit | (B) Bus Stop

Figure 4.2 - 3
March 21 - 3:00 PM

Azimuth 238.4 Altitude 30.6



Existing Conditions

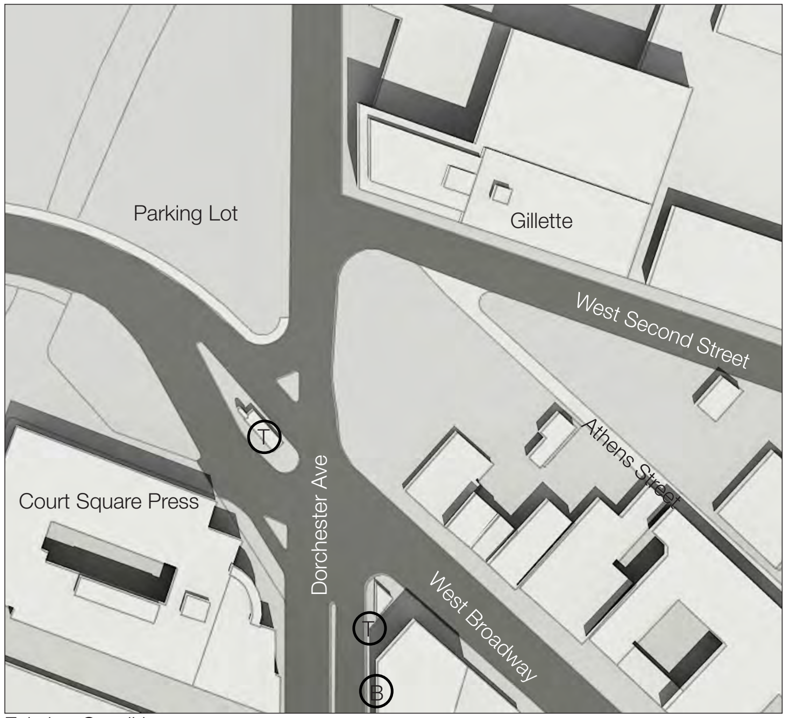


Proposed Conditions

Proposed Building | Existing Shadow | New Shadow | New Shadow on Facade | (T) Rapid Transit | (B) Bus Stop

Figure 4.2 - 4
June 21 - 9:00 AM

Azimuth 105.5 Altitude 50.9



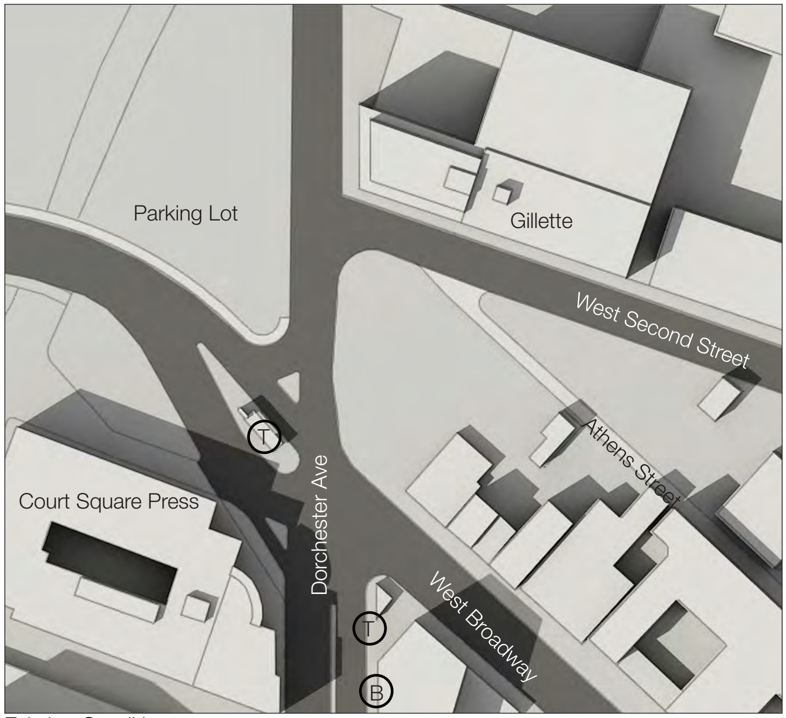
Existing Conditions

Proposed Conditions

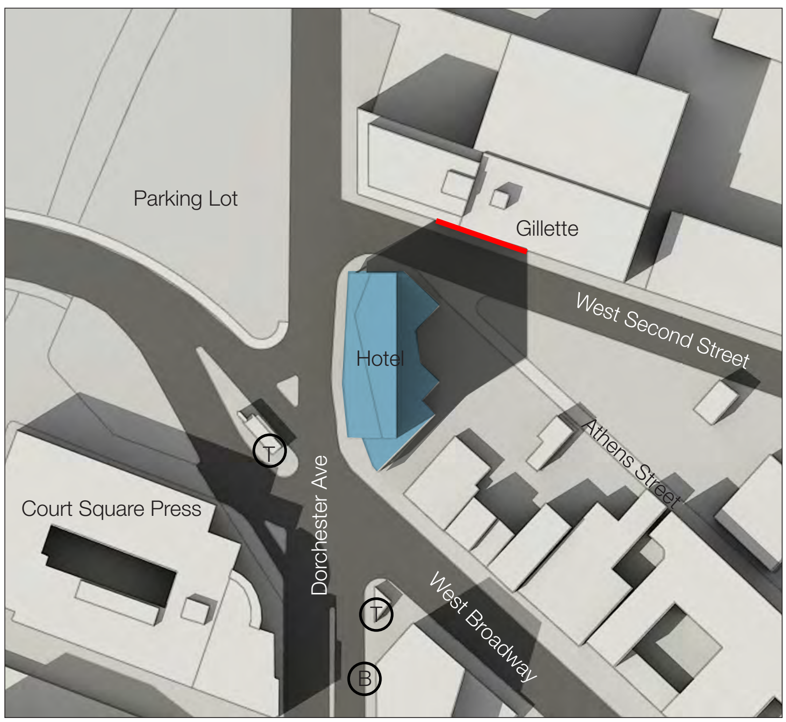
Proposed Building | Existing Shadow | New Shadow | New Shadow on Facade | (T) Rapid Transit | (B) Bus Stop

Figure 4.2 - 5
June 21 - 12:00 Noon

Azimuth 189.7 Altitude 70.9



Existing Conditions

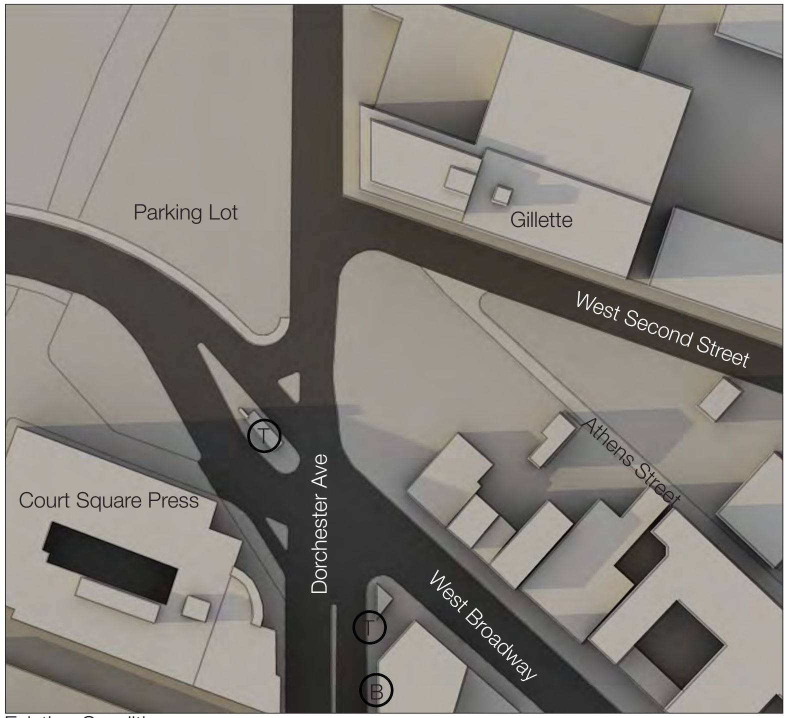


Proposed Conditions

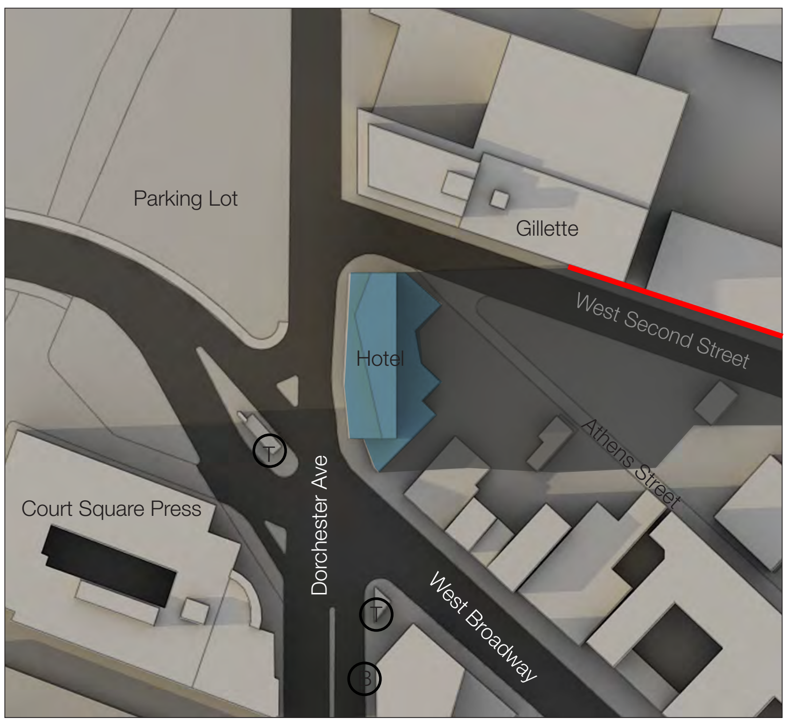
Proposed Building · Existing Shadow · New Shadow · New Shadow on Facade · (T) Rapid Transit · (B) Bus Stop

Figure 4.2 - 6
June 21 - 3:00 PM

Azimuth 260.4 Altitude 45.9



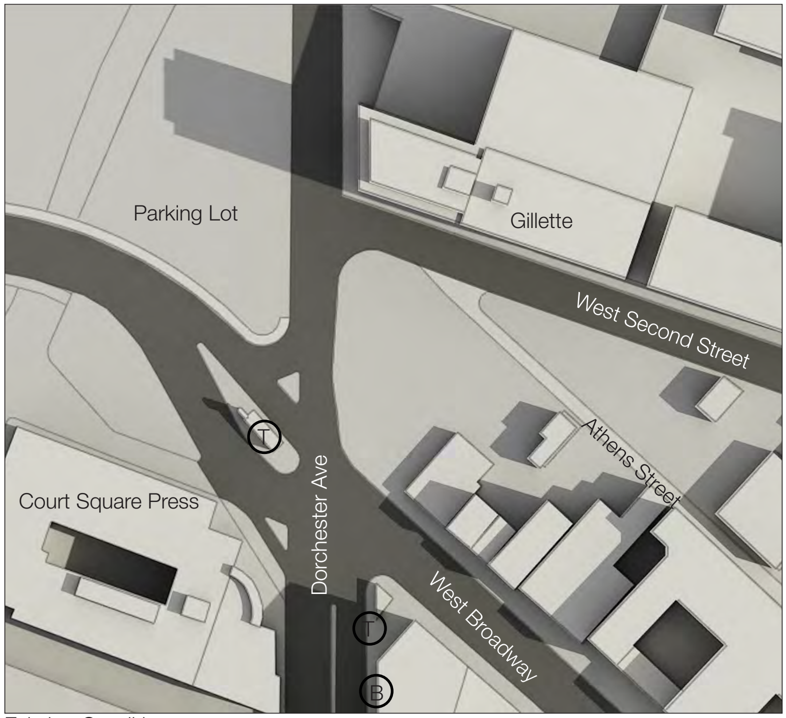
Existing Conditions



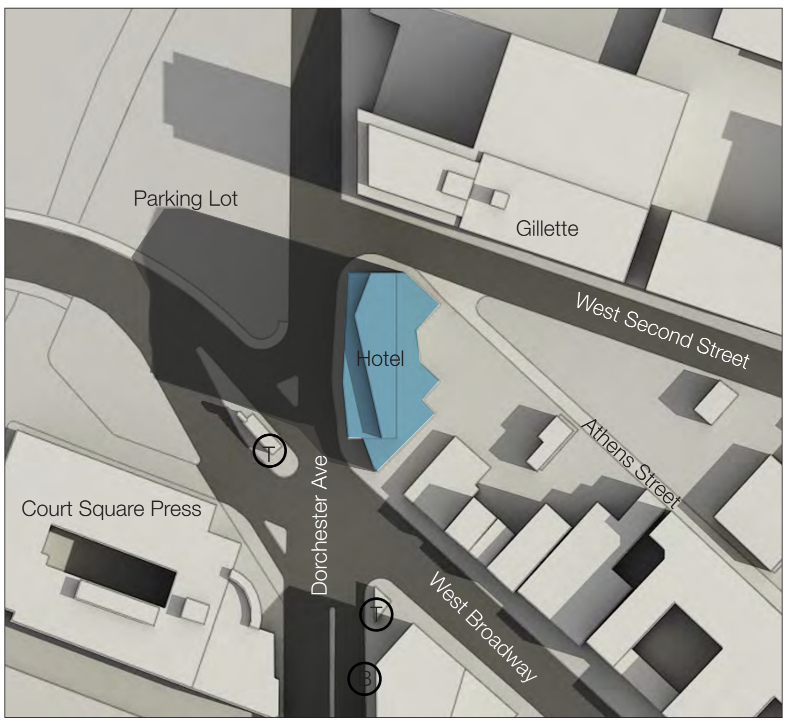
Proposed Conditions

Figure 4.2 - 7
June 21 - 6:00 PM

Azimuth 289.9 Altitude 13.1



Existing Conditions

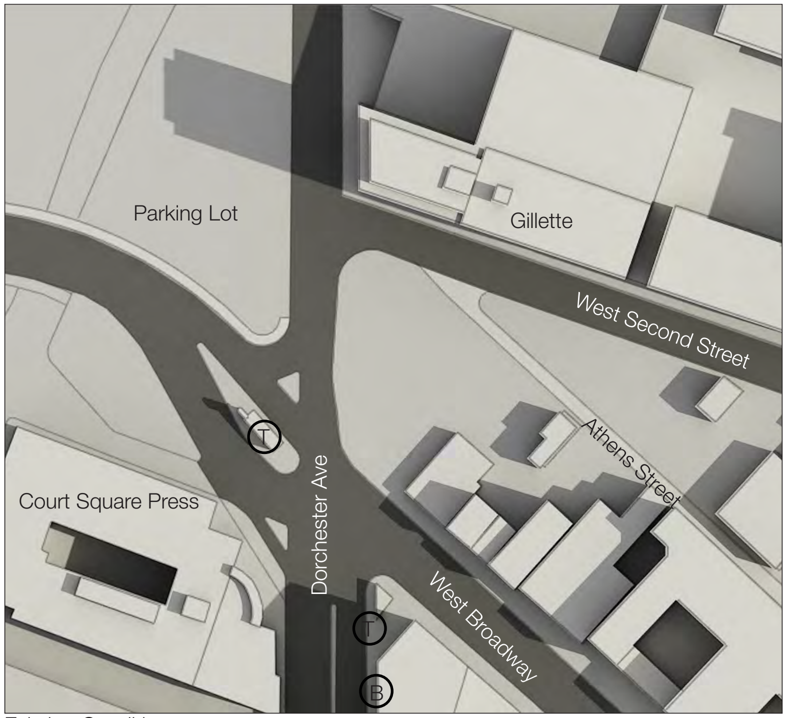


Proposed Conditions

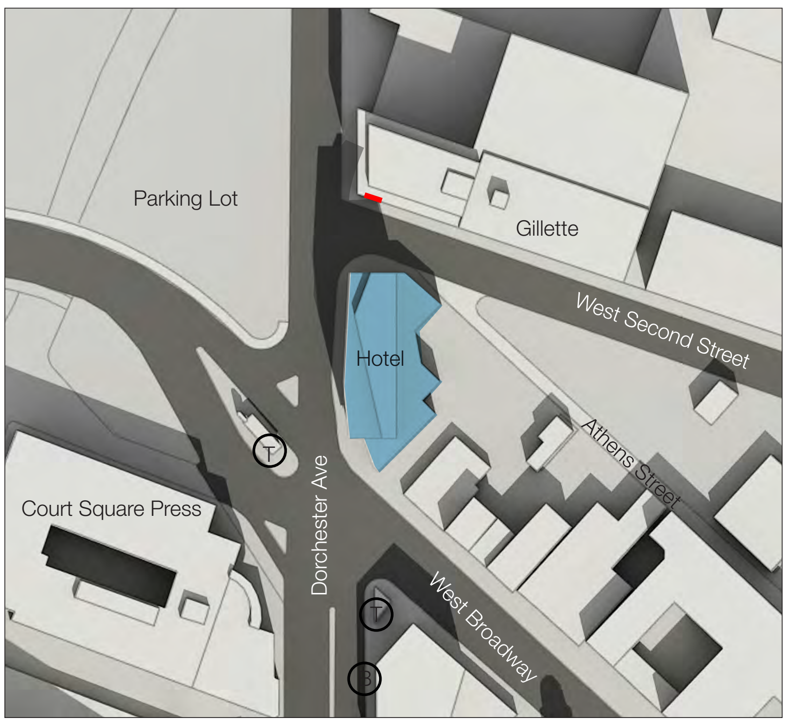
Proposed Building | Existing Shadow | New Shadow | New Shadow on Facade | (T) Rapid Transit | (B) Bus Stop

Figure 4.2 - 8
September 21 - 9:00 AM

Azimuth 129.1 Altitude 35.3



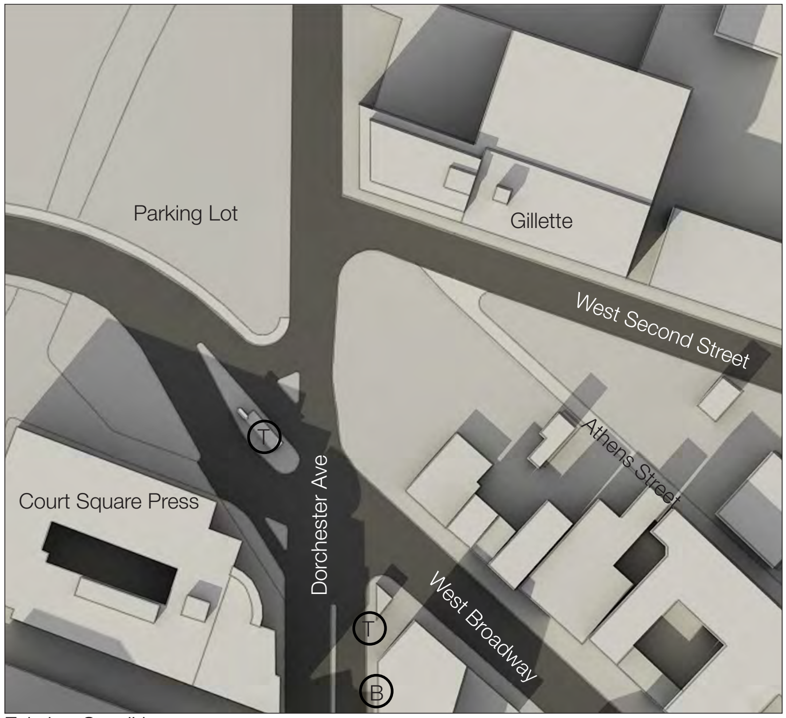
Existing Conditions



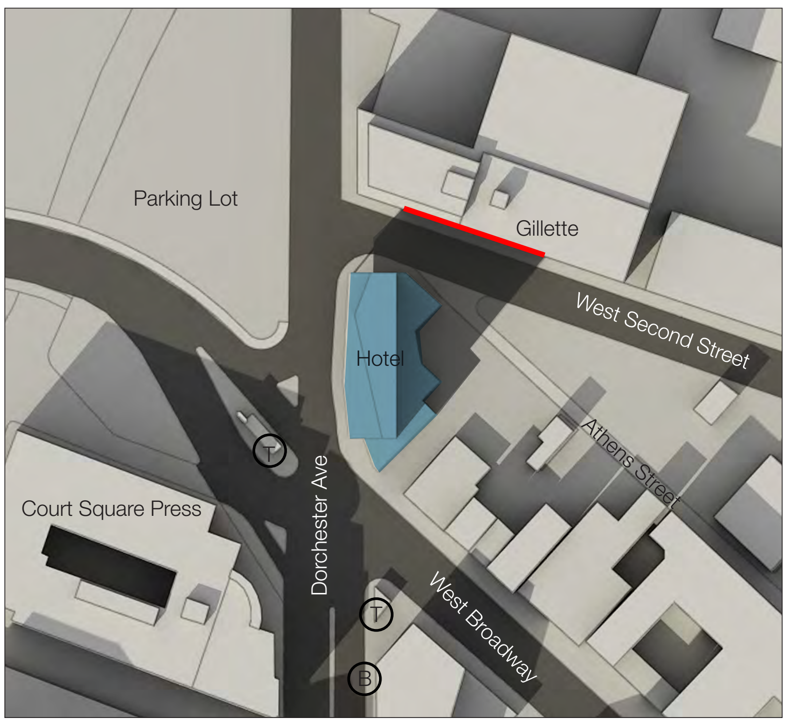
Proposed Conditions

Proposed Building | Existing Shadow | New Shadow | New Shadow on Facade | T Rapid Transit | B Bus Stop

Figure 4.2 - 9
September 21 - 12:00 Noon *Azimuth 188.5 Altitude 47.8*



Existing Conditions



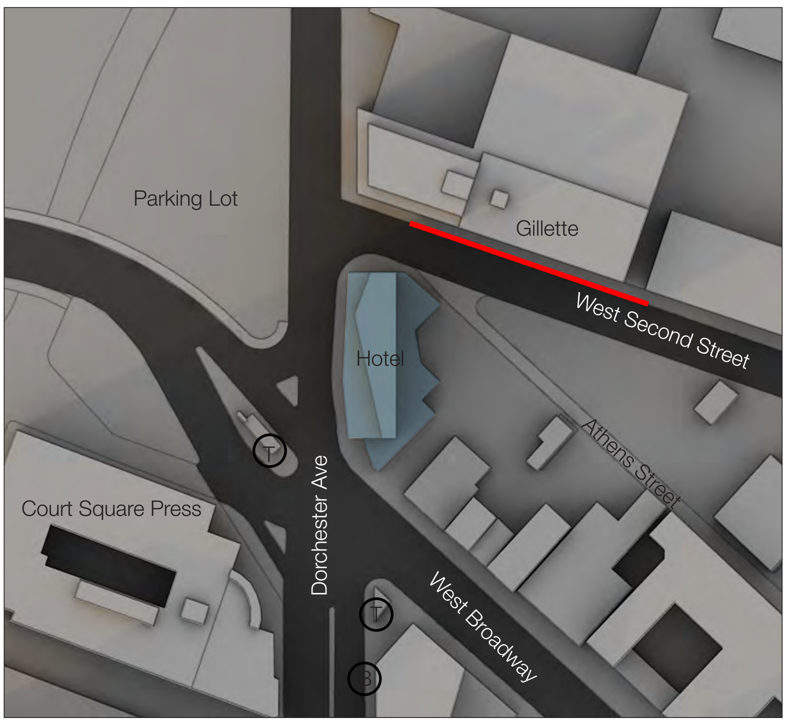
Proposed Conditions

Proposed Building | Existing Shadow | New Shadow | New Shadow on Facade | (T) Rapid Transit | (B) Bus Stop

Figure 4.2 - 10
September 21 - 3:00 PM

Azimuth 24.4 Altitude 28.2

Existing Conditions



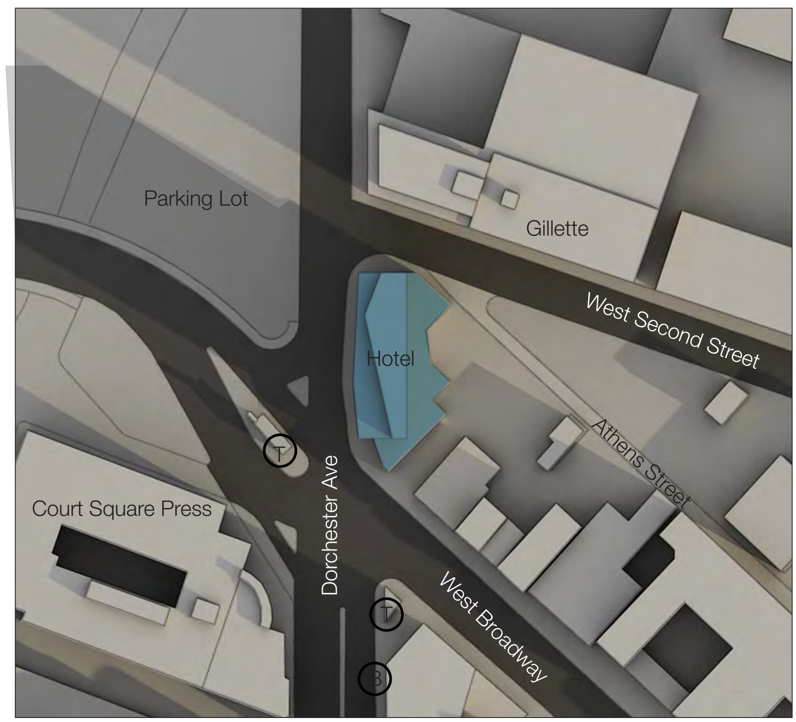
Proposed Conditions

Proposed Building | Existing Shadow | New Shadow | New Shadow on Facade | (T) Rapid Transit | (B) Bus Stop

Figure 4.2 - 11
September 21 - 6:00 PM

Azimuth 274.1 Altitude -4

Existing Conditions



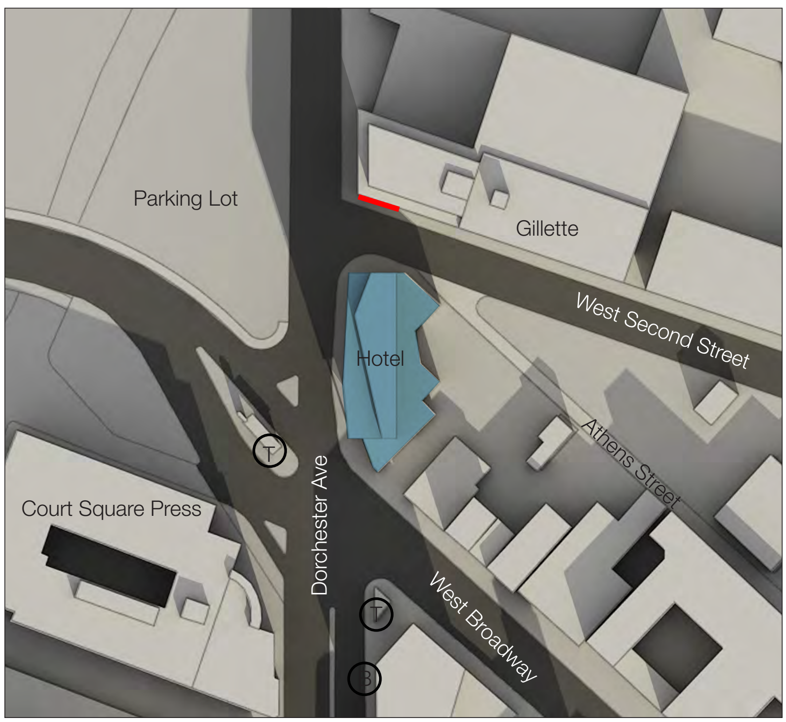
Proposed Conditions

Proposed Building | Existing Shadow | New Shadow | New Shadow on Facade | (T) Rapid Transit | (B) Bus Stop

Figure 4.2 - 12
December 21 - 9:00 AM

Azimuth 142.0 Altitude 14.3

Existing Conditions



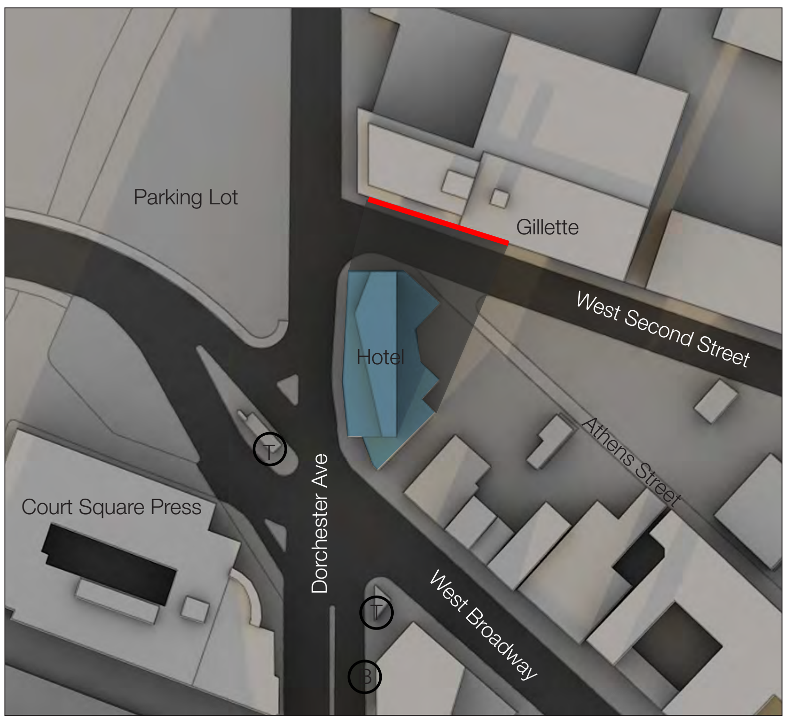
Proposed Conditions

Proposed Building | Existing Shadow | New Shadow | New Shadow on Facade | T Rapid Transit | B Bus Stop

Figure 4.2 - 13
December 21 - 12:00 Noon

Azimuth 184.4 Altitude24.1

Existing Conditions



Proposed Conditions

Proposed Building | Existing Shadow | New Shadow | New Shadow on Facade | (T) Rapid Transit | (B) Bus Stop

Figure 4.2 - 14
December 21 - 3:00 PM

Azimuth 225.0 Altitude 10.0

4.3 Daylight Analysis

The following section describes the anticipated effect on daylight coverage at the Project Site as a result of the Proposed Project. An analysis of the obstruction of skyplane under the Existing and Build conditions is a requirement of the Article 80 Large Project Review (Section 80B-2(c) of the City of Boston Zoning Code). The daylight analysis was prepared using the BRA's Daylight Analysis Program (BRADA) and has been completed in accordance with the requirements of Article 80.

4.3.1 Methodology

The Project was analyzed using the BRADA and by comparing the Existing and Build Condition. This section provides a description of the methodology used for the analysis.

The BRADA program was developed in 1985 by the Massachusetts Institute of Technology to estimate the pedestrian's view of the skydome taking into account the massing and building materials used. The software approximates a pedestrian's view of a site based on input parameters such as: location of viewpoint, length and height of buildings and the relative reflectivity of the building facades. The model typically uses the midpoint of an adjacent right-of-way or sidewalk as the analysis viewpoint. Based on these data, the model calculates the perceived skyplane obstruction and provides a graphic depicting the analysis conditions.

The model inputs were taken from a combination of the BRA City model, an existing conditions survey, and schematic design plans prepared by VJAA Architects dated June 2013. As described above, the BRADA software considers the relative reflectivity of building facades when calculating perceived daylight obstruction. Highly reflective materials are thought to reduce the perceived skyplane obstruction when compared to non-reflective materials. For the purposes of this daylight analysis, the building facades are considered non-reflective, resulting in a conservative estimate of daylight obstruction.

4.3.2 Viewpoints

The daylight analysis encompassed consideration of three viewpoints around the Project Site including:

- West Broadway: This viewpoint is located on the centerline of West Broadway, centered on the southern façade of the building
- Dorchester Avenue: This viewpoint is located on the centerline of Dorchester Avenue, centered on the western façade of the building
- West 2nd Street: This viewpoint is located on the centerline of West 2nd Street, centered on the northern façade of the building

These points represent one viewpoint for each building façade when viewed from the adjacent pubic way, sidewalk or property line, as appropriate.

4.3.3 Daylight Existing Condition

Under the Existing Condition, there are no skyplane obstructions from any of the viewpoints, because the site is currently an open parking lot.

4.3.4 Daylight Building Conditions

The Project-related daylight impacts for the viewpoints from West Broadway, Dorchester Avenue and West 2nd Street are presented in **Figures 4.3-1, 4.3-2, and 4.3-3**. Under the Build Condition, all viewpoints are expected to experience an increase in skyplane obstruction (23.9 percent obstruction along West Broadway, 72.4 percent along Dorchester Avenue and 56.8 percent obstruction along West 2nd Street) due to the increased height of the proposed building. This effect is to be expected and cannot be avoided when replacing a vacant site with a much taller building.

4.3.5 Results

Each viewpoint (the centerlines of West Broadway, centered on the southern façade of the building, Dorchester Avenue, centered on the western façade of the building, and West 2nd Street, centered on the northern facade) will experience an increase in skyplane obstruction under the Build Condition. The results of the analysis are presented in Figures 4.3-1, 4.3-2, and 4.3-3. This effect is to be expected and cannot be avoided when replacing a vacant site with a much taller building with the varied massing

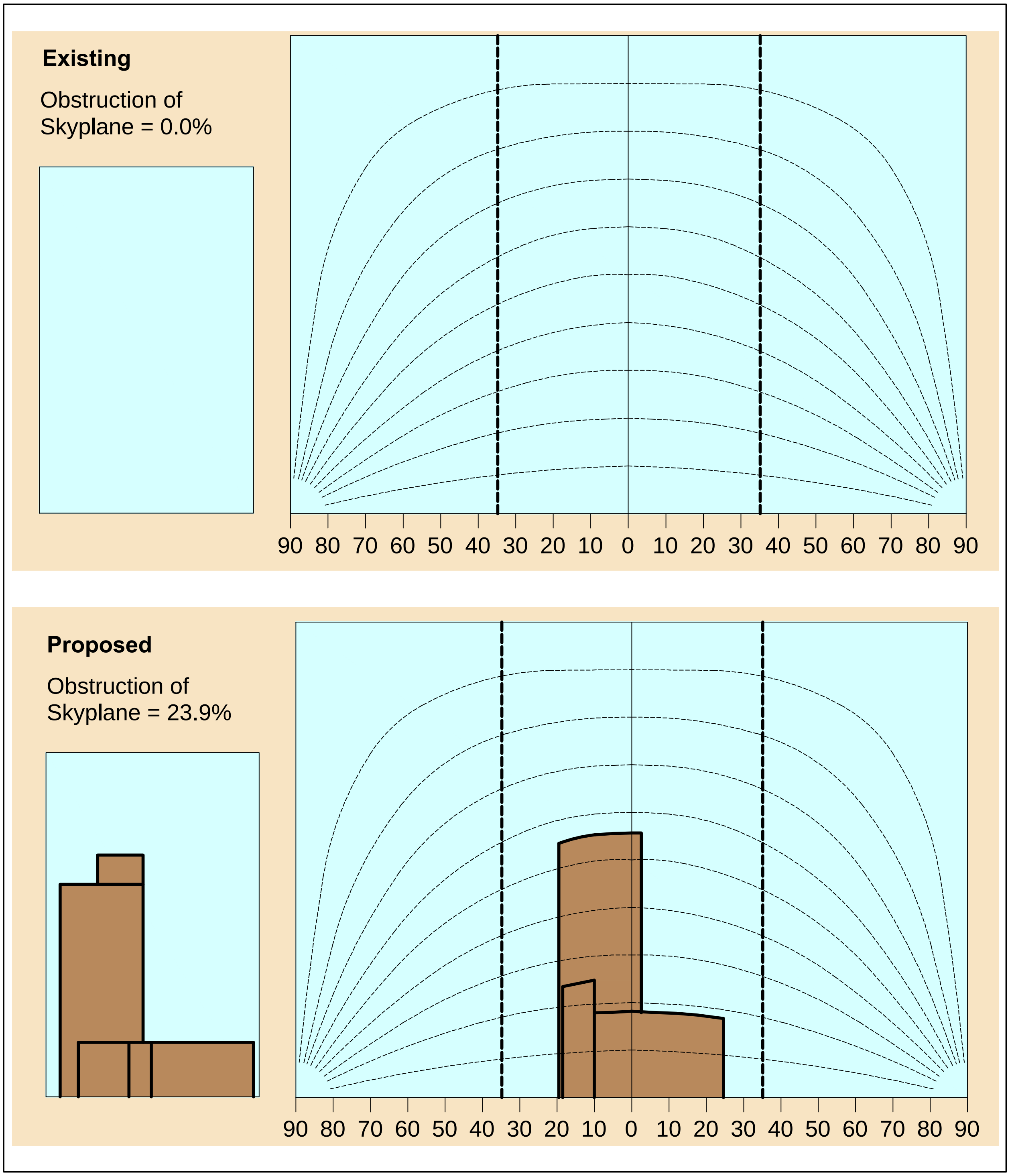


Figure 4.3-1
Boston Redevlopment Authority Daylight Analysis
Center of West Broadway

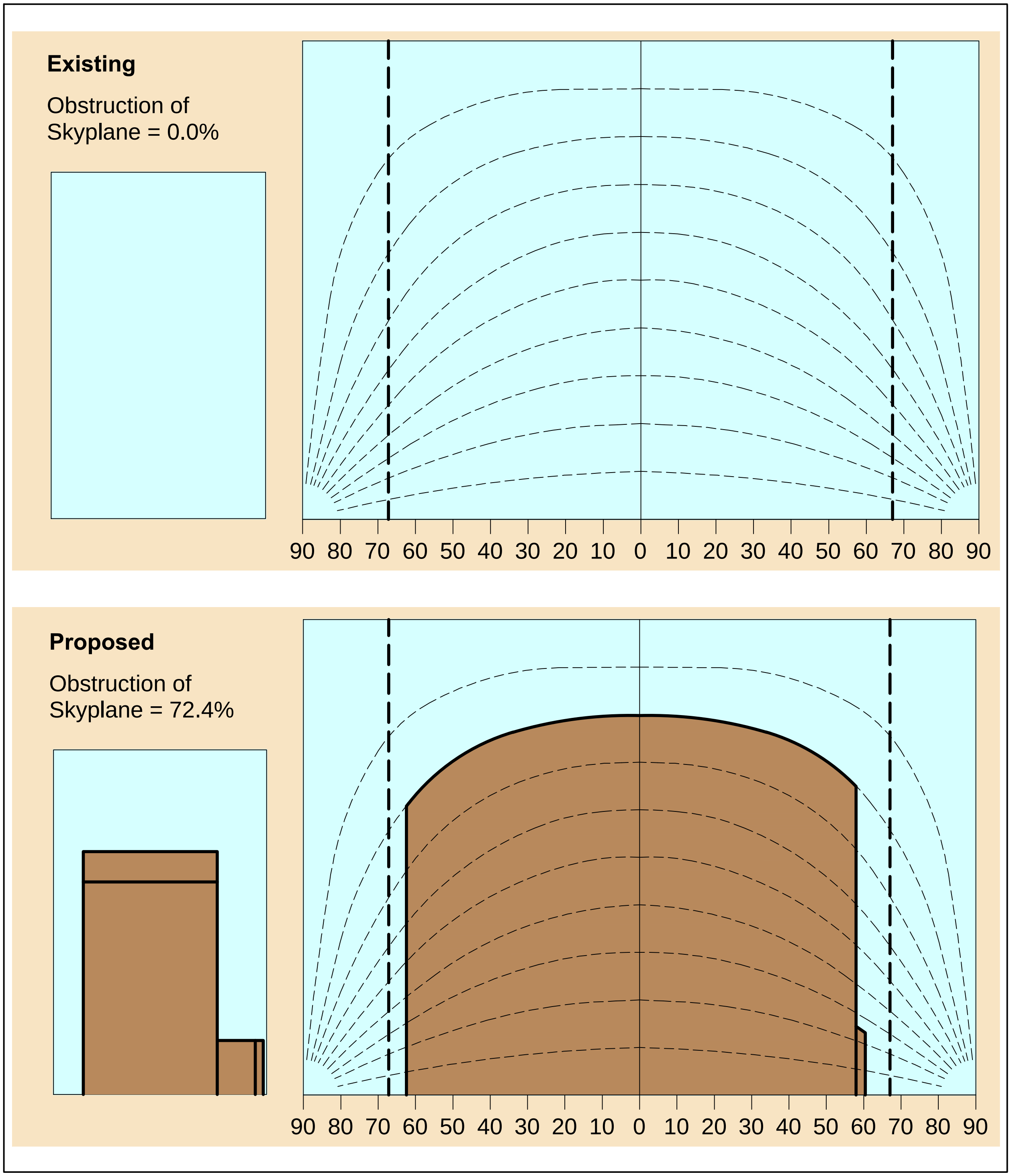


Figure 4.3-2
Boston Redevlopment Authority Daylight Analysis
Center of Dorchester Avenue

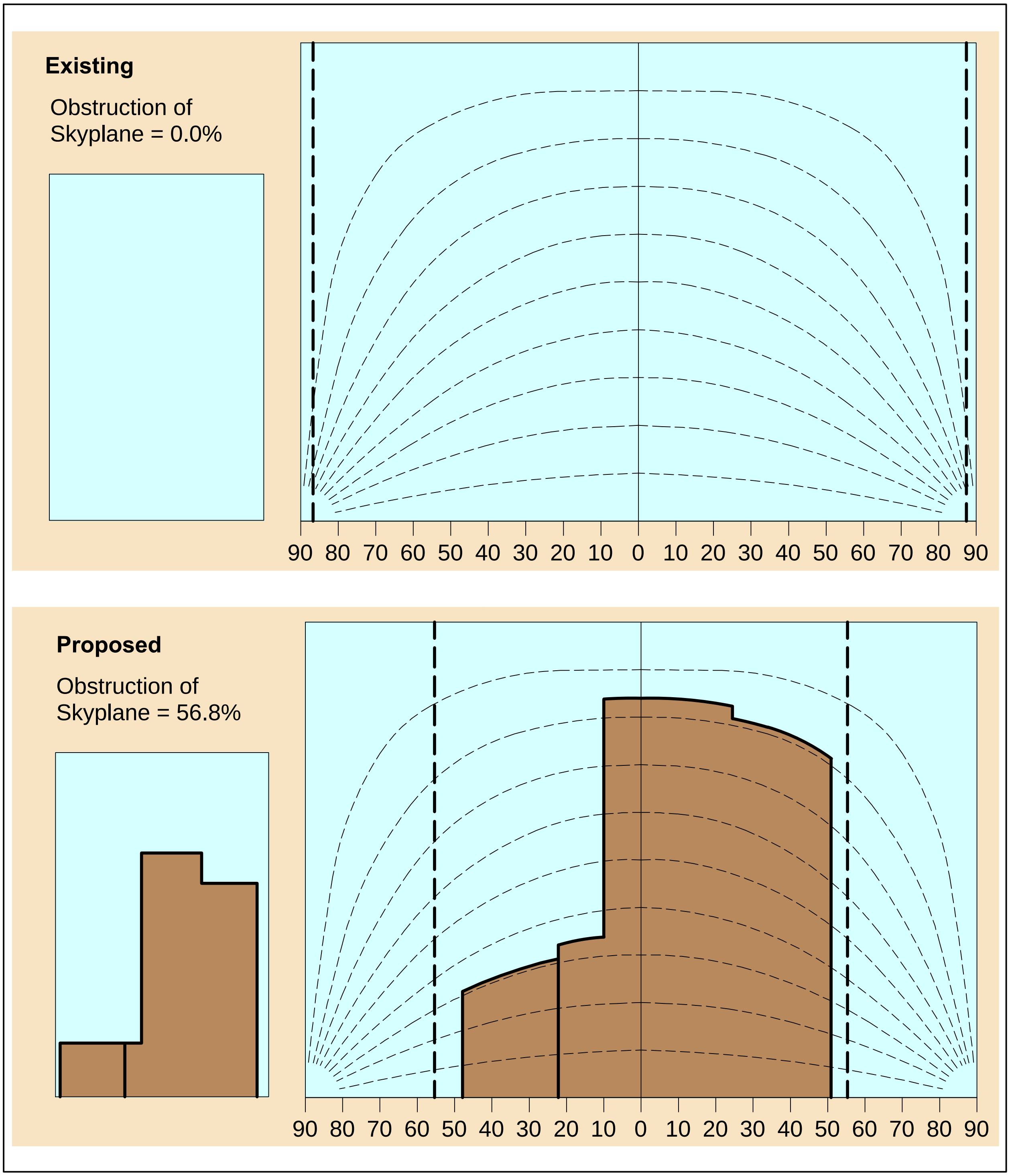


Figure 4.3-3
Boston Redevlopment Authority Daylight Analysis
Center of West 2nd Street

4.4 Air Quality

Tech Environmental, Inc. performed air quality analyses for the proposed 156-room hotel (the "Project" and/or the "Site") to be located at 6 West Broadway (the former Sunoco lot) in South Boston. These analyses consisted of: 1) an evaluation of existing air quality; 2) an evaluation of potential carbon monoxide (CO) impacts from the operation of the Project's heating system and emergency generator, and 3) a microscale CO analysis for intersections in the Project area that meet the BRA criteria for requiring such an analysis.

4.4.1 Existing Air Quality

The City of Boston is currently classified as being in attainment of the Massachusetts and National Ambient Air Quality Standards ("NAAQS") for all of the criteria air pollutants except ozone (see **Table 4.4-1**). These air quality standards have been established to protect the public health and welfare in ambient air, with a margin for safety.

The Massachusetts Department of Environmental Protection ("DEP") currently operates air monitors in various locations throughout the city. The closest, most representative, DEP monitors for carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), fine particulate matter ($PM_{2.5}$), coarse particulate matter (PM_{10}), and lead are located at Dudley Square (Harrison Avenue). Harrison Avenue, Boston, MA. The closest, most representative, DEP monitor for ozone is located at Dudley Square (Harrison Avenue).

Table 4.4-2 summarizes the DEP air monitoring data, for the most recent available, complete, three-year period (2010-2012), that are considered to be representative of the project area. **Table 4.4-2** shows that the existing air quality in the Project area is generally much better than the NAAQS. The highest impacts relative to a NAAQS are for ozone and $PM_{2.5}$. Ozone is a regional air pollutant on which the small amount of additional traffic generated by this Project will have an insignificant impact. The Project's operations will not have a significant impact on local $PM_{2.5}$ concentrations.

Table 4.4-1. Massachusetts and National Ambient Air Quality Standards (NAAQS)

Pollutant	Averaging Time	NAAQS ($\mu g/m^3$)
SO_2	1-hour[P] 24-hour[P] Annual[P] (Arithmetic Mean)	196[a] 365[b] 80
CO	1-hour[P] 8-hour[P]	40,000[b] 10,000[b]
NO_2	1-hour[P] Annual[P/S] (Arithmetic Mean)	188[c] 100
PM_{10}	24-hour[P/S]	150
$PM_{2.5}$	24-hour[P/S] Annual[P/S] (Arithmetic Mean)	35[d] 12[e,f]
O_3	8-hour[P/S]	147[g]
Pb	Rolling 3-Month Avg.[P/S] Calendar Quarter[P/S] (Arithmetic Mean)	0.15 1.5

P = primary standard; S = secondary standard.
[a] 99th percentile 1-hour concentrations in a year (average over three years).
[b] One exceedance per year is allowed.
[c] 98th percentile 1-hour concentrations in a year (average over three years).
[d] 98th percentile 24-hour concentrations in a year (average over three years).
[e] Three-year average of annual arithmetic means.
[f] As of March 18, 2013, the U.S. EPA lowered the $PM_{2.5}$ annual standard from 15 ug/m^3 to 12 ug/m^3.
[g] Three-year average of the annual 4th-highest daily maximum 8-hour ozone concentration must not exceed 0.075 ppm (147 ug/m^3) (effective May 27, 2008) and the annual PM_{10} standard was revoked in 2006.

Table 4.4-2. Representative Existing Air Quality in the Project Area

Pollutant, Averaging Period	Monitor Location	Value (↘g/m^3)	NAAQS (↘g/m^3)	Percent of NAAQS
CO, 1-hour	Harrison Avenue, Boston	2,863	40,000	7%
CO, 8-hour	Harrison Avenue, Boston	2,061	10,000	21%
NO_2, 1-hour	Harrison Avenue, Boston	93.4	188	50%
NO_2, Annual	Harrison Avenue, Boston	34.8	100	35%
Ozone, 8-hour	Harrison Avenue, Boston	131	147	89%
PM_{10}, 24-hour	Harrison Avenue, Boston	41	150	27%
$PM_{2.5}$, 24-hour	Harrison Avenue, Boston	21.3	35	59%
$PM_{2.5}$, Annual	Harrison Avenue, Boston	8.4	12	69%
Lead, Quarterly	Harrison Avenue, Boston	0.017	1.5	1.1%
$SO_{2,}$ 1-hour	Harrison Avenue, Boston	47.4	196	24%

Source: MassDEP, http://www.mass.gov/dep/air/priorities/aqreports.htm., downloaded July 22, 2013.

Notes:

(1) Annual averages are highest measured during the most recent three-year period for which data are available (2010 - 2012). Values for periods of 24-hours or less are highest, second-highest over the three-year period unless otherwise noted.

(2) The eight-hour ozone value is the 3-year average of the annual fourth-highest values, the 24-hour $PM_{2.5}$ value is the 3-year average of the 98th percentile values, the annual $PM_{2.5}$ value is the 3-year average of the annual values – these are the values used to determine compliance with the NAAQS for these air pollutants.

(3) The one-hour NO_2 value is the -year average of the 98th percentile values and the one-hour SO_2 value is the -year average of the 99th percentile values

(4) The one-hour ozone standard was revoked by the US EPA in 2005; the annual PM_{10} standard was revoked in 2006 and the 3-hour SO_2 standard was revoked by the US EPA in 2010.

4.4.2 Impacts from Heating, Mechanical, and Exhaust Systems

The Project will include fuel combustion equipment that will emit air pollutants to the atmosphere when operating. Fuel combustion equipment for the Project will include gas-fired heating equipment and a diesel-fired standby generator (300 kW). Heating will be accomplished with gas-fired hot-water boilers will be created with a central gas-fired system.

The objective of this analysis was to determine the maximum CO concentrations at the closest sensitive receptors surrounding the Project. These closest sensitive receptors include: air intakes located on the proposed building and nearby existing buildings, and pedestrians at ground level anywhere near the Project. The gas-fired heating equipment and a diesel-fired standby generator CO emissions were modeled using an U.S. EPA-approved air model.

Building Heating CO Emission Rate

The Project will include fuel combustion equipment that will emit air pollutants to the atmosphere when operating. Fuel combustion equipment for the Project will include gas-fired hot water boilers for space heating system.

EPA's AP-42 document was used to determine the uncontrolled CO emission rate for the gas-fired equipment. The total equipment heat input capacity for the hotel was conservatively estimated to be approximately 4.0 million Btu per hour (MMBtu/hour). Assuming a heating value of 1,020 Btu/cubic foot of natural gas this translates to approximately 4,080 cubic feet of natural gas burned per hour. Using a CO emission factor of 0.084 lb/MMBtu,1 the maximum total CO emissions from the Project's heating equipment will be 0.33 lb/hour (0.042 gram/sec). This calculation conservatively assumes that all of the gas-fired fuel combustion equipment is operating simultaneously at its full design capacity.

Emissions from the standby generator may occur for brief periods during periodic testing (maximum 20 – 30 minutes per week) and whenever a break in electrical power necessitates their use. Using emissions data from an Caterpillar gas-fired standby generator, the manufacturer's emission factor for CO is 0.25 grams/brake-horsepower. Therefore, the maximum CO emission rate for the 300-kW generator will be 0.086 gram/sec.

Peak Ambient CO Concentration

Worst-case concentrations of CO from the building heating system and standby generator were predicted for locations around the building with using AERMOD model (Version 12345) in screening-mode. The results of the air quality analysis for locations outside and around the building are summarized in **Table 4.4-3**. The results in Table 4.4-3 represent all outside locations on and near the Project Site, including nearby building air intakes and nearby residences. **Appendix B** contains the AERMOD model output.

The AERMOD model in screening-mode was used to predict the maximum concentration of CO by modeling the fuel combustion equipment emissions as a volume source and the standby generator as a point source with aerodynamic building downwash using worst-case meteorological conditions for an urban area. The screening-mode option simulates modeling results predicted by AERSCREEN. The predicted concentrations presented here represent the worst-case air quality impacts from the building heating system and garage at all locations on and around the Project. AERMOD predicted one-hour average concentrations of air pollutants.

AERMOD predicted that the maximum one-hour CO concentration from the fuel combustion equipment and standby generator will be 0.09 ppm (103 µg/m3). This concentration represents the maximum CO concentration at any location surrounding the Project.

[1] US EPA, "Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition Volume I: Stationary Point and Area Sources", Table 1.4-1, January 1995 (revised July 1998).

The maximum predicted eight-hour CO concentration at any ambient (outside) location will be significantly smaller than the one-hour prediction. This is because: 1) the average number of vehicles entering and exiting the garage over the peak eight-hour period will be significantly less than the peak one-hour values used to predict the peak one-hour CO impact, and 2) the worst-case meteorological conditions used to predict the peak one-hour impact will not persist for eight consecutive hours. AERSCREEN guidance allows the maximum eight-hour CO impact to be conservatively estimated by multiplying the maximum one-hour impact by a factor of 0.9 (i.e. the eight-hour impact is 90% of the one-hour impact). The maximum predicted eight-hour CO concentration was determined to be approximately 0.08 ppm (0.09 ppm x 0.9).

The U.S. EPA has established National Ambient Air Quality Standards (NAAQS) to protect the public health and welfare in ambient air, with a margin for safety. The NAAQS for CO are 35 ppm for a one-hour average and 9 ppm for an eight-hour average. The Commonwealth of Massachusetts has established the same standards for CO. The CO background values of 2.5 ppm for a one-hour period and 1.8 ppm for an eight-hour period were added to the maximum predicted building heating system and standby generator ambient impacts to represent the CO contribution from other, more distant, sources. With the background concentration added, the peak, total, one-hour and eight-hour CO impacts from the fuel combustion equipment, at any location around the building, will be no larger than 2.6 ppm and 1.9 ppm, respectively. These maximum predicted total CO concentrations (fuel combustion equipment and standby generator exhaust impacts plus background) are safely in compliance with the NAAQS. This analysis demonstrates that the operation of the fuel combustion equipment will not have an adverse impact on air quality.

Table 4.4-3. Peak Predicted Building Heating System Air Quality Impacts

Location	Peak Predicted One-Hour Impact (ppm)	One-Hour NAAQS (ppm)	Peak Predicted Eight-Hour Impact (ppm)	Eight-Hour NAAQS (ppm)
Outside – Surrounding the Building*	2.6	35 (NAAQS)	1.9	9 (NAAQS)

NAAQS = Massachusetts and National Ambient Air Quality Standards for CO (ppm = parts per million)
* Representative of maximum CO impact at all nearby residences, buildings, and sidewalks.

Conclusions

A conservative air quality analysis demonstrates that there will be no adverse air quality impacts from the operation of the Project's proposed fuel combustion equipment and standby generator.

4.4.3 Microscale CO Analysis for Selected Intersections

The Boston Redevelopment Authority (BRA) and the Massachusetts DEP typically require a microscale air quality analysis for any intersection in the Project study area where the level of service (LOS) is expected to deteriorate to D and the proposed project causes a 10% increase in traffic or where the level of service is E or F and the project contributes to a reduction in LOS. For such intersections, a microscale air quality analysis is required to examine the carbon monoxide (CO) concentrations at sensitive receptors near the intersection.

A microscale CO air quality analysis was performed to predict the maximum one-hour and eight-hour CO concentrations for sensitive receptors at the three intersections in the Project area that meet the BRA selection criteria. The analysis was performed for three cases: 2013 Existing, 2018 No-Build, and 2018 Build. Estimation of CO levels at the intersections that meet the BRA/DEP selection criteria under the 2018 Build scenario provides a good indication of whether the project will interfere with the maintenance of the NAAQS for CO. Since CO levels are highest near intersections where the worst traffic congestion occurs, compliance with the NAAQS at these intersections and receptors protects public health elsewhere in the community.

Dispersion Model

The latest version of the U.S. EPA CAL3QHC model[2] (Version 2.0, dated October 1995) was used to predict maximum one-hour CO concentrations at each intersection from both moving and idling vehicles. This model includes the U.S. EPA CALINE-3 dispersion model[3] along with methods for estimating queue lengths and the contribution of emissions from idling vehicles at intersections. The Air Quality Appendix (**Appendix B)** contains the CAL3QHC model output.

Meteorological Inputs

The following meteorological parameters were selected for the CAL3QHC modeling, in accordance with U.S. EPA and Massachusetts DEP guidance:

- Roughness Length: 321 cm (central business district)
- Mixing Height: 1,000 meters
- Wind Speed: 1.0 m/s (minimum)
- Wind Direction: 360^{o} in 10^{o} increments
- Stability Class: Class D.

Intersections

Eight intersections were included in the transportation study area, and each of these intersections was considered for a microscale CO air quality analysis. Table 4.5-5 shows a summary of the 2018 Build LOS analysis for each intersection. The Project will generate a total of 84 motor vehicle trips during the morning peak traffic period and 85 motor vehicle trips during the afternoon peak traffic period. Based on data presented in Section (summarized in **Table 4.4-4**), two intersections meet the DEP/BRA criteria for a microscale analysis:

1. Dorchester Avenue/West Broadway
2. West Broadway/A Street

[2] U.S. EPA, User's Guide to CAL3QHC Version 2.0: A Modeling Methodology for Predicting Pollution Concentrations Near Roadway Intersections, Office of Air Quality Planning and Standards, September 1995.
[3] California Department of Transportation, CALINE-3, A Versatile Dispersion Model for Predicting Air Pollutant Levels Near Highways and Arterial Streets, FHWA/CA/TL-79/23, Sacramento, CA, November 1979.

Table 4.4-4. Summary of Build Case Level of Service

Intersection	Build LOS (AM/PM)	Requires Analysis?
Dorchester Ave./W. Broadway – signalized	F/E	YES*
West Broadway/A Street – signalized	C/E	YES
A Street/West Second Street – signalized	B/B	NO
West 2nd Street/Porte- cochère Entrance – unsignalized	A/A	NO
Dorchester Avenue/Porte- cochère Entrance – unsignalized	A/A	NO
A Street/West 3rd Street – unsignalized	D/F	NO*
West 2nd Street/Athens Street– unsignalized	B/B	NO
Dorchester Avenue/West 2nd Street – unsignalized	C/D (6.3%)	NO

The LOS shown represents the overall delay at each signalized intersection and the worst approach at the unsignalized intersection. Percentages shown for LOS D are percent increase in traffic from the Project.
*Project does not contribute to reduction in level of service.

Source: Howard/Stein-Hudson Associates, Inc.

Receptors

Receptors are the locations where the CAL3QHC model predicts CO concentrations. Receptors were placed at regular intervals along each modeled roadway, where the public could have access. These receptors conservatively cover all of the locations where the general public may have frequent and prolonged access to the ambient air at each intersection. Figures 1 and 2 in the **Appendix B** show the locations of the receptors that were modeled at each of the three analyzed intersections. Following U.S. EPA guidance, all receptors were placed at a height of 1.8 meters and were located at least 3 meters from roadway curbsides.

Modeled Roadways

Each roadway approach was modeled as a 1,000 meter, free-flow (moving vehicles), line source. The width of each free-flow link was set equal to the roadway width (excluding the parking areas) plus 3 meters on each side. Composite CO emission rates, in units of grams per mile, were applied to each free-flow link.

Each roadway approach with traffic signal control was also modeled as a queue link (vehicles waiting for a traffic signal to turn green). The width of each queue link was modeled as the actual approach lane width. The length of each queue was calculated by the CAL3QHC model. An idle CO emission factor, in grams per hour, was applied to each queue link.

The CAL3QHC model requires the input of signal timing for signalized intersections. All three of the intersections are signalized and were modeled as being signalized for all three cases. Signal timings were provided by Howard/Stein-Hudson Associates, Inc., the Project's transportation consultant, and are shown in the **Appendix B** for the peak periods that were modeled

Eight-Hour Average CO Concentrations

Peak eight-hour CO concentrations from roadway traffic were calculated by multiplying the model predicted one-hour CO values (without an added background concentration) by a persistence factor of 0.7.[4] The persistence factor takes into account that the intensity of the traffic during the peak eight-hour period will be less than that which will occur during the peak one-hour period. It also takes into account that the worst-case meteorological conditions (i.e. low wind speed blowing directly from the source to the receptor), corresponding to the peak one-hour concentrations, will not persist for an entire eight-hour period.

Background CO Concentrations

The one-hour and eight-hour traffic-related CO concentrations predicted by the CAL3QHC model were added to conservative one-hour and eight-hour background CO concentrations of 2.5 parts of CO ppm and 1.8 ppm, respectively, for the existing case. Background concentrations for the year 2018 will likely be lower than the existing background CO concentrations. To be conservative, the same background concentrations were used for the 2018 No-Build and Build cases. The sums of the CAL3QHC modeled CO concentrations plus background were compared to the NAAQS for CO.

CO Emission Factors

The MOBILE6.2 Emission Factor Model[5] was used to predict the composite CO emission factors for moving (free flow) vehicles at the intersections and the idle emission factors for vehicles queued at traffic signals. Output from the MOBILE6.2 model is included in the **Appendix B**.

The input parameters used for the MOBILE6.2 models are consistent with those required by the latest Massachusetts DEP guidance dated February 12, 2003. This guidance allows credit to be taken for an enhanced I/M program with Massachusetts specific cutpoints, Stage II (refueling) emission controls, and reformulated gasoline.

Idle emission factors were calculated from the MOBILE6.2 emission factors for a speed of 2.5 mph, following U.S. EPA guidance. The idle emission factors for 2013 and 2018 were determined to be 54.36 and 47.86 grams/hour, respectively. MOBILE6.2 was used to predict the free flow emission rate for vehicles traveling on the roadways, conservatively using a vehicle

[4] U.S. EPA, Guideline for Modeling Carbon Monoxide from Roadway Intersections, EPA-454/R-92-005, Office of Air Quality Planning and Standards, November 1992.
[5] U.S. EPA, User's Guide to MOBILE6.1 and MOBILE6.2: Mobile Source Emission Factor Model, EPA420-R-02-028, Office of Transportation and Air Quality, October 2002.

speed of 25 mph for all of the modeled roadways. The free flow CO emission rates for a traffic speed of 25 mph were predicted to be 12.00 grams/mile in 2013 and 10.71 grams/mile in 2018.

Traffic Information

Traffic volume data were available for the peak weekday morning and afternoon periods. Traffic data for the period with the worst LOS (i.e. largest traffic congestion and vehicle delays) at each intersection were modeled to reflect the potential worst-case air quality impacts.

Predicted Project Impacts

The microscale air quality analysis predicted maximum one-hour and eight-hour CO concentrations for sensitive receptors for three intersections in the project area which meet the BRA/DEP selection criteria. The highest predicted CO concentrations for the one-hour and eight-hour periods, which consist of the sum of the maximum predicted impacts from intersection traffic and a conservative background CO concentration, are summarized in Tables **4.4-5 and 4.4-6**. The results in these tables do not represent typical air pollution levels in the project area. Rather, they represent the highest concentrations that could exist during the joint occurrence of worst-case meteorology and peak roadway traffic.

2013 Existing Case: The maximum predicted one-hour and eight-hour CO concentrations, including conservative background concentrations of CO, for the 2013 Existing case are 3.6 ppm and 2.6 ppm, respectively. These maximum air quality impacts are predicted to occur at receptor #33 to the north of the intersection of Dorchester Avenue/West Broadway (see the Figure in the **Appendix B**), and are in compliance with the NAAQS for CO.

2018 No-Build Case: For the 2018 No-Build case, the maximum predicted one-hour and eight-hour CO concentrations, including conservative background concentrations of CO, are 3.4 ppm and 2.4 ppm, respectively These maximum air quality impacts are predicted to occur at receptor #33 to the north of the intersection of Dorchester Avenue/West Broadway (see the Figure in the **Appendix B**). These maximum concentrations are less than those predicted for the 2013 Existing case and comply with the one-hour and eight-hour NAAQS for CO.

Table 4.4-5. Maximum Predicted One-Hour CO Concentrations at Sensitive Receptors (ppm)

Intersection	2013 Existing	2018 No-Build	2018 Build
Dorchester Avenue/West Broadway	3.6	3.4	3.2
West Broadway/ A Street	3.2	3.2	3.2
NAAQS	**35**	**35**	**35**

Note: Maximum predicted one-hour concentrations include background concentrations. The added one-hour average background CO concentration is 2.5 ppm in 2013 and 2018.

2018 Build Case: For the 2018 Build case, the maximum predicted one-hour and eight-hour CO concentrations, including conservative background concentrations of CO, are 3.2 and 2.3 ppm, respectively. These maximum concentrations are less than those predicted for the 2013 Existing case and the 2018 No-Build case. The predicted CO impacts at all receptors are safely in compliance with the one-hour and eight-hour NAAQS for CO. These maximum air quality impacts are also predicted to occur at receptor #3 on the northwest corner of the intersection of Dorchester Avenue/West Broadway (see the Figure in the **Appendix B**). These results demonstrate that the project will not have an adverse impact on air quality at the most congested intersections in the project area.

Table 4.4-6. Maximum Predicted Eight-Hour CO Concentrations at Sensitive Receptors (ppm)

Intersection	2013 Existing	2018 No-Build	2018 Build
Dorchester Avenue/West Broadway	2.6	2.4	2.3
West Broadway/ A Street	2.3	2.3	2.3
NAAQS	**9**	**9**	**9**

Note: Maximum predicted eight-hour concentrations include background concentrations. The added eight-hour average background CO concentration is 1.8 ppm in 2013 and 2018.

The maximum predicted CO impacts for the 2018 No-Build and Build cases are less than those predicted for the 2013 Existing Case. This is a result of the lower CO emission rates for motor vehicles predicted by the MOBILE6.2 model for 2018, compared to 2013. The reduction in motor vehicle CO emission rates is primarily a result of the improved motor vehicle emission controls, and occurs as newer vehicles with lower CO emissions replace older vehicles on the road. The maximum predicted CO impacts for the 2018 Build case is less than those predicted for the 2018 No-Build Case due to proposed Travel Demand Management (TDM) measures presented in

Section 7.0. The results show that the project will not have a significant impact on the air quality at the analyzed intersections.

The worst-case air quality impacts at the Project site can be conservatively represented by the highest predicted CO concentration at the intersection of Dorchester Avenue/West Broadway, which is adjacent to the Project site. Adding in the impacts from the fuel combustion equipment and standby generator and background concentration, the conservative estimate of the worst-case total one-hour and eight-hour CO impacts at the Project site will be 3.7 ppm and 2.7 ppm, respectively. These values are safely in compliance with the NAAQS for CO and indicate that the Project will not have an adverse impact on local air quality.

Conclusions

The microscale CO air quality dispersion modeling analysis clearly indicates that the worst-case traffic generated by the South Boston Hotel project will not cause or contribute to any violations of the NAAQS for CO, and will not significantly affect air quality. Total CO impacts at the intersections with the largest delays and at the Project site, including the impacts from the fuel combustion equipment and standby generator, are predicted to be safely in compliance with the NAAQS for CO.

4.5 Noise Impacts

Tech Environmental, Inc., performed a noise study to determine whether the operation of the proposed Project will comply with the City of Boston Noise Regulations and the Massachusetts Department of Environmental Protection ("DEP") Noise Policy.

4.5.1 Common Measures of Community Noise

The unit of sound pressure is the decibel (dB). The decibel scale is logarithmic to accommodate the wide range of sound intensities to which the human ear is subjected. A property of the decibel scale is that the sound pressure levels of two separate sounds are not directly additive. For example, if a sound of 70 dB is added to another sound of 70 dB, the total is only a 3-decibel increase (or 73 dB), not a doubling to 140 dB. Thus, every 3 dB increase represents a doubling of sound energy. For broadband sounds, a 3 dB change is the minimum change perceptible to the human ear. Table 4.5-1 gives the perceived change in loudness of different changes in sound pressure levels.6

[6] American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc., 1989 ASHRAE Handbook--Fundamentals (I-P) Edition, Atlanta, GA, 1989.

Table 4.5-1. Subjective Effects of Changes in Sound Pressure Levels

Change in Sound Level	Apparent Change in Loudness
3 dB	Just perceptible
5 dB	Noticeable
10 dB	Twice (or half) as loud

Non-steady noise exposure in a community is commonly expressed in terms of the A-weighted sound level (dBA); A-weighting approximates the frequency response of the human ear. Levels of many sounds change from moment to moment. Some are sharp impulses lasting 1 second or less, while others rise and fall over much longer periods of time. There are various measures of sound pressure designed for different purposes. To establish the background ambient sound level in an area, the L_{90} metric, which is the sound level exceeded 90 percent of the time, is typically used. The L_{90} can also be thought of as the level representing the quietest 10 percent of any time period. Similarly, the L_{10} can also be thought of as the level representing the quietest 90 percent of any time period. The L_{10} and L_{90} are broadband sound pressure measures, i.e., they include sounds at all frequencies.

Sound level measurements typically include an analysis of the sound spectrum into its various frequency components to determine tonal characteristics. The unit of frequency is Hertz (Hz), measuring the cycles per second of the sound pressure waves, and typically the frequency analysis examines nine octave bands from 32 Hz to 8,000 Hz. A source is said to create a pure tone if acoustic energy is concentrated in a narrow frequency range and one octave band has a sound level 3 dB greater than both adjacent octave bands.

The acoustic environment in an urban area such as the Project area results from numerous sources. Observations show that major contributors to the background sound level in the Project area include motor vehicle traffic on local and distant streets, aircraft over-flights, mechanical equipment on nearby buildings, and general city noises such as street sweepers and police/fire sirens. Typical sound levels associated with various activities and environments are presented in **Table 4.5-2**.

4.5.2 Noise Regulations

Commonwealth Noise Policy

The DEP regulates noise through 310 CMR 7.00, "Air Pollution Control." In these regulations "air contaminant" is defined to include sound and a condition of "air pollution" includes the presence of an air contaminant in such concentration and duration as to "cause a nuisance" or "unreasonably interfere with the comfortable enjoyment of life and property."

Regulation 7.10 prohibits “unnecessary emissions” of noise. The DEP DAQC Policy Statement 90-001 (February 1, 1990) interprets a violation of this noise regulation to have occurred if the noise source causes either:

1. An increase in the broadband sound pressure level of more than 10 dBA above the ambient level; or
2. A “pure tone” condition.

The ambient background level is defined as the L_{90} level as measured during equipment operating hours. A “pure tone” condition occurs when any octave band sound pressure level exceeds both of the two adjacent octave band sound pressure levels by 3 dB or more.

The DEP does not regulate noise from motor vehicles accessing a site or the equipment backup notification alarms. Therefore, the provisions described above only apply to a portion of the sources that may generate sound following construction of the Project.

Local Regulations

The City of Boston Environment Department regulates noise through the Regulations for the Control of Noise as administered by the Air Pollution Control Commission. The Project is located in an area consisting of commercial and residential uses. The Project will have low-rise residential uses to the north, east, and south. The Project must comply with Regulation 2.2 for noise levels in Residential Zoning Districts at these residential locations**. Table 4.5-3** lists the maximum allowable octave band and broadband sound pressure levels for residential and business districts. Daytime is defined by the City of Boston Noise Regulations as occurring between the hours of 7:00 a.m. and 6:00 p.m. daily except Sunday. Compliance with the most restrictive nighttime residential limits will ensure compliance for other land uses with equal or higher noise limits.

Table 4.5-2. Common Indoor and Outdoor Sound Levels

Outdoor Sound Levels	Sound Pressure (μPa)	Sound Level (dBA)	Indoor Sound Levels
	6,324,555	110	Rock Band at 5 m
Jet Over-Flight at 300 m		105	
	2,000,000	100	Inside New York Subway Train
Gas Lawn Mower at 1 m		95	
	632,456	90	Food Blender at 1 m
Diesel Truck at 15 m		85	
Noisy Urban Area—Daytime	200,000	80	Garbage Disposal at 1 m
		75	Shouting at 1 m
Gas Lawn Mower at 30 m	63,246	70	Vacuum Cleaner at 3 m
Suburban Commercial Area		65	Normal Speech at 1 m
	20,000	60	
Quiet Urban Area—Daytime		55	Quiet Conversation at 1m
	6,325	50	Dishwasher Next Room
Quiet Urban Area—Nighttime		45	
	2,000	40	Empty Theater or Library
Quiet Suburb—Nighttime		35	
	632	30	Quiet Bedroom at Night
Quiet Rural Area—Nighttime		25	Empty Concert Hall
Rustling Leaves	200	20	Average Whisper
		15	Broadcast and Recording Studios
	63	10	
		5	Human Breathing
Reference Pressure Level	20	0	Threshold of Hearing

Notes: μPa, or micro-Pascals, describes sound pressure levels (force/area). DBA, or A-weighted decibels, describes sound pressure on a logarithmic scale with respect to 20 μPa (reference pressure level).

Table 4.5-3. Maximum Allowable Sound Pressure Levels (dB) City of Boston

Octave Band (Hz)	Zoning District		
	Residential (Daytime)	Residential (All Other Times)	Business (anytime)
32 Hz	76	68	79
63 Hz	75	67	78
125 Hz	69	61	73
250 Hz	62	52	68
500 Hz	56	46	62
1000 Hz	50	40	56
2000 Hz	45	33	51
4000 Hz	40	28	47
8000 Hz	38	26	44
Broadband (dBA)	**60**	**50**	**65**

4.5.3 Pre-Construction Sound Level Measurements

Existing baseline sound levels in the Project area were measured during the quietest overnight period when human activity and street traffic were at a minimum, and when the Project's mechanical equipment (the principal sound sources) could be operating. Since the Project's mechanical equipment may operate at any time during a 24-hour day, a weekday between 11:00 p.m. and 4:00 a.m. was selected as the worst-case time period, i.e., the time period when Project-related sounds may be most noticeable due to the quieter background sound levels. Establishing an existing background (L_{90}) during the quietest hours of the facility operation is a conservative approach for noise impact assessment and is required by the DEP Noise Policy.

The nighttime noise measurement locations are as follows (see the Figure 1 in the **Appendix C**):

Monitoring Location #1: West 2nd Street at Athens Street

Monitoring Location #2: Dorchester Ave at Traveler Street

Broadband (dBA) and octave band sound level measurements were made with a Bruel and Kjaer Model 2250 environmental sound level analyzer, at each monitoring location, for a duration of approximately twenty minutes. The full octave band frequency analysis was performed on the frequencies spanning 16 to 16,000 Hertz. A time-integrated statistical analysis of the data used to quantify the sound variation was also performed, including the calculation of the L_{90}, which is used to set the ambient background sound level.

The B&K model 2250 is equipped with a ½" precision condenser microphone and has an operating range of 5 dB to 140 dB and an overall frequency range of 3.5 Hz to 20,000 Hz. This meter meets or exceeds all requirements set forth in the ANSI S1.4-1983 Standards for Type 1 quality and accuracy and the State and City requirements for sound level instrumentation. Prior to any measurements, this sound analyzer was calibrated with an ANSI Type 1 calibrator that has an accuracy traceable to the National Institute of Standards and Technology (NIST). During all measurements, the B&K 2250 was tripod mounted at approximately five feet above the ground in open areas away from vertical reflecting surfaces.

The sound level monitoring was conducted on Thursday, May 2, 2013. Weather conditions during the sound survey were conducive to accurate sound level monitoring: the temperature was 55^{o}F, the skies were clear, and the winds were 0 to 3 mph. The microphone of the sound level analyzer was fitted with a 7-inch windscreen to negate any effects of wind-generated noise.

The nighttime sound level measurements taken in the vicinity of the Project Site reveal sound levels that are typical for an urban area. A significant source of existing sound at all locations is motor vehicle traffic on nearby highways and local streets, residential and commercial air handling equipment, and aircraft over-flights.

The results of the nighttime baseline sound level measurements are presented in **Table 4.5-4**, and the complete measurement printouts are provided in **Appendix C**. The nighttime background L_{90} level was 54.9 dBA at Location #2 and 56.0 dBA at Location #1. The octave band data in **Table 4.5-4** show that no pure tones were detected in the nighttime noise measurements.

Table 4.5-4. Nighttime Baseline Sound Level Measurements, May 2, 2013

Sound Level Measurement	(Location #1) West 2nd and Athens Street 12:05 - 12:25 a.m.	(Location #2) Macallen Building 12:26- 12:46 a.m.
Broadband (dBA)		
Background (L_{90})	56.0	54.9
Octave Band L_{90} (dB)		
16 Hz	59.1	59.1
32 Hz	63.0	61.6
63 Hz	63.3	61.8
125 Hz	60.4	59.4
250 Hz	55.1	56.0
500 Hz	53.1	52.1
1000 Hz	52.1	50.2
2000 Hz	45.6	44.1
4000 Hz	32.9	32.3
8000 Hz	19.1	18.4
16000 Hz	12.2	12.2
Pure Tone?	No	No

4.5.4 Reference Data and Candidate Mitigation Measures

The mechanical systems for the Proposed Project are in the early design stage. Typical sound power data for the equipment of the expected size and type for the Project have been used in the acoustic model to represent the Project's mechanical equipment. The sound levels from all potential significant Project noise sources are discussed in this section.

The design for the Proposed Project is expected to include the following significant mechanical equipment:

- A 100-ton cooling tower
- Seven makeup air handling units on the building rooftop.
- Six building exhaust fans
- One 300-kW standby generator

The equipment listed above, which will be located on two separate building roof levels, was included in the noise impact analysis. The Project's traffic was not included in the noise analysis because motor vehicles are exempt under both the City of Boston and Massachusetts DEP noise regulations.

The proposed project will have one 300-kW standby generator. This unit will include a critical silencer (mufflers) to mitigate exhaust noise, and will be located in a sound attenuating enclosure, as necessary, to reduce mechanical noise at ground level adjacent to the kitchen area. The standby generator will be operated only when electrical service to the building is interrupted and periodically for brief periods for testing purposes. The standby generator will be tested for the minimum acceptable amount designated by the manufacturer; and will only be tested during daytime periods. To be conservative, the emergency generator was included in the sound level impact analysis. Final standby generator equipment will be selected and designed to assure compliance with all applicable noise regulations.

The sound generation profiles for the mechanical equipment noise sources operating concurrently under full-load conditions were used to determine the maximum possible resultant sound levels from the Project Site as a whole, to define a worst-case scenario. To be in compliance with City and DEP regulations, the resultant sound level must not exceed the allowable octave band limits in the City of Boston noise regulation and must be below the allowable incremental noise increase, relative to existing noise levels, as required in the DEP Noise Policy.

This sound level impact analysis was performed using sound generation data for representative equipment to demonstrate compliance with noise regulations. As the building design evolves, the sound generation for the actual equipment selected may differ from the values that were utilized for the analysis.

To minimize the sound level at nearby residences, the following noise mitigation specifications will be incorporated into the final engineering design of the South Boston Boutique Hotel project, as necessary, to comply with the applicable sound level criteria:

- **Specification of low-noise mechanical equipment and silencers:** The ERU and RTUs will be of a low-noise design. The standby generator will be equipped with a critical exhaust silencer for sound reduction.
- **Acoustical shielding:** The 100-ton cooling tower will be partially enclosed with a 10-foot high L-shaped sound wall in order to meet the City of Boston Noise Ordinance octave band limits at the nearest residence at 21-22 West Broadway. The sound wall will be designed to meet a density of 5 lbs/sf. An alternative would be to replace the cooling tower with a low-noise chiller. The noise analysis is based on the cooling tower and L-shaped sound walls.
- **Operational restrictions:** The standby generator will only be operated when electrical service to the buildings is interrupted and for occasional brief daytime periods for the minimum acceptable amount of testing designated by the manufacturer.

4.5.5 Calculated Future Sound Levels

Methodology

Future maximum sound levels at the upper floors of all existing residences bordering the Project, and at the nearest residential property lines, were calculated with acoustic modeling software assuming simultaneous operation of all mechanical equipment at their maximum loads.

The Cadna-A computer program, a comprehensive 3-dimensional acoustical modeling software package was used to calculate Project generated sound propagation and attenuation.[7] The model is based on ISO 9613, an internationally recognized standard specifically developed to ensure the highly accurate calculation of environmental noise in an outdoor environment. ISO 9613 standard incorporates the propagation and attenuation of sound energy due to divergence with distance, surface and building reflections, air and ground absorption, and sound wave diffraction and shielding effects caused by barriers, buildings, and ground topography.

Receptors

The closest/worst-case sensitive (residential) location is to the southeast of the project area at 21-22 West Broadway. This location was selected based on the proximity of the equipment (smaller distances correspond to larger noise impacts) and the amount of shielding by other buildings (taller nearby residential locations will experience less shielding from the Project's rooftop mechanical equipment, which may result in larger potential noise impacts from the Project). This location is expected to receive the largest sound level impacts from the Project's rooftop mechanical equipment. It can be classified as a residential zone.

The sound level impacts from the building's mechanical equipment were predicted at the closest residential location, as well as at the residential building to the southwest (Macallen Building). Figure 1 in Appendix C shows the locations of the modeled noise receptors. Noise impacts at other nearby noise-sensitive locations (residences, parks, etc.) farther from the Project Site will be less than those predicted for these receptors.

4.5.6 Compliance with State and Local Noise Standards

The City of Boston and DEP noise standards apply to the operation of the mechanical equipment at the proposed Project. The details of the noise predictions are presented in **Tables 4.5-6** through **4.5-8**. The sound impact analysis includes the simultaneous operation of the Project's rooftop HVAC equipment. The predicted sound levels are worst-case predictions that represent all hours of the day, as the analysis assumes full operation of the mechanical equipment 24-hours a day. The typical sound level impacts from the mechanical equipment will likely be lower than what is presented here, since most of the mechanical equipment will operate at full-load only during certain times of the day and during the warmer months of the year, it is not likely that all of the

[7] Cadna-A Computer Aided Noise Abatement Program, Version 4.3

mechanical equipment will operate at the same time. Sound level impacts at locations farther from the Project (e.g. other residences, etc.) will be lower than those presented in this report.

City of Boston Noise Standards

The noise impact analysis results, presented in **Tables 4.5-6** through **4.5-8**, reveal that the sound level impact at the worst-case property line and the closest residence will be between 54.9 and 56.0 dBA. The smallest sound level impact of 39 dBA is predicted to occur at the Macallen Building. The largest sound level impact of 47 dBA is predicted to occur at the closest residence at 21-22 West Broadway. Noise impacts predicted at all locations are in compliance with the City of Boston's nighttime noise limit (50 dBA) for a residential area. Note that sound levels from the Project will be below the residential nighttime limits at all times. The results also demonstrate compliance with the City of Boston, residential, non-daytime, octave band noise limits at both closest locations.

The City of Boston noise limits for business areas are significantly higher than the nighttime noise limits for residential areas (see **Table 4.5-3**). The Project will also easily comply with the City of Boston business area noise limits at all surrounding commercial properties.

Massachusetts DEP Noise Regulations

The predicted sound level impacts at the worst-case property line and the worst-case residential locations were added to the measured L_{90} value of the quietest daily hour to test compliance with DEP's noise criteria. Assuming the Project's mechanical noise is constant throughout the day, the Project will cause the largest increase in sound levels during the period when the lowest background noise occurs. Minimum background sound levels (diurnal) typically occur between 12:00 a.m. and 5:00 a.m.

The predicted sound level impacts at the worst-case property line and the closest residences were added to the L_{90} values measured during the period with the least amount of background noise to test compliance with DEP's noise criteria. The predicted noise impacts at the property line and the closest residences were added to the most-representative measured L_{90} values to determine the largest possible increase in the sound level at each location during the quietest hour at the Project Site.

As shown in **Tables 4.5-6** through **4.5-8**, the Project is predicted to produce a less than 1 dBA change in the background sound levels at all modeled locations. Therefore, the Project’s worst-case sound level impacts during the quietest nighttime periods will be in compliance with the Massachusetts DEP allowed noise increase of 10 dBA. The noise predictions for each octave band indicate that the mechanical equipment will not create a pure tone condition at any location.

Table 4.5-6. Estimated Future Sound Level Impacts – Anytime, Athens Street (Closest Residence) – Location R1

Octave Bands	Residential Nighttime	Maximum Predicted Sound Levels*
32 Hz	68	58
63 Hz	67	58
125 Hz	61	55
250 Hz	52	51
500 Hz	46	44
1000 Hz	40	39
2000 Hz	33	32
4000 Hz	28	25
8000 Hz	26	18
Broadband (dBA)	**50**	**47**
Compliance with the City of Boston Noise Regulation?		Yes

Sound Level Metric	Maximum Sound Levels* (dBA)
Existing Nighttime Background, L_{90} (Location # 1)	56.0
South Boston Hotel Project*	47.2
Calculated Combined Future Sound Level	56.5
Calculated Incremental Increase	+0.5
Compliance with DEP Noise Policy?	Yes

* Assumes full-load operation of all mechanical equipment.
Note: DEP Policy allows a sound level increase of up to 10 dBA

Table 4.5-7. Estimated Future Sound Level Impacts – Anytime, Macallen Building Ground Floor – Location R2

Octave Bands	Residential Nighttime	Maximum Predicted Sound Levels*
32 Hz	68	48
63 Hz	67	49
125 Hz	61	48
250 Hz	52	43
500 Hz	46	35
1000 Hz	40	30
2000 Hz	33	26
4000 Hz	28	17
8000 Hz	26	7
Broadband (dBA)	**50**	**39**
Compliance with the City of Boston Noise Regulation?		Yes

Sound Level Metric	Maximum Sound Levels* (dBA)
Existing Nighttime Background, L_{90} (Location # 2)	54.9
South Boston Hotel Project*	38.6
Calculated Combined Future Sound Level	55
Calculated Incremental Increase	+0.1
Compliance with DEP Noise Policy?	Yes

*Assumes full-load operation of all mechanical equipment.
Note: DEP Policy allows a sound level increase of up to 10 dBA.

Table 4.5-8. Estimated Future Sound Level Impacts – Anytime, Macallen Building Upper Floors – Location R3

Octave Bands	Residential Nighttime Noise Standards	Maximum Predicted Sound Levels*
32 Hz	68	49
63 Hz	67	49
125 Hz	61	47
250 Hz	52	42
500 Hz	46	33
1000 Hz	40	28
2000 Hz	33	24
4000 Hz	28	16
8000 Hz	26	6
Broadband (dBA)	**50**	**37**
Compliance with the City of Boston Noise Regulation?		Yes

Sound Level Metric	Maximum Sound Levels* (dBA)
Existing Nighttime Background, L_{90} (Location # 2)	54.9
South Boston Hotel Project*	37.4
Calculated Combined Future Sound Level	55
Calculated Incremental Increase	+ 0.1
Compliance with DEP Noise Policy?	Yes

*Assumes full-load operation of all mechanical equipment.
Note: DEP Policy allows a sound level increase of up to 10 dBA.

4.5.7 Conclusions

Sound levels at all nearby sensitive locations and at all property lines will fully comply with the most stringent City of Boston and DEP daytime and nighttime sound level limits.

This acoustic analysis demonstrates that the Project’s design will meet the applicable acoustic criteria.

4.6 Stormwater Management and Water Quality

The Project is expected to reduce the volume of stormwater runoff leaving the site as well as substantially improve the water quality. The project will meet the Department of Environmental Protection's (DEP) Stormwater Management Standards for redevelopment.

The volume of stormwater runoff leaving the site will be reduced as landscaped areas are proposed for the now completely impervious site. It is expected that rooftop runoff from the proposed building will be collected and conveyed to a subsurface infiltration system. The infiltration system will have an overflow tied into the combined sewer in Dorchester Avenue or West 2nd Street that will be used during large storm events. It is anticipated that the equivalent of 1 inch over the site's impervious area can be recharged as prescribed in BWSC's Site Plan Requirements.

Stormwater runoff will be treated through the use of deep sump catch basins and water quality treatment units. An operation and maintenance plan will be developed to support the long-term functionality of the proposed stormwater management system.

Erosion and sediment controls will be used during construction to protect adjacent properties, the municipal storm drain system and the on-site storm drain system. A pollution prevention plan will be prepared for use during construction including during demolition activity.

4.7 Solid and Hazardous Waste Materials

4.7.1 Solid Waste

During the preparation of the Site, debris from the parking lot will be removed from the Project Site. The Proponent will ensure that waste removal and disposal during construction and operation will be in conformance with the City and DEP's Regulations for Solid Waste.

Upon completion of construction, the Project is estimated to generate approximately 156 tons of solid waste per year, based on the assumption that each of the 156± rooms will each generate approximately 1.8 tons per year, and the retail/restaurant uses will generate in total 71 tons per year. The restaurant waster is expected to be contained in a trash compactor and removed by a licensed waste hauler contracted by building management. A significant portion of the waste will be recycled. The project will also include ambitious goals for construction waste management in order to meet the requirements for the LEED™ rating system. This strategy will divert demolition and construction waste by reusing and recycling materials.

In order to meet the requirements for the Boston Environmental Department and the LEED™ rating system, the Project will include space dedicated to the storage and collection of recyclables. The recycling program will meet or exceed the City's guidelines, and provide areas for waste paper and newspaper, metal, glass, and plastics (21 through 27, co-mingled).

4.7.2 *Hazardous Waste and Materials*

According to the City of Boston historical street directories from 1940 to 1945, the property was owned by Robert B. Kirkpatrick and operated as a gasoline filling station. According to the City of Boston historical street directories from 1950 to 1981 and the Sanborn Maps from 1950, 1964, and 1990, the property owner was George F. McKenzie and McKenzie Sunoco gasoline station operated on the property. In December 2003, Pappas Industrial Parks, Inc. purchased the property. Subsequent to property acquisition, the gasoline station and all of its associated appurtenances were demolished and/or removed and the property currently consists of an asphalt-paved parking lot.

On September 24, 2004 ECS of Wakefield, Massachusetts notified MassDEP of a 72-hour reportable condition under the Massachusetts Contingency Plan (MCP). The reportable condition consisted of jar-headspace concentration greater than 100 ppm measured in soil samples collected from test pits during the pre-characterization of soil prior to removal of underground storage tanks (USTs). MassDep approved the removal of up to 500 cubic yards of contaminated soil as part of Immediate Response Action (IRA) activities, MassDEP assigned RTN 2-23264 to the release.

In October 2004, ECS oversaw the removal and disposal of three gasoline UST's, one diesel UST, one 275-gallon waste oil UST, two hydraulic lift pistons, and an oil/water separator and their contents off-site.

A Phase I Initial Site Investigation Report was completed for Pappas Industrial Parks by ECS in September 2005.

Based on soil sampling results and analysis of groundwater during the Phase I investigation, a Phase II Comprehensive Site Assessment and Class A-2 Response Action Outcome was completed by GEI Consultants on September 30, 2011, leading to collection of additional soil and groundwater samples to supplement existing data and risk classification.

Additional information on the reports prepared for the Proponent related to subsurface investigations is available on request.

4.8 Geotechnical/Groundwater Impacts Analysis

It is anticipated that there will be little or no impact to the groundwater table due to this Project. Limited dewatering will be required inside the excavation to remove groundwater and surface water runoff or rainwater during construction. The proposed construction is not anticipated to have adverse effects on long-term groundwater levels because the entire property has historically been capped and because the lowest floor level is above the groundwater level. Any groundwater removed from the excavation will be discharged under a NPDES general or exclusion permit. Construction mitigation measures will be incorporated into the Project to avoid the potential for ground movement and settlement during excavation, and potential impacts on adjacent buildings, utility lines and the roadways.

The geotechnical analysis for the Project will also include a description of foundation construction methodology and amount and method of excavation with particular attention on measures to ensure groundwater levels will not be lowered during or after construction.

4.8.1 Groundwater Control

It is anticipated that limited dewatering during construction will be accomplished using filtered sumps. Effluent will either be recharged to the ground on site, or will be discharged under a NPDES general or exclusion permit. Effluent will be treated before discharge as required by the permit.

4.8.2 Probable Project Impacts and Mitigation Measures

It is anticipated that there will be little or no impact to groundwater levels die to this Project. However, the excavation during construction may result in limited settlements of the adjacent ground surface and utilities. Mitigation measures will include the use of appropriate excavation support to minimize potential settlements of roadways and utilities.

4.9 Construction Impact

The following section describes impacts likely to result from the South Boston Hotel Project construction and the steps that will be taken to avoid or minimize environmental and transportation-related impacts. The Proponent will employ a construction manager that will be responsible for developing a construction phasing and staging plan and for coordinating construction activities with all appropriate regulatory agencies. The Project's geotechnical consultant will provide consulting services associated with foundation design recommendations, prepare geotechnical specifications, and review the construction contractor's proposed procedures.

4.9.1 Construction Management Plan

The Proponent will comply with applicable state and local regulations governing construction of the Project. The Proponent will require that the general contractor comply with the Construction Management Plan, ("CMP") developed in consultation with and approved by the Boston Transportation Department ("BTD"), prior to the commencement of construction. The construction manager will be bound by the CMP, which will establish the guidelines for the duration of the Project and will include specific mitigation measures and staging plans to minimize impacts on abutters.

Proper pre-construction planning with the neighborhood will be essential to the successful construction of this Project. Construction methodologies that will ensure safety will be employed, signage will include construction manager contact information with emergency contact numbers.

The Proponent will also coordinate construction with other ongoing projects in the neighborhood.

4.9.2 Proposed Construction Program

Construction Activity Schedule

The construction period for the proposed Project is expected to last approximately 15 months, beginning in the 4th Quarter 2013 and reaching completion in the 1st Quarter 2015. See **Figure 4.9-1** for the preliminary schedule for additional detail. The City of Boston Noise and Work Ordinances will dictate the normal work hours, which will be from 7:00 AM to 6:00 PM, Monday through Friday.

Perimeter Protection/Public Safety

The CMP will describe any necessary sidewalk closures, pedestrian re-routings, and barrier placements and/or fencing deemed necessary to ensure safety around the Site perimeter. If possible, the sidewalk will remain open to pedestrian traffic during the construction period. Barricades and secure fencing will be used to isolate construction areas from pedestrian traffic. In addition, sidewalk areas and walkways near construction activities will be well marked and lighted to ensure pedestrian safety.

Proper signage will be placed at every corner of the Project as well as those areas that may be confusing to pedestrians and automobile traffic.

The Proponent will continue to coordinate with all pertinent regulatory agencies and representatives of the surrounding neighborhoods to ensure they are informed of any changes in construction activities.

Activity ID	Activity Name	Orig Dur	Start	Finish
PAPPAS PROPERITES - SOUTH BOSTON HOTEL				
1000	Notice to Proceed	0	11/12/13*	
1010	Demolition / Site	20	11/12/13	12/10/13
1020	Superstructure	120	12/11/13	06/02/14
1030	Facade	40	05/05/14	06/30/14
1040	Roof	40	06/03/14	07/29/14
1050	MEP Rough-In	120	03/24/14	09/10/14
1060	Fit-Out	180	06/17/14	03/04/15
1070	Start-Up / Inspections	40	02/04/15	04/01/15
1080	Occupancy	0		04/01/15

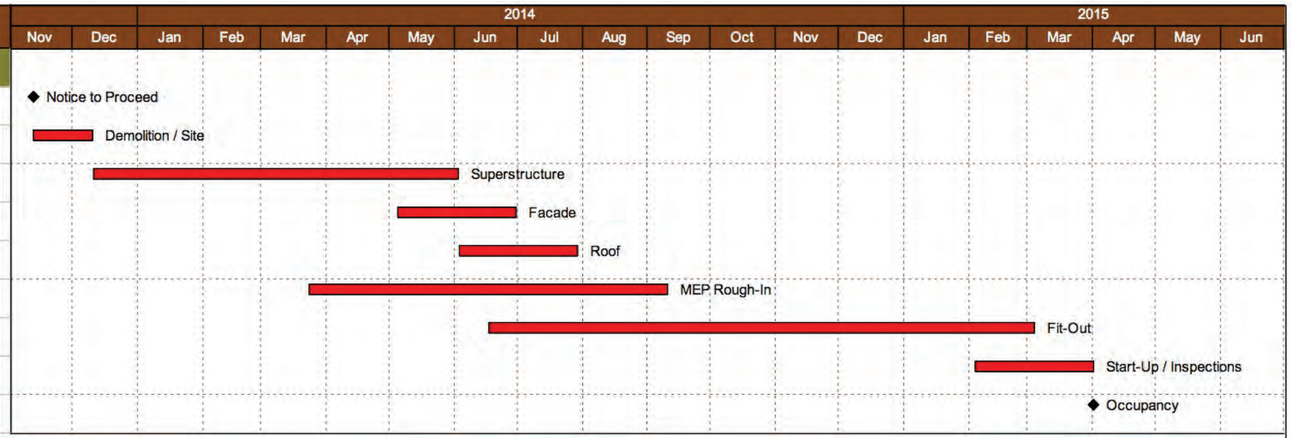


Figure 4.9-1
Preliminary Construction Timeline

4.9.3 *Construction Traffic Impacts*

Construction Vehicle Routes

Estimated truck deliveries and routes are identified in at the end of this section. Specific truck routes will be established with BTD through the CMP. These established truck routes will prohibit travel on any residential side streets. Construction contracts will include clauses restricting truck travel to BTD requirements. Maps showing approved truck routes will be provided to all suppliers, contractors, and subcontractors. It is anticipated that all deliveries will be via I-93, across the Broadway Street Bridge direct to the site, not passing through any residential areas.

Construction Worker Parking

The number of workers required for construction of the Project will vary during the construction period. However, it is anticipated that all construction workers will arrive and depart prior to peak traffic periods.

Limited parking in designated areas of the Project Site and lay-down area(s) will be allowed. Parking will be discouraged in the immediate neighborhood. Further, public transit use will be encouraged with the Proponent and construction manager working to ensure the construction workers are informed of the public transportation options serving the area. Terms and conditions related to worker parking will be written into each subcontractor's contract. The contractor will provide a weekly orientation with all new personnel to ensure enforcement of this policy.

Pedestrian Traffic

The Site abuts sidewalks on two streets. Pedestrian traffic may be temporarily impacted in these areas. The Construction Manager will minimize the impact the construction of the proposed building will have and the adjacent sidewalks. The contractor will implement a plan that will clearly denote all traffic patterns. Safety measures such as jersey barriers, fencing, and signage will be used to direct pedestrian traffic around the construction site and to secure the work area.

4.9.4 *Construction Environmental Impacts and Mitigation*

Construction Air Quality

Construction activities may generate fugitive dust, which will result in a localized increase of airborne particle levels. Fugitive dust emission from construction activities will depend on such factors as the properties of the emitting surface (e.g. moisture content), meteorological variables, and construction practices employed.

To reduce the emission of fugitive dust and minimize impacts on the local environment the construction contractor will adhere to a number of strictly enforceable mitigation measures. These measures may include:

- Using wetting agents to control and suppress dust from construction debris;
- Ensuring that all trucks traveling to and from the Project Site will be fully covered;
- Removing construction debris regularly;
- Monitoring construction practices closely to ensure any emissions of dust are negligible;
- Cleaning streets and sidewalks to minimize dust and dirt accumulation;
- Monitoring construction activities by the job site superintendent and safety officer; and
- Wheel-washing trucks before they leave the Project Site during the excavation phase.

Construction Noise Impacts

To reduce the noise impacts of construction on the surrounding neighborhood, a number of noise mitigation measures will be included in the CMP. Some of the measures that may be taken to ensure a low level of noise emissions include:

- Initiating a proactive program for compliance to the City of Boston's noise limitation impact;
- Scheduling of work during regular working hours as much as possible;
- Using mufflers on all equipment and ongoing maintenance of intake and exhaust mufflers;
- Muffling enclosures on continuously operating equipment, such as air compressors and welding generators;
- Scheduling construction activities so as to avoid the simultaneous operation of the noisiest construction activities;
- Turning off all idling equipment;
- Reminding truck drivers that trucks cannot idle more than five (5) minutes unless the engine is required to operate lifts of refrigeration units;
- Locating noisy equipment at locations that protect sensitive locations and neighborhoods through shielding or distance;
- Installing a site barricade at certain locations;
- Identifying and maintaining truck routes to minimize traffic and noise throughout the project;
- Replacing specific construction techniques by less noisy ones where feasible-e.g., using vibration pile driving instead of impact driving if practical and mixing concrete off-site instead of on-site; and
- Maintaining all equipment to have proper sound attenuation devices.

4.9.5 Rodent Control

The City of Boston enforces the requirements established under Massachusetts State Sanitary Code, Chapter 11, 105 CMR 410.550. This policy establishes that the elimination of rodents is required for issuance of any building permits. During construction, rodent control service visits will be made by a certified rodent control firm to monitor the situation.

4.9.6 Utility Protection During Construction

During construction, the City or Commonwealth's infrastructure will be protected using sheeting and shoring, temporary relocations, and construction staging as required. The contractor will be required to coordinate all protection measures, temporary supports, and temporary shutdowns of all utilities with the appropriate utility owners and/or agencies. The contractor will also be required to provide adequate notification to the utility owner/operator prior to any work commencing on their utility. Also, in the event a utility cannot be maintained in service during a switch-over to a temporary or permanent system, the contractor will be required to coordinate the shutdown with the utility owners/operators and Project abutters to minimize impacts and inconveniences accordingly.

5.0 HISTORIC RESOURCES COMPONENT

The following section provides a discussion of the existing buildings on the Project Site and the historic districts in the Project vicinity.

5.1 Project Site and Existing Buildings

Much of the area known today as the Seaport was initially tidal marsh. Originally a peninsula of approximately 579 acres, South Boston separated Boston Harbor and South Bay from Dorchester Bay. A rural area of little activity, South Boston during the 17th and 18th centuries served Dorchester as pasturage. In 1804, South Boston was annexed to Boston and legislation was passed allowing for landfill to create new sites for commercial development. In 1805, the South Boston toll bridge opened, providing access from South Boston to the center of the city and the Dorchester Turnpike was established, connecting the growing district to Dorchester. A commercial axis developed along Broadway with residential uses clustering around West Fourth Street. Industrial activities began to appear around Fort Point Channel, including iron and glass foundries and shipyards. The Old Colony Railroad was laid along Old Colony Avenue in 1845. During the period between 1830 and 1850, the population of South Boston had increased from 2,200 to 13,000 and by 1870 it stood at over 39,000. By 1910, South Boston' land area had increased in size to 1,333 acres. During the early industrial era of the first half of the 19th century, iron foundries and machine shops formed the area's economic base. The next phase of industrialism focused on the area's premier intermodal transportation access (by rail and water) and manufacturing for transport took the lead as the singular most important industry.

According to files at the Massachusetts Historical Commission, the on-site structures are not listed in the National or State Register of Historic Places, or the Inventory of Historical and Archaeological Assets of the Commonwealth. It is not expected that the Project will cause adverse impacts on any historic or architectural elements of nearby historic resources outside the Project Site (see **Figure 5-1** at the end of this section for historic resources in the Project vicinity).

5.2 Project Site at West Broadway/Dorchester Avenue Intersection

According to the Sanborn Maps from 1899 and 1923, the property, located at the intersection of West Broadway and Dorchester Avenue, consisted of several lots, which appear to be improved with residential structures. According to the City of Boston historical street directories from 1940 to 1945, the property was owned by Robert B. Kirkpatrick and operated as a gasoline filling station. According to the City of Boston historical street directories from 1950 to 1981 and the Sanborn Maps from 1950, 1964, and 1990, the property owner was George F. McKenzie and McKenzie Sunoco gasoline station operated on the property. In December 2003, Pappas Industrial Parks, Inc. purchased the property. Subsequent to property acquisition, the gasoline station and all of its associated appurtenances were demolished and/or removed and the property currently consists of an asphalt-paved parking lot.

5.3 Historic Districts and Resources

The Project Site is not within, nor does it directly abut, any listed historic districts or resources. The area surrounding the Project Site is a busy commercial district. Retail and commercial uses characterize much of the area along Dorchester Avenue and Broadway. North of the Project Site, the Gillette Company factory complex and other industrial uses are present.

While there are no buildings or districts within a quarter mile of the Project Site that are presently on the National Register of Historic Places, several sites and districts that are recommended for National Register historic designation exist in the surrounding area. A discussion of these sites is provided below.

5.4 Church of Saints Peter and Paul and Parochial Residence

Located at 45 West Broadway a block away from the Project Site, this church was designed by Boston architect Gridley J. F. Bryant in the early 19th century. Constructed of Quincy granite, the building was begun in 1842 and completed in 1845. A severe fire in 1848 destroyed the interior leaving only the outer walls, but the structure was rebuilt and was rededicated in 1853.

Located at 55 West Broadway, the parish house is a large 3-story red brick building with double swell bowed façade, sandstone trim, and a porch with a single arched entry. Between 1891 and 1899 the building was connected to the Church.

Both buildings are recommended for inclusion on the National Register of Historic Places and for recognition as Boston Landmarks. The church has recently undergone a residential conversion.

5.5 Fort Point Historic District

Lying north of the proposal Site, just east of the Fort Point Channel, this area is composed of large, ornamental brick warehouses constructed by the Boston Wharf Company during the latter half of the 19th century and early 20th century. Renovated and rehabilitated over time, these structures now house a variety of uses. Many of the buildings house commercial uses such as financial, architectural, and computer office space, while there also exists a residential base, with many artists residing in the renovated warehouses. A portion of this area, consisting of 98 industrial, commercial, and civic buildings in addition to five bridges, has been determined eligible for inclusion on the National Register of Historic Places.

5.6 Archaeological Resources

Upon researching the Site on the Boston Inventory Map at Massachusetts Historic Commission, it was determined that there are no existing pre-historic or historic archaeological sites on the Site, nor are there any within a quarter mile of the Project Site.

Figure 5-1.
Historic Resources

6.0 INFRASTRUCTURE SYSTEMS COMPONENT

The existing infrastructure surrounding the site appears sufficient to service the needs of the Proposed Project. The following sections describe the existing sewer, water, and drainage systems surrounding the site and explain how these systems will service the development. The analysis also discusses any anticipated Project-related impacts on the utilities and identifies mitigation measures to address these potential impacts.

A detailed infrastructure analysis will be performed when the Project proceeds into the Design Development Phase. The Project's team will coordinate with the appropriate utilities to address the capacity of the area utilities to provide services for the new building. A Boston Water and Sewer Commission (BWSC) Site Plan and General Service Application is required for the new water, sanitary sewer, and storm drain connections. In addition, a Storm Water Pollution Prevention Plan will be submitted specifying best management measures for protecting the BWSC drainage systems during construction.

A Drainage Discharge Permit Application is required from BWSC for any construction dewatering. The appropriate approvals from the Massachusetts Water Resource Authority (MWRA), Massachusetts Department of Environmental Protection (MassDEP), and the U.S. Environmental Protection Agency (EPA) will also be sought.

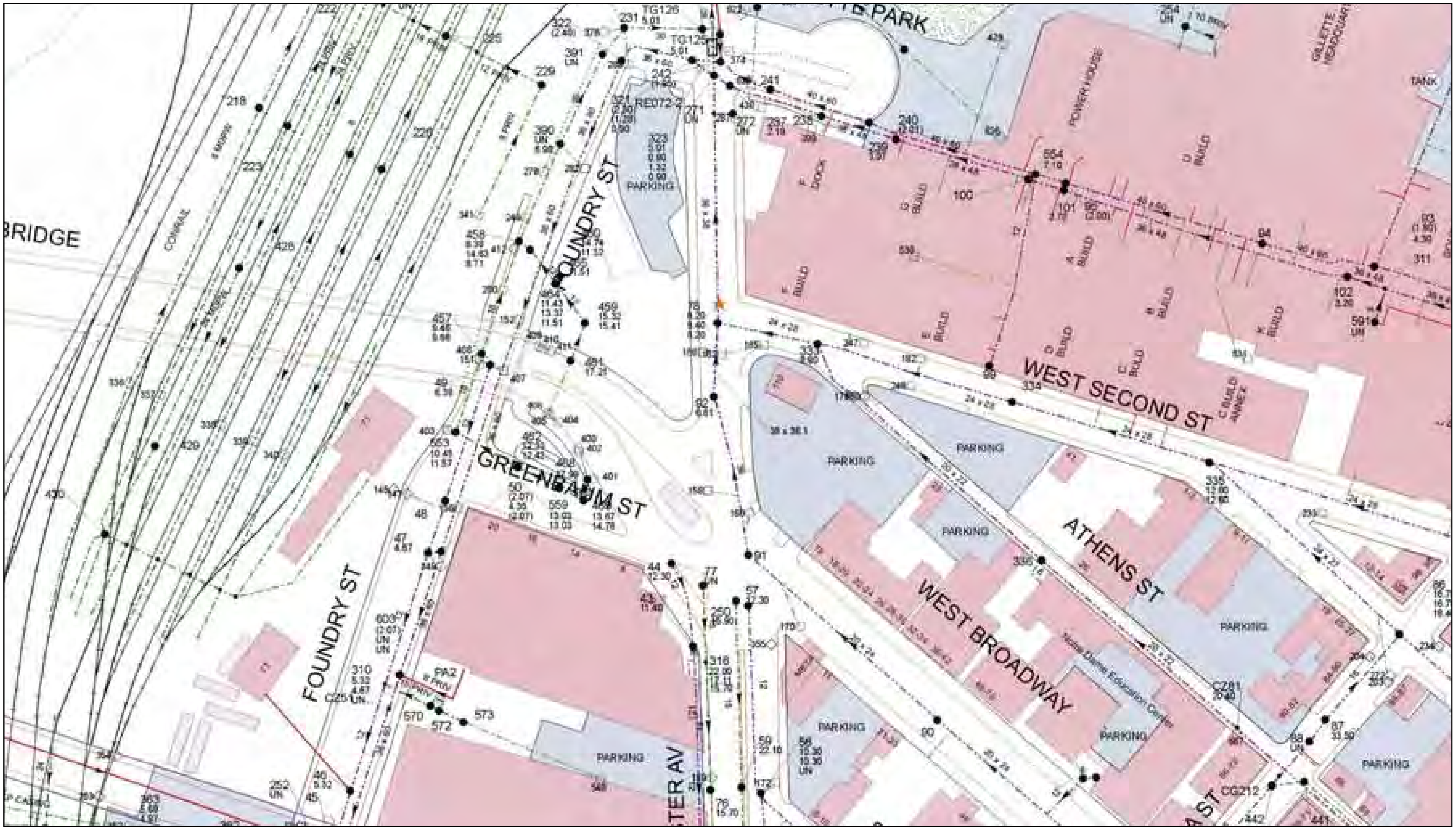
6.1 Sanitary Sewer System

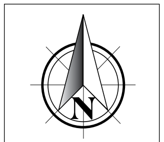
6.1.1 Existing Sewer System

The Boston Water and Sewer Commission owns and maintains the sewer system adjacent to the site (See **Figure 6-1**). There is an existing 20' x 24" combined sewer located in West Broadway to the south of the Project. This sewer ties into a 36-inch combined sewer located in Dorchester Avenue, which increases to a 36" x 38" culvert to the northwest of the Project site. There is also a 24"x 28" combined sewer in West 2nd Street located to the north of the Project site that ties into the Dorchester Avenue system. The existing site consists of a surface parking lot and presently does not have a sanitary sewer connection.

6.1.2 Project-Generated Sewage Flow

The Project will generate an estimated 23,110 gallons per day (gpd) based on design sewer flows provided in 314 CMR 7.00-Sewer System Extension and Connection Permit Program as summarized in **Table 6-1.**





Not to scale.

Figure 6-1.
BWSC Sewer System Map

Table 6-1. Projected Sanitary Sewer Flows, South Boston Hotel

Use*	Quantity	Unit Flow Rate	Estimated Maximum Daily Flow (gpd)
Hotel	156 beds	110 gpd/bedroom	17,160 gpd
Bar /Restaurant	90 seats (4,534 sf)	35 gpd/seat	3,150 gpd
Coffee Shop	20 seats	20 gpd/seat	400 gpd
Conference/Meeting Rooms	85 seats (2,735sf)	10 gpd/seat	850 gpd
Roof Top Bar	45 seats (1,007sf)	10 gpd/seat	450 gpd
Exterior Pool Deck/Lounge	60 seats (3,484 sf)	10 gpd/seat	600 gpd
Screening Room	50 seats (798sf)	10 gpd/seat	500 gpd
Total			**23,110 gpd**

*Uses identified are preliminary and subject to change in the final plans

6.1.3 Sanitary Sewage Connection

It is anticipated that the proposed building's sanitary services will tie into the 36-inch combined sewer main in Dorchester Avenue. It is expected that the building will have two 6-inch sanitary services. A separate kitchen waste line will be provided for the hotel's kitchen and routed to a grease trap prior to tying into the municipal system.

The Proponent will submit a Site Plan to the BWSC for review and approval. Additionally, the grease trap will be coordinated with BWSC's Operations Department. Based on the proposed estimated sanitary flow, a Compliance Certification will be reviewed and approved by BWSC prior to submitting to the Massachusetts Department of Environmental Protection ("DEP") as required.

6.1.4 Sewer System Mitigation

The environmental design goals for the Proposed Project include reducing wastewater volumes by incorporating efficient fixtures into the design. Low-flow faucets, aerated shower-heads, and dual-flush toilets are being considered to reduce water usage and sewer generation. As previously mentioned, grease traps will treat kitchen waste streams minimizing any grease reaching the municipal system.

6.2 Water System

6.2.1 Existing Water Service

The water mains in the vicinity of the Project Site are owned and maintained by BWSC (see **Figure 6-2**). There is an 8-inch cement-lined ductile iron (CLDI) water main located in West Broadway, a 16-inch pit cast iron (PCI) water main in Dorchester Avenue and in West 2nd Street, and an 8-inch CLDI in Athens Street that are all part of the Southern Low service network. There is also a 12-inch pit cast iron (PCI) water main in West 2nd Street that is part of BWSC's Southern High service network.

According to BWSC's records, there is a ¾" service to the site that is connected to the 16-inch water main in West 2nd Street. This service will be cut and capped at the main if still in existence.

The site is within the service radius of several hydrants. There are two hydrants directly adjacent to the site (H136 and H 191). There is also a hydrant to the south (H170) on West Broadway, to the west on Greenbaum Street (H209), to the north (H184) on Dorchester Avenue, and to the east (H162) on West 2nd Street. The Proponent will confirm that the hydrants are sufficient for the development and coordinate any proposed changes in locations with BWSC and the Boston Fire Department (BFD) during the detailed design phase.

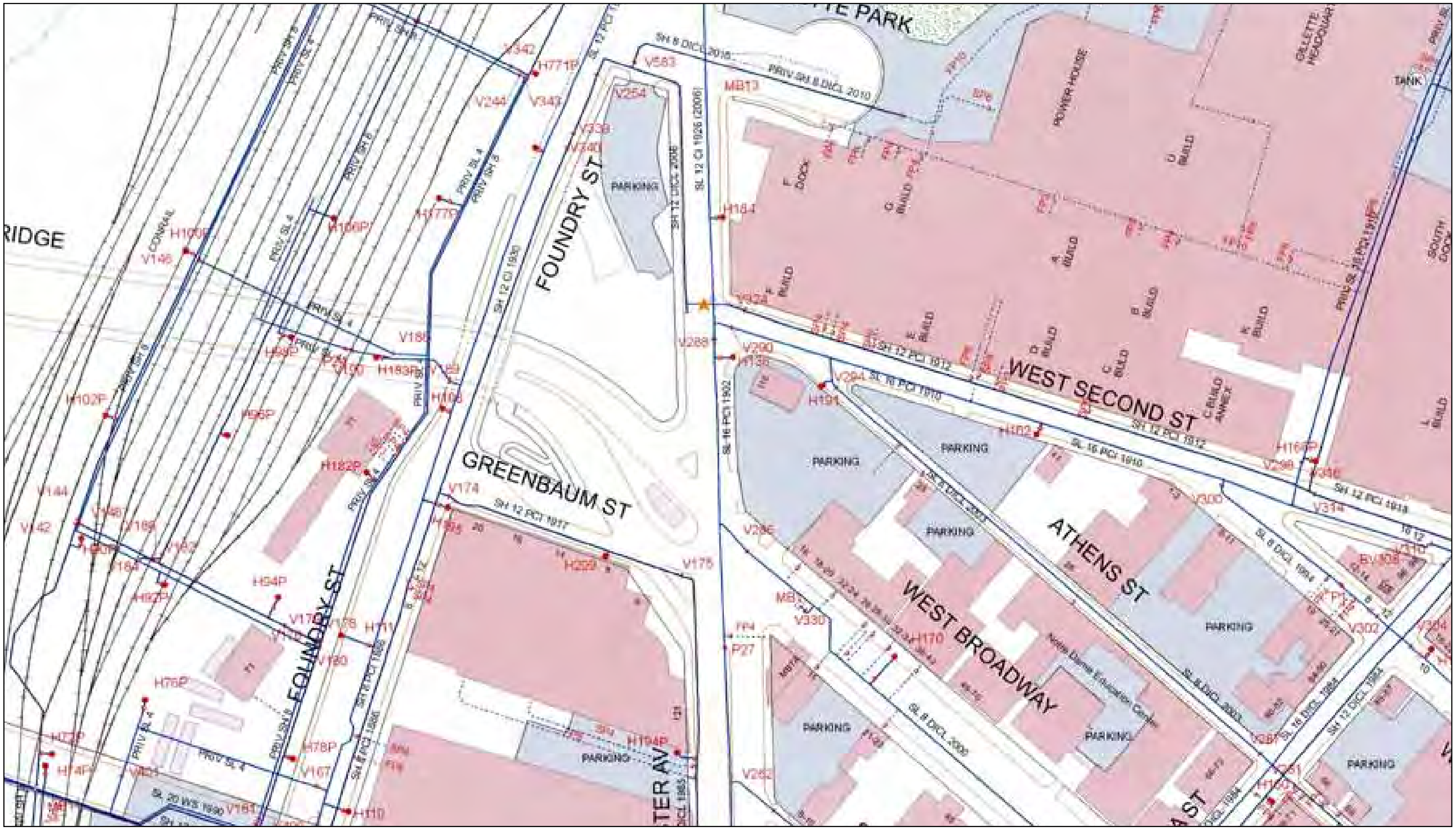
6.2.2 Anticipated Water Consumption

The maximum daily water demand is estimated to be 25,500 gpd based on the sewage flow estimate and an added factor for system losses including the average requirements for the Project's cooling system. A more detailed water use estimate, including estimates for irrigation and air conditioning make-up water, and meter sizing calculations will be submitted to BWSC as part of the Site Plan approval process.

6.2.3 Proposed Water Service

It is anticipated that the domestic water and fire protection services for the Project will be directly tapped from the 16-inch low service main in Dorchester Avenue. The water supply systems servicing the building will be gated so as to minimize public hazard or inconvenience in the event of a water main break. Final locations and sizes of the services will be provided on a Site Plan during the detailed design phase and submitted to BWSC for review and approval.

Water service to the building will be metered in accordance with BWSC's requirements. The property owner will provide a suitable location for a Meter Transmission Unit (MTU) as part of BWSC's Automatic Meter Reading System. A backflow preventer will be installed on the fire protection service and will be coordinated with BWSC's Cross Connection Control Department.



Not to scale.

Figure 6-2.
BWSC Water System Map

6.3 Water Supply System Mitigation

As discussed in the Sewer System Mitigation Section, water conservation measures such as low-flow fixtures, aerated showerheads, and dual-flush toilets are being considered to reduce potable water usage. Water usage for landscape irrigation will be significantly reduced by the selection of native and adaptive plantings, and using soil moisture sensors as part of the irrigation system.

6.4 Storm Drainage System

6.4.1 Existing Drainage Conditions

The site is entirely paved entirely with no pervious surfaces. Stormwater runoff from the site flows overland to the adjacent catch basins in Dorchester Avenue and West 2nd Street.

6.4.2 Proposed Drainage Systems

The Project is expected to reduce the volume of stormwater runoff leaving the site as well as substantially improve the water quality. The project will meet the Department of Environmental Protection's (DEP) Stormwater Management Standards for redevelopment.

The volume of stormwater runoff leaving the site will be reduced as landscaped areas are proposed for the now completely impervious site. It is expected that rooftop runoff from the proposed building will be collected and conveyed to a subsurface infiltration system. The infiltration system will have an overflow tied into the combined sewer in Dorchester Avenue or West 2nd Street that will be used during large storm events. It is anticipated that the equivalent of 1 inch over the site's impervious area can be recharged as prescribed in BWSC's Site Plan Requirements.

Stormwater runoff will be treated through the use of deep sump catch basins and water quality treatment units. An operation and maintenance plan will be developed to support the long-term functionality of the proposed stormwater management system.

Erosion and sediment controls will be used during construction to protect adjacent properties, the municipal storm drain system and the on-site storm drain system. A pollution prevention plan will be prepared for use during construction including during demolition activity.

6.5 Water Quality

The development will result in improved stormwater quality and is not expected to have negative impacts on the water quality of nearby Fort Point Channel and Boston Harbor.

6.6 Electric Systems

The electrical, heating and energy systems for the proposed Project have not yet been designed. Information on these systems will be made available to the appropriate utilities as Project design progresses.

6.6.1 Existing Electric Systems

NSTAR owns and maintains the electrical transmission system in the vicinity of the project. The street lighting system adjacent to the site consists of acorn luminaires in good condition.

6.6.2 Proposed Electric Connections

The primary feed to service the development is expected to be pulled from an NSTAR manhole in Dorchester Avenue to a pad-mounted transformer on-site. The electric load will be determined during the detailed design phase and coordinated with NSTAR.

The proponent will work the Public Works Department, Street Lighting Section to determine the adequacy of street lighting in the area and coordinate any temporary or permanent relocations of the street lighting.

6.7 Telephone and Cable Systems

Verizon has telephone and internet services in the Project area. Their facilities in this area are underground and consist primarily of copper wires and fiber optic cables. Telephone systems will be reviewed with Verizon as the design progresses.

Comcast has infrastructure in the area and offers cable television, telephone and internet services. All cable lines in this area are underground. The project will be reviewed with Comcast as the design progresses.

6.8 Steam and Gas Systems

Veolia has infrastructure in Dorchester Avenue and West 2nd Street. Neither system is currently in service.

National Grid owns and maintains an 8-inch, plastic, intermediate pressure gas main in D Street. The project is expected to use natural gas for heating and domestic hot water. The actual size and location of the building services will be coordinated with National Grid.

6.9 Utility Protection During Construction

The Contractor will notify utility companies and call “Dig Safe” prior to excavation. During construction, infrastructure will be protected using sheeting and shoring, temporary relocations, and construction staging as required. The Construction Contractor will be required to coordinate all protection measures, temporary supports, and temporary shutdowns of all utilities with the appropriate utility owners and/or agencies. The Construction Contractor will also be required to provide adequate notification to the utility owner prior to any work commencing on their utility. Also, in the event a utility cannot be maintained in service during switch over to a temporary or permanent system, the Construction Contractor will be required to coordinate the shutdown with the utility owners and project abutters to minimize impacts and inconveniences.

7.0 TRANSPORTATION COMPONENT

7.1 Introduction

7.1.1 Purpose of the Transportation Component

Howard/Stein-Hudson Associates, Inc. (HSH) has conducted an evaluation of the transportation impacts of a proposed 156±-room hotel to be located at 6 West Broadway (the former Sunoco lot) in South Boston (the "Project" and/or the "Site"). This transportation study adheres to the Boston Transportation Department (BTD) *Transportation Access Plan Guidelines* and Article 80 development review process. This study includes an evaluation of existing conditions, future conditions with and without the Project, projected parking demand, loading operations, transit services, and pedestrian activity.

7.1.2 Project Description

The Project site is located at 6 West Broadway in the South Boston neighborhood of Boston just north of the Broadway MBTA station, as shown in **Figure 7-1.** The site is bounded by West 2nd Street to the north, Dorchester Avenue to the west, West Broadway to the south, commercial properties to the east, and Athens Street to the northeast. The Project site contains a vacant parking lot enclosed by a chain-link fence.

Located at the intersection of West Broadway and Dorchester Avenue, the Project includes a 156 room hotel with 4,619 square feet (sf) of ground floor restaurant and bar space and 1,589 sf of rooftop bar/lounge space. Overall, the Project will contain approximately 87,000 gsf of space between the hotel and restaurant/bar uses.

Vehicular access/egress will be provided by a porte-cochère that will intersect the easterly side of Dorchester Avenue and the southerly side of West 2nd Street. The entrance will be located along Dorchester Avenue approximately 50 feet south of West 2nd Street and the exit will be located along West 2nd Street, approximately 20 feet east of Dorchester Avenue. Exiting movements will be restricted to right-turns only onto West 2nd Street. All vehicles entering and exiting the site will be served by either an on-site valet or taxi service. Parking for valet service will be off-site and most likely in the area north and east of the Project site. The exact location, arrangement, and operations of valet activity and parking will be defined and codified in the Transportation Access Plan Agreement (TAPA).

Figure 7-1.
Locus Map and Study Area Intersections

7.1.3 Study Area

The transportation study area is generally bounded by Dorchester Avenue to the west, West Broadway to the south, West 2nd Street to the north, and A Street to the east. It includes the following six intersections, also shown on **Figure 7-1**:

- Dorchester Avenue at West 2nd Street;
- Dorchester Avenue at West Broadway;
- West 2nd Street at Athens Street;
- A Street at West 2nd Street;
- A Street at West 3rd Street; and
- West Broadway at A Street.

7.1.4 Study Methodology

This transportation study and supporting analyses were conducted in accordance with BTD guidelines and is described below.

The existing conditions analysis includes an inventory of the existing (2013) transportation conditions such as roadway capacities, traffic characteristics, parking and curb usage, transit, pedestrian circulation, bicycle facilities, loading, and site conditions. As requested by the BTD, existing counts were conducted for vehicles, bicycles, and pedestrians at the study area intersections. The traffic counts form the basis for the transportation analysis conducted as part of this evaluation.

The future transportation conditions analysis evaluates potential transportation impacts associated with the Project. Long-term impacts are evaluated for the year 2018, based on a five-year horizon from the existing year (2013). Expected roadway, parking, transit, pedestrian, bicycle accommodation, and loading capacities and deficiencies are identified. This section includes the following scenarios:

The 2018 No-Build conditions scenario includes both general background traffic growth and traffic growth associated with specific developments and transportation improvements that are planned in the vicinity of the Project site.

The 2018 Build conditions scenario includes Project-generated traffic volume estimates added to the traffic volumes developed as part of the 2018 No-Build conditions scenario.

The final part of the transportation study identifies measures to mitigate Project-related impacts and to address any traffic, pedestrian, bicycle, transit, safety, or construction related issues that are necessary to accommodate the Project.

An evaluation of short-term traffic impacts associated with construction activities is also provided.

7.2 Existing Transportation Conditions

This section includes descriptions of existing study area roadway geometries, intersection traffic control, peak-hour vehicular and pedestrian volumes, average daily traffic volumes, transit availability, parking and curb usage, and loading conditions.

7.2.1 Existing Roadway Conditions

The major study area roadways are described below. The descriptions reflect functional classifications by the Massachusetts Department of Transportation (MassDOT) Highway Division's Office of Transportation Planning.

Dorchester Avenue borders the Project site to the west, is classified as an urban principal arterial roadway south of West Broadway and an urban minor arterial north of West Broadway, and generally runs in a north-south direction throughout the study area. North of West Broadway, Dorchester Avenue provides access to the Gillette headquarters and the United States Postal Service (USPS) General Mail Facility. Public access along Dorchester Avenue is currently not allowed through the USPS facility, although there are long-term as yet undefined planning efforts to relocate and then redevelop the USPS facility and open Dorchester Avenue to general traffic from West Broadway to Summer Street. South of West Broadway, Dorchester Avenue continues through Dorchester to the Milton Town Line. Between the USPS General Mail Facility and West Broadway, Dorchester Avenue generally consists of a single lane in each direction with parking prohibited on each side of the roadway. Between West Broadway and West Fourth Street, Dorchester Avenue generally consists of two lanes in each direction with additional turning lanes provided at the major intersections. Metered on-street parking is provided on the southbound side of the roadway between West Broadway and West Fourth Street. Sidewalks are provided along both sides of Dorchester Avenue.

West Broadway borders the Project site to the south, is classified as an urban minor arterial, and generally runs in a northwest-southeast direction throughout the study area. West Broadway provides access to the South End neighborhood of Boston to the west via the Broadway Bridge and South Boston to the east. It also provides direct access to the regional highway network (I-93 and I-90) as well as access to the Leather District/South Station area and downtown Boston beyond. In the vicinity of the Project site, West Broadway consists of a single lane of travel in each direction, with on-street parking provided along both sides. Sidewalks are provided along both sides of West Broadway.

West 2nd Street borders the Project site to the north, is classified as an urban minor arterial, and generally runs in an east-west direction throughout the study area. West 2nd Street provides access to South Boston to the east and terminates at its intersection with Dorchester Avenue to the west.

In the vicinity of the Project site, West 2nd Street consists of a single lane of travel in each direction. On-street parking is prohibited along West 2nd Street in the vicinity of the Project site. Sidewalks are provided along both sides of West 2nd Street. West 2nd Street is a primary truck route for USPS facilities north of the Project site.

A Street is located east of the Project site, is classified as an urban minor arterial, and generally runs in a north-south direction throughout the study area. A Street provides access to the Fort Point Channel and Seaport District areas to the north and terminates at Dorchester Avenue to the south, south of the Project site. In the vicinity of the Project site, A Street consists of a single lane of travel in each direction and additional turn lanes provided at some intersections. On-street parking is prohibited along A Street in the vicinity of the Project site. Sidewalks are provided along both sides of A Street.

Athens Street is adjacent to the Project site to the northeast, is classified as a local roadway, and generally runs in a northwest-southeast direction throughout the study area. Athens Street consists of an approximately 12-foot wide lane that accommodates one-way travel in the northwestbound direction (toward West 2nd Street), with no on-street parking. Sidewalks are provided along both sides of Athens Street.

7.2.2 Existing Intersection Conditions

The existing study area intersections are described below. Intersection characteristics such as traffic control, lane usage, pedestrian facilities, pavement markings, and adjacent land use are described.

Dorchester Avenue at West 2nd Street is an unsignalized intersection with three approaches. The West 2nd Street westbound approach consists of a single travel lane under STOP-sign control. The directions of travel along West 2nd Street are separated by a double-yellow centerline. The Dorchester Avenue approaches consist of single-travel lanes separated by a double-yellow centerline. Sidewalks are provided along both sides of all three approaches to the intersection, with a crosswalk across the West 2nd Street approach. Parking is prohibited along all legs of the intersection. The pavement markings are in fair to poor conditions. Land use at the intersection consists of the Project site and other commercial properties.

Dorchester Avenue at West Broadway is a signalized intersection with four approaches. The West Broadway eastbound approach consists of an exclusive left-turn lane, a through lane, and an exclusive, channelized right-turn lane. The directions of travel along the West Broadway eastbound approach are separated by an approximately 35-foot wide island that contains an entrance to Broadway MBTA Red Line station. The West Broadway westbound approach consists of a shared left-turn/through lane and a shared through/right-turn lane. The directions of travel along the West Broadway westbound approach are separated by a double-yellow centerline. On-street parking is provided along the West Broadway westbound approach. The Dorchester Avenue northbound approach consists of an exclusive left-turn lane and a shared through/right-turn lane. The directions of travel along the Dorchester Avenue northbound approach are separated by a raised median. The Dorchester Avenue southbound approach consists of a shared left-turn/through lane and a short channelized right-turn lane under YIELD-sign control. The directions of travel along the Dorchester Avenue southbound approach are separated by a double-yellow centerline. Sidewalks are provided along both sides of all approaches to the intersection and marked crosswalks are provided across all legs of the intersection. A concurrent pedestrian phase is provided for the crosswalk across the West Broadway eastbound approach to the intersection. All other pedestrian crossings are provided an exclusive pedestrian phase upon pushbutton actuation. Land use in the vicinity of the intersection consists of the Project site, the Broadway MBTA Station, and the Court Square Press Building.

West 2nd Street at Athens Street is an unsignalized intersection with three approaches. The intersection is located approximately 70 feet to the east of the intersection of Dorchester Avenue and West 2nd Street. The Athens Street northwestbound approach accommodates one-way travel entering the intersection and consists of a single travel lane operating under STOP-sign control. The West 2nd Street approaches consist of single travel lanes. The directions of travel along West 2nd Street are separated by a double-yellow centerline. Sidewalks are provided along both sides of all approaches to the intersection. Crosswalks are not provided at the intersection. Land use in the vicinity of the intersection consists of residential and commercial properties.

A Street at West 2nd Street is a signalized intersection with four approaches. The A Street northbound approach consists of a single travel lane that accommodates left-turning and through movements. The A Street southbound approach consists of a single travel lane that accommodates through and right-turn movements. The directions of travel along A Street are separated by a double-yellow centerline. The West 2nd Street eastbound approach consists of a single travel that accommodates left-turning and right-turning movements. The directions of travel along the West 2nd Street eastbound approach are separated by a double-yellow centerline. The West 2nd Street westbound approach accommodates one-way travel entering the intersection and consists of an exclusive left-turn lane and a shared through/right-turn lane. Sidewalks are provided along both sides of all approaches to the intersection and crosswalks are provided across all legs of the intersection. Pedestrian signal equipment is not provided at the intersection. Land use in the vicinity of the intersection consists of commercial properties.

A Street at West 3rd Street is an unsignalized intersection with four approaches. The West 3rd Street eastbound approach operates under STOP-sign control and is one-way entering the intersection and consists of a single travel lane with parking provided on both sides. The West 3rd Street westbound approach operates under STOP-sign control and consists of a single travel lane. Parking is prohibited along both sides of West 3rd Street westbound. The directions of travel along West 3rd Street westbound are separated by a faded double-yellow centerline. The A Street northbound and southbound approaches consist of single travel lanes. The directions of travel along A Street are separated by a double-yellow centerline. Sidewalks are provided along both sides of all approaches to the intersection and crosswalks are provided across all legs of the intersection. Land use in the vicinity of the intersection consists of commercial properties.

West Broadway at A Street is a signalized intersection with four approaches. The West Broadway eastbound and westbound approaches consist of single travel lanes. The directions of travel along West Broadway are separated by a double-yellow centerline. The A Street northbound approach consists of a single travel lane. The directions of travel along A Street northbound are separated by a double-yellow centerline. The A Street southbound approach consists of a shared left-turn/through lane and an exclusive right-turn lane. The directions of travel along A Street southbound are separated by a double-yellow centerline. Sidewalks are provided along both sides of all approaches to the intersection and crosswalks are provided across all legs of the intersection. Concurrent pedestrian phases are provided upon pushbutton actuation. Land use in the vicinity of the intersection consists of several residential buildings, a gas station, and other commercial properties.

7.2.3 Existing Traffic Conditions

Traffic movement data was collected at the study area intersections in April 2013. Manual turning movement counts (TMCs) and vehicle classification counts were conducted during the weekday morning and weekday evening peak periods (7:00-9:00 AM and 4:00-6:00 PM, respectively). The vehicle classification counts included car, truck, pedestrian, and bicycle movements. Based on the TMCs, the peak hours of vehicular traffic throughout the study area are 7:15-8:15 AM and 5:00-6:00 PM. The detailed traffic counts are provided in **Appendix D** (in separate cover).

Seasonal Adjustment

In order to account for seasonal variation in traffic volumes throughout the year, data provided by the Massachusetts Department of Transportation (MassDOT) were reviewed. Typically, nearby continuous traffic count stations are used to determine monthly fluctuations in traffic volumes. However, monthly traffic counts for the nearby continuous traffic count stations located on Interstate 93 were not available at the time of this study. Therefore, the most recent (2011) MassDOT Weekday Seasonal Factors were used to determine the need for seasonal adjustments to the April 2013 TMCs. The 2011 seasonal adjustment factor for April for roadways similar to the study area is 0.92, which indicates that average month traffic volumes are approximately 92 percent of typical April traffic volumes. To provide a conservative analysis, the April counts were not adjusted downward to reflect average month conditions. The MassDOT 2011 Weekday Seasonal Factors table is provided in **Appendix D**. The 2013 Existing weekday morning and evening peak hour traffic volumes are shown in **Figure 7-2** and **Figure 7-3**, respectively.

7.2.4 Existing Traffic Operations

The criterion for evaluating traffic operations is level of service (LOS), which is determined by assessing average delay incurred by vehicles at intersections and along intersection approaches. Trafficware's Synchro (version 8.0) software package was used to calculate average delay and associated LOS at the study area intersections. This software is based on the traffic operational analysis methodology of the Transportation Research Board's 2000 *Highway Capacity Manual* (HCM).

Level of service and delay (in seconds) are based on intersection geometry, traffic data, and traffic control for each intersection. For the signalized intersections within the study area, traffic signal timing and phasing plans provided by BTD were used in the analysis.

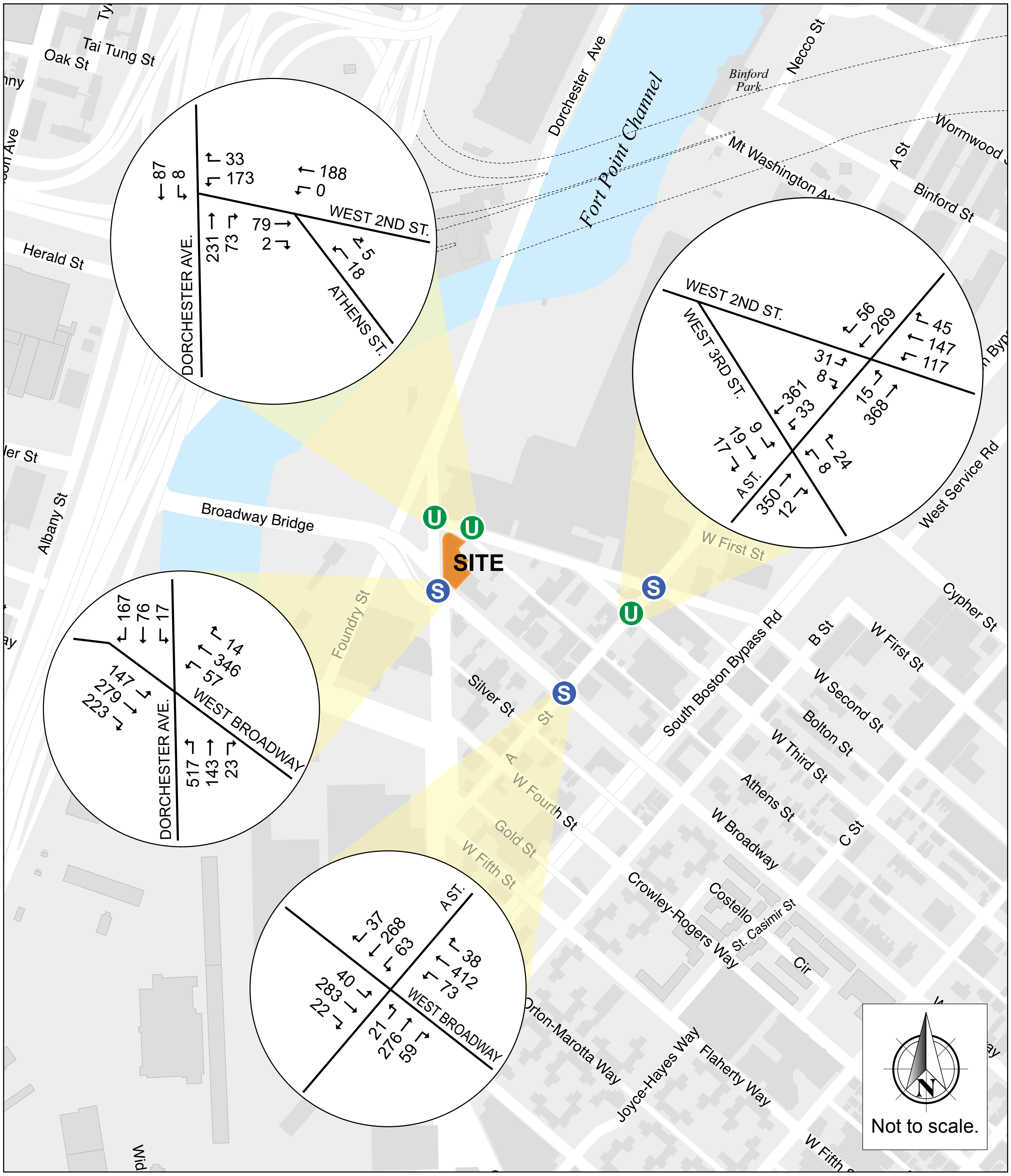


Figure 7-2.
Existing Conditions (2013) Turning Movements,
a.m. Peak Hour (7:15-8:15 a.m.)

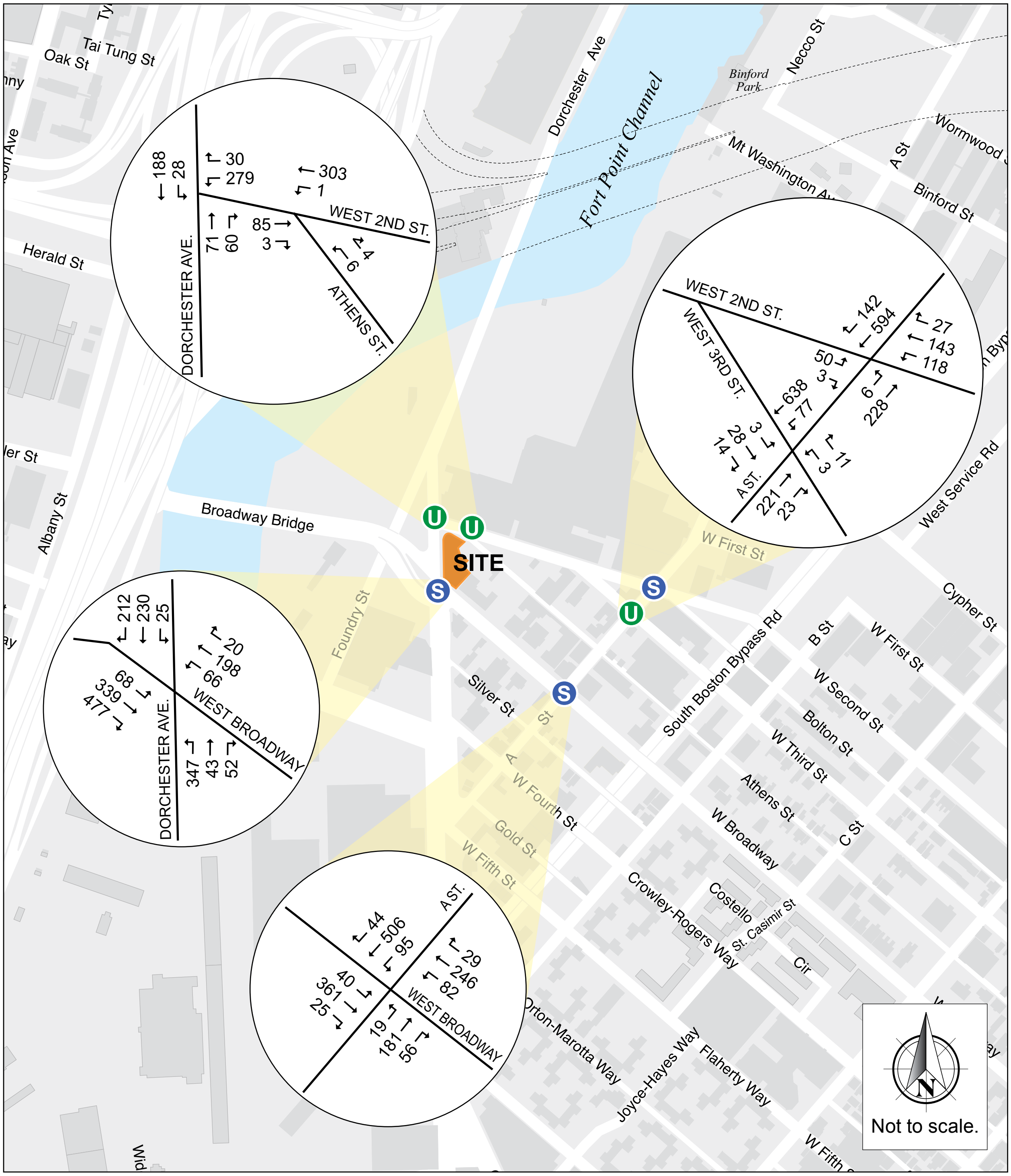


Figure 7-3.
Existing Conditions (2013) Turning Movements,
p.m. Peak Hour (5:00-6:00 p.m.)

Table 7-1 summarizes the delay and LOS thresholds for signalized and unsignalized intersections, as defined in the HCM. LOS A defines the most favorable condition, with minimum traffic delay. LOS F represents the worst condition (unacceptable), with significant traffic delay. The threshold at LOS E/LOS F indicates that the intersection, or intersection approach, is theoretically at capacity. LOS D is generally considered acceptable in an urban environment, such as the Project study area, and below theoretical operating capacity.

Table 7-1. Intersection Level of Service Criteria

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

Table 7-2 and **Table 7-3** present the 2013 Existing conditions operational analysis for the study area intersections for the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in **Appendix D**.

Table 7-2. Existing Conditions (2013) Level of Service Summary, a.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Dorchester Avenue at West Broadway	**F**	**>80.0**	**0.80**	**-**	**-**
West Broadway EB left	C	22.1	0.57	92	#201
West Broadway EB thru	B	18.3	0.42	170	233
West Broadway EB right	A	8.2	0.16	0	35
West Broadway WB left	A	9.8	0.28	44	39
West Broadway WB thru/right	B	10.7	0.42	194	231
Dorchester Avenue NB left	F	>80.0	>1.00	~388	#602
Dorchester Avenue NB thru/right	C	26.5	0.40	73	128
Dorchester Avenue SB left/thru	D	39.8	0.41	48	77
Dorchester Avenue SB right	C	34.8	0.14	0	49
West Broadway at A Street	**C**	**26.0**	**0.69**	**-**	**-**
West Broadway EB left/thru/right	A	8.3	0.44	74	m115
West Broadway WB left/thru/right	B	13.9	0.56	190	369
A Street NB left/thru/right	C	34.1	0.78	209	261
A Street SB left/thru	E	55.2	0.92	204	280
A Street SB right	C	20.5	0.04	0	17
West 2nd Street at A Street	**B**	**16.2**	**0.36**	**-**	**-**
West 2nd Street EB left	C	28.8	0.21	20	37
West 2nd Street EB right	C	25.1	0.01	0	3
West 2nd Street WB left	C	30.6	0.41	85	100
West 2nd Street WB thru/right	C	31.6	0.48	115	148
A Street NB left/thru	A	7.4	0.32	94	141
A Street SB thru/right	A	7.2	0.29	76	113
Unsignalized Intersections					
Dorchester Avenue at West 2nd Street					
West 2nd Street WB left/right	C	15.7	0.41	-	50
Dorchester Avenue NB thru/right	A	0.0	0.20	-	0
Dorchester Avenue SB left/thru	A	0.9	0.01	-	1
West 2nd Street at Athens Street					
West 2nd Street EB thru	A	0.0	0.07	-	0
West 2nd Street WB thru	A	0.0	0.00	-	0
Athens Street NB left/right	B	10.1	0.04	-	3
A Street at West 3rd Street					
West 3rd Street EB left/thru/right	D	27.3	0.31	-	32
West 3rd Street WB left	E	40.6	0.14	-	11
West 3rd Street WB right	B	11.6	0.05	-	4
A Street NB thru/right	A	0.0	0.25	-	0
A Street SB left/thru	A	1.1	0.04	-	3

= 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after 2 cycles.
~ = Volume exceeds capacity; queue is theoretically infinite. Queue shown is maximum after 2 cycles.
m = Volume for 95th percentile queue is metered by upstream signal

Table 7-3. Existing Conditions (2013) Level of Service Summary, p.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Dorchester Avenue at West Broadway	**D**	**48.4**	**0.75**	**-**	**-**
West Broadway EB left	C	25.3	0.37	38	79
West Broadway EB thru	C	29.1	0.64	184	#343
West Broadway EB right	B	15.4	0.32	0	59
West Broadway WB left	C	28.5	0.57	23	m#105
West Broadway WB thru/right	C	24.8	0.42	70	171
Dorchester Avenue NB left	F	>80.0	>1.00	~287	#374
Dorchester Avenue NB thru/right	B	17.6	0.14	21	41
Dorchester Avenue SB left/thru	D	49.1	0.77	152	196
Dorchester Avenue SB right	C	31.9	0.19	0	29
West Broadway at A Street	**C**	**21.3**	**0.73**	**-**	**-**
West Broadway EB left/thru/right	B	12.8	0.63	235	m353
West Broadway WB left/thru/right	B	19.7	0.56	156	284
A Street NB left/thru/right	B	19.0	0.51	114	160
A Street SB left/thru	C	31.4	0.84	299	391
A Street SB right	B	15.4	0.12	3	24
West 2nd Street at A Street	**B**	**17.2**	**0.54**	**-**	**-**
West 2nd Street EB left	E	57.1	0.58	32	#78
West 2nd Street EB right	C	32.1	0.00	0	3
West 2nd Street WB left	D	42.4	0.54	79	116
West 2nd Street WB thru/right	D	46.7	0.67	112	170
A Street NB left/thru	A	3.3	0.16	31	50
A Street SB thru/right	A	5.6	0.51	135	199
Unsignalized Intersections					
Dorchester Avenue at West 2nd Street					
West 2nd Street WB left/right	D	29.1	0.74	-	159
Dorchester Avenue NB thru/right	A	0.0	0.09	-	0
Dorchester Avenue SB left/thru	A	1.6	0.03	-	3
West 2nd Street at Athens Street					
West 2nd Street EB thru	A	0.0	0.07	-	0
West 2nd Street WB thru	A	0.1	0.00	-	0
Athens Street NB left/right	B	11.0	0.02	-	1
A Street at West 3rd Street					
West 3rd Street EB left/thru/right	E	39.3	0.36	-	38
West 3rd Street WB left	F	>50.0	0.15	-	13
West 3rd Street WB right	B	10.3	0.02	-	2
A Street NB thru/right	A	0.0	0.15	-	0
A Street SB left/thru	A	2.2	0.09	-	7

= 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after 2 cycles.
~ = Volume exceeds capacity; queue is theoretically infinite. Queue shown is maximum after 2 cycles.
m = Volume for 95th percentile queue is metered by upstream signal

The intersection of Dorchester Avenue at West Broadway currently operates at an overall LOS F during the weekday morning peak hour and LOS D during the weekday evening peak hour. The Dorchester Avenue northbound left-turn is the only movement that operates over capacity and at LOS F during the peak periods. Field observations indicate that the Dorchester Avenue northbound approach is metered by the upstream traffic signal at the intersection of Dorchester Avenue at West 4th Street, which is not reflected in this analysis. The southbound approach to the intersection contains a shared left-turn/through lane, with left-turns being provided a permissive phase only. Field observations indicate that the southbound through movements are able to maneuver around the left-turning vehicles that wait for gaps in the opposing traffic stream due to the skew of the intersection and the width of the travel lanes. Therefore, the analysis considered the southbound left-turn movements to operate in a short, exclusive lane to accurately model this approach to the intersection.

The intersection of West Broadway at A Street currently operates at an overall LOS C during both the weekday morning and evening peak hours, with all movements operating at LOS C or better during the weekday morning peak hour. During the weekday evening peak hour, the A Street southbound left-turn/through movements operate at LOS E, with queues that spill back to upstream intersections.

The intersection of West 2nd Street at A Street currently operates at an overall LOS B during both the weekday morning and evening peak hours, with no observed operational deficiencies.

The majority of the movements at the three unsignalized study area intersections currently operate at LOS D or better during the weekday morning and evening peak hours. Movements along West 3rd Street at the intersection with A Street operate at LOS D or worse; however, the volume along West 3rd Street is minimal during the peak hours.

7.2.5 Existing Parking and Curb Use

Figure 7-4 illustrates the on-street parking regulations in the vicinity of the study area. As shown in **Figure 7-4**, on-street parking is not allowed along West 2nd Street, Athens Street, A Street, or the Broadway Bridge. On-street parking is generally allowed along West Broadway and the westerly side of Dorchester Avenue in the vicinity of the Project site, with 15-minute and two-hour time restrictions. There are no public commercial off-street parking lots or garages within a quarter-mile of the Project site. Bus stops are located along the Dorchester Avenue northbound and West Broadway eastbound adjacent to Broadway Station.

Figure 7-4.
On-Street Parking

7.2.6 Existing Public Transportation

The Project site is located directly across West Broadway from the Broadway MBTA station. The Broadway Station provides access to the MBTA Red Line and three MBTA bus routes. The following describes each public transportation route served by the Broadway MBTA station, with a map of the nearby public transportation services shown in **Figure 7-5**.

MBTA Bus Route 9 – This route provides service between the City Point bus terminal in South Boston and Copley Square in the Back Bay. Weekday and Saturday service run from approximately 5:10 AM to 1:15 AM, with Sunday service running from approximately 6:00 AM to 1:15 AM. Headways range from approximately 5 minutes to 30 minutes.

MBTA Bus Route 11 – This route provides service between the City Point bus terminal in South Boston and downtown Boston. Weekday and Saturday service run from approximately 5:10 AM to 1:25 AM, with Sunday service running from approximately 6:15 AM to 1:30 AM. Headways range from approximately 10 minutes to 50 minutes.

MBTA Bus Route 47 – This route provides service between Broadway Station in South Boston and Central Square in Cambridge via Ruggles Station and the Fenway area. Weekday service runs from approximately 6:00 AM to 1:00 AM with headways of approximately 10 to 45 minutes. Saturday service runs from approximately 5:35 AM to 1:10 AM with headways of approximately 25 to 40 minutes. Sunday service runs from approximately 8:00 AM to 1:10 AM with headways of approximately 40 minutes to one hour.

MBTA Red Line – The Red Line branch of the MBTA subway system stops at Broadway Station. The Red Line provides access between Alewife Station to the north and both Ashmont Station and Braintree Station to the south. The Red Line also provides convenient access to downtown Boston, Cambridge, and Quincy. South Station, which provides access to bus terminals, commuter rail lines, regional rail lines, and Logan Airport via the MBTA Silver Line is one stop north of Broadway Station on the Red Line. The Red Line operates with headways of approximately 9 to 16 minutes.

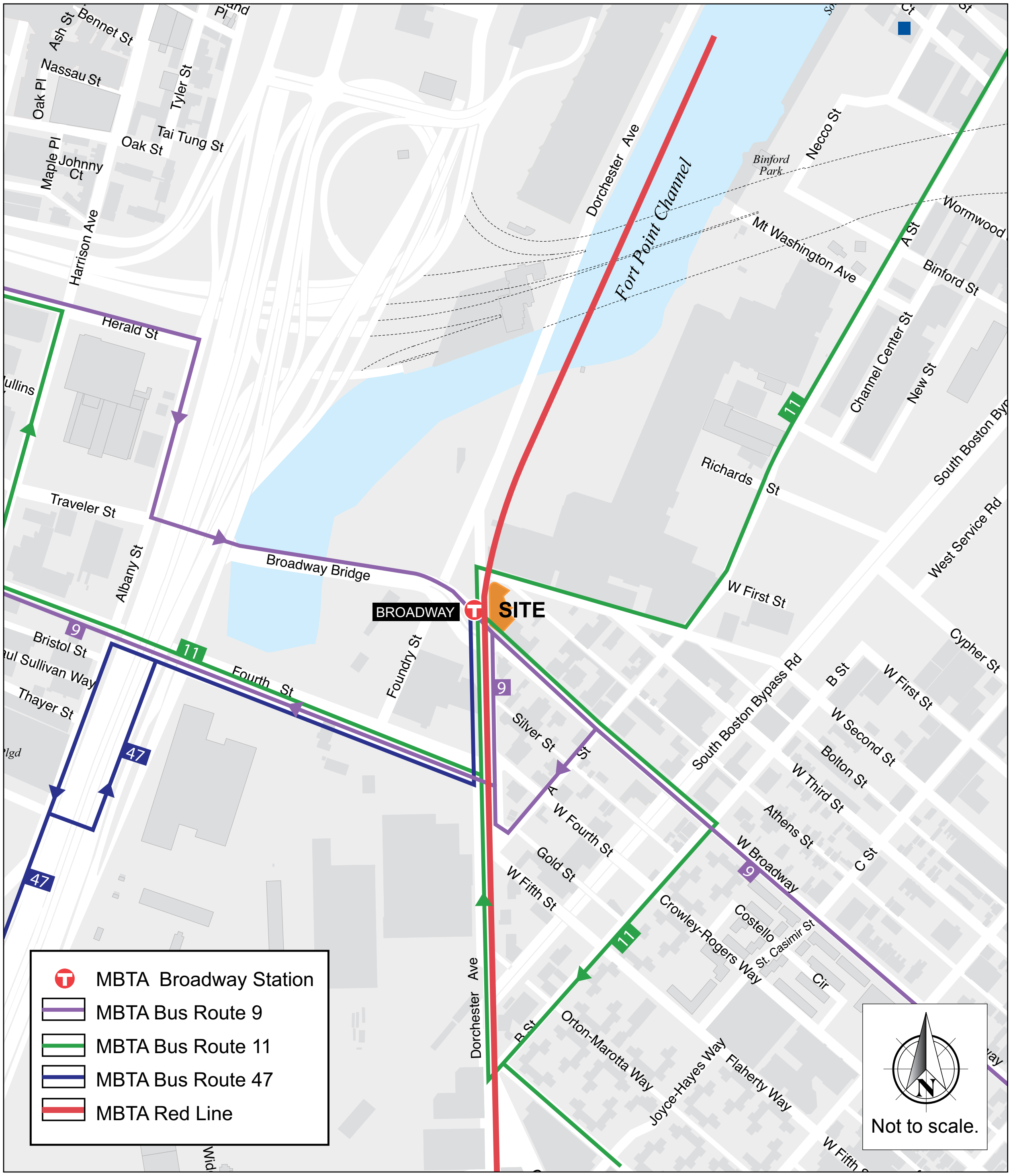


Figure 7-5.
Public Transportation

7.2.7 Existing Pedestrian and Bicycle Conditions

Sidewalks are provided along all streets within the study area and are generally in fair to good condition. Adjacent to the Project site, the sidewalks are approximately 14 feet in width along West Broadway and approximately 9 feet in width along Dorchester Avenue. Sidewalks are currently provided along the site frontage on West Broadway, Dorchester Avenue, and West 2^{nd} Street, separated from the site by an existing chain link fence. With Broadway Station in the immediate study area, pedestrian activity is heavy at and between the intersections of A Street at West Broadway and Dorchester Avenue at West Broadway, with lighter pedestrian activity at the remaining study area intersections. The existing pedestrian activity during the weekday morning and evening peak hours is show in **Figure 7-6**.

In the vicinity of the study area, Dorchester Avenue and West Broadway are designated as advanced bicycle routes and A Street and West 2^{nd} Street are designated as intermediate bicycle routes on the 2010-2011 Boston Bikes Map. The South Bay Harbor Trail also runs through the study area, connecting Ruggles Station in Roxbury to the Boston Harborwalk in the Fort Point Channel area. There are also several bicycle storage racks located along West Broadway in the vicinity of Broadway Station. The existing bicycle activity during the weekday morning and peak hours is shown in **Figure 7-7**.

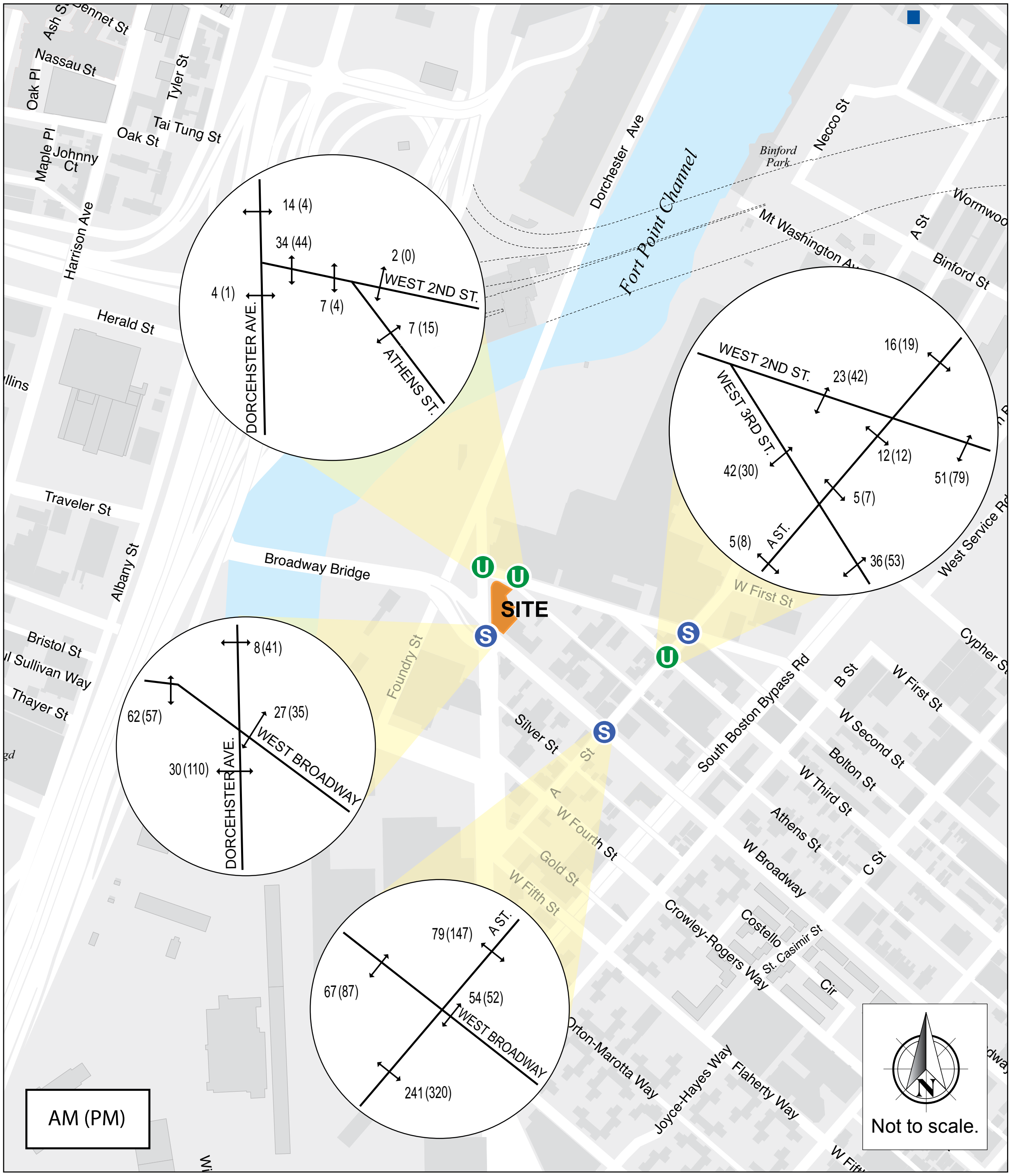


Figure 7-6.
Existing Conditions (2013) Pedestrian Volumes, a.m. and p.m. Peak Hours

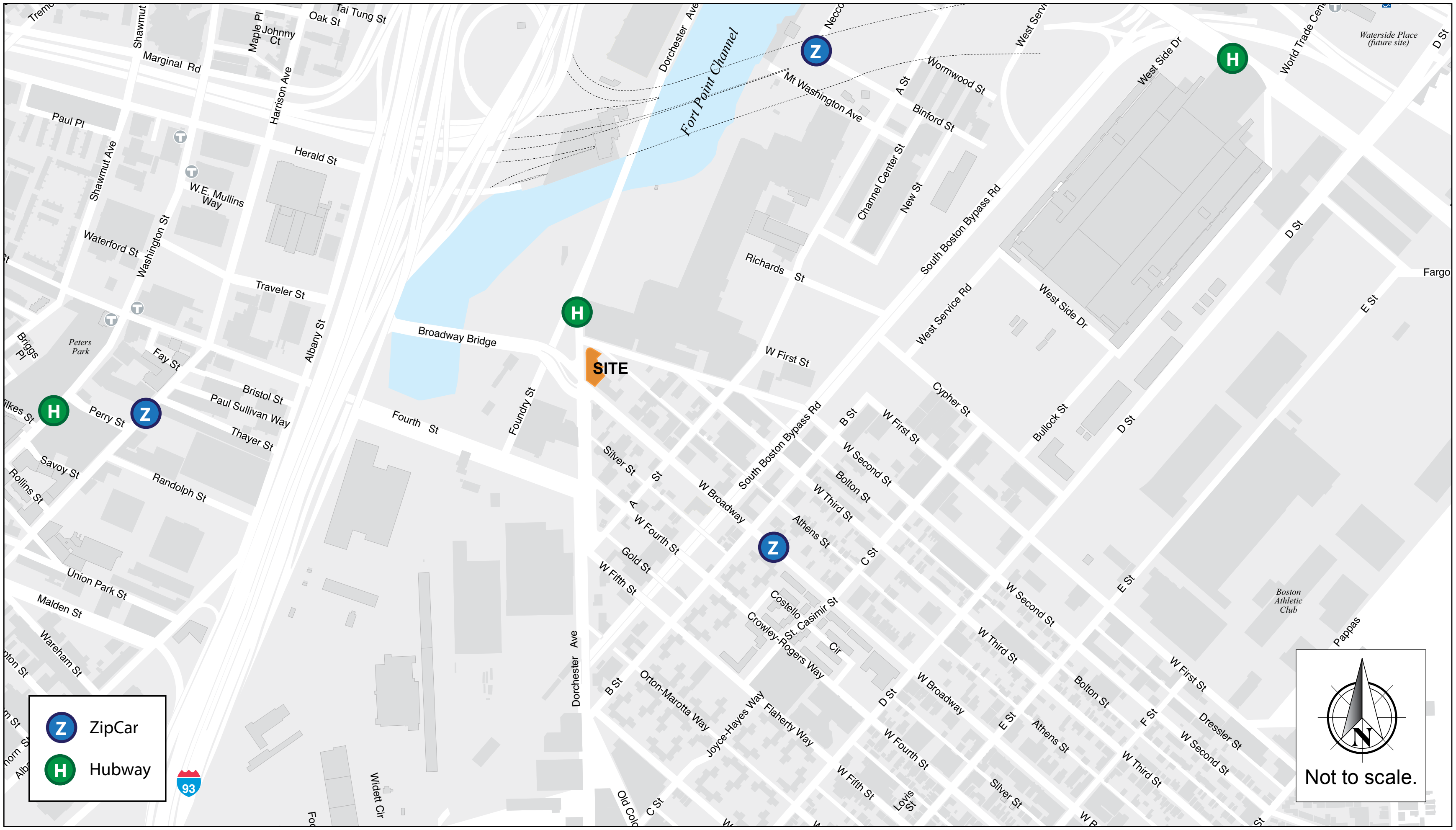


Figure 7-7.
ZipCar and Hubway Locations

7.2.8 *Bicycle and Car Sharing*

Hubway is a bicycle sharing system in the Boston area, which was launched in 2011 and consists of over 100 stations and 1,000 bicycles. A Hubway station with a total capacity of 15 bicycles is located just north of the site along Dorchester Avenue at Gillette Park. There are no other Hubway stations within a quarter-mile of the Project site.

Car sharing, predominantly served by Zipcar in the Boston area, provides easy access to vehicular transportation for those who do not own cars. Vehicles are rented hourly or daily with all vehicle costs (gas, maintenance, insurance, and parking) included in the rental fee. Vehicles are checked out for a specific time period and returned to their original designated location. A total of seven Zipcar vehicles are located at 170 West Broadway (Liberty Roast Beef), approximately one-quarter mile east of the Project site. **Figure 7-8** shows the location of the Hubway and Zipcar locations nearest the Project site.

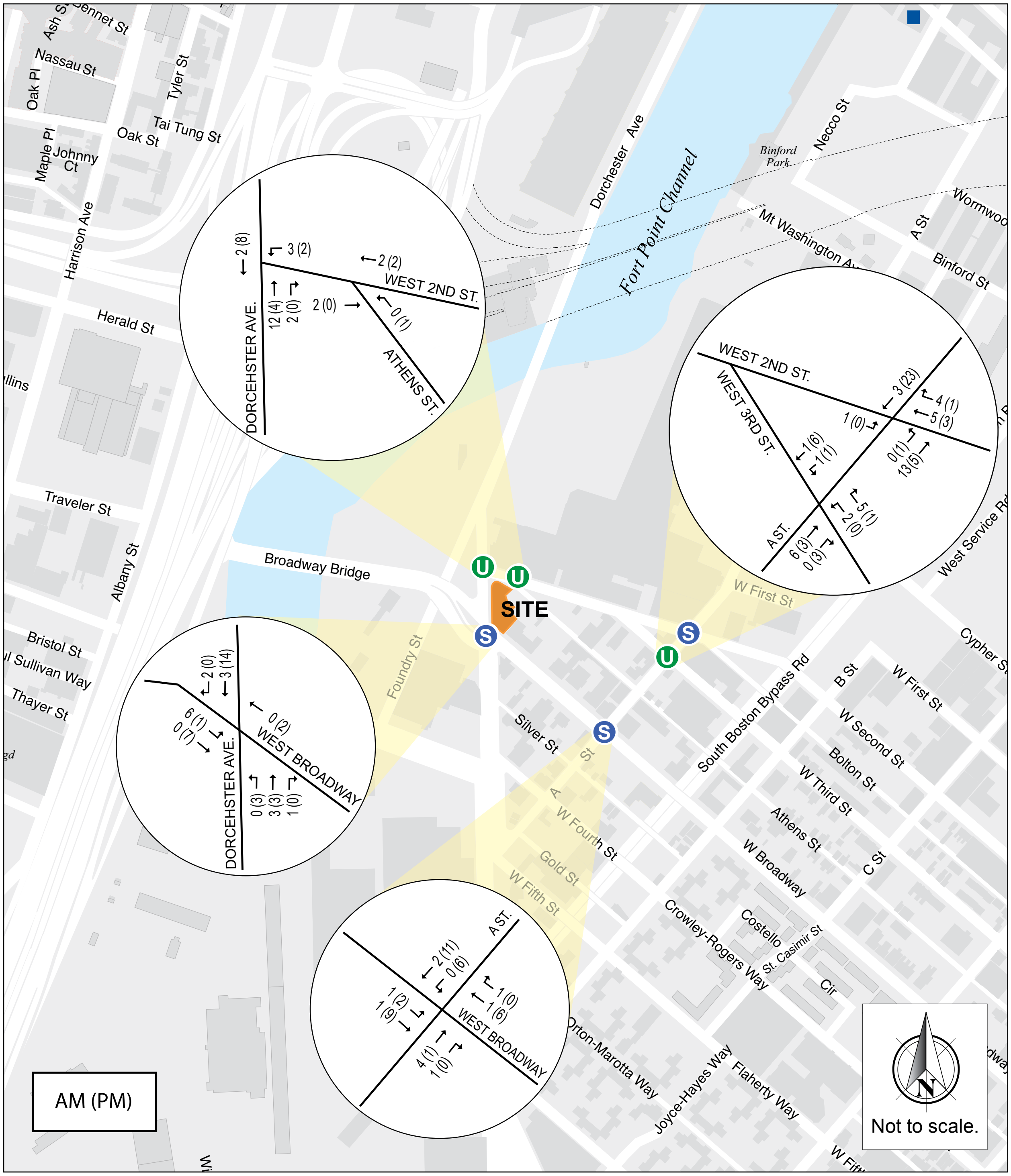


Figure 7-8.
Existing Conditions (2013) Bicycle Volumes,
a.m. and p.m. Peak Hours

7.3 Future Conditions

For transportation impact analyses, it is standard practice to evaluate two future conditions: No-Build conditions (without the proposed project) and Build conditions (with the proposed project). In accordance with BTD guidelines, these conditions are projected to a future date five years from the Existing conditions year. For this evaluation of this Project, 2018 was selected as the horizon year for the future conditions analyses.

This section presents a description of the 2018 future conditions scenarios and includes an evaluation of the transportation facilities under the No-Build and Build conditions.

7.3.1 No-Build Conditions

The No-Build conditions reflect a future scenario that incorporates any anticipated traffic growth independent of the Project and any planned infrastructure improvements that will affect travel patterns throughout the study area.

No-Build Background Growth

Two methodologies are used to account for future traffic growth, independent of the Project. The first methodology accounts for general background traffic growth that may be affected by changes in demographics, automobile usage, and automobile ownership. Based on a review of recent traffic studies conducted for projects within the vicinity of the study area, a 1% annual traffic growth rate was used to develop the future conditions traffic volumes.

The second methodology identifies any specific planned developments that are expected to affect traffic patterns throughout the study area within the future analysis time horizon. The following projects are located in the vicinity of the study area and, where appropriate, traffic volumes associated with these projects were also incorporated into the future conditions traffic volumes.

11 West Broadway – This project is adjacent to Broadway Station and consists of 50 residential units, 8,000 square feet of retail space, and parking spaces located underneath the 6-story building. This project has been approved by the BRA and is currently under construction.

275 Albany Street – This project will consist of up to 380 residential units and up to 180 parking spaces. This project has been approved by the BRA and is expected to begin construction in late 2013/early 2014.

One Channel Center (169 A Street) – This project will consist of the construction of 525,000 sf of office space, a new parking garage containing 970 spaces and two new open space areas totaling approximately 78,000 sf to be located off A Street. This project has been approved by the BRA and is currently under construction.

West Square (320 D Street) – This project consists of approximately 259 residential units and up to 268 parking spaces. This project has been approved by the BRA and is currently under construction.

Ink Block (300 Harrison Avenue) – This project consists of 471 residential units, approximately 85,000 sf of retail space (including a supermarket), and 411 parking spaces. This project has been approved by the BRA.

22-26 West Broadway – This project consists of the construction of a new 6-story building to include 31 apartment units and 3,834 sf of retail space. This project has been approved by the BRA.

The one-percent per year annual growth rate was applied to the 2013 Existing conditions traffic volumes, then the traffic volumes associated with the background development projects listed above were added to develop the 2018 No-Build conditions traffic volumes. The 2018 No-Build weekday morning and evening peak hour traffic volumes are shown on **Figure 7-9** and **Figure 7-10**, respectively.

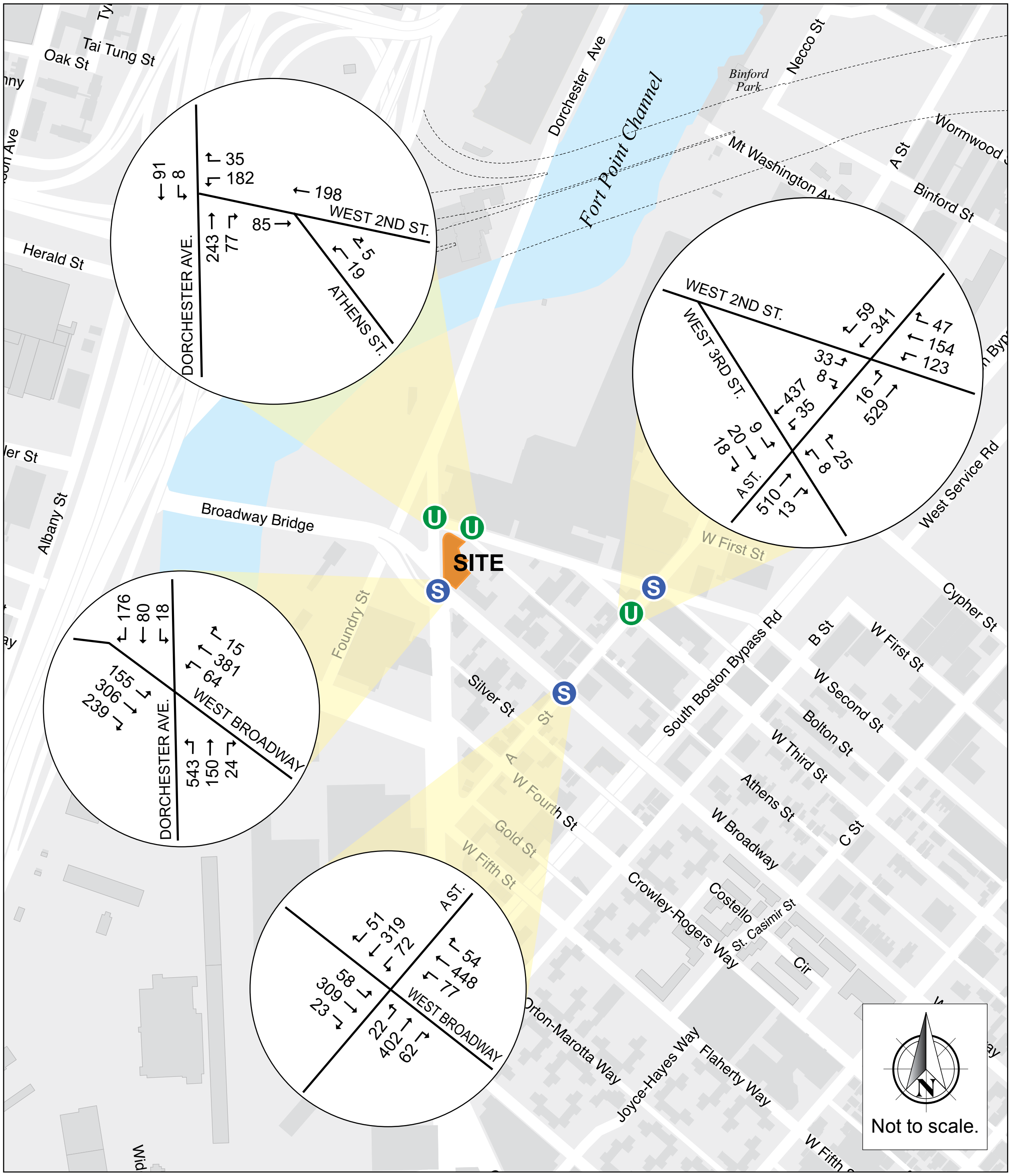


Figure 7-9.
No-Build Conditions (2018) Traffic Volumes,
a.m. Peak Hour (7:15-8:15 a.m.)

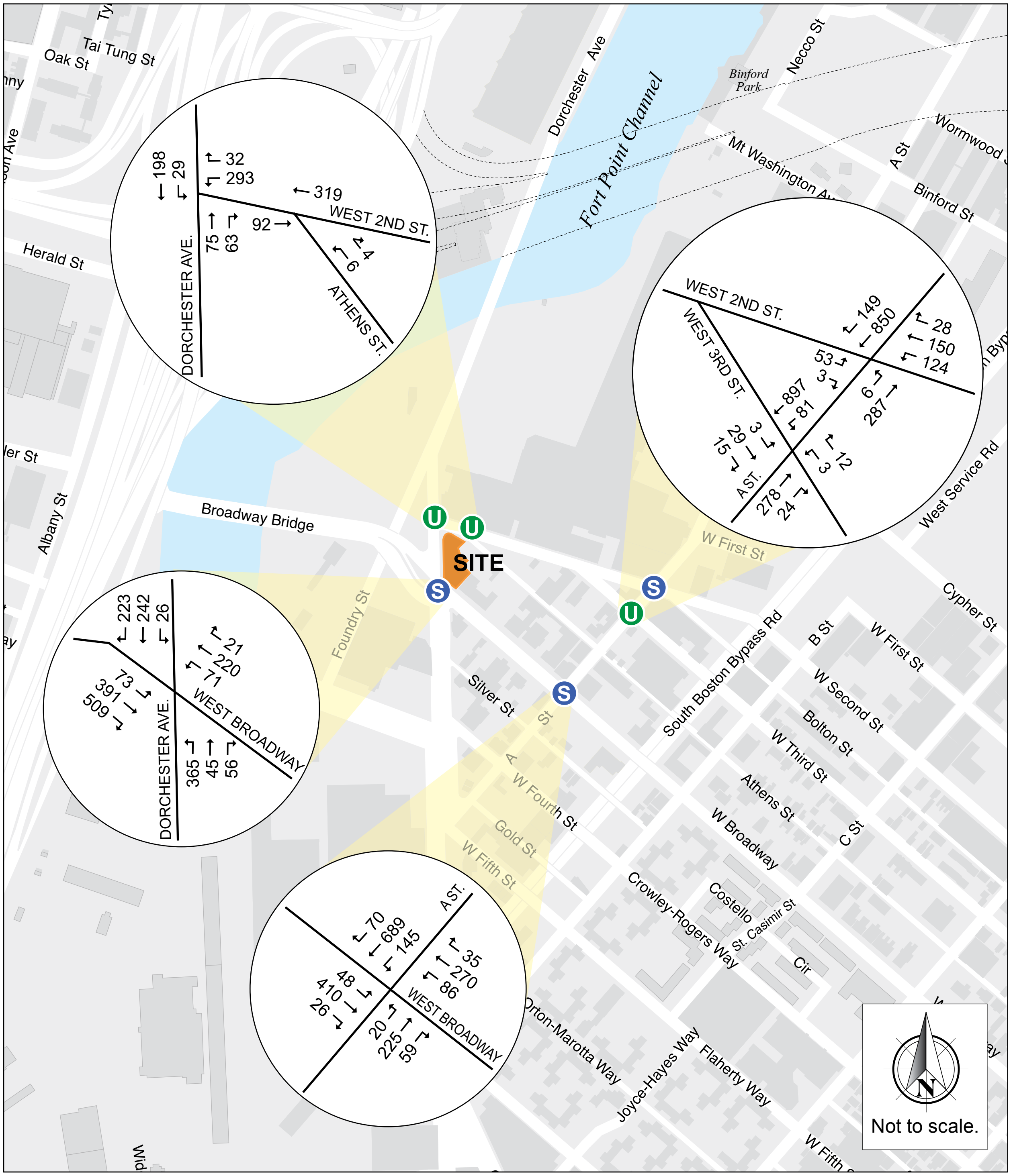


Figure 7-10.
No-Build Conditions (2018) Traffic Volumes,
p.m. Peak Hour (5:00-6:00 p.m.)

Proposed Infrastructure Improvements

A review of planned improvements to roadway, transit, bicycle, and pedestrian facilities was conducted to determine if there are any nearby projects in the vicinity of the study area. The following project is currently in the Massachusetts Environmental Protection Act (MEPA) permitting process:

South Station Expansion Project. MassDOT is collaborating with various stakeholders such as the MBTA, Amtrak, the City of Boston, and the Federal Railroad Administration to expand and improve South Station. The improvements at South Station will include the construction of additional tracks and platforms, the addition of layover space, and the opening of the segment of Dorchester Avenue adjacent to the Fort Point Channel to the public. The opening of Dorchester Avenue to public travel will provide another north-south route between the Seaport District and the West Broadway neighborhood and has the potential to significantly alter existing travel patterns throughout the Seaport District and the West Broadway neighborhood, especially along the A Street and Dorchester Avenue corridors. As part of the project, the existing U.S. Postal Service mail facility located to the east of South Station would be acquired and demolished to allow for the expansion. The project may also include up to approximately 2.5 million square feet and 26 stories of mixed-use space. The transportation improvements and potential trip generation estimates associated with the South Station Expansion Project are not expected to be implemented within the five-year future year horizon and were not included in the analysis of the future conditions scenarios.

No-Build Traffic Operations

The 2018 No-Build conditions scenario analysis uses the same methodology as the 2013 Existing conditions scenario analysis. **Table 7-4** and **Table 7-5** present the 2018 No-Build conditions operations analysis for the weekday morning and evening peak hours, respectively. The shaded cells in the tables indicate a worsening in LOS between the 2013 Existing conditions and the 2018 No-Build conditions. The detailed analysis sheets are provided in **Appendix D**.

Table 7-4. No-Build Conditions (2018) Level of Service Summary, a.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Dorchester Avenue at West Broadway	**F**	**>80.0**	**0.84**	**-**	**-**
West Broadway EB left	C	24.2	0.62	94	#221
West Broadway EB thru	B	18.2	0.41	166	258
West Broadway EB right	A	8.2	0.16	0	42
West Broadway WB left	A	8.2	0.21	31	m35
West Broadway WB thru/right	A	10.0	0.46	214	249
Dorchester Avenue NB left	F	>80.0	>1.00	~432	#633
Dorchester Avenue NB thru/right	C	26.1	0.37	70	124
Dorchester Avenue SB left/thru	D	38.5	0.36	42	83
Dorchester Avenue SB right	C	34.8	0.14	0	55
West Broadway at A Street	**C**	**30.8**	**0.76**	**-**	**-**
West Broadway EB left/thru/right	C	25.8	0.44	220	m318
West Broadway WB left/thru/right	B	17.0	0.63	233	418
A Street NB left/thru/right	C	31.3	0.78	254	330
A Street SB left/thru	E	56.9	0.95	227	#354
A Street SB right	B	18.9	0.05	0	21
West 2nd Street at A Street	**B**	**14.0**	**0.43**	**-**	**-**
West 2nd Street EB left	C	27.3	0.15	16	41
West 2nd Street EB right	C	25.0	0.01	0	10
West 2nd Street WB left	C	28.8	0.30	62	112
West 2nd Street WB thru/right	C	30.2	0.40	95	162
A Street NB left/thru	A	8.5	0.43	144	209
A Street SB thru/right	A	7.4	0.32	91	138
Unsignalized Intersections					
Dorchester Avenue at West 2nd Street					
West 2nd Street WB left/right	C	15.2	0.40	-	48
Dorchester Avenue NB thru/right	A	0.0	0.20	-	0
Dorchester Avenue SB left/thru	A	0.7	0.01	-	1
West 2nd Street at Athens Street					
West 2nd Street EB thru	A	0.0	0.05	-	0
West 2nd Street WB thru	A	0.0	0.13	-	0
Athens Street NB left/right	A	9.9	0.02	-	2
A Street at West 3rd Street					
West 3rd Street EB left/thru/right	D	29.2	0.26	-	25
West 3rd Street WB left	E	40.6	0.08	-	6
West 3rd Street WB right	B	13.0	0.06	-	5
A Street NB thru/right	A	0.0	0.33	-	0
A Street SB left/thru	A	1.1	0.04	-	3

= 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after 2 cycles.
~ = Volume exceeds capacity; queue is theoretically infinite. Queue shown is maximum after 2 cycles.
m = Volume for 95th percentile queue is metered by upstream signal

Table 7-5. No-Build Conditions (2018) Level of Service Summary, p.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Dorchester Avenue at West Broadway	**D**	**39.6**	**0.72**	**-**	**-**
West Broadway EB left	C	25.5	0.36	35	85
West Broadway EB thru	C	32.9	0.74	214	#413
West Broadway EB right	B	15.0	0.34	0	61
West Broadway WB left	D	53.0	0.75	30	m#85
West Broadway WB thru/right	C	31.6	0.42	99	m161
Dorchester Avenue NB left	F	>80.0	>1.00	~250	#395
Dorchester Avenue NB thru/right	B	17.1	0.12	18	48
Dorchester Avenue SB left/thru	D	49.8	0.76	142	208
Dorchester Avenue SB right	C	32.3	0.17	0	56
West Broadway at A Street	**E**	**55.1**	**0.98**	**-**	**-**
West Broadway EB left/thru/right	B	19.9	0.74	87	m143
West Broadway WB left/thru/right	C	32.7	0.76	199	#349
A Street NB left/thru/right	B	16.1	0.57	116	204
A Street SB left/thru	F	>80.0	>1.00	~612	#841
A Street SB right	B	11.3	0.09	8	30
West 2nd Street at A Street	**B**	**14.8**	**0.65**	**-**	**-**
West 2nd Street EB left	D	46.2	0.46	30	71
West 2nd Street EB right	C	32.1	0.00	0	3
West 2nd Street WB left	D	40.8	0.49	71	129
West 2nd Street WB thru/right	D	43.0	0.58	98	168
A Street NB left/thru	A	3.4	0.19	39	61
A Street SB thru/right	A	7.7	0.67	228	340
Dorchester Avenue at West 2nd Street					
West 2nd Street WB left/right	C	21.8	0.63	-	110
Dorchester Avenue NB thru/right	A	0.0	0.09	-	0
Dorchester Avenue SB left/thru	A	1.2	0.02	-	2
West 2nd Street at Athens Street					
West 2nd Street EB thru	A	0.0	0.06	-	0
West 2nd Street WB thru	A	0.0	0.20	-	0
Athens Street NB left/right	B	10.1	0.01	-	1
A Street at West 3rd Street					
West 3rd Street EB left/thru/right	F	>50.0	0.62	-	71
West 3rd Street WB left	F	>50.0	0.11	-	9
West 3rd Street WB right	B	10.7	0.02	-	2
A Street NB thru/right	A	0.0	0.18	-	0
A Street SB left/thru	A	2.1	0.08	-	6

= 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after 2 cycles.
~ = Volume exceeds capacity; queue is theoretically infinite. Queue shown is maximum after 2 cycles.
m = Volume for 95th percentile queue is metered by upstream signal

As shown in **Table 7-4**, the LOS at the study area intersections will generally remain unchanged between the 2013 Existing and 2018 No-Build conditions during the weekday morning peak hour. The only movement in the study area to experience a worsening in LOS is the West Broadway eastbound approach at A Street, which decreases from LOS B to LOS C during the weekday morning peak hour.

As shown in **Table 7-5**, the LOS at the intersections of West 2nd Street at A Street, Dorchester Avenue at West 2nd Street, and West 2nd Street at Athens Street remain unchanged between the 2013 Existing and 2018 No-Build conditions during the weekday evening peak hour. The remaining three intersections will experience a worsening in LOS between 2013 Existing and 2018 No-Build conditions during the weekday evening peak hour for some movements and are listed below.

Dorchester Avenue at West Broadway: The West Broadway westbound left-turn movement will decrease from LOS C to LOS D.

West Broadway at A Street: Overall operations at this intersection decrease from LOS C to LOS E, with the West Broadway westbound approach decreasing from LOS B to LOS C and the A Street southbound left-turn/through movement decreasing from LOS C to LOS F. This intersection experiences moderate traffic volume increases along the A Street approach from the various background projects included in the No-Build analysis.

A Street at West 3rd Street: The West 3rd Street eastbound approach will decrease from LOS E to LOS F. As mentioned in the existing conditions analysis, traffic volumes along this approach are minimal during the peak hours.

7.3.2 Build Conditions

The Project consists of the construction of a 156±-room boutique hotel with approximately 4,619 sf of ground floor tenant-leased restaurant space and 1,589 sf of rooftop bar/lounge space. The 2018 Build conditions reflect a future scenario that adds anticipated Project-generated trips to the 2018 No-Build conditions traffic volumes.

Site Access and Circulation

Vehicular access/egress will be provided by a porte-cochère that will intersect the easterly (northbound) side of Dorchester Avenue and the southerly (eastbound) side of West 2nd Street as shown in **Figure 7-11**. The entrance will be located along Dorchester Avenue approximately 50 feet south of West 2nd Street and the exit will be located along West 2nd Street, approximately 20 feet east of Dorchester Avenue. Due to the proximity of Dorchester Avenue to the point of egress, left-turns will be prohibited from exiting the porte-cochère onto West 2nd Street. Vehicles exiting the porte-cochère will be required to circulate around the area using West 2nd Street or West 3rd Street, A Street, and West Broadway to travel to Dorchester Avenue and the Broadway Bridge.

The porte-cochère will be 15 feet in width and approximately 80 feet in length, providing enough space for four parked vehicles and allowing uninterrupted circulation.

All vehicles entering and exiting the site will be served by either an on-site valet or taxi service. Typical of an urban hotel, it is anticipated that the majority of the guests will either arrive by taxi or public transportation and will not have a need for parking. The proximity to Broadway Station provides the hotel guests easy access to and from South Station and Logan Airport via the Red Line and Silver Line. The valet service is expected to primarily serve the restaurant uses on the site. Parking for valet service will be off-site and most likely in the area north and east of the Project site. The exact location, arrangement, and operations of valet activity and parking will be defined and detailed in the Transportation Access Plan Agreement (TAPA).

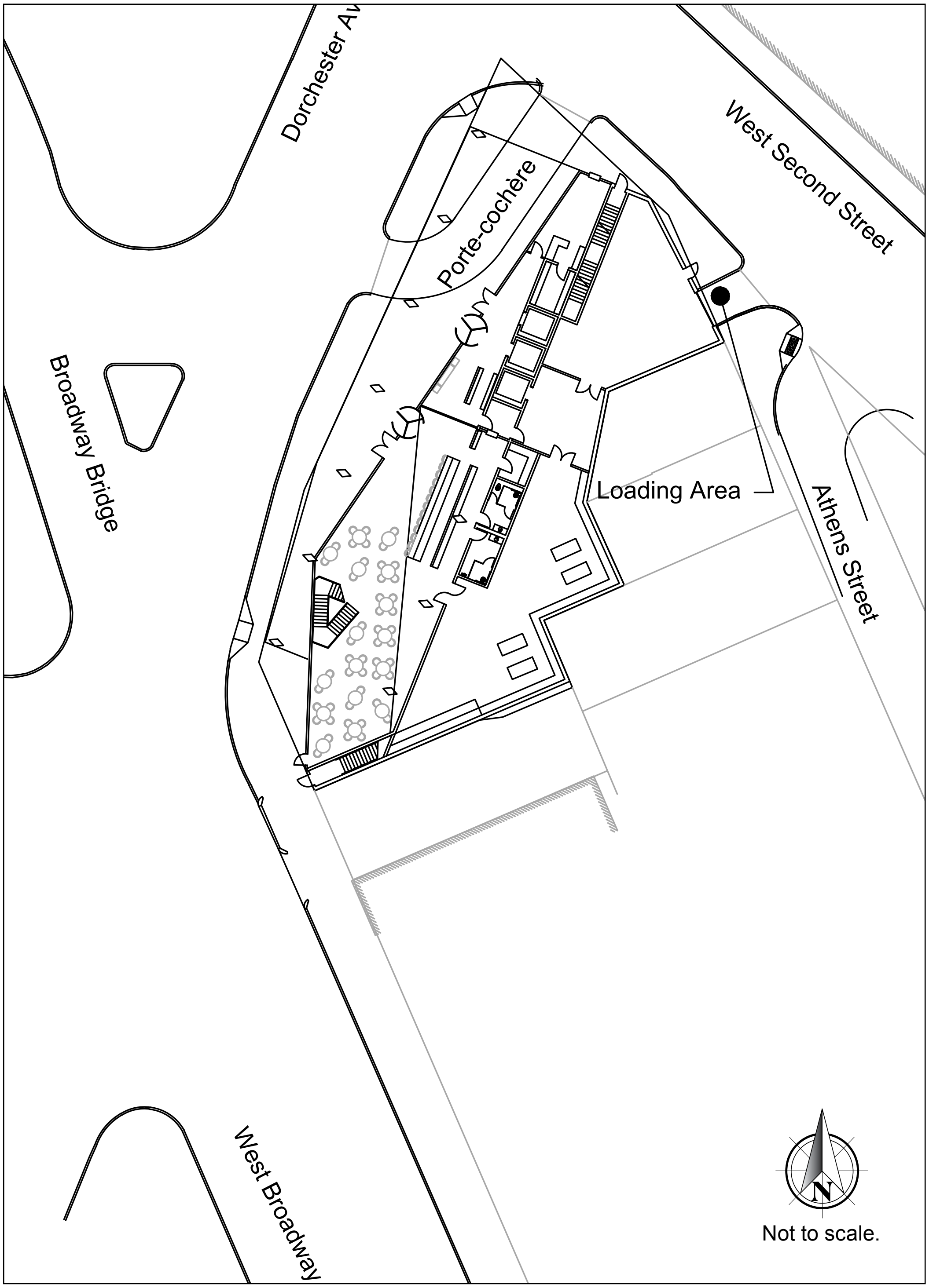


Figure 7-11.
Proposed Site Access Plan

Trip Generation

Trip generation is a complex, multi-step process that produces an estimate of vehicle trips, transit trips, walk trips, and bicycle trips associated with a proposed project and a specific land use program. A project's location and proximity to different modes determines how people will travel to and from that project site.

To estimate the number of trips expected to be generated by the Project, data published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual*[8] were used. ITE provides data to estimate the total number of unadjusted vehicular trips associated with the Project. In an urban setting well-served by transit, adjustments are necessary to account for other travel mode shares such as walking, bicycling, and transit.

To estimate the unadjusted number of vehicular trips for the Project, the following ITE land use codes (LUCs) were used:

LUC 310 – Hotel. The hotel land use is defined as a place of lodging that provides sleeping accommodations and supporting facilities such as restaurants, cocktail lounges, meeting and banquet rooms or convention centers, limited recreational facilities (e.g., pool, fitness room), and/or other retail services or shops. Trip generation estimates are based on average vehicular rates per room.

LUC 932 – High-Turnover (Sit-Down) Restaurant. The high-turnover (sit-down) restaurant land use is defined as a full-service eating establishment with a typical stay of duration of approximately one hour. Trip generation estimates are based on average vehicular rates per 1,000 sf of gross floor area. This land use was also selected to be used in the trip generation estimates even though the hotel land use does consider ancillary restaurants as part of their usage. Due to the nature and location of the Project, the tenant-leased restaurant use is intended to serve both patrons of the hotel and customers that are not staying at the hotel.

Mode Split

The BTD provides vehicle, transit, and walking mode split rates for different areas of Boston. The Project is located in the northerly portion of designated Area 8, which also includes areas of Dorchester along the MBTA Red Line and Dorchester Avenue, south of the Project site. The unadjusted vehicular trips were converted to person trips by using vehicle occupancy rates published by the Federal Highway Administration (FHWA)[9]. The person trips were then distributed to different modes according to the mode shares shown in **Table 7-6**.

8 *Trip Generation Manual*, 9th Edition; Institute of Transportation Engineers; Washington, D.C.; 2012.

9 *Summary of Travel Trends: 2009 National Household Travel Survey*; FHWA; Washington, D.C.; June 2011.

Table 7-6. Mode Split Assumptions

Time Period		Vehicle Occupancy Rate [a]	Walk Share [b]	Transit Share [b]	Auto Share [b]
Daily					
Hotel	In	2.20	24%	15%	61%
	Out	2.20	24%	15%	61%
Restaurant	In	1.78	24%	15%	61%
	Out	1.78	24%	15%	61%
a.m. Peak Hour					
Hotel	In	2.20	20%	15%	65%
	Out	2.20	30%	24%	45%
Restaurant	In	1.78	20%	15%	65%
	Out	1.78	30%	24%	45%
p.m. Peak Hour					
Hotel	In	2.20	30%	24%	45%
	Out	2.20	20%	15%	65%
Restaurant	In	1.78	30%	24%	45%
	Out	1.78	20%	15%	65%

a Based on Table 16 from "Summary of Travel Trends: 2009 National Household Travel Survey" (FHWA,2011).
b Based on rates published by the Boston Transportation Department.

Vehicle Trip Generation

The trip generation process described above yields the adjusted vehicle trips associated with the Project. It is also expected that a portion of the vehicle trips associated with the hotel will be by taxi. Based on published data[10], it is expected that approximately 25 percent of the vehicular trips associated with the hotel use will be taxi trips. Due to the nature of the Project the guests of the boutique hotel are generally not expected to travel to the site by personal vehicle. However, the trip generation estimates do account for some personal vehicle usage by the guests, providing a higher trip generation estimate and a more conservative traffic operations analysis than what will be expected for a hotel at this location.

Table 7-7 presents trip generation estimates for the Project. Detailed trip generation worksheets are provided in **Appendix D**.

[10] *Central Artery/Tunnel Project Detailed Travel Model Documentation*; Bechtel/Parsons Brinckerhoff and Cambridge Systematics, Inc.; Boston/Cambridge, MA; September 30, 1994.

Table 7-7. Project Vehicle Trip Generation

Time Period	Direction	Hotel (taxi) [a]	Hotel (private auto) [a]	Restaurant [b]	Total
Daily	**Total**	**194**	**584**	**482**	**1,260**
	In	97	292	241	630
	Out	97	292	241	630
a.m. Peak Hour	**Total**	**12**	**35**	**37**	**84**
	In	8	24	24	56
	Out	4	11	13	28
p.m. Peak Hour	**Total**	**12**	**40**	**33**	**85**
	In	5	17	17	39
	Out	7	23	16	46

a Based on LUC 310 – Hotel (156 rooms)
b Based on LUC 932 – High-Turnover (Sit-Down) Restaurant (6,208 sf)

As shown in **Table 7-7,** the Project is expected to generate approximately 1,260 new trips on an average weekday, with approximately 84 new trips during the weekday morning peak hour (56 entering and 28 exiting) and 85 new trips during the weekday evening peak hour (39 entering and 46 exiting).

Trip Distribution

The trip distribution identifies the various travel paths for vehicles arriving and leaving the Project site. Trip distribution patterns for the Project were based on BTD's origin-destination data for Area 8. The BTD data was further refined to reflect the nature of the hotel use of the Project. It is expected that a higher percentage of the hotel trips, especially the taxi trips, would travel to and from Logan Airport than the data for Area 8 indicates. To account for trips to and from Logan Airport, 25 percent of the trips were shifted to A Street, which provides the most direct route to and from Logan Airport via the Massachusetts Turnpike at Exit 25. This shifted traffic also accounts for the taxi trips associated with the site, some of which are expected to travel to and from Logan Airport. **Figure 7-12** shows the trip distribution pattern for the Proposed Project.

The Project-generated trips were assigned to the study area roadway network based on the trip distribution patterns shown in **Figure 7-12** and are shown in **Figure 7-13** and **Figure 7-14** for the weekday morning and weekday evening peak hours, respectively. The Project-generated trip networks also incorporate vehicle maneuvers associated with valet activity destined to and from the anticipated parking areas for the Project. The Project-generated trips were added to the 2018 No-Build conditions traffic volumes to develop the 2018 Build conditions peak hour traffic volume networks and are shown in **Figure 7-15** and **Figure 7-16** for the weekday morning and weekday evening peak hours, respectively.

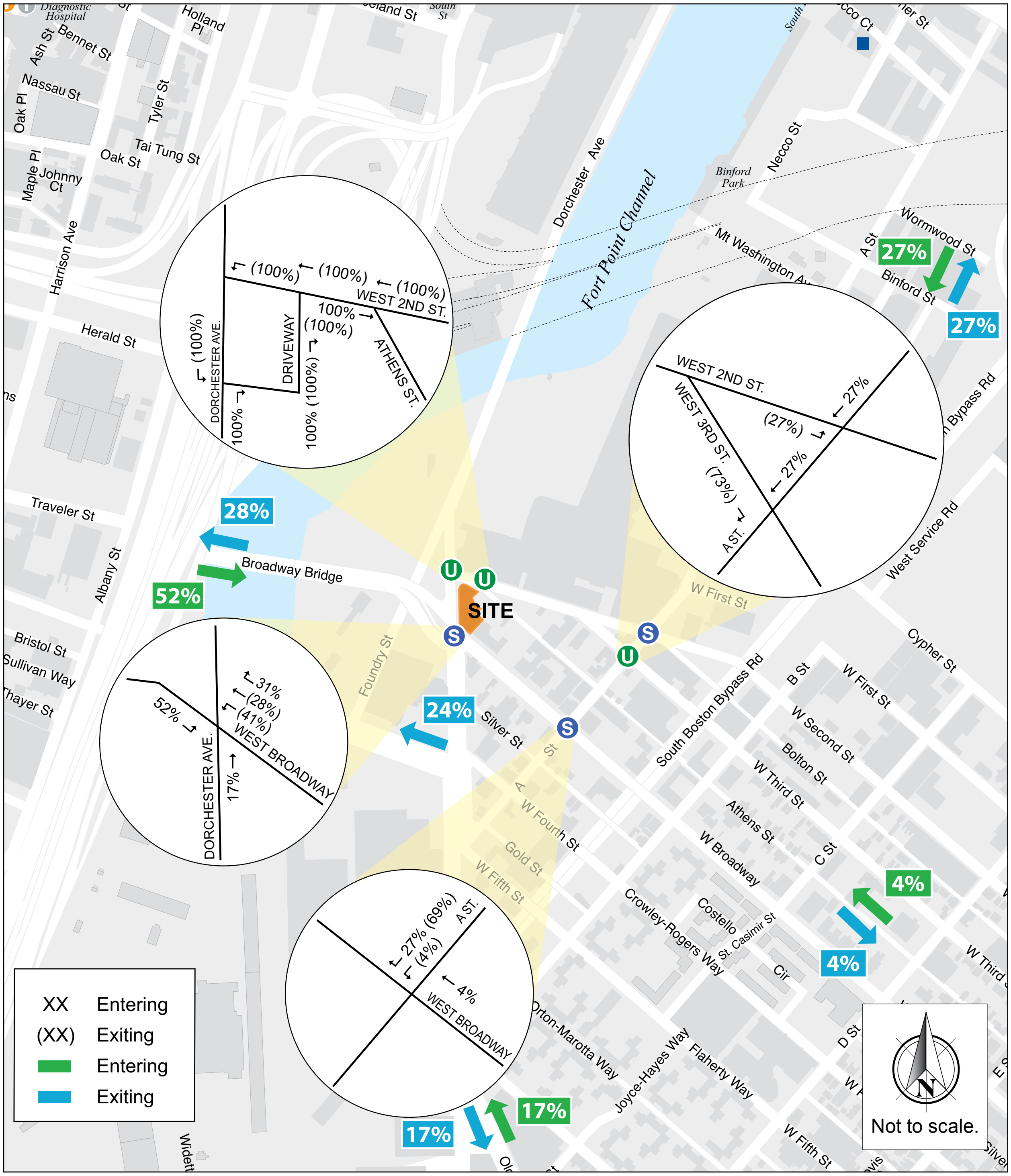


Figure 7-12.
Trip Distribution

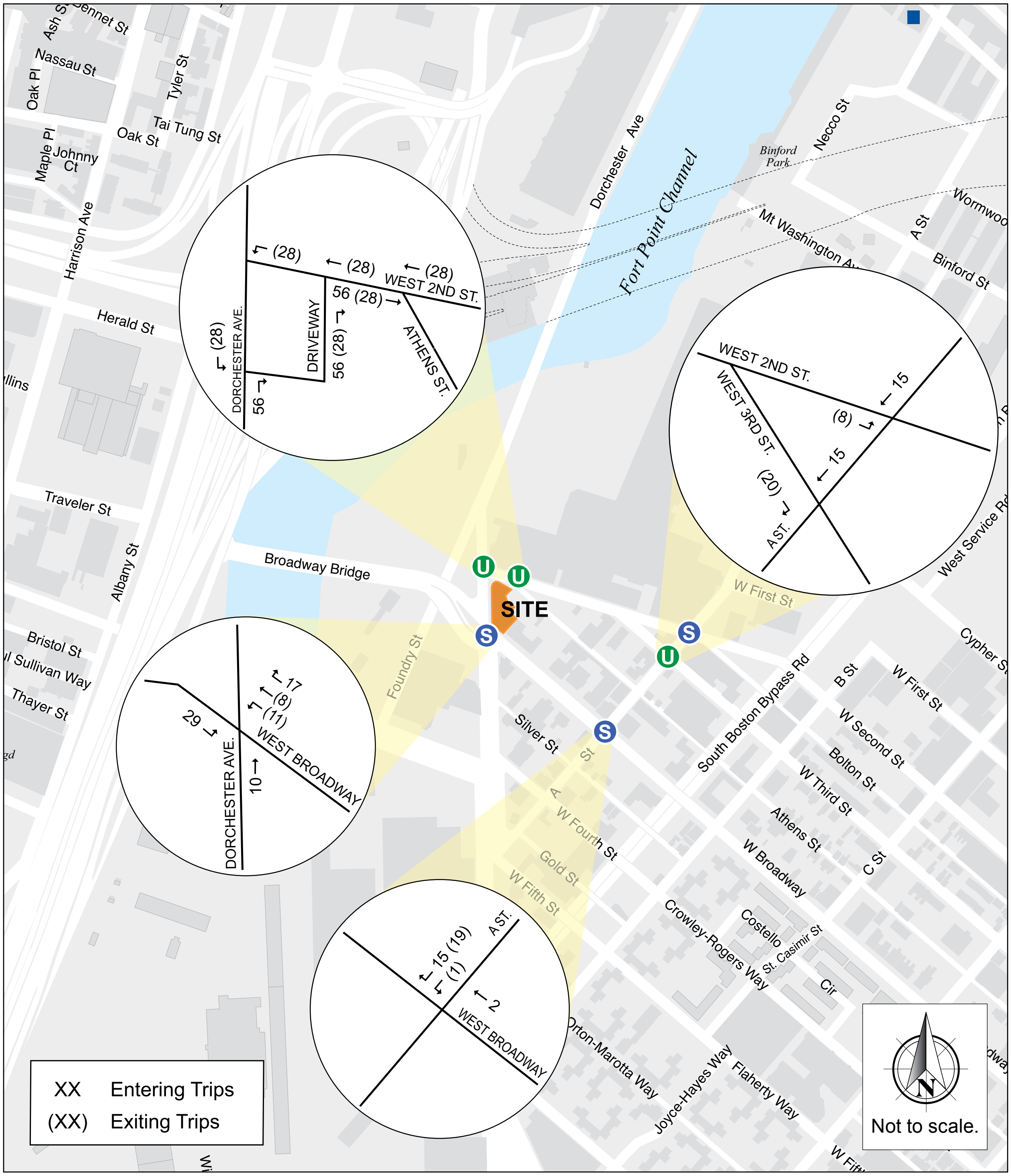


Figure 7-13.
Project-Generated Trips, a.m. Peak Hour

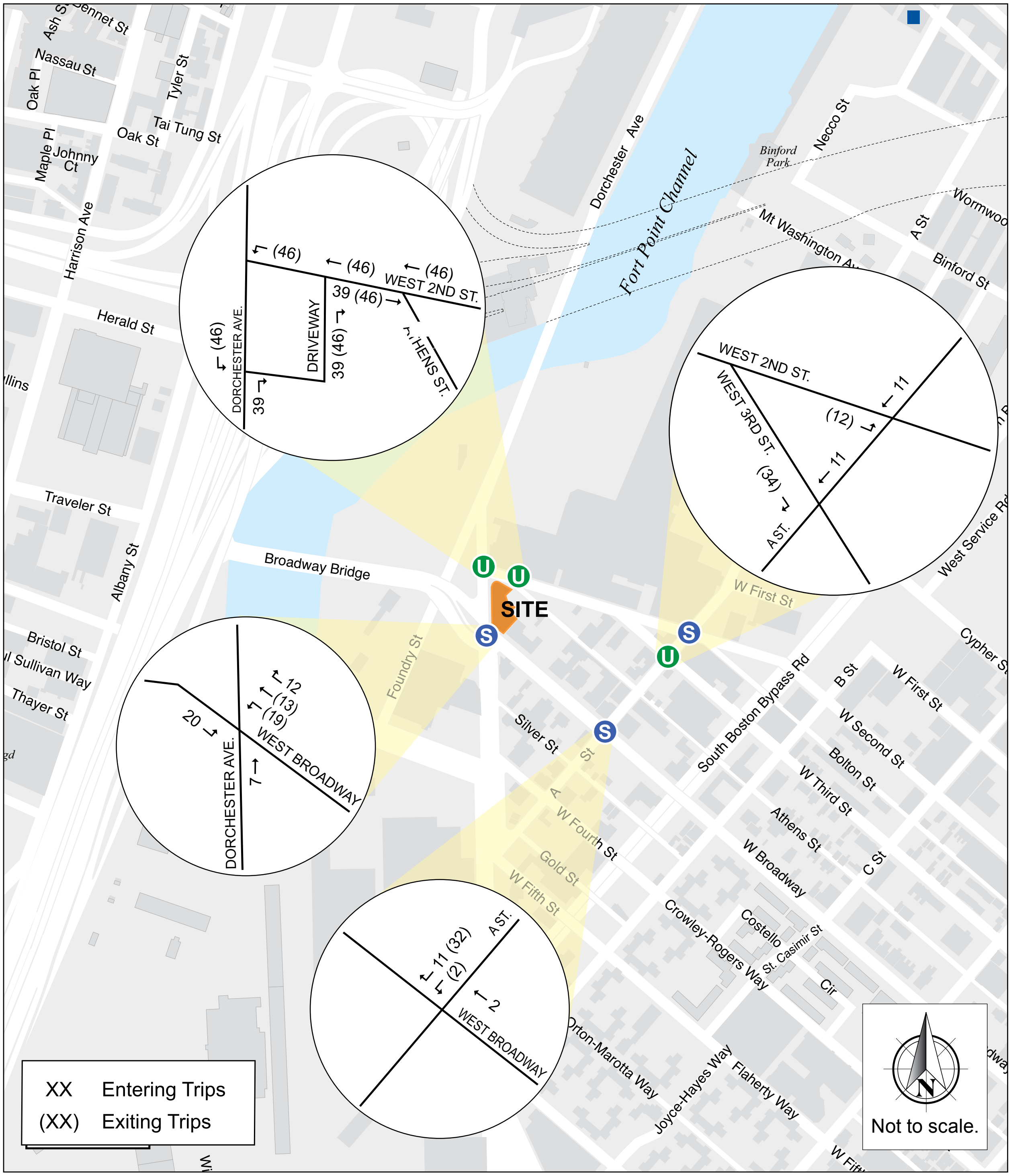


Figure 7-14.
Project-Generated Trips, p.m. Peak Hour

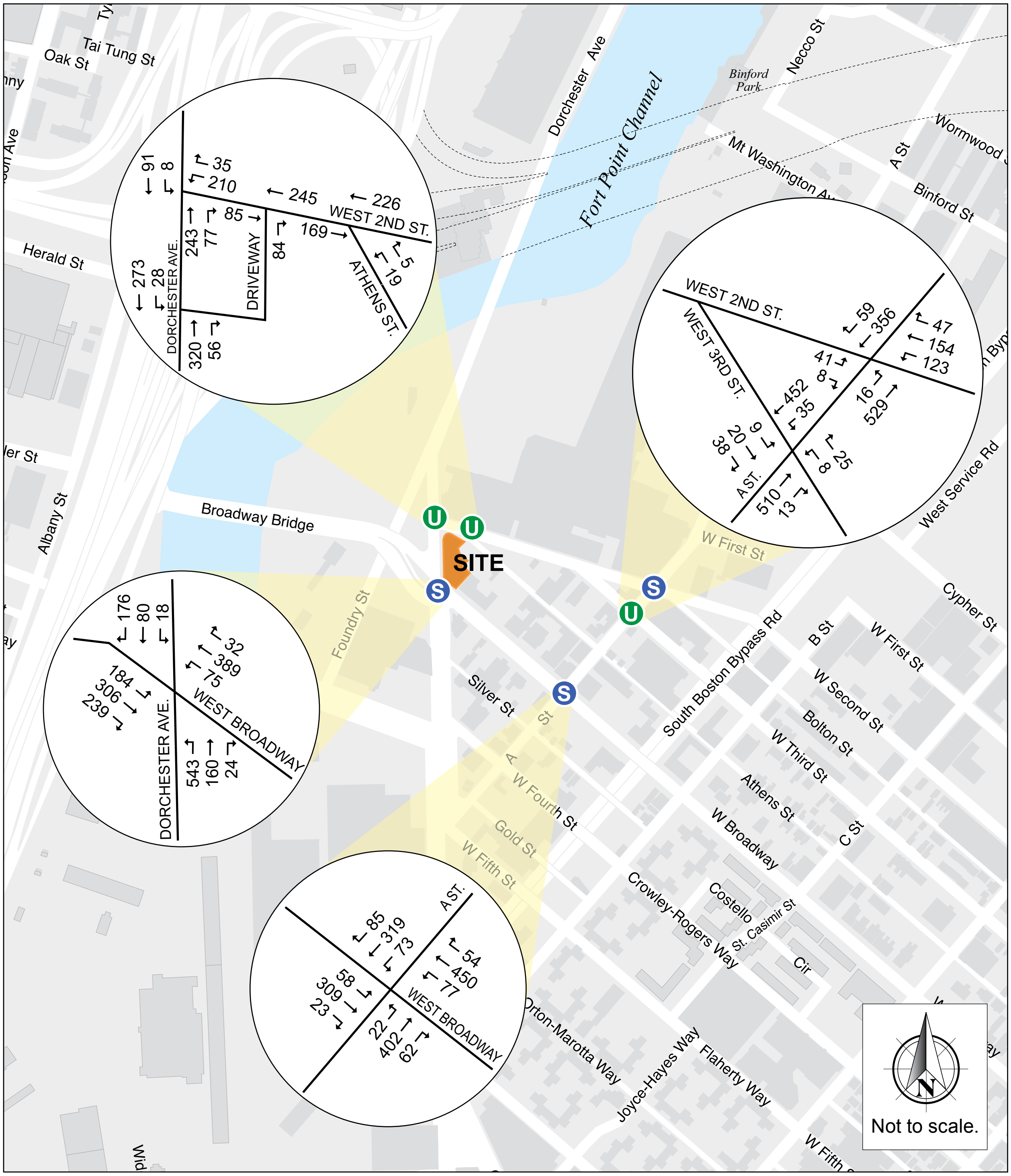


Figure 7-15.
Build Conditions (2018) Traffic Volumes, a.m. Peak Hour

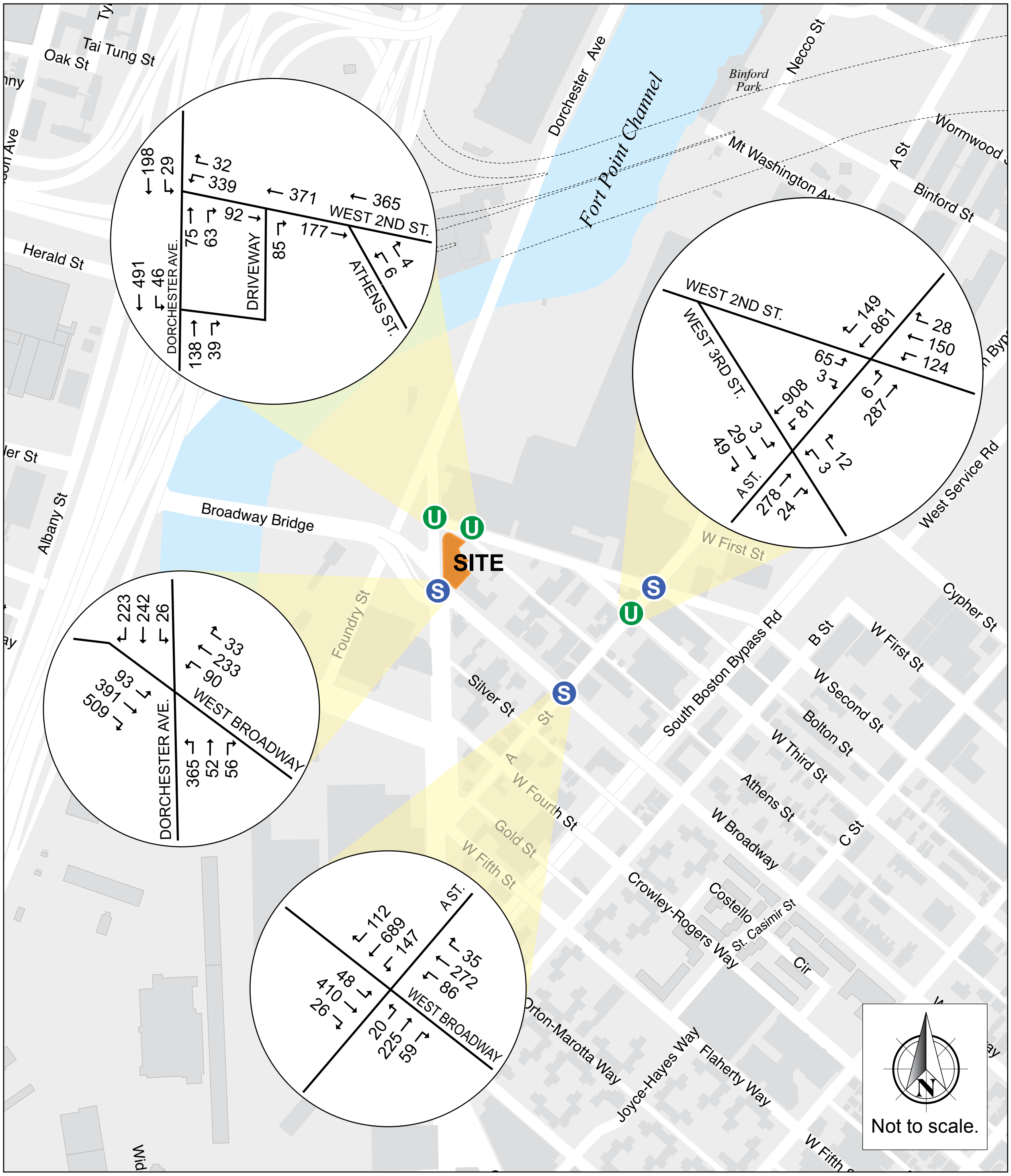


Figure 7-16.
Build Conditions (2018) Traffic Volumes, p.m. Peak Hour

Build Conditions Traffic Operations

The 2018 Build conditions scenario analysis uses the same methodology as the 2013 Existing and 2018 No-Build conditions scenario analyses. **Table 7-8** and **Table 7-9** present the 2018 Build conditions operations analyses for the weekday morning and evening peak hours, respectively. The shaded cells in the tables indicate a decrease in LOS between the 2018 No-Build conditions and the 2018 Build conditions. The detailed analysis sheets are provided in **Appendix D**.

Table 7-8. Build Conditions (2018) Level of Service Summary, a.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Dorchester Avenue at West Broadway	**F**	**>80.0**	**0.93**	**-**	**-**
West Broadway EB left	D	37.9	0.79	~141	#275
West Broadway EB thru	B	18.2	0.41	166	258
West Broadway EB right	A	8.2	0.16	0	42
West Broadway WB left	A	9.2	0.25	38	m46
West Broadway WB thru/right	B	10.9	0.49	230	#302
Dorchester Avenue NB left	F	>80.0	>1.00	~432	#633
Dorchester Avenue NB thru/right	C	26.5	0.40	75	131
Dorchester Avenue SB left/thru	D	38.5	0.36	42	83
Dorchester Avenue SB right	C	34.8	0.14	0	55
West Broadway at A Street	**C**	**30.8**	**0.76**	**-**	**-**
West Broadway EB left/thru/right	C	25.8	0.44	221	m318
West Broadway WB left/thru/right	B	17.1	0.64	234	420
A Street NB left/thru/right	C	31.2	0.78	254	329
A Street SB left/thru	E	58.1	0.95	227	#357
A Street SB right	B	19.1	0.08	0	27
West 2nd Street at A Street	**B**	**14.0**	**0.43**	**-**	**-**
West 2nd Street EB left	C	28.0	0.19	20	50
West 2nd Street EB right	C	25.0	0.01	0	10
West 2nd Street WB left	C	28.8	0.30	62	112
West 2nd Street WB thru/right	C	30.2	0.40	95	162
A Street NB left/thru	A	8.5	0.43	144	209
A Street SB thru/right	A	7.5	0.34	96	144
Unsignalized Intersections					
Dorchester Avenue at West 2nd Street					
West 2nd Street WB left/right	C	16.5	0.46	-	61
Dorchester Avenue NB thru/right	A	0.0	0.20	-	0
Dorchester Avenue SB left/thru	A	0.7	0.01	-	1
West 2nd Street at Athens Street					
West 2nd Street EB thru	A	0.0	0.11	-	0
West 2nd Street WB thru	A	0.0	0.14	-	0
Athens Street NB left/right	B	10.8	0.02	-	2
A Street at West 3rd Street					
West 3rd Street EB left/thru/right	D	26.5	0.30	-	31
West 3rd Street WB left	E	45.6	0.09	-	7
West 3rd Street WB right	B	13.0	0.06	-	5
A Street NB thru/right	A	0.0	0.33	-	0
A Street SB left/thru	A	1.1	0.04	-	3
Dorchester Avenue at Porte-cochère Entrance					
Dorchester Avenue NB thru/right	A	0.0	0.24	-	0
Dorchester Avenue SB left/thru	A	1.0	0.03	-	2
West 2nd Street at Porte-cochère Exit					-
West 2nd Street EB thru	A	0.0	0.05	-	0
West 2nd Street WB thru	A	0.0	0.16	-	0
Porte-cochère Exit NB right	A	9.1	0.09	-	8

= 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after 2 cycles.
~ = Volume exceeds capacity; queue is theoretically infinite. Queue shown is maximum after 2 cycles.
m = Volume for 95th percentile queue is metered by upstream signal

Table 7-9. Build Conditions (2018) Level of Service Summary, p.m. Peak Hour

Intersection/Approach	LOS	Delay (s)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Signalized Intersections					
Dorchester Avenue at West Broadway	**E**	**58.3**	**0.77**	**-**	**-**
West Broadway EB left	C	22.3	0.38	46	#115
West Broadway EB thru	C	25.5	0.62	214	#413
West Broadway EB right	B	15.2	0.35	0	61
West Broadway WB left	C	30.6	0.59	40	m#106
West Broadway WB thru/right	C	25.9	0.39	112	m182
Dorchester Avenue NB left	F	>80.0	>1.00	~249	#394
Dorchester Avenue NB thru/right	C	20.7	0.15	21	52
Dorchester Avenue SB left/thru	D	49.3	0.76	142	208
Dorchester Avenue SB right	C	32.2	0.17	0	56
West Broadway at A Street	**E**	**55.3**	**0.98**	**-**	**-**
West Broadway EB left/thru/right	C	20.5	0.74	88	m178
West Broadway WB left/thru/right	C	32.8	0.76	200	#351
A Street NB left/thru/right	B	16.1	0.58	117	206
A Street SB left/thru	F	>80.0	>1.00	~616	#846
A Street SB right	B	11.7	0.15	12	41
West 2nd Street at A Street	**B**	**15.3**	**0.66**	**-**	**-**
West 2nd Street EB left	D	52.1	0.56	38	#96
West 2nd Street EB right	C	32.1	0.00	0	3
West 2nd Street WB left	D	40.8	0.49	71	129
West 2nd Street WB thru/right	D	43.0	0.58	98	168
A Street NB left/thru	A	3.4	0.19	39	61
A Street SB thru/right	A	7.9	0.68	233	349
Unsignalized Intersections					
Dorchester Avenue at West 2nd Street					
West 2nd Street WB left/right	D	27.0	0.73	-	152
Dorchester Avenue NB thru/right	A	0.0	0.09	-	0
Dorchester Avenue SB left/thru	A	1.2	0.02	-	2
West 2nd Street at Athens Street					
West 2nd Street EB thru	A	0.0	0.11	-	0
West 2nd Street WB thru	A	0.0	0.23	-	0
Athens Street NB left/right	B	11.0	0.01	-	1
A Street at West 3rd Street					
West 3rd Street EB left/thru/right	F	>50.0	0.79	-	112
West 3rd Street WB left	F	>50.0	0.16	-	12
West 3rd Street WB right	B	10.7	0.02	-	2
A Street NB thru/right	A	0.0	0.18	-	0
A Street SB left/thru	A	2.1	0.08	-	6
Dorchester Avenue at Porte-cochère Entrance					
Dorchester Avenue NB thru/right	A	0.0	0.11	-	0
Dorchester Avenue SB left/thru	A	1.0	0.04	-	3
West 2nd Street at Porte-cochère Exit					
West 2nd Street EB thru	A	0.0	0.06	-	0
West 2nd Street WB thru	A	0.0	0.24	-	0
Porte-cochère Exit NB right	A	9.2	0.10	-	8

= 95th percentile volume exceeds capacity; queue may be longer. Queue shown is maximum after 2 cycles.
~ = Volume exceeds capacity; queue is theoretically infinite. Queue shown is maximum after 2 cycles.
m = Volume for 95th percentile queue is metered by upstream signal

As shown in **Table 7-8**, the LOS at the study area intersections will generally remain unchanged between the 2018 No-Build and 2018 Build conditions during the weekday morning peak hour. The following two intersections will experience a worsening in LOS between 2018 No-Build and 2018 Build conditions during the weekday morning peak hour for some movements:

- **Dorchester Avenue at West Broadway:** The West Broadway eastbound left-turn movement will decrease from LOS C to LOS D. The West Broadway westbound through/right turn movements will decrease from LOS A to LOS B. The Project will not have a significant impact on operations at this intersection during the weekday morning peak hour.
- **West 2nd Street at Athens Street:** The Athens Street northbound approach will decrease from LOS A to LOS B. The Athens Street approach to the intersection carries minimal traffic and will not be significantly affected by the addition of Project-related traffic.

As shown in **Table 7-9**, the LOS for the majority of the movements at the study area intersections will remain unchanged between the 2018 No-Build and 2018 Build conditions during the weekday evening peak hour. The following three intersections will experience a worsening in LOS between 2018 No-Build and 2018 Build conditions during the weekday evening peak hour for some movements:

- **Dorchester Avenue at West Broadway:** Overall operations at this intersection decrease from LOS D to LOS E, with the Dorchester Avenue northbound through/right-turn movements decreasing from LOS B to LOS C. As previously noted, field observations indicate that operations at the intersection are better than the analysis indicates, especially for the Dorchester Avenue northbound left-turn movement, which is shown to operate at LOS F. The analysis shows that all other movements at the intersection are expected to operate under capacity with the addition of Project-related traffic volumes.
- **West Broadway at A Street:** The West Broadway eastbound approach will decrease from LOS B to LOS C caused by a minimal increase in delay from 19.9 seconds to 20.5 seconds.
- **Dorchester Avenue at West 2nd Street:** The West 2nd Street westbound approach will decrease from LOS C to LOS D. This movement will accommodate some Project-related valet movements and will continue to operate adequately and under capacity.

Based on the traffic operations analysis presented in **Table 7-8** and **Table 7-9**, the Proposed Project is not expected to have a significant impact upon traffic operations at the study area intersections. The existing roadway infrastructure will accommodate the minor increases in traffic volumes at the study area intersections expected to be generated by the Project. No additional capacity or operational improvements are necessary at the study area intersections to accommodate the Project-generated traffic volumes.

Parking

The Project will not provide on-site parking. Parking for guests of the hotel and restaurant will be provided by an on-site valet service. An agreement between the Proponent and nearby landowners that can provide the parking supply for the valet service will be a requirement of the TAPA between the Proponent and BTD.

For new developments, BTD has established maximum parking ratios by area of the City through their district based parking goals and guidelines. For the South Boston neighborhood, the recommended BTD maximum parking ratio for hotels is 0.40 parking spaces per room and the recommended BTD maximum parking ratio for restaurants is 0.75-1.25 parking spaces per 1,000 sf. Based on current trends in parking demand in downtown Boston, certain land uses exhibit lower ratios than BTD maximum guidelines, including those for hotels at 0.25 per unit vs. 0.40 per unit. Based on current parking trends and the BTD parking guidelines, between 39 and 62 spaces are necessary to accommodate parking for the hotel at full occupancy and a total of 5 spaces are necessary to accommodate parking for the restaurant uses. As stated above, all of the necessary parking will be provided off-site through agreements between the Proponent and nearby landowners.

Public Transportation

Based on the transit mode shares presented in **Table 7-6,** the future transit trips associated with the Project were estimated and are summarized in **Table 7-10.**

Table 7-10. Project Transit Trips

Time of Day		Hotel	Restaurant	Total
Daily	In	210	105	315
	Out	210	105	315
	Total	**420**	**210**	**630**
a.m. Peak	In	16	10	26
	Out	18	13	31
	Total	**34**	**23**	**57**
p.m. Peak	In	25	16	41
	Out	15	6	21
	Total	**40**	**22**	**62**

As shown in **Table 7-10,** approximately 630 new transit trips will occur over the course of an average weekday, with 57 new transit trips during the weekday morning peak hour and 62 new transit trips during the weekday evening peak hour. The transit trips will be dispersed on the bus and subway lines at Broadway Station and will be accommodated by the existing public transportation system.

Pedestrians

Based on the walk mode shares presented in **Table 7-6**, the future walk trips were estimated and are summarized in **Table 7-11.**

Table 7-11. Project Pedestrian Trips

Time of Day		Hotel	Restaurant	Total
	In	336	169	505
Daily	Out	336	169	505
	Total	**672**	**338**	**1,010**
	In	22	13	35
a.m. Peak	Out	22	16	38
	Total	**44**	**29**	**73**
	In	32	20	52
p.m. Peak	Out	20	9	29
	Total	**52**	**29**	**81**

Over the course of the day, the Project will generate 1,010 new pedestrian trips per day, with approximately 73 new pedestrian trips during the weekday morning peak hour and 81 new pedestrian trips during the weekday evening peak hour. This level of activity is the equivalent of one new pedestrian every 50 seconds during the weekday morning peak hour and one new pedestrian every 45 seconds during the weekday evening peak hour. These increases in pedestrian activity will not impact the pedestrian environment in the study area.

The majority of the pedestrian trips will most likely be oriented toward the nearby businesses along West Broadway and along Dorchester Avenue. Some pedestrian trips will also use the Broadway Bridge and the recently completed South Bay Harbor Trail, which connects the West Broadway neighborhood to the South End and Seaport District.

The Project will also include an improved pedestrian atmosphere along the segment of Dorchester Avenue between West Broadway and West 2nd Street and at the corner of Dorchester Avenue at West Broadway. As shown on the site plan in **Figure 7-11**, the existing chain link fence will be removed and a wide pedestrian area will be provided from the northeast corner of the intersection of Dorchester Avenue at West Broadway to the intersection of Dorchester Avenue at West 2nd Street. These improvements will also enhance pedestrian access between Broadway Station and the properties north of the site along Dorchester Avenue and West 2nd Street.

Bicycle Accommodations

BTD has established guidelines requiring projects subject to Transportation Access Plan Agreements to provide secure bicycle parking for employees and short-term bicycle racks for visitors. Based on BTD guidelines, the Project will supply a minimum of 25 secure bicycle parking/storage spaces within the building for employees. Bicycle racks for up to 4 bicycles will be placed around the Site for use by visitors.

There is also a Hubway station located just north of the Project site, which will provide patrons and employees of the hotel with convenient bicycling opportunities to travel to other parts of Boston via the South Bay Harbor Trail.

Loading and Service Accommodations

Loading and service operations will occur at an internal loading dock, with an access/egress curb cut provided along West 2nd Street, near the intersection with Athens Street. As shown on the site plan in **Figure 7-11**, the loading dock will include one bay for single-unit trucks and smaller delivery vehicles. Vehicles will access the loading dock by traveling along West 2nd Street eastbound and backing into the bay. To perform this maneuver, vehicles will need to temporarily stop along West 2nd Street. Based on a review of the roadway geometry and the traffic volumes along West 2nd Street, this maneuver will not have any significant impact on vehicle or pedestrian movements. The location of the bay is ideally situated to limit the conflicts between vehicles and pedestrians and will allow vehicles to safely enter and exit the site.

Hotel and restaurant deliveries include primarily linens and food. Delivery estimates were based on National Cooperative Highway Research Program (NCHRP)[11] data for Boston. **Table 7-12** shows the characteristics of truck activity.

Table 7-12. Expected Delivery Activity

Use	Number of Deliveries			General Delivery Times
	SU 30 or smaller	Larger than SU 30	Total	
Hotel	2	1	3	10% before 7:00 a.m. 70% between 7:00 a.m. and 1:00 p.m. 20% after 1:00 p.m.
Restaurant /Bar	4	1	5	100% between 7:00 a.m. and 1:00 p.m.
Total	**6**	**2**	**8**	

The Project will generate about 8 daily delivery trips. Most deliveries are expected to occur between 7:00 a.m. and 1:00 p.m., or, on average, about one to two deliveries per hour during this period. The proposed loading dock will be sufficient to handle the loading demands of the Project.

[11] *Truck Trip Generation Data—Synthesis 298.* National Cooperative Highway Research Program (NCHRP) and Transportation Research Board. 2001.

7.4 Transportation Demand Management

The Project Proponent is committed to implementing Travel Demand Management ("TDM") measures to reduce dependence on autos. TDM will be facilitated by the nature and location of the proposed uses within the proposed Project.

On-site management will keep a supply of transit information (schedules, maps, fare information) in the building available upon request by hotel guests and visitors.

The Proponent will work with the City to develop a TDM program appropriate to the Project and consistent with its level of impact. TDM measures for the Project may include, but are not limited to, the following:

Transportation Coordinator. The Proponent will require the Hotel Operator to designate a full-time, on-site employee as the transportation coordinator for the site. The transportation coordinator will oversee all transportation issues. This includes managing vehicular and valet operations, service and loading, valet parking, and TDM programs.

Guaranteed Ride Home Program. The Proponent will require the Hotel Operator to offer a "guaranteed ride home" for employees in order to remove an obstacle to transit use.

Transit Pass Programs. The Proponent will require the Hotel Operator to encourage employees to use transit through the following measures:

- Offering on-site transit pass sales or participation in the MBTA Corporate T-Pass Program.
- Offering T-pass subsidies to full-time employees and, on a *pro rata* basis, to part-time employees.
- Investigating the potential of offering federal "Commuter Choice" programs, including pre-tax deductions for transit passes and subsidized transit passes.

Information and Promotion of Travel Alternatives. The Developer will encourage the Hotel Operator to:

- Provide employees and visitors with public transit system maps, schedules, and other information on transit services in the area and provide such information in a prominent location within the Hotel, as well as on the Hotel's Web site.
- Provide an annual (or more frequent) newsletter or bulletin summarizing transit, ridesharing, bicycling, alternative work schedules, and other travel options.
- Provide information on travel alternatives for employees and visitors via the Internet and in the building lobby.
- Provide information on travel alternatives to new employees.

7.5 Evaluation of Short-term Construction Impacts

Most construction activities will be accommodated within the current site boundaries. Details of the overall construction schedule, working hours, number of construction workers, worker transportation and parking, number of construction vehicles, and routes will be addressed in detail in a Construction Management Plan to be filed with BTD in accordance with the City's transportation maintenance plan requirements.

To minimize transportation impacts during the construction period, the following measures will be considered for the Construction Management Plan:

- Limited construction worker parking on-site;
- Encouragement of worker carpooling;
- Consideration of a subsidy for MBTA passes for full-time employees; and
- Providing secure spaces on-site for workers' supplies and tools so they do not have to be brought to the site each day.

The Construction Management Plan to be executed with the City prior to commencement of construction will document all committed measures.

8.0 Coordination with Governmental Agencies

8.1 Architectural Access Board Requirements

This Project will comply with the requirements of the Architectural Access Board. The Project will also be designed to comply with the Standards of the Americans with Disabilities Act.

8.2 Massachusetts Environmental Policy Act

Based on information currently available, development of the Proposed Project will not result in a state permit/state agency action and meet a review threshold that would require MEPA review by the MEPA Office of the Executive Office of Energy and Environmental Affairs.

8.3 Boston Civic Design Commission

The Project does not exceed the 100,000 gross square feet size threshold requirement for review by the Boston Civic Design Commission. Therefore, the Proponent does not intend to meet with the Boston Civic Design Commission as a part of the Article 80 Large Project Review.

9.0 PROJECT CERTIFICATION

This form has been circulated to the Boston Redevelopment Authority as required by Article 80 of the Boston Zoning Code.

Sun Condos LLC

08/12/13

Signature of Proponent
Timothy Pappas, on behalf of Sun Condos LLC
by its Manager, Pappas Industrial Parks, Inc.

Date

Mitchell L. Fischman Consulting LLC

08/02/13

Signature of Preparer
Mitchell L. Fischman, AICP

Date

APPENDIX A – LETTER OF INTENT TO FILE PNF

McDermott, Quilty & Miller LLP
131 Oliver Street - 5th Floor
Boston, Massachusetts 02110

Telephone: 617-946-4600
Facsimile: 617-946-4624

B.R.A.

2013 MAY 24 P 1:43

May 25, 2013

VIA HAND DELIVERY
Mr. Peter Meade, Director
Boston Redevelopment Authority
One City Hall Square
Boston, MA 02201

Subject: **South Boston Boutique Hotel**
Intent to File Project Notification Form (PNF)

Dear Director Meade:

Please consider this letter as notification on behalf of Sun Condos LLC, by it's Manager, Pappas Industrial Parks, Inc. (the "Proponent") that the Proponent expects to file a Project Notification Form ("PNF") for a proposal for a new South Boston Boutique Hotel Project in accordance with the Article 80B Large Project Review requirements of the Boston Zoning Code. This new development will involve the construction of a new 156 room (87,000 gross square feet) hotel which will include a ground level full service restaurant and bar, coffee shop, fitness center, meeting rooms, conference rooms, screening room, second level terrace, rooftop bar, and exterior pool deck/outdoor lounge to be located at the intersection of Broadway and Dorchester Avenue in the South Boston neighborhood ("Proposed Project") (see **Figure 1. Site Locus for South Boston Boutique Hotel.)**

The site circulation plan is designed to create a safe and pleasant entry to the Project from Broadway with a porte-cochere front door drop off from Dorchester Avenue. This access will include pedestrian amenities to strengthen the relationship between the Proposed Project and the Broadway MBTA station across Broadway. Additional service vehicle access will be provided from West Second Street. We also expect to utilize valet parking with a nearby lease arrangement for offsite parking spaces to meet parking demand from the hotel.

The Project Site is located within a highly commercialized area and is in the midst of a very active transportation node that includes the major MBTA Redline station at Broadway and Dorchester Avenue. In addition, the Fitzgerald Expressway (I-93) is located just to the west of the Project Site. Nearby uses include the Procter Gamble / Gillette Company's complex to the north, as well as ground level commercial and retail uses along Dorchester Avenue and

Broadway. The Project Site is also across Dorchester Avenue from a residential complex that includes the Court Square Press development and Macallen Building residences which were developed by the Pappas Companies.

The preliminary Proposed Project details has been presented at an initial community meeting hosted by the West Broadway Neighborhood Association (the immediate neighborhood interest group), and at individual meetings with local elected officials and the key leadership of the nearby St. Vincent/Lower End Political Action Committee.

On behalf of the entire project team, we look forward to working with you and your staff on this Project, which we believe will be a positive addition to the South Boston neighborhood and the City of Boston.

Please advise if there are any questions of the Proponent or if I can provide any further details as we prepare to file a PNF.

Sincerely,

Joseph P. Hanley

Joseph P. Hanley, Esq.
Partner

Attachment: **Figure 1. Site Locus for South Boston Boutique Hotel**

cc: Tim Pappas
Lauren Williams, BRA
Richard McGuinness, BRA
Heather Campisano, BRA
Ted Schwartzberg, BRA
Sean Regan, Mayor's Office of Neighborhood Services
City Councilor Bill Linehan
State Representative Nick Collins

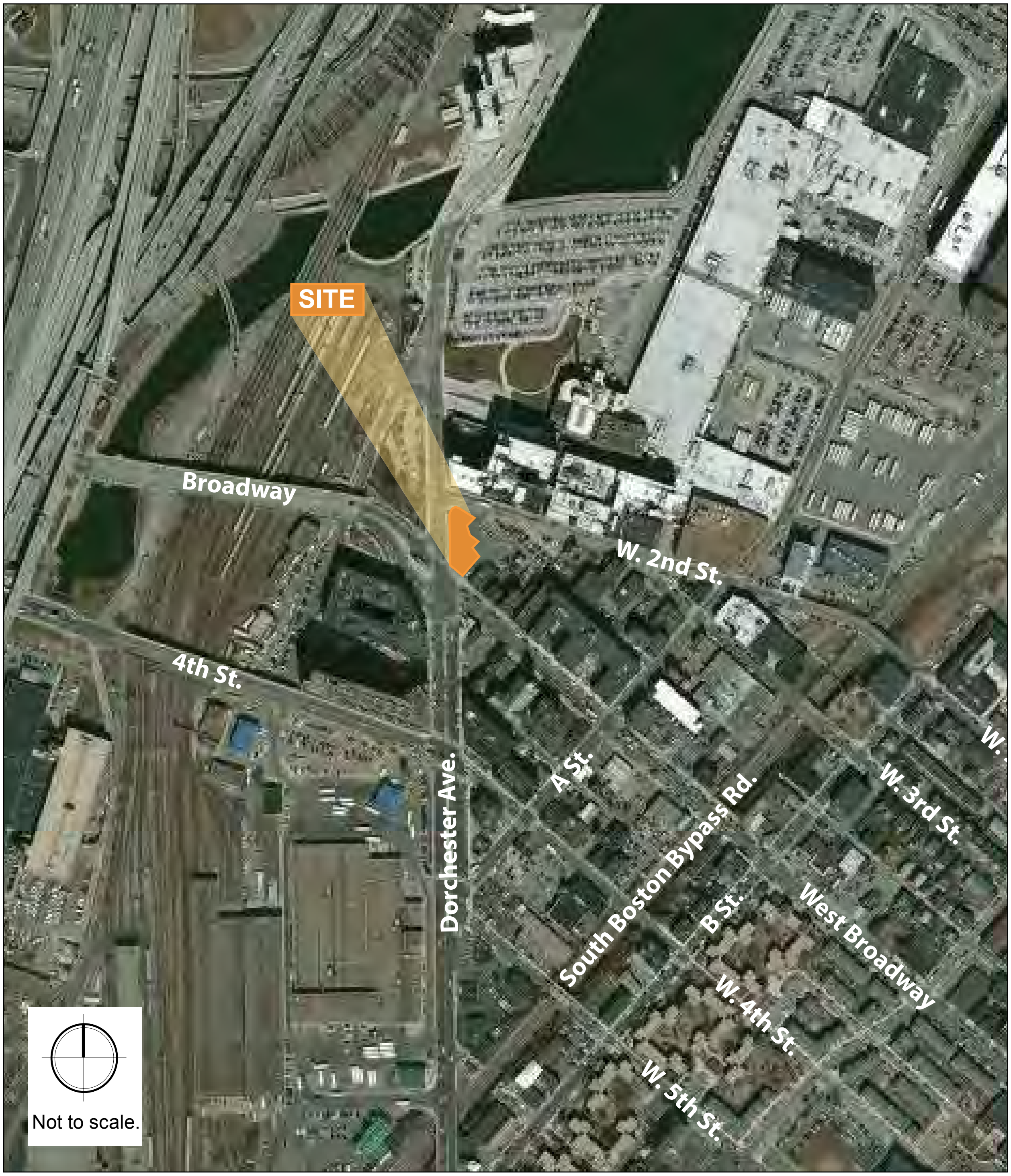


Figure 1.
Site Locus for South Boston Boutique Hotel

APPENDIX B – AIR QUALITY APPENDIX

APPENDIX B
AIR QUALITY

SOUTH BOSTON HOTEL
PROJECT NOTIFICATION FORM

Pages	Contents
2 - 4	AERMOD Model Output
5 - 12	MOBILE6.2 2013 and 2018 Output for CO Microscale Analysis
13 - 37	CAL3QHC 2013 and 2018 Output for CO Microscale Analysis
38 - 39	Figures 1 and 2: CAL3QHC Existing, No-Build and Build Conditions

```
**MODELOPTs:  NonDFAULT CONC                                    FLAT                FLGPOL              NOCHKD
    SCREEN                                                                BETA

                                      ***     MODEL SETUP OPTIONS SUMMARY       ***
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

**Model Is Setup For Calculation of Average CONCentration Values.

  --  DEPOSITION LOGIC  --
**NO GAS DEPOSITION Data Provided.
**NO PARTICLE DEPOSITION Data Provided.
**Model Uses NO DRY DEPLETION.  DRYDPLT  =  F
**Model Uses NO WET DEPLETION.  WETDPLT  =  F

**Model Uses URBAN Dispersion Algorithm for the SBL for     2 Source(s),
  for Total of    1 Urban Area(s):
  Urban Population =      3240.0 ;  Urban Roughness Length =  1.000 m

**Model Allows User-Specified Options:
        1. Stack-tip Downwash.
        2. Model Assumes Receptors on FLAT Terrain.
        3. Use Calms Processing Routine.
        4. Use Missing Data Processing Routine.
        5. No Exponential Decay.
        6. Urban Roughness Length of 1.0 Meter Used.

**Other Options Specified:
        NOCHKD   - Suppresses checking of date sequence in meteorology files
        SCREEN   - Use screening option
which forces calculation of centerline values

**Model Accepts FLAGPOLE Receptor Heights.

**Model Calculates  1 Short Term Average(s) of:   1-HR

**This Run Includes:      2 Source(s);       1 Source Group(s); and     530 Receptor(s)

**The Model Assumes A Pollutant Type of:  OTHER

**Model Set To Continue RUNning After the Setup Testing.

**Output Options Selected:
         Model Outputs Tables of Highest Short Term Values by Receptor (RECTABLE Keyword)
         Model Outputs External File(s) of High Values for Plotting (PLOTFILE Keyword)
         Model Outputs Separate Summary File of High Ranked Values (SUMMFILE Keyword)

**NOTE:  The Following Flags May Appear Following CONC Values:  c for Calm Hours
                                                                m for Missing Hours
                                                                b for Both Calm and Missing Hours

**Misc. Inputs:  Base Elev. for Pot. Temp. Profile (m MSL) =     0.00 ;  Decay Coef. =    0.000     ;  Rot. Angle =     0.0
                 Emission Units = GRAMS/SEC                              ;  Emission Rate Unit Factor =   0.10000E+07
                 Output Units   = MICROGRAMS/M**3

**Approximate Storage Requirements of Model =      3.6 MB of RAM.

**Input Runstream File:          CO_5yrs_OTHER.DTA
**Output Print File:             CO_5yrs_OTHER.LST

**File for Summary of Results:   W:\Apps\aermod\3641\CO_5yrs_OTHER.SUM
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**MODELOPTs: NonDFAULT CONC FLAT FLGPOL NOCHKD
SCREEN BETA

*** METEOROLOGICAL DAYS SELECTED FOR PROCESSING ***
(1=YES; 0=NO)

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NOTE: METEOROLOGICAL DATA ACTUALLY PROCESSED WILL ALSO DEPEND ON WHAT IS INCLUDED IN THE DATA FILE.

*** UPPER BOUND OF FIRST THROUGH FIFTH WIND SPEED CATEGORIES ***
(METERS/SEC)

1.54, 3.09, 5.14, 8.23, 10.80,

**MODELOPTs: NonDFAULT CONC FLAT FLGPOL NOCHKD
SCREEN BETA

*** UP TO THE FIRST 24 HOURS OF METEOROLOGICAL DATA ***

Surface file: Urban.sfc Met Version: SCREEN
Profile file: Urban.PFL
Surface format: FREE
Profile format: FREE
Surface station no.: 11111 Upper air station no.: 22222
Name: UNKNOWN Name: UNKNOWN
Year: 2010 Year: 2010

First 24 hours of scalar data

YR	MO	DY	JDY	HR	H0	U*	W*	DT/DZ	ZICNV	ZIMCH	M-O LEN	Z0	BOWEN	ALBEDO	REF WS	WD	HT	REF TA	HT
10	01	01	1	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	10.	10.0	255.2	2.0
10	01	02	2	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	20.	10.0	255.2	2.0
10	01	03	3	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	30.	10.0	255.2	2.0
10	01	04	4	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	40.	10.0	255.2	2.0
10	01	05	5	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	50.	10.0	255.2	2.0
10	01	06	6	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	60.	10.0	255.2	2.0
10	01	07	7	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	70.	10.0	255.2	2.0
10	01	08	8	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	80.	10.0	255.2	2.0
10	01	09	9	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	90.	10.0	255.2	2.0
10	01	10	10	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	100.	10.0	255.2	2.0
10	01	11	11	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	110.	10.0	255.2	2.0
10	01	12	12	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	120.	10.0	255.2	2.0
10	01	13	13	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	130.	10.0	255.2	2.0
10	01	14	14	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	140.	10.0	255.2	2.0
10	01	15	15	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	150.	10.0	255.2	2.0
10	01	16	16	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	160.	10.0	255.2	2.0
10	01	17	17	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	170.	10.0	255.2	2.0
10	01	18	18	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	180.	10.0	255.2	2.0
10	01	19	19	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	190.	10.0	255.2	2.0
10	01	20	20	01	-1.2	0.043	-9.000	0.020	-999.	21.	5.5	1.00	1.62	0.21	0.50	200.	10.0	255.2	2.0

```
10 01 21  21 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21   0.50  210.   10.0  255.2    2.0
10 01 22  22 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21   0.50  220.   10.0  255.2    2.0
10 01 23  23 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21   0.50  230.   10.0  255.2    2.0
10 01 24  24 01   -1.2  0.043 -9.000  0.020 -999.   21.      5.5  1.00   1.62   0.21   0.50  240.   10.0  255.2    2.0


First hour of profile data
YR MO DY HR HEIGHT F  WDIR    WSPD AMB_TMP sigmaA  sigmaW  sigmaV
10 01 01 01   10.0 1   10.    0.50   255.3   99.0  -99.00  -99.00

F indicates top of profile (=1) or below (=0)
*** AERMOD - VERSION  12345 ***   *** South Boston Hotel                                                ***        07/24/13
                                  *** CO One-Hour Screening Modeling Analysis                           ***        09:15:29
                                                                                                                   PAGE   4
**MODELOPTs:  NonDFAULT CONC                                    FLAT               FLGPOL              NOCHKD
    SCREEN                                                                BETA

                                             *** THE SUMMARY OF HIGHEST  1-HR RESULTS ***


                                   ** CONC OF OTHER    IN MICROGRAMS/M**3                          **

                                                        DATE                                                                NETWORK
GROUP ID                          AVERAGE CONC     (YYMMDDHH)            RECEPTOR  (XR, YR, ZELEV, ZHILL, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH   1ST HIGH VALUE IS     103.18814  ON 10081702: AT (  330593.13,  4689998.28,     0.00,     0.00,   41.10)  DC


*** RECEPTOR TYPES:  GC = GRIDCART
                     GP = GRIDPOLR
                     DC = DISCCART
                     DP = DISCPOLR
*** AERMOD - VERSION  12345 ***   *** South Boston Hotel                                                ***        07/24/13
                                  *** CO One-Hour Screening Modeling Analysis                           ***        09:15:29
                                                                                                                   PAGE   5
**MODELOPTs:  NonDFAULT CONC                                    FLAT               FLGPOL              NOCHKD
    SCREEN                                                                BETA

*** Message Summary : AERMOD Model Execution ***

 --------- Summary of Total Messages --------

A Total of           0 Fatal Error Message(s)
A Total of           1 Warning Message(s)
A Total of           0 Informational Message(s)

A Total of       18504 Hours Were Processed

A Total of           0 Calm Hours Identified

A Total of           0 Missing Hours Identified (  0.00 Percent)


   ******** FATAL ERROR MESSAGES ********
              ***  NONE  ***


   ********   WARNING MESSAGES   ********
CO W320      11 URBOPT:Input Parameter May Be Out-of-Range for Parameter       URB-POP
```

```
****************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                               *
* Input file: 3641_13W.INP (file 1, run 1).                                *
****************************************************************************
* *** Winter 2013 ***

* Reading Registration Distributions from the following external
* data file: 2005_REG.D
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)

* Reading I/M program description records from the following external
* data file: 09NEWIM.D
* 15 Year Exemption Age
* New Annual OBD Exhaust I/M program for Light Duty MY 1996 through 2007 vehicles <=8,500 lb GVWR
* New Annual OBD Exhaust I/M program for Light Duty and Medium duty MY 2008 and later <=14,000 lb GVWR
* New Annual OBD Evap I/M program for Light Duty MY 1996 through 2007 vehicles <=8,500 lb GVWR
* New Annual OBD Evap I/M program for for Light Duty and Medium duty MY 2008 and later <=14,000 lb GVWR
  M601 Comment:
              User has enabled STAGE II REFUELING.


* Reading 94+ LEV IMPLEMENTATION SCHEDULE from the following external
* data file: MA_LEV2.D

  Reading User Supplied Tier2 Exhaust bin phase-in fractions

     Data read from file: LEV2EXH.D


  Reading User Supplied Tier2 EVAP phase-in fractions
```

```
   Data read from file: LEV2EVAP.D


 Reading User Supplied Tier2 50K certification standards

   Data read from file: LEV2CERT.D

 M616 Comment:
             User has supplied post-1999 sulfur levels.
 M614 Comment:
             User supplied diesel sale fractions.

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* 2013 - Winter at 2.5 mph
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
 M583 Warning:
          The user supplied arterial average speed of  2.5
          will be used for all hours of the day.  100% of VMT
          has been assigned to the arterial/collector roadway
          type for all hours of the day and all vehicle types.
 M112 Warning:
             Wintertime Reformulated Gasoline Rules Apply
*** I/M credits for Tech1&2 vehicles were read from the following external
    data file: TECH12.D
 M 48 Warning:
            there are no sales for vehicle class HDGV8b
 HDDV DEFEAT DEVICE EFFECTS ARE PRESENT. THE REBUILD FRACTION IS 0.10.

 LEV phase-in data read from file MA_LEV2.D
                  Calendar Year:  2013
                          Month:  Jan.
                       Altitude:  Low
            Minimum Temperature:  22.8 (F)
            Maximum Temperature:  38.3 (F)
              Absolute Humidity:   75. grains/lb
             Fuel Sulfur Content:   30. ppm

            Exhaust I/M Program:  Yes
               Evap I/M Program:  Yes
                    ATP Program:  No
               Reformulated Gas:  Yes
```

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.3030	0.4092	0.1607		0.0364	0.0002	0.0015	0.0852	0.0037	1.0000
Composite Emission Factors (g/mi):										
Composite CO :	23.94	21.45	22.62	21.78	35.95	3.659	1.435	4.405	104.23	21.743

```
* # # # # # # # # # # # # # # # # # # # # # # # # # #
* 2013 - Winter at 10 mph
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
```

```
 M583 Warning:
           The user supplied arterial average speed of 10.0
           will be used for all hours of the day.  100% of VMT
           has been assigned to the arterial/collector roadway
           type for all hours of the day and all vehicle types.
 M112 Warning:
              Wintertime Reformulated Gasoline Rules Apply
 M 48 Warning:
             there are no sales for vehicle class HDGV8b

 LEV phase-in data read from file MA_LEV2.D
                   Calendar Year:  2013
                           Month:  Jan.
                        Altitude:  Low
             Minimum Temperature:  22.8 (F)
             Maximum Temperature:  38.3 (F)
               Absolute Humidity:   75. grains/lb
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
                Evap I/M Program:  Yes
                     ATP Program:  No
                Reformulated Gas:  Yes

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:               <6000     >6000     (All)
                       ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.3030    0.4092    0.1607              0.0364    0.0002    0.0015    0.0852    0.0037    1.0000
 -------------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite CO  :     13.33     12.12     12.26     12.16     19.11     2.302     0.881     2.479     33.28    12.000
 -------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* 2013 - Winter at 25 mph
* File 1, Run 1, Scenario 3.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
 M583 Warning:
           The user supplied arterial average speed of 25.0
           will be used for all hours of the day.  100% of VMT
           has been assigned to the arterial/collector roadway
           type for all hours of the day and all vehicle types.
 M112 Warning:
              Wintertime Reformulated Gasoline Rules Apply
 M 48 Warning:
             there are no sales for vehicle class HDGV8b

 LEV phase-in data read from file MA_LEV2.D
                   Calendar Year:  2013
                           Month:  Jan.
                        Altitude:  Low
             Minimum Temperature:  22.8 (F)
             Maximum Temperature:  38.3 (F)
               Absolute Humidity:   75. grains/lb
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
```

Evap I/M Program: Yes
ATP Program: No
Reformulated Gas: Yes

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.3030	0.4092	0.1607		0.0364	0.0002	0.0015	0.0852	0.0037	1.0000
Composite Emission Factors (g/mi):										
Composite CO :	11.58	10.48	10.47	10.48	7.83	1.307	0.474	1.068	16.70	9.919

```
***************************************************************************
* MOBILE6.2.03 (24-Sep-2003)                                              *
* Input file: 3641_18W.INP (file 1, run 1).                               *
***************************************************************************
* *** Winter 2018 ***

* Reading Registration Distributions from the following external
* data file: 2005_REG.D
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.998     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
               0.999     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)
  M 49 Warning:
                1.00     MYR sum not = 1. (will normalize)

* Reading I/M program description records from the following external
* data file: 09NEWIM.D
* 15 Year Exemption Age
* New Annual OBD Exhaust I/M program for Light Duty MY 1996 through 2007 vehicles <=8,500 lb GVWR
* New Annual OBD Exhaust I/M program for Light Duty and Medium duty MY 2008 and later <=14,000 lb GVWR
* New Annual OBD Evap I/M program for Light Duty MY 1996 through 2007 vehicles <=8,500 lb GVWR
* New Annual OBD Evap I/M program for for Light Duty and Medium duty MY 2008 and later <=14,000 lb GVWR
  M601 Comment:
             User has enabled STAGE II REFUELING.


* Reading 94+ LEV IMPLEMENTATION SCHEDULE from the following external
* data file: MA_LEV2.D

  Reading User Supplied Tier2 Exhaust bin phase-in fractions

     Data read from file: LEV2EXH.D


  Reading User Supplied Tier2 EVAP phase-in fractions
```

```
   Data read from file: LEV2EVAP.D


 Reading User Supplied Tier2 50K certification standards

   Data read from file: LEV2CERT.D

 M616 Comment:
             User has supplied post-1999 sulfur levels.
 M614 Comment:
             User supplied diesel sale fractions.

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* 2018 - Winter at 2.5 mph
* File 1, Run 1, Scenario 1.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
 M583 Warning:
          The user supplied arterial average speed of  2.5
          will be used for all hours of the day.  100% of VMT
          has been assigned to the arterial/collector roadway
          type for all hours of the day and all vehicle types.
 M112 Warning:
             Wintertime Reformulated Gasoline Rules Apply
*** I/M credits for Tech1&2 vehicles were read from the following external
    data file: TECH12.D
 M 48 Warning:
            there are no sales for vehicle class HDGV8b
 HDDV DEFEAT DEVICE EFFECTS ARE PRESENT. THE REBUILD FRACTION IS 0.10.

 LEV phase-in data read from file MA_LEV2.D
                   Calendar Year:  2018
                           Month:  Jan.
                        Altitude:  Low
             Minimum Temperature:  22.8 (F)
             Maximum Temperature:  38.3 (F)
               Absolute Humidity:   75. grains/lb
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
                Evap I/M Program:  Yes
                     ATP Program:  No
                Reformulated Gas:  Yes

      Vehicle Type:      LDGV    LDGT12    LDGT34      LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
              GVWR:                <6000     >6000     (All)
                        ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
  VMT Distribution:    0.2703    0.4324    0.1698              0.0365    0.0002    0.0016    0.0856    0.0036    1.0000
 -----------------------------------------------------------------------------------------------------------------------
 Composite Emission Factors (g/mi):
     Composite CO  :     21.50     19.03     19.70     19.22     32.86     2.668     1.212     2.093    104.23    19.143
 -----------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # # #
* 2018 - Winter at 10 mph
* File 1, Run 1, Scenario 2.
* # # # # # # # # # # # # # # # # # # # # # # # # # #
```

```
 M583 Warning:
           The user supplied arterial average speed of 10.0
           will be used for all hours of the day.  100% of VMT
           has been assigned to the arterial/collector roadway
           type for all hours of the day and all vehicle types.
 M112 Warning:
              Wintertime Reformulated Gasoline Rules Apply
 M 48 Warning:
             there are no sales for vehicle class HDGV8b

LEV phase-in data read from file MA_LEV2.D
                   Calendar Year:  2018
                           Month:  Jan.
                        Altitude:  Low
             Minimum Temperature:  22.8 (F)
             Maximum Temperature:  38.3 (F)
               Absolute Humidity:   75. grains/lb
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
                Evap I/M Program:  Yes
                     ATP Program:  No
                Reformulated Gas:  Yes

     Vehicle Type:     LDGV    LDGT12    LDGT34     LDGT      HDGV      LDDV      LDDT      HDDV        MC   All Veh
             GVWR:              <6000     >6000     (All)
                      ------    ------    ------    ------    ------    ------    ------    ------    ------    ------
 VMT Distribution:    0.2703    0.4324    0.1698              0.0365    0.0002    0.0016    0.0856    0.0036    1.0000
 ------------------------------------------------------------------------------------------------------------------------
Composite Emission Factors (g/mi):
    Composite CO  :    12.34     10.80     10.83     10.81     17.47     1.686     0.741     1.178     33.28    10.707
 ------------------------------------------------------------------------------------------------------------------------

* # # # # # # # # # # # # # # # # # # # # # # # # #
* 2018 - Winter at 25 mph
* File 1, Run 1, Scenario 3.
* # # # # # # # # # # # # # # # # # # # # # # # # #
 M583 Warning:
           The user supplied arterial average speed of 25.0
           will be used for all hours of the day.  100% of VMT
           has been assigned to the arterial/collector roadway
           type for all hours of the day and all vehicle types.
 M112 Warning:
              Wintertime Reformulated Gasoline Rules Apply
 M 48 Warning:
             there are no sales for vehicle class HDGV8b

LEV phase-in data read from file MA_LEV2.D
                   Calendar Year:  2018
                           Month:  Jan.
                        Altitude:  Low
             Minimum Temperature:  22.8 (F)
             Maximum Temperature:  38.3 (F)
               Absolute Humidity:   75. grains/lb
             Fuel Sulfur Content:   30. ppm

             Exhaust I/M Program:  Yes
```

Evap I/M Program: Yes
ATP Program: No
Reformulated Gas: Yes

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.2703	0.4324	0.1698		0.0365	0.0002	0.0016	0.0856	0.0036	1.0000

Composite Emission Factors (g/mi):

	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
Composite CO :	10.81	9.35	9.27	9.33	7.16	0.967	0.396	0.507	16.70	8.903

JOB: HOTEL INDIGO DOT AVE & W BROADWAY RUN: 2013 1-HR PEAK PM

DATE : 6/24/13
TIME : 9:23:51

The MODE flag has been set to C for calculating CO averages.

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 1000. M AMB = 0.0 PPM

LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	LENGTH (FT)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)	V/C	QUEUE (VEH)
1. DOT AVE SB (1) QUEUE	775869.8	********	775857.1	********	988.	359.	AG	118.	100.0	0.0	15.0	1.34	50.2
2. DOT AVE SB (2) QUEUE	775840.7	********	775919.1	********	642.	7.	AG	118.	100.0	0.0	15.0	1.20	32.6
3. DOT AVE SB (3) FRE F	775875.5	********	775881.5	********	386.	179.	AG	867.	12.0	0.0	35.0		
4. DOT AVE NB (1) QUEUE	775903.9	********	775906.3	********	136.	179.	AG	94.	100.0	0.0	15.0	0.78	6.9
5. DOT AVE NB (2) QUEUE	775918.6	********	775919.3	********	37.	179.	AG	87.	100.0	0.0	15.0	0.20	1.9
6. DOT AVE NB (3) FRE F	775897.0	********	775881.1	********	255.	356.	AG	176.	12.0	0.0	25.0		
7. DOT AVE NB (4) FRE F	775881.1	********	775870.2	********	218.	357.	AG	126.	12.0	0.0	25.0		
8. WEST BROADWAY WB (1)	775942.6	********	775964.0	********	28.	129.	AG	102.	100.0	0.0	12.0	0.18	1.4
9. WEST BROADWAY WB (2)	775940.2	********	776010.5	********	91.	129.	AG	102.	100.0	0.0	12.0	0.60	4.6
10. WEST BROADWAY WB (3)	775888.8	********	775719.7	********	248.	317.	AG	935.	12.0	0.0	35.0		
11. WEST BROADWAY WB (4)	775719.7	********	775206.3	********	519.	278.	AG	935.	12.0	0.0	35.0		
12. WEST BROADWAY EB (1)	775835.3	********	775818.0	********	29.	323.	AG	102.	100.0	0.0	12.0	0.19	1.5
13. WEST BROADWAY EB (2)	775835.3	********	775756.9	********	136.	325.	AG	102.	100.0	0.0	12.0	0.84	6.9
14. WEST BROADWAY EB (3)	775837.9	********	775762.7	********	133.	326.	AG	78.	100.0	0.0	12.0	0.67	6.8
15. WEST BROADWAY EB (4)	775894.3	********	776305.1	********	533.	130.	AG	473.	12.0	0.0	25.0		

JOB: HOTEL INDIGO DOT AVE & W BROADWAY RUN: 2013 1-HR PEAK PM

DATE : 6/24/13
TIME : 9:23:51

ADDITIONAL QUEUE LINK PARAMETERS

LINK DESCRIPTION	CYCLE LENGTH (SEC)	RED TIME (SEC)	CLEARANCE LOST TIME (SEC)	APPROACH VOL (VPH)	SATURATION FLOW RATE (VPH)	IDLE EM FAC (gm/hr)	SIGNAL TYPE	ARRIVAL RATE
1. DOT AVE SB (1) QUEUE	90	73	4.0	312	1900	54.36	2	3
2. DOT AVE SB (2) QUEUE	90	73	4.0	279	1900	54.36	2	3
4. DOT AVE NB (1) QUEUE	90	58	4.0	428	1900	54.36	2	3
5. DOT AVE NB (2) QUEUE	90	54	4.0	124	1900	54.36	2	3
8. WEST BROADWAY WB (1)	90	63	4.0	80	1900	54.36	2	3
9. WEST BROADWAY WB (2)	90	63	4.0	264	1900	54.36	2	3
12. WEST BROADWAY EB (1)	90	63	4.0	84	1900	54.36	2	3
13. WEST BROADWAY EB (2)	90	63	4.0	373	1900	54.36	2	3
14. WEST BROADWAY EB (3)	90	48	4.0	507	1900	54.36	2	3

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. 1A	775833.3	********	5.9
2. 1B	775834.4	********	5.9
3. 1C	775835.5	********	5.9
4. 1D	775780.8	********	5.9
5. 1E	775627.7	********	5.9
6. 1F	775447.2	********	5.9
7. 1G	775261.2	********	5.9
8. 1H	775249.2	********	5.9
9. 1I	775435.2	********	5.9
10. 1J	775625.5	********	5.9
11. 1K	775722.9	********	5.9
12. 1L	775799.5	********	5.9
13. 1M	775843.2	********	5.9
14. 1N	775848.7	********	5.9
15. 1O	775857.4	********	5.9
16. 1P	775856.3	********	5.9
17. 1Q	775936.2	********	5.9
18. 1R	775935.1	********	5.9
19. 1S	775936.2	********	5.9
20. 1T	775936.2	********	5.9
21. 1U	775993.1	********	5.9
22. 1V	776057.6	********	5.9
23. 1W	776130.9	********	5.9
24. 1X	776212.9	********	5.9
25. 1Y	776249.0	********	5.9
26. 1Z	776170.2	********	5.9
27. 1AA	776103.5	********	5.9
28. 1BB	776022.6	********	5.9
29. 1CC	775928.5	********	5.9
30. 1DD	775906.6	********	5.9
31. 1EE	775897.9	********	5.9
32. 1FF	775895.7	********	9.2
33. 1GG	775888.0	********	12.5

JOB: HOTEL INDIGO DOT AVE & W BROADWAY RUN: 2013 1-HR PEAK PM

MODEL RESULTS

REMARKS : In search of the angle corresponding to
the maximum concentration, only the first
angle, of the angles with same maximum
concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND * CONCENTRATION
ANGLE * (PPM)

(DEGR)*	REC1	REC2	REC3	REC4	REC5	REC6	REC7	REC8	REC9	REC10	REC11	REC12	REC13	REC14	REC15	REC16	REC17	REC18	REC19	REC20
0. *	0.2	0.3	0.4	0.1	0.0	0.0	0.0	0.2	0.3	0.2	0.2	0.7	0.6	0.5	0.6	0.5	0.2	0.4	0.3	0.4
10. *	0.4	0.5	0.7	0.2	0.0	0.0	0.0	0.2	0.2	0.2	0.4	0.9	0.4	0.6	0.7	0.5	0.0	0.0	0.2	0.3
20. *	0.5	0.6	0.7	0.4	0.1	0.0	0.0	0.2	0.3	0.3	0.4	0.8	0.4	0.3	0.6	0.5	0.0	0.0	0.2	0.2
30. *	0.5	0.6	0.7	0.4	0.1	0.0	0.0	0.2	0.3	0.4	0.4	0.8	0.3	0.5	0.5	0.4	0.0	0.0	0.1	0.2
40. *	0.5	0.6	0.7	0.3	0.2	0.0	0.0	0.2	0.3	0.4	0.4	0.6	0.3	0.4	0.5	0.4	0.0	0.0	0.1	0.2
50. *	0.4	0.5	0.6	0.3	0.2	0.0	0.0	0.3	0.3	0.4	0.4	0.5	0.4	0.4	0.5	0.3	0.0	0.0	0.1	0.2
60. *	0.4	0.4	0.5	0.3	0.2	0.0	0.0	0.3	0.3	0.4	0.4	0.4	0.5	0.4	0.3	0.3	0.0	0.0	0.1	0.2
70. *	0.4	0.4	0.5	0.2	0.2	0.0	0.0	0.3	0.3	0.5	0.4	0.3	0.4	0.4	0.3	0.3	0.0	0.0	0.1	0.1
80. *	0.4	0.4	0.5	0.2	0.2	0.0	0.1	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.3	0.3	0.0	0.0	0.1	0.1
90. *	0.4	0.4	0.5	0.2	0.3	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.6	0.5	0.3	0.3	0.0	0.0	0.1	0.1
100. *	0.4	0.4	0.5	0.2	0.5	0.3	0.3	0.1	0.2	0.2	0.3	0.4	0.6	0.4	0.3	0.3	0.0	0.0	0.1	0.1
110. *	0.4	0.4	0.5	0.2	0.6	0.5	0.4	0.1	0.1	0.1	0.3	0.4	0.5	0.4	0.3	0.3	0.0	0.0	0.1	0.1
120. *	0.4	0.4	0.5	0.2	0.6	0.5	0.4	0.0	0.0	0.2	0.5	0.4	0.4	0.4	0.3	0.3	0.0	0.0	0.0	0.1
130. *	0.5	0.5	0.5	0.3	0.6	0.4	0.4	0.0	0.0	0.2	0.5	0.4	0.4	0.4	0.4	0.2	0.0	0.0	0.0	0.1
140. *	0.5	0.5	0.6	0.5	0.5	0.4	0.4	0.0	0.0	0.1	0.3	0.3	0.4	0.3	0.4	0.2	0.0	0.0	0.0	0.0
150. *	0.5	0.6	0.6	0.6	0.5	0.3	0.3	0.0	0.0	0.1	0.3	0.3	0.4	0.4	0.4	0.2	0.0	0.0	0.0	0.0
160. *	0.5	0.6	0.8	0.6	0.3	0.3	0.3	0.0	0.0	0.0	0.2	0.2	0.4	0.4	0.4	0.1	0.0	0.0	0.0	0.0
170. *	0.4	0.6	0.6	0.7	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.3	0.1	0.0	0.0	0.0	0.0
180. *	0.4	0.5	0.6	0.6	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.2	0.0	0.0	0.0	0.1	0.2
190. *	0.3	0.3	0.4	0.4	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.2
200. *	0.1	0.1	0.4	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.3	0.5
210. *	0.0	0.1	0.2	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.5
220. *	0.1	0.1	0.2	0.3	0.4	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.6
230. *	0.1	0.1	0.2	0.3	0.4	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.6
240. *	0.1	0.1	0.2	0.3	0.4	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.6
250. *	0.1	0.1	0.2	0.3	0.5	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.6
260. *	0.0	0.1	0.2	0.4	0.5	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.6
270. *	0.0	0.1	0.3	0.5	0.5	0.3	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.5
280. *	0.0	0.0	0.2	0.6	0.3	0.2	0.0	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.4	0.5
290. *	0.0	0.0	0.1	0.6	0.2	0.1	0.0	0.0	0.2	0.3	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.4	0.5
300. *	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.3	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.2	0.2	0.4	0.4
310. *	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.3	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.2	0.2	0.4	0.6
320. *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.2	0.1	0.1	0.1	0.0	0.0	0.2	0.3	0.5	0.5
330. *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.2	0.1	0.3	0.3	0.0	0.0	0.0	0.2	0.3	0.5	0.3
340. *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.2	0.1	0.3	0.3	0.1	0.1	0.1	0.2	0.4	0.6	0.5
350. *	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.2	0.3	0.2	0.2	0.5	0.5	0.4	0.4	0.2	0.4	0.4	0.6	0.4
360. *	0.2	0.3	0.4	0.1	0.0	0.0	0.0	0.2	0.3	0.2	0.2	0.7	0.6	0.5	0.6	0.5	0.2	0.4	0.3	0.4
MAX *	0.5	0.6	0.8	0.7	0.6	0.5	0.4	0.3	0.3	0.5	0.5	0.9	0.6	0.6	0.7	0.5	0.4	0.4	0.6	0.6
DEGR. *	20	20	160	170	110	110	110	50	0	70	120	10	0	10	10	0	350	0	340	220

JOB: HOTEL INDIGO DOT AVE & W BROADWAY RUN: 2013 1-HR PEAK PM

MODEL RESULTS

REMARKS : In search of the angle corresponding to
the maximum concentration, only the first
angle, of the angles with same maximum
concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	*	CONCENTRATION (PPM) REC21	REC22	REC23	REC24	REC25	REC26	REC27	REC28	REC29	REC30	REC31	REC32	REC33
0.	*	0.4	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.5	0.9
10.	*	0.3	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.3	0.5
20.	*	0.3	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3
30.	*	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
40.	*	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.	*	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60.	*	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70.	*	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80.	*	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
90.	*	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.	*	0.3	0.3	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110.	*	0.3	0.3	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120.	*	0.3	0.3	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
130.	*	0.2	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
140.	*	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0
150.	*	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.0	0.0
160.	*	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.0	0.1
170.	*	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.3
180.	*	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.3	0.3	0.4	0.4	0.6
190.	*	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.4	0.3	0.5	0.5	1.0
200.	*	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.3	0.3	0.5	0.7	1.1
210.	*	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.3	0.3	0.7	0.7	0.8
220.	*	0.2	0.1	0.0	0.0	0.1	0.1	0.2	0.5	0.2	0.5	0.7	0.7	0.7
230.	*	0.2	0.1	0.0	0.0	0.1	0.1	0.2	0.5	0.1	0.5	0.7	0.6	0.7
240.	*	0.2	0.1	0.0	0.0	0.1	0.1	0.2	0.4	0.1	0.5	0.6	0.6	0.6
250.	*	0.2	0.1	0.1	0.0	0.1	0.2	0.2	0.4	0.3	0.6	0.6	0.5	0.5
260.	*	0.3	0.2	0.1	0.0	0.1	0.2	0.2	0.4	0.3	0.6	0.7	0.5	0.4
270.	*	0.3	0.2	0.1	0.1	0.2	0.2	0.2	0.5	0.4	0.7	0.7	0.5	0.4
280.	*	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.5	0.4	0.7	0.6	0.4	0.4
290.	*	0.2	0.1	0.2	0.1	0.1	0.1	0.2	0.2	0.5	0.6	0.6	0.4	0.4
300.	*	0.3	0.2	0.2	0.1	0.1	0.1	0.2	0.3	0.4	0.7	0.5	0.4	0.4
310.	*	0.5	0.4	0.2	0.2	0.1	0.0	0.1	0.1	0.7	0.5	0.6	0.5	0.5
320.	*	0.3	0.5	0.3	0.2	0.0	0.0	0.2	0.3	0.5	0.5	0.6	0.7	0.6
330.	*	0.7	0.7	0.4	0.3	0.1	0.2	0.2	0.2	0.5	0.6	0.6	0.7	0.7
340.	*	0.6	0.5	0.4	0.2	0.0	0.1	0.2	0.2	0.4	0.6	0.6	0.7	0.9
350.	*	0.5	0.3	0.2	0.2	0.0	0.0	0.0	0.2	0.3	0.6	0.5	0.6	0.9
360.	*	0.4	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.5	0.9
MAX	*	0.7	0.7	0.4	0.3	0.2	0.2	0.2	0.5	0.7	0.7	0.7	0.7	1.1
DEGR.	*	330	330	330	330	270	250	220	220	310	270	210	200	200

THE HIGHEST CONCENTRATION OF 1.10 PPM OCCURRED AT RECEPTOR REC33.

CAL3QHC: LINE SOURCE DISPERSION MODEL - VERSION 2.0 Dated 95221 PAGE 1

JOB: HOTEL INDIGO DOT AVE & W BROADWAY RUN: 2018 NO-BUILD 1-HR PEAK PM

DATE : 6/24/13
TIME : 9:23:24

The MODE flag has been set to C for calculating CO averages.

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 1000. M AMB = 0.0 PPM

LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	LENGTH (FT)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)	V/C	QUEUE (VEH)
1. DOT AVE SB (1) QUEUE	775869.8	********	775857.2	********	979.	359.	AG	106.	100.0	0.0	15.0	1.38	49.8
2. DOT AVE SB (2) QUEUE	775840.7	********	775897.5	********	465.	7.	AG	106.	100.0	0.0	15.0	1.15	23.6
3. DOT AVE SB (3) FRE F	775875.5	********	775881.5	********	386.	179.	AG	881.	10.7	0.0	35.0		
4. DOT AVE NB (1) QUEUE	775903.9	********	775906.1	********	124.	179.	AG	81.	100.0	0.0	15.0	0.70	6.3
5. DOT AVE NB (2) QUEUE	775918.6	********	775919.2	********	32.	179.	AG	76.	100.0	0.0	15.0	0.17	1.6
6. DOT AVE NB (3) FRE F	775897.0	********	775881.1	********	255.	356.	AG	151.	10.7	0.0	25.0		
7. DOT AVE NB (4) FRE F	775881.1	********	775870.2	********	218.	357.	AG	117.	10.7	0.0	25.0		
8. WEST BROADWAY WB (1)	775942.6	********	775963.5	********	27.	129.	AG	91.	100.0	0.0	12.0	0.18	1.4
9. WEST BROADWAY WB (2)	775940.2	********	776011.1	********	92.	129.	AG	91.	100.0	0.0	12.0	0.62	4.7
10. WEST BROADWAY WB (3)	775888.8	********	775719.7	********	248.	317.	AG	878.	10.7	0.0	35.0		
11. WEST BROADWAY WB (4)	775719.7	********	775206.3	********	519.	278.	AG	878.	10.7	0.0	35.0		
12. WEST BROADWAY EB (1)	775835.3	********	775818.7	********	28.	323.	AG	91.	100.0	0.0	12.0	0.19	1.4
13. WEST BROADWAY EB (2)	775835.3	********	775689.6	********	253.	325.	AG	91.	100.0	0.0	12.0	1.01	12.8
14. WEST BROADWAY EB (3)	775837.9	********	775757.7	********	142.	326.	AG	68.	100.0	0.0	12.0	0.71	7.2
15. WEST BROADWAY EB (4)	775894.3	********	776305.1	********	533.	130.	AG	514.	10.7	0.0	25.0		

JOB: HOTEL INDIGO DOT AVE & W BROADWAY RUN: 2018 NO-BUILD 1-HR PEAK PM

DATE : 6/24/13
TIME : 9:23:24

ADDITIONAL QUEUE LINK PARAMETERS

LINK DESCRIPTION	CYCLE LENGTH (SEC)	RED TIME (SEC)	CLEARANCE LOST TIME (SEC)	APPROACH VOL (VPH)	SATURATION FLOW RATE (VPH)	IDLE EM FAC (gm/hr)	SIGNAL TYPE	ARRIVAL RATE
1. DOT AVE SB (1) QUEUE	90	74	4.0	291	1900	47.86	2	3
2. DOT AVE SB (2) QUEUE	90	74	4.0	242	1900	47.86	2	3
4. DOT AVE NB (1) QUEUE	90	57	4.0	397	1900	47.86	2	3
5. DOT AVE NB (2) QUEUE	90	53	4.0	110	1900	47.86	2	3
8. WEST BROADWAY WB (1)	90	64	4.0	77	1900	47.86	2	3
9. WEST BROADWAY WB (2)	90	64	4.0	262	1900	47.86	2	3
12. WEST BROADWAY EB (1)	90	64	4.0	79	1900	47.86	2	3
13. WEST BROADWAY EB (2)	90	64	4.0	425	1900	47.86	2	3
14. WEST BROADWAY EB (3)	90	48	4.0	541	1900	47.86	2	3

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. 1A	775833.3	********	5.9
2. 1B	775834.4	********	5.9
3. 1C	775835.5	********	5.9
4. 1D	775780.8	********	5.9
5. 1E	775627.7	********	5.9
6. 1F	775447.2	********	5.9
7. 1G	775261.2	********	5.9
8. 1H	775249.2	********	5.9
9. 1I	775435.2	********	5.9
10. 1J	775625.5	********	5.9
11. 1K	775722.9	********	5.9
12. 1L	775799.5	********	5.9
13. 1M	775843.2	********	5.9
14. 1N	775848.7	********	5.9
15. 1O	775857.4	********	5.9
16. 1P	775856.3	********	5.9
17. 1Q	775936.2	********	5.9
18. 1R	775935.1	********	5.9
19. 1S	775936.2	********	5.9
20. 1T	775936.2	********	5.9
21. 1U	775993.1	********	5.9
22. 1V	776057.6	********	5.9
23. 1W	776130.9	********	5.9
24. 1X	776212.9	********	5.9
25. 1Y	776249.0	********	5.9
26. 1Z	776170.2	********	5.9
27. 1AA	776103.5	********	5.9
28. 1BB	776022.6	********	5.9
29. 1CC	775928.5	********	5.9
30. 1DD	775906.6	********	5.9
31. 1EE	775897.9	********	5.9
32. 1FF	775895.7	********	9.2
33. 1GG	775888.0	********	12.5

JOB: HOTEL INDIGO DOT AVE & W BROADWAY RUN: 2018 NO-BUILD 1-HR PEAK PM

MODEL RESULTS

REMARKS : In search of the angle corresponding to
the maximum concentration, only the first
angle, of the angles with same maximum
concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND * CONCENTRATION
ANGLE * (PPM)

(DEGR)*	REC1	REC2	REC3	REC4	REC5	REC6	REC7	REC8	REC9	REC10	REC11	REC12	REC13	REC14	REC15	REC16	REC17	REC18	REC19	REC20
0. *	0.2	0.3	0.4	0.1	0.0	0.0	0.0	0.2	0.2	0.2	0.4	0.7	0.6	0.5	0.4	0.4	0.2	0.3	0.2	0.3
10. *	0.3	0.4	0.6	0.2	0.0	0.0	0.0	0.2	0.2	0.2	0.4	0.7	0.4	0.5	0.6	0.4	0.0	0.0	0.1	0.2
20. *	0.4	0.5	0.7	0.2	0.1	0.0	0.0	0.2	0.2	0.3	0.5	0.8	0.3	0.3	0.5	0.4	0.0	0.0	0.1	0.2
30. *	0.4	0.5	0.7	0.2	0.1	0.0	0.0	0.2	0.2	0.3	0.6	0.8	0.2	0.4	0.5	0.4	0.0	0.0	0.1	0.2
40. *	0.4	0.4	0.6	0.3	0.1	0.0	0.0	0.2	0.2	0.3	0.6	0.5	0.3	0.4	0.5	0.3	0.0	0.0	0.1	0.2
50. *	0.4	0.4	0.5	0.2	0.2	0.0	0.0	0.2	0.2	0.4	0.6	0.4	0.4	0.4	0.3	0.3	0.0	0.0	0.1	0.2
60. *	0.4	0.4	0.5	0.2	0.2	0.0	0.0	0.2	0.2	0.4	0.6	0.4	0.3	0.4	0.3	0.3	0.0	0.0	0.1	0.2
70. *	0.4	0.4	0.5	0.2	0.2	0.0	0.0	0.2	0.2	0.4	0.6	0.3	0.3	0.4	0.3	0.3	0.0	0.0	0.1	0.1
80. *	0.4	0.4	0.5	0.2	0.2	0.0	0.0	0.2	0.2	0.5	0.6	0.2	0.4	0.4	0.3	0.3	0.0	0.0	0.1	0.1
90. *	0.4	0.4	0.5	0.2	0.3	0.1	0.1	0.2	0.2	0.4	0.4	0.3	0.4	0.4	0.3	0.3	0.0	0.0	0.1	0.1
100. *	0.4	0.4	0.5	0.2	0.5	0.2	0.3	0.1	0.2	0.2	0.4	0.3	0.4	0.4	0.3	0.3	0.0	0.0	0.1	0.1
110. *	0.4	0.4	0.5	0.2	0.4	0.3	0.4	0.0	0.0	0.2	0.3	0.3	0.4	0.4	0.3	0.3	0.0	0.0	0.1	0.1
120. *	0.4	0.4	0.5	0.2	0.5	0.4	0.4	0.0	0.0	0.2	0.4	0.3	0.4	0.4	0.3	0.2	0.0	0.0	0.0	0.1
130. *	0.4	0.4	0.5	0.3	0.5	0.3	0.3	0.0	0.0	0.1	0.5	0.2	0.4	0.3	0.3	0.2	0.0	0.0	0.0	0.1
140. *	0.4	0.4	0.5	0.4	0.5	0.3	0.3	0.0	0.0	0.1	0.3	0.3	0.4	0.3	0.4	0.2	0.0	0.0	0.0	0.0
150. *	0.5	0.4	0.5	0.4	0.4	0.3	0.3	0.0	0.0	0.1	0.3	0.2	0.4	0.3	0.4	0.1	0.0	0.0	0.0	0.0
160. *	0.5	0.4	0.7	0.5	0.3	0.3	0.3	0.0	0.0	0.0	0.2	0.1	0.3	0.3	0.4	0.1	0.0	0.0	0.0	0.0
170. *	0.4	0.5	0.6	0.5	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.3	0.1	0.0	0.0	0.0	0.0
180. *	0.3	0.4	0.5	0.5	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.0	0.0	0.0	0.0	0.1
190. *	0.3	0.2	0.3	0.4	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.2
200. *	0.0	0.2	0.3	0.4	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3
210. *	0.0	0.1	0.2	0.4	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.5
220. *	0.1	0.0	0.2	0.4	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.5
230. *	0.1	0.1	0.2	0.4	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.6
240. *	0.1	0.1	0.2	0.4	0.4	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.6
250. *	0.1	0.1	0.3	0.4	0.4	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.5
260. *	0.0	0.1	0.2	0.5	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.5
270. *	0.0	0.1	0.3	0.6	0.4	0.3	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.5
280. *	0.0	0.0	0.2	0.5	0.3	0.2	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.4	0.5
290. *	0.0	0.0	0.1	0.4	0.1	0.1	0.0	0.0	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.4	0.5
300. *	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.2	0.4	0.3
310. *	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.2	0.2	0.4	0.6
320. *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.1	0.2	0.1	0.0	0.0	0.0	0.2	0.2	0.4	0.4
330. *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.3	0.2	0.0	0.0	0.0	0.2	0.3	0.6	0.4
340. *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.4	0.3	0.1	0.1	0.1	0.2	0.3	0.4	0.5
350. *	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.4	0.5	0.5	0.4	0.2	0.2	0.3	0.3	0.4	0.4
360. *	0.2	0.3	0.4	0.1	0.0	0.0	0.0	0.2	0.2	0.2	0.4	0.7	0.6	0.5	0.4	0.4	0.2	0.3	0.2	0.3
MAX *	0.5	0.5	0.7	0.6	0.5	0.4	0.4	0.2	0.2	0.5	0.6	0.8	0.6	0.5	0.6	0.4	0.3	0.3	0.6	0.6
DEGR. *	150	20	20	270	100	120	110	0	0	80	30	20	0	0	10	0	350	0	330	230

JOB: HOTEL INDIGO DOT AVE & W BROADWAY RUN: 2018 NO-BUILD 1-HR PEAK PM

MODEL RESULTS

REMARKS : In search of the angle corresponding to
the maximum concentration, only the first
angle, of the angles with same maximum
concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC21	REC22	REC23	REC24	REC25	REC26	REC27	REC28	REC29	REC30	REC31	REC32	REC33
0.	0.4	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.3	0.3	0.4	0.6
10.	0.3	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.5
20.	0.3	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
30.	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
40.	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
50.	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60.	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70.	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80.	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
90.	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.	0.3	0.2	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110.	0.3	0.3	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120.	0.3	0.3	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
130.	0.2	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
140.	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0
150.	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.0	0.0
160.	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.0	0.1
170.	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.1	0.3
180.	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.3	0.3	0.6
190.	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.4	0.3	0.4	0.5	0.8
200.	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.3	0.3	0.5	0.6	0.9
210.	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.3	0.2	0.5	0.7	0.7
220.	0.2	0.1	0.0	0.0	0.1	0.1	0.1	0.4	0.1	0.4	0.7	0.6	0.7
230.	0.2	0.1	0.0	0.0	0.1	0.1	0.2	0.5	0.1	0.4	0.7	0.4	0.6
240.	0.2	0.1	0.0	0.0	0.1	0.1	0.2	0.4	0.0	0.4	0.7	0.5	0.5
250.	0.2	0.1	0.1	0.0	0.1	0.2	0.2	0.4	0.2	0.5	0.6	0.5	0.5
260.	0.2	0.1	0.1	0.0	0.1	0.2	0.2	0.4	0.3	0.6	0.7	0.5	0.4
270.	0.2	0.2	0.1	0.0	0.1	0.2	0.2	0.4	0.3	0.6	0.7	0.5	0.3
280.	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.7	0.6	0.4	0.3
290.	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.3	0.5	0.6	0.6	0.4	0.3
300.	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.4	0.5	0.6	0.5	0.4	0.4
310.	0.5	0.2	0.2	0.2	0.1	0.0	0.1	0.1	0.5	0.4	0.5	0.4	0.4
320.	0.3	0.4	0.3	0.2	0.0	0.0	0.1	0.3	0.3	0.4	0.6	0.4	0.5
330.	0.6	0.5	0.4	0.2	0.0	0.1	0.2	0.2	0.3	0.5	0.6	0.6	0.6
340.	0.5	0.3	0.4	0.2	0.0	0.1	0.1	0.2	0.3	0.6	0.5	0.6	0.7
350.	0.5	0.3	0.2	0.2	0.0	0.0	0.0	0.1	0.3	0.5	0.5	0.6	0.7
360.	0.4	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.2	0.3	0.3	0.4	0.6
MAX	0.6	0.5	0.4	0.2	0.1	0.2	0.2	0.5	0.5	0.7	0.7	0.7	0.9
DEGR.	330	330	330	0	150	250	230	230	290	280	220	210	200

THE HIGHEST CONCENTRATION OF 0.90 PPM OCCURRED AT RECEPTOR REC33.

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CAL3QHC: LINE SOURCE DISPERSION MODEL - VERSION 2.0 Dated 95221                        PAGE  1

JOB: HOTEL INDIGO DOT AVE & W BROADWAY                  RUN: 2018 BUILD 1-HR PEAK PM

DATE :  6/24/13
TIME :  9:24:14

   The MODE flag has been set to C for calculating CO averages.

 SITE & METEOROLOGICAL VARIABLES
 -------------------------------
 VS =   0.0 CM/S       VD =   0.0 CM/S       Z0 = 321. CM
  U =  1.0 M/S         CLAS =   4  (D)     ATIM =  60. MINUTES     MIXH =  1000. M   AMB =  0.0 PPM

 LINK VARIABLES
 --------------
   LINK DESCRIPTION     *         LINK COORDINATES (FT)          *    LENGTH  BRG TYPE   VPH    EF      H   W     V/C QUEUE
                        *   X1        Y1        X2        Y2     *     (FT)  (DEG)           (G/MI)  (FT) (FT)        (VEH)
------------------------*----------------------------------------*----------------------------------------------------------
 1. DOT AVE SB (1) QUEUE* 775869.8  ********  775859.9  ******** *     767.   359. AG    104. 100.0   0.0 15.0 1.25  39.0
 2. DOT AVE SB (2) QUEUE* 775840.7  ********  775871.7  ******** *     254.     7. AG    104. 100.0   0.0 15.0 1.04  12.9
 3. DOT AVE SB (3) FRE F* 775875.5  ********  775881.5  ******** *     386.   179. AG    902.  10.7   0.0 35.0
 4. DOT AVE NB (1) QUEUE* 775903.9  ********  775906.5  ******** *     145.   179. AG     88. 100.0   0.0 15.0 0.86   7.3
 5. DOT AVE NB (2) QUEUE* 775918.6  ********  775919.3  ******** *      37.   179. AG     83. 100.0   0.0 15.0 0.22   1.9
 6. DOT AVE NB (3) FRE F* 775897.0  ********  775881.1  ******** *     255.   356. AG    194.  10.7   0.0 25.0
 7. DOT AVE NB (4) FRE F* 775881.1  ********  775870.2  ******** *     218.   357. AG    117.  10.7   0.0 25.0
 8. WEST BROADWAY WB (1)* 775942.6  ********  775967.1  ******** *      32.   129. AG     84. 100.0   0.0 12.0 0.19   1.6
 9. WEST BROADWAY WB (2)* 775940.2  ********  776012.2  ******** *      93.   129. AG     84. 100.0   0.0 12.0 0.55   4.7
10. WEST BROADWAY WB (3)* 775888.8  ********  775719.7  ******** *     248.   317. AG    892.  10.7   0.0 35.0
11. WEST BROADWAY WB (4)* 775719.7  ********  775206.3  ******** *     519.   278. AG    892.  10.7   0.0 35.0
12. WEST BROADWAY EB (1)* 775835.3  ********  775815.8  ******** *      33.   323. AG     84. 100.0   0.0 12.0 0.19   1.7
13. WEST BROADWAY EB (2)* 775835.3  ********  775756.3  ******** *     137.   325. AG     84. 100.0   0.0 12.0 0.81   7.0
14. WEST BROADWAY EB (3)* 775837.9  ********  775757.7  ******** *     142.   326. AG     68. 100.0   0.0 12.0 0.71   7.2
15. WEST BROADWAY EB (4)* 775894.3  ********  776305.1  ******** *     533.   130. AG    514.  10.7   0.0 25.0
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JOB: HOTEL INDIGO DOT AVE & W BROADWAY RUN: 2018 BUILD 1-HR PEAK PM

DATE : 6/24/13
TIME : 9:24:14

ADDITIONAL QUEUE LINK PARAMETERS

LINK DESCRIPTION	CYCLE LENGTH (SEC)	RED TIME (SEC)	CLEARANCE LOST TIME (SEC)	APPROACH VOL (VPH)	SATURATION FLOW RATE (VPH)	IDLE EM FAC (gm/hr)	SIGNAL TYPE	ARRIVAL RATE
1. DOT AVE SB (1) QUEUE	90	73	4.0	291	1900	47.86	2	3
2. DOT AVE SB (2) QUEUE	90	73	4.0	242	1900	47.86	2	3
4. DOT AVE NB (1) QUEUE	90	62	4.0	397	1900	47.86	2	3
5. DOT AVE NB (2) QUEUE	90	58	4.0	118	1900	47.86	2	3
8. WEST BROADWAY WB (1)	90	59	4.0	98	1900	47.86	2	3
9. WEST BROADWAY WB (2)	90	59	4.0	289	1900	47.86	2	3
12. WEST BROADWAY EB (1)	90	59	4.0	101	1900	47.86	2	3
13. WEST BROADWAY EB (2)	90	59	4.0	425	1900	47.86	2	3
14. WEST BROADWAY EB (3)	90	48	4.0	541	1900	47.86	2	3

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. 1A	775833.3	********	5.9
2. 1B	775834.4	********	5.9
3. 1C	775835.5	********	5.9
4. 1D	775780.8	********	5.9
5. 1E	775627.7	********	5.9
6. 1F	775447.2	********	5.9
7. 1G	775261.2	********	5.9
8. 1H	775249.2	********	5.9
9. 1I	775435.2	********	5.9
10. 1J	775625.5	********	5.9
11. 1K	775722.9	********	5.9
12. 1L	775799.5	********	5.9
13. 1M	775843.2	********	5.9
14. 1N	775848.7	********	5.9
15. 1O	775857.4	********	5.9
16. 1P	775856.3	********	5.9
17. 1Q	775936.2	********	5.9
18. 1R	775935.1	********	5.9
19. 1S	775936.2	********	5.9
20. 1T	775936.2	********	5.9
21. 1U	775993.1	********	5.9
22. 1V	776057.6	********	5.9
23. 1W	776130.9	********	5.9
24. 1X	776212.9	********	5.9
25. 1Y	776249.0	********	5.9
26. 1Z	776170.2	********	5.9
27. 1AA	776103.5	********	5.9
28. 1BB	776022.6	********	5.9
29. 1CC	775928.5	********	5.9
30. 1DD	775906.6	********	5.9
31. 1EE	775897.9	********	5.9
32. 1FF	775895.7	********	9.2
33. 1GG	775888.0	********	12.5

JOB: HOTEL INDIGO DOT AVE & W BROADWAY RUN: 2018 BUILD 1-HR PEAK PM

MODEL RESULTS

REMARKS : In search of the angle corresponding to
the maximum concentration, only the first
angle, of the angles with same maximum
concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND * CONCENTRATION
ANGLE * (PPM)

(DEGR)*	REC1	REC2	REC3	REC4	REC5	REC6	REC7	REC8	REC9	REC10	REC11	REC12	REC13	REC14	REC15	REC16	REC17	REC18	REC19	REC20
0. *	0.2	0.2	0.3	0.1	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.7	0.5	0.4	0.4	0.4	0.1	0.3	0.2	0.2
10. *	0.2	0.3	0.5	0.1	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.7	0.4	0.4	0.5	0.5	0.0	0.0	0.1	0.2
20. *	0.3	0.3	0.6	0.2	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.7	0.2	0.3	0.5	0.5	0.0	0.0	0.1	0.2
30. *	0.3	0.3	0.6	0.2	0.1	0.0	0.0	0.2	0.2	0.3	0.4	0.7	0.2	0.4	0.5	0.4	0.0	0.0	0.1	0.2
40. *	0.2	0.3	0.5	0.2	0.1	0.0	0.0	0.2	0.2	0.3	0.4	0.5	0.3	0.4	0.5	0.4	0.0	0.0	0.1	0.2
50. *	0.2	0.3	0.5	0.2	0.1	0.0	0.0	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.0	0.0	0.1	0.2
60. *	0.2	0.3	0.5	0.2	0.1	0.0	0.0	0.2	0.2	0.3	0.4	0.4	0.4	0.4	0.4	0.3	0.0	0.0	0.1	0.2
70. *	0.2	0.4	0.5	0.2	0.1	0.0	0.0	0.3	0.3	0.4	0.4	0.3	0.3	0.4	0.3	0.3	0.0	0.0	0.1	0.1
80. *	0.2	0.4	0.5	0.2	0.2	0.0	0.0	0.3	0.2	0.4	0.4	0.2	0.4	0.4	0.3	0.3	0.0	0.0	0.1	0.1
90. *	0.2	0.4	0.5	0.2	0.3	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.5	0.4	0.3	0.3	0.0	0.0	0.1	0.1
100. *	0.2	0.4	0.5	0.2	0.5	0.2	0.3	0.1	0.2	0.1	0.3	0.3	0.5	0.4	0.3	0.3	0.0	0.0	0.1	0.1
110. *	0.2	0.4	0.5	0.2	0.4	0.4	0.4	0.0	0.0	0.1	0.3	0.3	0.4	0.4	0.3	0.3	0.0	0.0	0.1	0.1
120. *	0.2	0.4	0.5	0.2	0.4	0.4	0.4	0.0	0.0	0.1	0.4	0.4	0.4	0.4	0.3	0.2	0.0	0.0	0.0	0.1
130. *	0.2	0.4	0.5	0.3	0.4	0.3	0.3	0.0	0.0	0.0	0.5	0.2	0.4	0.4	0.3	0.2	0.0	0.0	0.0	0.1
140. *	0.2	0.4	0.5	0.3	0.4	0.3	0.3	0.0	0.0	0.1	0.3	0.3	0.4	0.3	0.4	0.2	0.0	0.0	0.0	0.0
150. *	0.4	0.4	0.5	0.4	0.4	0.3	0.3	0.0	0.0	0.1	0.3	0.3	0.4	0.3	0.4	0.2	0.0	0.0	0.0	0.0
160. *	0.4	0.4	0.7	0.4	0.3	0.3	0.3	0.0	0.0	0.0	0.2	0.1	0.4	0.3	0.4	0.1	0.0	0.0	0.0	0.0
170. *	0.3	0.6	0.6	0.5	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.3	0.1	0.0	0.0	0.0	0.0
180. *	0.3	0.5	0.5	0.5	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.2
190. *	0.3	0.2	0.3	0.4	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.2
200. *	0.0	0.1	0.3	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.5
210. *	0.0	0.1	0.1	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.5
220. *	0.1	0.0	0.1	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.6
230. *	0.1	0.1	0.1	0.3	0.3	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.6
240. *	0.1	0.1	0.1	0.3	0.4	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.4	0.6
250. *	0.1	0.1	0.2	0.3	0.4	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.6
260. *	0.0	0.1	0.2	0.4	0.4	0.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.6
270. *	0.0	0.1	0.3	0.5	0.4	0.3	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.5
280. *	0.0	0.0	0.2	0.6	0.3	0.2	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.4	0.5
290. *	0.0	0.0	0.1	0.4	0.1	0.1	0.0	0.0	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.4	0.5
300. *	0.0	0.0	0.0	0.4	0.1	0.0	0.0	0.0	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.2	0.4	0.3
310. *	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.1	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.2	0.2	0.4	0.5
320. *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.2	0.3	0.4	0.4
330. *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.1	0.3	0.1	0.0	0.0	0.0	0.2	0.3	0.5	0.3
340. *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.1	0.3	0.3	0.0	0.1	0.1	0.2	0.4	0.5	0.5
350. *	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.4	0.4	0.3	0.2	0.2	0.3	0.3	0.4	0.4
360. *	0.2	0.2	0.3	0.1	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.7	0.5	0.4	0.4	0.4	0.1	0.3	0.2	0.2
MAX *	0.4	0.6	0.7	0.6	0.5	0.4	0.4	0.3	0.3	0.4	0.5	0.7	0.5	0.4	0.5	0.5	0.3	0.4	0.5	0.6
DEGR. *	150	170	160	280	100	110	110	70	70	70	130	0	0	0	10	10	350	340	330	220

JOB: HOTEL INDIGO DOT AVE & W BROADWAY RUN: 2018 BUILD 1-HR PEAK PM

MODEL RESULTS

REMARKS : In search of the angle corresponding to
the maximum concentration, only the first
angle, of the angles with same maximum
concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC21	REC22	REC23	REC24	REC25	REC26	REC27	REC28	REC29	REC30	REC31	REC32	REC33
0.	0.3	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.2	0.2
10.	0.3	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
20.	0.3	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30.	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
40.	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
50.	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60.	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
70.	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80.	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
90.	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
100.	0.3	0.2	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
110.	0.3	0.3	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
120.	0.3	0.3	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
130.	0.2	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
140.	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.2	0.0	0.0	0.0	0.0
150.	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.0	0.0
160.	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.1	0.0	0.0	0.0
170.	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2
180.	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.3	0.2	0.3	0.3	0.3
190.	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.4	0.3	0.4	0.5	0.5
200.	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.3	0.3	0.5	0.6	0.5
210.	0.1	0.0	0.0	0.0	0.1	0.1	0.1	0.3	0.3	0.2	0.5	0.7	0.4
220.	0.2	0.1	0.0	0.0	0.1	0.1	0.1	0.4	0.1	0.3	0.6	0.6	0.3
230.	0.2	0.1	0.0	0.0	0.1	0.1	0.2	0.4	0.1	0.4	0.6	0.4	0.3
240.	0.2	0.1	0.0	0.0	0.1	0.1	0.2	0.4	0.0	0.4	0.6	0.5	0.3
250.	0.2	0.1	0.1	0.0	0.1	0.2	0.2	0.4	0.1	0.4	0.6	0.5	0.3
260.	0.2	0.2	0.1	0.0	0.1	0.2	0.2	0.4	0.3	0.5	0.7	0.5	0.2
270.	0.3	0.2	0.1	0.0	0.1	0.2	0.2	0.5	0.3	0.6	0.7	0.5	0.2
280.	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.6	0.6	0.4	0.2
290.	0.1	0.1	0.2	0.1	0.1	0.1	0.2	0.2	0.4	0.6	0.6	0.4	0.2
300.	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.3	0.4	0.6	0.5	0.4	0.2
310.	0.4	0.2	0.2	0.2	0.1	0.0	0.1	0.1	0.6	0.4	0.5	0.3	0.2
320.	0.3	0.4	0.3	0.2	0.0	0.0	0.1	0.3	0.4	0.4	0.6	0.3	0.3
330.	0.6	0.5	0.3	0.2	0.0	0.1	0.1	0.2	0.4	0.4	0.6	0.4	0.3
340.	0.4	0.3	0.4	0.2	0.0	0.0	0.1	0.1	0.4	0.5	0.6	0.3	0.3
350.	0.4	0.3	0.2	0.2	0.0	0.0	0.0	0.1	0.3	0.4	0.4	0.3	0.3
360.	0.3	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.2	0.2
MAX	0.6	0.5	0.4	0.2	0.1	0.2	0.2	0.5	0.6	0.6	0.7	0.7	0.5
DEGR.	330	330	340	0	150	250	230	270	310	270	260	210	190

THE HIGHEST CONCENTRATION OF 0.70 PPM OCCURRED AT RECEPTOR REC3 .

CAL3QHC: LINE SOURCE DISPERSION MODEL - VERSION 2.0 Dated 95221 PAGE 1

JOB: HOTEL INDIGO A ST & W BROADWAY RUN: 2013 1-HR PEAK PM

DATE : 6/24/13
TIME : 9:24:54

The MODE flag has been set to C for calculating CO averages.

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 1000. M AMB = 0.0 PPM

LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	LENGTH (FT)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)	V/C	QUEUE (VEH)
1. WEST BROADWAY EB (2)	776564.5	********	776332.1	********	306.	311.	AG	527.	12.0	0.0	25.0		
2. WEST BROADWAY EB (1)	776305.4	********	776206.1	********	130.	310.	AG	76.	100.0	0.0	15.0	0.65	6.6
3. A ST SB (3) FRE FLO	776321.1	********	776135.9	********	291.	220.	AG	688.	12.0	0.0	25.0		
4. A ST SB (1) QUEUE	776359.8	********	776486.0	********	191.	41.	AG	83.	100.0	0.0	10.0	0.89	9.7
5. A ST SB (2) QUEUE	776353.9	********	776374.9	********	32.	42.	AG	83.	100.0	0.0	10.0	0.16	1.6
6. A ST NB (2) FRE FLO	776569.9	********	776347.3	********	341.	221.	AG	326.	12.0	0.0	25.0		
7. A ST NB (1) QUEUE	776315.6	********	776260.4	********	88.	219.	AG	83.	100.0	0.0	15.0	0.45	4.5
8. WEST BROADWAY WB (2)	776065.0	********	776341.5	********	365.	131.	AG	411.	12.0	0.0	25.0		
9. WEST BROADWAY WB (1)	776369.6	********	776446.3	********	103.	132.	AG	76.	100.0	0.0	15.0	0.51	5.2

JOB: HOTEL INDIGO A ST & W BROADWAY RUN: 2013 1-HR PEAK PM

DATE : 6/24/13

TIME : 9:24:54

ADDITIONAL QUEUE LINK PARAMETERS

LINK DESCRIPTION	CYCLE LENGTH (SEC)	RED TIME (SEC)	CLEARANCE LOST TIME (SEC)	APPROACH VOL (VPH)	SATURATION FLOW RATE (VPH)	IDLE EM FAC (gm/hr)	SIGNAL TYPE	ARRIVAL RATE
2. WEST BROADWAY EB (1)	90	47	4.0	504	1900	54.36	2	3
4. A ST SB (1) QUEUE	90	51	4.0	621	1900	54.36	2	3
5. A ST SB (2) QUEUE	90	51	4.0	113	1900	54.36	2	3
7. A ST NB (1) QUEUE	90	51	4.0	315	1900	54.36	2	3
9. WEST BROADWAY WB (1)	90	47	4.0	399	1900	54.36	2	3

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
1. 2A	776338.5	********	5.9
2. 2B	776247.6	********	5.9
3. 2C	776169.0	********	5.9
4. 2D	776102.2	********	5.9
5. 2E	776056.0	********	5.9
6. 2F	776131.1	********	5.9
7. 2G	776212.4	********	5.9
8. 2H	776295.1	********	5.9
9. 2I	776251.0	********	5.9
10. 2J	776193.2	********	5.9
11. 2K	776141.5	********	5.9
12. 2L	776169.0	********	5.9
13. 2M	776223.5	********	5.9
14. 2N	776286.1	********	5.9
15. 2O	776336.4	********	5.9
16. 2P	776392.3	********	5.9
17. 2Q	776454.3	********	5.9
18. 2R	776503.9	********	5.9
19. 2S	776545.2	********	5.9
20. 2T	776579.0	********	5.9
21. 2U	776532.2	********	5.9
22. 2V	776490.8	********	5.9
23. 2W	776431.6	********	5.9
24. 2X	776375.8	********	5.9
25. 2Y	776421.9	********	5.9
26. 2Z	776459.8	********	5.9
27. 2AA	776499.8	********	5.9
28. 2BB	776533.5	********	5.9
29. 2CC	776504.6	********	5.9
30. 2DD	776463.9	********	5.9
31. 2EE	776429.5	********	5.9
32. 2FF	776395.7	********	5.9

JOB: HOTEL INDIGO A ST & W BROADWAY RUN: 2013 1-HR PEAK PM

MODEL RESULTS

REMARKS : In search of the angle corresponding to
the maximum concentration, only the first
angle, of the angles with same maximum
concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND * CONCENTRATION
ANGLE * (PPM)

(DEGR)*	REC1	REC2	REC3	REC4	REC5	REC6	REC7	REC8	REC9	REC10	REC11	REC12	REC13	REC14	REC15	REC16	REC17	REC18	REC19	REC20
0. *	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.2	0.0	0.0	0.3	0.3	0.7	0.3	0.6	0.2	0.2	0.2	0.0
10. *	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.3	0.0	0.1	0.3	0.3	0.5	0.4	0.5	0.2	0.2	0.2	0.0
20. *	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.3	0.1	0.1	0.3	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.0
30. *	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.2	0.2	0.2	0.3	0.2	0.3	0.5	0.4	0.3	0.2	0.2	0.2	0.0
40. *	0.3	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.5	0.3	0.4	0.2	0.2	0.4	0.4	0.3	0.2	0.2	0.2	0.0
50. *	0.4	0.0	0.0	0.0	0.1	0.1	0.3	0.4	0.7	0.5	0.5	0.1	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.0
60. *	0.5	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.5	0.5	0.5	0.0	0.0	0.2	0.3	0.3	0.2	0.2	0.2	0.0
70. *	0.5	0.0	0.0	0.0	0.1	0.1	0.3	0.4	0.6	0.5	0.4	0.0	0.0	0.2	0.3	0.3	0.2	0.2	0.1	0.0
80. *	0.5	0.0	0.0	0.0	0.1	0.1	0.4	0.3	0.7	0.3	0.4	0.0	0.0	0.1	0.3	0.4	0.2	0.2	0.1	0.0
90. *	0.5	0.0	0.0	0.0	0.1	0.1	0.3	0.2	0.6	0.3	0.3	0.0	0.0	0.1	0.4	0.4	0.2	0.2	0.1	0.0
100. *	0.3	0.1	0.0	0.0	0.1	0.1	0.3	0.4	0.6	0.3	0.3	0.0	0.0	0.1	0.4	0.4	0.3	0.3	0.1	0.0
110. *	0.3	0.1	0.0	0.0	0.1	0.2	0.3	0.5	0.6	0.3	0.3	0.0	0.0	0.1	0.4	0.4	0.3	0.2	0.1	0.0
120. *	0.2	0.0	0.0	0.0	0.1	0.2	0.4	0.5	0.5	0.3	0.3	0.0	0.0	0.0	0.4	0.4	0.2	0.2	0.0	0.0
130. *	0.3	0.1	0.1	0.1	0.1	0.1	0.3	0.4	0.5	0.3	0.3	0.0	0.0	0.0	0.2	0.3	0.2	0.1	0.0	0.0
140. *	0.3	0.2	0.2	0.1	0.0	0.0	0.1	0.3	0.5	0.3	0.3	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.0	0.0
150. *	0.3	0.3	0.2	0.1	0.0	0.1	0.1	0.3	0.4	0.3	0.3	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0
160. *	0.4	0.3	0.2	0.1	0.0	0.1	0.1	0.4	0.4	0.3	0.3	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
170. *	0.2	0.3	0.1	0.1	0.0	0.0	0.1	0.4	0.4	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
180. *	0.3	0.3	0.1	0.1	0.0	0.0	0.1	0.4	0.4	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
190. *	0.4	0.3	0.1	0.1	0.0	0.0	0.1	0.4	0.4	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
200. *	0.4	0.2	0.1	0.1	0.0	0.0	0.0	0.4	0.5	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
210. *	0.4	0.2	0.1	0.1	0.0	0.0	0.0	0.4	0.5	0.3	0.2	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.1
220. *	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.2	0.4	0.2	0.1	0.0	0.1	0.2	0.3	0.0	0.0	0.0	0.0	0.1
230. *	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.1	0.3	0.1	0.1	0.0	0.2	0.3	0.4	0.0	0.0	0.0	0.0	0.1
240. *	0.3	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.2	0.4	0.4	0.1	0.0	0.0	0.0	0.1
250. *	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.3	0.4	0.4	0.1	0.0	0.0	0.0	0.1
260. *	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.4	0.4	0.2	0.0	0.0	0.0	0.1
270. *	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.5	0.3	0.2	0.1	0.0	0.0	0.1
280. *	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.5	0.3	0.3	0.1	0.0	0.0	0.2
290. *	0.3	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.5	0.2	0.3	0.1	0.1	0.1	0.1
300. *	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.2	0.5	0.3	0.3	0.2	0.1	0.1	0.1
310. *	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.2	0.2	0.5	0.4	0.6	0.2	0.2	0.3	0.1
320. *	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.0	0.2	0.2	0.5	0.5	0.5	0.4	0.4	0.3	0.0
330. *	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.0	0.0	0.0	0.2	0.2	0.5	0.4	0.5	0.4	0.4	0.3	0.0
340. *	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.0	0.0	0.0	0.2	0.2	0.7	0.4	0.4	0.4	0.3	0.3	0.0
350. *	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.2	0.0	0.0	0.2	0.3	0.7	0.3	0.4	0.4	0.3	0.3	0.0
360. *	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.2	0.0	0.0	0.3	0.3	0.7	0.3	0.6	0.2	0.2	0.2	0.0
MAX *	0.5	0.3	0.2	0.1	0.1	0.2	0.4	0.5	0.7	0.5	0.5	0.3	0.4	0.7	0.5	0.6	0.4	0.4	0.3	0.2
DEGR. *	60	150	140	130	10	110	80	110	50	50	50	0	20	0	320	0	320	320	310	280

JOB: HOTEL INDIGO A ST & W BROADWAY RUN: 2013 1-HR PEAK PM

MODEL RESULTS

REMARKS : In search of the angle corresponding to the maximum concentration, only the first angle, of the angles with same maximum concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC21	REC22	REC23	REC24	REC25	REC26	REC27	REC28	REC29	REC30	REC31	REC32
0.	0.0	0.0	0.2	0.5	0.4	0.4	0.2	0.2	0.0	0.0	0.0	0.0
10.	0.0	0.0	0.2	0.4	0.4	0.4	0.2	0.2	0.0	0.0	0.0	0.0
20.	0.0	0.0	0.0	0.4	0.4	0.3	0.2	0.2	0.0	0.0	0.0	0.0
30.	0.0	0.0	0.0	0.3	0.3	0.3	0.2	0.2	0.0	0.0	0.0	0.0
40.	0.0	0.0	0.0	0.3	0.3	0.3	0.2	0.1	0.0	0.0	0.0	0.2
50.	0.0	0.0	0.0	0.1	0.2	0.2	0.1	0.1	0.0	0.1	0.2	0.3
60.	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.2	0.3
70.	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.3	0.3
80.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3
90.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3
100.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.3
110.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.3
120.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.3
130.	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.1	0.2	0.3	0.3
140.	0.0	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.3
150.	0.1	0.1	0.2	0.3	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.3
160.	0.1	0.1	0.2	0.3	0.1	0.0	0.0	0.0	0.1	0.3	0.3	0.4
170.	0.1	0.1	0.3	0.3	0.1	0.0	0.0	0.0	0.1	0.3	0.3	0.4
180.	0.1	0.1	0.3	0.3	0.2	0.0	0.0	0.0	0.1	0.3	0.4	0.5
190.	0.1	0.1	0.3	0.2	0.2	0.2	0.0	0.0	0.2	0.3	0.3	0.4
200.	0.1	0.1	0.3	0.2	0.3	0.1	0.1	0.1	0.2	0.3	0.3	0.5
210.	0.1	0.1	0.3	0.2	0.2	0.2	0.1	0.1	0.2	0.3	0.4	0.4
220.	0.1	0.1	0.3	0.4	0.3	0.4	0.4	0.3	0.2	0.3	0.2	0.3
230.	0.1	0.1	0.3	0.5	0.4	0.4	0.5	0.3	0.1	0.1	0.2	0.1
240.	0.1	0.1	0.4	0.5	0.4	0.4	0.4	0.3	0.0	0.0	0.0	0.2
250.	0.1	0.1	0.4	0.4	0.6	0.4	0.4	0.3	0.0	0.0	0.0	0.2
260.	0.1	0.2	0.5	0.2	0.7	0.4	0.4	0.3	0.0	0.0	0.0	0.2
270.	0.2	0.3	0.4	0.4	0.5	0.4	0.4	0.2	0.0	0.0	0.0	0.1
280.	0.2	0.4	0.4	0.3	0.4	0.3	0.3	0.1	0.0	0.0	0.0	0.1
290.	0.1	0.2	0.3	0.3	0.4	0.3	0.3	0.1	0.0	0.0	0.0	0.0
300.	0.2	0.2	0.2	0.4	0.3	0.3	0.2	0.1	0.0	0.0	0.0	0.0
310.	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.1	0.0	0.0	0.0	0.0
320.	0.0	0.1	0.0	0.4	0.3	0.3	0.2	0.1	0.0	0.0	0.0	0.0
330.	0.0	0.0	0.1	0.3	0.3	0.3	0.2	0.1	0.0	0.0	0.0	0.0
340.	0.0	0.0	0.1	0.3	0.3	0.3	0.1	0.1	0.0	0.0	0.0	0.0
350.	0.0	0.0	0.2	0.3	0.4	0.4	0.2	0.2	0.0	0.0	0.0	0.0
360.	0.0	0.0	0.2	0.5	0.4	0.4	0.2	0.2	0.0	0.0	0.0	0.0
MAX	0.2	0.4	0.5	0.5	0.7	0.4	0.5	0.3	0.2	0.3	0.4	0.5
DEGR.	270	280	260	0	260	0	230	220	190	140	180	180

THE HIGHEST CONCENTRATION OF 0.70 PPM OCCURRED AT RECEPTOR REC14.

JOB: HOTEL INDIGO A ST & W BROADWAY RUN: 2018 NO-BUILD 1-HR PEAK PM

DATE : 6/24/13
TIME : 9:24:34

The MODE flag has been set to C for calculating CO averages.

SITE & METEOROLOGICAL VARIABLES

VS = 0.0 CM/S VD = 0.0 CM/S Z0 = 321. CM
U = 1.0 M/S CLAS = 4 (D) ATIM = 60. MINUTES MIXH = 1000. M AMB = 0.0 PPM

LINK VARIABLES

LINK DESCRIPTION	X1	Y1	X2	Y2	LENGTH (FT)	BRG (DEG)	TYPE	VPH	EF (G/MI)	H (FT)	W (FT)	V/C	QUEUE (VEH)
1. WEST BROADWAY EB (2)	776564.5	********	776332.1	********	306.	311.	AG	668.	10.7	0.0	25.0		
2. WEST BROADWAY EB (1)	776305.4	********	776185.4	********	157.	310.	AG	77.	100.0	0.0	15.0	0.83	8.0
3. A ST SB (3) FRE FLO	776321.1	********	776135.9	********	291.	220.	AG	870.	10.7	0.0	25.0		
4. A ST SB (1) QUEUE	776359.8	********	776989.4	********	951.	41.	AG	63.	100.0	0.0	10.0	1.07	48.3
5. A ST SB (2) QUEUE	776353.9	********	776366.1	********	18.	42.	AG	63.	100.0	0.0	10.0	0.09	0.9
6. A ST NB (2) FRE FLO	776569.9	********	776347.3	********	341.	221.	AG	335.	10.7	0.0	25.0		
7. A ST NB (1) QUEUE	776315.6	********	776265.5	********	80.	219.	AG	63.	100.0	0.0	15.0	0.39	4.0
8. WEST BROADWAY WB (2)	776065.0	********	776341.5	********	365.	131.	AG	388.	10.7	0.0	25.0		
9. WEST BROADWAY WB (1)	776369.6	********	776462.6	********	124.	132.	AG	77.	100.0	0.0	15.0	0.67	6.3

JOB: HOTEL INDIGO A ST & W BROADWAY RUN: 2018 NO-BUILD 1-HR PEAK PM

DATE : 6/24/13
TIME : 9:24:34

ADDITIONAL QUEUE LINK PARAMETERS

LINK DESCRIPTION	*	CYCLE LENGTH (SEC)	RED TIME (SEC)	CLEARANCE LOST TIME (SEC)	APPROACH VOL (VPH)	SATURATION FLOW RATE (VPH)	IDLE EM FAC (gm/hr)	SIGNAL TYPE	ARRIVAL RATE
2. WEST BROADWAY EB (1)	*	90	54	4.0	526	1900	47.86	2	3
4. A ST SB (1) QUEUE	*	90	44	4.0	907	1900	47.86	2	3
5. A ST SB (2) QUEUE	*	90	44	4.0	76	1900	47.86	2	3
7. A ST NB (1) QUEUE	*	90	44	4.0	331	1900	47.86	2	3
9. WEST BROADWAY WB (1)	*	90	54	4.0	421	1900	47.86	2	3

RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (FT) X	Y	Z	*
1. 2A	*	776338.5	********	5.9	*
2. 2B	*	776247.6	********	5.9	*
3. 2C	*	776169.0	********	5.9	*
4. 2D	*	776102.2	********	5.9	*
5. 2E	*	776056.0	********	5.9	*
6. 2F	*	776131.1	********	5.9	*
7. 2G	*	776212.4	********	5.9	*
8. 2H	*	776295.1	********	5.9	*
9. 2I	*	776251.0	********	5.9	*
10. 2J	*	776193.2	********	5.9	*
11. 2K	*	776141.5	********	5.9	*
12. 2L	*	776169.0	********	5.9	*
13. 2M	*	776223.5	********	5.9	*
14. 2N	*	776286.1	********	5.9	*
15. 2O	*	776336.4	********	5.9	*
16. 2P	*	776392.3	********	5.9	*
17. 2Q	*	776454.3	********	5.9	*
18. 2R	*	776503.9	********	5.9	*
19. 2S	*	776545.2	********	5.9	*
20. 2T	*	776579.0	********	5.9	*
21. 2U	*	776532.2	********	5.9	*
22. 2V	*	776490.8	********	5.9	*
23. 2W	*	776431.6	********	5.9	*
24. 2X	*	776375.8	********	5.9	*
25. 2Y	*	776421.9	********	5.9	*
26. 2Z	*	776459.8	********	5.9	*
27. 2AA	*	776499.8	********	5.9	*
28. 2BB	*	776533.5	********	5.9	*
29. 2CC	*	776504.6	********	5.9	*
30. 2DD	*	776463.9	********	5.9	*
31. 2EE	*	776429.5	********	5.9	*
32. 2FF	*	776395.7	********	5.9	*

JOB: HOTEL INDIGO A ST & W BROADWAY RUN: 2018 NO-BUILD 1-HR PEAK PM

MODEL RESULTS

REMARKS : In search of the angle corresponding to
the maximum concentration, only the first
angle, of the angles with same maximum
concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND * CONCENTRATION
ANGLE * (PPM)

(DEGR) *	REC1	REC2	REC3	REC4	REC5	REC6	REC7	REC8	REC9	REC10	REC11	REC12	REC13	REC14	REC15	REC16	REC17	REC18	REC19	REC20
0. *	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.2	0.0	0.0	0.3	0.3	0.5	0.3	0.6	0.4	0.3	0.3	0.0
10. *	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.2	0.0	0.1	0.3	0.3	0.4	0.3	0.6	0.3	0.2	0.3	0.0
20. *	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.3	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.2	0.2	0.2	0.0
30. *	0.1	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.3	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.0
40. *	0.1	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.5	0.4	0.5	0.2	0.4	0.4	0.4	0.5	0.2	0.2	0.2	0.0
50. *	0.3	0.0	0.0	0.0	0.1	0.1	0.3	0.4	0.7	0.5	0.5	0.1	0.1	0.2	0.4	0.5	0.2	0.2	0.2	0.0
60. *	0.4	0.1	0.0	0.0	0.1	0.1	0.4	0.3	0.7	0.5	0.5	0.0	0.1	0.2	0.3	0.3	0.2	0.2	0.2	0.0
70. *	0.4	0.1	0.0	0.0	0.1	0.1	0.4	0.4	0.7	0.5	0.5	0.0	0.1	0.2	0.3	0.5	0.2	0.2	0.2	0.0
80. *	0.3	0.0	0.0	0.0	0.1	0.1	0.3	0.2	0.7	0.5	0.4	0.0	0.1	0.2	0.4	0.5	0.3	0.3	0.1	0.0
90. *	0.3	0.0	0.0	0.0	0.1	0.1	0.3	0.2	0.6	0.4	0.4	0.0	0.0	0.1	0.4	0.4	0.3	0.3	0.1	0.0
100. *	0.3	0.0	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.3	0.3	0.0	0.0	0.1	0.4	0.5	0.3	0.3	0.1	0.0
110. *	0.3	0.0	0.0	0.0	0.1	0.2	0.3	0.5	0.5	0.3	0.3	0.0	0.0	0.1	0.5	0.5	0.3	0.3	0.1	0.0
120. *	0.1	0.0	0.0	0.0	0.1	0.2	0.3	0.6	0.4	0.3	0.3	0.0	0.0	0.0	0.5	0.4	0.3	0.2	0.0	0.0
130. *	0.3	0.1	0.1	0.1	0.0	0.1	0.3	0.6	0.4	0.3	0.3	0.0	0.0	0.0	0.3	0.4	0.2	0.2	0.0	0.0
140. *	0.3	0.2	0.2	0.1	0.0	0.2	0.2	0.4	0.4	0.3	0.3	0.0	0.0	0.0	0.2	0.3	0.1	0.1	0.0	0.0
150. *	0.4	0.3	0.2	0.1	0.0	0.1	0.1	0.5	0.4	0.3	0.3	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0
160. *	0.4	0.3	0.3	0.1	0.0	0.1	0.1	0.4	0.4	0.3	0.3	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
170. *	0.2	0.3	0.3	0.1	0.0	0.1	0.1	0.4	0.4	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
180. *	0.3	0.3	0.1	0.1	0.0	0.0	0.1	0.4	0.4	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
190. *	0.3	0.3	0.1	0.1	0.0	0.0	0.1	0.5	0.5	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
200. *	0.4	0.2	0.1	0.1	0.0	0.0	0.0	0.5	0.5	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
210. *	0.4	0.2	0.1	0.1	0.0	0.0	0.0	0.3	0.5	0.4	0.2	0.0	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.1
220. *	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.2	0.5	0.3	0.2	0.0	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.1
230. *	0.4	0.2	0.1	0.1	0.0	0.0	0.0	0.1	0.3	0.1	0.1	0.0	0.2	0.3	0.4	0.0	0.0	0.0	0.0	0.1
240. *	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.3	0.3	0.5	0.1	0.0	0.0	0.0	0.1
250. *	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.3	0.4	0.5	0.1	0.0	0.0	0.0	0.1
260. *	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.3	0.4	0.3	0.1	0.1	0.0	0.0	0.2
270. *	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.4	0.3	0.1	0.1	0.0	0.0	0.2
280. *	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.3	0.3	0.1	0.1	0.0	0.2
290. *	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.2	0.2	0.2	0.2	0.1	0.2
300. *	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.3	0.4	0.3	0.3	0.2	0.2	0.2	0.1
310. *	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.2	0.3	0.4	0.4	0.6	0.2	0.3	0.3	0.1
320. *	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.2	0.3	0.4	0.5	0.5	0.4	0.4	0.4	0.0
330. *	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.0	0.0	0.0	0.3	0.3	0.4	0.4	0.6	0.4	0.5	0.4	0.0
340. *	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.4	0.0	0.0	0.0	0.3	0.3	0.5	0.4	0.5	0.4	0.4	0.3	0.0
350. *	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.1	0.0	0.0	0.3	0.3	0.5	0.4	0.4	0.4	0.3	0.3	0.0
360. *	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.2	0.0	0.0	0.3	0.3	0.5	0.3	0.6	0.4	0.3	0.3	0.0
MAX *	0.4	0.3	0.3	0.1	0.1	0.2	0.4	0.6	0.7	0.5	0.5	0.3	0.4	0.5	0.5	0.6	0.4	0.5	0.4	0.2
DEGR. *	60	150	160	130	20	100	60	120	50	50	40	0	30	0	110	0	0	330	320	260

JOB: HOTEL INDIGO A ST & W BROADWAY RUN: 2018 NO-BUILD 1-HR PEAK PM

MODEL RESULTS

REMARKS : In search of the angle corresponding to
the maximum concentration, only the first
angle, of the angles with same maximum
concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND * CONCENTRATION
ANGLE * (PPM)

(DEGR) *	REC21	REC22	REC23	REC24	REC25	REC26	REC27	REC28	REC29	REC30	REC31	REC32
0. *	0.0	0.0	0.1	0.3	0.3	0.4	0.3	0.4	0.0	0.0	0.0	0.0
10. *	0.0	0.0	0.1	0.3	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0
20. *	0.0	0.0	0.1	0.4	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0
30. *	0.0	0.0	0.1	0.4	0.4	0.4	0.4	0.4	0.1	0.1	0.1	0.1
40. *	0.0	0.0	0.0	0.3	0.3	0.4	0.3	0.2	0.1	0.1	0.1	0.3
50. *	0.0	0.0	0.0	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3
60. *	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3
70. *	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.3	0.3	0.3	0.3
80. *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3
90. *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.3
100. *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.3
110. *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2
120. *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2
130. *	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2
140. *	0.0	0.1	0.2	0.3	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2
150. *	0.1	0.1	0.2	0.4	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2
160. *	0.1	0.2	0.4	0.4	0.1	0.0	0.0	0.0	0.2	0.2	0.2	0.4
170. *	0.1	0.2	0.4	0.4	0.2	0.0	0.0	0.0	0.2	0.2	0.3	0.5
180. *	0.1	0.2	0.4	0.4	0.2	0.1	0.0	0.0	0.2	0.3	0.4	0.5
190. *	0.1	0.2	0.3	0.2	0.2	0.2	0.0	0.0	0.3	0.3	0.4	0.4
200. *	0.2	0.2	0.3	0.2	0.3	0.2	0.1	0.1	0.3	0.3	0.3	0.4
210. *	0.2	0.2	0.3	0.2	0.3	0.2	0.1	0.1	0.2	0.3	0.3	0.3
220. *	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.3	0.2	0.2	0.2	0.2
230. *	0.2	0.2	0.3	0.5	0.4	0.4	0.4	0.3	0.1	0.0	0.1	0.1
240. *	0.2	0.2	0.4	0.4	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.1
250. *	0.2	0.2	0.4	0.4	0.3	0.4	0.4	0.4	0.0	0.0	0.0	0.1
260. *	0.2	0.4	0.4	0.2	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.1
270. *	0.3	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.0	0.0	0.0	0.1
280. *	0.3	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.0	0.0	0.0	0.0
290. *	0.3	0.5	0.3	0.3	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0
300. *	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0
310. *	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0
320. *	0.0	0.1	0.0	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0
330. *	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0
340. *	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0
350. *	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0
360. *	0.0	0.0	0.1	0.3	0.3	0.4	0.3	0.4	0.0	0.0	0.0	0.0
MAX *	0.3	0.5	0.4	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.4	0.5
DEGR. *	270	280	160	230	10	0	10	0	70	60	180	170

THE HIGHEST CONCENTRATION OF 0.70 PPM OCCURRED AT RECEPTOR REC9 .

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CAL3QHC: LINE SOURCE DISPERSION MODEL - VERSION 2.0 Dated 95221                        PAGE  1

      JOB: HOTEL INDIGO A ST & W BROADWAY                     RUN: 2018 BUILD 1-HR PEAK PM

      DATE :  6/24/13
      TIME :  9:25:19

         The MODE flag has been set to C for calculating CO averages.

       SITE & METEOROLOGICAL VARIABLES
       -------------------------------
       VS =   0.0 CM/S      VD =   0.0 CM/S      Z0 = 321. CM
        U =  1.0 M/S        CLAS =   4  (D)     ATIM =  60. MINUTES     MIXH =  1000. M   AMB =  0.0 PPM

       LINK VARIABLES
       --------------
         LINK DESCRIPTION     *         LINK COORDINATES (FT)          *    LENGTH  BRG TYPE   VPH    EF      H   W    V/C QUEUE
                              *   X1        Y1        X2        Y2     *     (FT)  (DEG)            (G/MI)  (FT) (FT)        (VEH)
      ------------------------*----------------------------------------*-------------------------------------------------------------
       1. WEST BROADWAY EB (2)* 776564.5  ********  776332.1  ******** *     306.   311. AG    670.  10.7   0.0 25.0
       2. WEST BROADWAY EB (1)* 776305.4  ********  776185.4  ******** *     157.   310. AG     77. 100.0   0.0 15.0 0.83   8.0
       3. A ST SB (3) FRE FLO * 776321.1  ********  776135.9  ******** *     291.   220. AG    870.  10.7   0.0 25.0
       4. A ST SB (1) QUEUE   * 776359.8  ********  777002.9  ******** *     972.    41. AG     63. 100.0   0.0 10.0 1.08  49.4
       5. A ST SB (2) QUEUE   * 776353.9  ********  776373.4  ******** *      29.    42. AG     63. 100.0   0.0 10.0 0.14   1.5
       6. A ST NB (2) FRE FLO * 776569.9  ********  776347.3  ******** *     341.   221. AG    335.  10.7   0.0 25.0
       7. A ST NB (1) QUEUE   * 776315.6  ********  776265.5  ******** *      80.   219. AG     63. 100.0   0.0 15.0 0.39   4.0
       8. WEST BROADWAY WB (2)* 776065.0  ********  776341.5  ******** *     365.   131. AG    436.  10.7   0.0 25.0
       9. WEST BROADWAY WB (1)* 776369.6  ********  776463.0  ******** *     125.   132. AG     77. 100.0   0.0 15.0 0.67   6.3
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JOB: HOTEL INDIGO A ST & W BROADWAY RUN: 2018 BUILD 1-HR PEAK PM

DATE : 6/24/13
TIME : 9:25:19

ADDITIONAL QUEUE LINK PARAMETERS

LINK DESCRIPTION	*	CYCLE LENGTH (SEC)	RED TIME (SEC)	CLEARANCE LOST TIME (SEC)	APPROACH VOL (VPH)	SATURATION FLOW RATE (VPH)	IDLE EM FAC (gm/hr)	SIGNAL TYPE	ARRIVAL RATE
2. WEST BROADWAY EB (1)	*	90	54	4.0	526	1900	47.86	2	3
4. A ST SB (1) QUEUE	*	90	44	4.0	909	1900	47.86	2	3
5. A ST SB (2) QUEUE	*	90	44	4.0	122	1900	47.86	2	3
7. A ST NB (1) QUEUE	*	90	44	4.0	331	1900	47.86	2	3
9. WEST BROADWAY WB (1)	*	90	54	4.0	423	1900	47.86	2	3

RECEPTOR LOCATIONS

RECEPTOR	*	COORDINATES (FT) X	Y	Z	*
1. 2A	*	776338.5	********	5.9	*
2. 2B	*	776247.6	********	5.9	*
3. 2C	*	776169.0	********	5.9	*
4. 2D	*	776102.2	********	5.9	*
5. 2E	*	776056.0	********	5.9	*
6. 2F	*	776131.1	********	5.9	*
7. 2G	*	776212.4	********	5.9	*
8. 2H	*	776295.1	********	5.9	*
9. 2I	*	776251.0	********	5.9	*
10. 2J	*	776193.2	********	5.9	*
11. 2K	*	776141.5	********	5.9	*
12. 2L	*	776169.0	********	5.9	*
13. 2M	*	776223.5	********	5.9	*
14. 2N	*	776286.1	********	5.9	*
15. 2O	*	776336.4	********	5.9	*
16. 2P	*	776392.3	********	5.9	*
17. 2Q	*	776454.3	********	5.9	*
18. 2R	*	776503.9	********	5.9	*
19. 2S	*	776545.2	********	5.9	*
20. 2T	*	776579.0	********	5.9	*
21. 2U	*	776532.2	********	5.9	*
22. 2V	*	776490.8	********	5.9	*
23. 2W	*	776431.6	********	5.9	*
24. 2X	*	776375.8	********	5.9	*
25. 2Y	*	776421.9	********	5.9	*
26. 2Z	*	776459.8	********	5.9	*
27. 2AA	*	776499.8	********	5.9	*
28. 2BB	*	776533.5	********	5.9	*
29. 2CC	*	776504.6	********	5.9	*
30. 2DD	*	776463.9	********	5.9	*
31. 2EE	*	776429.5	********	5.9	*
32. 2FF	*	776395.7	********	5.9	*

JOB: HOTEL INDIGO A ST & W BROADWAY RUN: 2018 BUILD 1-HR PEAK PM

MODEL RESULTS

REMARKS : In search of the angle corresponding to
the maximum concentration, only the first
angle, of the angles with same maximum
concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND * CONCENTRATION
ANGLE * (PPM)

(DEGR)*	REC1	REC2	REC3	REC4	REC5	REC6	REC7	REC8	REC9	REC10	REC11	REC12	REC13	REC14	REC15	REC16	REC17	REC18	REC19	REC20
0. *	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.3	0.0	0.0	0.3	0.3	0.6	0.3	0.6	0.4	0.3	0.3	0.0
10. *	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.2	0.0	0.1	0.3	0.3	0.4	0.3	0.6	0.3	0.2	0.3	0.0
20. *	0.0	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.3	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.3	0.2	0.2	0.0
30. *	0.1	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.3	0.2	0.3	0.3	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.0
40. *	0.1	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.5	0.4	0.5	0.2	0.4	0.4	0.4	0.5	0.2	0.2	0.2	0.0
50. *	0.4	0.0	0.0	0.0	0.1	0.1	0.3	0.4	0.7	0.5	0.5	0.1	0.1	0.3	0.4	0.5	0.2	0.2	0.2	0.0
60. *	0.4	0.1	0.0	0.0	0.1	0.1	0.4	0.3	0.7	0.5	0.5	0.0	0.1	0.2	0.3	0.4	0.2	0.2	0.2	0.0
70. *	0.4	0.1	0.0	0.0	0.1	0.1	0.4	0.4	0.7	0.5	0.5	0.0	0.1	0.2	0.3	0.5	0.2	0.2	0.2	0.0
80. *	0.3	0.0	0.0	0.0	0.1	0.1	0.3	0.3	0.7	0.5	0.4	0.0	0.1	0.2	0.4	0.5	0.3	0.3	0.1	0.0
90. *	0.3	0.0	0.0	0.0	0.1	0.1	0.3	0.2	0.6	0.4	0.4	0.0	0.0	0.1	0.4	0.4	0.3	0.3	0.1	0.0
100. *	0.3	0.0	0.0	0.0	0.1	0.2	0.3	0.4	0.5	0.3	0.3	0.0	0.0	0.1	0.4	0.5	0.3	0.3	0.1	0.0
110. *	0.3	0.0	0.0	0.0	0.1	0.2	0.3	0.5	0.5	0.3	0.3	0.0	0.0	0.1	0.5	0.5	0.3	0.3	0.1	0.0
120. *	0.1	0.0	0.0	0.0	0.1	0.2	0.3	0.6	0.4	0.3	0.3	0.0	0.0	0.0	0.5	0.4	0.3	0.2	0.0	0.0
130. *	0.3	0.2	0.1	0.1	0.1	0.1	0.3	0.6	0.4	0.3	0.3	0.0	0.0	0.0	0.3	0.4	0.2	0.2	0.0	0.0
140. *	0.3	0.2	0.2	0.1	0.0	0.2	0.2	0.4	0.4	0.3	0.3	0.0	0.0	0.0	0.2	0.3	0.1	0.1	0.0	0.0
150. *	0.4	0.3	0.2	0.1	0.0	0.1	0.1	0.5	0.4	0.3	0.3	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0
160. *	0.5	0.3	0.3	0.1	0.0	0.1	0.1	0.4	0.4	0.3	0.3	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
170. *	0.2	0.3	0.3	0.1	0.0	0.1	0.1	0.4	0.4	0.3	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
180. *	0.3	0.3	0.1	0.1	0.0	0.0	0.1	0.4	0.4	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
190. *	0.3	0.3	0.1	0.1	0.0	0.0	0.1	0.5	0.5	0.4	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
200. *	0.4	0.2	0.1	0.1	0.0	0.0	0.0	0.5	0.5	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
210. *	0.4	0.2	0.1	0.1	0.0	0.0	0.0	0.3	0.5	0.4	0.2	0.0	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.1
220. *	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.2	0.5	0.3	0.2	0.0	0.1	0.1	0.2	0.0	0.0	0.0	0.0	0.1
230. *	0.4	0.2	0.1	0.1	0.0	0.0	0.0	0.1	0.3	0.1	0.1	0.0	0.2	0.3	0.4	0.0	0.0	0.0	0.0	0.1
240. *	0.3	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.0	0.3	0.3	0.5	0.1	0.0	0.0	0.0	0.1
250. *	0.2	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.3	0.4	0.5	0.1	0.0	0.0	0.0	0.1
260. *	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.3	0.4	0.3	0.1	0.1	0.0	0.0	0.2
270. *	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.4	0.3	0.1	0.1	0.0	0.0	0.2
280. *	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.3	0.3	0.1	0.1	0.0	0.2
290. *	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.4	0.2	0.2	0.2	0.2	0.1	0.2
300. *	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.3	0.4	0.3	0.3	0.2	0.2	0.2	0.1
310. *	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.2	0.3	0.4	0.4	0.6	0.2	0.3	0.3	0.1
320. *	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.0	0.0	0.0	0.2	0.3	0.4	0.5	0.5	0.4	0.5	0.4	0.0
330. *	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.4	0.0	0.0	0.0	0.3	0.3	0.4	0.4	0.6	0.4	0.5	0.4	0.0
340. *	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.4	0.0	0.0	0.0	0.3	0.3	0.6	0.4	0.5	0.4	0.4	0.3	0.0
350. *	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.2	0.0	0.0	0.3	0.3	0.6	0.4	0.4	0.4	0.3	0.3	0.0
360. *	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.3	0.0	0.0	0.3	0.3	0.6	0.3	0.6	0.4	0.3	0.3	0.0
MAX *	0.5	0.3	0.3	0.1	0.1	0.2	0.4	0.6	0.7	0.5	0.5	0.3	0.4	0.6	0.5	0.6	0.4	0.5	0.4	0.2
DEGR. *	160	150	160	130	20	100	60	120	50	50	40	0	30	0	110	0	0	320	320	260

JOB: HOTEL INDIGO A ST & W BROADWAY RUN: 2018 BUILD 1-HR PEAK PM

MODEL RESULTS

REMARKS : In search of the angle corresponding to
the maximum concentration, only the first
angle, of the angles with same maximum
concentrations, is indicated as maximum.

WIND ANGLE RANGE: 0.-360.

WIND ANGLE (DEGR)	CONCENTRATION (PPM) REC21	REC22	REC23	REC24	REC25	REC26	REC27	REC28	REC29	REC30	REC31	REC32
0.	0.0	0.0	0.1	0.3	0.3	0.4	0.3	0.3	0.0	0.0	0.0	0.0
10.	0.0	0.0	0.1	0.3	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0
20.	0.0	0.0	0.1	0.4	0.4	0.4	0.4	0.4	0.0	0.0	0.0	0.0
30.	0.0	0.0	0.1	0.4	0.4	0.4	0.4	0.4	0.1	0.1	0.1	0.1
40.	0.0	0.0	0.0	0.3	0.3	0.4	0.3	0.2	0.1	0.1	0.1	0.3
50.	0.0	0.0	0.0	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.3	0.3
60.	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.3	0.3	0.3
70.	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.3	0.3	0.3	0.3
80.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3	0.3	0.3
90.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.3
100.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.3
110.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2
120.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2
130.	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2
140.	0.0	0.1	0.2	0.3	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2
150.	0.1	0.1	0.2	0.4	0.0	0.0	0.0	0.0	0.2	0.2	0.2	0.2
160.	0.1	0.2	0.4	0.4	0.1	0.0	0.0	0.0	0.2	0.2	0.2	0.3
170.	0.1	0.2	0.4	0.4	0.2	0.0	0.0	0.0	0.2	0.2	0.3	0.5
180.	0.2	0.2	0.4	0.4	0.2	0.1	0.0	0.0	0.2	0.3	0.4	0.5
190.	0.1	0.2	0.3	0.2	0.2	0.2	0.0	0.0	0.3	0.3	0.4	0.4
200.	0.2	0.2	0.3	0.2	0.3	0.2	0.1	0.1	0.3	0.3	0.3	0.4
210.	0.2	0.2	0.3	0.2	0.3	0.2	0.1	0.1	0.2	0.3	0.3	0.3
220.	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.3	0.2	0.2	0.2	0.2
230.	0.2	0.2	0.3	0.5	0.4	0.4	0.4	0.3	0.1	0.0	0.1	0.1
240.	0.2	0.2	0.4	0.4	0.4	0.4	0.3	0.4	0.0	0.0	0.0	0.1
250.	0.2	0.2	0.4	0.4	0.3	0.4	0.4	0.4	0.0	0.0	0.0	0.2
260.	0.2	0.4	0.4	0.2	0.5	0.4	0.3	0.4	0.0	0.0	0.0	0.2
270.	0.3	0.4	0.4	0.4	0.4	0.2	0.2	0.2	0.0	0.0	0.0	0.1
280.	0.3	0.5	0.4	0.3	0.3	0.2	0.2	0.2	0.0	0.0	0.0	0.1
290.	0.3	0.5	0.3	0.3	0.3	0.2	0.2	0.2	0.0	0.0	0.0	0.0
300.	0.2	0.3	0.3	0.4	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0
310.	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0
320.	0.0	0.1	0.0	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0
330.	0.0	0.0	0.0	0.3	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0
340.	0.0	0.0	0.1	0.3	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0
350.	0.0	0.0	0.1	0.3	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0
360.	0.0	0.0	0.1	0.3	0.3	0.4	0.3	0.3	0.0	0.0	0.0	0.0
MAX	0.3	0.5	0.4	0.5	0.5	0.4	0.4	0.4	0.3	0.3	0.4	0.5
DEGR.	270	280	160	230	260	0	10	10	70	60	180	170

THE HIGHEST CONCENTRATION OF 0.70 PPM OCCURRED AT RECEPTOR REC9 .

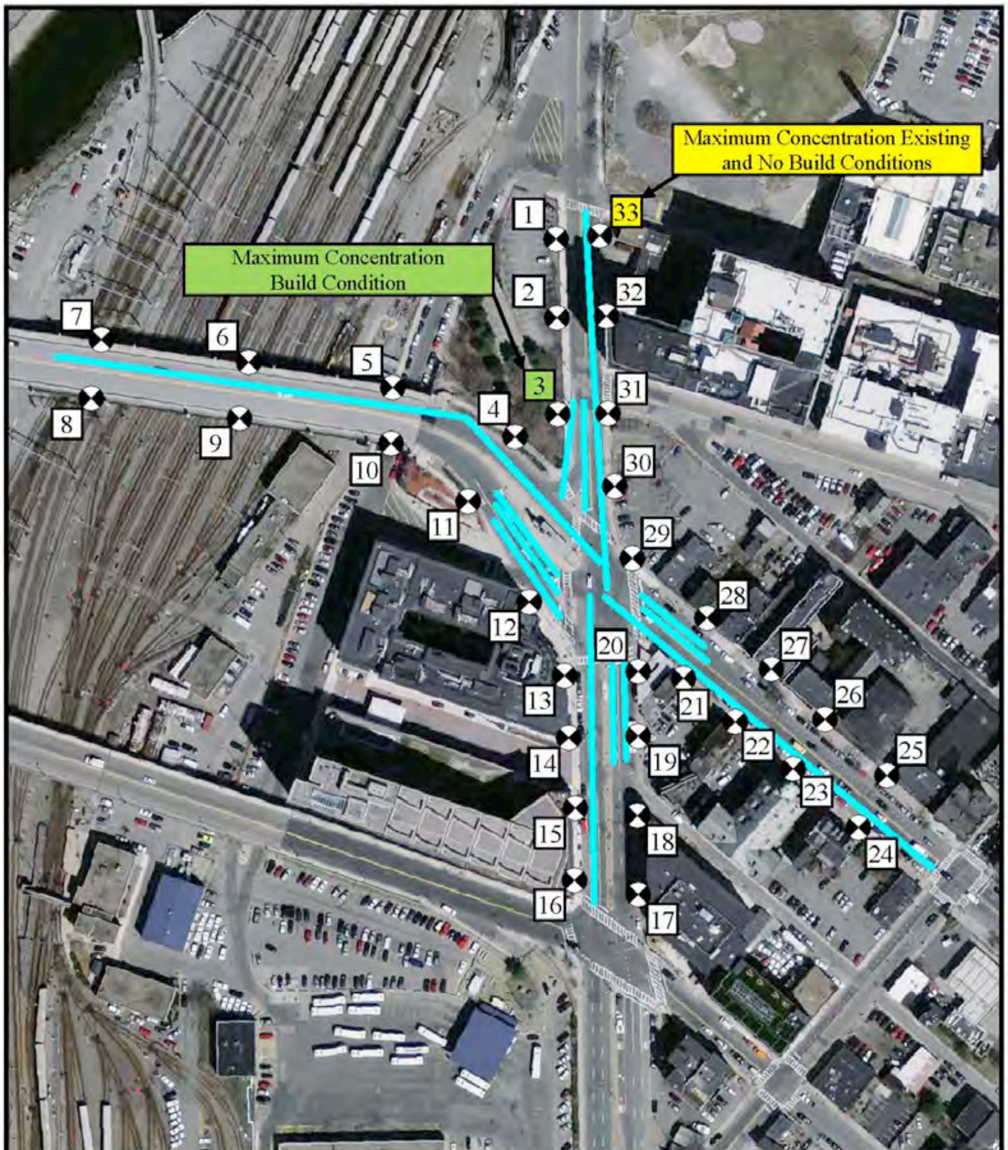


Figure 1

Dorchester Avenue & West Broadway
Existing and Future No Build & Build Conditions
Roadway Links and Receptors

TECH environmental
FOCUSED KNOWLEDGE. REAL SOLUTIONS.

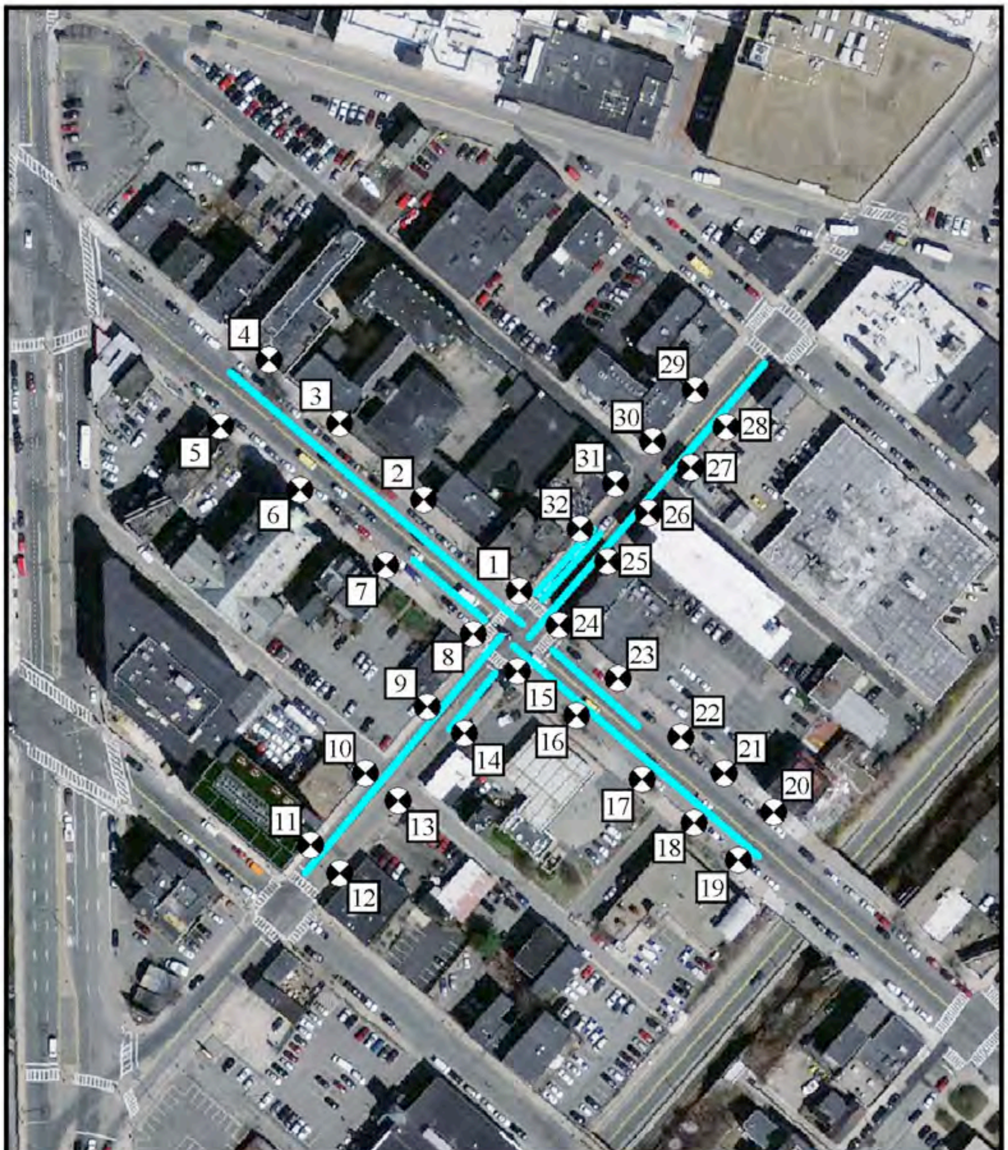


Figure 2

A Street & West Broadway
Existing and Future No Build & Build Conditions
Roadway Links and Receptors

TECH environmental
FOCUSED KNOWLEDGE. REAL SOLUTIONS.

APPENDIX C – NOISE APPENDIX

APPENDIX C
NOISE

SOUTH BOSTON HOTEL
PROJECT NOTIFICATION FORM

Page **Contents**

Figure 1

Sound Monitoring Locations and Modeling Receptors

Cadna Noise Modeling Results

Sound Modeling Results

Name	ID	Sound Level (dBA)	Height (m)	Coordinates X (m)	Y (m)	Z (m)
21-22 West Broadway	R1	47.2	1.52	236554.8	899265.3	1.52
Macellan Building	R2	38.6	1.52	236467.8	899231	1.52
Macellan Building 3rd floor	R3	37.4	5.5	236467.8	899228.4	5.5

Octave Band Levels

21-22 West Broadway

Frequency	*31.5*	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*
Sound Level (dB)	58	58	55.2	51.4	44	39.3	31.9	25.2	17.9

Macellan Building

Frequency	*31.5*	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*
Sound Level (dB)	48.3	48.9	48.2	42.5	35	29.7	25.8	17.4	6.5

Macellan Building 3rd floor

Frequency	*31.5*	*63*	*125*	*250*	*500*	*1000*	*2000*	*4000*	*8000*
Sound Level (dB)	48.8	49.3	47	41.6	33.3	28	23.6	16.2	6

APPENDIX D – TRANSPORTATION APPENDIX

TRANSPORTATION TECHNICAL APPENDIX

- TRAFFIC COUNTS
- TRIP GENERATION CALCULATIONS
- INTERSECTION CAPACITY ANALYSIS WORKSHEETS

TRAFFIC COUNTS

MASSACHUSETTS HIGHWAY DEPARTMENT - STATEWIDE TRAFFIC DATA COLLECTION

2011 WEEKDAY SEASONAL FACTORS *

* Note: These are weekday factors. The average of the factors for the year will not equal 1, as weekend data are not considered.

FACTOR GROUP	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
GROUP **1** - WEST INTERSTATE	0.98	0.93	0.90	0.89	0.90	0.88	0.91	0.90	0.89	0.89	0.93	0.95
Use group 2 for R5, R6, & R0 GROUP **2** - **RURAL MAJOR COLLECTOR (R-5)**	1.12	1.12	1.07	0.99	0.91	0.90	0.86	0.86	0.92	0.93	1.01	1.05
GROUP **3A** - RECREATIONAL **(1-4) See below	1.26	1.25	1.20	1.06	0.96	0.89	0.76	0.76	0.92	0.99	1.08	1.14
GROUP **3B** - RECREATIONAL ***(5) See below	1.22	1.26	1.22	1.06	0.96	0.90	0.72	0.74	0.97	1.02	1.14	1.15
GROUP **4** - I-495 INTERSTATE	1.02	1.00	1.00	0.96	0.92	0.89	0.85	0.83	0.93	0.96	1.01	1.03
GROUP **5** - EAST INTERSTATE	1.04	1.00	0.96	0.93	0.92	0.91	0.91	0.89	0.93	0.93	0.96	1.01
GROUP **6**: Use group 6 for U2, U3, U5, U6, U0, R2, & R3 **URBAN ARTERIALS, COLLECTORS & RURAL ARTERIALS (R-2, R-3)**	1.03	1.01	0.96	0.92	0.91	0.90	0.92	0.92	0.93	0.92	0.97	0.97
GROUP **7** - I-84 PROXIMITY (STA. 17, 3921)	1.24	1.24	1.15	1.04	0.99	1.00	0.93	0.89	1.05	1.05	1.05	1.12
GROUP **8** - I-295 PROXIMITY (STA. 6590)	1.00	0.99	0.95	0.92	0.94	0.91	0.93	0.92	0.95	0.94	0.97	0.95
GROUP **9** - I-195 PROXIMITY (STA. 7)	1.13	1.05	1.03	0.95	0.89	0.87	0.86	0.79	0.88	0.91	0.99	1.03

RECREATIONAL: (ALL YEARS)

**GROUP 3A:

1. CAPE COD (ALL TOWNS)

2.PLYMOUTH(SOUTH OF RTE.3A)

7014, 7079,7080,7090,7091,7092,7093,7094,7095,7096,7097,7108,7178

3.MARTHA'S VINEYARD

4.NANTUCKET

***GROUP 3B:

5.PERMANENTS 2 & 189

1066,1067,1083,1084,1085,1086,1087,1088,1089,1090,1091,1092,

1093,1094,1095,1096,1097,1098,1099,1100,1101,1102,1103,1104,

1105,1106,1107,1108,1113,1114,1116,2196,2197,2198

2011 AXLE CORRECTION FACTORS

ROAD INVENTORY FUNCTIONAL CLASSIFICATION	AXLE CORRECTION FACTOR
RURAL	
1	0.95
2	0.97
3	0.98
0,5,6	0.98
URBAN	
1	0.96
2,3	0.98
5	0.98
0,6	0.99
I-84	0.90

ROUND OFF

0 - 999............10

> 1,000..........100

Apply I-84 factor to stations:

3290, 3921, 3929

Accurate Counts
978-664-2565

N/S Street : Dorchester Avenue
E/W Street: W Broadway / Traveler St
City/State : Boston, MA
Weather : Cloudy

File Name : 12117001
Site Code : 12117001
Start Date : 4/25/2013
Page No : 1

Groups Printed- Cars - Trucks

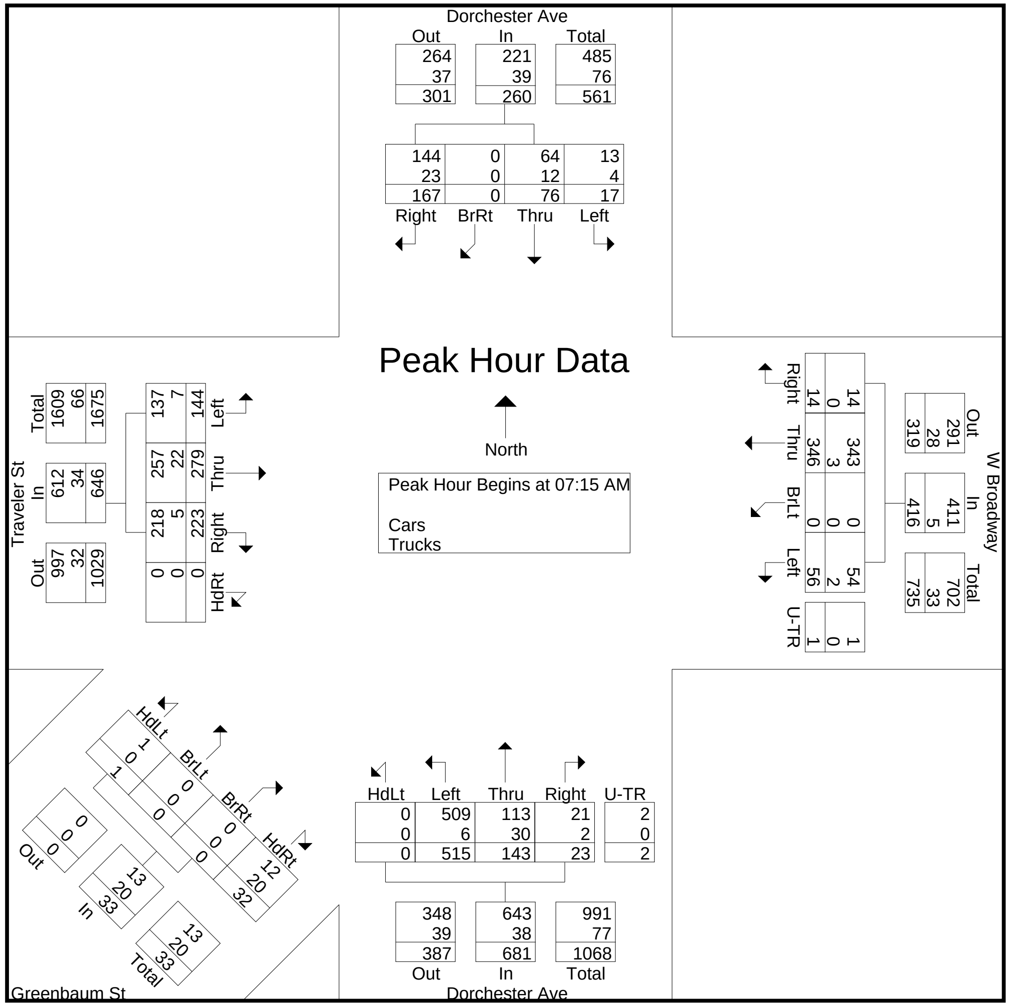
	Dorchester Ave From North				W Broadway From East					Dorchester Ave From South					Greenbaum St From Southwest				Traveler St From West							
Start Time	Left	Thru	BrRt	Right	Left	BrLt	Thru	Right	U-TR	HdLt	Left	Thru	Right	U-TR	HdLt	BrLt	BrRt	HdRt	Left	Thru	Right	HdRt	U-TR	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	2	15	0	30	7	0	76	1	0	0	106	30	8	0	2	0	0	6	40	71	54	0	1	1	448	449
07:15 AM	4	25	0	40	10	0	85	5	0	0	117	28	5	0	1	0	0	9	31	59	65	0	1	1	484	485
07:30 AM	6	19	0	37	13	0	86	3	0	0	139	39	2	0	0	0	0	9	39	62	54	0	0	0	508	508
07:45 AM	3	13	0	42	10	0	91	5	1	0	126	36	6	1	0	0	0	6	41	85	55	0	1	1	521	522
Total	15	72	0	149	40	0	338	14	1	0	488	133	21	1	3	0	0	30	151	277	228	0	3	3	1961	1964
08:00 AM	4	19	0	48	23	0	84	1	0	0	133	40	10	1	0	0	0	8	33	73	49	0	0	0	526	526
08:15 AM	0	17	0	25	17	0	83	4	0	0	124	30	6	1	0	0	0	5	28	74	52	0	0	0	466	466
08:30 AM	6	15	0	40	15	0	85	3	0	0	138	26	6	0	0	0	1	10	25	80	67	0	0	0	517	517
08:45 AM	1	16	0	31	9	0	65	4	0	0	123	34	3	0	0	0	0	9	46	82	70	0	0	0	493	493
Total	11	67	0	144	64	0	317	12	0	0	518	130	25	2	0	0	1	32	132	309	238	0	0	0	2002	2002
Grand Total	26	139	0	293	104	0	655	26	1	0	1006	263	46	3	3	0	1	62	283	586	466	0	3	3	3963	3966
Apprch %	5.7	30.3	0	64	13.2	0	83.3	3.3	0.1	0	76.3	20	3.5	0.2	4.5	0	1.5	93.9	21.2	43.9	34.9	0				
Total %	0.7	3.5	0	7.4	2.6	0	16.5	0.7	0	0	25.4	6.6	1.2	0.1	0.1	0	0	1.6	7.1	14.8	11.8	0		0.1	99.9	
Cars	18	124	0	266	102	0	645	25	1	0	992	200	40	3	2	0	1	25	263	543	453	0		0	0	3706
% Cars	69.2	89.2	0	90.8	98.1	0	98.5	96.2	100	0	98.6	76	87	100	66.7	0	100	40.3	92.9	92.7	97.2	0	100	0	0	93.4
Trucks	8	15	0	27	2	0	10	1	0	0	14	63	6	0	1	0	0	37	20	43	13	0		0	0	260
% Trucks	30.8	10.8	0	9.2	1.9	0	1.5	3.8	0	0	1.4	24	13	0	33.3	0	0	59.7	7.1	7.3	2.8	0	0	0	0	6.6

	Dorchester Ave From North					W Broadway From East						Dorchester Ave From South						Greenbaum St From Southwest					Traveler St From West					
Start Time	Left	Thru	BrRt	Right	App. Total	Left	BrLt	Thru	Right	U-TR	App. Total	HdLt	Left	Thru	Right	U-TR	App. Total	HdLt	BrLt	BrRt	HdRt	App. Total	Left	Thru	Right	HdRt	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																												
Peak Hour for Entire Intersection Begins at 07:15 AM																												
07:15 AM	4	**25**	0	40	69	10	0	85	**5**	0	100	0	117	28	5	0	150	**1**	0	0	**9**	**10**	31	59	**65**	0	155	484
07:30 AM	**6**	19	0	37	62	13	0	86	3	0	102	0	**139**	39	2	0	180	0	0	0	9	9	39	62	54	0	155	508
07:45 AM	3	13	0	42	58	10	0	**91**	5	**1**	107	0	126	36	6	**1**	169	0	0	0	6	6	**41**	**85**	55	0	**181**	521
08:00 AM	4	19	0	**48**	**71**	**23**	0	84	1	0	**108**	0	133	**40**	**10**	1	**184**	0	0	0	8	8	33	73	49	0	155	**526**
Total Volume	17	76	0	167	260	56	0	346	14	1	417	0	515	143	23	2	683	1	0	0	32	33	144	279	223	0	646	2039
% App. Total	6.5	29.2	0	64.2		13.4	0	83	3.4	0.2		0	75.4	20.9	3.4	0.3		3	0	0	97		22.3	43.2	34.5	0		
PHF	.708	.760	.000	.870	.915	.609	.000	.951	.700	.250	.965	.000	.926	.894	.575	.500	.928	.250	.000	.000	.889	.825	.878	.821	.858	.000	.892	.969
Cars	13	64	0	144	221	54	0	343	14	1	412	0	509	113	21	2	645	1	0	0	12	13	137	257	218	0	612	1903
% Cars	76.5	84.2	0	86.2	85.0	96.4	0	99.1	100	100	98.8	0	98.8	79.0	91.3	100	94.4	100	0	0	37.5	39.4	95.1	92.1	97.8	0	94.7	93.3
Trucks	4	12	0	23	39	2	0	3	0	0	5	0	6	30	2	0	38	0	0	0	20	20	7	22	5	0	34	136
% Trucks	23.5	15.8	0	13.8	15.0	3.6	0	0.9	0	0	1.2	0	1.2	21.0	8.7	0	5.6	0	0	0	62.5	60.6	4.9	7.9	2.2	0	5.3	6.7

Accurate Counts
978-664-2565

N/S Street : Dorchester Avenue
E/W Street: W Broadway / Traveler St
City/State : Boston, MA
Weather : Cloudy

File Name : 12117001
Site Code : 12117001
Start Date : 4/25/2013
Page No : 2

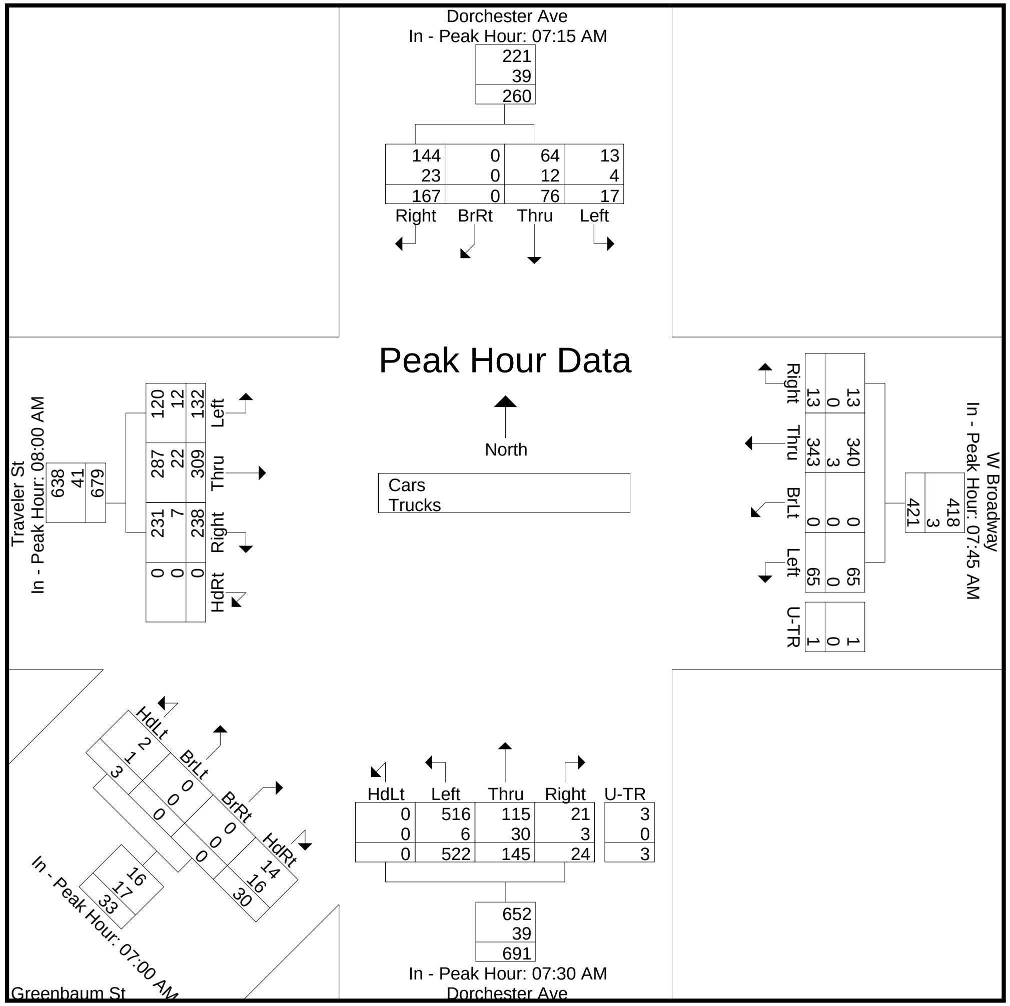


Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:15 AM					07:45 AM						07:30 AM						07:00 AM					08:00 AM				
+0 mins.	4	**25**	0	40	69	10	0	**91**	**5**	**1**	107	0	**139**	39	2	0	180	**2**	0	0	6	8	33	73	49	0	155
+15 mins.	**6**	19	0	37	62	**23**	0	84	1	0	**108**	0	126	36	6	**1**	169	1	0	0	**9**	**10**	28	74	52	0	154
+30 mins.	3	13	0	42	58	17	0	83	4	0	104	0	133	**40**	**10**	1	**184**	0	0	0	9	9	25	80	67	0	172
+45 mins.	4	19	0	**48**	**71**	15	0	85	3	0	103	0	124	30	6	1	161	0	0	0	6	6	**46**	**82**	**70**	0	**198**
Total Volume	17	76	0	167	260	65	0	343	13	1	422	0	522	145	24	3	694	3	0	0	30	33	132	309	238	0	679
% App. Total	6.5	29.2	0	64.2		15.4	0	81.3	3.1	0.2		0	75.2	20.9	3.5	0.4		9.1	0	0	90.9		19.4	45.5	35.1	0	
PHF	.708	.760	.000	.870	.915	.707	.000	.942	.650	.250	.977	.000	.939	.906	.600	.750	.943	.375	.000	.000	.833	.825	.717	.942	.850	.000	.857
Cars	13	64	0	144	221	65	0	340	13	1	419	0	516	115	21	3	655	2	0	0	14	16	120	287	231	0	638
% Cars	76.5	84.2	0	86.2	85	100	0	99.1	100	100	99.3	0	98.9	79.3	87.5	100	94.4	66.7	0	0	46.7	48.5	90.9	92.9	97.1	0	94
Trucks	4	12	0	23	39	0	0	3	0	0	3	0	6	30	3	0	39	1	0	0	16	17	12	22	7	0	41

Accurate Counts

978-664-2565



Accurate Counts
978-664-2565

N/S Street : Dorchester Avenue
E/W Street: W Broadway / Traveler St
City/State : Boston, MA
Weather : Cloudy

File Name : 12117001
Site Code : 12117001
Start Date : 4/25/2013

Groups Printed- Cars - Trucks

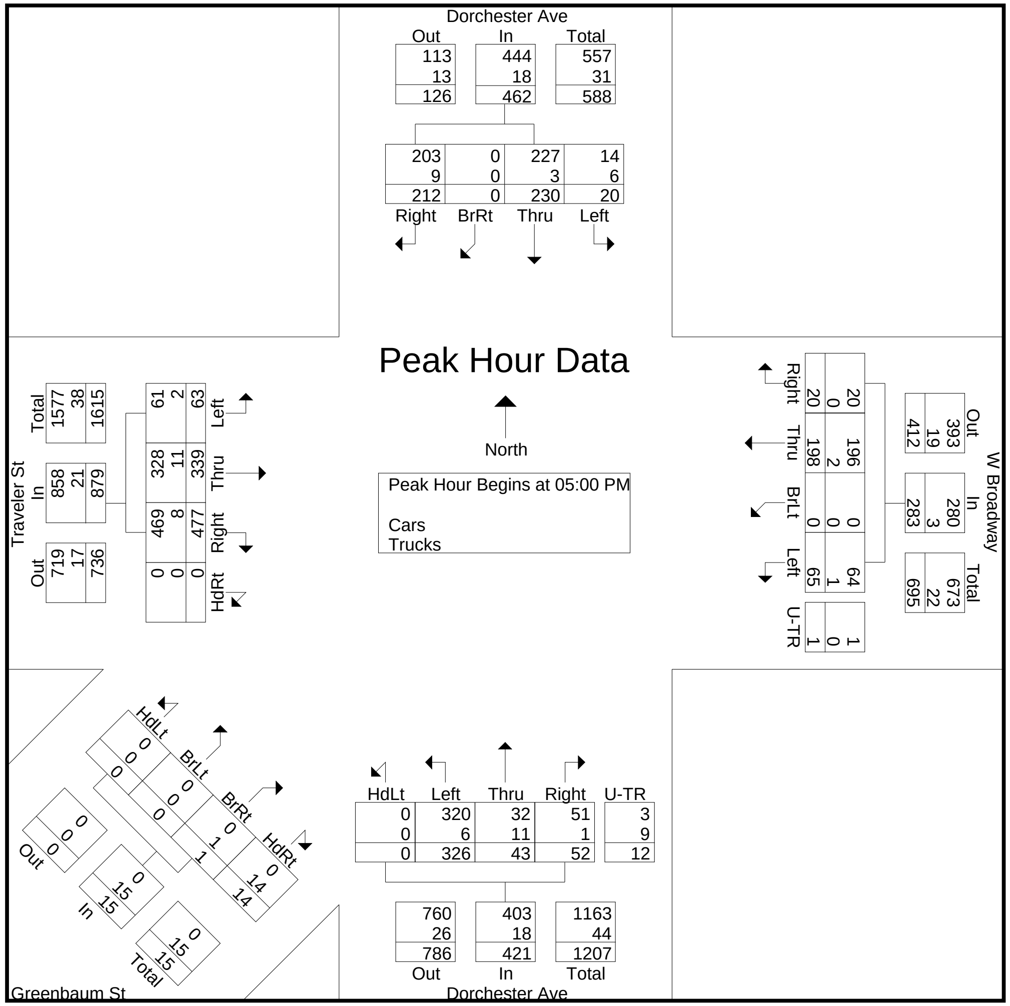
	Dorchester Ave From North				W Broadway From East					Dorchester Ave From South					Greenbaum St From Southwest				Traveler St From West							
Start Time	Left	Thru	BrRt	Right	Left	BrLt	Thru	Right	U-TR	HdLt	Left	Thru	Right	U-TR	HdLt	BrLt	BrRt	HdRt	Left	Thru	Right	HdRt	U-TR	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	2	39	0	56	23	0	36	5	2	0	62	13	10	2	0	0	0	3	15	73	117	0	7	7	458	465
04:15 PM	3	42	0	48	19	0	31	3	0	0	57	7	7	4	0	0	0	8	14	73	120	0	2	2	436	438
04:30 PM	3	43	0	49	25	0	44	7	0	0	92	10	6	1	0	0	0	4	13	67	95	0	1	1	459	460
04:45 PM	2	39	0	45	15	0	37	8	0	0	93	12	8	0	0	0	0	5	12	62	133	0	1	1	471	472
Total	10	163	0	198	82	0	148	23	2	0	304	42	31	7	0	0	0	20	54	275	465	0	11	11	1824	1835
05:00 PM	3	53	0	62	13	0	49	4	0	0	67	8	11	2	0	0	0	5	13	85	127	0	0	0	502	502
05:15 PM	6	55	0	38	18	0	57	9	1	0	101	11	17	3	0	0	1	4	16	75	124	0	1	1	536	537
05:30 PM	5	52	0	70	14	0	52	2	0	0	81	14	10	3	0	0	0	4	15	93	106	0	2	2	521	523
05:45 PM	6	70	0	42	20	0	40	5	0	0	77	10	14	4	0	0	0	1	19	86	120	0	2	2	514	516
Total	20	230	0	212	65	0	198	20	1	0	326	43	52	12	0	0	1	14	63	339	477	0	5	5	2073	2078
Grand Total	30	393	0	410	147	0	346	43	3	0	630	85	83	19	0	0	1	34	117	614	942	0	16	16	3897	3913
Apprch %	3.6	47.2	0	49.2	27.3	0	64.2	8	0.6	0	77.1	10.4	10.2	2.3	0	0	2.9	97.1	7	36.7	56.3	0				
Total %	0.8	10.1	0	10.5	3.8	0	8.9	1.1	0.1	0	16.2	2.2	2.1	0.5	0	0	0	0.9	3	15.8	24.2	0		0.4	99.6	
Cars	19	377	0	392	146	0	341	42	1	0	617	58	81	9	0	0	0	4	108	594	925	0		0	0	3725
% Cars	63.3	95.9	0	95.6	99.3	0	98.6	97.7	33.3	0	97.9	68.2	97.6	47.4	0	0	0	11.8	92.3	96.7	98.2	0	68.8	0	0	95.2
Trucks	11	16	0	18	1	0	5	1	2	0	13	27	2	10	0	0	1	30	9	20	17	0		0	0	188
% Trucks	36.7	4.1	0	4.4	0.7	0	1.4	2.3	66.7	0	2.1	31.8	2.4	52.6	0	0	100	88.2	7.7	3.3	1.8	0	31.2	0	0	4.8

	Dorchester Ave From North					W Broadway From East						Dorchester Ave From South						Greenbaum St From Southwest					Traveler St From West					
Start Time	Left	Thru	BrRt	Right	App. Total	Left	BrLt	Thru	Right	U-TR	App. Total	HdLt	Left	Thru	Right	U-TR	App. Total	HdLt	BrLt	BrRt	HdRt	App. Total	Left	Thru	Right	HdRt	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																												
Peak Hour for Entire Intersection Begins at 05:00 PM																												
05:00 PM	3	53	0	62	118	13	0	49	4	0	66	0	67	8	11	2	88	0	0	0	**5**	**5**	13	85	**127**	0	**225**	502
05:15 PM	**6**	55	0	38	99	18	0	**57**	**9**	**1**	**85**	0	**101**	11	**17**	3	**132**	0	0	**1**	4	5	16	75	124	0	215	**536**
05:30 PM	5	52	0	**70**	**127**	14	0	52	2	0	68	0	81	**14**	10	3	108	0	0	0	4	4	15	**93**	106	0	214	521
05:45 PM	6	**70**	0	42	118	**20**	0	40	5	0	65	0	77	10	14	**4**	105	0	0	0	1	1	**19**	86	120	0	225	514
Total Volume	20	230	0	212	462	65	0	198	20	1	284	0	326	43	52	12	433	0	0	1	14	15	63	339	477	0	879	2073
% App. Total	4.3	49.8	0	45.9		22.9	0	69.7	7	0.4		0	75.3	9.9	12	2.8		0	0	6.7	93.3		7.2	38.6	54.3	0		
PHF	.833	.821	.000	.757	.909	.813	.000	.868	.556	.250	.835	.000	.807	.768	.765	.750	.820	.000	.000	.250	.700	.750	.829	.911	.939	.000	.977	.967
Cars	14	227	0	203	444	64	0	196	20	1	281	0	320	32	51	3	406	0	0	0	0	0	61	328	469	0	858	1989
% Cars	70.0	98.7	0	95.8	96.1	98.5	0	99.0	100	100	98.9	0	98.2	74.4	98.1	25.0	93.8	0	0	0	0	0	96.8	96.8	98.3	0	97.6	95.9
Trucks	6	3	0	9	18	1	0	2	0	0	3	0	6	11	1	9	27	0	0	1	14	15	2	11	8	0	21	84
% Trucks	30.0	1.3	0	4.2	3.9	1.5	0	1.0	0	0	1.1	0	1.8	25.6	1.9	75.0	6.2	0	0	100	100	100	3.2	3.2	1.7	0	2.4	4.1

Accurate Counts
978-664-2565

N/S Street : Dorchester Avenue
E/W Street: W Broadway / Traveler St
City/State : Boston, MA
Weather : Cloudy

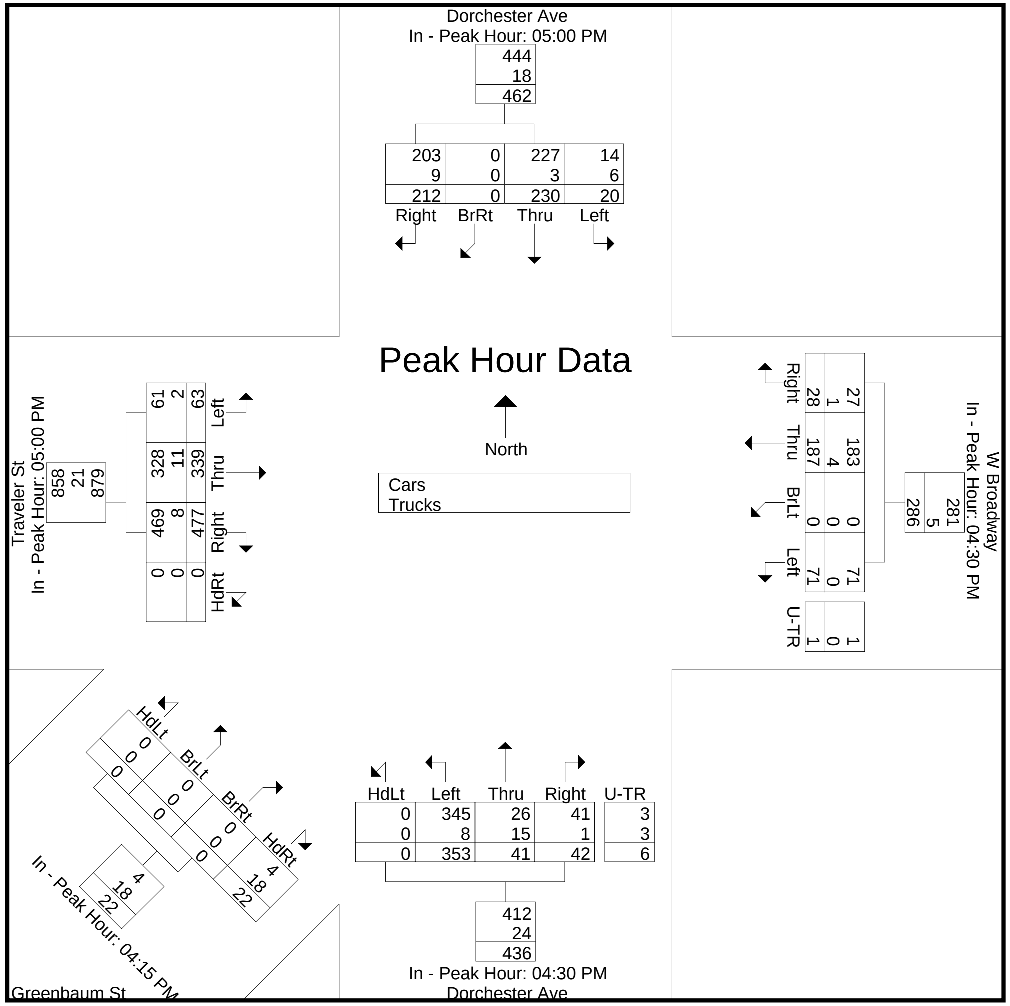
File Name : 12117001
Site Code : 12117001
Start Date : 4/25/2013



Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM					04:30 PM						04:30 PM						04:15 PM					05:00 PM				
+0 mins.	3	53	0	62	118	**25**	0	44	7	0	76	0	92	10	6	1	109	0	0	0	**8**	**8**	13	85	**127**	0	**225**
+15 mins.	**6**	55	0	38	99	15	0	37	8	0	60	0	93	**12**	8	0	113	0	0	0	4	4	16	75	124	0	215
+30 mins.	5	52	0	**70**	**127**	13	0	49	4	0	66	0	67	8	11	2	88	0	0	0	5	5	15	**93**	106	0	214
+45 mins.	6	**70**	0	42	118	18	0	**57**	**9**	**1**	**85**	0	**101**	11	**17**	**3**	**132**	0	0	0	5	5	**19**	86	120	0	225
Total Volume	20	230	0	212	462	71	0	187	28	1	287	0	353	41	42	6	442	0	0	0	22	22	63	339	477	0	879
% App. Total	4.3	49.8	0	45.9		24.7	0	65.2	9.8	0.3		0	79.9	9.3	9.5	1.4		0	0	0	100		7.2	38.6	54.3	0	
PHF	.833	.821	.000	.757	.909	.710	.000	.820	.778	.250	.844	.000	.874	.854	.618	.500	.837	.000	.000	.000	.688	.688	.829	.911	.939	.000	.977
Cars	14	227	0	203	444	71	0	183	27	1	282	0	345	26	41	3	415	0	0	0	4	4	61	328	469	0	858
% Cars	70	98.7	0	95.8	96.1	100	0	97.9	96.4	100	98.3	0	97.7	63.4	97.6	50	93.9	0	0	0	18.2	18.2	96.8	96.8	98.3	0	97.6
Trucks	6	3	0	9	18	0	0	4	1	0	5	0	8	15	1	3	27	0	0	0	18	18	2	11	8	0	21

Accurate Counts
978-664-2565



Accurate Counts
978-664-2565

N/S Street : Dorchester Avenue
E/W Street : West 2nd Street
City/State : Boston, MA
Weather : Cloudy

File Name : 12117002
Site Code : 12117002
Start Date : 4/25/2013
Page No : 1

Groups Printed- Cars - Trucks

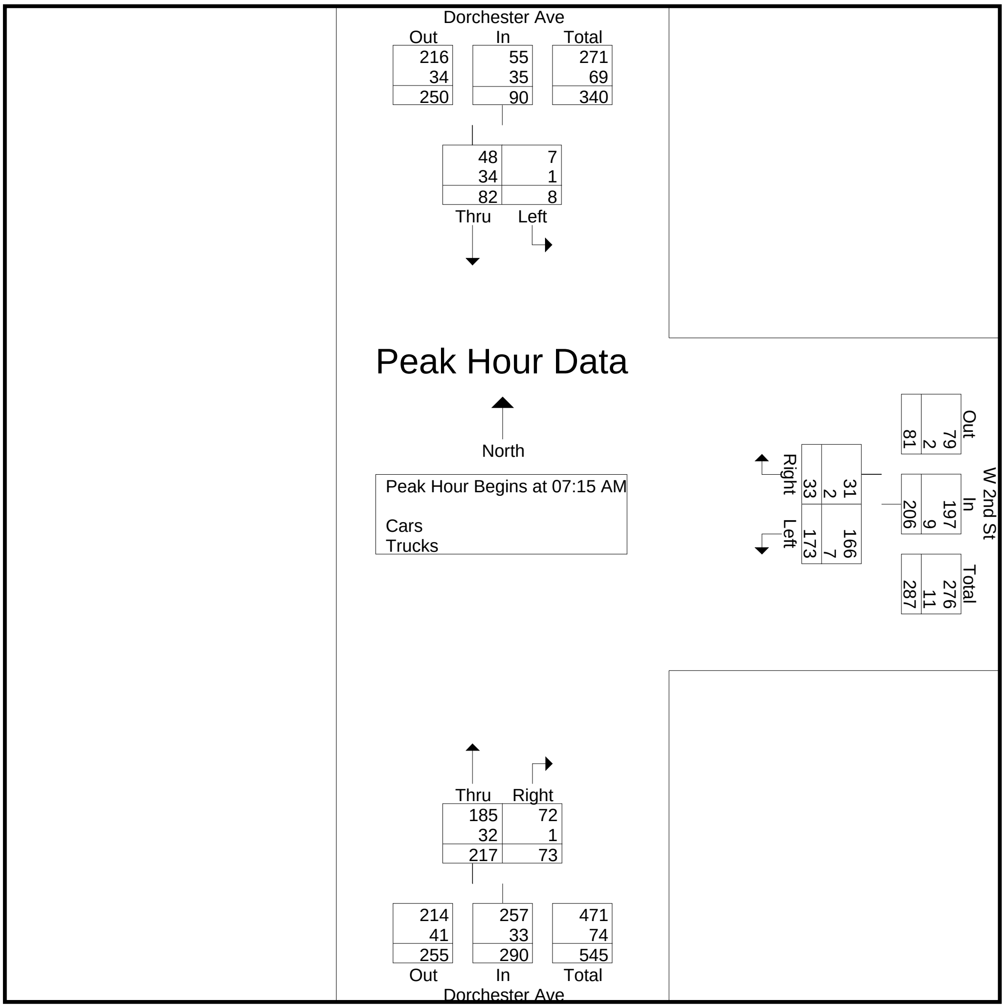
	Dorchester Ave From North		W 2nd St From East		Dorchester Ave From South		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	6	19	28	7	55	13	128
07:15 AM	3	26	42	10	52	12	145
07:30 AM	1	26	41	4	54	21	147
07:45 AM	3	13	41	10	55	25	147
Total	13	84	152	31	216	71	567
08:00 AM	1	17	49	9	56	15	147
08:15 AM	3	6	39	11	42	23	124
08:30 AM	5	8	51	8	32	14	118
08:45 AM	2	16	34	5	57	19	133
Total	11	47	173	33	187	71	522
Grand Total	24	131	325	64	403	142	1089
Apprch %	15.5	84.5	83.5	16.5	73.9	26.1	
Total %	2.2	12	29.8	5.9	37	13	
Cars	20	88	311	55	326	137	937
% Cars	83.3	67.2	95.7	85.9	80.9	96.5	86
Trucks	4	43	14	9	77	5	152
% Trucks	16.7	32.8	4.3	14.1	19.1	3.5	14

	Dorchester Ave From North			W 2nd St From East			Dorchester Ave From South			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	**3**	**26**	**29**	42	**10**	52	52	12	64	145
07:30 AM	1	26	27	41	4	45	54	21	75	**147**
07:45 AM	3	13	16	41	10	51	55	**25**	**80**	147
08:00 AM	1	17	18	**49**	9	**58**	**56**	15	71	147
Total Volume	8	82	90	173	33	206	217	73	290	586
% App. Total	8.9	91.1		84	16		74.8	25.2		
PHF	.667	.788	.776	.883	.825	.888	.969	.730	.906	.997
Cars	7	48	55	166	31	197	185	72	257	509
% Cars	87.5	58.5	61.1	96.0	93.9	95.6	85.3	98.6	88.6	86.9
Trucks	1	34	35	7	2	9	32	1	33	77
% Trucks	12.5	41.5	38.9	4.0	6.1	4.4	14.7	1.4	11.4	13.1

Accurate Counts
978-664-2565

N/S Street : Dorchester Avenue
E/W Street : West 2nd Street
City/State : Boston, MA
Weather : Cloudy

File Name : 12117002
Site Code : 12117002
Start Date : 4/25/2013
Page No : 2



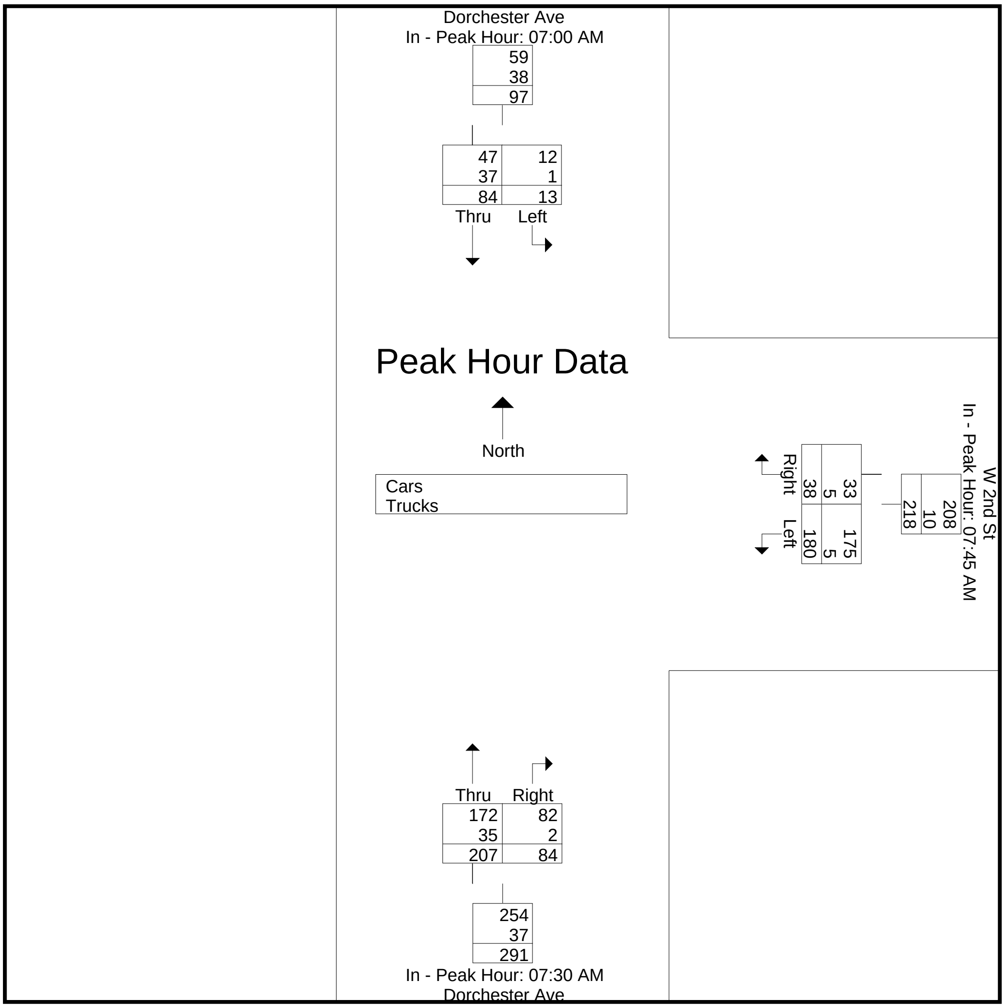
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:00 AM			07:45 AM			07:30 AM		
+0 mins.	**6**	19	25	41	10	51	54	21	75
+15 mins.	3	**26**	**29**	49	9	58	55	**25**	**80**
+30 mins.	1	26	27	39	**11**	50	**56**	15	71
+45 mins.	3	13	16	**51**	8	**59**	42	23	65
Total Volume	13	84	97	180	38	218	207	84	291
% App. Total	13.4	86.6		82.6	17.4		71.1	28.9	
PHF	.542	.808	.836	.882	.864	.924	.924	.840	.909
Cars	12	47	59	175	33	208	172	82	254
% Cars	92.3	56	60.8	97.2	86.8	95.4	83.1	97.6	87.3
Trucks	1	37	38	5	5	10	35	2	37
% Trucks	7.7	44	39.2	2.8	13.2	4.6	16.9	2.4	12.7

Accurate Counts
978-664-2565

N/S Street : Dorchester Avenue
E/W Street : West 2nd Street
City/State : Boston, MA
Weather : Cloudy

File Name : 12117002
Site Code : 12117002
Start Date : 4/25/2013
Page No : 3



Accurate Counts
978-664-2565

N/S Street : Dorchester Avenue
E/W Street : West 2nd Street
City/State : Boston, MA
Weather : Cloudy

File Name : 12117002
Site Code : 12117002
Start Date : 4/25/2013

Groups Printed- Cars - Trucks

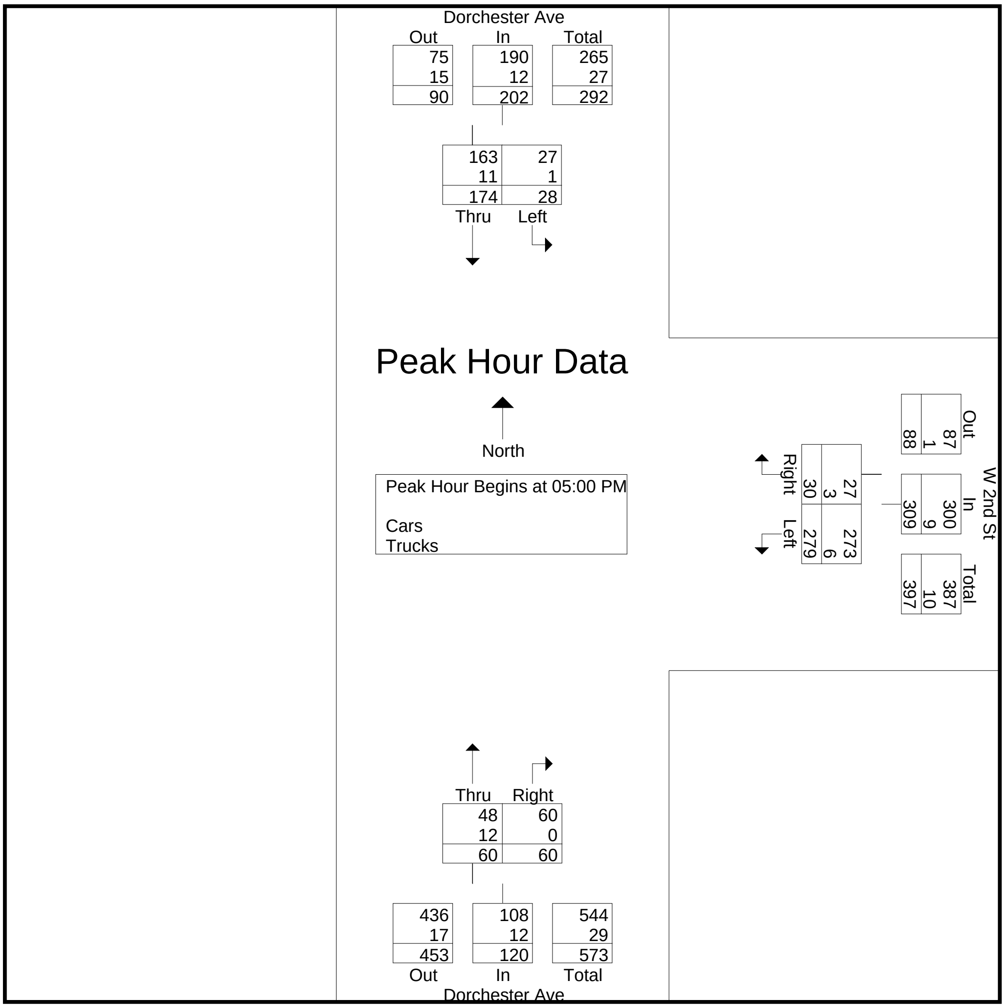
	Dorchester Ave From North		W 2nd St From East		Dorchester Ave From South		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	3	40	53	6	15	13	130
04:15 PM	4	51	49	9	16	11	140
04:30 PM	5	38	53	12	16	16	140
04:45 PM	7	43	47	9	22	12	140
Total	19	172	202	36	69	52	550
05:00 PM	3	43	72	10	12	15	155
05:15 PM	11	50	52	7	14	17	151
05:30 PM	9	39	88	6	18	9	169
05:45 PM	5	42	67	7	16	19	156
Total	28	174	279	30	60	60	631
Grand Total	47	346	481	66	129	112	1181
Apprch %	12	88	87.9	12.1	53.5	46.5	
Total %	4	29.3	40.7	5.6	10.9	9.5	
Cars	46	317	466	55	94	111	1089
% Cars	97.9	91.6	96.9	83.3	72.9	99.1	92.2
Trucks	1	29	15	11	35	1	92
% Trucks	2.1	8.4	3.1	16.7	27.1	0.9	7.8

	Dorchester Ave From North			W 2nd St From East			Dorchester Ave From South			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	3	43	46	72	**10**	82	12	15	27	155
05:15 PM	**11**	**50**	**61**	52	7	59	14	17	31	151
05:30 PM	9	39	48	**88**	6	**94**	**18**	9	27	**169**
05:45 PM	5	42	47	67	7	74	16	**19**	**35**	156
Total Volume	28	174	202	279	30	309	60	60	120	631
% App. Total	13.9	86.1		90.3	9.7		50	50		
PHF	.636	.870	.828	.793	.750	.822	.833	.789	.857	.933
Cars	27	163	190	273	27	300	48	60	108	598
% Cars	96.4	93.7	94.1	97.8	90.0	97.1	80.0	100	90.0	94.8
Trucks	1	11	12	6	3	9	12	0	12	33
% Trucks	3.6	6.3	5.9	2.2	10.0	2.9	20.0	0	10.0	5.2

Accurate Counts
978-664-2565

N/S Street : Dorchester Avenue
E/W Street : West 2nd Street
City/State : Boston, MA
Weather : Cloudy

File Name : 12117002
Site Code : 12117002
Start Date : 4/25/2013
Page No : 2



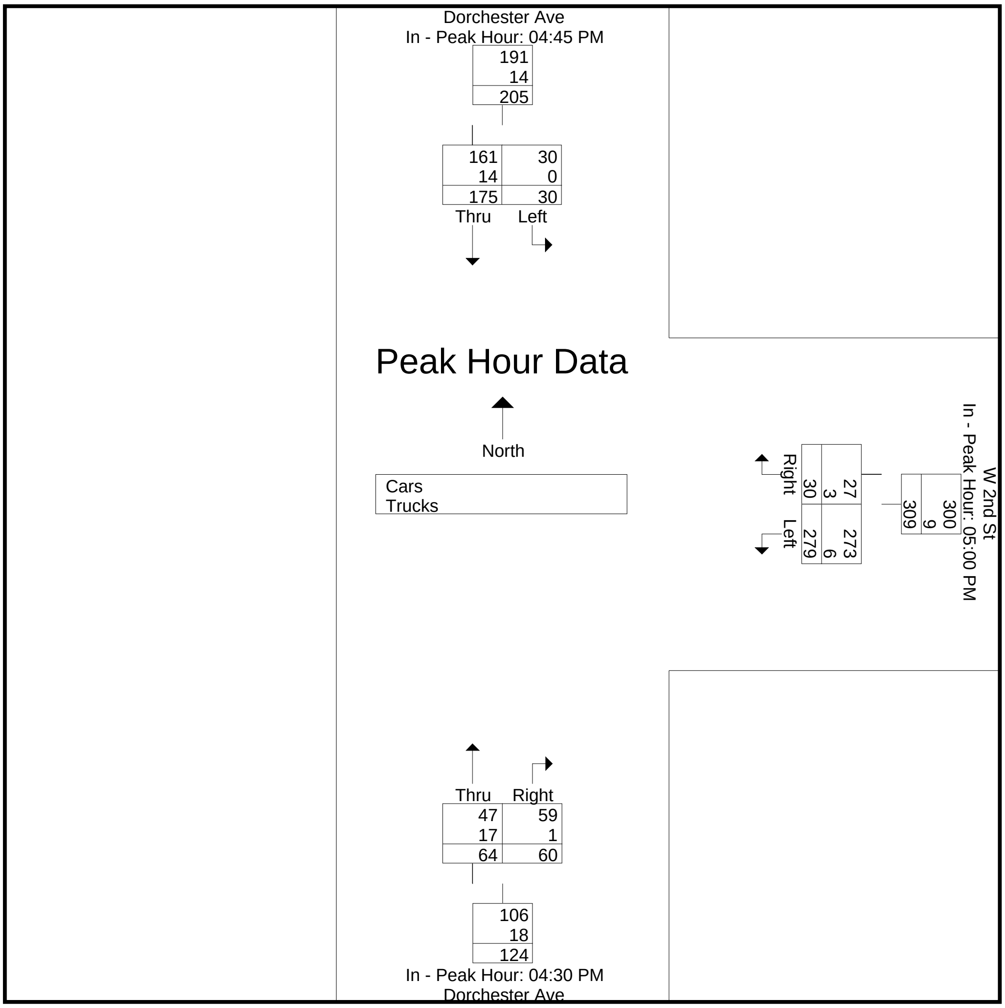
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	04:45 PM			05:00 PM			04:30 PM		
+0 mins.	7	43	50	72	**10**	82	16	16	32
+15 mins.	3	43	46	52	7	59	**22**	12	**34**
+30 mins.	**11**	**50**	**61**	**88**	6	**94**	12	15	27
+45 mins.	9	39	48	67	7	74	14	**17**	31
Total Volume	30	175	205	279	30	309	64	60	124
% App. Total	14.6	85.4		90.3	9.7		51.6	48.4	
PHF	.682	.875	.840	.793	.750	.822	.727	.882	.912
Cars	30	161	191	273	27	300	47	59	106
% Cars	100	92	93.2	97.8	90	97.1	73.4	98.3	85.5
Trucks	0	14	14	6	3	9	17	1	18
% Trucks	0	8	6.8	2.2	10	2.9	26.6	1.7	14.5

Accurate Counts
978-664-2565

N/S Street : Dorchester Avenue
E/W Street : West 2nd Street
City/State : Boston, MA
Weather : Cloudy

File Name : 12117002
Site Code : 12117002
Start Date : 4/25/2013
Page No : 3



Accurate Counts
978-664-2565

N/S Street : A Street
E/W Street : West 2nd Street
City/State : Boston, MA
Weather : Cloudy

File Name : 12117003
Site Code : 12117003
Start Date : 4/25/2013
Page No : 1

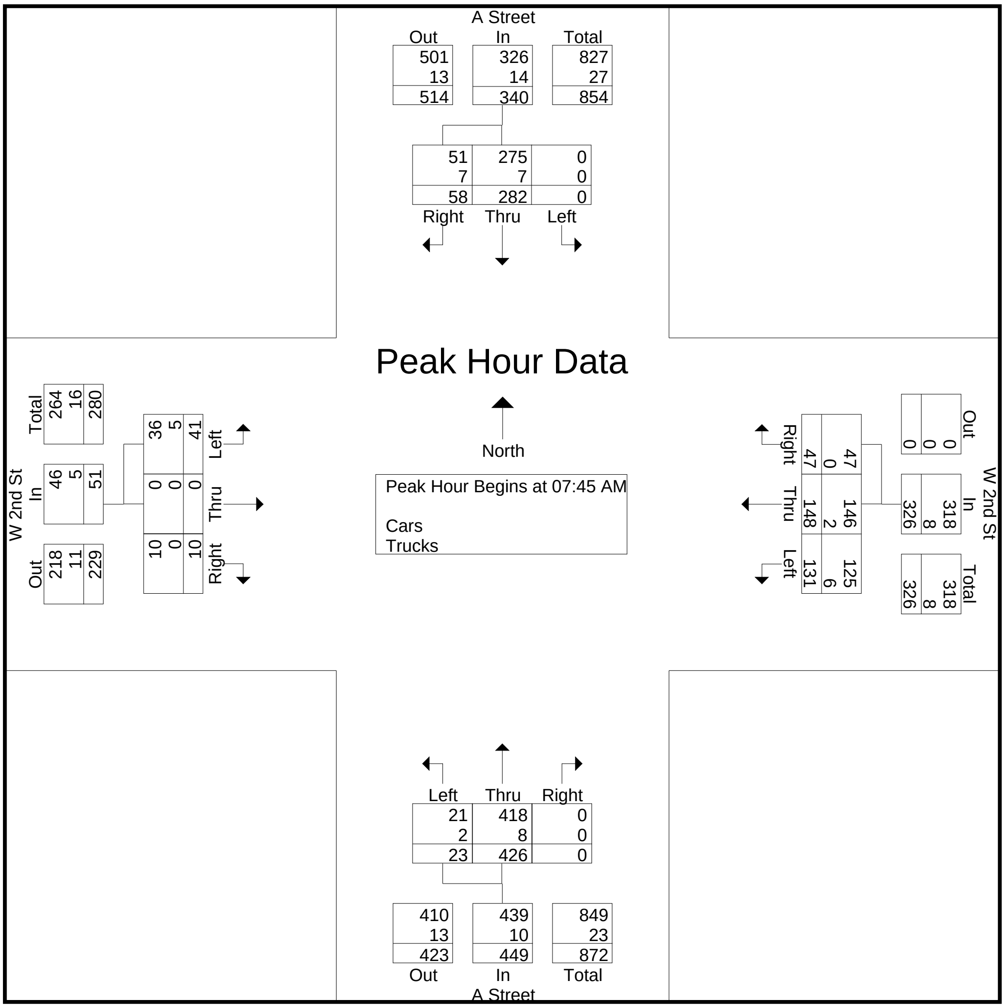
Groups Printed- Cars - Trucks

	A Street From North			W 2nd St From East			A Street From South			W 2nd St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	58	7	12	26	6	6	90	0	10	0	1	216
07:15 AM	0	58	20	22	29	14	0	79	0	6	0	0	228
07:30 AM	0	68	12	23	37	12	4	79	0	9	0	2	246
07:45 AM	0	77	16	27	31	11	4	100	0	11	0	5	282
Total	0	261	55	84	123	43	14	348	0	36	0	8	972
08:00 AM	0	66	8	45	50	8	7	101	0	5	0	1	291
08:15 AM	0	59	16	30	30	11	7	100	0	11	0	3	267
08:30 AM	0	80	18	29	37	17	5	125	0	14	0	1	326
08:45 AM	0	68	15	25	25	9	4	123	0	11	0	0	280
Total	0	273	57	129	142	45	23	449	0	41	0	5	1164
Grand Total	0	534	112	213	265	88	37	797	0	77	0	13	2136
Apprch %	0	82.7	17.3	37.6	46.8	15.5	4.4	95.6	0	85.6	0	14.4	
Total %	0	25	5.2	10	12.4	4.1	1.7	37.3	0	3.6	0	0.6	
Cars	0	518	96	201	258	87	35	774	0	69	0	12	2050
% Cars	0	97	85.7	94.4	97.4	98.9	94.6	97.1	0	89.6	0	92.3	96
Trucks	0	16	16	12	7	1	2	23	0	8	0	1	86
% Trucks	0	3	14.3	5.6	2.6	1.1	5.4	2.9	0	10.4	0	7.7	4

	A Street From North				W 2nd St From East				A Street From South				W 2nd St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	0	77	16	93	27	31	11	69	4	100	0	104	11	0	**5**	**16**	282
08:00 AM	0	66	8	74	**45**	**50**	8	**103**	**7**	101	0	108	5	0	1	6	291
08:15 AM	0	59	16	75	30	30	11	71	7	100	0	107	11	0	3	14	267
08:30 AM	0	**80**	**18**	**98**	29	37	**17**	83	5	**125**	0	**130**	**14**	0	1	15	**326**
Total Volume	0	282	58	340	131	148	47	326	23	426	0	449	41	0	10	51	1166
% App. Total	0	82.9	17.1		40.2	45.4	14.4		5.1	94.9	0		80.4	0	19.6		
PHF	.000	.881	.806	.867	.728	.740	.691	.791	.821	.852	.000	.863	.732	.000	.500	.797	.894
Cars	0	275	51	326	125	146	47	318	21	418	0	439	36	0	10	46	1129
% Cars	0	97.5	87.9	95.9	95.4	98.6	100	97.5	91.3	98.1	0	97.8	87.8	0	100	90.2	96.8
Trucks	0	7	7	14	6	2	0	8	2	8	0	10	5	0	0	5	37
% Trucks	0	2.5	12.1	4.1	4.6	1.4	0	2.5	8.7	1.9	0	2.2	12.2	0	0	9.8	3.2

Accurate Counts
978-664-2565

N/S Street : A Street	File Name : 12117003
E/W Street : West 2nd Street	Site Code : 12117003
City/State : Boston, MA	Start Date : 4/25/2013
Weather : Cloudy	Page No : 2

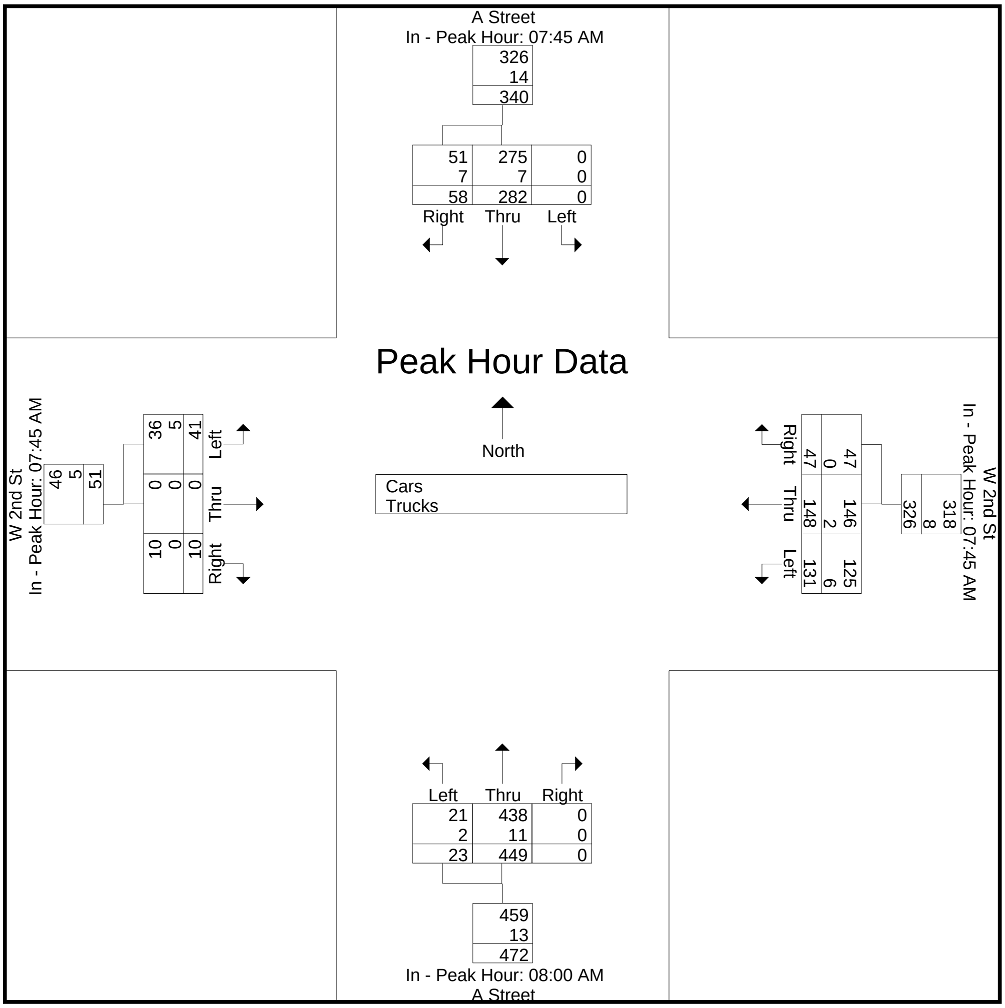


Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:45 AM				08:00 AM				07:45 AM			
+0 mins.	0	77	16	93	27	31	11	69	**7**	101	0	108	11	0	**5**	**16**
+15 mins.	0	66	8	74	**45**	**50**	8	**103**	7	100	0	107	5	0	1	6
+30 mins.	0	59	16	75	30	30	11	71	5	**125**	0	**130**	11	0	3	14
+45 mins.	0	**80**	**18**	**98**	29	37	**17**	83	4	123	0	127	**14**	0	1	15
Total Volume	0	282	58	340	131	148	47	326	23	449	0	472	41	0	10	51
% App. Total	0	82.9	17.1		40.2	45.4	14.4		4.9	95.1	0		80.4	0	19.6	
PHF	.000	.881	.806	.867	.728	.740	.691	.791	.821	.898	.000	.908	.732	.000	.500	.797
Cars	0	275	51	326	125	146	47	318	21	438	0	459	36	0	10	46
% Cars	0	97.5	87.9	95.9	95.4	98.6	100	97.5	91.3	97.6	0	97.2	87.8	0	100	90.2
Trucks	0	7	7	14	6	2	0	8	2	11	0	13	5	0	0	5
% Trucks	0	2.5	12.1	4.1	4.6	1.4	0	2.5	8.7	2.4	0	2.8	12.2	0	0	9.8

Accurate Counts
978-664-2565

N/S Street : A Street	File Name : 12117003
E/W Street : West 2nd Street	Site Code : 12117003
City/State : Boston, MA	Start Date : 4/25/2013
Weather : Cloudy	Page No : 3



Accurate Counts
978-664-2565

N/S Street : A Street
E/W Street : West 2nd Street
City/State : Boston, MA
Weather : Clear

File Name : 12117003
Site Code : 12117003
Start Date : 4/25/2013
Page No : 1

Groups Printed- Cars - Trucks

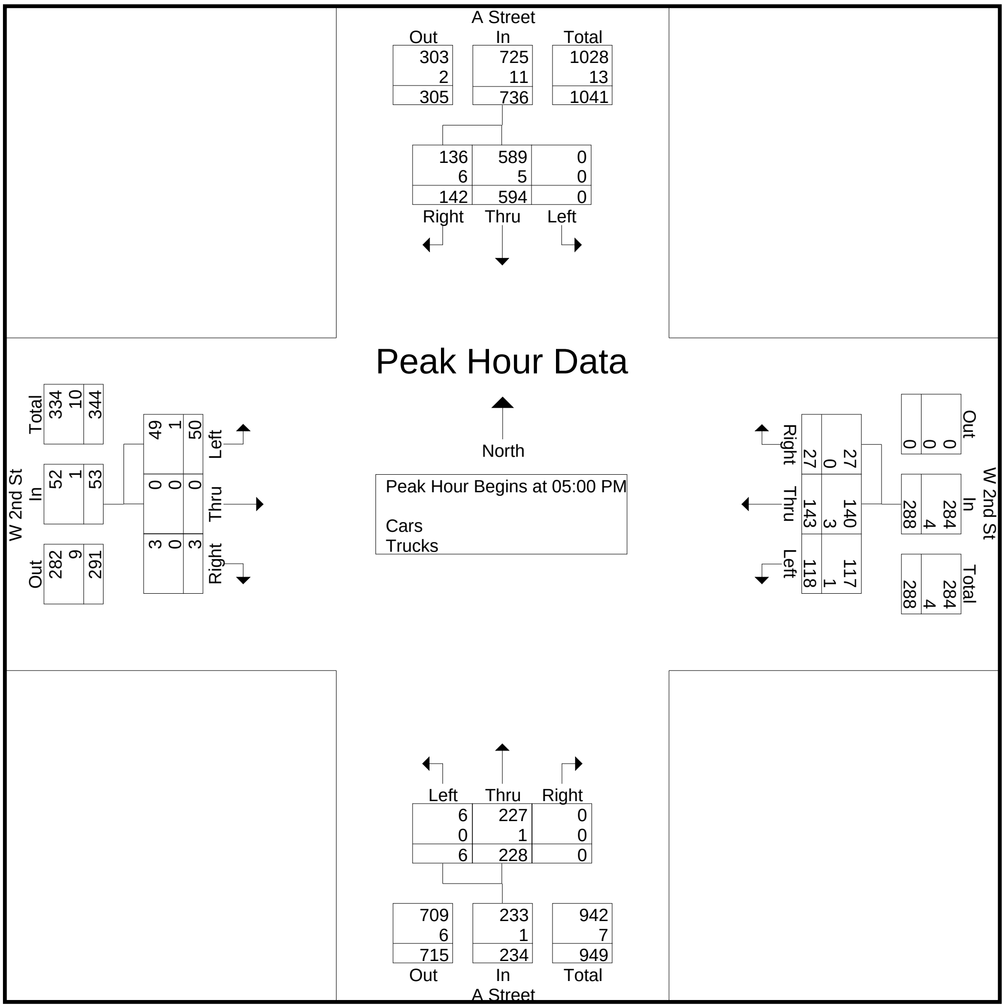
	A Street From North			W 2nd St From East			A Street From South			W 2nd St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	0	160	28	27	26	11	5	28	0	12	0	1	298
04:15 PM	0	134	34	23	17	10	1	51	0	7	0	0	277
04:30 PM	0	111	26	19	30	6	0	65	0	13	0	1	271
04:45 PM	0	144	31	25	30	8	1	68	0	10	0	0	317
Total	0	549	119	94	103	35	7	212	0	42	0	2	1163
05:00 PM	0	151	34	39	39	2	2	59	0	8	0	1	335
05:15 PM	0	145	27	36	30	6	0	55	0	13	0	1	313
05:30 PM	0	154	36	20	43	12	1	57	0	14	0	1	338
05:45 PM	0	144	45	23	31	7	3	57	0	15	0	0	325
Total	0	594	142	118	143	27	6	228	0	50	0	3	1311
Grand Total	0	1143	261	212	246	62	13	440	0	92	0	5	2474
Apprch %	0	81.4	18.6	40.8	47.3	11.9	2.9	97.1	0	94.8	0	5.2	
Total %	0	46.2	10.5	8.6	9.9	2.5	0.5	17.8	0	3.7	0	0.2	
Cars	0	1131	241	208	240	62	13	434	0	91	0	5	2425
% Cars	0	99	92.3	98.1	97.6	100	100	98.6	0	98.9	0	100	98
Trucks	0	12	20	4	6	0	0	6	0	1	0	0	49
% Trucks	0	1	7.7	1.9	2.4	0	0	1.4	0	1.1	0	0	2

	A Street From North				W 2nd St From East				A Street From South				W 2nd St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	151	34	185	**39**	39	2	**80**	2	**59**	0	**61**	8	0	**1**	9	335
05:15 PM	0	145	27	172	36	30	6	72	0	55	0	55	13	0	1	14	313
05:30 PM	0	**154**	36	**190**	20	**43**	**12**	75	1	57	0	58	14	0	1	**15**	**338**
05:45 PM	0	144	**45**	189	23	31	7	61	**3**	57	0	60	**15**	0	0	15	325
Total Volume	0	594	142	736	118	143	27	288	6	228	0	234	50	0	3	53	1311
% App. Total	0	80.7	19.3		41	49.7	9.4		2.6	97.4	0		94.3	0	5.7		
PHF	.000	.964	.789	.968	.756	.831	.563	.900	.500	.966	.000	.959	.833	.000	.750	.883	.970
Cars	0	589	136	725	117	140	27	284	6	227	0	233	49	0	3	52	1294
% Cars	0	99.2	95.8	98.5	99.2	97.9	100	98.6	100	99.6	0	99.6	98.0	0	100	98.1	98.7
Trucks	0	5	6	11	1	3	0	4	0	1	0	1	1	0	0	1	17
% Trucks	0	0.8	4.2	1.5	0.8	2.1	0	1.4	0	0.4	0	0.4	2.0	0	0	1.9	1.3

Accurate Counts
978-664-2565

N/S Street : A Street
E/W Street : West 2nd Street
City/State : Boston, MA
Weather : Clear

File Name : 12117003
Site Code : 12117003
Start Date : 4/25/2013
Page No : 2



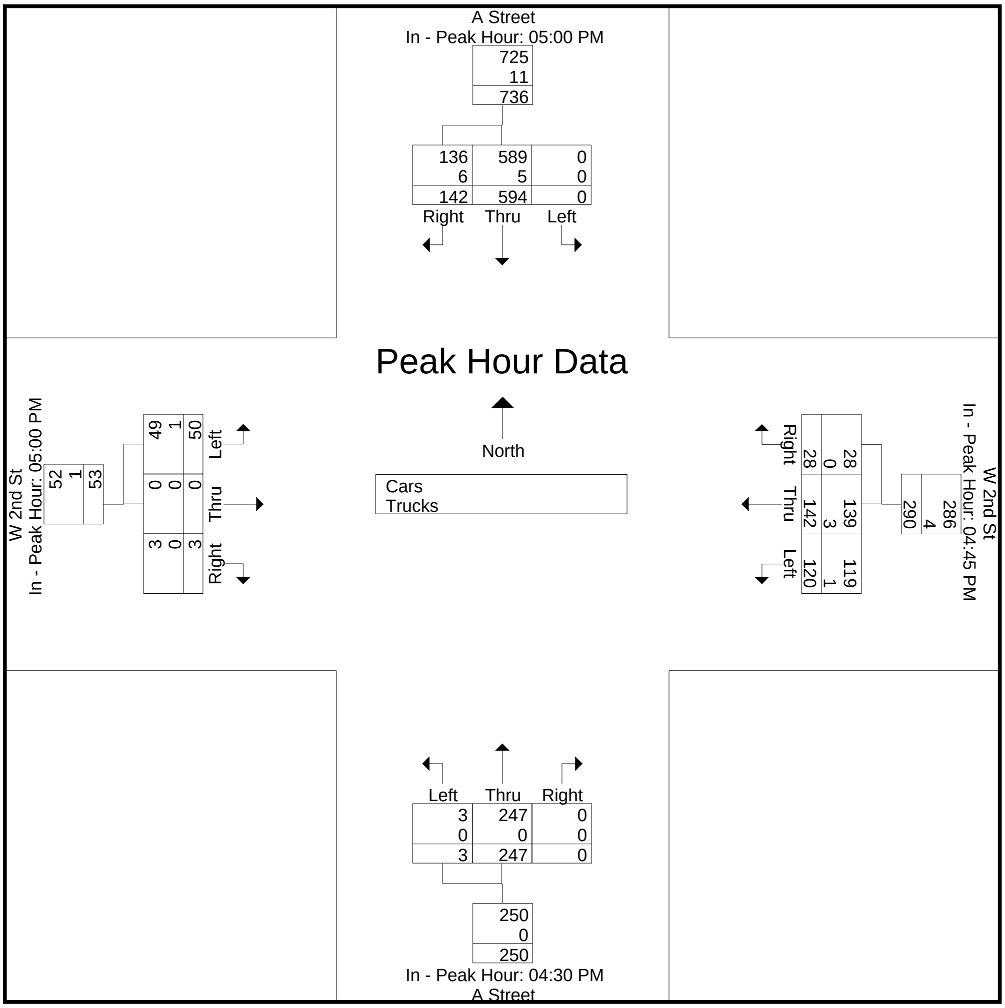
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				04:45 PM				04:30 PM				05:00 PM			
+0 mins.	0	151	34	185	25	30	8	63	0	65	0	65	8	0	**1**	9
+15 mins.	0	145	27	172	**39**	39	2	**80**	1	**68**	0	**69**	13	0	1	14
+30 mins.	0	**154**	36	**190**	36	30	6	72	**2**	59	0	61	14	0	1	**15**
+45 mins.	0	144	**45**	189	20	**43**	**12**	75	0	55	0	55	**15**	0	0	15
Total Volume	0	594	142	736	120	142	28	290	3	247	0	250	50	0	3	53
% App. Total	0	80.7	19.3		41.4	49	9.7		1.2	98.8	0		94.3	0	5.7	
PHF	.000	.964	.789	.968	.769	.826	.583	.906	.375	.908	.000	.906	.833	.000	.750	.883
Cars	0	589	136	725	119	139	28	286	3	247	0	250	49	0	3	52
% Cars	0	99.2	95.8	98.5	99.2	97.9	100	98.6	100	100	0	100	98	0	100	98.1
Trucks	0	5	6	11	1	3	0	4	0	0	0	0	1	0	0	1
% Trucks	0	0.8	4.2	1.5	0.8	2.1	0	1.4	0	0	0	0	2	0	0	1.9

Accurate Counts
978-664-2565

N/S Street : A Street
E/W Street : West 2nd Street
City/State : Boston, MA
Weather : Clear

File Name : 12117003
Site Code : 12117003
Start Date : 4/25/2013
Page No : 3



Accurate Counts
978-664-2565

N/S Street : A Street
E/W Street : West 3rd Street
City/State : Boston, MA
Weather : Cloudy

File Name : 12117004
Site Code : 12117004
Start Date : 4/25/2013
Page No : 1

Groups Printed- Cars - Trucks

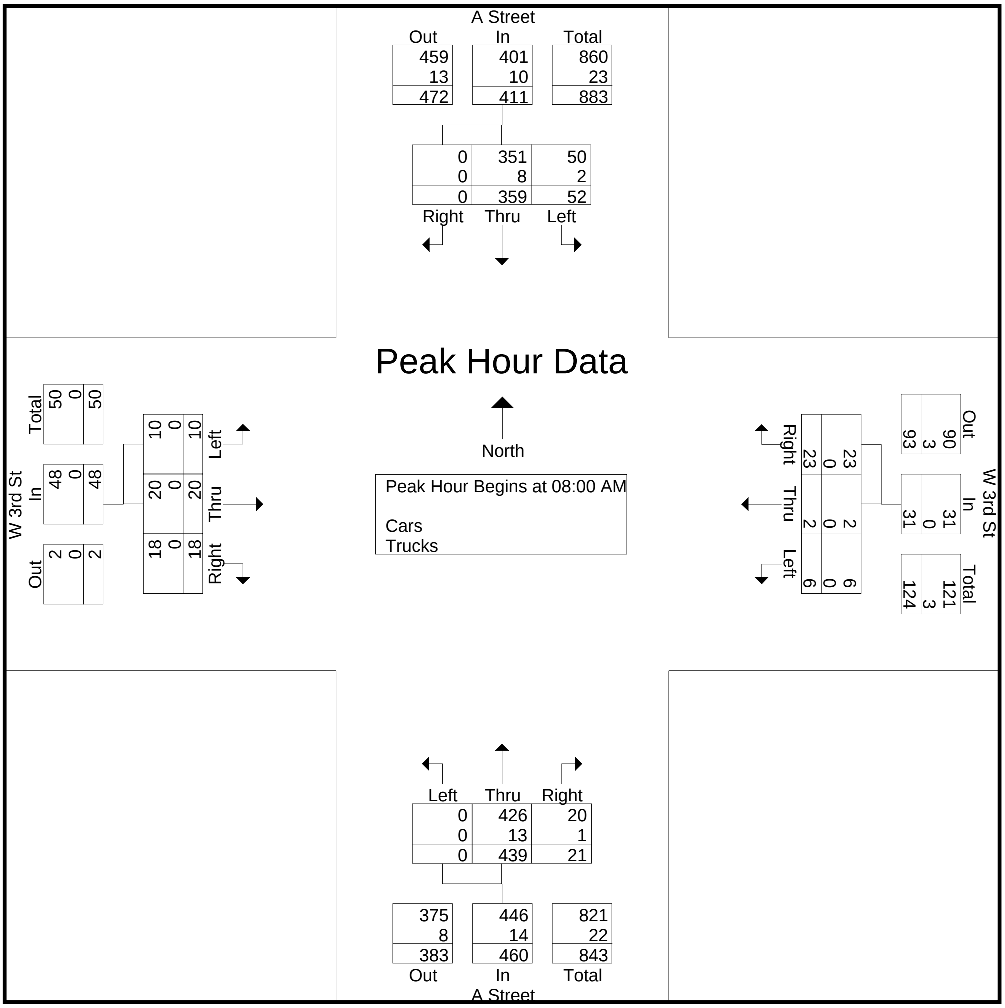
	A Street From North			**W 3rd St From East**			**A Street From South**			**W 3rd St From West**			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	5	68	0	0	0	3	0	90	5	1	6	3	181
07:15 AM	2	76	0	0	0	6	0	74	3	2	3	3	169
07:30 AM	11	83	0	2	0	4	0	78	0	3	5	8	194
07:45 AM	10	96	0	2	0	7	0	96	4	1	4	3	223
Total	28	323	0	4	0	20	0	338	12	7	18	17	767
08:00 AM	10	106	0	4	0	7	0	102	5	3	7	3	247
08:15 AM	11	77	0	0	0	5	0	96	10	3	3	6	211
08:30 AM	20	93	0	2	2	5	0	121	3	2	7	3	258
08:45 AM	11	83	0	0	0	6	0	120	3	2	3	6	234
Total	52	359	0	6	2	23	0	439	21	10	20	18	950
Grand Total	80	682	0	10	2	43	0	777	33	17	38	35	1717
Apprch %	10.5	89.5	0	18.2	3.6	78.2	0	95.9	4.1	18.9	42.2	38.9	
Total %	4.7	39.7	0	0.6	0.1	2.5	0	45.3	1.9	1	2.2	2	
Cars	78	655	0	9	2	42	0	753	30	17	38	35	1659
% Cars	97.5	96	0	90	100	97.7	0	96.9	90.9	100	100	100	96.6
Trucks	2	27	0	1	0	1	0	24	3	0	0	0	58
% Trucks	2.5	4	0	10	0	2.3	0	3.1	9.1	0	0	0	3.4

	A Street From North				**W 3rd St From East**				**A Street From South**				**W 3rd St From West**				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	10	**106**	0	**116**	**4**	0	**7**	**11**	0	102	5	107	**3**	**7**	3	**13**	247
08:15 AM	11	77	0	88	0	0	5	5	0	96	**10**	106	3	3	**6**	12	211
08:30 AM	**20**	93	0	113	2	**2**	5	9	0	**121**	3	**124**	2	7	3	12	**258**
08:45 AM	11	83	0	94	0	0	6	6	0	120	3	123	2	3	6	11	234
Total Volume	52	359	0	411	6	2	23	31	0	439	21	460	10	20	18	48	950
% App. Total	12.7	87.3	0		19.4	6.5	74.2		0	95.4	4.6		20.8	41.7	37.5		
PHF	.650	.847	.000	.886	.375	.250	.821	.705	.000	.907	.525	.927	.833	.714	.750	.923	.921
Cars	50	351	0	401	6	2	23	31	0	426	20	446	10	20	18	48	926
% Cars	96.2	97.8	0	97.6	100	100	100	100	0	97.0	95.2	97.0	100	100	100	100	97.5
Trucks	2	8	0	10	0	0	0	0	0	13	1	14	0	0	0	0	24
% Trucks	3.8	2.2	0	2.4	0	0	0	0	0	3.0	4.8	3.0	0	0	0	0	2.5

Accurate Counts
978-664-2565

N/S Street : A Street
E/W Street : West 3rd Street
City/State : Boston, MA
Weather : Cloudy

File Name : 12117004
Site Code : 12117004
Start Date : 4/25/2013
Page No : 2



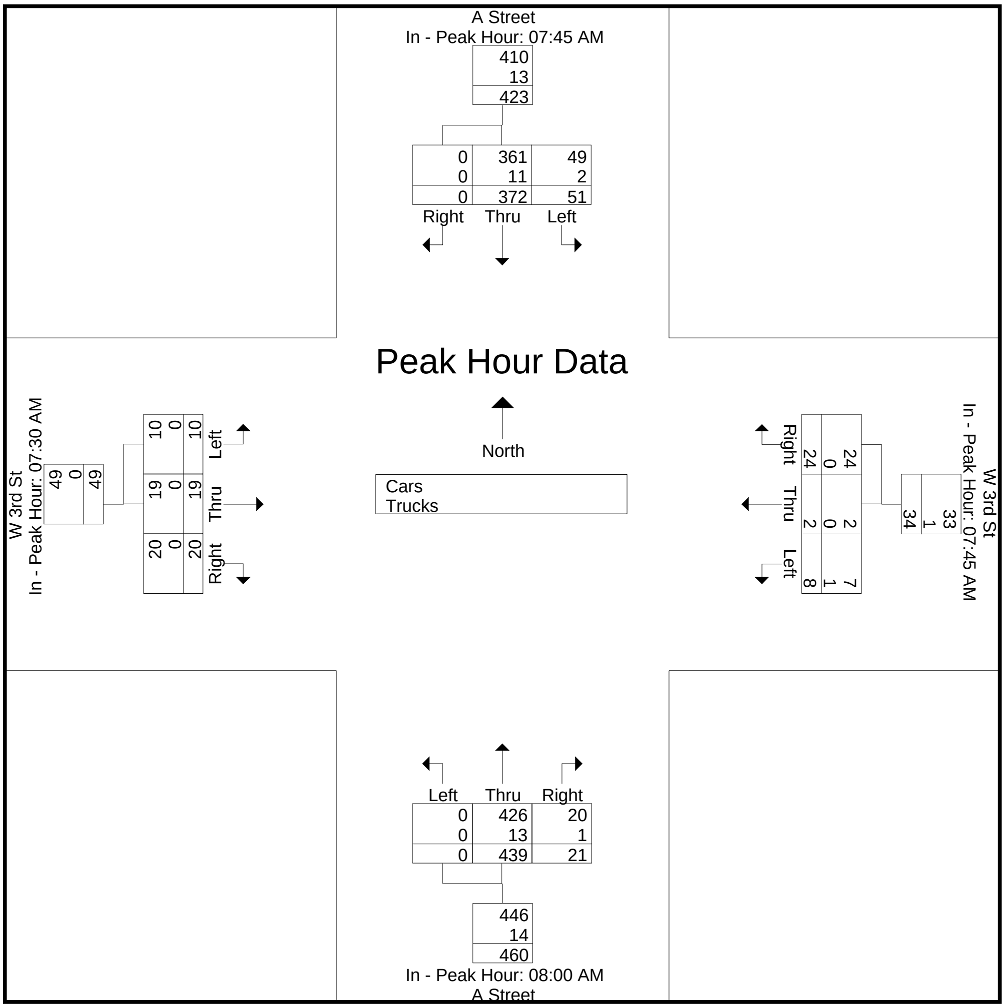
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:45 AM				08:00 AM				07:30 AM			
+0 mins.	10	96	0	106	2	0	**7**	9	0	102	5	107	**3**	5	**8**	**16**
+15 mins.	10	**106**	0	**116**	**4**	0	7	**11**	0	96	**10**	106	1	4	3	8
+30 mins.	11	77	0	88	0	0	5	5	0	**121**	3	**124**	3	**7**	3	13
+45 mins.	**20**	93	0	113	2	**2**	5	9	0	120	3	123	3	3	6	12
Total Volume	51	372	0	423	8	2	24	34	0	439	21	460	10	19	20	49
% App. Total	12.1	87.9	0		23.5	5.9	70.6		0	95.4	4.6		20.4	38.8	40.8	
PHF	.638	.877	.000	.912	.500	.250	.857	.773	.000	.907	.525	.927	.833	.679	.625	.766
Cars	49	361	0	410	7	2	24	33	0	426	20	446	10	19	20	49
% Cars	96.1	97	0	96.9	87.5	100	100	97.1	0	97	95.2	97	100	100	100	100
Trucks	2	11	0	13	1	0	0	1	0	13	1	14	0	0	0	0
% Trucks	3.9	3	0	3.1	12.5	0	0	2.9	0	3	4.8	3	0	0	0	0

Accurate Counts
978-664-2565

N/S Street : A Street
E/W Street : West 3rd Street
City/State : Boston, MA
Weather : Cloudy

File Name : 12117004
Site Code : 12117004
Start Date : 4/25/2013
Page No : 3



Accurate Counts
978-664-2565

N/S Street : A Street
E/W Street : West 3rd Street
City/State : Boston, MA
Weather : Clear

File Name : 12117004
Site Code : 12117004
Start Date : 4/25/2013
Page No : 1

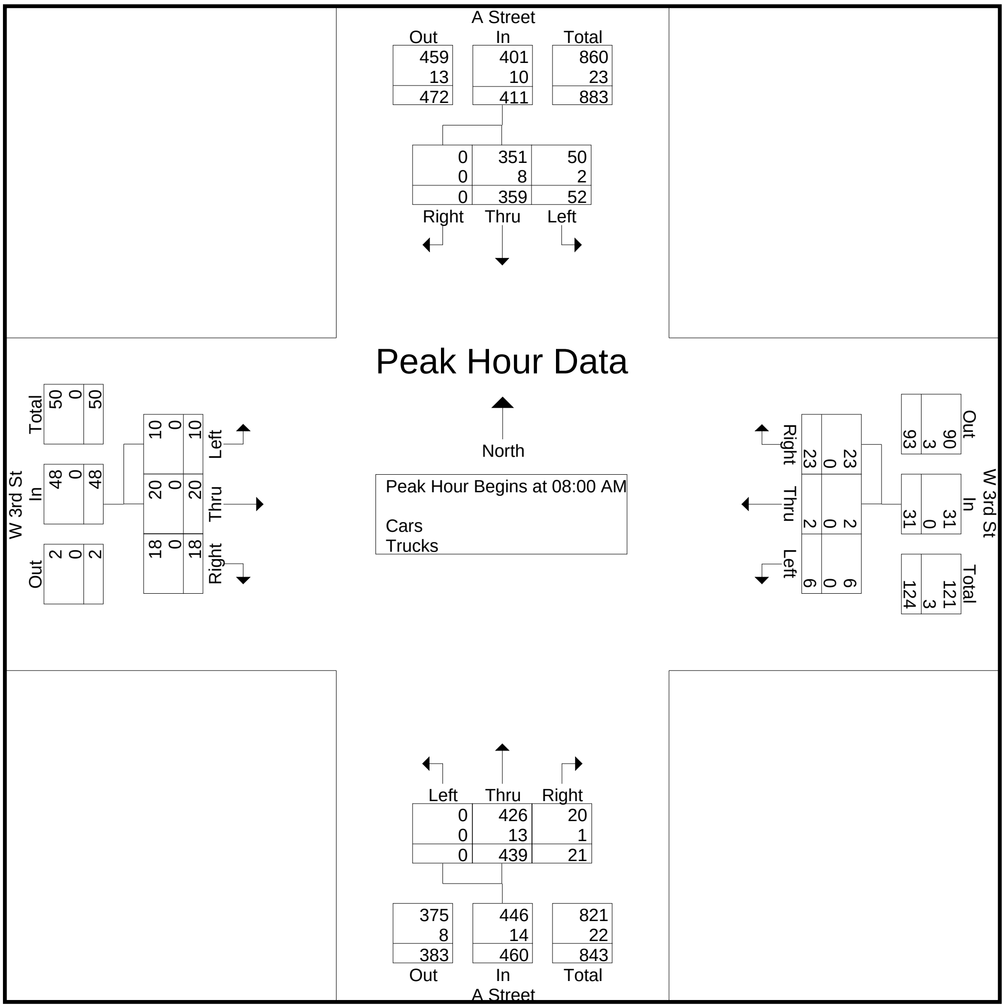
Groups Printed- Cars - Trucks

	A Street From North			W 3rd St From East			A Street From South			W 3rd St From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	32	159	0	1	0	2	0	32	4	0	4	1	235
04:15 PM	11	142	0	2	0	4	0	46	2	1	4	6	218
04:30 PM	15	114	0	1	0	3	0	62	7	1	10	6	219
04:45 PM	15	158	0	1	0	2	0	65	4	0	5	4	254
Total	73	573	0	5	0	11	0	205	17	2	23	17	926
05:00 PM	18	175	0	0	0	4	0	57	4	1	7	5	271
05:15 PM	22	160	0	3	0	3	0	51	7	1	7	2	256
05:30 PM	26	142	0	0	1	1	0	57	7	1	5	3	243
05:45 PM	10	161	0	0	0	3	0	56	5	0	9	4	248
Total	76	638	0	3	1	11	0	221	23	3	28	14	1018
Grand Total	149	1211	0	8	1	22	0	426	40	5	51	31	1944
Apprch %	11	89	0	25.8	3.2	71	0	91.4	8.6	5.7	58.6	35.6	
Total %	7.7	62.3	0	0.4	0.1	1.1	0	21.9	2.1	0.3	2.6	1.6	
Cars	149	1195	0	8	1	22	0	420	39	5	50	31	1920
% Cars	100	98.7	0	100	100	100	0	98.6	97.5	100	98	100	98.8
Trucks	0	16	0	0	0	0	0	6	1	0	1	0	24
% Trucks	0	1.3	0	0	0	0	0	1.4	2.5	0	2	0	1.2

	A Street From North				W 3rd St From East				A Street From South				W 3rd St From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 08:00 AM																	
08:00 AM	10	**106**	0	**116**	**4**	0	**7**	**11**	0	102	5	107	**3**	**7**	3	**13**	247
08:15 AM	11	77	0	88	0	0	5	5	0	96	**10**	106	3	3	**6**	12	211
08:30 AM	**20**	93	0	113	2	**2**	5	9	0	**121**	3	**124**	2	7	3	12	**258**
08:45 AM	11	83	0	94	0	0	6	6	0	120	3	123	2	3	6	11	234
Total Volume	52	359	0	411	6	2	23	31	0	439	21	460	10	20	18	48	950
% App. Total	12.7	87.3	0		19.4	6.5	74.2		0	95.4	4.6		20.8	41.7	37.5		
PHF	.650	.847	.000	.886	.375	.250	.821	.705	.000	.907	.525	.927	.833	.714	.750	.923	.921
Cars	50	351	0	401	6	2	23	31	0	426	20	446	10	20	18	48	926
% Cars	96.2	97.8	0	97.6	100	100	100	100	0	97.0	95.2	97.0	100	100	100	100	97.5
Trucks	2	8	0	10	0	0	0	0	0	13	1	14	0	0	0	0	24
% Trucks	3.8	2.2	0	2.4	0	0	0	0	0	3.0	4.8	3.0	0	0	0	0	2.5

N/S Street : A Street
E/W Street : West 3rd Street
City/State : Boston, MA
Weather : Clear

File Name : 12117004
Site Code : 12117004
Start Date : 4/25/2013



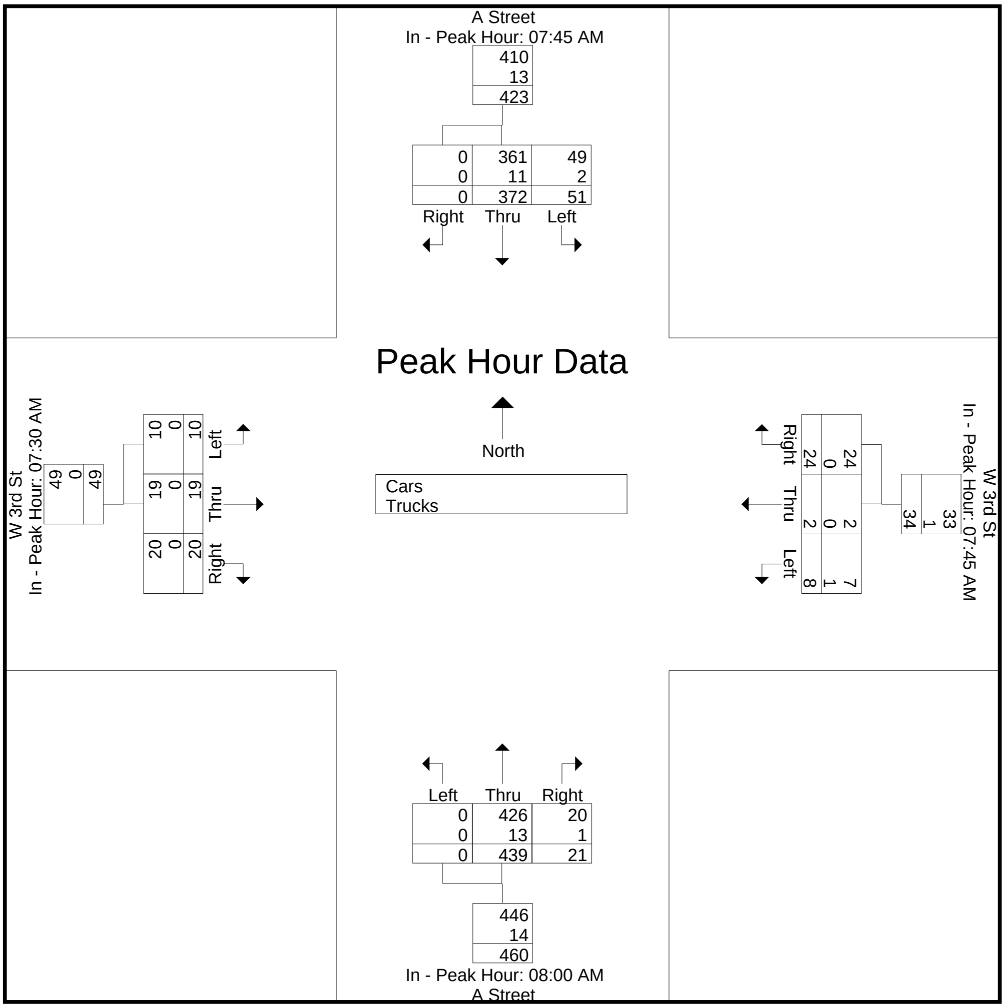
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:45 AM				08:00 AM				07:30 AM			
+0 mins.	10	96	0	106	2	0	**7**	9	0	102	5	107	**3**	5	**8**	**16**
+15 mins.	10	**106**	0	**116**	**4**	0	7	**11**	0	96	**10**	106	1	4	3	8
+30 mins.	11	77	0	88	0	0	5	5	0	**121**	3	**124**	3	**7**	3	13
+45 mins.	**20**	93	0	113	2	**2**	5	9	0	120	3	123	3	3	6	12
Total Volume	51	372	0	423	8	2	24	34	0	439	21	460	10	19	20	49
% App. Total	12.1	87.9	0		23.5	5.9	70.6		0	95.4	4.6		20.4	38.8	40.8	
PHF	.638	.877	.000	.912	.500	.250	.857	.773	.000	.907	.525	.927	.833	.679	.625	.766
Cars	49	361	0	410	7	2	24	33	0	426	20	446	10	19	20	49
% Cars	96.1	97	0	96.9	87.5	100	100	97.1	0	97	95.2	97	100	100	100	100
Trucks	2	11	0	13	1	0	0	1	0	13	1	14	0	0	0	0
% Trucks	3.9	3	0	3.1	12.5	0	0	2.9	0	3	4.8	3	0	0	0	0

Accurate Counts
978-664-2565

N/S Street : A Street
E/W Street : West 3rd Street
City/State : Boston, MA
Weather : Clear

File Name : 12117004
Site Code : 12117004
Start Date : 4/25/2013
Page No : 3



Accurate Counts
978-664-2565

N/S Street : A Street	File Name : 12117005
E/W Street: West Broadway	Site Code : 12117005
City/State : Boston, MA	Start Date : 4/25/2013
Weather : Cloudy	Page No : 1

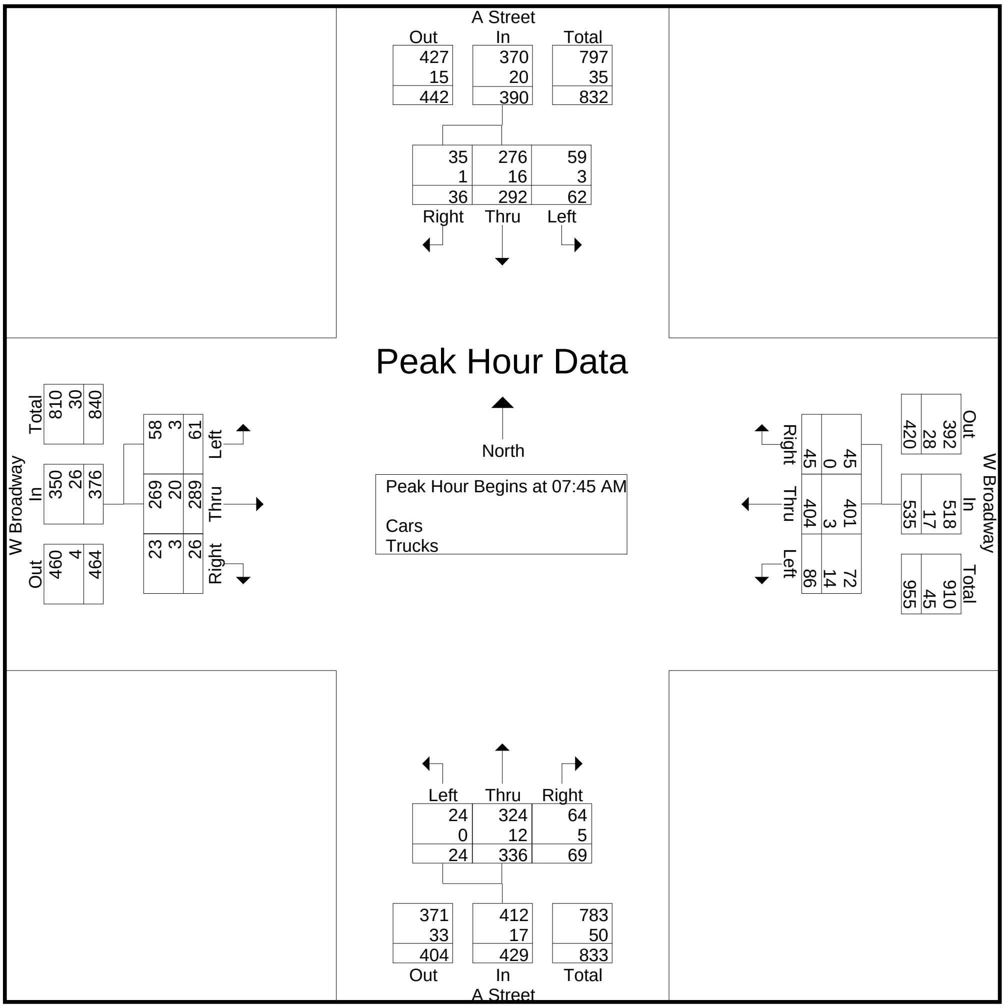
Groups Printed- Cars - Trucks

	A Street From North			**W Broadway From East**			**A Street From South**			**W Broadway From West**			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	16	46	6	16	91	9	5	76	13	9	67	2	356
07:15 AM	10	52	8	16	98	8	2	64	10	6	77	4	355
07:30 AM	12	65	11	19	103	13	9	60	15	4	62	6	379
07:45 AM	20	74	9	21	100	5	5	74	20	20	73	5	426
Total	58	237	34	72	392	35	21	274	58	39	279	17	1516
08:00 AM	21	74	9	17	111	12	5	78	14	10	71	7	429
08:15 AM	9	72	3	23	93	14	8	91	17	12	80	6	428
08:30 AM	12	72	15	25	100	14	6	93	18	19	65	8	447
08:45 AM	13	68	4	21	74	12	6	92	16	18	77	1	402
Total	55	286	31	86	378	52	25	354	65	59	293	22	1706
Grand Total	113	523	65	158	770	87	46	628	123	98	572	39	3222
Apprch %	16.1	74.6	9.3	15.6	75.9	8.6	5.8	78.8	15.4	13.8	80.7	5.5	
Total %	3.5	16.2	2	4.9	23.9	2.7	1.4	19.5	3.8	3	17.8	1.2	
Cars	105	488	62	131	761	85	46	597	107	94	531	35	3042
% Cars	92.9	93.3	95.4	82.9	98.8	97.7	100	95.1	87	95.9	92.8	89.7	94.4
Trucks	8	35	3	27	9	2	0	31	16	4	41	4	180
% Trucks	7.1	6.7	4.6	17.1	1.2	2.3	0	4.9	13	4.1	7.2	10.3	5.6

	A Street From North				**W Broadway From East**				**A Street From South**				**W Broadway From West**				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	20	**74**	9	103	21	100	5	126	5	74	**20**	99	**20**	73	5	**98**	426
08:00 AM	**21**	74	9	**104**	17	**111**	12	**140**	5	78	14	97	10	71	7	88	429
08:15 AM	9	72	3	84	23	93	**14**	130	**8**	91	17	116	12	**80**	6	98	428
08:30 AM	12	72	**15**	99	**25**	100	14	139	6	**93**	18	**117**	19	65	**8**	92	**447**
Total Volume	62	292	36	390	86	404	45	535	24	336	69	429	61	289	26	376	1730
% App. Total	15.9	74.9	9.2		16.1	75.5	8.4		5.6	78.3	16.1		16.2	76.9	6.9		
PHF	.738	.986	.600	.938	.860	.910	.804	.955	.750	.903	.863	.917	.763	.903	.813	.959	.968
Cars	59	276	35	370	72	401	45	518	24	324	64	412	58	269	23	350	1650
% Cars	95.2	94.5	97.2	94.9	83.7	99.3	100	96.8	100	96.4	92.8	96.0	95.1	93.1	88.5	93.1	95.4
Trucks	3	16	1	20	14	3	0	17	0	12	5	17	3	20	3	26	80
% Trucks	4.8	5.5	2.8	5.1	16.3	0.7	0	3.2	0	3.6	7.2	4.0	4.9	6.9	11.5	6.9	4.6

Accurate Counts
978-664-2565

N/S Street : A Street	File Name : 12117005
E/W Street: West Broadway	Site Code : 12117005
City/State : Boston, MA	Start Date : 4/25/2013
Weather : Cloudy	Page No : 2



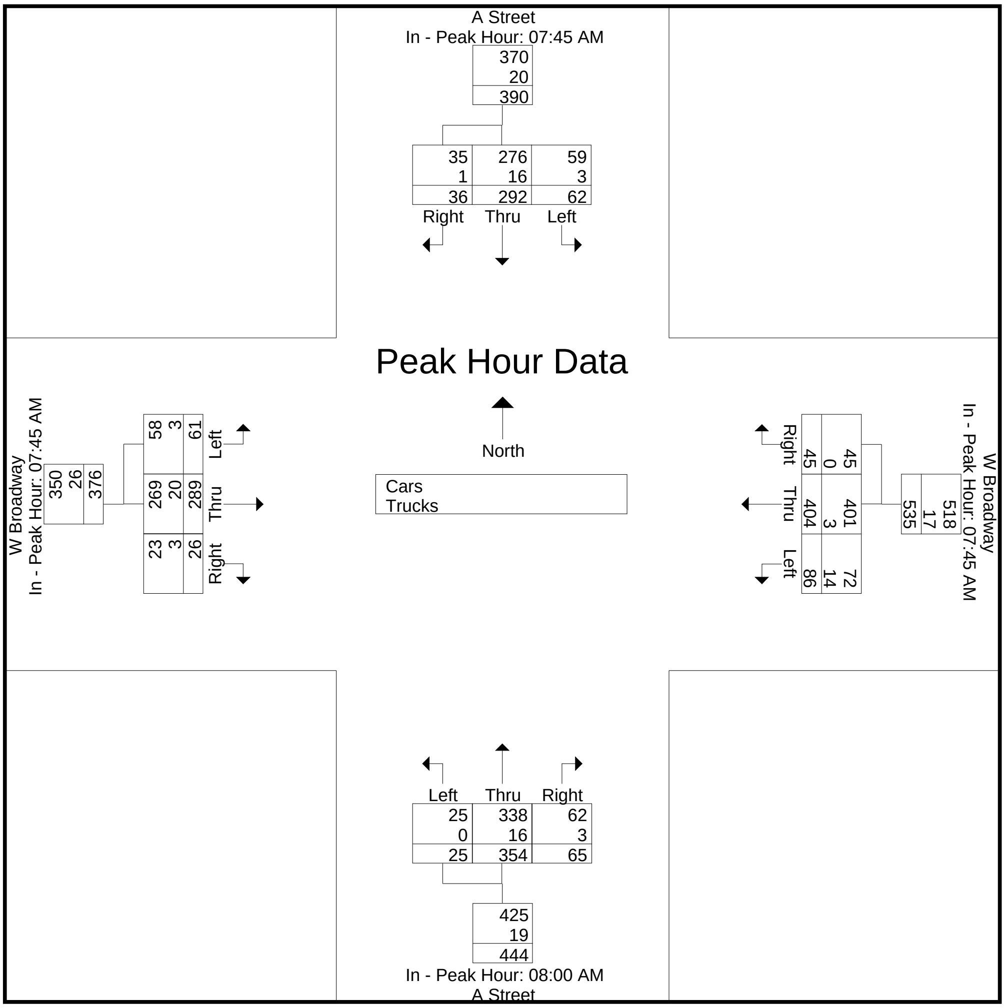
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	07:45 AM				07:45 AM				08:00 AM				07:45 AM			
+0 mins.	20	**74**	9	103	21	100	5	126	5	78	14	97	**20**	73	5	**98**
+15 mins.	**21**	74	9	**104**	17	**111**	12	**140**	**8**	91	17	116	10	71	7	88
+30 mins.	9	72	3	84	23	93	**14**	130	6	**93**	**18**	**117**	12	**80**	6	98
+45 mins.	12	72	**15**	99	**25**	100	14	139	6	92	16	114	19	65	**8**	92
Total Volume	62	292	36	390	86	404	45	535	25	354	65	444	61	289	26	376
% App. Total	15.9	74.9	9.2		16.1	75.5	8.4		5.6	79.7	14.6		16.2	76.9	6.9	
PHF	.738	.986	.600	.938	.860	.910	.804	.955	.781	.952	.903	.949	.763	.903	.813	.959
Cars	59	276	35	370	72	401	45	518	25	338	62	425	58	269	23	350
% Cars	95.2	94.5	97.2	94.9	83.7	99.3	100	96.8	100	95.5	95.4	95.7	95.1	93.1	88.5	93.1
Trucks	3	16	1	20	14	3	0	17	0	16	3	19	3	20	3	26
% Trucks	4.8	5.5	2.8	5.1	16.3	0.7	0	3.2	0	4.5	4.6	4.3	4.9	6.9	11.5	6.9

Accurate Counts
978-664-2565

N/S Street : A Street
E/W Street: West Broadway
City/State : Boston, MA
Weather : Cloudy

File Name : 12117005
Site Code : 12117005
Start Date : 4/25/2013
Page No : 3



Accurate Counts
978-664-2565

N/S Street : A Street
E/W Street: West Broadway
City/State : Boston, MA
Weather : Clear

File Name : 12117005
Site Code : 12117005
Start Date : 4/25/2013
Page No : 1

Groups Printed- Cars - Trucks

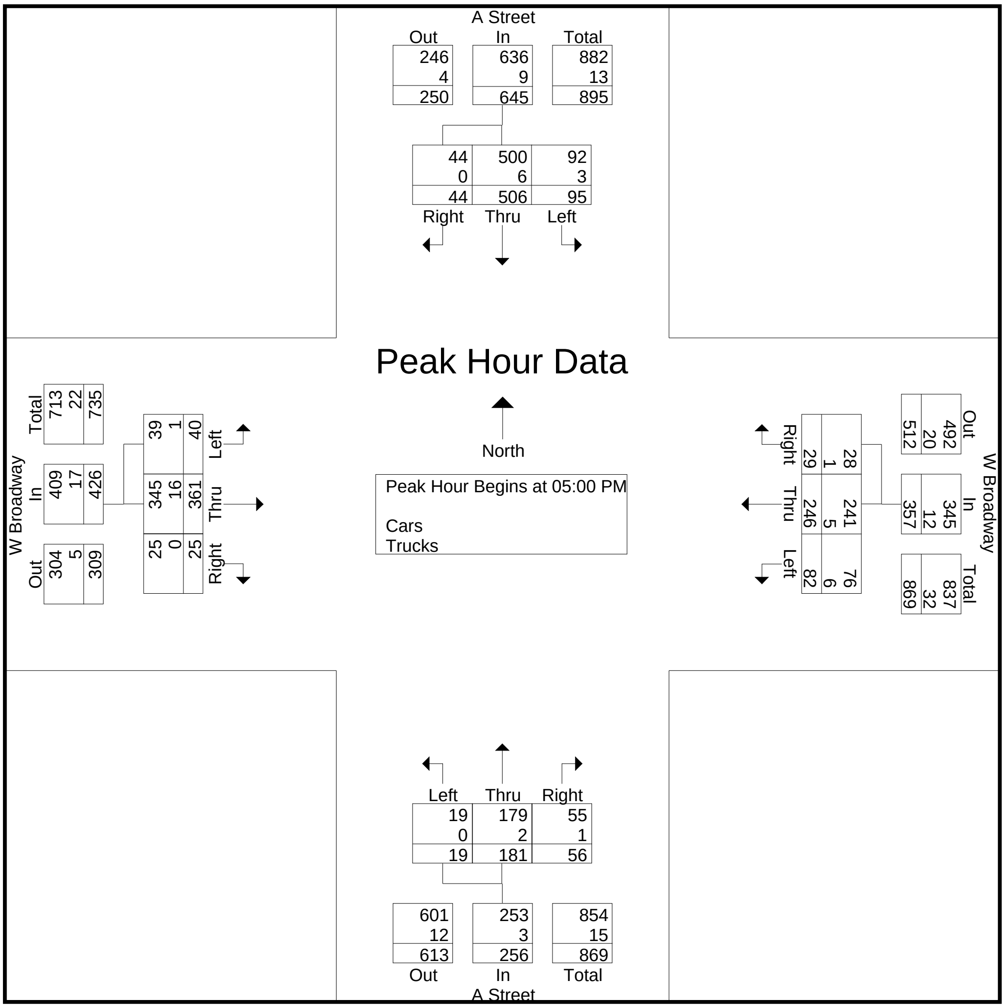
	A Street From North			W Broadway From East			A Street From South			W Broadway From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	41	111	13	8	50	5	7	20	14	6	77	6	358
04:15 PM	22	106	8	8	44	8	2	33	11	12	71	2	327
04:30 PM	27	103	12	10	64	11	5	45	16	8	81	2	384
04:45 PM	22	121	7	13	46	14	7	54	18	4	74	3	383
Total	112	441	40	39	204	38	21	152	59	30	303	13	1452
05:00 PM	30	135	8	22	68	10	4	47	19	8	88	11	450
05:15 PM	17	130	15	17	67	4	7	52	11	13	86	3	422
05:30 PM	23	116	10	21	51	4	5	34	14	15	94	4	391
05:45 PM	25	125	11	22	60	11	3	48	12	4	93	7	421
Total	95	506	44	82	246	29	19	181	56	40	361	25	1684
Grand Total	207	947	84	121	450	67	40	333	115	70	664	38	3136
Apprch %	16.7	76.5	6.8	19	70.5	10.5	8.2	68.2	23.6	9.1	86	4.9	
Total %	6.6	30.2	2.7	3.9	14.3	2.1	1.3	10.6	3.7	2.2	21.2	1.2	
Cars	204	925	84	108	443	65	39	326	112	67	632	38	3043
% Cars	98.6	97.7	100	89.3	98.4	97	97.5	97.9	97.4	95.7	95.2	100	97
Trucks	3	22	0	13	7	2	1	7	3	3	32	0	93
% Trucks	1.4	2.3	0	10.7	1.6	3	2.5	2.1	2.6	4.3	4.8	0	3

	A Street From North				W Broadway From East				A Street From South				W Broadway From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**30**	**135**	8	**173**	**22**	**68**	10	**100**	4	47	**19**	**70**	8	88	**11**	107	**450**
05:15 PM	17	130	**15**	162	17	67	4	88	**7**	**52**	11	70	13	86	3	102	422
05:30 PM	23	116	10	149	21	51	4	76	5	34	14	53	**15**	**94**	4	**113**	391
05:45 PM	25	125	11	161	22	60	**11**	93	3	48	12	63	4	93	7	104	421
Total Volume	95	506	44	645	82	246	29	357	19	181	56	256	40	361	25	426	1684
% App. Total	14.7	78.4	6.8		23	68.9	8.1		7.4	70.7	21.9		9.4	84.7	5.9		
PHF	.792	.937	.733	.932	.932	.904	.659	.893	.679	.870	.737	.914	.667	.960	.568	.942	.936
Cars	92	500	44	636	76	241	28	345	19	179	55	253	39	345	25	409	1643
% Cars	96.8	98.8	100	98.6	92.7	98.0	96.6	96.6	100	98.9	98.2	98.8	97.5	95.6	100	96.0	97.6
Trucks	3	6	0	9	6	5	1	12	0	2	1	3	1	16	0	17	41
% Trucks	3.2	1.2	0	1.4	7.3	2.0	3.4	3.4	0	1.1	1.8	1.2	2.5	4.4	0	4.0	2.4

Accurate Counts
978-664-2565

N/S Street : A Street
E/W Street: West Broadway
City/State : Boston, MA
Weather : Clear

File Name : 12117005
Site Code : 12117005
Start Date : 4/25/2013
Page No : 2



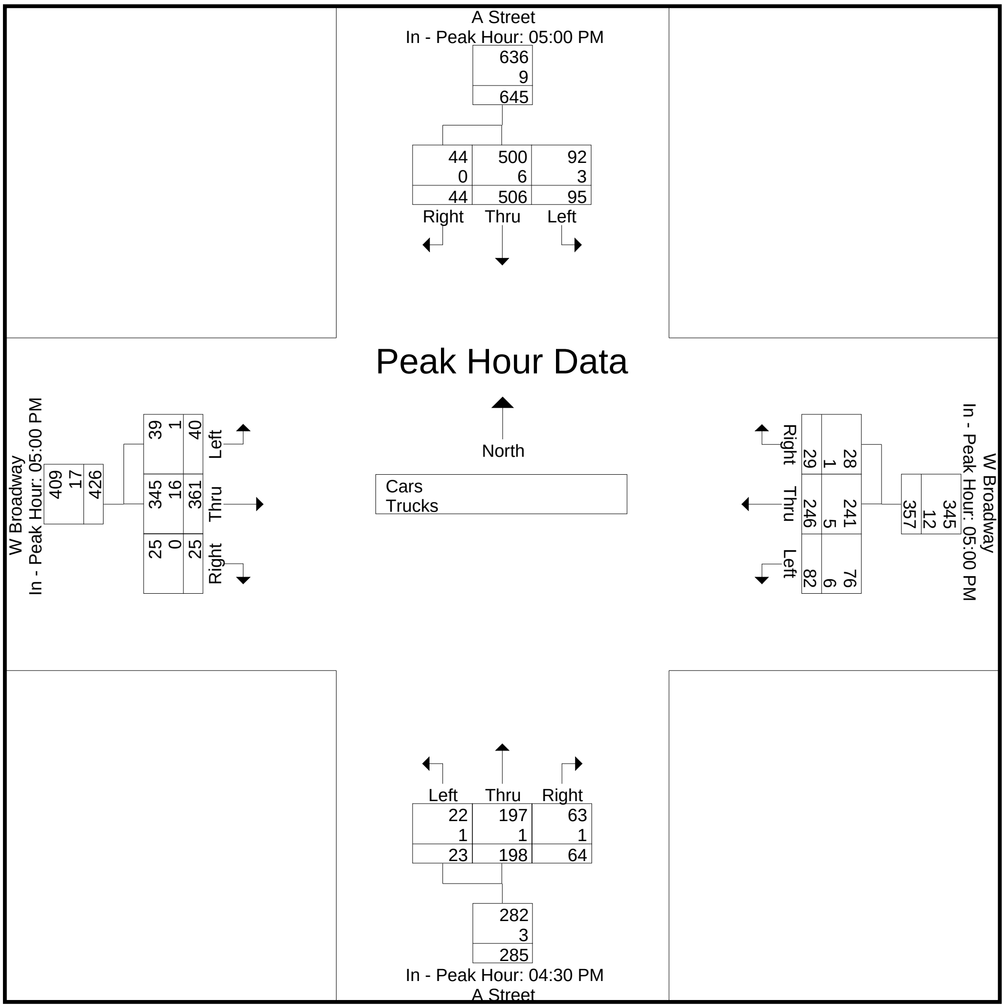
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1
Peak Hour for Each Approach Begins at:

	05:00 PM				05:00 PM				04:30 PM				05:00 PM			
+0 mins.	**30**	**135**	8	**173**	**22**	**68**	10	**100**	5	45	16	66	8	88	**11**	107
+15 mins.	17	130	**15**	162	17	67	4	88	**7**	**54**	18	**79**	13	86	3	102
+30 mins.	23	116	10	149	21	51	4	76	4	47	**19**	70	**15**	**94**	4	**113**
+45 mins.	25	125	11	161	22	60	**11**	93	7	52	11	70	4	93	7	104
Total Volume	95	506	44	645	82	246	29	357	23	198	64	285	40	361	25	426
% App. Total	14.7	78.4	6.8		23	68.9	8.1		8.1	69.5	22.5		9.4	84.7	5.9	
PHF	.792	.937	.733	.932	.932	.904	.659	.893	.821	.917	.842	.902	.667	.960	.568	.942
Cars	92	500	44	636	76	241	28	345	22	197	63	282	39	345	25	409
% Cars	96.8	98.8	100	98.6	92.7	98	96.6	96.6	95.7	99.5	98.4	98.9	97.5	95.6	100	96
Trucks	3	6	0	9	6	5	1	12	1	1	1	3	1	16	0	17
% Trucks	3.2	1.2	0	1.4	7.3	2	3.4	3.4	4.3	0.5	1.6	1.1	2.5	4.4	0	4

Accurate Counts
978-664-2565

N/S Street : A Street
E/W Street: West Broadway
City/State : Boston, MA
Weather : Clear

File Name : 12117005
Site Code : 12117005
Start Date : 4/25/2013
Page No : 3



TRIP GENERATION CALCULATIONS

South Boston Hotel

Trip Generation Assessment

HOWARD/STEIN-HUDSON ASSOCIATES

25-Apr-13

	Private	Taxi
Vehicle Trip Rates - Hotel	0.75	0.25
Vehicle Trip Rates - Restaurant	1	0

				VEHICULAR TRIP GENERATION					CONVERSION TO PERSON TRIPS		MODE SHARE SPLIT - BY PERSON TRIPS					
Land Use	Size	Category	Trip Rates (Trips/ksf or unit)	Unadjusted Vehicle Trips	Internal trips	Pass-by %	Pass-by Trips	Net Vehicle Trips	Assumed national vehicle occupancy rate[1]	Converted to Person trips	Transit Share[2]	Transit Trips	Walk/Bike/ Other Share[2]	Walk/ Bike/ Other Trips	Vehicle Share[2]	Total Vehicle Person Trips
Daily Peak Hour																
Hotel[6]	156	Total		1,274	0	0%	0	1,274	2.2	2,803	15%	420	24%	672	61%	1,710
	rooms	In		637	0	0%	0	637	2.2	1,401	15%	210	24%	336	61%	855
		Out		637	0	0%	0	637	2.2	1,401	15%	210	24%	336	61%	855
Restaurant/Retail[7]	6.2	Total		790	0	0%	0	790	1.8	1,406	15%	210	24%	338	61%	858
	KSF	In		395	0	0%	0	395	1.8	703	15%	105	24%	169	61%	429
		Out		395	0	0%	0	395	1.8	703	15%	105	24%	169	61%	429
Total		Total		2,064						4,209		630		1,010		2,568
		In		1,032						2,105		315		505		1,284
		Out		1,032						2,105		315		505		1,284
AM Peak Hour																
Hotel[6]	156	Total		83	0	0%	0	83	2.2	183		34		44		104
	rooms	In		49	0	0%	0	49	2.2	108	15%	16	20%	22	65%	70
		Out		34	0	0%	0	34	2.2	75	24%	18	30%	22	45%	34
Restaurant/Retail[7]	6.2	Total		67	0	0%	0	67	1.8	119		23		29		67
	KSF	In		37	0	0%	0	37	1.8	66	15%	10	20%	13	65%	43
		Out		30	0	0%	0	30	1.8	53	24%	13	30%	16	45%	24
Total		Total		150						302		57		73		171
		In		86						174		26		35		113
		Out		64						128		31		38		58
PM Peak Hour																
Hotel[6]	156	Total		94	0	0%	0	94	2.2	207		40		52		114
	rooms	In		48	0	0%	0	48	2.2	106	24%	25	30%	32	45%	48
		Out		46	0	0%	0	46	2.2	101	15%	15	20%	20	65%	66
Restaurant/Retail[7]	6.2	Total		61	0	0%	0	61	1.8	109		22		29		58
	KSF	In		37	0	0%	0	37	1.8	66	24%	16	30%	20	45%	30
		Out		24	0	0%	0	24	1.8	43	15%	6	20%	9	65%	28
Total		Total		155						315		62		81		172
		In		85						171		41		52		78
		Out		70						144		21		29		94
Summary																
Net Trips Total																
Net Trips In																
Net Trips Out																

			VEHICLE TRIP METHODOLOGY 1[8]							VEHICLE TRIP METHODOLOGY 2[9]				
Land Use	Size	Category	Total Vehicle Person Trips - Personal Vehicle[3]	Vehicle Person Trips - Taxi[3]	Assumed local auto occupancy rate for autos[4]	Assumed local auto occupancy rate for taxis[5]	Total Adjusted Presonal Vehicle Trips	Total Adjusted Taxi Trips	Total Automobile Trips	Assumed local auto occupancy rate for autos[4]	Total Adjusted Vehicle Trips	Total Adjusted Personal Vehicle Trips	Total Adjusted Taxi Trips	Total Automobile Trips
Daily Peak Hour														
Hotel[6]	156	Total	1,282	428	2.2	1.2	582	356	938	2.2	778	584	194	778
	rooms	In	641	214	2.2	1.2	291	178	469	2.2	389	292	97	389
		Out	641	214	2.2	1.2	291	178	469	2.2	389	292	97	389
Restaurant/Retail[7]	6.2	Total	858	0	1.8	1.0	482	0	482	1.8	482	482	0	482
	KSF	In	429	0	1.8	1.0	241	0	241	1.8	241	241	0	241
		Out	429	0	1.8	1.0	241	0	241	1.8	241	241	0	241
Total		Total	2,140	428			1,064	356	1,420		1,260	1,066	194	1,260
		In	1,070	214			532	178	710		630	533	97	630
		Out	1,070	214			532	178	710		630	533	97	630
AM Peak Hour														
Hotel[6]	156	Total	79	25	2.2	1.2	36	21	57	2.2	47	35	12	47
	rooms	In	53	17	2.2	1.2	24	14	38	2.2	32	24	8	32
		Out	26	8	2.2	1.2	12	7	19	2.2	15	11	4	15
Restaurant/Retail[7]	6.2	Total	67	0	1.8	1.0	37	0	37	1.8	37	37	0	37
	KSF	In	43	0	1.8	1.0	24	0	24	1.8	24	24	0	24
		Out	24	0	1.8	1.0	13	0	13	1.8	13	13	0	13
Total		Total	146	25			73	21	94		84	72	12	84
		In	96	17			48	14	62		56	48	8	56
		Out	50	8			25	7	32		28	24	4	28
PM Peak Hour														
Hotel[6]	156	Total	86	28	2.2	1.2	39	23	62	2.2	52	40	12	52
	rooms	In	36	12	2.2	1.2	16	10	26	2.2	22	17	5	22
		Out	50	16	2.2	1.2	23	13	36	2.2	30	23	7	30
Restaurant/Retail[7]	6.2	Total	58	0	1.8	1.0	33	0	33	1.8	33	33	0	33
	KSF	In	30	0	1.8	1.0	17	0	17	1.8	17	17	0	17
		Out	28	0	1.8	1.0	16	0	16	1.8	16	16	0	16
Total		Total	144	28			72	23	95		85	73	12	85
		In	66	12			33	10	43		39	34	5	39
		Out	78	16			39	13	52		46	39	7	46
Summary														
Net Trips Total														
Net Trips In														
Net Trips Out														

1. 2009 National vehicle occupancy rates - 1.13:home to work; 1.84: family/personal business; 1.78: shopping; 2.2 social/recreational (Summary of Travel Trends: 2009 National Household Travel Survey; FHWA; June 2011)
2. Mode shares based on peak-hour BTD Data for Area 8 (BTD Blue Book)
3. Vehicle Trips = 75% Private Auto and 25% Taxi. Taxi trip rate based on CTPS Taxi activity rates for Hotel lane use, as adopted by Central Artery/Tunnel Project.
4. Local vehicle occupancy rates based on 2009 National vehicle occupancy rates.
5. Taxi occupancy was assumed to be the maximum of one fewer passenger than vehicle occupancy rate (taxi driver is not included) or 1.0.
6. ITE Trip Generation Rate, 9th Edition, LUC 310 (Hotel), Average rates
7. ITE Trip Generation, 9th Edition, LUC 932 (High-Turnover Sit Down Restaurant), Average Rates
8. Methodology 1 assigns person trips to private vehicles and cabs and then converts to vehicle trips.
9. Methodology 2 assigns vehicle trips to private vehicles and cabs.

INTERSECTION CAPACITY ANALYSIS WORKSHEETS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	147	279	223	57	346	14	517	143	23	17	76	167	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	11	14	12	11	16	16	11	12	12	12	12	16	
Storage Length (ft)	120		0	85		0	90		0	25		0	
Storage Lanes	1		1	1		0	1		0	1		1	
Taper Length (ft)	25			25			25			25			
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		657			559			538			245		
Travel Time (s)		14.9			12.7			12.2			5.6		
Confl. Peds. (#/hr)	8		30	30		8	62		27	27		62	
Confl. Bikes (#/hr)			6						3			3	
Peak Hour Factor	0.87	0.82	0.86	0.62	0.95	0.70	0.93	0.89	0.58	0.71	0.76	0.87	
Heavy Vehicles (%)	5%	8%	2%	4%	1%	0%	1%	21%	9%	24%	16%	14%	
Parking (#/hr)						0							
Adj. Flow (vph)	169	340	259	92	364	20	556	161	40	24	100	192	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	169	340	259	92	384	0	556	201	0	24	100	192	
Turn Type	Perm	NA	pt+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm	
Protected Phases		5	5 6		5		6	1 6			1		2
Permitted Phases	5			5			1 6			1		1	
Detector Phase	5	5	5 6	5	5		6	1 6		1	1	1	
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		6.0			8.0	8.0	8.0	4.0
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0			23.0	23.0	23.0	23.0
Total Split (s)	29.0	29.0		29.0	29.0		15.0			23.0	23.0	23.0	23.0
Total Split (%)	32.2%	32.2%		32.2%	32.2%		16.7%			25.6%	25.6%	25.6%	26%
Maximum Green (s)	25.0	25.0		25.0	25.0		11.0			19.0	19.0	19.0	20.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0			3.0	3.0	3.0	2.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0			1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0			0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0			4.0	4.0	4.0	
Lead/Lag	Lead	Lead		Lead	Lead		Lag			Lead	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0			2.0	2.0	2.0	3.0
Recall Mode	None	None		None	None		Max			C-Min	C-Min	C-Min	None
Walk Time (s)										8.0	8.0	8.0	8.0
Flash Dont Walk (s)										11.0	11.0	11.0	12.0
Pedestrian Calls (#/hr)										30	30	30	30
v/c Ratio	0.57	0.42	0.25	0.28	0.42		1.45	0.39		0.33	0.38	0.51	
Control Delay	37.5	25.2	2.7	15.9	14.7		244.2	22.7		43.8	36.1	9.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0	
Total Delay	37.5	25.2	2.7	15.9	14.7		244.2	22.7		43.8	36.1	9.9	
Queue Length 50th (ft)	92	170	0	44	194		~388	73		11	48	0	
Queue Length 95th (ft)	#201	233	35	39	231		#602	128		27	77	49	
Internal Link Dist (ft)		577			479			458			165		
Turn Bay Length (ft)	120			85			90			25			
Base Capacity (vph)	295	804	1047	324	906		383	586		94	345	433	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0	
Reduced v/c Ratio	0.57	0.42	0.25	0.28	0.42		1.45	0.34		0.26	0.29	0.44	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 38 (42%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Dorchester Ave. & West Broadway

ø1 (R)	ø2	ø5	ø6
23 s	23 s	29 s	15 s

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	147	279	223	57	346	14	517	143	23	17	76	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	11	16	16	11	12	12	12	12	16
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.98		1.00	1.00	0.83
Flpb, ped/bikes	1.00	1.00	1.00	0.98	1.00		0.92	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1654	1877	1583	1645	2113		1586	1527		1410	1638	1332
Flt Permitted	0.40	1.00	1.00	0.44	1.00		0.67	1.00		0.30	1.00	1.00
Satd. Flow (perm)	691	1877	1583	764	2113		1112	1527		443	1638	1332
Peak-hour factor, PHF	0.87	0.82	0.86	0.62	0.95	0.70	0.93	0.89	0.58	0.71	0.76	0.87
Adj. Flow (vph)	169	340	259	92	364	20	556	161	40	24	100	192
RTOR Reduction (vph)	0	0	105	0	2	0	0	11	0	0	0	163
Lane Group Flow (vph)	169	340	154	92	382	0	556	190	0	24	100	29
Confl. Peds. (#/hr)	8		30	30		8	62		27	27		62
Confl. Bikes (#/hr)			6						3			3
Heavy Vehicles (%)	5%	8%	2%	4%	1%	0%	1%	21%	9%	24%	16%	14%
Parking (#/hr)						0						
Turn Type	Perm	NA	pt+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		5	5 6		5		6	1 6			1	
Permitted Phases	5			5			1 6			1		1
Actuated Green, G (s)	38.6	38.6	53.6	38.6	38.6		24.4	28.4		13.4	13.4	13.4
Effective Green, g (s)	38.6	38.6	53.6	38.6	38.6		24.4	28.4		13.4	13.4	13.4
Actuated g/C Ratio	0.43	0.43	0.60	0.43	0.43		0.27	0.32		0.15	0.15	0.15
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0			4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0			2.0	2.0	2.0
Lane Grp Cap (vph)	296	805	942	327	906		359	481		65	243	198
v/s Ratio Prot		0.18	0.10		0.18		c0.19	0.12			0.06	
v/s Ratio Perm	c0.24			0.12			c0.23			0.05		0.02
v/c Ratio	0.57	0.42	0.16	0.28	0.42		1.55	0.40		0.37	0.41	0.14
Uniform Delay, d1	19.4	17.9	8.2	16.7	17.9		31.8	24.1		34.5	34.7	33.3
Progression Factor	1.00	1.00	1.00	0.56	0.58		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.7	0.4	0.1	0.4	0.3		260.4	2.4		15.4	5.1	1.5
Delay (s)	22.1	18.3	8.2	9.8	10.7		292.2	26.5		49.9	39.8	34.8
Level of Service	C	B	A	A	B		F	C		D	D	C
Approach Delay (s)		15.7			10.5			221.6			37.6	
Approach LOS		B			B			F			D	

Intersection Summary			
HCM 2000 Control Delay	84.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	0	8	117	147	45	15	368	0	0	269	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	13	16	16	16	16	16	16	16	16
Storage Length (ft)	0		0	40		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		266			366			103			244	
Travel Time (s)		6.0			8.3			2.3			5.5	
Confl. Peds. (#/hr)	16		12	12		16	23		51	51		23
Confl. Bikes (#/hr)			1			1						
Peak Hour Factor	0.70	0.92	0.40	0.65	0.74	0.80	0.54	0.92	0.89	0.92	0.87	0.70
Heavy Vehicles (%)	6%	0%	13%	5%	3%	2%	0%	2%	0%	0%	3%	11%
Adj. Flow (vph)	44	0	20	180	199	56	28	400	0	0	309	80
Shared Lane Traffic (%)												
Lane Group Flow (vph)	44	0	20	180	255	0	0	428	0	0	389	0
Turn Type	D.Pm		custom	Perm	NA		Perm	NA			NA	
Protected Phases					2			1			1	
Permitted Phases	2		2	2			1					
Detector Phase	2		2	2	2		1	1			1	
Switch Phase												
Minimum Initial (s)	8.0		8.0	8.0	8.0		8.0	8.0			8.0	
Minimum Split (s)	12.0		12.0	12.0	12.0		12.0	12.0			12.0	
Total Split (s)	27.0		27.0	27.0	27.0		63.0	63.0			63.0	
Total Split (%)	30.0%		30.0%	30.0%	30.0%		70.0%	70.0%			70.0%	
Maximum Green (s)	23.0		23.0	23.0	23.0		59.0	59.0			59.0	
Yellow Time (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0	1.0			1.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0			0.0			0.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lag		Lag	Lag	Lag		Lead	Lead			Lead	
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes			Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
Recall Mode	Max		Max	Max	Max		C-Max	C-Max			C-Max	
v/c Ratio	0.21		0.05	0.41	0.49			0.32			0.30	
Control Delay	29.7		11.4	31.2	30.5			7.6			6.8	
Queue Delay	0.0		0.0	0.0	0.0			0.0			0.0	
Total Delay	29.7		11.4	31.2	30.5			7.6			6.8	
Queue Length 50th (ft)	20		0	85	116			94			76	
Queue Length 95th (ft)	37		3	100	148			141			113	
Internal Link Dist (ft)		186			286			23			164	
Turn Bay Length (ft)				40								
Base Capacity (vph)	206		398	443	523			1333			1311	
Starvation Cap Reductn	0		0	0	0			0			0	
Spillback Cap Reductn	0		0	0	0			0			0	
Storage Cap Reductn	0		0	0	0			0			0	
Reduced v/c Ratio	0.21		0.05	0.41	0.49			0.32			0.30	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 33 (37%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated

Splits and Phases: 4: A Street & West 2nd Street

ø1 (R) 63 s
ø2 27 s

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	31	0	8	117	147	45	15	368	0	0	269	56
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	15	15	15	13	16	16	16	16	16	16	16	16
Total Lost time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00		1.00	1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00		0.96	1.00	0.99			1.00			0.99	
Flpb, ped/bikes	0.98		1.00	0.98	1.00			1.00			1.00	
Frt	1.00		0.85	1.00	0.97			1.00			0.97	
Flt Protected	0.95		1.00	0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1838		1502	1735	2003			2106			1985	
Flt Permitted	0.42		1.00	0.95	1.00			0.96			1.00	
Satd. Flow (perm)	806		1502	1735	2003			2035			1985	
Peak-hour factor, PHF	0.70	0.92	0.40	0.65	0.74	0.80	0.54	0.92	0.89	0.92	0.87	0.70
Adj. Flow (vph)	44	0	20	180	199	56	28	400	0	0	309	80
RTOR Reduction (vph)	0	0	15	0	11	0	0	0	0	0	10	0
Lane Group Flow (vph)	44	0	5	180	244	0	0	428	0	0	379	0
Confl. Peds. (#/hr)	16		12	12		16	23		51	51		23
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	6%	0%	13%	5%	3%	2%	0%	2%	0%	0%	3%	11%
Turn Type	D.Pm		custom	Perm	NA		Perm	NA			NA	
Protected Phases					2			1			1	
Permitted Phases	2		2	2			1					
Actuated Green, G (s)	23.0		23.0	23.0	23.0			59.0			59.0	
Effective Green, g (s)	23.0		23.0	23.0	23.0			59.0			59.0	
Actuated g/C Ratio	0.26		0.26	0.26	0.26			0.66			0.66	
Clearance Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	205		383	443	511			1334			1301	
v/s Ratio Prot					c0.12						0.19	
v/s Ratio Perm	0.05		0.00	0.10				c0.21				
v/c Ratio	0.21		0.01	0.41	0.48			0.32			0.29	
Uniform Delay, d1	26.4		25.0	27.8	28.4			6.8			6.6	
Progression Factor	1.00		1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	2.4		0.1	2.8	3.2			0.6			0.6	
Delay (s)	28.8		25.1	30.6	31.6			7.4			7.2	
Level of Service	C		C	C	C			A			A	
Approach Delay (s)		27.6			31.2			7.4			7.2	
Approach LOS		C			C			A			A	

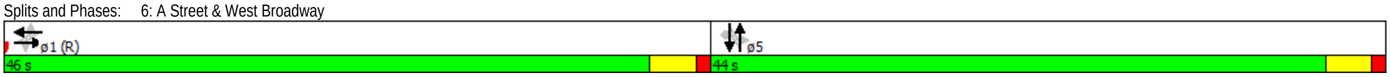
Intersection Summary			
HCM 2000 Control Delay	16.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	283	22	73	412	38	21	276	59	63	265	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	16	16	12	12	11
Storage Length (ft)	0		0	0		0	0		0	0		150
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		559			564			287			196	
Travel Time (s)		12.7			12.8			6.5			4.5	
Confl. Peds. (#/hr)	79		24	24		79	67		54	54		67
Peak Hour Factor	0.50	0.92	0.79	0.87	0.93	0.73	0.58	0.88	0.74	0.75	0.90	0.84
Heavy Vehicles (%)	3%	7%	5%	19%	1%	0%	0%	4%	17%	10%	8%	5%
Parking (#/hr)			0			0						
Adj. Flow (vph)	80	308	28	84	443	52	36	314	80	84	294	44
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	416	0	0	579	0	0	430	0	0	378	44
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1			1			5			5	
Permitted Phases	1			1			5			5		5
Detector Phase	1	1		1	1		5	5		5	5	5
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	16.0	16.0		16.0	16.0		18.0	18.0		18.0	18.0	18.0
Total Split (s)	46.0	46.0		46.0	46.0		44.0	44.0		44.0	44.0	44.0
Total Split (%)	51.1%	51.1%		51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	48.9%
Maximum Green (s)	42.0	42.0		42.0	42.0		40.0	40.0		40.0	40.0	40.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		4.0			4.0			4.0			4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	None
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	5.0	5.0		5.0	5.0		7.0	7.0		7.0	7.0	7.0
Pedestrian Calls (#/hr)	100	100		100	100		100	100		100	100	100
v/c Ratio		0.43			0.56			0.79			0.93	0.11
Control Delay		28.8			16.2			36.3			58.9	5.7
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay		28.8			16.2			36.3			58.9	5.7
Queue Length 50th (ft)		219			190			209			204	0
Queue Length 95th (ft)		m315			369			261			280	17
Internal Link Dist (ft)		479			484			207			116	
Turn Bay Length (ft)												150
Base Capacity (vph)		961			1027			730			547	532
Starvation Cap Reductn		0			0			0			0	0
Spillback Cap Reductn		0			0			0			0	0
Storage Cap Reductn		0			0			0			0	0
Reduced v/c Ratio		0.43			0.56			0.59			0.69	0.08

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 57 (63%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: A Street & West Broadway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	283	22	73	412	38	21	276	59	63	265	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	16	16	16	12	12	11
Total Lost time (s)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.99			0.97			0.96			1.00	0.77
Flpb, ped/bikes		0.99			1.00			0.99			1.00	1.00
Frt		0.99			0.99			0.97			1.00	0.85
Flt Protected		0.99			0.99			1.00			0.99	1.00
Satd. Flow (prot)		1950			1973			1889			1733	1143
Flt Permitted		0.83			0.89			0.86			0.71	1.00
Satd. Flow (perm)		1627			1760			1627			1246	1143
Peak-hour factor, PHF	0.50	0.92	0.79	0.87	0.93	0.73	0.58	0.88	0.74	0.75	0.90	0.84
Adj. Flow (vph)	80	308	28	84	443	52	36	314	80	84	294	44
RTOR Reduction (vph)	0	2	0	0	3	0	0	11	0	0	0	30
Lane Group Flow (vph)	0	414	0	0	576	0	0	419	0	0	378	14
Confl. Peds. (#/hr)	79		24	24		79	67		54	54		67
Heavy Vehicles (%)	3%	7%	5%	19%	1%	0%	0%	4%	17%	10%	8%	5%
Parking (#/hr)			0			0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1			1			5			5	
Permitted Phases	1			1			5			5		5
Actuated Green, G (s)		52.4			52.4			29.6			29.6	29.6
Effective Green, g (s)		52.4			52.4			29.6			29.6	29.6
Actuated g/C Ratio		0.58			0.58			0.33			0.33	0.33
Clearance Time (s)		4.0			4.0			4.0			4.0	4.0
Vehicle Extension (s)		2.0			2.0			2.0			2.0	2.0
Lane Grp Cap (vph)		947			1024			535			409	375
v/s Ratio Prot												
v/s Ratio Perm		0.25			c0.33			0.26			c0.30	0.01
v/c Ratio		0.44			0.56			0.78			0.92	0.04
Uniform Delay, d1		10.5			11.7			27.3			29.1	20.5
Progression Factor		2.20			1.00			1.00			1.00	1.00
Incremental Delay, d2		1.3			2.2			6.8			26.0	0.0
Delay (s)		24.5			13.9			34.1			55.2	20.5
Level of Service		C			B			C			E	C
Approach Delay (s)		24.5			13.9			34.1			51.6	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM 2000 Control Delay	29.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	173	33	231	73	8	82
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.83	0.97	0.73	0.67	0.79
Hourly flow rate (vph)	197	40	238	100	12	104
Pedestrians	34		4			14
Lane Width (ft)	16.0		16.0			16.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	4		0			2
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			245			
pX, platoon unblocked	0.92	0.92			0.92	
vC, conflicting volume	454	336			372	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	358	230			269	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	64	94			99	
cM capacity (veh/h)	552	694			1088	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	236	338	116
Volume Left	197	0	12
Volume Right	40	100	0
cSH	572	1700	1088
Volume to Capacity	0.41	0.20	0.01
Queue Length 95th (ft)	50	0	1
Control Delay (s)	15.7	0.0	0.9
Lane LOS	C		A
Approach Delay (s)	15.7	0.0	0.9
Approach LOS	C		

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	79	2	0	188	18	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.86	0.86	0.50	0.42
Hourly flow rate (vph)	108	3	0	219	18	12
Pedestrians	7			2	7	
Lane Width (ft)	16.0			16.0	13.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	1			0	1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			118		342	119
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			118		342	119
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		97	99
cM capacity (veh/h)			1473		649	931

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	111	219	30
Volume Left	0	0	18
Volume Right	3	0	12
cSH	1700	1473	738
Volume to Capacity	0.07	0.00	0.04
Queue Length 95th (ft)	0	0	3
Control Delay (s)	0.0	0.0	10.1
Lane LOS			B
Approach Delay (s)	0.0	0.0	10.1
Approach LOS			B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	20.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	9	19	17	8	0	24	0	350	12	33	361	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.68	0.53	0.50	0.86	0.86	0.92	0.86	0.60	0.75	0.68	0.53
Hourly flow rate (vph)	12	28	32	16	0	28	0	407	20	44	531	0
Pedestrians		42			36			5			5	
Lane Width (ft)		16.0			15.0			16.0			16.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		5			4			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											103	
pX, platoon unblocked	0.84	0.84	0.84	0.84	0.84		0.84					
vC, conflicting volume	1111	1124	578	1123	1114	458	573			463		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1037	1052	402	1051	1040	458	396			463		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	92	83	94	86	100	95	100			96		
cM capacity (veh/h)	145	169	520	117	171	573	940			1067		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	72	16	28	427	575
Volume Left	12	16	0	0	44
Volume Right	32	0	28	20	0
cSH	232	117	573	1700	1067
Volume to Capacity	0.31	0.14	0.05	0.25	0.04
Queue Length 95th (ft)	32	11	4	0	3
Control Delay (s)	27.3	40.6	11.6	0.0	1.1
Lane LOS	D	E	B		A
Approach Delay (s)	27.3	22.2		0.0	1.1
Approach LOS	D	C			

Intersection Summary				
Average Delay	3.2			
Intersection Capacity Utilization	60.1%	ICU Level of Service		B
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	68	339	477	66	198	20	347	43	52	25	230	212	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	11	14	12	11	16	16	11	12	12	12	12	16	
Storage Length (ft)	120		0	85		0	90		0	25		0	
Storage Lanes	1		1	1		0	1		0	1		1	
Taper Length (ft)	25			25			25			25			
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		657			559			538			245		
Travel Time (s)		14.9			12.7			12.2			5.6		
Confl. Peds. (#/hr)	41		110	110		41	57		35	35		57	
Confl. Bikes (#/hr)			8			2			6			14	
Peak Hour Factor	0.81	0.91	0.94	0.83	0.87	0.56	0.81	0.77	0.76	0.78	0.82	0.76	
Heavy Vehicles (%)	3%	3%	2%	2%	1%	0%	7%	26%	2%	24%	1%	4%	
Parking (#/hr)						0							
Adj. Flow (vph)	84	373	507	80	228	36	428	56	68	32	280	279	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	84	373	507	80	264	0	428	124	0	32	280	279	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm	
Protected Phases		5	6		5		6	1 6			1		2
Permitted Phases	5		5	5			1 6			1		1	
Detector Phase	5	5	6	5	5		6	1 6		1	1	1	
Switch Phase													
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0		6.0			8.0	8.0	8.0	1.0
Minimum Split (s)	12.0	12.0	10.0	12.0	12.0		10.0			23.0	23.0	23.0	23.0
Total Split (s)	25.0	25.0	15.0	25.0	25.0		15.0			27.0	27.0	27.0	23.0
Total Split (%)	27.8%	27.8%	16.7%	27.8%	27.8%		16.7%			30.0%	30.0%	30.0%	26%
Maximum Green (s)	21.0	21.0	11.0	21.0	21.0		11.0			23.0	23.0	23.0	20.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	3.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0			1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0			0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0	4.0	
Lead/Lag	Lead	Lead	Lag	Lead	Lead		Lag			Lead	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes			Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0			2.0	2.0	2.0	2.0
Recall Mode	None	None	Max	None	None		Max			C-Min	C-Min	C-Min	None
Walk Time (s)										8.0	8.0	8.0	8.0
Flash Dont Walk (s)										11.0	11.0	11.0	12.0
Pedestrian Calls (#/hr)										30	30	30	70
v/c Ratio	0.38	0.64	0.55	0.57	0.43		1.21	0.20		0.46	0.74	0.54	
Control Delay	34.1	35.6	4.4	47.7	28.1		146.1	9.4		51.2	45.8	7.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0	
Total Delay	34.1	35.6	4.4	47.7	28.1		146.1	9.4		51.2	45.8	7.8	
Queue Length 50th (ft)	38	184	0	23	70		~287	21		16	152	0	
Queue Length 95th (ft)	79	#343	59	m#105	171		#374	41		38	196	29	
Internal Link Dist (ft)		577			479			458			165		
Turn Bay Length (ft)	120			85			90			25			
Base Capacity (vph)	224	586	920	140	620		353	712		89	480	581	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0	
Reduced v/c Ratio	0.38	0.64	0.55	0.57	0.43		1.21	0.17		0.36	0.58	0.48	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 75 (83%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Dorchester Ave. & West Broadway

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	68	339	477	66	198	20	347	43	52	25	230	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	11	16	16	11	12	12	12	12	16
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.91	1.00	0.99		1.00	0.94		1.00	1.00	0.82
Flpb, ped/bikes	0.96	1.00	1.00	0.92	1.00		0.98	1.00		0.96	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1624	1968	1438	1566	2066		1605	1455		1401	1881	1451
Flt Permitted	0.44	1.00	1.00	0.29	1.00		0.27	1.00		0.23	1.00	1.00
Satd. Flow (perm)	758	1968	1438	474	2066		458	1455		339	1881	1451
Peak-hour factor, PHF	0.81	0.91	0.94	0.83	0.87	0.56	0.81	0.77	0.76	0.78	0.82	0.76
Adj. Flow (vph)	84	373	507	80	228	36	428	56	68	32	280	279
RTOR Reduction (vph)	0	0	273	0	6	0	0	41	0	0	0	225
Lane Group Flow (vph)	84	373	234	80	258	0	428	83	0	32	280	54
Confl. Peds. (#/hr)	41		110	110		41	57		35	35		57
Confl. Bikes (#/hr)			8			2			6			14
Heavy Vehicles (%)	3%	3%	2%	2%	1%	0%	7%	26%	2%	24%	1%	4%
Parking (#/hr)						0						
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		5	6		5		6	1 6			1	
Permitted Phases	5		5	5			1 6			1		1
Actuated Green, G (s)	26.8	26.8	41.6	26.8	26.8		32.2	36.2		17.4	17.4	17.4
Effective Green, g (s)	26.8	26.8	41.6	26.8	26.8		32.2	36.2		17.4	17.4	17.4
Actuated g/C Ratio	0.30	0.30	0.46	0.30	0.30		0.36	0.40		0.19	0.19	0.19
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	225	586	728	141	615		352	585		65	363	280
v/s Ratio Prot		c0.19	0.05		0.13		c0.20	0.06			0.15	
v/s Ratio Perm	0.11		0.11	0.17			c0.23			0.09		0.04
v/c Ratio	0.37	0.64	0.32	0.57	0.42		1.22	0.14		0.49	0.77	0.19
Uniform Delay, d1	25.0	27.4	15.3	26.7	25.4		25.4	17.1		32.4	34.4	30.4
Progression Factor	1.00	1.00	1.00	0.96	0.97		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	1.7	0.1	2.8	0.2		120.4	0.5		24.3	14.6	1.5
Delay (s)	25.3	29.1	15.4	28.5	24.8		145.8	17.6		56.6	49.1	31.9
Level of Service	C	C	B	C	C		F	B		E	D	C
Approach Delay (s)		21.5			25.7			117.0			41.4	
Approach LOS		C			C			F			D	

Intersection Summary			
HCM 2000 Control Delay	48.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	0	3	113	143	27	6	229	0	0	594	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	13	16	16	16	16	16	16	16	16
Storage Length (ft)	0		0	40		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		266			366			103			244	
Travel Time (s)		6.0			8.3			2.3			5.5	
Confl. Peds. (#/hr)	19		12	12		19	42		12	12		42
Confl. Bikes (#/hr)						3			6			23
Peak Hour Factor	0.83	0.92	0.75	0.76	0.83	0.56	0.50	0.97	0.92	0.92	0.96	0.79
Heavy Vehicles (%)	0%	2%	2%	1%	2%	0%	0%	0%	0%	0%	1%	4%
Adj. Flow (vph)	60	0	4	149	172	48	12	236	0	0	619	180
Shared Lane Traffic (%)												
Lane Group Flow (vph)	60	0	4	149	220	0	0	248	0	0	799	0
Turn Type	D.Pm		custom	Perm	NA		Perm	NA			NA	
Protected Phases					2			1			1	
Permitted Phases	2		2	2			1					
Detector Phase	2		2	2	2		1	1			1	
Switch Phase												
Minimum Initial (s)	8.0		8.0	8.0	8.0		8.0	8.0			8.0	
Minimum Split (s)	12.0		12.0	12.0	12.0		12.0	12.0			12.0	
Total Split (s)	18.0		18.0	18.0	18.0		72.0	72.0			72.0	
Total Split (%)	20.0%		20.0%	20.0%	20.0%		80.0%	80.0%			80.0%	
Maximum Green (s)	14.0		14.0	14.0	14.0		68.0	68.0			68.0	
Yellow Time (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0	1.0			1.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0			0.0			0.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lag		Lag	Lag	Lag		Lead	Lead			Lead	
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes			Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
Recall Mode	Max		Max	Max	Max		Max	Max			Max	
v/c Ratio	0.58		0.02	0.54	0.68			0.16			0.52	
Control Delay	59.9		7.3	43.1	45.6			3.3			5.5	
Queue Delay	0.0		0.0	0.0	0.0			0.0			0.0	
Total Delay	59.9		7.3	43.1	45.6			3.3			5.5	
Queue Length 50th (ft)	32		0	79	112			31			135	
Queue Length 95th (ft)	#78		3	116	170			50			199	
Internal Link Dist (ft)		186			286			23			164	
Turn Bay Length (ft)				40								
Base Capacity (vph)	103		265	276	323			1567			1543	
Starvation Cap Reductn	0		0	0	0			0			0	
Spillback Cap Reductn	0		0	0	0			0			0	
Storage Cap Reductn	0		0	0	0			0			0	
Reduced v/c Ratio	0.58		0.02	0.54	0.68			0.16			0.52	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 61 (68%), Referenced to phase 6:, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: A Street & West 2nd Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	0	3	113	143	27	6	229	0	0	594	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	15	15	15	13	16	16	16	16	16	16	16	16
Total Lost time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00		1.00	1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00		0.94	1.00	0.98			1.00			0.99	
Flpb, ped/bikes	0.97		1.00	0.96	1.00			1.00			1.00	
Frt	1.00		0.85	1.00	0.97			1.00			0.97	
Flt Protected	0.95		1.00	0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1917		1641	1775	2012			2147			2027	
Flt Permitted	0.33		1.00	0.95	1.00			0.96			1.00	
Satd. Flow (perm)	664		1641	1775	2012			2076			2027	
Peak-hour factor, PHF	0.83	0.92	0.75	0.76	0.83	0.56	0.50	0.97	0.92	0.92	0.96	0.79
Adj. Flow (vph)	60	0	4	149	172	48	12	236	0	0	619	180
RTOR Reduction (vph)	0	0	3	0	11	0	0	0	0	0	12	0
Lane Group Flow (vph)	60	0	1	149	209	0	0	248	0	0	787	0
Confl. Peds. (#/hr)	19		12	12		19	42		12	12		42
Confl. Bikes (#/hr)						3			6			23
Heavy Vehicles (%)	0%	2%	2%	1%	2%	0%	0%	0%	0%	0%	1%	4%
Turn Type	D.Pm		custom	Perm	NA		Perm	NA			NA	
Protected Phases					2			1			1	
Permitted Phases	2		2	2			1					
Actuated Green, G (s)	14.0		14.0	14.0	14.0			68.0			68.0	
Effective Green, g (s)	14.0		14.0	14.0	14.0			68.0			68.0	
Actuated g/C Ratio	0.16		0.16	0.16	0.16			0.76			0.76	
Clearance Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	103		255	276	312			1568			1531	
v/s Ratio Prot					c0.10						c0.39	
v/s Ratio Perm	0.09		0.00	0.08				0.12				
v/c Ratio	0.58		0.00	0.54	0.67			0.16			0.51	
Uniform Delay, d1	35.3		32.1	35.0	35.8			3.1			4.4	
Progression Factor	1.00		1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	21.8		0.0	7.4	10.9			0.2			1.2	
Delay (s)	57.1		32.1	42.4	46.7			3.3			5.6	
Level of Service	E		C	D	D			A			A	
Approach Delay (s)		55.6			45.0			3.3			5.6	
Approach LOS		E			D			A			A	

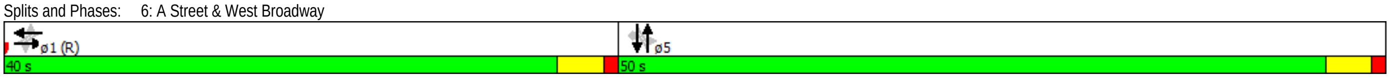
Intersection Summary			
HCM 2000 Control Delay	17.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	361	25	82	246	29	19	181	56	44	506	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	16	16	12	12	11
Storage Length (ft)	0		0	0		0	0		0	0		150
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		559			564			287			196	
Travel Time (s)		12.7			12.8			6.5			4.5	
Confl. Peds. (#/hr)	147		320	320		147	87		52	52		87
Confl. Bikes (#/hr)			11			6			1			17
Peak Hour Factor	0.50	0.92	0.79	0.87	0.93	0.73	0.58	0.88	0.74	0.75	0.90	0.84
Heavy Vehicles (%)	8%	9%	0%	16%	3%	7%	5%	4%	5%	3%	4%	0%
Parking (#/hr)			0			0						
Adj. Flow (vph)	80	392	32	94	265	40	33	206	76	59	562	113
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	504	0	0	399	0	0	315	0	0	621	113
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1			1			5			5	
Permitted Phases	1			1			5			5		5
Detector Phase	1	1		1	1		5	5		5	5	5
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	14.0	14.0		14.0	14.0		18.0	18.0		18.0	18.0	18.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0		50.0	50.0	50.0
Total Split (%)	44.4%	44.4%		44.4%	44.4%		55.6%	55.6%		55.6%	55.6%	55.6%
Maximum Green (s)	36.0	36.0		36.0	36.0		46.0	46.0		46.0	46.0	46.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		4.0			4.0			4.0			4.0	4.0
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	None
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	3.0	3.0		3.0	3.0		7.0	7.0		7.0	7.0	7.0
Pedestrian Calls (#/hr)	100	100		100	100		100	100		100	100	100
v/c Ratio		0.63			0.56			0.53			0.85	0.21
Control Delay		16.5			22.0			19.5			33.9	4.1
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay		16.5			22.0			19.5			33.9	4.1
Queue Length 50th (ft)		80			156			114			299	3
Queue Length 95th (ft)		m169			284			160			391	24
Internal Link Dist (ft)		479			484			207			116	
Turn Bay Length (ft)												150
Base Capacity (vph)		803			714			707			870	606
Starvation Cap Reductn		0			0			0			0	0
Spillback Cap Reductn		0			0			0			0	0
Storage Cap Reductn		0			0			0			0	0
Reduced v/c Ratio		0.63			0.56			0.45			0.71	0.19

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 31 (34%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 45
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: A Street & West Broadway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	361	25	82	246	29	19	181	56	44	506	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	16	16	16	12	12	11
Total Lost time (s)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.96			0.95			0.96			1.00	0.70
Flpb, ped/bikes		1.00			1.00			1.00			0.99	1.00
Frt		0.99			0.99			0.97			1.00	0.85
Flt Protected		0.99			0.99			0.99			1.00	1.00
Satd. Flow (prot)		1870			1864			1898			1807	1086
Flt Permitted		0.89			0.78			0.71			0.94	1.00
Satd. Flow (perm)		1668			1480			1361			1706	1086
Peak-hour factor, PHF	0.50	0.92	0.79	0.87	0.93	0.73	0.58	0.88	0.74	0.75	0.90	0.84
Adj. Flow (vph)	80	392	32	94	265	40	33	206	76	59	562	113
RTOR Reduction (vph)	0	3	0	0	4	0	0	15	0	0	0	59
Lane Group Flow (vph)	0	501	0	0	395	0	0	300	0	0	621	54
Confl. Peds. (#/hr)	147		320	320		147	87		52	52		87
Confl. Bikes (#/hr)			11			6			1			17
Heavy Vehicles (%)	8%	9%	0%	16%	3%	7%	5%	4%	5%	3%	4%	0%
Parking (#/hr)			0			0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1			1			5			5	
Permitted Phases	1			1			5			5		5
Actuated Green, G (s)		43.2			43.2			38.8			38.8	38.8
Effective Green, g (s)		43.2			43.2			38.8			38.8	38.8
Actuated g/C Ratio		0.48			0.48			0.43			0.43	0.43
Clearance Time (s)		4.0			4.0			4.0			4.0	4.0
Vehicle Extension (s)		2.0			2.0			2.0			2.0	2.0
Lane Grp Cap (vph)		800			710			586			735	468
v/s Ratio Prot												
v/s Ratio Perm		c0.30			0.27			0.22			c0.36	0.05
v/c Ratio		0.63			0.56			0.51			0.84	0.12
Uniform Delay, d1		17.4			16.6			18.7			22.9	15.3
Progression Factor		0.69			1.00			1.00			1.00	1.00
Incremental Delay, d2		2.7			3.1			0.3			8.5	0.0
Delay (s)		14.7			19.7			19.0			31.4	15.4
Level of Service		B			B			B			C	B
Approach Delay (s)		14.7			19.7			19.0			28.9	
Approach LOS		B			B			B			C	

Intersection Summary			
HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	279	30	71	60	28	188
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.79	0.75	0.83	0.79	0.64	0.87
Hourly flow rate (vph)	353	40	86	76	44	216
Pedestrians	44		1			4
Lane Width (ft)	16.0		16.0			16.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	5		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			245			
pX, platoon unblocked	1.00	1.00			1.00	
vC, conflicting volume	472	172			205	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	470	168			202	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	30	95			97	
cM capacity (veh/h)	507	825			1288	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	393	161	260
Volume Left	353	0	44
Volume Right	40	76	0
cSH	528	1700	1288
Volume to Capacity	0.74	0.09	0.03
Queue Length 95th (ft)	159	0	3
Control Delay (s)	29.1	0.0	1.6
Lane LOS	D		A
Approach Delay (s)	29.1	0.0	1.6
Approach LOS	D		

Intersection Summary			
Average Delay	14.6		
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	85	3	1	303	6	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.72	0.75	0.25	0.77	0.50	1.00
Hourly flow rate (vph)	118	4	4	394	6	4
Pedestrians	4				15	
Lane Width (ft)	16.0				13.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			137		541	135
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			137		541	135
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1440		495	907

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	122	398	10
Volume Left	0	4	6
Volume Right	4	0	4
cSH	1700	1440	605
Volume to Capacity	0.07	0.00	0.02
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.1	11.0
Lane LOS		A	B
Approach Delay (s)	0.0	0.1	11.0
Approach LOS			B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	26.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	28	14	3	0	11	0	221	23	77	638	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.78	0.70	0.25	0.92	0.69	0.92	0.97	0.82	0.73	0.91	0.92
Hourly flow rate (vph)	3	36	20	12	0	16	0	228	28	105	701	0
Pedestrians		30			53			8			7	
Lane Width (ft)		16.0			15.0			16.0			16.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		3			6			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											103	
pX, platoon unblocked	0.77	0.77	0.77	0.77	0.77		0.77					
vC, conflicting volume	1207	1251	739	1253	1237	302	731			309		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1119	1176	511	1179	1158	302	501			309		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	98	71	95	85	100	98	100			91		
cM capacity (veh/h)	117	124	418	79	127	696	799			1193		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	59	12	16	256	807
Volume Left	3	12	0	0	105
Volume Right	20	0	16	28	0
cSH	162	79	696	1700	1193
Volume to Capacity	0.36	0.15	0.02	0.15	0.09
Queue Length 95th (ft)	38	13	2	0	7
Control Delay (s)	39.3	58.6	10.3	0.0	2.2
Lane LOS	E	F	B		A
Approach Delay (s)	39.3	31.1		0.0	2.2
Approach LOS	E	D			

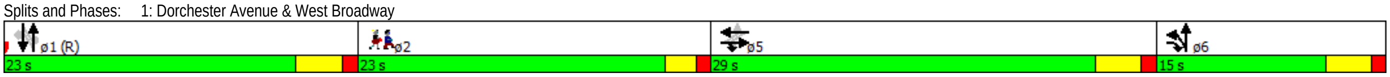
Intersection Summary			
Average Delay	4.3		
Intersection Capacity Utilization	67.7%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	155	306	239	64	381	15	543	150	24	18	80	176	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	11	14	12	11	16	16	11	12	12	12	12	16	
Storage Length (ft)	120		0	85		0	90		0	25		0	
Storage Lanes	1		1	1		0	1		0	1		1	
Taper Length (ft)	25			25			25			25			
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		657			559			538			245		
Travel Time (s)		14.9			12.7			12.2			5.6		
Confl. Peds. (#/hr)	8		30	30		8	62		27	27		62	
Confl. Bikes (#/hr)			6						3			3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.95	0.92	0.93	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	5%	8%	2%	4%	1%	0%	1%	21%	9%	24%	16%	14%	
Parking (#/hr)						0							
Adj. Flow (vph)	168	333	260	70	401	16	584	163	26	20	87	191	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	168	333	260	70	417	0	584	189	0	20	87	191	
Turn Type	Perm	NA	pt+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm	
Protected Phases		5	5 6		5		6	1 6			1		2
Permitted Phases	5			5			1 6			1		1	
Detector Phase	5	5	5 6	5	5		6	1 6		1	1	1	
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		6.0			8.0	8.0	8.0	4.0
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0			23.0	23.0	23.0	23.0
Total Split (s)	29.0	29.0		29.0	29.0		15.0			23.0	23.0	23.0	23.0
Total Split (%)	32.2%	32.2%		32.2%	32.2%		16.7%			25.6%	25.6%	25.6%	26%
Maximum Green (s)	25.0	25.0		25.0	25.0		11.0			19.0	19.0	19.0	20.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0			3.0	3.0	3.0	2.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0			1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0			0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0			4.0	4.0	4.0	
Lead/Lag	Lead	Lead		Lead	Lead		Lag			Lead	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0			2.0	2.0	2.0	3.0
Recall Mode	None	None		None	None		Max			C-Min	C-Min	C-Min	None
Walk Time (s)										8.0	8.0	8.0	8.0
Flash Dont Walk (s)										11.0	11.0	11.0	12.0
Pedestrian Calls (#/hr)										30	30	30	30
v/c Ratio	0.62	0.41	0.25	0.21	0.46		1.49	0.37		0.28	0.33	0.51	
Control Delay	41.2	25.1	2.7	13.3	13.9		261.8	22.9		40.6	35.0	9.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0	
Total Delay	41.2	25.1	2.7	13.3	13.9		261.8	22.9		40.6	35.0	9.9	
Queue Length 50th (ft)	94	166	0	31	214		~432	70		9	42	0	
Queue Length 95th (ft)	#221	258	42	m35	249		#633	124		31	83	55	
Internal Link Dist (ft)		577			479			458			165		
Turn Bay Length (ft)	120			85			90			25			
Base Capacity (vph)	271	805	1048	331	909		391	588		94	345	432	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0	
Reduced v/c Ratio	0.62	0.41	0.25	0.21	0.46		1.49	0.32		0.21	0.25	0.44	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 38 (42%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Dorchester Avenue & West Broadway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	306	239	64	381	15	543	150	24	18	80	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	11	16	16	11	12	12	12	12	16
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.99		1.00	1.00	0.83
Flpb, ped/bikes	1.00	1.00	1.00	0.98	1.00		0.91	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1654	1877	1583	1644	2118		1574	1541		1409	1638	1332
Flt Permitted	0.36	1.00	1.00	0.45	1.00		0.70	1.00		0.30	1.00	1.00
Satd. Flow (perm)	634	1877	1583	777	2118		1160	1541		443	1638	1332
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.95	0.92	0.93	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	168	333	260	70	401	16	584	163	26	20	87	191
RTOR Reduction (vph)	0	0	105	0	1	0	0	7	0	0	0	163
Lane Group Flow (vph)	168	333	155	70	416	0	584	182	0	20	87	28
Confl. Peds. (#/hr)	8		30	30		8	62		27	27		62
Confl. Bikes (#/hr)			6						3			3
Heavy Vehicles (%)	5%	8%	2%	4%	1%	0%	1%	21%	9%	24%	16%	14%
Parking (#/hr)						0						
Turn Type	Perm	NA	pt+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		5	5 6		5		6	1 6			1	
Permitted Phases	5			5			1 6			1		1
Actuated Green, G (s)	38.6	38.6	53.6	38.6	38.6		24.4	28.4		13.4	13.4	13.4
Effective Green, g (s)	38.6	38.6	53.6	38.6	38.6		24.4	28.4		13.4	13.4	13.4
Actuated g/C Ratio	0.43	0.43	0.60	0.43	0.43		0.27	0.32		0.15	0.15	0.15
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0			4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0			2.0	2.0	2.0
Lane Grp Cap (vph)	271	805	942	333	908		365	486		65	243	198
v/s Ratio Prot		0.18	0.10		0.20		c0.20	0.12			0.05	
v/s Ratio Perm	c0.27			0.09			c0.24			0.05		0.02
v/c Ratio	0.62	0.41	0.16	0.21	0.46		1.60	0.37		0.31	0.36	0.14
Uniform Delay, d1	20.0	17.8	8.2	16.1	18.3		31.9	23.9		34.2	34.4	33.3
Progression Factor	1.00	1.00	1.00	0.49	0.53		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.2	0.3	0.1	0.3	0.3		282.6	2.2		11.9	4.1	1.5
Delay (s)	24.2	18.2	8.2	8.2	10.0		314.4	26.1		46.0	38.5	34.8
Level of Service	C	B	A	A	A		F	C		D	D	C
Approach Delay (s)		16.1			9.7			243.9			36.7	
Approach LOS		B			A			F			D	

Intersection Summary			
HCM 2000 Control Delay	93.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	0	8	123	154	47	16	529	0	0	341	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	13	16	16	16	16	16	16	16	16
Storage Length (ft)	0		0	40		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		266			366			103			244	
Travel Time (s)		6.0			8.3			2.3			5.5	
Confl. Peds. (#/hr)	16		12	12		16	23		51	51		23
Confl. Bikes (#/hr)			1			1						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	0%	13%	5%	3%	2%	0%	2%	0%	0%	3%	11%
Adj. Flow (vph)	36	0	9	134	167	51	17	575	0	0	371	64
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	0	9	134	218	0	0	592	0	0	435	0
Turn Type	D.Pm		custom	Perm	NA		Perm	NA			NA	
Protected Phases					2			1			1	
Permitted Phases	2		2	2			1					
Detector Phase	2		2	2	2		1	1			1	
Switch Phase												
Minimum Initial (s)	8.0		8.0	8.0	8.0		8.0	8.0			8.0	
Minimum Split (s)	12.0		12.0	12.0	12.0		12.0	12.0			12.0	
Total Split (s)	27.0		27.0	27.0	27.0		63.0	63.0			63.0	
Total Split (%)	30.0%		30.0%	30.0%	30.0%		70.0%	70.0%			70.0%	
Maximum Green (s)	23.0		23.0	23.0	23.0		59.0	59.0			59.0	
Yellow Time (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0	1.0			1.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0			0.0			0.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lag		Lag	Lag	Lag		Lead	Lead			Lead	
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes			Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
Recall Mode	Max		Max	Max	Max		C-Max	C-Max			C-Max	
v/c Ratio	0.15		0.02	0.30	0.42			0.43			0.33	
Control Delay	28.1		11.6	29.3	28.7			8.7			7.3	
Queue Delay	0.0		0.0	0.0	0.0			0.0			0.0	
Total Delay	28.1		11.6	29.3	28.7			8.7			7.3	
Queue Length 50th (ft)	16		0	62	95			144			91	
Queue Length 95th (ft)	41		10	112	162			209			138	
Internal Link Dist (ft)		186			286			23			164	
Turn Bay Length (ft)				40								
Base Capacity (vph)	236		392	443	522			1363			1327	
Starvation Cap Reductn	0		0	0	0			0			0	
Spillback Cap Reductn	0		0	0	0			0			0	
Storage Cap Reductn	0		0	0	0			0			0	
Reduced v/c Ratio	0.15		0.02	0.30	0.42			0.43			0.33	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 33 (37%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 40
Control Type: Actuated-Coordinated

Splits and Phases: 4: A Street & West 2nd Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	0	8	123	154	47	16	529	0	0	341	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	15	15	15	13	16	16	16	16	16	16	16	16
Total Lost time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00		1.00	1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00		0.96	1.00	0.99			1.00			0.99	
Flpb, ped/bikes	0.98		1.00	0.98	1.00			1.00			1.00	
Frt	1.00		0.85	1.00	0.96			1.00			0.98	
Flt Protected	0.95		1.00	0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1835		1502	1735	1997			2109			2015	
Flt Permitted	0.48		1.00	0.95	1.00			0.99			1.00	
Satd. Flow (perm)	928		1502	1735	1997			2080			2015	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	0	9	134	167	51	17	575	0	0	371	64
RTOR Reduction (vph)	0	0	7	0	12	0	0	0	0	0	7	0
Lane Group Flow (vph)	36	0	2	134	206	0	0	592	0	0	428	0
Confl. Peds. (#/hr)	16		12	12		16	23		51	51		23
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	6%	0%	13%	5%	3%	2%	0%	2%	0%	0%	3%	11%
Turn Type	D.Pm		custom	Perm	NA		Perm	NA			NA	
Protected Phases					2			1			1	
Permitted Phases	2		2	2			1					
Actuated Green, G (s)	23.0		23.0	23.0	23.0			59.0			59.0	
Effective Green, g (s)	23.0		23.0	23.0	23.0			59.0			59.0	
Actuated g/C Ratio	0.26		0.26	0.26	0.26			0.66			0.66	
Clearance Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	237		383	443	510			1363			1320	
v/s Ratio Prot					c0.10						0.21	
v/s Ratio Perm	0.04		0.00	0.08				c0.28				
v/c Ratio	0.15		0.01	0.30	0.40			0.43			0.32	
Uniform Delay, d1	25.9		25.0	27.0	27.8			7.5			6.8	
Progression Factor	1.00		1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.4		0.0	1.8	2.4			1.0			0.7	
Delay (s)	27.3		25.0	28.8	30.2			8.5			7.4	
Level of Service	C		C	C	C			A			A	
Approach Delay (s)		26.8			29.6			8.5			7.4	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	309	23	77	448	54	22	402	62	72	319	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	16	16	12	12	11
Storage Length (ft)	0		0	0		0	0		0	0		150
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		559			564			287			196	
Travel Time (s)		12.7			12.8			6.5			4.5	
Confl. Peds. (#/hr)	79		24	24		79	67		54	54		67
Peak Hour Factor	0.92	0.92	0.92	0.92	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	7%	5%	19%	1%	0%	0%	4%	17%	10%	8%	5%
Parking (#/hr)			0			0						
Adj. Flow (vph)	63	336	25	84	482	59	24	437	67	78	347	55
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	424	0	0	625	0	0	528	0	0	425	55
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1			1			5			5	
Permitted Phases	1			1			5			5		5
Detector Phase	1	1		1	1		5	5		5	5	5
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	16.0	16.0		16.0	16.0		18.0	18.0		18.0	18.0	18.0
Total Split (s)	46.0	46.0		46.0	46.0		44.0	44.0		44.0	44.0	44.0
Total Split (%)	51.1%	51.1%		51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	48.9%
Maximum Green (s)	42.0	42.0		42.0	42.0		40.0	40.0		40.0	40.0	40.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		4.0			4.0			4.0			4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	None
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	5.0	5.0		5.0	5.0		7.0	7.0		7.0	7.0	7.0
Pedestrian Calls (#/hr)	100	100		100	100		100	100		100	100	100
v/c Ratio		0.45			0.64			0.79			0.95	0.12
Control Delay		29.6			19.2			33.4			58.9	5.1
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay		29.6			19.2			33.4			58.9	5.1
Queue Length 50th (ft)		220			233			254			227	0
Queue Length 95th (ft)		m318			418			330			#354	21
Internal Link Dist (ft)		479			484			207			116	
Turn Bay Length (ft)												150
Base Capacity (vph)		951			984			832			557	538
Starvation Cap Reductn		0			0			0			0	0
Spillback Cap Reductn		0			0			0			0	0
Storage Cap Reductn		0			0			0			0	0
Reduced v/c Ratio		0.45			0.64			0.63			0.76	0.10

Intersection Summary

Area Type: Other

Cycle Length: 90

Actuated Cycle Length: 90

Offset: 57 (63%), Referenced to phase 1:EBWB, Start of Green

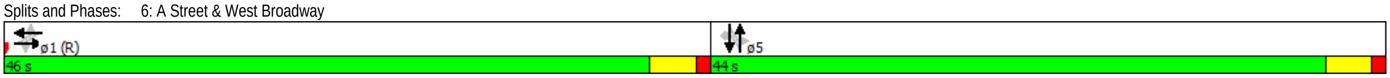
Natural Cycle: 40

Control Type: Actuated-Coordinated

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: A Street & West Broadway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	309	23	77	448	54	22	402	62	72	319	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	16	16	16	12	12	11
Total Lost time (s)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.99			0.97			0.98			1.00	0.77
Flpb, ped/bikes		1.00			1.00			1.00			1.00	1.00
Frt		0.99			0.99			0.98			1.00	0.85
Flt Protected		0.99			0.99			1.00			0.99	1.00
Satd. Flow (prot)		1982			1975			1949			1737	1143
Flt Permitted		0.86			0.89			0.95			0.72	1.00
Satd. Flow (perm)		1717			1772			1862			1255	1143
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	63	336	25	84	482	59	24	437	67	78	347	55
RTOR Reduction (vph)	0	2	0	0	4	0	0	6	0	0	0	35
Lane Group Flow (vph)	0	422	0	0	621	0	0	522	0	0	425	20
Confl. Peds. (#/hr)	79		24	24		79	67		54	54		67
Heavy Vehicles (%)	3%	7%	5%	19%	1%	0%	0%	4%	17%	10%	8%	5%
Parking (#/hr)			0			0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1			1			5			5	
Permitted Phases	1			1			5			5		5
Actuated Green, G (s)		49.8			49.8			32.2			32.2	32.2
Effective Green, g (s)		49.8			49.8			32.2			32.2	32.2
Actuated g/C Ratio		0.55			0.55			0.36			0.36	0.36
Clearance Time (s)		4.0			4.0			4.0			4.0	4.0
Vehicle Extension (s)		2.0			2.0			2.0			2.0	2.0
Lane Grp Cap (vph)		950			980			666			449	408
v/s Ratio Prot												
v/s Ratio Perm		0.25			c0.35			0.28			c0.34	0.02
v/c Ratio		0.44			0.63			0.78			0.95	0.05
Uniform Delay, d1		11.9			13.8			25.8			28.1	18.9
Progression Factor		2.05			1.00			1.00			1.00	1.00
Incremental Delay, d2		1.4			3.1			5.5			28.8	0.0
Delay (s)		25.8			17.0			31.3			56.9	18.9
Level of Service		C			B			C			E	B
Approach Delay (s)		25.8			17.0			31.3			52.5	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM 2000 Control Delay	30.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.2%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	182	35	243	77	8	91
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.97	0.92	0.92	0.92
Hourly flow rate (vph)	198	38	251	84	9	99
Pedestrians	34		4			14
Lane Width (ft)	16.0		16.0			16.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	4		0			2
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			245			
pX, platoon unblocked	0.89	0.89			0.89	
vC, conflicting volume	447	340			368	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	316	197			228	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	65	95			99	
cM capacity (veh/h)	569	703			1094	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	236	334	108
Volume Left	198	0	9
Volume Right	38	84	0
cSH	587	1700	1094
Volume to Capacity	0.40	0.20	0.01
Queue Length 95th (ft)	48	0	1
Control Delay (s)	15.2	0.0	0.7
Lane LOS	C		A
Approach Delay (s)	15.2	0.0	0.7
Approach LOS	C		

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	37.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	85	0	0	198	19	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	92	0	0	215	10	5
Pedestrians	7			2	7	
Lane Width (ft)	16.0			16.0	13.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	1			0	1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			99		322	101
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			99		322	101
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	99
cM capacity (veh/h)			1497		667	951

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	92	215	16
Volume Left	0	0	10
Volume Right	0	0	5
cSH	1700	1700	743
Volume to Capacity	0.05	0.13	0.02
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	9.9
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.9
Approach LOS			A

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	21.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	9	20	18	8	0	25	0	510	13	35	437	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	22	20	9	0	27	0	554	14	38	475	0
Pedestrians		42			36			5			5	
Lane Width (ft)		16.0			15.0			16.0			16.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		5			4			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											103	
pX, platoon unblocked	0.85	0.85	0.85	0.85	0.85		0.85					
vC, conflicting volume	1187	1198	522	1184	1190	602	517			604		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1131	1144	348	1128	1135	602	342			604		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	92	86	97	92	100	94	100			96		
cM capacity (veh/h)	126	151	563	110	152	474	994			946		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	51	9	27	568	513
Volume Left	10	9	0	0	38
Volume Right	20	0	27	14	0
cSH	199	110	474	1700	946
Volume to Capacity	0.26	0.08	0.06	0.33	0.04
Queue Length 95th (ft)	25	6	5	0	3
Control Delay (s)	29.2	40.6	13.0	0.0	1.1
Lane LOS	D	E	B		A
Approach Delay (s)	29.2	19.7		0.0	1.1
Approach LOS	D	C			

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	73	391	509	71	220	21	365	45	56	26	242	223	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	11	14	12	11	16	16	11	12	12	12	12	16	
Storage Length (ft)	120		0	85		0	90		0	25		0	
Storage Lanes	1		1	1		0	1		0	1		1	
Taper Length (ft)	25			25			25			25			
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		657			559			538			245		
Travel Time (s)		14.9			12.7			12.2			5.6		
Confl. Peds. (#/hr)	41		110	110		41	57		35	35		57	
Confl. Bikes (#/hr)			8			2			6			14	
Peak Hour Factor	0.92	0.92	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	3%	3%	2%	2%	1%	0%	7%	26%	2%	24%	1%	4%	
Parking (#/hr)						0							
Adj. Flow (vph)	79	425	541	77	239	23	397	49	61	28	263	242	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	79	425	541	77	262	0	397	110	0	28	263	242	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm	
Protected Phases		5	6		5		6	1 6			1		2
Permitted Phases	5		5	5			1 6			1		1	
Detector Phase	5	5	6	5	5		6	1 6		1	1	1	
Switch Phase													
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0		6.0			8.0	8.0	8.0	1.0
Minimum Split (s)	12.0	12.0	10.0	12.0	12.0		10.0			23.0	23.0	23.0	23.0
Total Split (s)	25.0	25.0	15.0	25.0	25.0		15.0			27.0	27.0	27.0	23.0
Total Split (%)	27.8%	27.8%	16.7%	27.8%	27.8%		16.7%			30.0%	30.0%	30.0%	26%
Maximum Green (s)	21.0	21.0	11.0	21.0	21.0		11.0			23.0	23.0	23.0	20.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	3.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0			1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0			0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0	4.0	
Lead/Lag	Lead	Lead	Lag	Lead	Lead		Lag			Lead	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes			Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0			2.0	2.0	2.0	2.0
Recall Mode	None	None	Max	None	None		Max			C-Min	C-Min	C-Min	None
Walk Time (s)										8.0	8.0	8.0	8.0
Flash Dont Walk (s)										11.0	11.0	11.0	12.0
Pedestrian Calls (#/hr)										30	30	30	70
v/c Ratio	0.36	0.74	0.57	0.76	0.43		1.05	0.17		0.40	0.73	0.51	
Control Delay	33.1	39.6	4.5	74.4	34.7		90.9	9.5		47.1	46.1	8.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0	
Total Delay	33.1	39.6	4.5	74.4	34.7		90.9	9.5		47.1	46.1	8.0	
Queue Length 50th (ft)	35	214	0	30	99		~250	18		14	142	0	
Queue Length 95th (ft)	85	#413	61	m#85	m161		#395	48		40	208	56	
Internal Link Dist (ft)		577			479			458			165		
Turn Bay Length (ft)	120			85			90			25			
Base Capacity (vph)	219	576	949	101	614		378	728		94	480	553	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0	
Reduced v/c Ratio	0.36	0.74	0.57	0.76	0.43		1.05	0.15		0.30	0.55	0.44	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 75 (83%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Dorchester Ave & West Broadway

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	391	509	71	220	21	365	45	56	26	242	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	11	16	16	11	12	12	12	12	16
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.91	1.00	0.99		1.00	0.94		1.00	1.00	0.82
Flpb, ped/bikes	0.96	1.00	1.00	0.93	1.00		0.98	1.00		0.96	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1622	1968	1446	1586	2089		1601	1455		1397	1881	1449
Flt Permitted	0.44	1.00	1.00	0.21	1.00		0.29	1.00		0.24	1.00	1.00
Satd. Flow (perm)	756	1968	1446	349	2089		483	1455		357	1881	1449
Peak-hour factor, PHF	0.92	0.92	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	79	425	541	77	239	23	397	49	61	28	263	242
RTOR Reduction (vph)	0	0	286	0	4	0	0	36	0	0	0	198
Lane Group Flow (vph)	79	425	255	77	258	0	397	74	0	28	263	44
Confl. Peds. (#/hr)	41		110	110		41	57		35	35		57
Confl. Bikes (#/hr)			8			2			6			14
Heavy Vehicles (%)	3%	3%	2%	2%	1%	0%	7%	26%	2%	24%	1%	4%
Parking (#/hr)						0						
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		5	6		5		6	1 6			1	
Permitted Phases	5		5	5			1 6			1		1
Actuated Green, G (s)	26.4	26.4	42.5	26.4	26.4		32.6	36.6		16.5	16.5	16.5
Effective Green, g (s)	26.4	26.4	42.5	26.4	26.4		32.6	36.6		16.5	16.5	16.5
Actuated g/C Ratio	0.29	0.29	0.47	0.29	0.29		0.36	0.41		0.18	0.18	0.18
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	221	577	747	102	612		374	591		65	344	265
v/s Ratio Prot		0.22	0.06		0.12		c0.19	0.05			0.14	
v/s Ratio Perm	0.10		0.12	c0.22			c0.19			0.08		0.03
v/c Ratio	0.36	0.74	0.34	0.75	0.42		1.06	0.12		0.43	0.76	0.17
Uniform Delay, d1	25.1	28.7	14.9	28.9	25.6		25.3	16.7		32.6	34.9	31.0
Progression Factor	1.00	1.00	1.00	1.16	1.23		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.4	4.2	0.1	19.4	0.1		63.7	0.4		19.5	14.9	1.4
Delay (s)	25.5	32.9	15.0	53.0	31.6		89.0	17.1		52.1	49.8	32.3
Level of Service	C	C	B	D	C		F	B		D	D	C
Approach Delay (s)		23.1			36.4			73.4			42.0	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM 2000 Control Delay	39.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	53	0	3	124	150	28	6	287	0	0	850	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	13	16	16	16	16	16	16	16	16
Storage Length (ft)	0		0	40		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		266			366			103			244	
Travel Time (s)		6.0			8.3			2.3			5.5	
Confl. Peds. (#/hr)	19		12	12		19	42		12	12		42
Confl. Bikes (#/hr)						3			6			23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.92	0.92	0.96	0.92
Heavy Vehicles (%)	0%	2%	2%	1%	2%	0%	0%	0%	0%	0%	1%	4%
Adj. Flow (vph)	58	0	3	135	163	30	7	296	0	0	885	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	58	0	3	135	193	0	0	303	0	0	1047	0
Turn Type	D.Pm		custom	Perm	NA		Perm	NA			NA	
Protected Phases					2			1			1	
Permitted Phases	2		2	2			1					
Detector Phase	2		2	2	2		1	1			1	
Switch Phase												
Minimum Initial (s)	8.0		8.0	8.0	8.0		8.0	8.0			8.0	
Minimum Split (s)	12.0		12.0	12.0	12.0		12.0	12.0			12.0	
Total Split (s)	18.0		18.0	18.0	18.0		72.0	72.0			72.0	
Total Split (%)	20.0%		20.0%	20.0%	20.0%		80.0%	80.0%			80.0%	
Maximum Green (s)	14.0		14.0	14.0	14.0		68.0	68.0			68.0	
Yellow Time (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0	1.0			1.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0			0.0			0.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lag		Lag	Lag	Lag		Lead	Lead			Lead	
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes			Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
Recall Mode	Max		Max	Max	Max		Max	Max			Max	
v/c Ratio	0.46		0.01	0.49	0.59			0.19			0.67	
Control Delay	47.7		5.7	41.5	42.0			3.5			7.9	
Queue Delay	0.0		0.0	0.0	0.0			0.0			0.0	
Total Delay	47.7		5.7	41.5	42.0			3.5			7.9	
Queue Length 50th (ft)	30		0	71	98			39			228	
Queue Length 95th (ft)	71		3	129	168			61			340	
Internal Link Dist (ft)		186			286			23			164	
Turn Bay Length (ft)				40								
Base Capacity (vph)	126		265	276	325			1595			1563	
Starvation Cap Reductn	0		0	0	0			0			0	
Spillback Cap Reductn	0		0	0	0			0			0	
Storage Cap Reductn	0		0	0	0			0			0	
Reduced v/c Ratio	0.46		0.01	0.49	0.59			0.19			0.67	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 61 (68%), Referenced to phase 6:, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated

Splits and Phases: 4: A Street & West 2nd Street

ø1 72 s
ø2 18 s

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	53	0	3	124	150	28	6	287	0	0	850	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	15	15	15	13	16	16	16	16	16	16	16	16
Total Lost time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00		1.00	1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00		0.94	1.00	0.99			1.00			0.99	
Flpb, ped/bikes	0.96		1.00	0.96	1.00			1.00			1.00	
Frt	1.00		0.85	1.00	0.98			1.00			0.98	
Flt Protected	0.95		1.00	0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1910		1641	1775	2040			2151			2059	
Flt Permitted	0.40		1.00	0.95	1.00			0.98			1.00	
Satd. Flow (perm)	811		1641	1775	2040			2111			2059	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.92	0.92	0.96	0.92
Adj. Flow (vph)	58	0	3	135	163	30	7	296	0	0	885	162
RTOR Reduction (vph)	0	0	3	0	8	0	0	0	0	0	7	0
Lane Group Flow (vph)	58	0	0	135	185	0	0	303	0	0	1040	0
Confl. Peds. (#/hr)	19		12	12		19	42		12	12		42
Confl. Bikes (#/hr)						3			6			23
Heavy Vehicles (%)	0%	2%	2%	1%	2%	0%	0%	0%	0%	0%	1%	4%
Turn Type	D.Pm		custom	Perm	NA		Perm	NA			NA	
Protected Phases					2			1			1	
Permitted Phases	2		2	2			1					
Actuated Green, G (s)	14.0		14.0	14.0	14.0			68.0			68.0	
Effective Green, g (s)	14.0		14.0	14.0	14.0			68.0			68.0	
Actuated g/C Ratio	0.16		0.16	0.16	0.16			0.76			0.76	
Clearance Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	126		255	276	317			1594			1555	
v/s Ratio Prot					c0.09						c0.50	
v/s Ratio Perm	0.07		0.00	0.08				0.14				
v/c Ratio	0.46		0.00	0.49	0.58			0.19			0.67	
Uniform Delay, d1	34.6		32.1	34.7	35.3			3.1			5.4	
Progression Factor	1.00		1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	11.6		0.0	6.1	7.7			0.3			2.3	
Delay (s)	46.2		32.1	40.8	43.0			3.4			7.7	
Level of Service	D		C	D	D			A			A	
Approach Delay (s)		45.5			42.1			3.4			7.7	
Approach LOS		D			D			A			A	

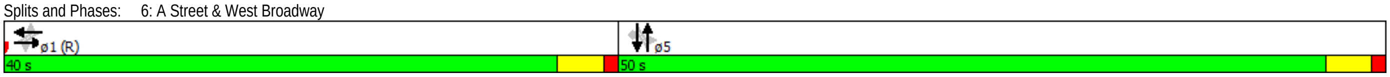
Intersection Summary			
HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	410	26	86	270	35	20	225	59	145	689	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	16	16	12	12	11
Storage Length (ft)	0		0	0		0	0		0	0		150
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		559			564			287			196	
Travel Time (s)		12.7			12.8			6.5			4.5	
Confl. Peds. (#/hr)	147		320	320		147	87		52	52		87
Confl. Bikes (#/hr)			11			6			1			17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	9%	0%	16%	3%	7%	5%	4%	5%	3%	4%	0%
Parking (#/hr)			0			0						
Adj. Flow (vph)	52	446	28	93	290	38	22	245	64	158	749	76
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	526	0	0	421	0	0	331	0	0	907	76
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1			1			5			5	
Permitted Phases	1			1			5			5		5
Detector Phase	1	1		1	1		5	5		5	5	5
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	14.0	14.0		14.0	14.0		18.0	18.0		18.0	18.0	18.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0		50.0	50.0	50.0
Total Split (%)	44.4%	44.4%		44.4%	44.4%		55.6%	55.6%		55.6%	55.6%	55.6%
Maximum Green (s)	36.0	36.0		36.0	36.0		46.0	46.0		46.0	46.0	46.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		4.0			4.0			4.0			4.0	4.0
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	None
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	3.0	3.0		3.0	3.0		7.0	7.0		7.0	7.0	7.0
Pedestrian Calls (#/hr)	100	100		100	100		100	100		100	100	100
v/c Ratio		0.74			0.76			0.58			1.15	0.13
Control Delay		20.3			33.6			19.3			105.7	6.1
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay		20.3			33.6			19.3			105.7	6.1
Queue Length 50th (ft)		87			199			116			~612	8
Queue Length 95th (ft)		m143			#349			204			#841	30
Internal Link Dist (ft)		479			484			207			116	
Turn Bay Length (ft)												150
Base Capacity (vph)		707			554			572			789	579
Starvation Cap Reductn		0			0			0			0	0
Spillback Cap Reductn		0			0			0			0	0
Storage Cap Reductn		0			0			0			0	0
Reduced v/c Ratio		0.74			0.76			0.58			1.15	0.13

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 31 (34%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: A Street & West Broadway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	410	26	86	270	35	20	225	59	145	689	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	16	16	16	12	12	11
Total Lost time (s)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.96			0.95			0.96			1.00	0.70
Flpb, ped/bikes		1.00			1.00			1.00			0.99	1.00
Frt		0.99			0.99			0.97			1.00	0.85
Flt Protected		1.00			0.99			1.00			0.99	1.00
Satd. Flow (prot)		1889			1883			1933			1790	1088
Flt Permitted		0.93			0.72			0.57			0.86	1.00
Satd. Flow (perm)		1761			1375			1099			1544	1088
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	446	28	93	290	38	22	245	64	158	749	76
RTOR Reduction (vph)	0	2	0	0	4	0	0	10	0	0	0	23
Lane Group Flow (vph)	0	524	0	0	417	0	0	321	0	0	907	53
Confl. Peds. (#/hr)	147		320	320		147	87		52	52		87
Confl. Bikes (#/hr)			11			6			1			17
Heavy Vehicles (%)	8%	9%	0%	16%	3%	7%	5%	4%	5%	3%	4%	0%
Parking (#/hr)			0			0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1			1			5			5	
Permitted Phases	1			1			5			5		5
Actuated Green, G (s)		36.0			36.0			46.0			46.0	46.0
Effective Green, g (s)		36.0			36.0			46.0			46.0	46.0
Actuated g/C Ratio		0.40			0.40			0.51			0.51	0.51
Clearance Time (s)		4.0			4.0			4.0			4.0	4.0
Vehicle Extension (s)		2.0			2.0			2.0			2.0	2.0
Lane Grp Cap (vph)		704			550			561			789	556
v/s Ratio Prot												
v/s Ratio Perm		0.30			c0.30			0.29			c0.59	0.05
v/c Ratio		0.74			0.76			0.57			1.15	0.09
Uniform Delay, d1		23.1			23.2			15.2			22.0	11.3
Progression Factor		0.69			1.00			1.00			1.00	1.00
Incremental Delay, d2		4.1			9.4			0.9			81.7	0.0
Delay (s)		19.9			32.7			16.1			103.7	11.3
Level of Service		B			C			B			F	B
Approach Delay (s)		19.9			32.7			16.1			96.6	
Approach LOS		B			C			B			F	

Intersection Summary			
HCM 2000 Control Delay	55.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	110.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	293	32	75	63	29	198
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	318	35	82	68	32	215
Pedestrians	44		1			4
Lane Width (ft)	16.0		16.0			16.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	5		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			245			
pX, platoon unblocked	0.98	0.98			0.98	
vC, conflicting volume	439	164			194	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	419	139			170	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	41	96			98	
cM capacity (veh/h)	539	843			1303	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	353	150	247
Volume Left	318	0	32
Volume Right	35	68	0
cSH	559	1700	1303
Volume to Capacity	0.63	0.09	0.02
Queue Length 95th (ft)	110	0	2
Control Delay (s)	21.8	0.0	1.2
Lane LOS	C		A
Approach Delay (s)	21.8	0.0	1.2
Approach LOS	C		

Intersection Summary			
Average Delay	10.7		
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	92	0	0	319	6	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	1.00
Hourly flow rate (vph)	100	0	0	347	3	4
Pedestrians	4				15	
Lane Width (ft)	16.0				13.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			115		466	115
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			115		466	115
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1466		549	930

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	100	347	7
Volume Left	0	0	3
Volume Right	0	0	4
cSH	1700	1700	709
Volume to Capacity	0.06	0.20	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	10.1
Lane LOS			B
Approach Delay (s)	0.0	0.0	10.1
Approach LOS			B

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	26.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	29	15	3	0	12	0	278	24	81	897	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	32	16	3	0	13	0	287	26	88	975	0
Pedestrians		30			53			8			7	
Lane Width (ft)		16.0			15.0			16.0			16.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		3			6			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											103	
pX, platoon unblocked	0.67	0.67	0.67	0.67	0.67		0.67					
vC, conflicting volume	1501	1547	1013	1544	1534	360	1005			366		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1501	1570	769	1566	1551	360	757			366		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	50	94	89	100	98	100			92		
cM capacity (veh/h)	56	63	258	29	64	646	556			1138		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	51	3	13	313	1063
Volume Left	3	3	0	0	88
Volume Right	16	0	13	26	0
cSH	82	29	646	1700	1138
Volume to Capacity	0.62	0.11	0.02	0.18	0.08
Queue Length 95th (ft)	71	9	2	0	6
Control Delay (s)	104.2	145.9	10.7	0.0	2.1
Lane LOS	F	F	B		A
Approach Delay (s)	104.2	37.7		0.0	2.1
Approach LOS	F	E			

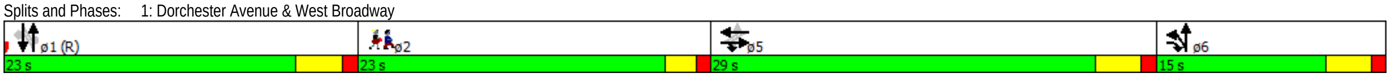
Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	184	306	239	75	389	32	543	160	24	18	80	176	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	11	14	12	11	16	16	11	12	12	12	12	16	
Storage Length (ft)	120		0	85		0	90		0	25		0	
Storage Lanes	1		1	1		0	1		0	1		1	
Taper Length (ft)	25			25			25			25			
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		657			559			538			245		
Travel Time (s)		14.9			12.7			12.2			5.6		
Confl. Peds. (#/hr)	8		30	30		8	62		27	27		62	
Confl. Bikes (#/hr)			6						3			3	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.95	0.92	0.93	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	5%	8%	2%	4%	1%	0%	1%	21%	9%	24%	16%	14%	
Parking (#/hr)						0							
Adj. Flow (vph)	200	333	260	82	409	35	584	174	26	20	87	191	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	200	333	260	82	444	0	584	200	0	20	87	191	
Turn Type	Perm	NA	pt+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm	
Protected Phases		5	5 6		5		6	1 6			1		2
Permitted Phases	5			5			1 6			1		1	
Detector Phase	5	5	5 6	5	5		6	1 6		1	1	1	
Switch Phase													
Minimum Initial (s)	8.0	8.0		8.0	8.0		6.0			8.0	8.0	8.0	4.0
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0			23.0	23.0	23.0	23.0
Total Split (s)	29.0	29.0		29.0	29.0		15.0			23.0	23.0	23.0	23.0
Total Split (%)	32.2%	32.2%		32.2%	32.2%		16.7%			25.6%	25.6%	25.6%	26%
Maximum Green (s)	25.0	25.0		25.0	25.0		11.0			19.0	19.0	19.0	20.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0			3.0	3.0	3.0	2.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0			1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0		0.0			0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0		4.0	4.0		4.0			4.0	4.0	4.0	
Lead/Lag	Lead	Lead		Lead	Lead		Lag			Lead	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes			Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0			2.0	2.0	2.0	3.0
Recall Mode	None	None		None	None		Max			C-Min	C-Min	C-Min	None
Walk Time (s)										8.0	8.0	8.0	8.0
Flash Dont Walk (s)										11.0	11.0	11.0	12.0
Pedestrian Calls (#/hr)										30	30	30	30
v/c Ratio	0.79	0.41	0.25	0.25	0.49		1.49	0.39		0.28	0.33	0.51	
Control Delay	56.1	25.1	2.7	14.8	15.6		261.8	23.4		40.6	35.0	9.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0	
Total Delay	56.1	25.1	2.7	14.8	15.6		261.8	23.4		40.6	35.0	9.9	
Queue Length 50th (ft)	~141	166	0	38	230		~432	75		9	42	0	
Queue Length 95th (ft)	#275	258	42	m46	#302		#633	131		31	83	55	
Internal Link Dist (ft)		577			479			458			165		
Turn Bay Length (ft)	120			85			90			25			
Base Capacity (vph)	252	805	1048	331	904		391	588		94	345	432	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0	
Reduced v/c Ratio	0.79	0.41	0.25	0.25	0.49		1.49	0.34		0.21	0.25	0.44	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 38 (42%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Dorchester Avenue & West Broadway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	184	306	239	75	389	32	543	160	24	18	80	176
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	11	16	16	11	12	12	12	12	16
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	0.99		1.00	1.00	0.83
Flpb, ped/bikes	1.00	1.00	1.00	0.98	1.00		0.91	1.00		0.97	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1655	1877	1583	1644	2104		1574	1542		1410	1638	1332
Flt Permitted	0.34	1.00	1.00	0.45	1.00		0.70	1.00		0.30	1.00	1.00
Satd. Flow (perm)	588	1877	1583	777	2104		1160	1542		443	1638	1332
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.95	0.92	0.93	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	200	333	260	82	409	35	584	174	26	20	87	191
RTOR Reduction (vph)	0	0	105	0	3	0	0	7	0	0	0	163
Lane Group Flow (vph)	200	333	155	82	441	0	584	193	0	20	87	28
Confl. Peds. (#/hr)	8		30	30		8	62		27	27		62
Confl. Bikes (#/hr)			6						3			3
Heavy Vehicles (%)	5%	8%	2%	4%	1%	0%	1%	21%	9%	24%	16%	14%
Parking (#/hr)						0						
Turn Type	Perm	NA	pt+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		5	5 6		5		6	1 6			1	
Permitted Phases	5			5			1 6			1		1
Actuated Green, G (s)	38.6	38.6	53.6	38.6	38.6		24.4	28.4		13.4	13.4	13.4
Effective Green, g (s)	38.6	38.6	53.6	38.6	38.6		24.4	28.4		13.4	13.4	13.4
Actuated g/C Ratio	0.43	0.43	0.60	0.43	0.43		0.27	0.32		0.15	0.15	0.15
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0			4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0			2.0	2.0	2.0
Lane Grp Cap (vph)	252	805	942	333	902		365	486		65	243	198
v/s Ratio Prot		0.18	0.10		0.21		c0.20	0.13			0.05	
v/s Ratio Perm	c0.34			0.11			c0.24			0.05		0.02
v/c Ratio	0.79	0.41	0.16	0.25	0.49		1.60	0.40		0.31	0.36	0.14
Uniform Delay, d1	22.3	17.8	8.2	16.4	18.6		31.9	24.1		34.2	34.4	33.3
Progression Factor	1.00	1.00	1.00	0.54	0.57		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	15.7	0.3	0.1	0.3	0.3		282.6	2.4		11.9	4.1	1.5
Delay (s)	37.9	18.2	8.2	9.2	10.9		314.4	26.5		46.0	38.5	34.8
Level of Service	D	B	A	A	B		F	C		D	D	C
Approach Delay (s)		19.9			10.6			241.0			36.7	
Approach LOS		B			B			F			D	

Intersection Summary			
HCM 2000 Control Delay	92.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	0	8	123	154	47	16	529	0	0	356	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	13	16	16	16	16	16	16	16	16
Storage Length (ft)	0		0	40		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		266			366			103			244	
Travel Time (s)		6.0			8.3			2.3			5.5	
Confl. Peds. (#/hr)	16		12	12		16	23		51	51		23
Confl. Bikes (#/hr)			1			1						
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	6%	0%	13%	5%	3%	2%	0%	2%	0%	0%	3%	11%
Adj. Flow (vph)	45	0	9	134	167	51	17	575	0	0	387	64
Shared Lane Traffic (%)												
Lane Group Flow (vph)	45	0	9	134	218	0	0	592	0	0	451	0
Turn Type	D.Pm		custom	Perm	NA		Perm	NA			NA	
Protected Phases					2			1			1	
Permitted Phases	2		2	2			1					
Detector Phase	2		2	2	2		1	1			1	
Switch Phase												
Minimum Initial (s)	8.0		8.0	8.0	8.0		8.0	8.0			8.0	
Minimum Split (s)	12.0		12.0	12.0	12.0		12.0	12.0			12.0	
Total Split (s)	27.0		27.0	27.0	27.0		63.0	63.0			63.0	
Total Split (%)	30.0%		30.0%	30.0%	30.0%		70.0%	70.0%			70.0%	
Maximum Green (s)	23.0		23.0	23.0	23.0		59.0	59.0			59.0	
Yellow Time (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0	1.0			1.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0			0.0			0.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lag		Lag	Lag	Lag		Lead	Lead			Lead	
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes			Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
Recall Mode	Max		Max	Max	Max		C-Max	C-Max			C-Max	
v/c Ratio	0.19		0.02	0.30	0.42			0.43			0.34	
Control Delay	28.9		11.6	29.3	28.7			8.7			7.4	
Queue Delay	0.0		0.0	0.0	0.0			0.0			0.0	
Total Delay	28.9		11.6	29.3	28.7			8.7			7.4	
Queue Length 50th (ft)	20		0	62	95			144			96	
Queue Length 95th (ft)	50		10	112	162			209			144	
Internal Link Dist (ft)		186			286			23			164	
Turn Bay Length (ft)				40								
Base Capacity (vph)	236		392	443	522			1363			1329	
Starvation Cap Reductn	0		0	0	0			0			0	
Spillback Cap Reductn	0		0	0	0			0			0	
Storage Cap Reductn	0		0	0	0			0			0	
Reduced v/c Ratio	0.19		0.02	0.30	0.42			0.43			0.34	

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 90	
Offset: 33 (37%), Referenced to phase 1:NBSB, Start of Green	
Natural Cycle: 40	
Control Type: Actuated-Coordinated	

Splits and Phases: 4: A Street & West 2nd Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	0	8	123	154	47	16	529	0	0	356	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	15	15	15	13	16	16	16	16	16	16	16	16
Total Lost time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00		1.00	1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00		0.96	1.00	0.99			1.00			0.99	
Flpb, ped/bikes	0.98		1.00	0.98	1.00			1.00			1.00	
Frt	1.00		0.85	1.00	0.96			1.00			0.98	
Flt Protected	0.95		1.00	0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1835		1502	1735	1997			2109			2018	
Flt Permitted	0.48		1.00	0.95	1.00			0.98			1.00	
Satd. Flow (perm)	928		1502	1735	1997			2079			2018	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	0	9	134	167	51	17	575	0	0	387	64
RTOR Reduction (vph)	0	0	7	0	12	0	0	0	0	0	7	0
Lane Group Flow (vph)	45	0	2	134	206	0	0	592	0	0	444	0
Confl. Peds. (#/hr)	16		12	12		16	23		51	51		23
Confl. Bikes (#/hr)			1			1						
Heavy Vehicles (%)	6%	0%	13%	5%	3%	2%	0%	2%	0%	0%	3%	11%
Turn Type	D.Pm		custom	Perm	NA		Perm	NA			NA	
Protected Phases					2			1			1	
Permitted Phases	2		2	2			1					
Actuated Green, G (s)	23.0		23.0	23.0	23.0			59.0			59.0	
Effective Green, g (s)	23.0		23.0	23.0	23.0			59.0			59.0	
Actuated g/C Ratio	0.26		0.26	0.26	0.26			0.66			0.66	
Clearance Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	237		383	443	510			1362			1322	
v/s Ratio Prot					c0.10						0.22	
v/s Ratio Perm	0.05		0.00	0.08				c0.28				
v/c Ratio	0.19		0.01	0.30	0.40			0.43			0.34	
Uniform Delay, d1	26.2		25.0	27.0	27.8			7.5			6.8	
Progression Factor	1.00		1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	1.8		0.0	1.8	2.4			1.0			0.7	
Delay (s)	28.0		25.0	28.8	30.2			8.5			7.5	
Level of Service	C		C	C	C			A			A	
Approach Delay (s)		27.5			29.6			8.5			7.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM 2000 Control Delay	14.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	309	23	77	450	54	22	402	62	73	319	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	16	16	12	12	11
Storage Length (ft)	0		0	0		0	0		0	0		150
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		559			564			287			196	
Travel Time (s)		12.7			12.8			6.5			4.5	
Confl. Peds. (#/hr)	79		24	24		79	67		54	54		67
Peak Hour Factor	0.92	0.92	0.92	0.92	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	7%	5%	19%	1%	0%	0%	4%	17%	10%	8%	5%
Parking (#/hr)			0			0						
Adj. Flow (vph)	63	336	25	84	484	59	24	437	67	79	347	92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	424	0	0	627	0	0	528	0	0	426	92
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1			1			5			5	
Permitted Phases	1			1			5			5		5
Detector Phase	1	1		1	1		5	5		5	5	5
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	16.0	16.0		16.0	16.0		18.0	18.0		18.0	18.0	18.0
Total Split (s)	46.0	46.0		46.0	46.0		44.0	44.0		44.0	44.0	44.0
Total Split (%)	51.1%	51.1%		51.1%	51.1%		48.9%	48.9%		48.9%	48.9%	48.9%
Maximum Green (s)	42.0	42.0		42.0	42.0		40.0	40.0		40.0	40.0	40.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		4.0			4.0			4.0			4.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	None
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	5.0	5.0		5.0	5.0		7.0	7.0		7.0	7.0	7.0
Pedestrian Calls (#/hr)	100	100		100	100		100	100		100	100	100
v/c Ratio		0.45			0.64			0.78			0.95	0.20
Control Delay		29.7			19.3			33.2			59.0	4.6
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay		29.7			19.3			33.2			59.0	4.6
Queue Length 50th (ft)		221			234			254			227	0
Queue Length 95th (ft)		m318			420			329			#357	27
Internal Link Dist (ft)		479			484			207			116	
Turn Bay Length (ft)												150
Base Capacity (vph)		949			983			833			556	559
Starvation Cap Reductn		0			0			0			0	0
Spillback Cap Reductn		0			0			0			0	0
Storage Cap Reductn		0			0			0			0	0
Reduced v/c Ratio		0.45			0.64			0.63			0.77	0.16

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 57 (63%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: A Street & West Broadway

ø1 (R)	ø5
46 s	44 s

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	58	309	23	77	450	54	22	402	62	73	319	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	16	16	16	12	12	11
Total Lost time (s)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.99			0.97			0.98			1.00	0.77
Flpb, ped/bikes		1.00			1.00			1.00			1.00	1.00
Frt		0.99			0.99			0.98			1.00	0.85
Flt Protected		0.99			0.99			1.00			0.99	1.00
Satd. Flow (prot)		1982			1976			1949			1737	1143
Flt Permitted		0.86			0.89			0.95			0.71	1.00
Satd. Flow (perm)		1717			1774			1863			1251	1143
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	63	336	25	84	484	59	24	437	67	79	347	92
RTOR Reduction (vph)	0	2	0	0	4	0	0	6	0	0	0	59
Lane Group Flow (vph)	0	422	0	0	623	0	0	522	0	0	426	33
Confl. Peds. (#/hr)	79		24	24		79	67		54	54		67
Heavy Vehicles (%)	3%	7%	5%	19%	1%	0%	0%	4%	17%	10%	8%	5%
Parking (#/hr)			0			0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1			1			5			5	
Permitted Phases	1			1			5			5		5
Actuated Green, G (s)		49.7			49.7			32.3			32.3	32.3
Effective Green, g (s)		49.7			49.7			32.3			32.3	32.3
Actuated g/C Ratio		0.55			0.55			0.36			0.36	0.36
Clearance Time (s)		4.0			4.0			4.0			4.0	4.0
Vehicle Extension (s)		2.0			2.0			2.0			2.0	2.0
Lane Grp Cap (vph)		948			979			668			448	410
v/s Ratio Prot												
v/s Ratio Perm		0.25			c0.35			0.28			c0.34	0.03
v/c Ratio		0.44			0.64			0.78			0.95	0.08
Uniform Delay, d1		12.0			13.9			25.7			28.1	19.0
Progression Factor		2.04			1.00			1.00			1.00	1.00
Incremental Delay, d2		1.4			3.2			5.5			30.0	0.0
Delay (s)		25.8			17.1			31.2			58.1	19.1
Level of Service		C			B			C			E	B
Approach Delay (s)		25.8			17.1			31.2			51.2	
Approach LOS		C			B			C			D	

Intersection Summary			
HCM 2000 Control Delay	30.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	210	35	243	77	8	91
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.97	0.92	0.92	0.92
Hourly flow rate (vph)	228	38	251	84	9	99
Pedestrians	34		4			14
Lane Width (ft)	16.0		16.0			16.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	4		0			2
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			245			
pX, platoon unblocked	0.91	0.91			0.91	
vC, conflicting volume	447	340			368	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	345	228			259	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	59	95			99	
cM capacity (veh/h)	561	692			1092	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	266	334	108
Volume Left	228	0	9
Volume Right	38	84	0
cSH	577	1700	1092
Volume to Capacity	0.46	0.20	0.01
Queue Length 95th (ft)	61	0	1
Control Delay (s)	16.5	0.0	0.7
Lane LOS	C		A
Approach Delay (s)	16.5	0.0	0.7
Approach LOS	C		

Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	169	0	0	226	19	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	184	0	0	246	10	5
Pedestrians	7			2	7	
Lane Width (ft)	16.0			16.0	13.0	
Walking Speed (ft/s)	4.0			4.0	4.0	
Percent Blockage	1			0	1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			191		443	193
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			191		443	193
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		98	99
cM capacity (veh/h)			1386		568	847

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	184	246	16
Volume Left	0	0	10
Volume Right	0	0	5
cSH	1700	1700	640
Volume to Capacity	0.11	0.14	0.02
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	10.8
Lane LOS			B
Approach Delay (s)	0.0	0.0	10.8
Approach LOS			B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	22.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	9	20	38	8	0	25	0	510	13	35	452	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	22	41	9	0	27	0	554	14	38	491	0
Pedestrians		42			36			5			5	
Lane Width (ft)		16.0			15.0			16.0			16.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		5			4			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											103	
pX, platoon unblocked	0.84	0.84	0.84	0.84	0.84		0.84					
vC, conflicting volume	1203	1214	538	1222	1207	602	533			604		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1148	1161	361	1171	1153	602	355			604		
tC, single (s)	7.1	6.5	6.2	7.2	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.0	3.3	2.2			2.2		
p0 queue free %	92	85	93	91	100	94	100			96		
cM capacity (veh/h)	122	146	551	97	148	474	978			946		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	73	9	27	568	529
Volume Left	10	9	0	0	38
Volume Right	41	0	27	14	0
cSH	240	97	474	1700	946
Volume to Capacity	0.30	0.09	0.06	0.33	0.04
Queue Length 95th (ft)	31	7	5	0	3
Control Delay (s)	26.5	45.6	13.0	0.0	1.1
Lane LOS	D	E	B		A
Approach Delay (s)	26.5	20.9		0.0	1.1
Approach LOS	D	C			

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	320	56	28	273
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	348	61	30	297
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						309
pX, platoon unblocked						
vC, conflicting volume	736	378			409	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	736	378			409	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			97	
cM capacity (veh/h)	376	668			1150	

Direction, Lane #	NB 1	SB 1
Volume Total	409	327
Volume Left	0	30
Volume Right	61	0
cSH	1700	1150
Volume to Capacity	0.24	0.03
Queue Length 95th (ft)	0	2
Control Delay (s)	0.0	1.0
Lane LOS		A
Approach Delay (s)	0.0	1.0
Approach LOS		

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑			↑		↱
Volume (veh/h)	85	0	0	245	0	84
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	92	0	0	266	0	91
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	168					
pX, platoon unblocked						
vC, conflicting volume			92		359	92
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			92		359	92
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	91
cM capacity (veh/h)			1502		640	965

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	92	266	91
Volume Left	0	0	0
Volume Right	0	0	91
cSH	1700	1700	965
Volume to Capacity	0.05	0.16	0.09
Queue Length 95th (ft)	0	0	8
Control Delay (s)	0.0	0.0	9.1
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.1
Approach LOS			A

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	16.3%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø2
Lane Configurations													
Volume (vph)	93	391	509	90	233	33	365	52	56	26	242	223	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	11	14	12	11	16	16	11	12	12	12	12	16	
Storage Length (ft)	120		0	85		0	90		0	25		0	
Storage Lanes	1		1	1		0	1		0	1		1	
Taper Length (ft)	25			25			25			25			
Right Turn on Red			Yes			Yes			Yes			Yes	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		657			559			538			245		
Travel Time (s)		14.9			12.7			12.2			5.6		
Confl. Peds. (#/hr)	41		110	110		41	57		35	35		57	
Confl. Bikes (#/hr)			8			2			6			14	
Peak Hour Factor	0.92	0.92	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	3%	3%	2%	2%	1%	0%	7%	26%	2%	24%	1%	4%	
Parking (#/hr)						0							
Adj. Flow (vph)	101	425	541	98	253	36	397	57	61	28	263	242	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	101	425	541	98	289	0	397	118	0	28	263	242	
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm	
Protected Phases		5	6		5		6	1 6			1		2
Permitted Phases	5		5	5			1 6			1		1	
Detector Phase	5	5	6	5	5		6	1 6		1	1	1	
Switch Phase													
Minimum Initial (s)	8.0	8.0	6.0	8.0	8.0		6.0			8.0	8.0	8.0	1.0
Minimum Split (s)	12.0	12.0	10.0	12.0	12.0		10.0			23.0	23.0	23.0	23.0
Total Split (s)	25.0	25.0	15.0	25.0	25.0		15.0			27.0	27.0	27.0	23.0
Total Split (%)	27.8%	27.8%	16.7%	27.8%	27.8%		16.7%			30.0%	30.0%	30.0%	26%
Maximum Green (s)	21.0	21.0	11.0	21.0	21.0		11.0			23.0	23.0	23.0	20.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0			3.0	3.0	3.0	2.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0			1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0			0.0	0.0	0.0	
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0	4.0	
Lead/Lag	Lead	Lead	Lag	Lead	Lead		Lag			Lead	Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes		Yes			Yes	Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0			2.0	2.0	2.0	2.0
Recall Mode	None	None	Max	None	None		Max			C-Min	C-Min	C-Min	None
Walk Time (s)										8.0	8.0	8.0	8.0
Flash Dont Walk (s)										11.0	11.0	11.0	12.0
Pedestrian Calls (#/hr)										30	30	30	70
v/c Ratio	0.38	0.62	0.58	0.60	0.40		1.39	0.21		0.40	0.73	0.51	
Control Delay	33.0	33.7	4.6	50.5	31.4		218.9	10.3		47.2	46.1	8.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	0.0	
Total Delay	33.0	33.7	4.6	50.5	31.4		218.9	10.3		47.2	46.1	8.0	
Queue Length 50th (ft)	46	214	0	40	112		~249	21		14	142	0	
Queue Length 95th (ft)	#115	#413	61	m#106	m182		#394	52		40	208	56	
Internal Link Dist (ft)		577			479			458			165		
Turn Bay Length (ft)	120			85			90			25			
Base Capacity (vph)	266	687	933	164	726		286	650		94	480	553	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	0	
Reduced v/c Ratio	0.38	0.62	0.58	0.60	0.40		1.39	0.18		0.30	0.55	0.44	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 75 (83%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Dorchester Ave & West Broadway

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	93	391	509	90	233	33	365	52	56	26	242	223
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	11	16	16	11	12	12	12	12	16
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.90	1.00	0.99		1.00	0.94		1.00	1.00	0.82
Flpb, ped/bikes	0.97	1.00	1.00	0.93	1.00		0.98	1.00		0.96	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.92		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1635	1968	1419	1595	2074		1601	1458		1398	1881	1449
Flt Permitted	0.45	1.00	1.00	0.28	1.00		0.29	1.00		0.24	1.00	1.00
Satd. Flow (perm)	773	1968	1419	476	2074		487	1458		355	1881	1449
Peak-hour factor, PHF	0.92	0.92	0.94	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	425	541	98	253	36	397	57	61	28	263	242
RTOR Reduction (vph)	0	0	286	0	5	0	0	40	0	0	0	197
Lane Group Flow (vph)	101	425	255	98	284	0	397	78	0	28	263	45
Confl. Peds. (#/hr)	41		110	110		41	57		35	35		57
Confl. Bikes (#/hr)			8			2			6			14
Heavy Vehicles (%)	3%	3%	2%	2%	1%	0%	7%	26%	2%	24%	1%	4%
Parking (#/hr)						0						
Turn Type	Perm	NA	pm+ov	Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases		5	6		5		6	1 6			1	
Permitted Phases	5		5	5			1 6			1		1
Actuated Green, G (s)	31.4	31.4	42.4	31.4	31.4		27.6	31.6		16.6	16.6	16.6
Effective Green, g (s)	31.4	31.4	42.4	31.4	31.4		27.6	31.6		16.6	16.6	16.6
Actuated g/C Ratio	0.35	0.35	0.47	0.35	0.35		0.31	0.35		0.18	0.18	0.18
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0			4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0		2.0			2.0	2.0	2.0
Lane Grp Cap (vph)	269	686	731	166	723		285	511		65	346	267
v/s Ratio Prot		c0.22	0.04		0.14		c0.17	0.05			0.14	
v/s Ratio Perm	0.13		0.14	0.21			c0.26			0.08		0.03
v/c Ratio	0.38	0.62	0.35	0.59	0.39		1.39	0.15		0.43	0.76	0.17
Uniform Delay, d1	22.0	24.3	15.1	24.0	22.1		28.6	20.0		32.5	34.8	30.9
Progression Factor	1.00	1.00	1.00	1.15	1.17		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.3	1.2	0.1	3.0	0.1		196.9	0.6		19.5	14.5	1.3
Delay (s)	22.3	25.5	15.2	30.6	25.9		225.5	20.7		52.0	49.3	32.2
Level of Service	C	C	B	C	C		F	C		D	D	C
Approach Delay (s)		20.0			27.1			178.6			41.7	
Approach LOS		B			C			F			D	

Intersection Summary			
HCM 2000 Control Delay	58.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	0	3	124	150	28	6	287	0	0	861	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	15	15	15	13	16	16	16	16	16	16	16	16
Storage Length (ft)	0		0	40		0	0		0	0		0
Storage Lanes	1		1	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		266			366			103			244	
Travel Time (s)		6.0			8.3			2.3			5.5	
Confl. Peds. (#/hr)	19		12	12		19	42		12	12		42
Confl. Bikes (#/hr)						3			6			23
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.92	0.92	0.96	0.92
Heavy Vehicles (%)	0%	2%	2%	1%	2%	0%	0%	0%	0%	0%	1%	4%
Adj. Flow (vph)	71	0	3	135	163	30	7	296	0	0	897	162
Shared Lane Traffic (%)												
Lane Group Flow (vph)	71	0	3	135	193	0	0	303	0	0	1059	0
Turn Type	D.Pm		custom	Perm	NA		Perm	NA			NA	
Protected Phases					2			1			1	
Permitted Phases	2		2	2			1					
Detector Phase	2		2	2	2		1	1			1	
Switch Phase												
Minimum Initial (s)	8.0		8.0	8.0	8.0		8.0	8.0			8.0	
Minimum Split (s)	12.0		12.0	12.0	12.0		12.0	12.0			12.0	
Total Split (s)	18.0		18.0	18.0	18.0		72.0	72.0			72.0	
Total Split (%)	20.0%		20.0%	20.0%	20.0%		80.0%	80.0%			80.0%	
Maximum Green (s)	14.0		14.0	14.0	14.0		68.0	68.0			68.0	
Yellow Time (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
All-Red Time (s)	1.0		1.0	1.0	1.0		1.0	1.0			1.0	
Lost Time Adjust (s)	0.0		0.0	0.0	0.0			0.0			0.0	
Total Lost Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lead/Lag	Lag		Lag	Lag	Lag		Lead	Lead			Lead	
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes			Yes	
Vehicle Extension (s)	3.0		3.0	3.0	3.0		3.0	3.0			3.0	
Recall Mode	Max		Max	Max	Max		Max	Max			Max	
v/c Ratio	0.56		0.01	0.49	0.59			0.19			0.68	
Control Delay	54.2		5.7	41.5	42.0			3.5			8.0	
Queue Delay	0.0		0.0	0.0	0.0			0.0			0.0	
Total Delay	54.2		5.7	41.5	42.0			3.5			8.0	
Queue Length 50th (ft)	38		0	71	98			39			233	
Queue Length 95th (ft)	#96		3	129	168			61			349	
Internal Link Dist (ft)		186			286			23			164	
Turn Bay Length (ft)				40								
Base Capacity (vph)	126		265	276	325			1594			1563	
Starvation Cap Reductn	0		0	0	0			0			0	
Spillback Cap Reductn	0		0	0	0			0			0	
Storage Cap Reductn	0		0	0	0			0			0	
Reduced v/c Ratio	0.56		0.01	0.49	0.59			0.19			0.68	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 61 (68%), Referenced to phase 6:, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: A Street & West 2nd Street

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	0	3	124	150	28	6	287	0	0	861	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	15	15	15	13	16	16	16	16	16	16	16	16
Total Lost time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00		1.00	1.00	1.00			1.00			1.00	
Frpb, ped/bikes	1.00		0.94	1.00	0.99			1.00			0.99	
Flpb, ped/bikes	0.96		1.00	0.96	1.00			1.00			1.00	
Frt	1.00		0.85	1.00	0.98			1.00			0.98	
Flt Protected	0.95		1.00	0.95	1.00			1.00			1.00	
Satd. Flow (prot)	1910		1641	1775	2040			2151			2060	
Flt Permitted	0.40		1.00	0.95	1.00			0.98			1.00	
Satd. Flow (perm)	811		1641	1775	2040			2111			2060	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.92	0.92	0.96	0.92
Adj. Flow (vph)	71	0	3	135	163	30	7	296	0	0	897	162
RTOR Reduction (vph)	0	0	3	0	8	0	0	0	0	0	7	0
Lane Group Flow (vph)	71	0	0	135	185	0	0	303	0	0	1052	0
Confl. Peds. (#/hr)	19		12	12		19	42		12	12		42
Confl. Bikes (#/hr)						3			6			23
Heavy Vehicles (%)	0%	2%	2%	1%	2%	0%	0%	0%	0%	0%	1%	4%
Turn Type	D.Pm		custom	Perm	NA		Perm	NA			NA	
Protected Phases					2			1			1	
Permitted Phases	2		2	2			1					
Actuated Green, G (s)	14.0		14.0	14.0	14.0			68.0			68.0	
Effective Green, g (s)	14.0		14.0	14.0	14.0			68.0			68.0	
Actuated g/C Ratio	0.16		0.16	0.16	0.16			0.76			0.76	
Clearance Time (s)	4.0		4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	126		255	276	317			1594			1556	
v/s Ratio Prot					c0.09						c0.51	
v/s Ratio Perm	0.09		0.00	0.08				0.14				
v/c Ratio	0.56		0.00	0.49	0.58			0.19			0.68	
Uniform Delay, d1	35.2		32.1	34.7	35.3			3.1			5.5	
Progression Factor	1.00		1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	17.0		0.0	6.1	7.7			0.3			2.4	
Delay (s)	52.1		32.1	40.8	43.0			3.4			7.9	
Level of Service	D		C	D	D			A			A	
Approach Delay (s)		51.3			42.1			3.4			7.9	
Approach LOS		D			D			A			A	

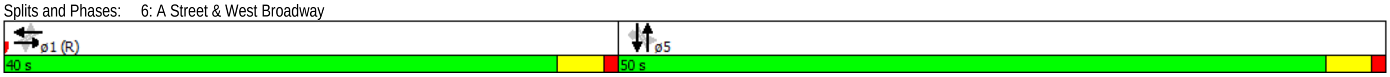
Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	410	26	86	272	35	20	225	59	147	689	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	16	16	16	16	16	16	16	12	12	11
Storage Length (ft)	0		0	0		0	0		0	0		150
Storage Lanes	0		0	0		0	0		0	0		1
Taper Length (ft)	25			25			25			25		
Right Turn on Red			Yes			Yes			Yes			Yes
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		559			564			287			196	
Travel Time (s)		12.7			12.8			6.5			4.5	
Confl. Peds. (#/hr)	147		320	320		147	87		52	52		87
Confl. Bikes (#/hr)			11			6			1			17
Peak Hour Factor	0.92	0.92	0.92	0.92	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	8%	9%	0%	16%	3%	7%	5%	4%	5%	3%	4%	0%
Parking (#/hr)			0			0						
Adj. Flow (vph)	52	446	28	93	292	38	22	245	64	160	749	122
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	526	0	0	423	0	0	331	0	0	909	122
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1			1			5			5	
Permitted Phases	1			1			5			5		5
Detector Phase	1	1		1	1		5	5		5	5	5
Switch Phase												
Minimum Initial (s)	10.0	10.0		10.0	10.0		10.0	10.0		10.0	10.0	10.0
Minimum Split (s)	14.0	14.0		14.0	14.0		18.0	18.0		18.0	18.0	18.0
Total Split (s)	40.0	40.0		40.0	40.0		50.0	50.0		50.0	50.0	50.0
Total Split (%)	44.4%	44.4%		44.4%	44.4%		55.6%	55.6%		55.6%	55.6%	55.6%
Maximum Green (s)	36.0	36.0		36.0	36.0		46.0	46.0		46.0	46.0	46.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	0.0
Total Lost Time (s)		4.0			4.0			4.0			4.0	4.0
Lead/Lag	Lead	Lead		Lead	Lead		Lag	Lag		Lag	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Recall Mode	C-Max	C-Max		C-Max	C-Max		None	None		None	None	None
Walk Time (s)	7.0	7.0		7.0	7.0		7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	3.0	3.0		3.0	3.0		7.0	7.0		7.0	7.0	7.0
Pedestrian Calls (#/hr)	100	100		100	100		100	100		100	100	100
v/c Ratio		0.75			0.76			0.58			1.16	0.21
Control Delay		21.0			33.7			19.5			107.9	6.1
Queue Delay		0.0			0.0			0.0			0.0	0.0
Total Delay		21.0			33.7			19.5			107.9	6.1
Queue Length 50th (ft)		88			200			117			~616	12
Queue Length 95th (ft)		m178			#351			206			#846	41
Internal Link Dist (ft)		479			484			207			116	
Turn Bay Length (ft)												150
Base Capacity (vph)		706			555			567			787	593
Starvation Cap Reductn		0			0			0			0	0
Spillback Cap Reductn		0			0			0			0	0
Storage Cap Reductn		0			0			0			0	0
Reduced v/c Ratio		0.75			0.76			0.58			1.16	0.21

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 31 (34%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 6: A Street & West Broadway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	410	26	86	272	35	20	225	59	147	689	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	16	16	16	16	16	16	16	16	12	12	11
Total Lost time (s)		4.0			4.0			4.0			4.0	4.0
Lane Util. Factor		1.00			1.00			1.00			1.00	1.00
Frpb, ped/bikes		0.96			0.95			0.96			1.00	0.70
Flpb, ped/bikes		1.00			1.00			1.00			0.99	1.00
Frt		0.99			0.99			0.97			1.00	0.85
Flt Protected		1.00			0.99			1.00			0.99	1.00
Satd. Flow (prot)		1889			1884			1933			1789	1088
Flt Permitted		0.93			0.72			0.56			0.85	1.00
Satd. Flow (perm)		1760			1378			1092			1540	1088
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.93	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	52	446	28	93	292	38	22	245	64	160	749	122
RTOR Reduction (vph)	0	2	0	0	4	0	0	10	0	0	0	38
Lane Group Flow (vph)	0	524	0	0	419	0	0	321	0	0	909	84
Confl. Peds. (#/hr)	147		320	320		147	87		52	52		87
Confl. Bikes (#/hr)			11			6			1			17
Heavy Vehicles (%)	8%	9%	0%	16%	3%	7%	5%	4%	5%	3%	4%	0%
Parking (#/hr)			0			0						
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		1			1			5			5	
Permitted Phases	1			1			5			5		5
Actuated Green, G (s)		36.0			36.0			46.0			46.0	46.0
Effective Green, g (s)		36.0			36.0			46.0			46.0	46.0
Actuated g/C Ratio		0.40			0.40			0.51			0.51	0.51
Clearance Time (s)		4.0			4.0			4.0			4.0	4.0
Vehicle Extension (s)		2.0			2.0			2.0			2.0	2.0
Lane Grp Cap (vph)		704			551			558			787	556
v/s Ratio Prot												
v/s Ratio Perm		0.30			c0.30			0.29			c0.59	0.08
v/c Ratio		0.74			0.76			0.58			1.16	0.15
Uniform Delay, d1		23.1			23.3			15.2			22.0	11.7
Progression Factor		0.69			1.00			1.00			1.00	1.00
Incremental Delay, d2		4.7			9.5			0.9			83.9	0.0
Delay (s)		20.5			32.8			16.1			105.9	11.7
Level of Service		C			C			B			F	B
Approach Delay (s)		20.5			32.8			16.1			94.8	
Approach LOS		C			C			B			F	

Intersection Summary			
HCM 2000 Control Delay	55.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	110.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	339	32	75	63	29	198
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	368	35	82	68	32	215
Pedestrians	44		1			4
Lane Width (ft)	16.0		16.0			16.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	5		0			0
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			245			
pX, platoon unblocked	0.99	0.99			0.99	
vC, conflicting volume	439	164			194	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	431	153			184	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	31	96			98	
cM capacity (veh/h)	537	836			1302	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	403	150	247
Volume Left	368	0	32
Volume Right	35	68	0
cSH	554	1700	1302
Volume to Capacity	0.73	0.09	0.02
Queue Length 95th (ft)	152	0	2
Control Delay (s)	27.0	0.0	1.2
Lane LOS	D		A
Approach Delay (s)	27.0	0.0	1.2
Approach LOS	D		

Intersection Summary			
Average Delay	14.0		
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	177	0	0	365	6	4
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	1.00
Hourly flow rate (vph)	192	0	0	397	3	4
Pedestrians	4				15	
Lane Width (ft)	16.0				13.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	0				1	
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume			207		608	207
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			207		608	207
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			1357		454	827

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	192	397	7
Volume Left	0	0	3
Volume Right	0	0	4
cSH	1700	1700	604
Volume to Capacity	0.11	0.23	0.01
Queue Length 95th (ft)	0	0	1
Control Delay (s)	0.0	0.0	11.0
Lane LOS			B
Approach Delay (s)	0.0	0.0	11.0
Approach LOS			B

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	29.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	29	49	3	0	12	0	278	24	81	908	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.97	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	3	32	53	3	0	13	0	287	26	88	987	0
Pedestrians		30			53			8			7	
Lane Width (ft)		16.0			15.0			16.0			16.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		3			6			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											103	
pX, platoon unblocked	0.66	0.66	0.66	0.66	0.66		0.66					
vC, conflicting volume	1513	1559	1025	1593	1546	360	1017			366		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1519	1589	779	1641	1569	360	767			366		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	48	79	84	100	98	100			92		
cM capacity (veh/h)	54	60	252	21	62	646	545			1138		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1
Volume Total	88	3	13	313	1075
Volume Left	3	3	0	0	88
Volume Right	53	0	13	26	0
cSH	111	21	646	1700	1138
Volume to Capacity	0.79	0.16	0.02	0.18	0.08
Queue Length 95th (ft)	112	12	2	0	6
Control Delay (s)	108.6	209.9	10.7	0.0	2.1
Lane LOS	F	F	B		A
Approach Delay (s)	108.6	50.5		0.0	2.1
Approach LOS	F	F			

Intersection Summary			
Average Delay	8.5		
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	0	138	39	46	491
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	150	42	50	534
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)						309
pX, platoon unblocked						
vC, conflicting volume	805	171			192	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	805	171			192	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			96	
cM capacity (veh/h)	339	873			1381	

Direction, Lane #	NB 1	SB 1
Volume Total	192	584
Volume Left	0	50
Volume Right	42	0
cSH	1700	1381
Volume to Capacity	0.11	0.04
Queue Length 95th (ft)	0	3
Control Delay (s)	0.0	1.0
Lane LOS		A
Approach Delay (s)	0.0	1.0
Approach LOS		

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Volume (veh/h)	92	0	0	371	0	85
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	100	0	0	403	0	92
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)	168					
pX, platoon unblocked						
vC, conflicting volume			100		503	100
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			100		503	100
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	90
cM capacity (veh/h)			1493		528	956

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	100	403	92
Volume Left	0	0	0
Volume Right	0	0	92
cSH	1700	1700	956
Volume to Capacity	0.06	0.24	0.10
Queue Length 95th (ft)	0	0	8
Control Delay (s)	0.0	0.0	9.2
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.2
Approach LOS			A

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	22.9%	ICU Level of Service	A
Analysis Period (min)	15		

APPENDIX E – PEDESTRIAN WIND ASSESSMENT APPENDIX

Boutique Hotel - 6 West Broadway

Boston, MA

Pedestrian Wind Assessment

RWDI # 1202287
July 23, 2013

SUBMITTED TO

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Sun Condos LLC, By it's Manager,
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SUBMITTED BY

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1. Introduction

Rowan Williams Davies & Irwin Inc. (RWDI) was retained by Sun Condos LLC to assess the potential wind conditions for the proposed Boutique Hotel at 6 West Broadway in Boston, MA (Image 1). The objective of this assessment was to provide a qualitative evaluation of wind comfort conditions on and around the development and recommend mitigation measures, if necessary.

This qualitative assessment is based on the following:

- a review of regional long-term meteorological data;
- our previous wind-tunnel tests on buildings in the Boston area;
- design drawings received by RWDI on April 26, 2013;
- our engineering judgment and expert knowledge of wind flows around buildings[1,3];
- Use of software developed by RWDI (*Windestimator*[2]) for estimating the potential wind comfort conditions around generalized building forms.

This qualitative approach provides a screening-level estimation of potential wind conditions. To quantify these conditions or refine any conceptual mitigation measures, physical scale model tests would typically be required. Note that other wind issues, such as those relating to door pressures, exhaust re-entrainment, snowdrifts, etc. are not considered in the scope of this assessment.

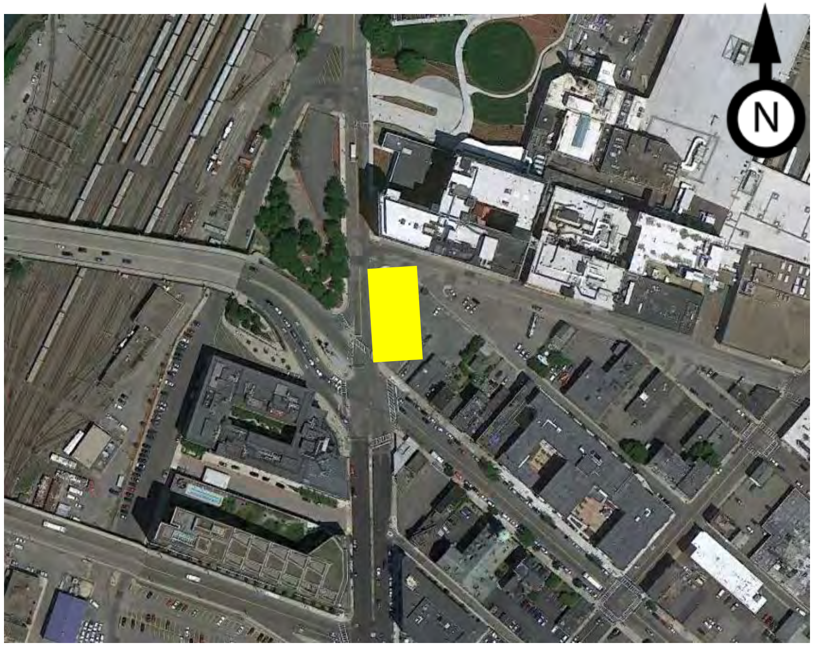

Image 1 - Aerial Photograph of Existing Site and Surroundings
(Courtesy of Google earth™)

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1. H. Wu and F. Kriksic (2012). "Designing for Pedestrian Comfort in Response to Local Climate", *Journal of Wind Engineering and Industrial Aerodynamics*, vol.104-106, pp.397-407.
2. H. Wu, C.J. Williams, H.A. Baker and W.F. Waechter (2004), "Knowledge-based Desk-Top Analysis of Pedestrian Wind Conditions", *ASCE Structure Congress 2004,* Nashville, Tennessee.
3. C.J. Williams, H. Wu, W.F. Waechter and H.A. Baker (1999), "Experience with Remedial Solutions to Control Pedestrian Wind Problems", *10th International Conference on Wind Engineering*, Copenhagen, Denmark.

2. Building and Site Information

The proposed development site is located on the east side of Dorchester Avenue between West 2nd Street and West Broadway in Boston, as shown in the aerial photo in Image 1. It consists of a 12-story tower with a rectangular floor plate on a one-story podium, for a total height of approximately 141 ft (see image on cover page). Pedestrian areas include building entrances A1 and A2 in Image 2) and sidewalks (B). Outdoor terraces at the second level (C) and on the roof top (D1 and D2) are not general public spaces and wind conditions on these terraces are not the focus of the current assessment.

The site is currently a parking lot. There are existing buildings of similar massing located to the immediate north and northeast (Gillette Building), to the south (two future buildings at and beyond the Broadway Station) and to the southwest (The Macallen and Court Square). To the southeast quadrant are lower buildings and to the northwest is a treed park, as shown in Image 1. Further away from the site are low-rise buildings and roadways, with the Boston downtown to the distant north, the airport to the northeast

Ground Floor

Second Level

Roof Top

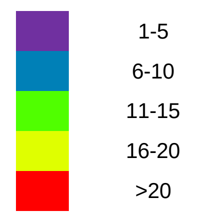
Image 2 – Floor Plans

3. Meteorological Data

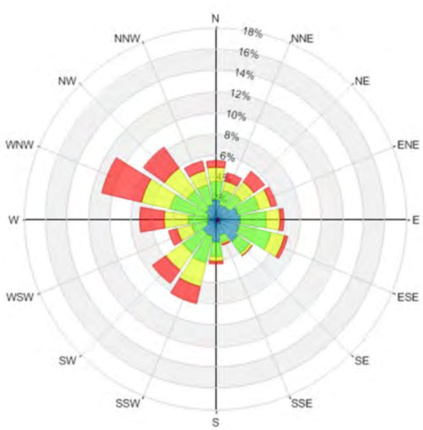
Wind statistics at Boston-Logan International Airport between 1981 and 2011 were analyzed for the spring (March to May), summer (June to August), fall (September to November) and winter (December to February) seasons. Image 3 graphically depict the distributions of wind frequency and directionality for these four seasons and for the annual period. When all winds are considered, winds from the northwest and southwest quadrants are predominant. The northeasterly winds are also frequent, especially in the spring.

Strong winds with mean speeds greater than 20 mph (red bands) measured at the airport are prevalently from the northwesterly directions throughout the year, while the southwesterly and northeasterly winds are also frequent.

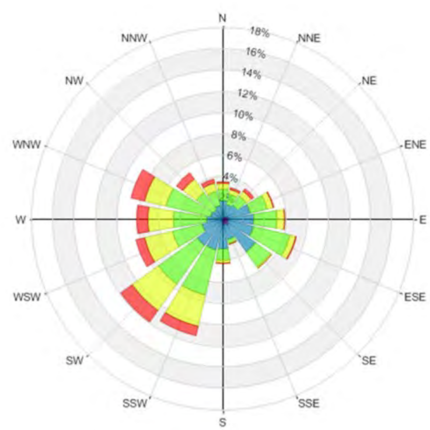
Therefore, winds from the northwest, southwest and northeast directions are considered most relevant to the current study, while winds from other directions are also considered in our analysis.



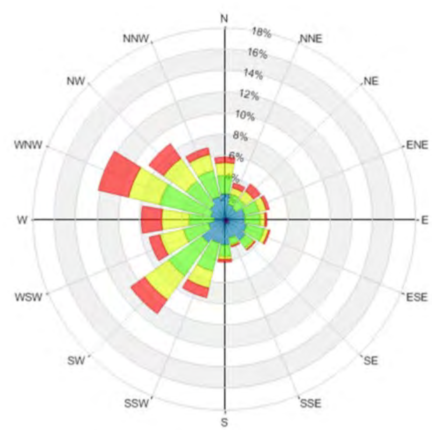
Annual Winds



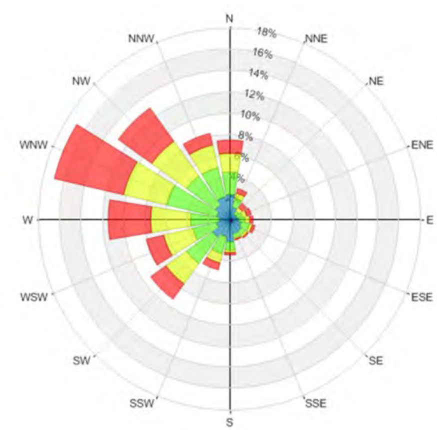
Spring (March to May)



Summer (June to August)



Fall (September to November)



Winter (December to February)

Image 3 - Directional Distribution (%) of Winds (Blowing From) - Boston Logan International Airport (1973 to 2011)

4. EXPLANATION OF CRITERIA

The BRA has adopted two standards for assessing the relative wind comfort of pedestrians. First, the BRA wind design guidance criterion states that an effective gust velocity (hourly mean wind speed +1.5 times the root mean square wind speed) of 31 mph should not be exceeded more than one percent of the time. The second set of criteria used by the BRA to determine the acceptability of specific locations is based on the work of Melbourne[4]. This set of criteria is used to determine the relative level of pedestrian wind comfort for activities such as sitting, standing, or walking. The criteria are expressed in terms of benchmarks for the 1-hour mean wind speed exceeded 1% of the time (i.e., the 99-percentile mean wind speed). They are as follows:

Table 1: BRA Mean Wind Criteria *

Dangerous	*> 27 mph*
Uncomfortable for Walking	*> 19 and ≤ 27 mph*
Comfortable for Walking	*> 15 and ≤ 19 mph*
Comfortable for Standing	*> 12 and ≤ 15 mph*
Comfortable for Sitting	*< 12 mph*

* Applicable to the hourly mean wind speed exceeded one percent of the time.

Pedestrians on walkways and parking lots will be active and wind speeds comfortable for walking are appropriate. Lower wind speeds comfortable for standing are desired for building entrances where people are apt to linger. For outdoor terraces, low wind speeds comfortable for sitting are desired during the summer. In the winter, wind conditions in these areas may not be of a serious concern due to limited usage.

The wind climate found in a typical downtown location in Boston is generally comfortable for the pedestrian use of sidewalks and thoroughfares and meets the BRA effective gust velocity criterion of 31 mph. However, without any mitigation measures, this wind climate is likely to be frequently unsuitable for more passive activities such as sitting.

4. Melbourne, W.H., 1978, "Criteria for Environmental Wind Conditions", *Journal of Industrial Aerodynamics*, 3 (1978) 241 - 249.

5. PEDESTRIAN WIND CONDITIONS

5.1 Background

Predicting wind speeds and occurrence frequencies is complicated. It involves building geometry, orientation, position and height of surrounding buildings, upstream terrain and the local wind climate. Over the years, RWDI has conducted more than 2,000 wind-tunnel model studies on pedestrian wind conditions around buildings, yielding a broad knowledge base. This knowledge has been incorporated into RWDI's proprietary software that allows, in many situations, for a qualitative, screening-level numerical estimation of pedestrian wind conditions without wind tunnel testing.

The development site is sheltered by the existing buildings to the northeast and southwest, but fully exposed to the predominant winds from the northwest quadrant. The existing wind conditions on and around the development site are likely comfortable for walking on an annual basis, with uncomfortable winds from time to time in the winter.

The proposed building is similar or slightly taller than the existing buildings to the northeast and southwest. It has an overhang above the main entrances along the west façade and a one-story podium at both the south and north ends. These are positive design features for wind control. However, the large west façade of the proposed development will intercept the prevailing northwesterly winds and deflect them down to the southwest corner of the building (Image 4a). In addition, wind may accelerate along West 2nd Street and West Broadway through the gap between the proposed and existing buildings, where increased wind activity is anticipated (Image 4b).

Image 5 is an illustration of the northwesterly winds flowing around the proposed and existing buildings.

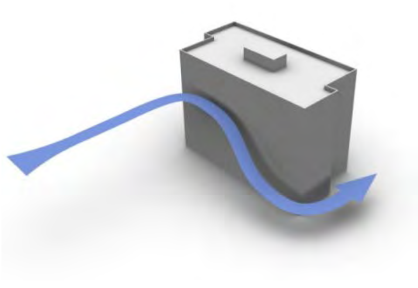


Image 4a - Corner Acceleration

Image 4b - Channeling Effect

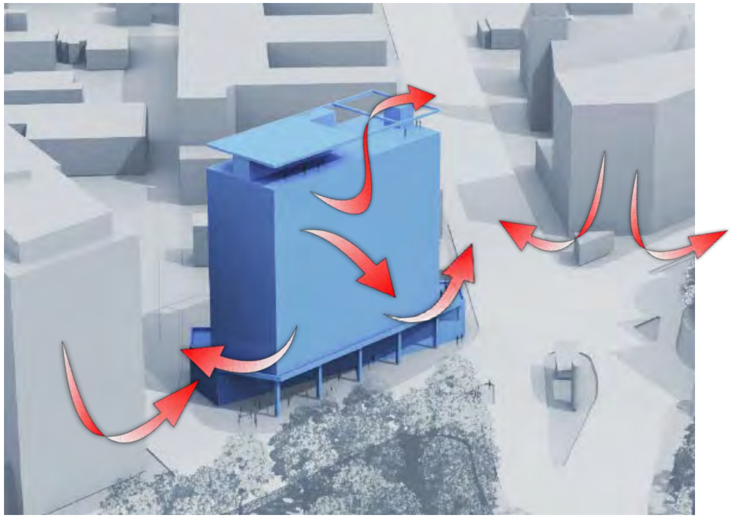


Image 5 – Flow Pattern of Northwesterly Winds around Buildings

5.2 Potential Wind Conditions

Given the building size and local wind climate, it is our prediction that the future wind conditions on and around the site will meet the effective gust criterion in general. The following is a detailed discussion on pedestrian wind conditions in key pedestrian areas.

Building Entrances

The entrances to the hotel lobby and restaurant are located within an arcade under the proposed tower (Locations A1 and A2 in Images 2 and 5). The overhang will deflect the prevailing northwest winds away from the entrances, while the proposed building will also shelter the area from the northeast winds. However, the southwest and south winds may accelerate into the entrance area, as shown in Image 5, resulting in unsuitable wind conditions for building entrances from time to time.

It is our understanding that revolving doors will be used at the building entrances, which is a positive design feature to improve door operability. In addition to the boulevard trees proposed along the sidewalks around the development (see Image 2), wind screens or coniferous landscaping of 8 ft or taller should be included in the area on the south side of Entrances A1 and A2 (see Image 5). Two mitigation examples are provided in Image 6 for reference.

Sidewalks

Wind conditions on the sidewalks around the proposed development are expected to be suitable on an annual basis. At the northwest and southwest corners of the tower (Locations B1 and B2 in Image 2), increased wind activity is anticipated, with uncomfortable winds in the winter.

Inclusion of podium structures at both ends of the tower (Image 5) is a positive design feature for wind reduction at the grade level. If feasible, expanded podium structures or large canopies at the corners as well as additional coniferous landscaping along the sidewalk can be considered to improve the wind conditions around building corners.

Image 5 – Building Entrances and Potential Mitigation

Image 6 – Mitigation Examples for Entrances

6. SUMMARY

The proposed building is sheltered from the northeast and southwest winds, but exposed to the prevailing northwest winds. The tower is designed on a podium, with building entrances under the tower overhang. As a result, the future wind conditions on and around the site will meet the effective gust criterion and suitable wind conditions are predicted at building entrances and sidewalks in general.

Conceptual wind control measures have been provided for the areas around the building entrances and tower corners, in order to enhance the wind conditions.

7. APPLICABILITY OF RESULTS

In the event of any significant changes to the design, construction or operation of the building or addition of surroundings in the future, RWDI could provide an assessment of their impact on the design considered in this report. It is the responsibility of others to contact RWDI to initiate this process.

PROJECT NOTIFICATION FORM

SOUTH BOSTON HOTEL

Boston, Massachusetts

Prepared by

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