November 2015

Redevelopment of the Government Center Garage

WP-B1 Residential Building

Boston, Massachusetts

SUBMITTED TO
Boston Redevelopment Authority

PROPONENT
The HYM Investment Group, LLC on behalf of Bulfinch Congress Holdings, LLC

PREPARED BY
vhb

IN ASSOCIATION WITH
CBTarchitects
Howard/Stein-Hudson Associates, Inc.
Dirtworks, PC
Rubin and Rudman, LLP
The Green Engineer
WSP
Tishman Construction

November 16, 2015

Mr. Brian P. Golden, Director
Boston Redevelopment Authority
One City Hall Square
Boston, MA 02201

Re: **Expanded Project Notification Form**
Redevelopment of the Government Center Garage – WP-B1 Residential Building
One Congress Street, Boston, Massachusetts

Dear Mr. Golden:

On behalf of Bulfinch Congress Holdings, LLC ("BCH"), the owner of the proposed project, The HYM Investment Group, LLC ("HYM") as the proposed proponent (the "Proponent") is pleased to submit the enclosed Expanded Project Notification Form (EPNF) for a 486-unit residential building to be located along New Sudbury Street on the West Parcel as the first phase of the Redevelopment of the Government Center Garage project located at One Congress Street in downtown Boston (referred to herein as "WP-B1," or the "Proposed Project").

The Proposed Project is a component of the overall redevelopment plan for the Government Center Garage (the "Garage")—an approximately 2,310-space parking garage that creates a physical, visual, and perceptual barrier between its surrounding neighborhoods. Planned Development Area (PDA) No. 96, which sets the zoning (i.e., building height, massing, and uses) for the larger redevelopment plan includes a vibrant mixed use development consisting of six new buildings (or "Project Components") was approved by the Boston Redevelopment Authority (the "BRA") Board on November 14, 2013 and the Boston Zoning Commission (the "BZC") on December 11, 2013 under Article 80C, Planned Development Area Review of the Boston Zoning Code (the "Code"). In order to receive PDA approval, the proposed redevelopment plan was required to be reviewed under Article 80B, Large Project Review of the Code (the "Development Plan Project"). The Preliminary Adequacy Determination for the Development Plan Project was issued by the BRA on November 22, 2013.

According to the Development Review Procedures of the approved PDA, each individual building is anticipated to be subject to Large Project Review under Article 80B. Since the BRA has approved conceptual plans, this subsequent review and approval is intended to be focused on the advanced building and public realm design.

WP-B1 plays a critical role in the first step goal towards completely encompassing the southwestern portion of the Garage and will start to create a new and interesting in streetscape downtown Boston. By beginning to replace a massive unsightly barrier with an active residential and ground floor retail uses and upgraded streetscape, the Proposed Project will substantially contribute to improving the vitality, and the urban design and architectural character of the Government Center and Bulfinch Triangle areas. Overall, the Proposed Project will achieve many key goals and public benefits including, but not limited to:

- Take advantage of existing infrastructure developed to support the density of the downtown core and begin to revitalize an underutilized urban renewal era above-ground structured parking garage and use land efficiently providing a dense residential development.
- Become a catalyst for growth and redevelopment in the Government Center and Bulfinch Triangle neighborhoods.
- Provide 486 new housing units with approximately 64 units designated as affordable, per Boston's Inclusionary Housing Ordinance.
- Create over 500 construction jobs in all trades.
- Create approximately $1.5 million in new local real estate tax revenue.
- Enhance and activate New Sudbury Street along West Parcel with streetscape improvements and new ground-floor residential lobby and retail.
- Add a new Hubway bike share station on the East Parcel at the existing MBTA Haymarket bus facility.
- Incorporate sustainability throughout by targeting LEED Gold for New Construction, and thoughtfully planning for efficient use of energy and resources through all stages of design and during operations.

Requests for copies of this submittal should be directed to Lauren DeVoe at 617-607-0091 or via e-mail at ldevoe@vhb.com.

We look forward to working with you, your staff and the community in your continuing review of this project.

Very truly yours,

The HYM Investment Group, LLC

Thomas O'Brien
Managing Partner

Enclosure

Redevelopment of the Government Center Garage – WP-B1 Residential Building

Boston, Massachusetts

SUBMITTED TO	**Boston Redevelopment Authority** One City Hall Square Boston, MA 02201
PROPONENT	**The HYM Investment Group, LLC** on behalf of Bulfinch Congress Holdings, LLC One Congress Street, 10th Floor Boston, MA 02114
PREPARED BY	**VHB** 99 High Street, 10th Floor Boston, MA 02110

In association with:

CBTarchitects	The Green Engineer
Howard/Stein-Hudson Associates, Inc.	WSP
Dirtworks, PC	Tishman Construction
Rubin and Rudman, LLP	

November 2015

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Project Description

Consistent with Article 80 of the Boston Zoning Code and Enabling Act ("Article 80"), this Expanded Project Notification Form (EPNF) presents the first phase of the Redevelopment of Government Center Garage project—the residential building located on the West Parcel (WP-B1, or the "Proposed Project"). Refer to Figure 1.1 for site location and context. WP-B1 plays a critical role in the first step goal towards completely encompassing the southwestern portion of the Government Center Garage and will begin to create a new and interesting streetscape in downtown Boston.

The Proposed Project is a component of the overall redevelopment plan for the Government Center Garage (the "Garage")—a physical, visual, and perceptual barrier between the surrounding neighborhoods. Planned Development Area (PDA) No. 96, which sets the zoning (i.e., building height, massing, and uses) for the larger redevelopment plan including a vibrant mixed use development consisting of six new buildings (or "Project Components") was approved by the Boston Redevelopment Authority (the "BRA") Board on November 14, 2013 and the Boston Zoning Commission (the "BZC") on December 11, 2013 under Article 80C, Planned Development Area Review of the Boston Zoning Code (the "Code"). In order to receive PDA approval, the proposed redevelopment plan was required to be reviewed under Article 80B, Large Project Review of the Code (the "Development Plan Project"). The Preliminary Adequacy Determination for the Development Plan Project was issued by the BRA on November 22, 2013.

According to the Development Review Procedures of the approved PDA, each Project Component is anticipated to be subject to Large Project Review under Article 80B. Since the BRA has approved conceptual plans, this subsequent review and approval is intended to be focused on the advanced building and public realm design to confirm consistency with the PDA.

The following chapter provides a description of site context and existing conditions, an overview of the history and background of the Development Plan Project, and a description of the Proposed Project, including a summary public benefits and consistency with local, regional, and state planning goals and initiatives. Also provided is an overview of the public review and participation process and an outline of subsequent sections of this EPNF.

1.1 Site Context and Existing Conditions

Figures 1.2 and 1.3 present an aerial image and photographs of the Garage as it exists today, respectively. A remnant of the urban renewal era with an outdated program and planning form, the Proposed Project is located within a the southwest corner of the footprint of an antiquated and underutilized 11-story above-grade parking garage structure with failing retail (the "Proposed Project Site"). Refer to Figure 1.4 for the existing conditions site plan. The Garage is set on an approximately 4.82-acre site generally bounded by New Chardon Street to the north, the John F. Fitzgerald Surface Road (the "Surface Road")/Interstate-93 (I-93) Ramp Parcel to the east, New Sudbury Street to the south, and Bowker Street to the west (the "PDA Site").

The PDA Site and Proposed Project Site are located within the 1964 Government Center Urban Renewal District, the more recently established Government Center/Markets District (Article 45 of the Code), and the Sudbury Street Restricted Growth Area. The Proposed Project Site is immediately adjacent to Government Center—the location of Boston City Hall, Suffolk County courthouses, and state and federal office buildings. To the north of the Proposed Project Site is the Bulfinch Triangle, which consists of sports/entertainment uses (e.g., Boston TD Garden complex), offices, retail and residential buildings. The PDA Site is also nearby and/or connected to the following additional urban neighborhoods or distinct sections of the city:

- North End, which consists of residential and neighborhood retail, including restaurants;
- Bulfinch Triangle/Entertainment District, a neighborhood with a rich history which consists of a mix of commercial and residential uses, and, further north, the TD Garden, home to the Boston Celtics and Boston Bruins;
- Market District and the Rose F. Kennedy Greenway (also referred to herein as the "Greenway");
- Financial District, which primarily consists of office uses;
- West End, which consists of residential uses and, further northwest, institutional uses (e.g., hospitals/ medical offices); and
- Beacon Hill residential neighborhood.

This very mixed context offers the opportunity to create a very positive intervention and reconnect the PDA Site to these surrounding areas. The Proposed Project has the potential to unlock the value of the various uses in close proximity.

As identified on the existing conditions site plan presented in Figure 1.4, the Proposed Project Site is composed of a portion of the western end of the existing garage structure and a portion of the adjacent public sidewalk on the northern side of New Sudbury Street. The Proposed Project Site is generally bounded by New Sudbury Street to the south, Bowker Street to the west, and the existing garage structure to the north and east. New Sudbury Street is a one-way local street connecting from Cambridge Street and Beacon Hill to I-93 northbound and the North End at Surface Road/Washington Street northbound. Bowker Street, which is located to the west of the Proposed Project Site is a one-way local street that continues from Hawkins Street to New Chardon Street.

1.2 Project Background and History

The Garage was built in the late 1960's as part of an urban renewal project – the Government Center Urban Renewal District, which mandated the clearance of numerous residential and commercial buildings for the construction of local, state, and federal government offices and other related facilities (residential uses were prohibited). This resulted in the construction of a mega-block parking garage, which visually and physically divided and disrupted the urban neighborhoods and districts around it. Conceived at a time when auto-centric policy dominated, the existing underutilized 2,310-space parking garage adds little to the vitality of the area around it and in many ways detracts from the vibrancy of this section of downtown Boston.

Bulfinch Congress Holdings, LLC ("BCH") as the owner of the Proposed Project, is the single purpose entity comprised of the National Electrical Benefit Fund ("NEBF"). BCH purchased the property in 2007 with the primary goal of redeveloping the Garage. In 2010, BCH brought on The HYM Investment Group, LLC ("HYM")—a Boston-based real estate company focused on the acquisition, development, and management of complicated urban mixed-use projects—to operate the Garage and develop a viable redevelopment plan on behalf of BCH (the "Proponent").

The prime objective of the Development Plan Project is to break-up the existing 1960's urban renewal mega-block by opening Merrimac Street (referred to herein as Congress Street)[1] to air and daylight and creating two new vibrant, mixed use, appropriately scaled urban blocks (the "West Parcel and "East Parcel") with active and pedestrian-friendly ground floors and unique public spaces that will reconnect the areas around it. The Development Plan Project aims to be a leader in sustainable, transit-oriented, and integrated redevelopment that will serve as a catalyst for further redevelopment of the Government Center area. By bringing back uses, such as residential and retail (which previously existed prior to 1960's urban renewal of the area) and introducing new office tenants from the new economy (high tech and creative industry), the Development Plan Project will revitalize the area, which is currently dominated by government office use.

1.2.1 Overview of the Development Plan Project Review

As part of the approval of the PDA, the Development Plan Project was subject to review under Article 80B. The Proponent commenced Large Project Review by filing a Letter of Intent (LOI) with the BRA on June 21, 2011, which indicated the Proponent's intent to submit a Project

1 The portion of the public way that runs under the Garage is commonly referred to as Congress Street; however, according to the City of Boston's Street Book, it is named Merrimac Street.

Notification Form (PNF) in connection with the Development Plan Project (i.e., for approval of the conceptual master plan). Filed on June 5, 2013, the PNF presented details about the Project and provided information and preliminary analysis of transportation, environmental protection, infrastructure, and other components in order to inform the city agencies and neighborhood residents about the Development Plan Project, potential impacts and proposed mitigation (the "2013 PNF"). Notice of the BRA's receipt of the 2013 PNF was published in the Boston Herald on June 6, 2013, which initiated the reconvening of the Mayoral-appointed Impact Advisory Group (IAG) and a 30-day public comment period. The Proponent agreed to an extension of the public comment period, which was requested by the BRA and community. Pursuant of Section 80B-5.3 of the Zoning Code, a scoping session was held on June 19, 2013 with the City of Boston's public agencies, at which time the Project was reviewed and discussed. Members of the IAG were also invited to attend the scoping session.

Written comments on the 2013 PNF were submitted to the BRA from elected officials and the City's public agencies as well as community organizations and the general public (i.e., local residents and business owners). On August 9, 2013, the BRA issued the Scoping Determination, which outlined additional information and analyses required for continued agency and public review. The Proponent submitted a Draft Project Impact Report (DPIR) on August 23, 2013 (the "2013 DPIR").

Simultaneously, in August 2013, the BZC adopted the Greenway District Overlay with revised zoning codes for this area, which includes the PDA Site. In connection with this overlay, the BRA proposed adoption of zoning controls for certain areas within the Greenway District, including the PDA Site. On September 13, 2013, a PDA Development Plan was submitted to the BRA and public for review and approval of zoning relief in accordance with Article 80C of the Code. The PDA set forth the proposed location and appearance of structures, open spaces and landscaping, uses of the area, densities, traffic circulation, parking and loading facilities, access to public transportation, and dimensions and heights of structures. After a public hearing on November 14, 2013, the BRA Board unanimously voted to approve the PDA Development Plan and issued a Preliminary Adequacy Determination, waiving further review in accordance with Article 80 of the Boston Zoning Code. And on December 11, 2013, the BZC voted to approve the PDA.

According to the Development Review Procedures of the approved PDA, each of the Project Components is anticipated to be subject to Large Project Review under Section 80B of the Zoning Code. Since the BRA has approved conceptual plans, this subsequent review and approval is intended to be focused on the advanced building and public realm design to confirm each Project Component's consistency with the Development Plan Project. Minor modifications or design refinements related to site improvements, public spaces, building massing or exterior facades, roofscapes, public spaces, transportation mitigation, parking or service/loading are to be subject of this review without amendment of the PDA unless the BRA determines changes are not consistent with the Development Plan Project.

1.2.1.1 Overview of Agency Coordination on the Development Plan Project

City agencies had the opportunity to review the Development Plan Project and its potential impacts as part of the extensive Article 80 review process. In addition to the BRA meetings on the 2013 PNF and DPIR filings, the Proponent held multiple separate meetings with the City's environmental staff of the Boston Environmental and Energy Services Department. Specifically, the group discussed the Development Plan Project's ability to achieve a high level of sustainability as well as addressing other typical environmental issues, including preliminary pedestrian wind and shadows studies.

The Proponent also held numerous meetings with BTD staff and a joint meeting with Department of Public Works (DPW) (at their request to hold a joint meeting) to provide an overview of the Development Plan Project, and to discuss how DPW and BTD can coordinate on items, such as utilities, parking, and traffic implications with respect to the Development Plan Project.

The Proponent met with the Boston Landmarks Commission (BLC) staff to share an update on the ongoing review by the Massachusetts Historical Commission (MHC) and provided all supplemental information submitted in response to MHC's review comments. At the BLC meeting, it was confirmed that the Garage building is not subject to Article 85 (Demolition Delay) of the Boston Zoning Code because only partial demolition is proposed.

1.2.2 Overview of Massachusetts Environmental Policy Act (MEPA) Review

Following BRA approvals of the Development Plan Project, the Proponent commenced review under the Massachusetts Environmental Policy Act (MEPA) by filing an Expanded Environmental Notification Form (EENF) in December 2013. The almost 11-month MEPA review process allowed for continued public review, and state agency review and comment. On October 31, 2014, the Secretary of the Executive Office of Energy and Environmental Affairs (EEA) determined the Master Plan adequately and properly complied with MEPA and its implementing regulations.

1.3 Proposed Project Description

As shown in the proposed conditions site plan presented in Figure 1.5, the approximately 547,940-square foot Proposed Project will introduce 486 residential units (apartments) with resident amenities and ground floor retail to New Sudbury Street. Refer to Figure 1.6 for a ground-level project rendering along New Sudbury Street. A summary of the Proposed Project program is provided in Table 1.1 below.

TABLE 1.1 PROPOSED DEVELOPMENT PROGRAM FOR WP-B1

Use	Size	Quantity
Residential (Apartments)	546,640 GSF	486 units[1]
Ground-floor Retail	1,300 GSF	NA
Total	**547,940 GSF**	

GSF Gross Square Feet
1 Includes a unit mix of studio, 1-, 1+-, 2-, 2+ and 3-bedroom units. Approximately 64 units (or 13%, per the PDA) will be designated affordable.

Since the PDA approval, the Proposed Project has been refined as follows:

- Shaped/varied massing
- Slightly more overall gross square footage (approximately 4,600)
- Approximately 22 additional residential units.

Refer to Section 2.5.1 of Chapter 2, *General Information and Regulatory Context* for a more detailed comparison to the PDA dimensional requirements.

1.3.1 Proposed Building Design Overview

The proposed design approach is to create an elegant residential building that graciously adds depth and character to its community and urban fabric. Rather than emulating existing Boston architecture, the Proposed Project design will complement the city skyline with a fresh contemporary design based on resiliency and sustainability.

The overall intent of introducing a new residential use is to begin to activate the PDA Site and surrounding neighborhood throughout the day, and bring new life and energy to New Sudbury Street in the evening hours. The Proposed Project design, as described further in Chapter 3, *Urban Design*, aims to distinguish it from the nearby office buildings and highlight its distinct residential role in the neighborhood.

1.3.2 Proposed Public Realm Improvements

The proposed ground-level enhancements are focused in three key areas: residential lobby entrance; retail; and the major reconstruction of an existing pedestrian connection where Bowker Street connects with New Sudbury Street on the westernmost edge of the Proposed Project Site. In order to accommodate the Proposed Project Site footprint, New Sudbury Street will be modified. The existing Boston Police Department (BPD)-designated angled on-street parking along the north side of New Sudbury Street (as well as some on-street BPD spaces on Bowker and Hawkins Streets) will be relocated into the Garage. In addition, the eastbound New Sudbury Street approach to the Congress Street intersection will be reduced to three lanes (a left turn lane, a through lane, and shared through/right turn lane). As described more fully in Chapter 3, *Urban Design*, the ground floor of the Proposed Project will feature a double-story residential lobby to create a sense of place accompanied by a ground floor retail space to further activate the streetscape and complement the diverse mix of uses in the neighborhood. The proposed design of the retail space creates an opportunity for café seating along New Sudbury Street.

Pavement treatments used within the various frontage, pedestrian, and furnishing zones will guide users through the public environment, maintaining accessible connections to adjacent interior spaces. Street trees and annual/perennial plantings define the street edge, as well as enhance pedestrian user experience. The general landscape palette consists of native or adapted species.

In addition to public realm enhancements along the building face, the Proponent proposes to undertake a significant reconstruction of the existing Bowker Street/New Sudbury Street pedestrian connection, which currently is non-ADA accessible concrete stair case. This pedestrian connection will be upgraded to include a new ADA accessible pathway along with new landscaping elements.

1.3.3 Access and Circulation

Resident parking will be provided within the existing Garage. Garage access/egress will be located at either end of the Proposed Project to provide vehicular access without disturbing the streetscape and pedestrian experience. As with the Development Plan Project, vehicular access to the Proposed Project will be directed along New Sudbury Street to the existing garage entrance located at the east end of the proposed residential building (Figure 1.5). Vehicular egress is located at the existing garage vehicular exit ramp located at the west end of the proposed residential building (Figure 1.5).

1.3.4 Parking

As discussed in Chapter 4, *Transportation and Parking*, the parking demand ratio assumed for WP-B1 is about 0.50 spaces per unit yielding a parking supply requirement of approximately 245 spaces. The existing Garage parking capacity is 2,310 spaces; the majority of which will remain after the construction of the Proposed Project and, therefore, ample parking will be available for the residential building. Dedicated residential parking spaces are not anticipated for the Project at this time.

1.3.5 Project Schedule

The Proposed Project is proposed to start construction in late 2016 or early 2017. The total construction duration for the Proposed Project is anticipated to be approximately 38 months.

1.4 Summary of Public Benefits

The public benefits of the Proposed Project include significant urban design and public realm improvements, job creation, and additional tax revenues. The Proposed Project will substantially contribute to improving the vitality, and the urban design and architectural character of the Government Center and Bulfinch Triangle areas, and will include some level of public benefits/amenities. The public benefits associated with the Proposed Project are listed below.

Public Realm

- Create 18/7 activity by bringing new residents to an area that often has little activity after 5PM.
- Begin to enclose the existing garage structure with dynamic ground floor retail and residential lobby as well as active residential units on the upper floors.
- Enhance and activate New Sudbury Street along West Parcel with streetscape improvements and new ground-floor residential lobby and retail.
- Enhance the existing neglected and degraded public pedestrian mid-block connection from New Sudbury Street to Bowker Street.

Transportation

- Utilize the extensive transportation infrastructure currently serving the Proposed Project Site, including the MBTA Haymarket subway and bus station and access to I-93.
- Implement Boston Complete Street Guidelines with provisions of a new bicycle lane and enhanced pedestrian facilities along New Sudbury Street.
- Provide on-site bicycle storage facility for residents and exterior at-grade short-term bike parking for visitors and customers.
- Add a new Hubway bike share station on the East Parcel at the existing MBTA Haymarket bus facility.
- Provide garage parking for displaced BPD (42 spaces).

Sustainability

- Take advantage of existing infrastructure developed to support the density of the downtown core.
- Begin to revitalize an underutilized urban renewal era above-ground structured parking garage and use land efficiently providing a dense residential development.
- Incorporate sustainability throughout by thoughtfully planning for efficient use of energy and resources through all stages of design and during operations.

- Provide a unique and sustainable project through the redevelopment and reuse of the existing Garage and by utilizing the Leadership in Energy and Environmental Design (LEED) Green Building Rating System, in compliance with Article 37 of the Code, targeting a LEED for New Construction Gold rating.
- Provide for beneficial impacts on water quality through the process of redevelopment and updating to current stormwater management standards, including rainwater harvesting for on-site re-use, and phosphorous mitigation.
- Lease and operate the buildings in a sustainable manner (i.e., following construction of each component, develop Tenant Manual/Guidelines to ensure that the sustainability efforts are implemented throughout operation).
- Add five (5) Electric Vehicle (EV) charging stations to the existing garage and provide preferred parking for low-emitting/fuel-efficient vehicles.

Social & Economic

- Become a catalyst for growth and redevelopment in the Government Center and Bulfinch Triangle neighborhoods.
- Provide 486 new housing units with approximately 64 units designated as affordable, per Boston's Inclusionary Housing Ordinance.
- Support the future Boston Public Market by introducing new uses to the area, which will bring new residents, customers, and employees.
- Create over 500 construction jobs in all trades.
- Create approximately $1.5 million in new local real estate tax revenue.

1.5 Consistency with Public Planning

WP-B1, as currently programed and designed, remains consistent with a number of the City's planning goals and initiatives for redevelopment of the area, as demonstrated in the 2013 DPIR. These include: (i) the Greenway District Planning Study Use and Development Guidelines (specifically, the Market District and Government Center sub-district); (ii) the Crossroads Initiative; (iii) Boston Complete Streets Guidelines; (iv) the Climate Action Plan; (v) the updated Open Space Plan; (vi) Article 45, Government Center/Markets District of the Zoning Code; and (vii) Article 37, Green Buildings of the Zoning Code. Also, the Project supports many regional and state-wide planning goals and initiatives.

1.6 Community Outreach

During the review and approval process of the Development Plan Project the Proponent was engaged in a highly public and transparent process to inform reviewing city and state agencies, elected officials, community representatives, and the general public. The Proponent is committed to maintaining an open dialogue on the Proposed Project with interested parties.

1.6.1 Community Engagement

The public has had the opportunity to review the Development Plan Project and its potential impacts as part of the Article 80 review (i.e., the 2013 PNF and DPIR filings) and PDA Plan review as well as the state MEPA review. To date, the Proponent has held over 50 meetings with various city departments, state agencies, civic organizations, community groups/community representatives, elected officials, and individual stakeholders.

In addition to the BRA public hearing held on June 19, 2013, the BRA review process included a series of Impact Advisory Group (IAG) meetings—all of which were made open to the public and were publically advertised—to go over the Project and specific topics, as needed/requested. IAG working sessions were held on June 12, June 19, June 26, July 10, August 7, August 23, 2013 and September 26, 2013 at Boston City Hall that were made open to the public and were publicly advertised.

The Proponent also created a project website, www.governmentcentergarageredevelopment.com, on which the presentations from each of the community meetings, including the community meetings that were held by the Proponent prior to the 2013 PNF submission as well as the community meetings and IAG working session meetings held during the review of the 2013 PNF and DPIR filings, can be downloaded. The public was notified of public meetings and Development Plan Project status/updates through the use social media, including Facebook, Twitter, and Google+ postings.

During the MEPA review process, the Proponent continued to meet with various city agencies/departments as well as departments of the MBTA and the MEPA staff. As required by the MEPA regulations, a public on-site scoping meeting was held on January 6, 2014, and both the EENF and DEIR were distributed and made available for public review and posted to the project website.

The Proponent remains committed to providing the public with the opportunity to review the design review document(s) for the Proposed Project as well as other future phases of the Development Plan Project, and will likely continue to meet with city and state agencies, elected officials, community representatives, and the general public on a regular basis, particularly during the design review process.

1.6.2 Impact Advisory Group

In connection with a prior proposal for the Development Plan Project, the BRA solicited IAG nominations. Such nominations were obtained from the local elected representatives and city councilor, as well as recommendations from the Offices of Neighborhood Services and City Councilors at Large. Nominations were also obtained from the BRA. The following are the present members of the IAG for the Proposed Project:

- Ms. Deborah Connors
- Ms. Jane Forrestall

- Ms. Francine Gannon
- Ms. Linda Jonash
- Ms. Martha Maguire
- Mr. Joe McDonald
- Mrs. Martha McNamara
- Ms. Kimberly Paikos
- Mr. David Roderick
- Mr. Jay Walsh

As with the previous Article 80 review process, in addition to the required BRA public hearing, the Proponent will hold IAG meetings during Article 80B review process for the Proposed Project—all of which will be made open to the public and publically advertised. These meetings are intended to go over the Proposed Project, including current building design and public realm improvements as well as specific topics, as needed/requested.

1.7 EPNF Report Contents

A description of enhancement to the public realm and assessment of potential environmental and community impacts was provided as part of the previous City of Boston Article 80 (the 2013 PNF and DPIR filings) as well as state MEPA review filings for the Development Plan Project. In accordance with the approved PDA, based on current WP-B1 building design, this EPNF presents an update to development-related issues, such as urban and architectural design, sustainable and green building design, transportation, environmental impact categories, infrastructure needs, and historic resources.

Chapter 2: General Information and Regulatory Context provides general information, including, a description of the Applicant/Proponent and project team, legal information, site ownership information, and a description of regulatory controls and approvals anticipated for the Proposed Project.

Chapter 3: Urban Design provides detailed descriptions of design development of the proposed residential building visual and architectural features as well as urban design/public realm improvements with supporting graphics.

Chapter 4: Transportation and Parking presents an update on traffic/transportation- and parking-related elements based on the more specific design and building program of the Proposed Project. The updated transportation study provides a more focused 5-year horizon compared to the 15-year full-build horizon analyzed for the Development Plan Project and includes a comprehensive assessment of the potential transportation impacts, including traffic, transit, pedestrian, bicycle, parking, and building service and loading requirements.

Chapter 5: Environmental Protection presents updated findings from the environmental studies that assess the potential Proposed Project-related impacts and the proposed feasible measures intended to mitigate, limit, or minimize those impacts.

Chapter 6: Sustainability/Green Building and Climate Change Preparedness provides an update to the sustainable design elements being considered for the Proposed Project based on a more advanced building design to continue to demonstrate compliance with Article 37 of the Code. This chapter also discusses the approach to preparing for changes in climate change, in accordance with the BRA Climate Change Resiliency and Preparedness Policy.

Chapter 7: Infrastructure describes the anticipated water consumption and sewage generation, and proposed utilities, including stormwater management facilities required for the Proposed Project.

Chapter 8: Historic Resources identifies any historic properties /districts within close proximity of the Proposed Project Site, and describes any effects to these properties and proposed mitigation as a result of the Proposed Project.

Supporting attachments include:

- Appendix A: Letter of Intent
- Appendix B: Transportation Supporting Documentation
- Appendix C: Pedestrian Wind Study Supporting Documentation
- Appendix D: Solar Glare Study Supporting Documentation
- Appendix E: Air Quality Supporting Documentation
- Appendix F: BRA Checklists
- Appendix G: List of Abutters
- Appendix H: Disclosure Form

Source: 2008 MassGIS 15cm Aerial

Figure 1.1

Site Location and Context

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

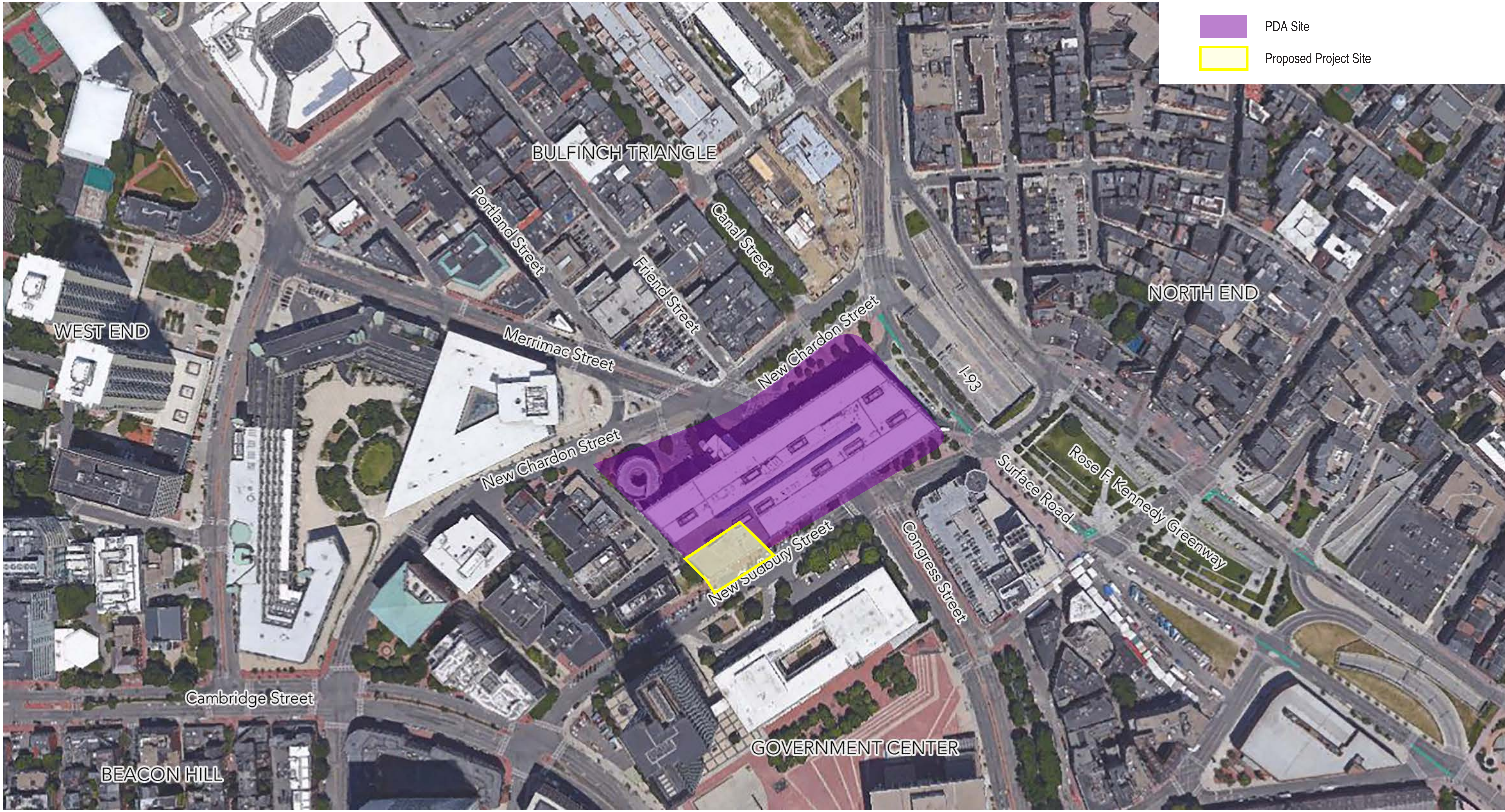
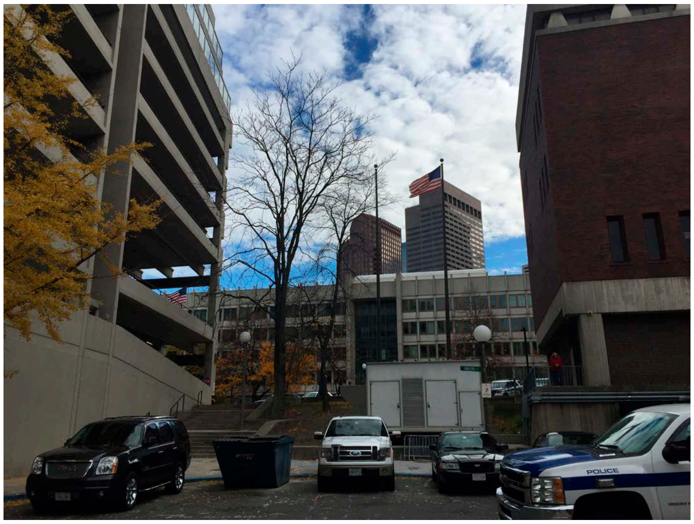


Figure 1.2

Aerial Image of the Existing Garage

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



Bowker Street

New Sudbury Street

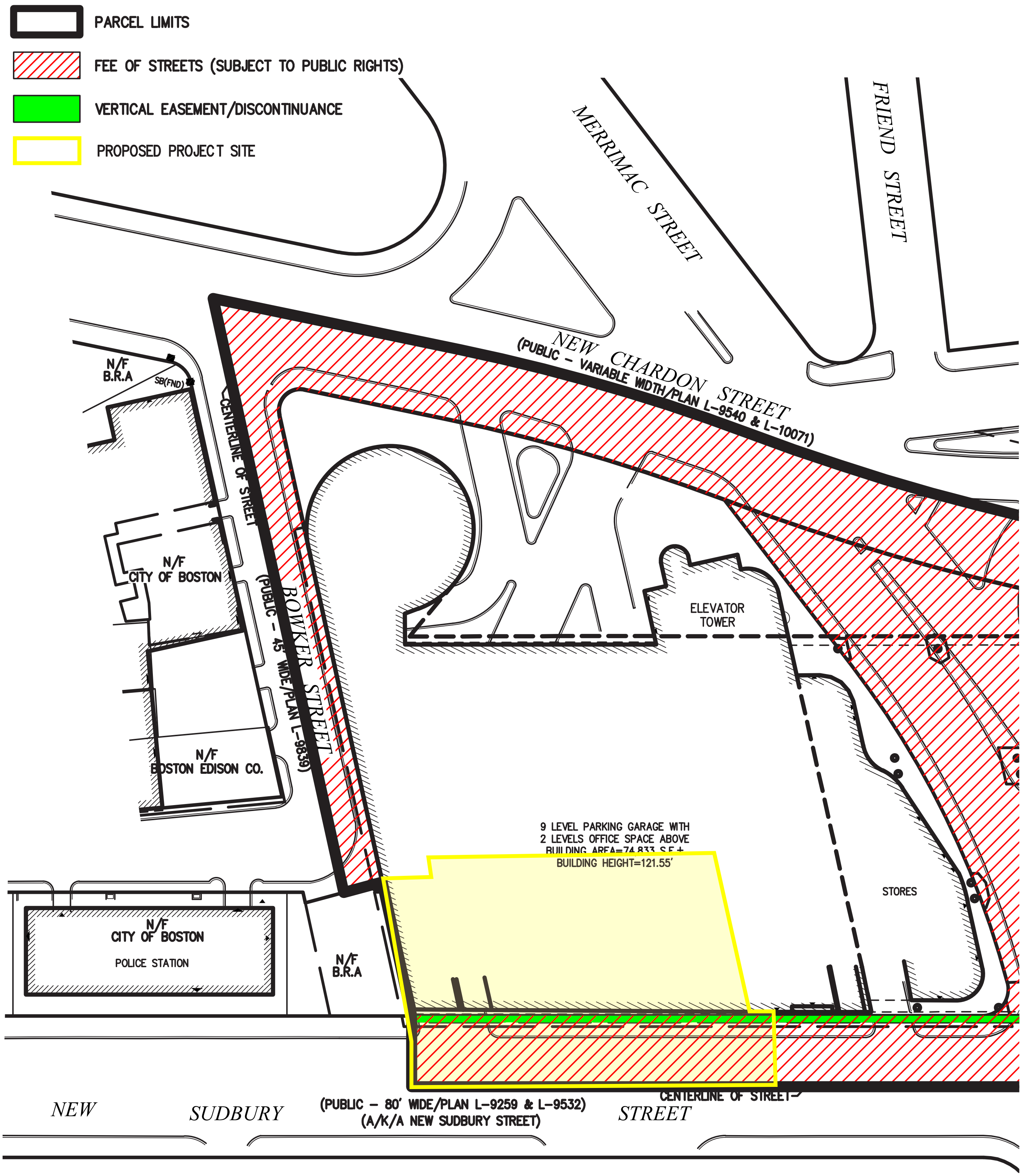
New Sudbury Street

Congress Street and New Sudbury Street Intersection

Figure 1.3

Existing Site Photos

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



Source: The property lines shown on this plan are based upon an actual field survey conducted by VHB in January, 2007 and from deeds and plans of record.

Figure 1.4

Existing Conditions Site Plan

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

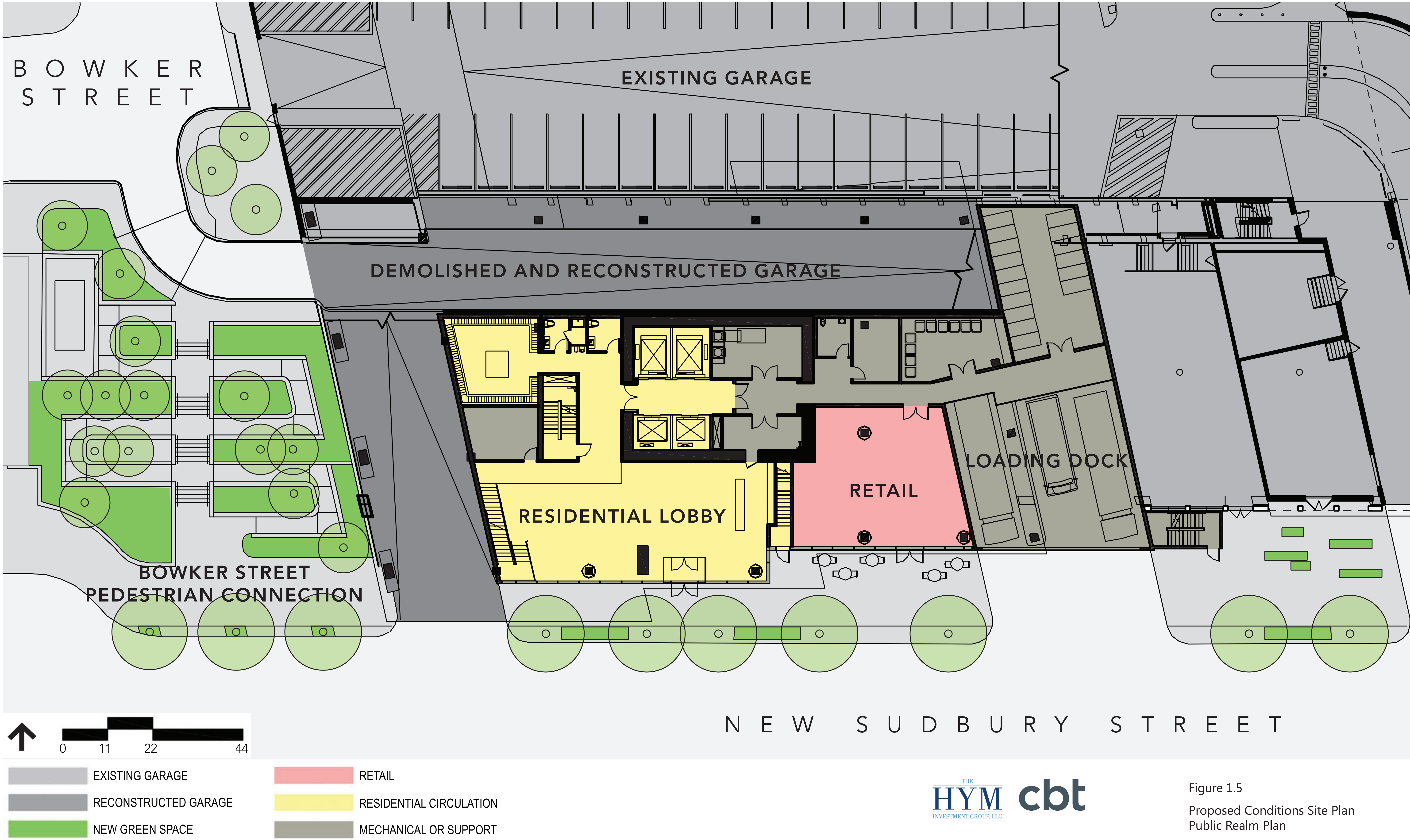


Figure 1.5

Proposed Conditions Site Plan
Public Realm Plan

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

Source Info

Source Info

Figure 1.6

Project Rendering

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

2

General Information and Regulatory Context

The following chapter provides general information, including, a description of the Applicant/Proponent and project team, legal information, site ownership information, and a description of regulatory controls and approvals anticipated for the Proposed Project.

2.1 Applicant/Proponent Information

The Applicant, Bulfinch Congress Holdings, LLC (or BCH) as the owner of the Proposed Project, is the single purpose entity comprised of the National Electrical Benefit Fund ("NEBF"). Refer to Appendix H for an updated Disclosure Form. BCH purchased the property in 2007 with the primary goal of redeveloping the Garage. In 2010, BCH brought on HYM to operate the Garage and develop a viable redevelopment plan on behalf of BCH.

HYM, as the Proponent, is a Boston based real estate company focused on the acquisition, development and management of complicated urban mixed-use projects. For over 35 years, HYM's principals have been working on real estate ventures in the Boston, New York and Washington, DC corridor. HYM develops, invests, owns and manages real estate assets for its own portfolio and on behalf of major institutional and private investors. HYM is committed to making a positive impact on the communities it works within. In addition to the Proposed Project, HYM is currently providing a variety of development management and/or advisory services for approximately 9.5 million square feet, including NorthPoint, a 45-acre mixed-use development located primarily in Cambridge where a portion of the site lies in Somerville, and Boston Landing, a proposed 1.6 million square foot mixed use campus along the Massachusetts Turnpike in Boston's Brighton neighborhood. HYM was also heavily involved in recently completed Twenty|20, a 355-unit residential tower in East Cambridge, and Waterside Place, a 237-unit apartment tower in Boston's Seaport District.

2.2 Development Team

The following lists the key members of the development team for the Proposed Project:

Developer/Proponent	The HYM Investment Group, LLC on behalf of Bulfinch Congress Holdings, LLC One Congress Street, 10th Floor Boston, MA 02114 (617) 248-8905 *Contacts:* Thomas N. O'Brien, Managing Director Douglas J. Manz, Director of Development
Architect	CBTarchitects 110 Canal Street Boston, MA 02114 (617) 262-4354 *Contacts:* David Hancock, Principal Kenneth Lewandowski, AIA, LEED AP, Associate Principal
Legal Counsel	Rubin and Rudman, LLP 50 Rowes Wharf Boston, MA 02110 (617) 330-7000 *Contact:* James Greene, Attorney
Civil Engineering, Permitting, Historic Advisor	VHB, Inc. 99 High Street, 10th Floor Boston, MA 02110 617-728-7777 *Contacts:* Howard Moshier, P.E., LEED AP, Senior Project Manager Lauren DeVoe, AICP, LEED AP-BD+C, Senior Environmental Planner Rita Walsh, Senior Preservation Planner
Traffic Engineer	Howard/Stein-Hudson Associates, Inc. 11 Beacon Street, Suite 1010 Boston, MA 02108 617.482.7080 *Contact:* Guy Busa, Jr., Principal
Mechanical, Electrical, and Plumbing Engineer	WSP 88 Black Falcon Avenue, Suite 210 Boston, MA 02210 (617) 210-1600 *Contact:* Tom Burroughs, PE, LEED AP, Senior Vice President of Building Systems
Sustainable Design Consultant	The Green Engineer 54 Junction Square Drive Concord, MA 01742 (978) 369-8978 *Contacts:* Chris Schaffner, PE, LEED Fellow, Principal and Founder Sarah Michelman, RA, LEED AP BD +C, Senior Project Manager

Landscape Architect	Dirtworks, PC 315 West 39th Street, Studio #910 New York, NY 10018 (212) 529-2263 *Contact*: David Kamp, FASLA, LF, NA, President
Construction Manager	Tishman Construction Corporation, New England Region An AECOM Company 66 Long Wharf, 2nd Floor Boston, MA 02110 (857) 383-3908 *Contact:* Jeffrey A. Eamer, First Vice President

2.3 Legal Information

2.3.1 Legal Judgments or Actions Pending Concerning the Proposed Project

There are no legal judgments or suits which would affect the ability of the Applicant to proceed with the Proposed Project.

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

The property is identified as 50 New Sudbury Street, Ward 3, Parcel 2700. There are no outstanding real estate taxes owed on the property.

2.3.3 Evidence of Site Control

The Proposed Project is a component of the PDA Site, which is owned by BCH, pursuant to a Deed dated February 28, 2007 recorded with the Suffolk County Registry of Deeds in Book 41381, Page 316 and noted on Certificate of Title No. 124328 (the "Property"). The Deed specifically references that the Property includes the fee interest to the centerlines of North Washington Street, (New) Sudbury Street, Bowker Street and New Chardon Street, subject to the rights of the public in these areas. The Property also includes certain overhead and subsurface areas that have been discontinued by the Public Improvement Commission in Merrimac Street, (New) Sudbury Street, Bowker Street and New Chardon Street. The Property is also subject to an easement for the public in Merrimac Street and an MBTA easement on North Washington Street.

2.3.4 Site Control/Public Easements

The Applicant acquired the Property at 50 New Sudbury Street by deed dated February 28, 2007 and recorded with Suffolk County Registry of Deeds in Book 41381, Page 316 on March 1, 2007. The property is subject to easement to the MBTA, a Maintenance Agreement with the City of Boston Public Improvements Commission (PIC), and an easement for structural supports from the BRA.

2.4 Proposed Project Site Description/Ownership

The Garage was built in the late 1960's as part of an urban renewal project – the Government Center Urban Renewal District, which mandated the clearance of numerous residential and commercial buildings for the construction of local, state, and federal government offices and other related facilities (residential uses were prohibited). This resulted in the construction of a mega-block parking Garage, which visually and physically divided and disrupted the urban neighborhoods and districts around it. Conceived at a time when auto-centric policy dominated, the existing underutilized 2,310-space parking Garage adds little to the vitality of the area around it and in many ways detracts from the vibrancy of this section of downtown Boston.

The Garage was initially constructed to serve short-term parkers with a capacity of 1,865 commercial public parking spaces. In 1990, approximately 256,532 square feet of office space was added in two levels above the existing ninth floor of the Garage. At that time, 445 new parking spaces were added through reconfiguration and restriping in order to support the new office space, increasing the Garage capacity to approximately 2,310 spaces. Approximately 37,602 square feet of retail space is also part of the existing Garage, mostly along Congress Street, and has historically been heavily underutilized.

2.4.1 Existing Proposed Project Site Conditions and Ownership

The Proposed Project Site, as identified on Figure 1.4, consists of 19,510 square feet, or 0.45 acres, is composed of a portion of the existing Garage structure and adjacent roadway areas owned in fee by the Applicant. The Proposed Project Site is generally bounded by New Sudbury Street to the south, Bowker Street to the west, and the existing Garage structure to the north and east. New Sudbury Street is a one-way local street connecting from Cambridge Street and Beacon Hill to I-93 northbound and the North End at Surface Road/Washington Street northbound. Bowker Street, which is located to the west of the Proposed Project Site is a one-way local street that continues from Hawkins Street to New Chardon Street.

Site ownership is recorded as a single parcel of land from the center lines of Bowker, New Chardon, and New Sudbury Streets to the state highway property line. Various easements exist on, over, and under the parcel, which allow access for public streets and utilities, and for surface and underground construction and operation of MBTA bus and subway systems.

This EPNF is for design review and approval of the Proposed Project and is not considered to be a subdivision or "condominium" of parcels for purposes of determining specific boundaries of the parcel. Consistent with the PDA, each parcel, or Project Component, will likely have separate owners, but this has not yet been defined in detail. The specific information on the current ownership is outlined in Table 2.1 below.

TABLE 2.1 WP-B1 SITE OWNERSHIP INFORMATION

Assessing Parcel #:	0302700-000
Address (Existing):	50 New Sudbury Street (Legal)
	One Congress Street (Secondary)
Address (Proposed):	75 New Sudbury Street
	Boston, MA, 02114
Ownership:	Bulfinch Congress Holdings, LLC
Lot Size:	19,510 square feet (0.45 acres)
Gross Building Area:	Proposed: 547,940 GSF
Occupancies/Tenancies:	Proposed: 546,640 GSF Residential (486 units), 1,300 GSF Retail, and Parking[1]

GSF Gross Square Feet

1 The existing Garage parking capacity is 2,310 spaces the majority of which will remain after the construction of the Proposed Project; therefore, ample parking will be available for the residential building. Dedicated residential parking spaces are not anticipated for the Proposed Project at this time.

2.4.2 Description of Site Metes and Bounds

The overall PDA Site (including to the center line of the street) at full build-out will contain 209,949 square feet (4.8 acres) and will consist of the West Parcel containing 129,744 square feet and the East Parcel containing 80,205 square feet, which includes areas to be acquired, as shown on a plan entitled: “Parcel Area Plan of Land in Boston, Massachusetts”, prepared by Vanesse Hangen Brustlin, Inc., scale 1′ = 40′, dated May 1, 2013 (“Parcel Area Plan”) in Appendix G of the 2013 DPIR along with a detailed description of the metes and bounds of the PDA Site.

The Proposed Project Site consists of approximately 19,510 square feet located in the southwest corner of the West Parcel (Figure 1.4). The specific metes and bounds of the WP-B1 parcel have not yet been determined.

2.4.3 Land Transfers and Easements

As part of the Proposed Project, the Proponent will request that with the cooperation of the BRA the City of Boston discontinue minor areas of existing public rights along New Sudbury Street, as shown in Figure 1.4, to allow the Proponent to wrap the Garage with the new building.

2.4.4 List of Nearby Property Owners

A list of property owners with addresses located within 500 feet of the boundaries of the Proposed Project Site is provided in Appendix G. This list was provided by the Boston Assessing Department.

2.5 Regulatory Controls, Approvals, and Permits

Table 2.2 below provides a comprehensive list of approvals and/or permits anticipated to be required for the Proposed Project.

TABLE 2.2 LIST OF ANTICIPATED PERMITS AND APPROVALS FOR WP-B1

Agency/Department	Permit/Approval/Action	Status
Federal		
Federal Aviation Administration	Determination of No Air Hazard to Air Navigation	To be obtained
Commonwealth of Massachusetts		
MassDEP Division of Water Pollution Control	Groundwater Discharge Permit	To be obtained (if required)
MassDEP Environmental Results Program	Permits related to fossil fuel burning building equipment, such as heating boilers and emergency generators	To be obtained
MassDEP Division of Air Quality Control	Pre-construction notice	To be submitted
Massachusetts Historical Commission	Memorandum of Agreement	Determination issued May 27, 2014; Consultation process ongoing
Massachusetts Water Resources Authority	Construction Dewatering Permit	To be obtained (if required)
City of Boston		
Boston Redevelopment Authority	• Review under Article 80B, Large Project Review • Review pursuant to Article 37, Green Buildings of the Boston Zoning Code	PDA approval received 11/14/13; EPNF filed herein for individual Project Component WP-B1
Boston Civic Design Commission	Review and approval pursuant to Article 28 of the Boston Zoning Code	To be obtained
Boston Transportation Department	• Review and approval of Construction Management Plan • Transportation Access Plan Agreement (TAPA)	Each to be obtained[1]
Boston Water and Sewer Commission	• Sewer Use Discharge Permit • Site Plan Approval • Construction Dewatering Permit	Each to be obtained
Boston Public Improvement Commission/Department of Public Works	• License for installation of groundwater monitoring well • Specific Repair Plan	Each to be obtained

Agency/Department	Permit/Approval/Action	Status
	• Street and Sidewalk Occupation Permits • Tieback/Earth Retention Permit • Air Rights Discontinuances	
Boston Inspectional Services Department	• Building Permit (Long Form) • Demolition Permit • Certificate of Occupancy	Each to be obtained
Boston Fire Department	Fuel storage permit	To be obtained
Boston Committee on Licenses	• Parking Garage Permit • License for Storage of Inflammables	Each to be obtained
Boston Employment Commission	Boston Residents Jobs Policy compliance	To be obtained
Boston Departments & Agencies	• Comments for Article 80B review • General Operational Permits, Licenses (as required)	Each to be obtained

MassDEP Massachusetts Department of Environmental Protection
1 Master TAPA is under review by BTD.

2.5.1 Zoning Controls/Planned Development Area

Upon recommendation by the BRA to the Zoning Commission for the designation of the Proposed Project Site as a PDA eligible area, the Proponent filed a draft Development Plan for public review and comment, in accordance with Article 80C of the Code in September 2013. Approval of the PDA No. 96 was received from the BRA Board on November 14, 2013 and the Boston Zoning Commission on December 11, 2013. The Preliminary Adequacy Determination was issued by the BRA on November 22, 2013.

The Project is consistent with the PDA dimensional requirements with minor modifications, as noted in Table 2.3 below. Such modifications include an increase in housing units (22 additional units) and slight increase in overall gross square footage (approximately 4,600 more square feet). These changes do not materially or adversely impact the PDA or require additional mitigation.

TABLE 2.3 PDA DIMENSIONAL REGULATIONS AND WP-B1 DIMENSIONS

Category	Existing PDA	Proposed Project (WP-B1)
Permitted Use	Residential, office, retail and hotel	Residential and retail
Maximum Gross Square Feet	543,300 GSF	546,640 GSF
Maximum Building Height	480 feet	480 feet
Maximum Floor Plates	13,000 SF	Average 13,300 SF floor plates
Housing Units	464 units	486 units
Affordable Housing Units	60 units	64 units
Parking Spaces	1,159 spaces	1,159 spaces[1]
Off-Street Loading Bays	Not specified	Three (3) off-street loading bays

1 Represents the future parking capacity under the full-build out of the Development Plan Project. The parking demand ratio assumed for WP-B1 is about 0.50 spaces per unit; therefore, the parking supply for the Proposed Project is approximately 245 spaces.

Refer to Section 3.4.4 of Chapter 3, *Urban Design* for a discussion of how the Proposed Project is consistent with the PDA design criteria discussion.

2.5.2 City of Boston Article 80B, Large Project Review

According to the Development Review Procedures of the approved PDA, each Project Component is anticipated to be subject to Large Project Review under Section 80B of the Zoning Code. Since the BRA has approved conceptual plans, this subsequent review and approval is intended to be focused on the advanced building and public realm design to confirm each Project Component's consistency with the Development Plan Project. Minor modifications or design refinements related to site improvements, exterior facades, roofscapes, public spaces, transportation mitigation, parking or service/loading are to be subject of this review without amendment of the PDA unless the BRA determines changes are not consistent with the Development Plan Project.

Table 2.4 below summarizes the updated development impact analyses provided herein compared to what was provided previously in the 2013 DPIR for the Development Plan Project.

TABLE 2.4 DEVELOPMENT REVIEW COMPONENTS FOR WP-B1

Development Impact Category	**Analyzed in 2013 PNF/DPIR for the Development Plan Project** (Yes/No)	**Updated for Proposed Project(WP-B1)** (Yes/No/Explanation)
Urban Design	Yes	Yes, updated based on current building design. The completed Accessibility Checklist provided (Appendix F).
Transportation and Parking	Yes, for a full build-out 15-year horizon	Yes, Proposed Project-specific traffic study for a 5-year horizon
Environmental Protection		
Wind	Yes (Preliminary Only)	Yes, Proposed Project-specific wind tunnel analysis
Shadow	Yes, comprehensive study provided	Yes, updated based on current building design
Daylight	Yes	No change
Solar Glare	Yes (Qualitative Only)	Yes, modeled based on current building design
Air Quality	Yes	Yes, for stationary sources based on current building design
Water Quality	Yes	No change
Flood Hazard	Yes	No change
Groundwater/Geo-technical	Yes	No change
Solid and Hazardous Waste	Yes	No change
Noise	Yes	No change
Temporary Construction Impacts	Yes	Yes, updated for the Proposed Project-specific construction phase
Rodent Control Post-construction	Yes	No change
Sustainability/Green Building	Yes	Yes, draft LEED for New Construction-specific scorecard and supporting narrative provided updated based on current building design
Climate Change Preparedness and Resiliency	No (not required)	Yes, comprehensive evaluation for the Proposed Project. The completed Climate Change Preparedness and Resiliency Checklist provided (Appendix F).
Infrastructure Systems	Yes	Yes, based on Proposed Project-specific infrastructure needs
Historic Resources	Yes	Yes, updated potential impacts on nearby historic resources based on current building design

3

Urban Design

A description of enhancement to the public realm was provided as part of the previous City of Boston Article 80 and state MEPA review filings for the Development Plan Project. In accordance with the approved PDA, this chapter presents an update on urban design based on the more specific design and program of the Proposed Project—the WP-B1 Residential Building, or Phase 1. This chapter provides detailed descriptions with supporting graphics related to the urban context, design and development of the Proposed Project.

Within the context of the larger Development Plan Project, the Proposed Project provides the opportunity to introduce a new vibrant residential building with ground floor uses and an enhanced pedestrian environment that aim to activate New Sudbury Street. In these ways, the Proposed Project contributes significantly to the master plan's vision to develop a design that speaks to the overall building's metropolitan scale and global perspective. However, it also creates a distinct sense of place and a strong Boston identity at the building scale.

The Proposed Project will achieve this unique character by taking a human-centered approach to design by tapering the building face back at the ground plane to create a welcoming and walkable public realm. Also, the building height steps down as it nears the Greenway, and utilizes massing and materials to create interesting and varied façades on all sides of the building. Finally it offers attractive amenity spaces for residents and guests that visually and vertically activate the building.

As the first phase of development, WP-B1 plays a critical role in the Development Plan Project's goal to completely encompass the Garage and create a new and interesting streetscape in downtown Boston.

3.1 Development Plan Project Overview

As part of the Article 80 review process, the Development Plan Project design (specifically, building heights and massing) evolved in response to BRA, community, and other public entities feedback and comments. The Proponent agreed to lower/rearrange the height and density of the buildings. These changes were outlined in detail within the 2013 DPIR, which was submitted to the BRA. Improvements specific to the Proposed Project include the following:

- The overall development program was reduced by 122,800 gross square feet of office uses. In addition, approximately 30,000 gross square feet of office space was shifted to residential space, which helped lower the induced traffic associated with the full build-out.
- Two (2) floors were added to the first proposed residential building on the West Parcel (WP-B1). In addition, the floor plate of this building was increased slightly to allow for an additional unit per floor.
- The same number of parking spaces would be provided at full build-out (approximately 1,159).

In summary, the changes to the Development Plan Project aimed to better address and be more consistent with the City's Greenway Guidelines. Combined, these changes reduced the overall impacts of the Development Plan Project, as demonstrated in the 2013 DPIR and further evaluated as part of the MEPA review process. Specifically, the change resulted in a reduction in net new shadow, a minor reduction in traffic as well as associated air emissions and parking demand (in particular during weekday periods freeing up additional parking for transient and commuter parking).

The Development Plan Project outlines a clear set of strategies to create a diverse mixed-use neighborhood downtown by removing and reinventing various portions of the underutilized Garage. As discussed in the 2013 DPIR, the following design goals were set for the Development Plan Project:

- Daylight Congress Street and provide new views/vistas by breaking the mega-block into two appropriately scaled urban blocks.
- Create a vibrant urban environment through the introduction of new/different uses (e.g., residential, hotel, office and retail tenant mix).
- Design a viable phased redevelopment strategy that provides community benefits with manageable construction impacts.
- Enhance pedestrian connections through and around the Project Site.
- Activate the public realm with new public open space and streetscape improvements.
- Be a leader for sustainability.

These goals are generally reflected in the approved PDA as part of the "Design Performance Criteria."

3.2 Key Design Considerations

The Proposed Project weighs and addresses the following urban design considerations:

- The proposed building shape responds to the form, massing, and structural constraints of the Garage, which in turn responds to the unusual shape and position of the PDA Site within the city.
- The Proposed Project advances the transformative vision for the redevelopment of the Garage and Government Center area. As such, it builds on the Development Plan Project prepared for the PDA Site and is consistent with the design criteria of the approved PDA.
- As part of the larger goal for the PDA Site, WP-B1 provides the opportunity to stitch together Boston's, North End, West End and Downtown neighborhoods.
- The introduction of residential development will activate downtown Boston throughout the day and bring new life and energy to New Sudbury Street, specifically. It will also balance the North End's largely residential land uses on the opposite side of the Greenway. The proposed building design clearly reads as a residential building to distinguish it from nearby office buildings and highlight its distinct role in the neighborhood.
- The proposed building design and residential unit layouts are informed by the Proposed Project Site's potential to provide residents and guests impressive views of Boston and the larger region.
- Additional greenspace and landscaping along New Sudbury Street and improvements to Bowker Street Pedestrian Connection will create a more interesting, inviting, and accessible streetscape for future residents, guests, and Bostonians alike.
- The proposed building design aims to reduce structural and functional impacts on the Garage for a sustainable development.
- The overall design of the Development Plan Project, including WP-B1 allows the Garage to remain functional at all times, keeping key neighborhood parking amenities available throughout construction.

3.3 Urban Context

The Garage's location at the intersection of the North End, West End, Beacon Hill, Bulfinch Triangle and Government Center neighborhoods uniquely positions it to stitch together downtown Boston's fragmented urban fabric. It also provides an important opportunity to re-introduce the human-scale and public spaces following the damage caused by the urban renewal efforts in the area in the 1950s and 1960s. As the Development Plan Project demonstrates, this will be achieved by creating a cluster of distinct and interesting buildings with strong visual, architectural and programmatic synergies. The proposed residential building (WP-B1), or the Proposed Project, will specifically further this goal with iconic architecture, innovative massing, and inviting streetscape designs that respond to the immediate urban context.

The Proposed Project Site is embedded within the existing Garage, as shown on Figure 1.4, and the Proposed Project will needle through the structure to create a new gesture in the city skyline. As shown in Figure 1.5, the Proposed Project will sit at the southwestern corner of the

PDA Site with frontage along New Sudbury Street. New Sudbury Street is a one-way Street that carries traffic from Cambridge Street towards Congress Street and the I-93 junction. This street experiences a gradual topographic change of approximately seven feet over 180 feet from the west corner of the Proposed Project Site to the east.

The centrally located Proposed Project Site will position the Proposed Project within walking distance of many of the city's civic, social, and recreational amenities. The Proposed Project Site is adjacent to the BPD Districts A-1 & A-15 (Downtown and Charlestown) station and directly across the street from the JFK Federal Building. It is also located diagonally across the street from the recently opened Boston Public Market and Rose F. Kennedy Greenway North End Parks just beyond. The Proposed Project is within walking distance of arts, athletic, and entertainment events at the Boston Garden, the culinary and cultural delights of the North End, and the historic and family attractions of Faneuil Hall, Quincy Market, and the Freedom Trail. Finally, it is just one block from City Hall and City Hall Plaza, home to many community events and celebrations throughout the year.

One of the strengths of the Proposed Project Site is its proximity to public transit. It is located immediately across the street from the MBTA Haymarket transit and bus stations, providing access to the Orange and Green Lines as well as several local bus routes. It is also located within walking distance of the Blue Line at Bowdoin Station located on Cambridge Street. Additionally, the Proposed Project Site is ¼-mile from North Station, offering connections to the MBTA Commuter Rail, and Green and Orange Lines, and Amtrak.

3.4 Proposed Project Design Development and Concept

Following the Development Plan Project, the Proposed Project will aim to align itself as closely as possible with the Greenway Planning Guidelines. The design team has approached the Proposed Project with a clear vision to create an elegant residential building that graciously adds depth and character to its community and urban fabric. This approach comes from an understanding that no matter how beautiful the architecture of an individual building, its true beauty lies in its ability to celebrate its surroundings. Rather than emulating existing Boston architecture, the Proposed Project design will complement the city skyline with a fresh contemporary design based on resiliency and sustainability.

Considering the interests of the both the surrounding neighborhood and its future residents, the team aimed to design a building that distinguished itself through its simplicity and verticality. The proposed design intentionally differs from that of the proposed office building also on the West Parcel (WP-B2) in order to create a more interesting skyline and urban experience downtown Boston. This differentiation also creates an opportunity for the two buildings to engage in an architectural conversation. This differentiation supports the intent of the approved PDA design criteria to encourage the incremental development and planning of this new urban neighborhood. It also diminishes the perception of the Proposed Project as part of a "super block" development.

Refer to Figure 3.1a through Figure 3.1h for the proposed building floor plans.

3.4.1 Height and Massing

Figure 3.2a through Figure 3.2b present the proposed building elevations and Figure 3.3 presents the proposed building north-south section. The Proposed Project will reach up to 480 feet in height to the last occupied floor and will use a variety of different design techniques to break down the building's massing. To emphasize the building's verticality, it will be subdivided into several different vertical blocks. These scalable blocks will shift slightly back and forth to create a more interesting and sculptural form.

As shown in Figure 3.4, the staggering of the different massing blocks will afford residents and community members more interesting and far-reaching views from inside the building. Situated in the heart of downtown Boston, the Proposed Project will offer views and vistas of the City, Harbor, and surrounding area. With no other high-rise buildings in the Proposed Project's immediate neighborhood other than the adjacent JFK Federal Building, residents and visitors will be able to enjoy uninterrupted views from all sides of the building.

These different blocks will also step down in height as they near the Greenway in order to preserve daylighting in the park and to mediate the differences in density from one side of the park to the other. This design decision will reinforce the building's massing, create a distinct profile and make a significant contribution to the city skyline. The building's penthouse and screens will be integrated into the façade to discreetly cover its mechanical systems from the view of any passersby on the street or anyone in nearby buildings. This design strategy will emphasize the building's graceful fluidity and verticality. Some elements of this updated massing and design strategy will result in changes to net new shadow impacts. The updated shadow studies, which are presented in Section 5.4 of Chapter 5, *Environmental Protection* (Figure 5.2 through Figure 5.5), represent the net new shadow based on current building design compared to those outlined in the 2013 DPIR. While the studies reflect slightly more net new shadow over some portions of the surrounding city fabric than compared to the previous building massing, this change is the result of the design team's efforts to adjust the massing of the proposed residential building to better fit within the context of the neighborhood and provide a more interesting contribution to the city skyline (as shown on Figure 3.5c). The net new shadow is offset under some conditions as indicated in yellow on the shadow study graphics.

To further highlight the Proposed Project's verticality and varied massing, the design includes amenity spaces on the 9th and 31st floors to activate the building in the air. The Proposed Project also pulls back from the sidewalk at the ground plane, as opposed to hanging over the public way as shown it was initially contemplated in the Development Plan Project in order to create a more open and active public realm at the street level. This design choice also creates an opportunity for an outdoor café on New Sudbury Street, adding depth and diversity to the area. This new street edge will update approximately one third of the Garage's current length along New Sudbury Street, or approximately two thirds of the block edge between Bowker

Street and Congress Street. The Proposed Project's engaging ground plane sets the stage for the Development Plan Project's goal to wrap the entire base of the Garage with an active streetscape.

3.4.2 Character and Materials

Figure 3.5a through Figure 3.5c present project renderings. The proposed residential building façade will be composed of a mixture of glass and metal panels in varying shades of gray. This design technique will be used to enhance the depth of the building's massing, making some components appear to recede while others appear to project from the overall façade. The design team determined this desired materiality by working from both the outside in and the inside out.

The design team considered the proposed building's desired character at a variety of different scales and perspectives. From a distance, the building's design reads as a strong, singular structure with clean vertical lines. Closer up, it is possible to distinguish between the varying shades of color of each of the vertical blocks, adding depth and interest to the proposed building as a piece of art and architecture within the neighborhood.

Working from the inside out, the team chose large glass panels that will afford residents unparalleled views of the city from their living spaces and more narrow glass panels for other rooms to create a sense of intimacy in studies and bedrooms. The window patterning also marks the building as a residential space and contributes to its unique identity in the neighborhood. Together, this diversity of window sizes, colors, and materials creates a sophisticated character for the proposed residential building.

3.4.3 Building Program

The Proposed Project will provide up to 486 residential units (apartments) with a mix of studio, one, two, and three-bedroom units. Some of these units will also enjoy a den or home office. This mix of units aims to cater to young professionals as well as families and empty-nesters/retirees to introduce diversity in the new residents. Additionally, a portion of the residential units will be affordable and accessible.

The proposed residential building will also feature ground floor retail space as well as numerous resident amenities. These amenities will be located in two distinct locations within the building to create more spaces for community interactions and connections. One location, on the 9th floor, will include active amenity spaces with a swimming pool, fitness center, yoga studio and sun deck. The other location, on the 31st level, will offer leisure spaces for residents with a multi-purpose room, library, and roof deck.

3.4.4 Consistency with PDA Design Performance Criteria

Site and Public Realm

1. The overall design should break down the existing Garage “superblock” character and create new, strong patterns of streets and blocks, pedestrian edges, and open spaces, with the goal of reintegrating two new blocks in the city fabric.

   The Proposed Project will act as an anchor for the west block, activating New Sudbury Street and easing the visual and physical impact of the existing Garage along this street. WP-B1’s ground floor retail space and potential café seating will also create welcoming pedestrian spaces and soften the street edge. The project will also add landscape elements along New Sudbury Street and enhance the Bowker Street Pedestrian Connection to create a fresh new greenspace.

Building Design & Architecture

1. The project must form a cluster of distinctive individual buildings that defines Government Center on the skyline.

   The Proposed Project has been designed to articulate a distinct identity within the larger Government Center development and the city.

2. The design of the taller (over 300 feet) buildings must respond to the unique “360 degree visibility/orientation” opportunity that the site (separate from Downtown and North Station) offers as it is approached from all directions around it.

   A study of changes to views and vistas from various points surrounding the PDA Site have been conducted to ensure that the Proposed Project has a distinct yet appropriate presence in the Boston skyline when viewed from a variety of different angles and perspectives.

3. Design of the building must mark its location in the city through the use of highest quality building materials, building performance systems, and inventive façade articulation to create a form that is durable, distinctive, and timeless.

   The Proposed Project will use high quality building materials to create a façade that varies in color and materiality, creating interest and depth that thoughtfully break down the building’s massing.

4. The buildings, both as a group and individually, must meaningfully contribute to the image of the Boston skyline (with an effect akin to the Hancock and Prudential buildings) from different vantage points including Boston Harbor, the Charles River, the highway, the Greenway and other long distance views.

   The Proposed Project emphasizes the building’s strong vertical lines and slender nature to form a distinct and meaningful contribution to the city’s skyline (Figure 3.5a).

5. From the Harbor and Charles River the high rises within the project must provide a legible read of the new high spine that is formed between South Station/Downtown and proposed Boston Garden/North Station development.

   At 480 feet in height, the Proposed Project will play a critical role in visually and physically connecting and continuing the new high spine.

6. The localized views of the project from different vantage points, especially the Rose Kennedy Greenway must enhance the experience of the Greenway and provide an aesthetically pleasing and distinctive backdrop to both Government Center Plaza and the Greenway.

   The Proposed Project has been designed to articulate its unique identity at all scales. The building's distinct vertical massing will create visual interest from a distance, providing a pleasing backdrop for city activities occurring at such civic and social centers as Government Center Plaza and the Greenway. Up close, its diverse materiality and careful attention to detail will further articulate the building's identity and contribute to the neighborhoods eclectic character.

7. The mechanical/top should be integrated to the overall architecture and form of the building.

   The mechanical systems and penthouse will be covered with a screen that is integrated into the building's façade.

8. The buildings must be expressive of the long standing reputation of Boston as a center of innovation. Consequently, the project must incorporate a systemic, research-based approach to sustainability and be designed to pursue higher LEED rating. The Proposed Project must contain at least one LEED platinum building, on LEED silver building, and the remaining buildings must rate at least LEED gold.

   The Proposed Project is currently targeting LEED gold certification.

9. In both the base and towers, embrace design that allows for flexibility and possible change in use.

   By pursuing rigorous and robust resiliency and sustainability strategies, the Proposed Project will position itself to adapt to the changing needs and conditions of the city and community overtime.

3.5 Views and Vistas

The design team has carefully conducted dozens of view studies to understand and best realize the full potential of the Proposed Project's central location in the city. In the 2013 DPIR, view perspectives were based on the conceptual design of the Development Plan Project, which addressed building heights and massing volumes only. These visual studies have been updated with the current more refined building design to illustrate the potential effect of the size, scale, and massing of the Proposed Project. Figure 3.6a through Figure 3.6k present the updated view perspectives.

As the view perspectives suggest, the design team has carefully considered how the Proposed Project will fit into Boston's skyline from a variety of different angles. A major contribution to the skyline, the building's slender and vertical massing allows it to both stand out and blend in as is most appropriate from different vantage points across the city. The team has paid particular attention to the building's presence as viewed from a number of different parks and public spaces.

3.6 Streetscape Improvements and Landscaping

The ground floor of the Proposed Project will feature a double-story lobby to create a sense of place and to welcome residents home. This lobby will also be accompanied by a ground floor retail space to further activate the streetscape and complement the diverse mix of uses in the neighborhood. The proposed design also creates an opportunity for café seating along New Sudbury Street. Landscape elements will also be used to create an inviting streetscape experience for all those who live, work, learn and play in the area.

The proposed landscaping is intended to connect the Proposed Project to the surrounding neighborhood, as well as create a rich and unique user experience in compliance with Boston Complete Streets guidelines. Pavement treatments used within the various frontage, pedestrian, and furnishing zones will guide users through the public environment, maintaining accessible connections to adjacent interior spaces. Street trees and annual/perennial plantings define the street edge, as well as enhance pedestrian user experience. The general landscape palette consists of native or adapted species. Figure 3.7a and Figure 3.7b illustrate the proposed New Sudbury Street streetscape/landscaping plan without and with tree canopy, respectively.

3.6.1 Residential Building

Figure 3.8a presents the streetscape section in front of the proposed residential building lobby. Pavement used within the frontage zone on New Sudbury Street complements adjacent interior spaces, creating visual connections where applicable. Street trees and annual/perennial plantings define the street edge and drop-off area, while enhancing the pedestrian user experience.

3.6.2 Ground Floor Retail

Figure 3.8b presents the streetscape section in front of the proposed ground floor retail. Pavement used within the retail space on New Sudbury Street is consistent with adjacent hardscape surfaces. Movable café tables and chairs provide flexible seating options within the frontage zone and out of pedestrian path of travel. Street trees and annual/perennial plantings define the street edge, as well as enhance the pedestrian user experience.

3.6.3 Bowker Street Pedestrian Connection

The existing pedestrian stairway located just west of the Proposed Project Site connecting New Sudbury Street and Bowker Street area is referred to herein as the "Bowker Street Pedestrian Connection" is owned by the BRA, not the Applicant (Figure 1.4). As part of design development of the Proposed Project, the Proponent and design team with the consent of the BRA continued to explore the feasibility of enhancing this area and the pedestrian way that extends along Bowker Street on the western edge of the PDA Site to better connect New Sudbury and New Chardon Streets. The elevation difference between Bowker and New Sudbury Streets precludes redevelopment as a vehicular street, which experiences a grade change of approximately eight feet over approximately 60-feet, or approximately 13 percent. Additionally, there are significant underground utilities located in this area, including several major electrical lines that service a large portion of Downtown Boston, two water lines and an emergency generator that serves the adjacent BPD station. Lastly, the raising of Bowker Street could have negative impact on existing building entries on the west side of Bowker Street.

With these known impediments, the Proponent has evaluated design solutions to improve the westernmost edge of the Proposed Project Site where Bowker Street meets New Sudbury Street and provide an accessible pedestrian way. Options that have been further explored during the design development of the Proposed Project include the potential to provide both stairs and a ramp to allow pedestrian access for all, including the mobility impaired, bicyclists, and others. A proposed combination of steps, sloped walkways, and planting beds would provide an accessible, park-like space and a comfortable and safe through-block connection for the neighborhood. Low, native plantings throughout help guide users through the space, with larger trees located along the edges to ease the scale of the adjacent structures. Refer to Figure 3.8c for the streetscape section of the proposed Bowker Street Pedestrian Connection.

3.7 Open Space

In addition to improvements to the public Bowker Street Green, open space will be provided to residents in the form of roof garden or deck on the 9th floor of the Proposed Project. This space will act as an important outdoor amenity for the residents and tenants as well as a space for sustainable stormwater management. This roof garden or deck may also extend beyond the 9th floor and out onto the roof of the Government Center Garage. Another amenity space on the 31st floor of the Proposed Project will offer leisure spaces for residents such as a multi-purpose room, library, and roof deck. Additional outdoor amenities may be developed in the future, depending on the needs of the Proposed Project's tenants and residents.

3.8 Access and Circulation

Resident parking will be provided within the existing Garage. Garage access/egress will be located at either end of the proposed residential building to provide vehicular access without disturbing the streetscape and pedestrian experience. As with the Development Plan Project, vehicular access to the Proposed Project will be directed along New Sudbury Street to the existing Garage entrance located at the east end of the proposed residential building (refer to Figure 4.12). Vehicular egress is located at the existing Garage vehicular exit ramp located at the west end of WP-B1. Additionally, three (3) loading bays will also be located off New Sudbury Street (Figure 1.5). Refer to Chapter 4, *Transportation and Parking* for additional information.

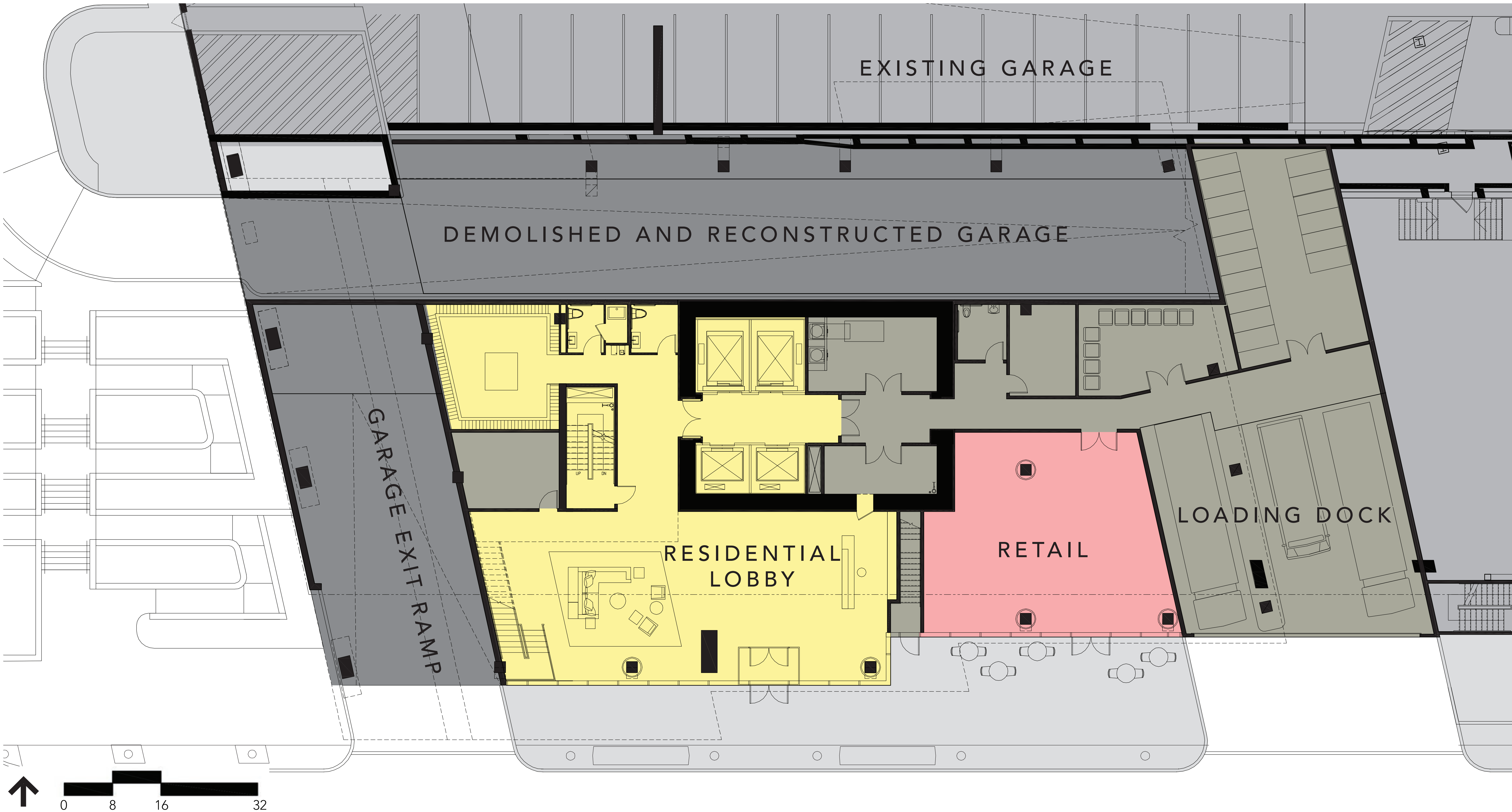
Within the context of the public realm, the entire building will be fully accessible to pedestrians, including the mobility impaired off, of New Sudbury Street. Additional pathways and connections will be provided to allow access to amenities, such as the roof garden and the adjacent Garage. A marked pedestrian crossing is proposed to be installed across Hawkins Street parallel and in line with the sidewalk on the west side of Bowker Street. The Proponent and its design team will continue to work in conjunction with the BRA and BTD as the design of the Proposed Project and Bowker Street Pedestrian Connection progresses.

New Sudbury Street will be reconstructed to be bicyclist-friendly. A temporary resident bicycle storage facility will be provided on the first floor of the Proposed Project (refer to Figure 4.14). This facility will temporarily serve the users of WP-B1 until the permanent 850-space bicycle facility is completed as part of a future phase for WP-B2 (office building).

3.8.1 Accessibility

The Proponent and design team have made efforts to consider accessibility in site infrastructure, existing and proposed surrounding conditions and materials, parking and drop-off areas, circulation, visit-ability and housing units for the Proposed Project. Appendix F includes a completed Accessibility Checklist for the Proposed Project, as required for initial Article 80 review submissions.

Sidewalks approaching the proposed residential building will be made accessible. Additionally, the sloped Bowker Street Pedestrian Connection open space between Sudbury and Bowker Streets will be redesigned as part of this Project to be accessible by way of ramps and stairs. Regarding accessible parking, much of the existing Garage will remain after the construction of the Proposed Project and accessible parking spaces are currently provided adjacent to the elevators on all floors of the Garage. Three (3) accessible parking spaces will be provided adjacent to the residential building on Garage Level 6 as part of the Proposed Project. Dedicated accessible residential parking spaces are not anticipated at this time. The Proponent will reach out to Institute for Human Centered Design for feedback on accessibility issues during Article 80, Large Project Review of the Proposed Project.



EXISTING GARAGE	STUDIO
RECONSTRUCTED GARAGE	ONE-BEDROOM
NEW GREEN SPACE	TWO-BEDROOM
RETAIL	THREE-BEDROOM
RESIDENTIAL CIRCULATION	
RESIDENTIAL AMENITY	
MECHANICAL OR SUPPORT	

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Figure 3.1a

Ground Floor Plan

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

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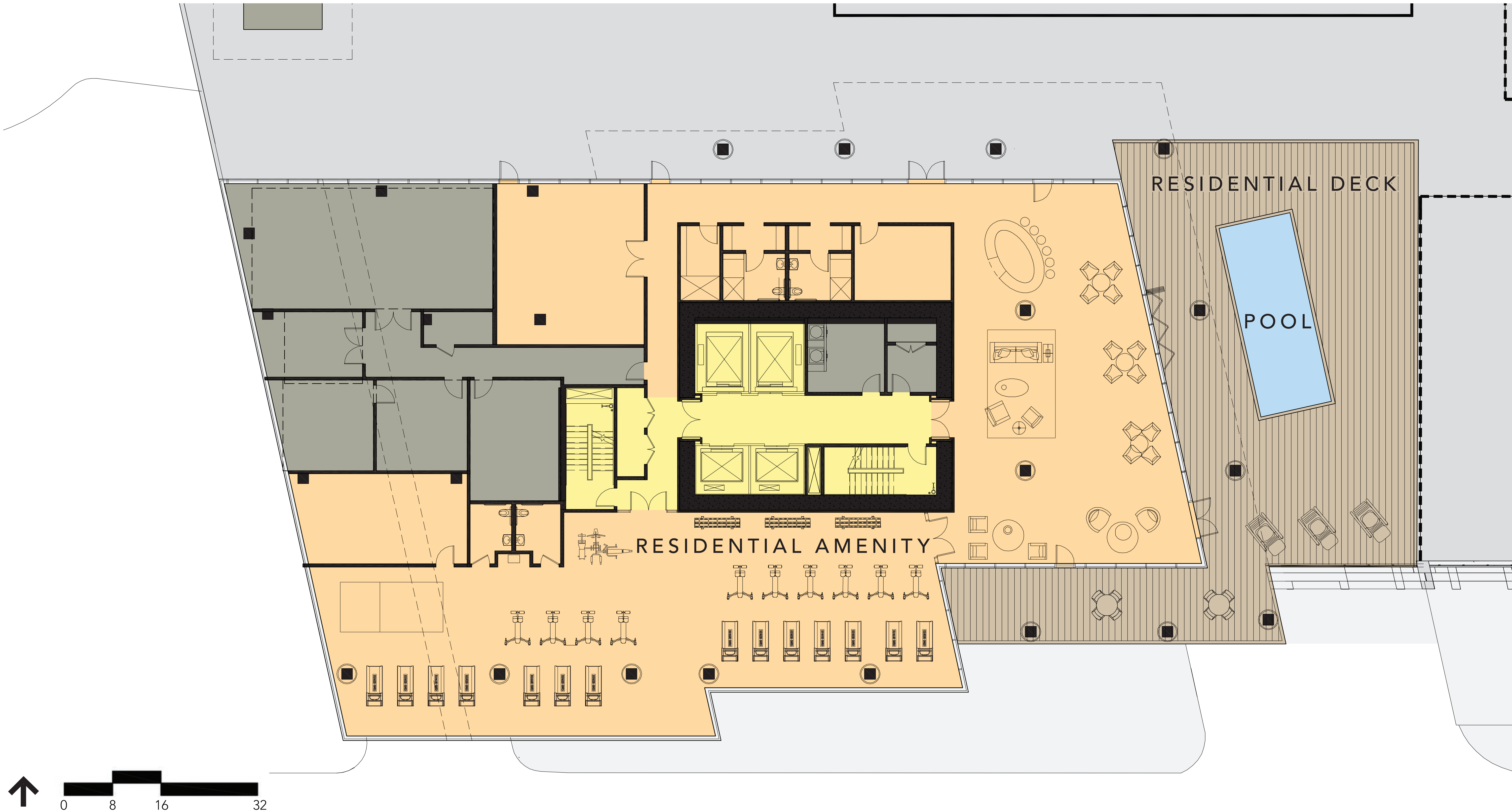
Figure 3.1b

Typical Lower Floor Plan

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



EXISTING GARAGE
RECONSTRUCTED GARAGE
NEW GREEN SPACE
RETAIL
STUDIO
ONE-BEDROOM
TWO-BEDROOM
THREE-BEDROOM
RESIDENTIAL CIRCULATION
RESIDENTIAL AMENITY
MECHANICAL OR SUPPORT

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Figure 3.1c

Lower Amenity Floor Plan

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

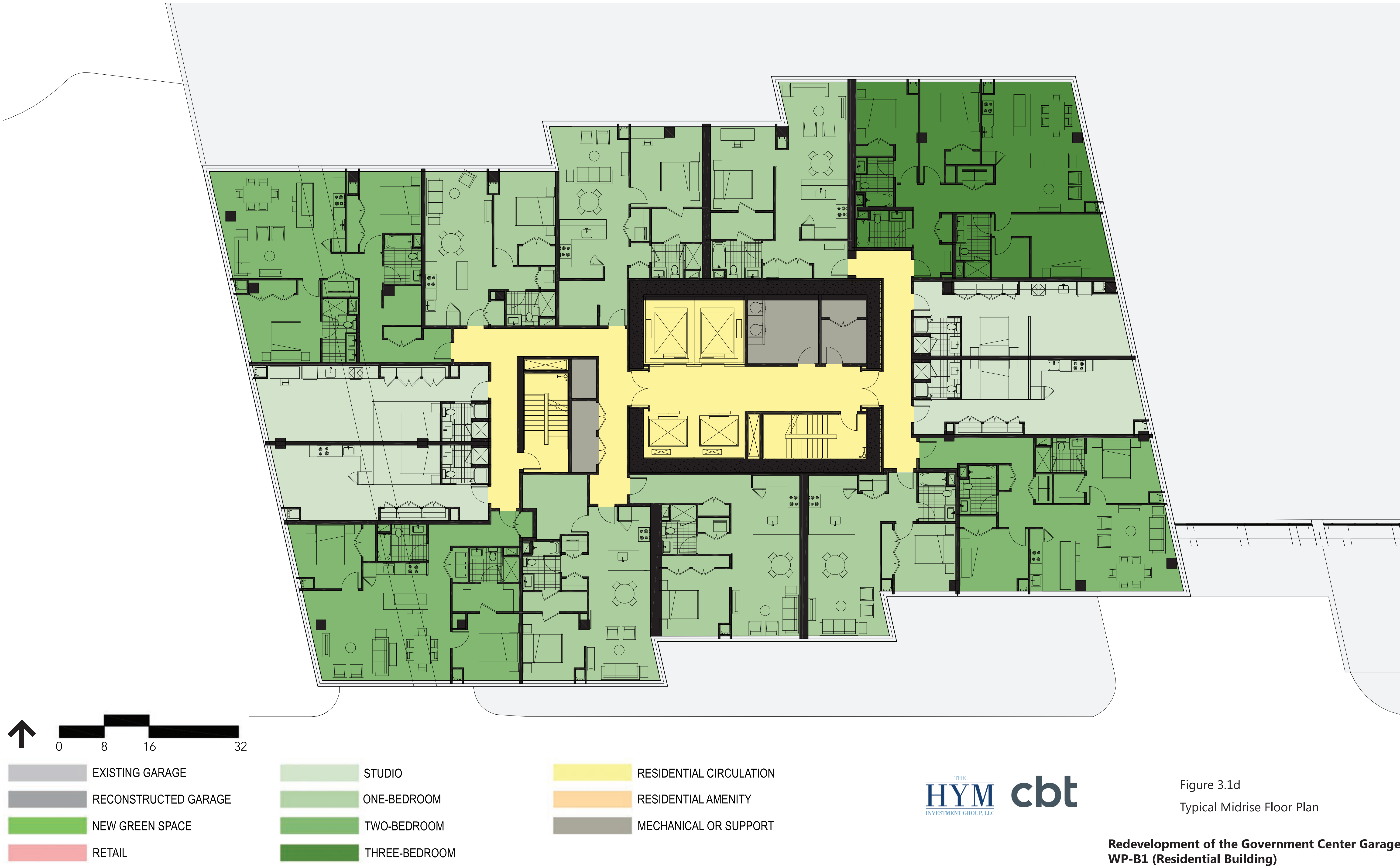

Figure 3.1d

Typical Midrise Floor Plan

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

Source Info

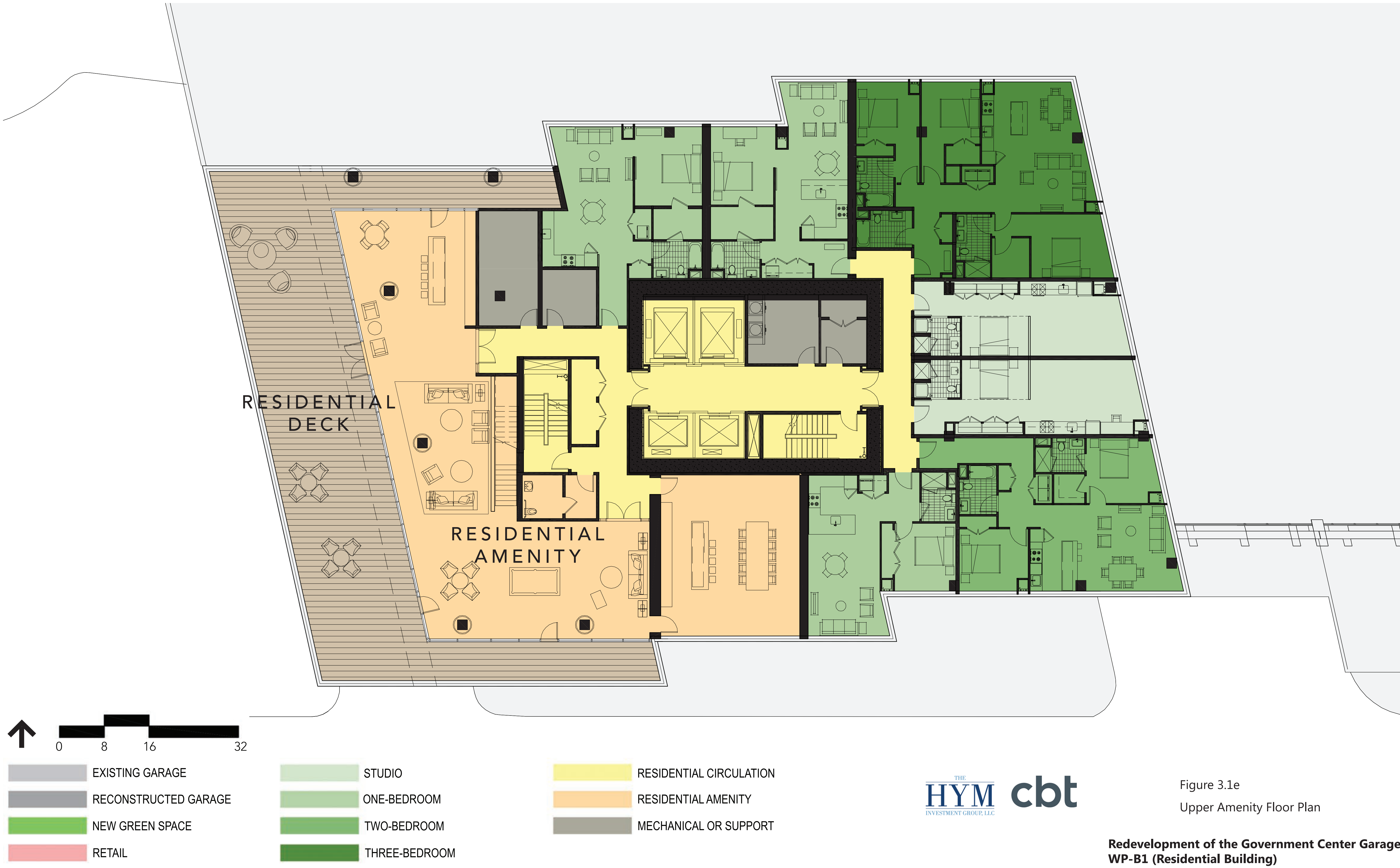

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Figure 3.1e

Upper Amenity Floor Plan

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

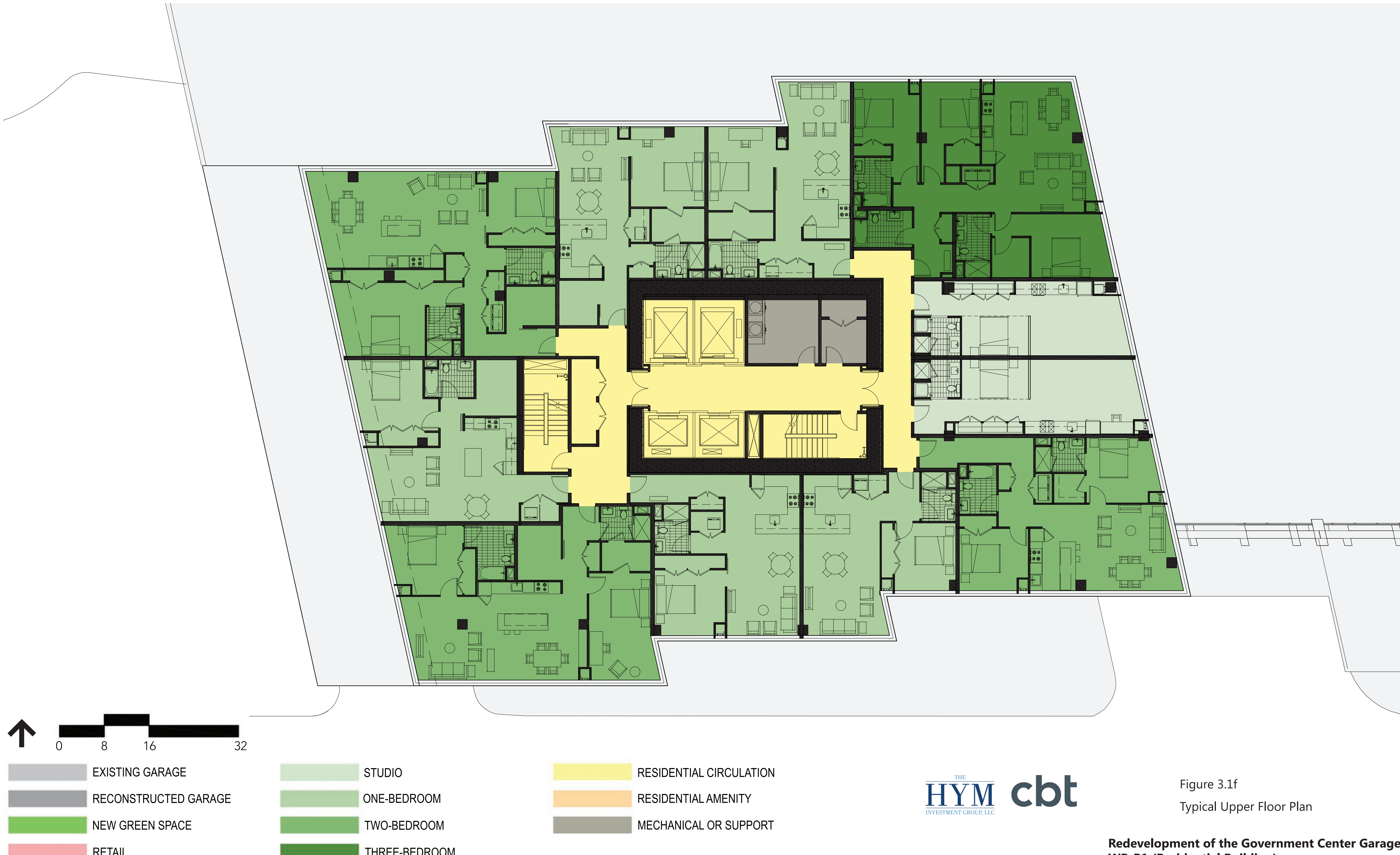
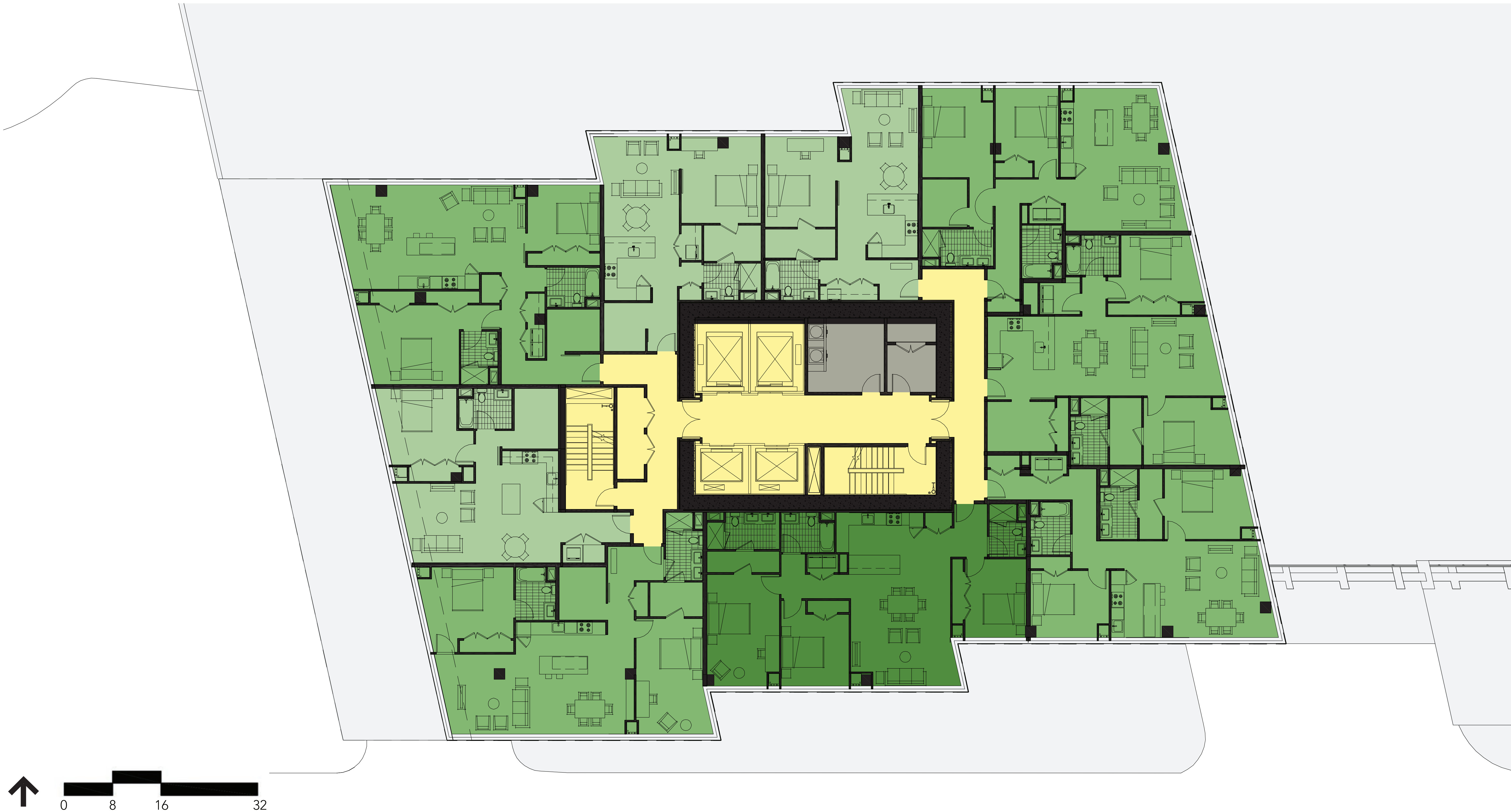


Figure 3.1f

Typical Upper Floor Plan

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

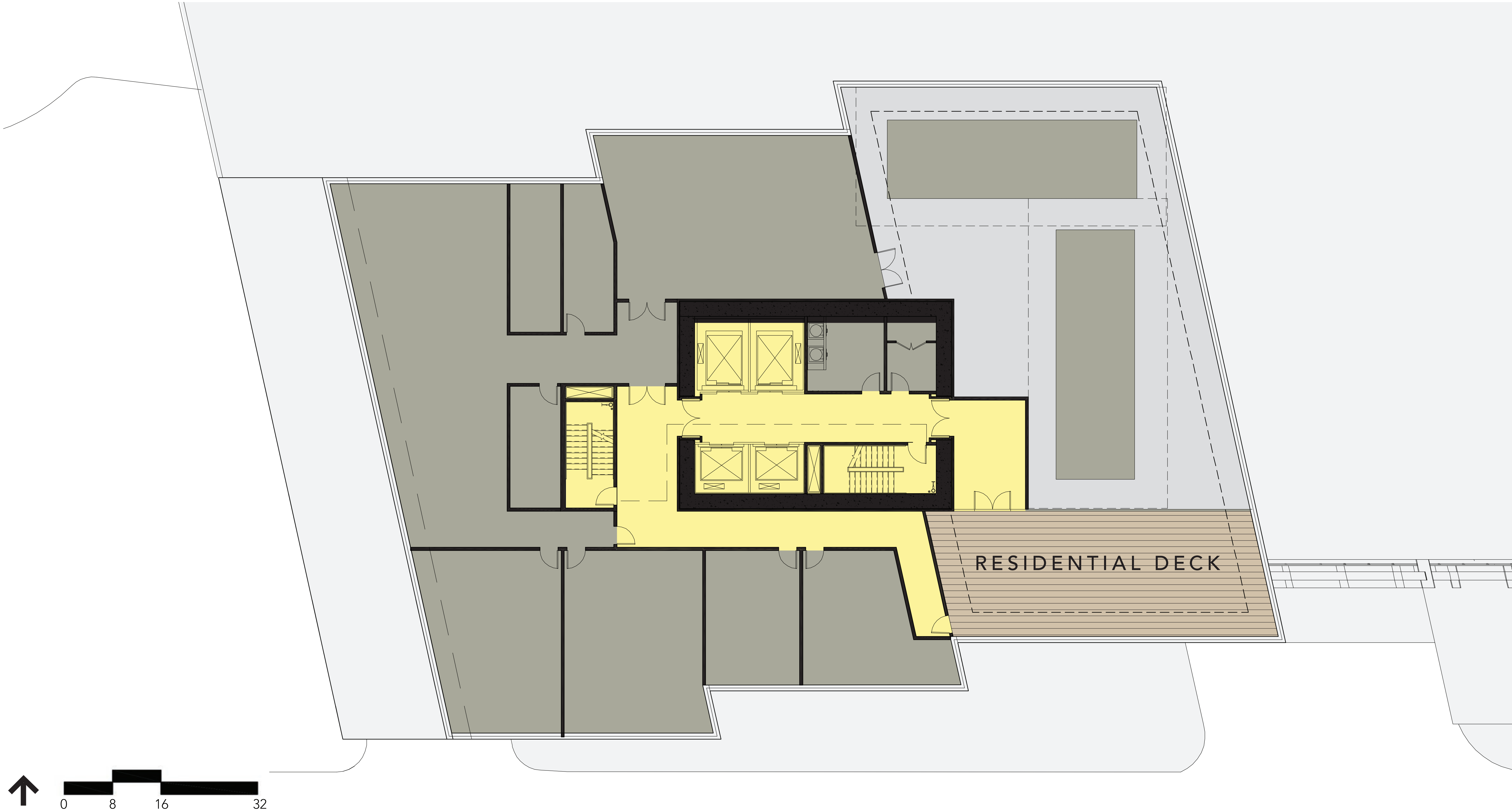


EXISTING GARAGE	STUDIO
RECONSTRUCTED GARAGE	ONE-BEDROOM
NEW GREEN SPACE	TWO-BEDROOM
RETAIL	THREE-BEDROOM
RESIDENTIAL CIRCULATION	
RESIDENTIAL AMENITY	
MECHANICAL OR SUPPORT	

Figure 3.1g

Typical Penthouse Floor Plan

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



EXISTING GARAGE	STUDIO
RECONSTRUCTED GARAGE	ONE-BEDROOM
NEW GREEN SPACE	TWO-BEDROOM
RETAIL	THREE-BEDROOM
RESIDENTIAL CIRCULATION	RESIDENTIAL AMENITY
MECHANICAL OR SUPPORT	

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Figure 3.1h

Roof Mechanical Floor Plan

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

South Elevation

West Elevation

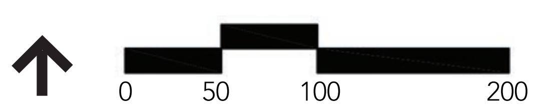


Figure 3.2a

South and West Elevations

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

North Elevation

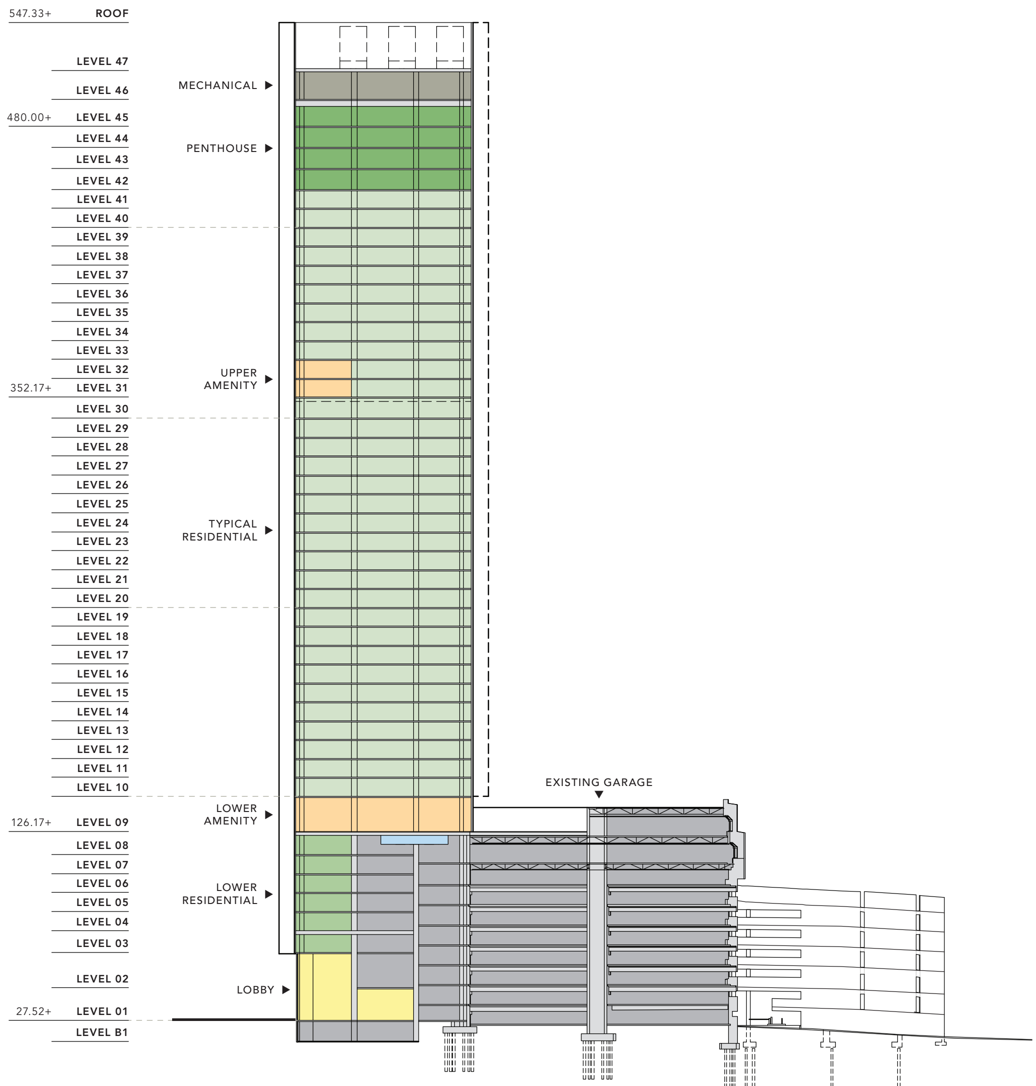
East Elevation

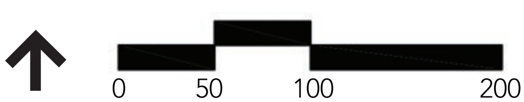
0 50 100 200

Figure 3.2b

North and East Elevations

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts





Source Info

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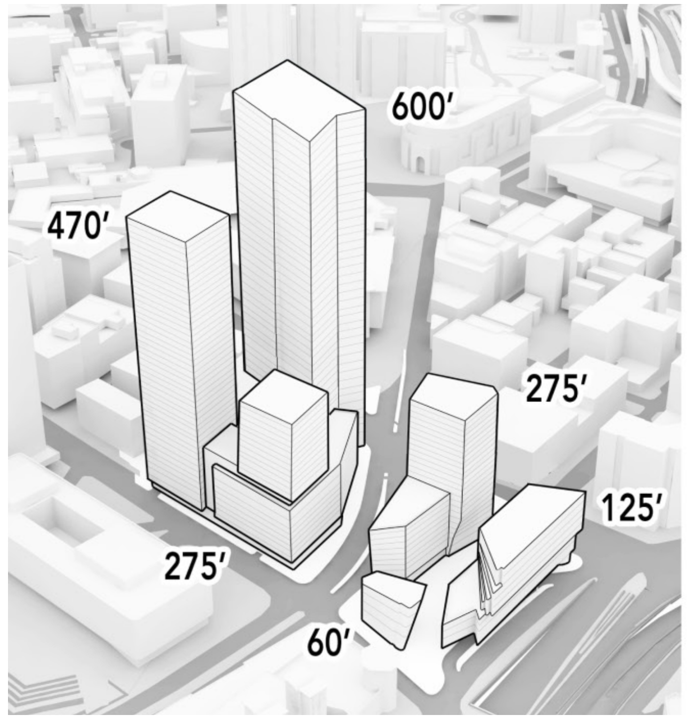
cbt

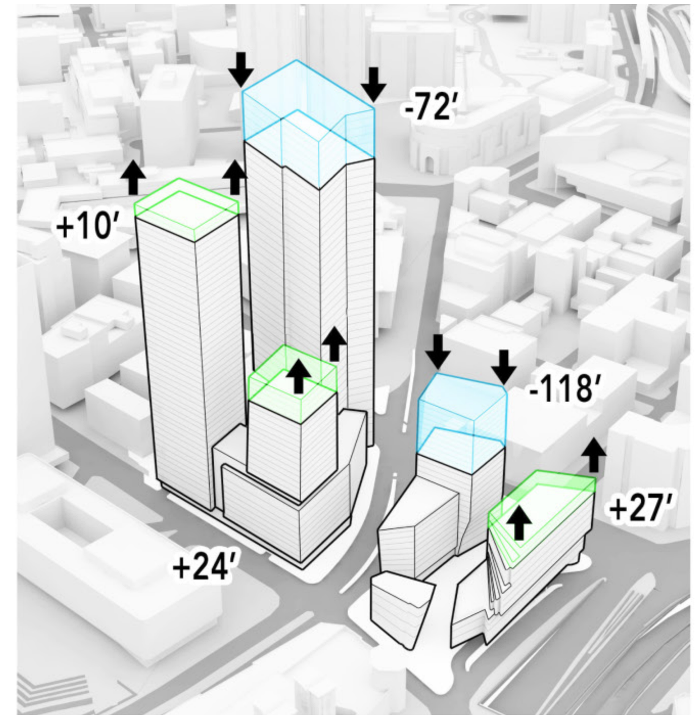
Figure 3.3

Section North-South

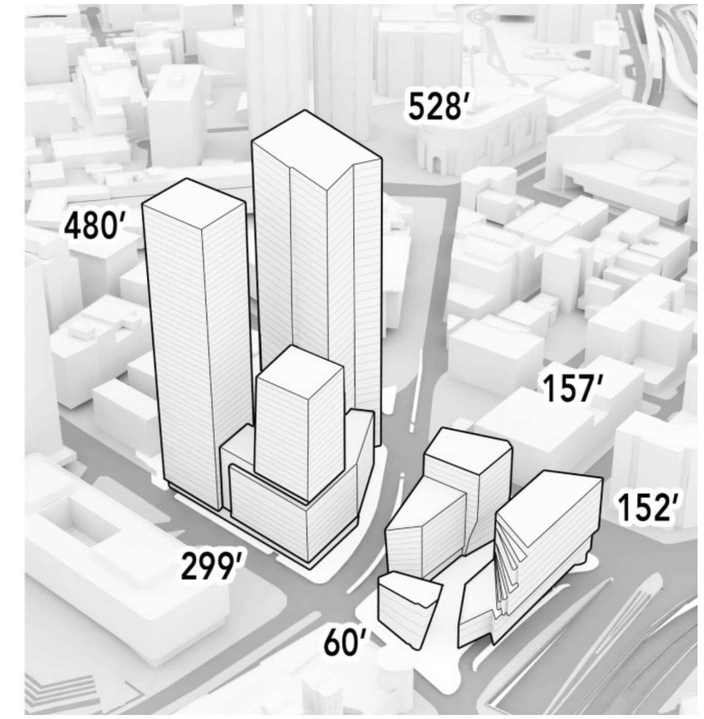
Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



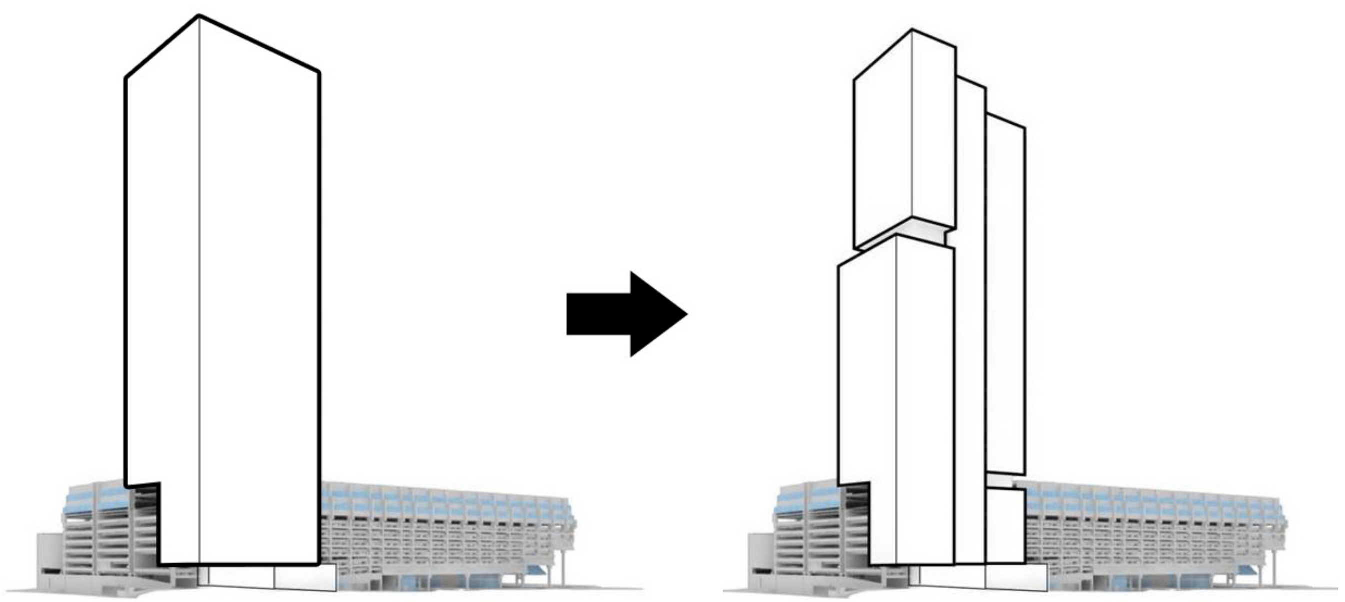
PNF Massing



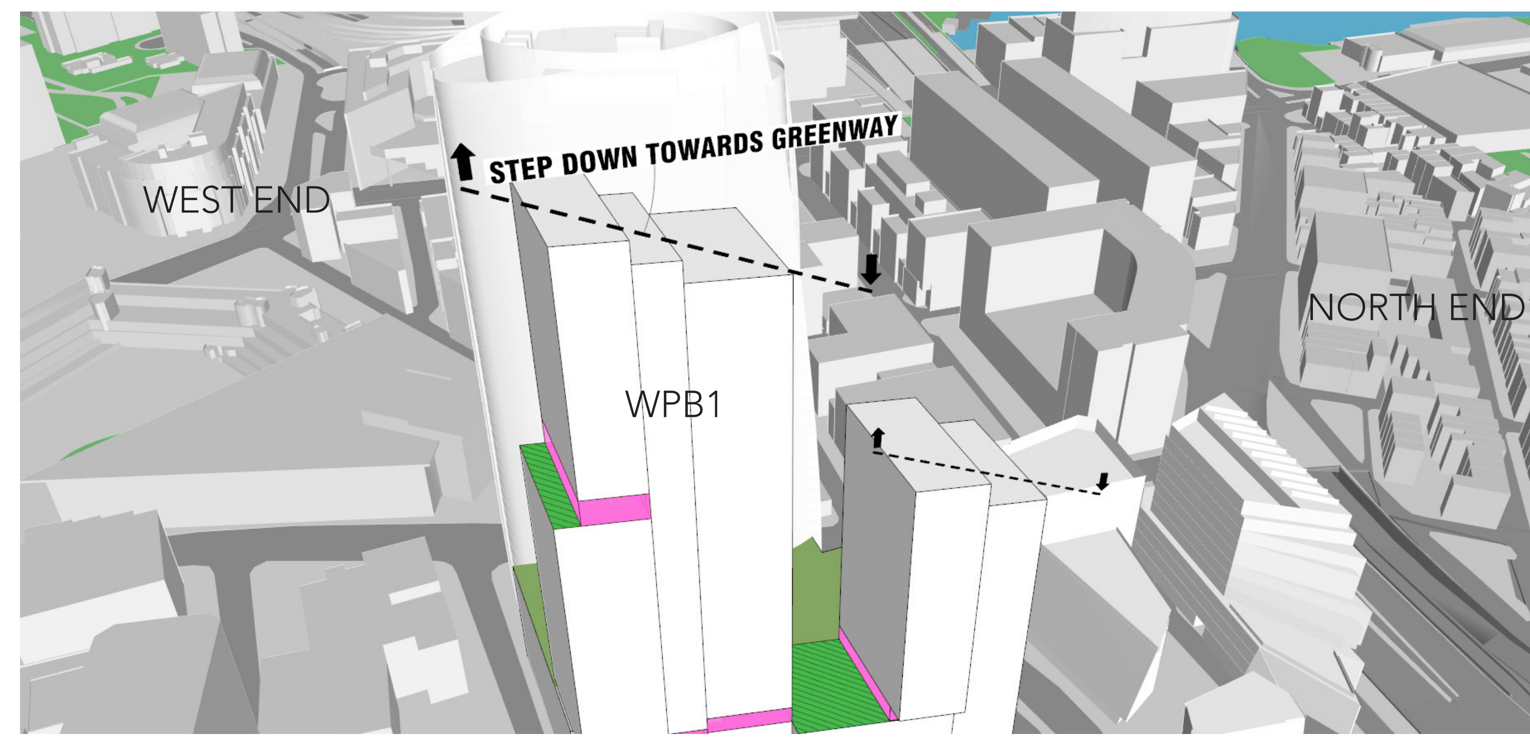
Response to BRA/Public Comments



Approved PDA/DPIR Massing



Massing Articulation and Scaling



Stepped Massing

Figure 3.4

Massing Evolution

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

Source Info

Figure 3.5a

Rendering Sudbury Street

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

Source Info

Figure 3.5b

Rendering Government Center Plaza

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

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Figure 3.5c

City Skyline View Rendering

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

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Figure 3.6a

View From Cambridge Street

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

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Figure 3.6b

View From Cambridge-Bowdoin Intersection

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

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Figure 3.6c

View From Rose F. Kennedy Greenway

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

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Figure 3.6d

View From Longfellow Bridge

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

Source Info

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Figure 3.6e

View From Memorial Drive

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

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Figure 3.6f

View From The Museum of Science

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

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Figure 3.6g

View From North Washington Street

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

Source Info

Figure 3.6h

View From The Public Garden

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

Figure 3.6i

View From Zakim Bridge

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

Figure 3.6j

View From North End - Thacher Street

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

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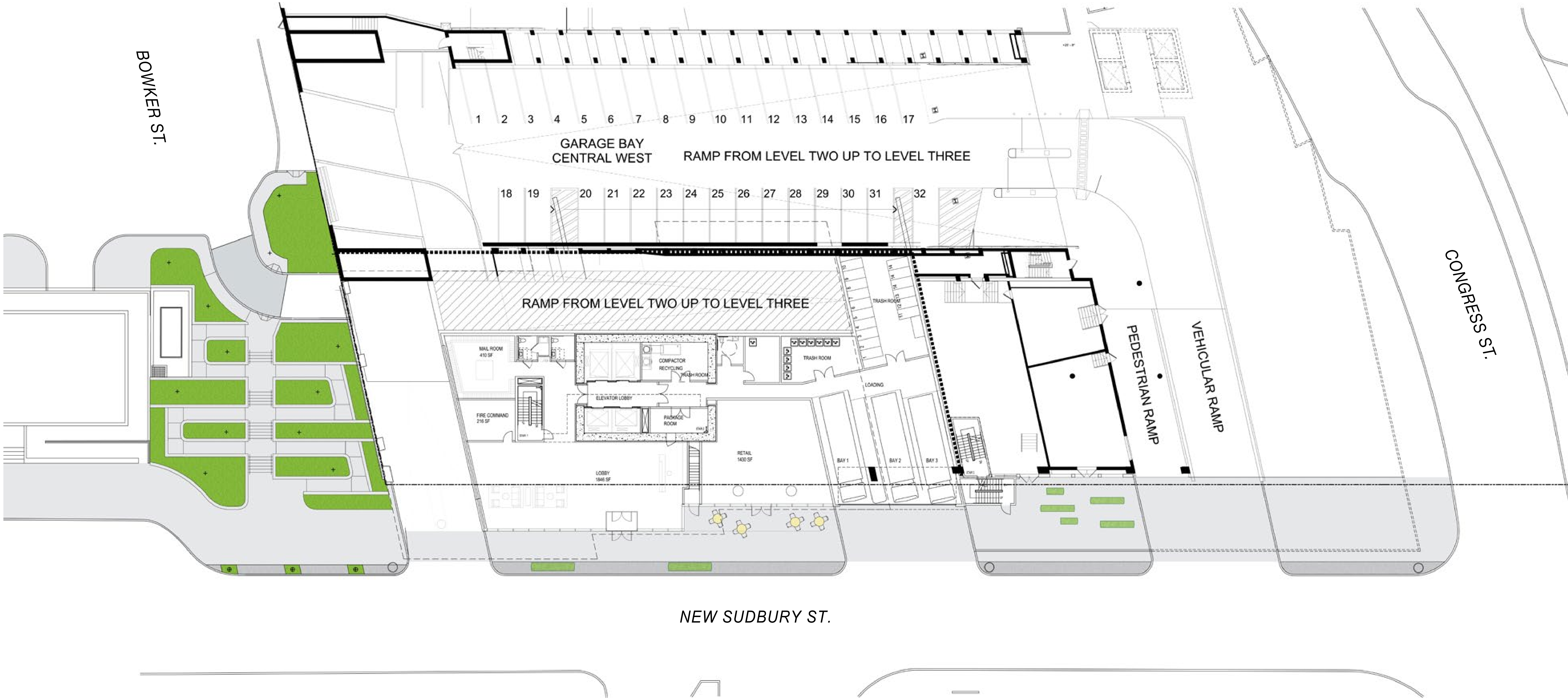
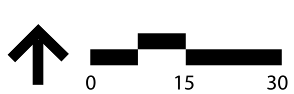
Figure 3.6k

View From Martha Road

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts





Concrete Sidewalk
Distinctive Pavement
Planted Area

Figure 3.7a

Proposed New Sudbury Streetscape Plan Without Tree Canopy

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

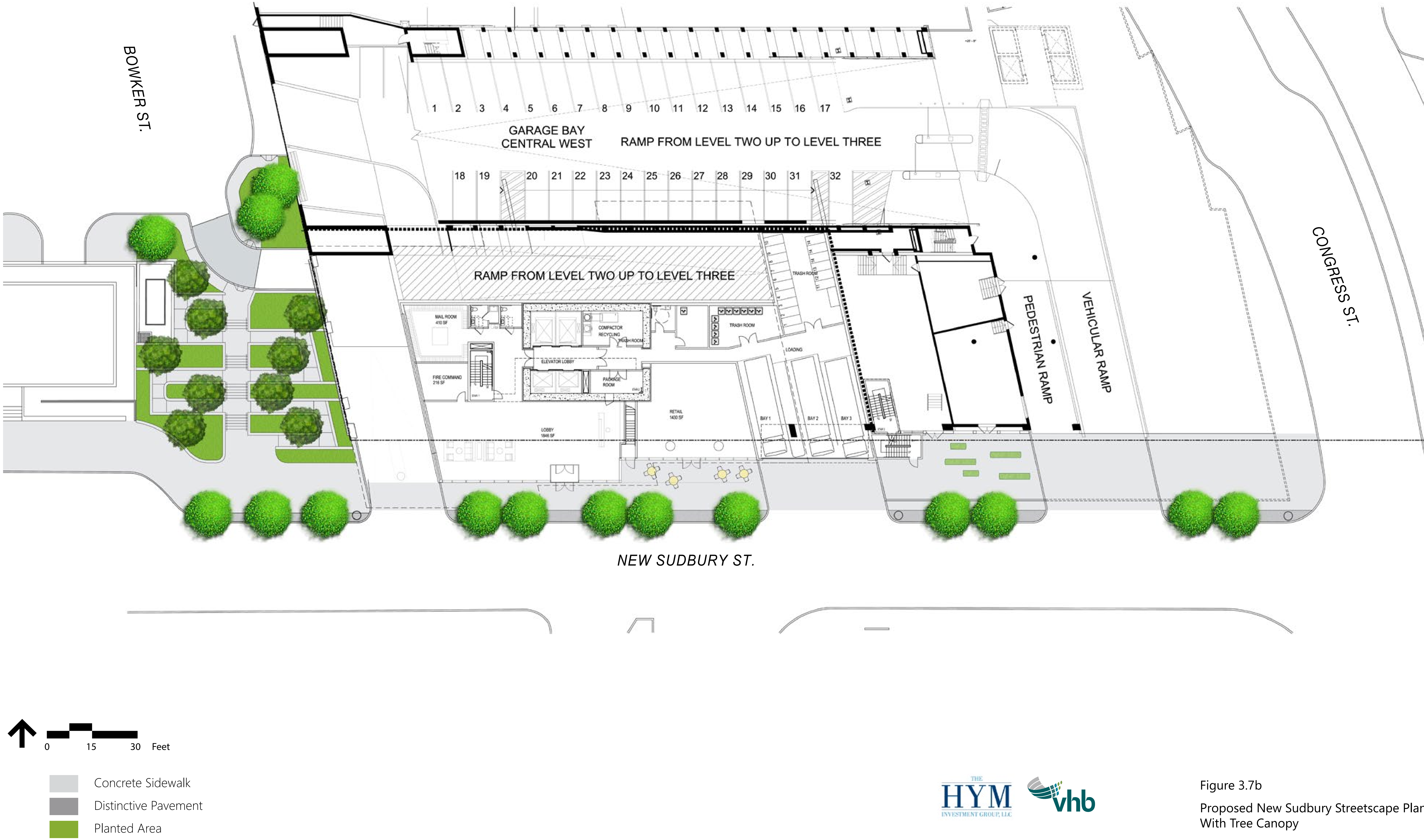
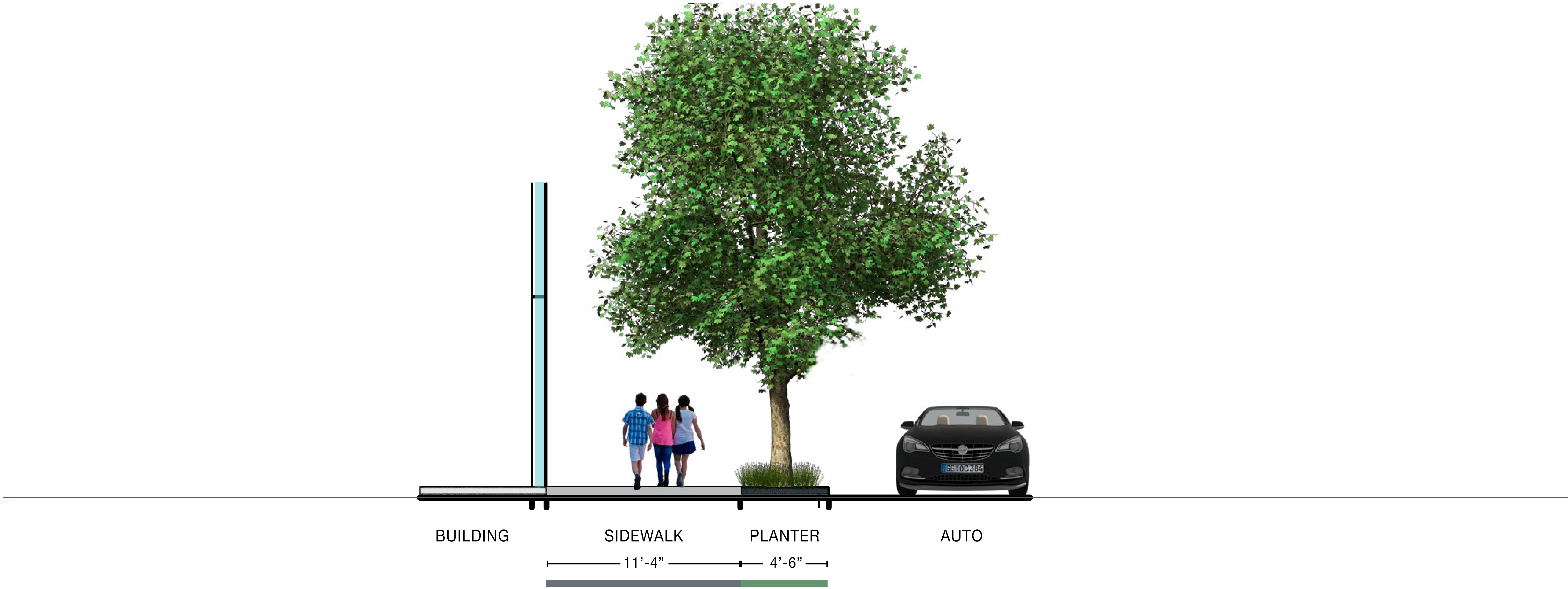
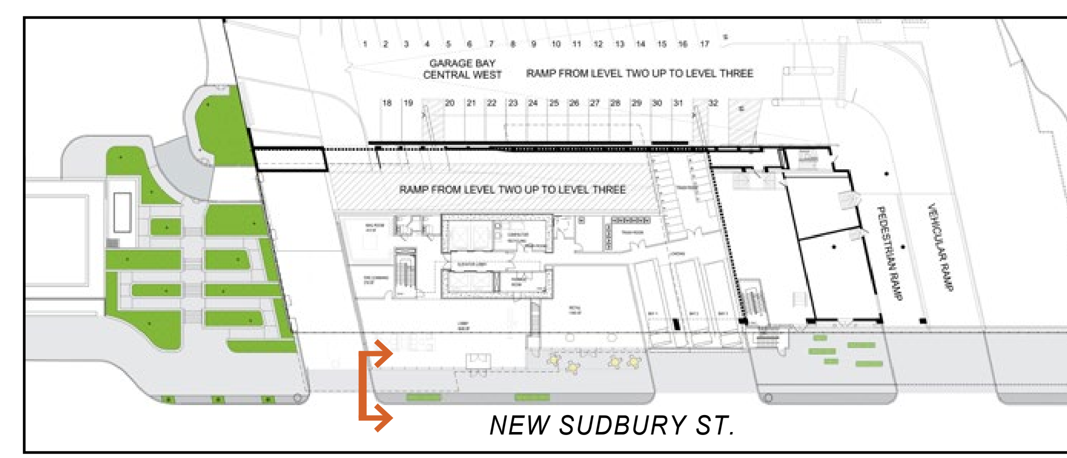


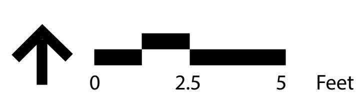
Figure 3.7b

Proposed New Sudbury Streetscape Plan
With Tree Canopy

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts







Pedestrian Zone

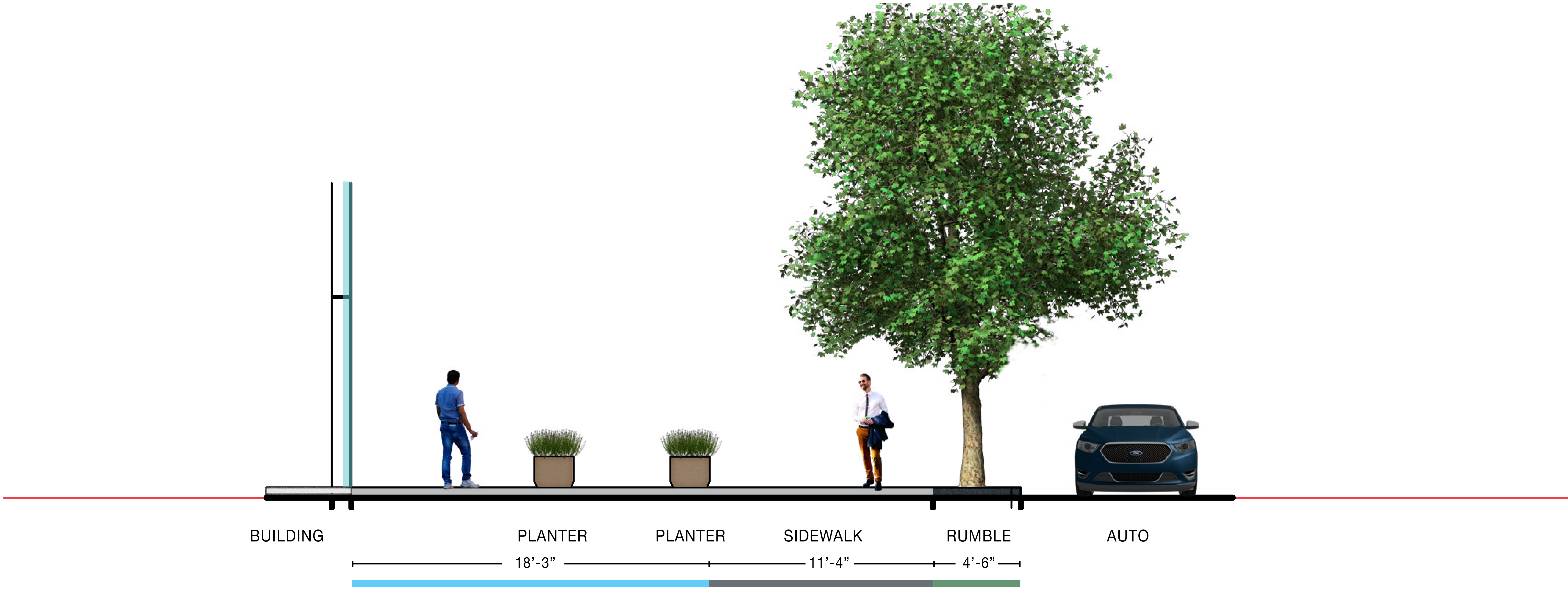
Greenscape Zone

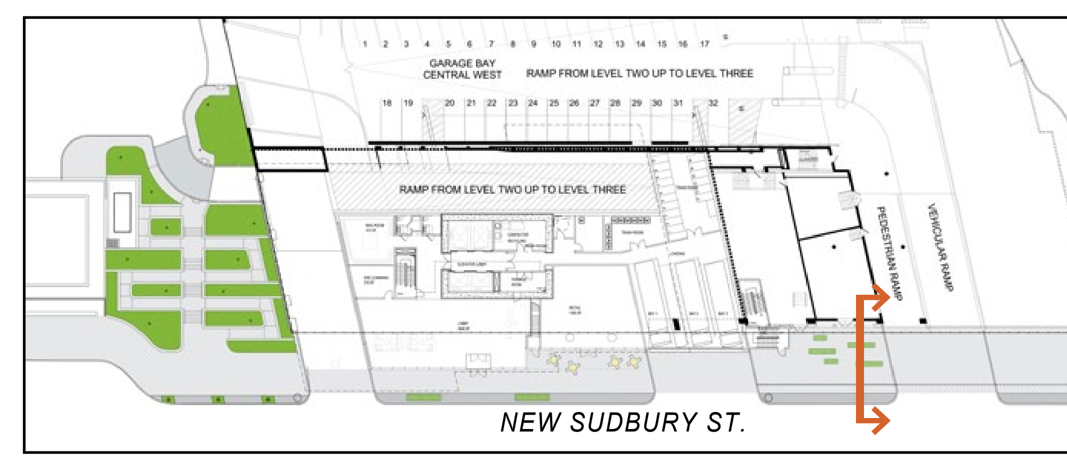
Frontage Zone

Figure 3.8a

Proposed New Sudbury Streetscape Cross-Section - Residential Building

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts





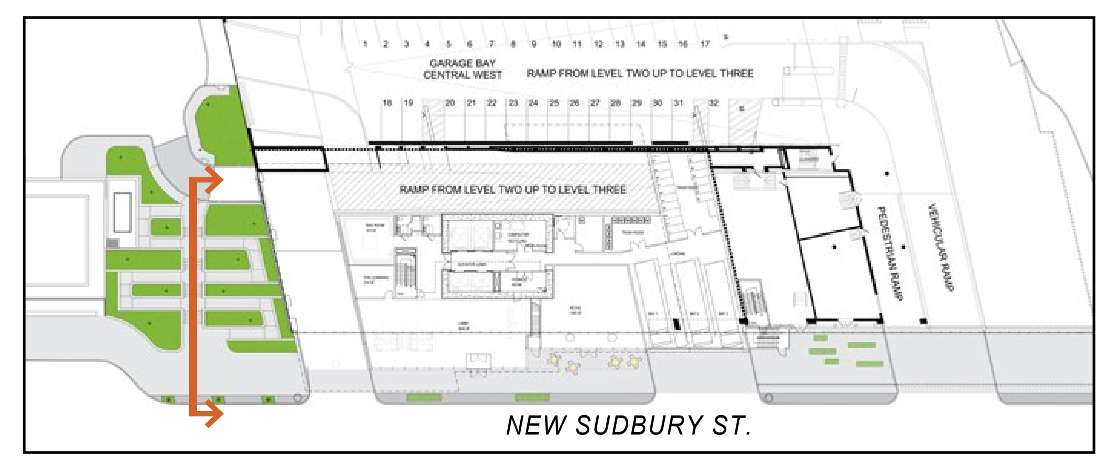
0 2.5 5 Feet

Pedestrian Zone
Greenscape Zone
Frontage Zone

Figure 3.8b

Proposed New Sudbury
Streetscape Cross-Section - Retail

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



0 2.5 5 Feet

Figure 3.8c

Proposed New Sudbury Streetscape
Cross-Section - Bowker Street

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

4

Transportation and Parking

A comprehensive transportation and parking study of the Development Plan Project was conducted as part of the previous Article 80 and state MEPA review processes. In accordance with the approved PDA, this chapter presents an update on traffic, transportation and parking related elements based on the more specific design and building program of the Proposed Project (Phase 1 or WP-B1). The updated transportation study provides a more focused 5-year horizon compared to the 15-year full-build horizon analyzed for the Development Plan Project and includes a comprehensive assessment of the potential transportation impacts, including traffic, transit, pedestrian, bicycle, parking, and building service and loading requirements. This study also identifies which components of the previously discussed Development Plan Project mitigation measures and Travel Demand Management (TDM) measures are appropriate to be associated with the Proposed Project. This analysis has been developed with input from the Boston Transportation Department (BTD) and BRA.

4.1 Project Description

As described in Chapter 1, *Project Description*, the Proposed Project consists of the development of 486 residential apartments and approximately 1,300 square feet of ground floor retail space. The majority of the existing 2,310-space Garage will remain for this first phase of the overall development and will provide adequate parking for the Proposed Project. The overall parking capacity of the Garage will be reduced to approximately 2,115 spaces in the southwest corner due to the Proposed Project and the enabling work required within the Garage done prior to, and in support of, both the overall Development Plan Project and the Proposed Project. This enabling work includes relocation of the 42 existing BPD-dedicated on-street parking spaces (including the angled on-street spaces along New Sudbury Street on the southern edge of the Proposed Project Site and some on-street parking spaces along Bowker and Hawkins Streets) to a dedicated space on a lower level of the Garage.

In order to accommodate the proposed residential building footprint, New Sudbury Street will be modified. In addition, the eastbound New Sudbury Street approach to Congress Street will be reduced to three lanes (a left turn lane, a through lane, and shared through/right turn lane).

4.1.1 Key Findings

As described in this EPNF, the Proposed Project will have an unperceivable impact on traffic operations and presents an opportunity to improve pedestrian conditions and the user experience in the area. The Proposed Project is expected to generate approximately one (1) vehicle trip per minute during the commuter peak hours. Parking demand will be fully accommodated in the existing Garage's surplus capacity. The Proposed Project is contained within the PDA Site without access alterations to the Garage. Minor modifications to traffic signal timings and lane usage are proposed to address any Proposed Project impacts, which are negligible as well as improve existing traffic operations deficiencies in the area that have long-existed.

4.2 Overview of the Development Plan Project Review

In June 2013, the Proponent filed a PNF with the BRA for a full build-out of the site, or the Development Plan Project. In response to comment letters received from the BRA, City of Boston departments, and the community as well as comments received at IAG and at community meetings, the Proponent made changes to the Development Plan Project building massing and program. The revised program was presented and analyzed as part of the 2013 DPIR. These documents contained a comprehensive transportation impact analysis and included an evaluation of traffic, transit, pedestrian, bicycle, parking and loading/service operations, and appropriate mitigation measures for the Development Plan Project. In accordance with the Development Review Procedures of the approved PDA, each individual future phase is required to be reviewed under the City's Article 80B, Large Project Review process so that specific transportation impacts along with which of the previously discussed mitigation and TDM measures are appropriate to be implemented with each Phase.

Subsequently, through 2014, the Development Plan Project was reviewed by state agencies under MEPA and its implementing regulations. The MEPA comprehensive transportation impact study for the Development Plan Project included additional supporting analysis and clarifications in response to reviewer comments. MEPA also further evaluated potential traffic mitigation measures for the overall Project and its individual components.

4.2.1 Development Plan Project Traffic Evaluation

The transportation analysis for the Development Plan Project included an evaluation of the then existing conditions (2013). Industry standard traffic engineering practice is to use a 5-year horizon; however, since the Development Plan Project is expected to be built in several phases, the year 2028 was designated as the future Full-Build design year. The future conditions without the redevelopment of the site (No-Build 2028), future conditions with the redevelopment in place (Build 2028) were thoroughly evaluated and the impact of the entire Development Plan Project was determined. The trip generation for the Development Plan Project was determined based on an assumed building program that included 755 residential units, approximately 19,100 square feet of retail, and approximately 1,004,950 square feet of office space on the West Parcel, and 57 residential units, a 196-room hotel, approximately 63,400 square feet of retail, and approximately 142,550 square feet of office space on the East Parcel, as presented in the 2013 DPIR.

4.2.2 Development Plan Project Parking Evaluation

The existing PDA Site currently contains approximately 2,310 parking spaces accessed from the West Parcel via New Chardon Street and New Sudbury Street. The parking spaces are currently underutilized with a peak parking demand of approximately 50 percent. Transient parking demand is at maximum during TD Garden events with approximately 550 spaces (weeknight) and 600 spaces (weekend night).

The Development Plan Project, at its completion, is anticipated to contain approximately 1,159 total parking spaces. For a mixed-use development with a common parking garage, the most efficient use of the parking resource is to "share" rather than have assigned or dedicated parking for each land, as discussed in Chapter 4, *Transportation and Parking* of the 2013 DPIR. Parking for the condominium and hotel uses, for example, will peak at night, while parking demand for the office space will peak during the day. It is expected that peak parking demand for the uses on-site for the Development Plan Project will be 590 spaces, with the remaining 569 spaces available for off-site monthly pass holders and transient parking.

4.3 Transportation Study Methodology

This transportation study adheres to the BTD Transportation Access Plan Guidelines and BRA Article 80 Large Project Review process. This study includes an evaluation of existing transportation conditions, future transportation conditions with and without the Proposed Project, projected parking demand, loading operations, transit services, pedestrian activity, and bicycle accommodation.

This transportation study determines the impact of the Proposed Project (the WP-B1 residential building), which will result in limited modifications to other portions of the PDA Site and the surrounding roadways. Future phases, most notably the development of the WP-B2 building (which includes demolition of the eastern portion of the existing garage structure over Congress Street and the East Parcel, and the relocation of the New Chardon Street Garage driveways to Bowker Street prior to issuance of WP-B2's certificate of occupancy), will be reviewed under a separate Article 80 filing.

The Existing (2015) Condition analysis includes an inventory of the existing transportation conditions such as traffic characteristics, parking, curb usage, transit, pedestrian circulation, bicycle facilities, loading, and site conditions. Per BTD request in August 2015, new data was collected including vehicles, bicycles, and pedestrians at the study area intersections in September 2015. A traffic data collection effort forms 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 2020, based on a five-year horizon from the year of the filing of this traffic study.

The No-Build (2020) Condition analysis includes general background traffic growth, traffic associated with other specific developments in the area, and transportation improvements that are planned in the vicinity of the site.

The Build (2020) Condition analysis includes a net increase in traffic volume due to the addition of WP-B1 Project-generated trip estimates to the traffic volumes developed as part of the No-Build (2020) Condition analysis. Expected roadway, parking, transit, pedestrian, and bicycle accommodations, as well as loading capabilities and deficiencies, are identified.

The final part of the transportation study identifies measures to mitigate WP-B1 Project-related impacts and to address any traffic, pedestrian, bicycle, transit, safety, or construction related issues that are necessary to accommodate the Proposed Project.

In order to present the interim traffic impact of the WP-B1 development and the necessary mitigation measures, for the purposes of the Transpiration section of this EPNF, it is assumed that the additional phases of the Development Plan Project redevelopment are not completed prior to 2020.

4.3.1 Study Area

The traffic analysis describes and evaluates the following study area intersections in addition to the garage driveways on New Sudbury Street, as identified by the BTD during a meeting in August 2015, and shown in Figure 4.1.

- North Washington Street/New Chardon Street/ Sumner Tunnel Off-ramp/I-93 Southbound and Callahan Tunnel On-ramps/Surface Road;
- New Chardon Street/Canal Street (pedestrian crossing);
- New Chardon Street/Congress Street/Merrimac Street/Government Center Garage North Entrance;
- New Chardon Street/Merrimac Street/Government Center Garage North Exit;
- Cambridge Street/New Chardon Street/Bowdoin Street;
- Cambridge Street/New Sudbury Street/Somerset Street;
- Congress Street/New Sudbury Street;
- Surface Street/New Sudbury Street/Surface Road; and
- Cross Street/New Sudbury Street /I-93 Northbound On-ramp.

4.4 Existing (2015) Condition

This section includes descriptions of existing study area roadway geometries, intersection traffic control, peak hour vehicular and pedestrian volumes, average daily traffic volumes, public and alternative (car share and bike share) transportation availability, on-street curb usage, and area off-street parking supply.

4.4.1 Existing Roadway Conditions

The roadways immediately serving the Proposed Project include the following facilities, which are categorized according to the MassDOT Office of Transportation Planning functional classifications.

Congress Street is an urban principal arterial roadway under City of Boston jurisdiction. Congress Street runs in a northwest-southeast direction between New Chardon Street at the Project Site and Northern Avenue in the Seaport Waterfront district. Congress Street generally consists of three travel lanes in each direction within the study area, and parking is prohibited.

New Sudbury Street is an urban principal arterial that falls under the jurisdiction of the City of Boston. New Sudbury Street runs one-way northeast-bound between Cambridge Street and Cross Street. New Sudbury Street generally consists of two travel lanes but widens at intersections (Congress Street and Surface Road) to include turning lanes. Parallel and diagonal parking is provided along New Sudbury Street; the diagonal parking is generally reserved for the Boston Police Department and the District Attorney.

New Chardon Street is an urban principal arterial that runs northeast–southwest between Cambridge Street and the intersection of Congress Street and Merrimac Street. New Chardon Street falls under the jurisdiction of the City of Boston. New Chardon Street consists of two lanes in each direction. On-street metered parking is generally provided. On weekdays, a portion of the parking spaces along the south side of the roadway, opposite the Brooke Courthouse, are restricted during peak commuter hours.

John F. Fitzgerald Surface Road (Surface Road) is an urban principal arterial roadway under MassDOT jurisdiction. Surface Road runs one-way southeast-bound along the subsurface John F. Fitzgerald Expressway (I-93) between North Washington Street and Purchase Street. Surface Road is separated from Cross Street and Atlantic Avenue, which run one-way northwest-bound, by the Rose Kennedy Greenway. Surface Road consists of two travel lanes at the Project Site but generally consist of three travel lanes further south. Parking is not permitted for its length.

4.4.2 Existing Intersection Conditions

Existing conditions at the study area intersections are described below.

New Chardon Street/North Washington Street/ Sumner Tunnel Off-ramps/I-93 Southbound and Callahan Tunnel On-ramps/Surface Road is a five-leg signalized intersection with three approaches. The New Chardon Street eastbound approach is under BTD jurisdiction and consists of two 11-feet wide through lanes to I-93 southbound/Sumner Tunnel on-ramps, and a 15-foot right-turn lane towards Surface Road. The Callahan Tunnel off-ramp approach is under MassDOT jurisdiction and consists of a single 40-foot lane that generally acts as two travel lanes. The North Washington Street southbound approach is under BTD jurisdiction and consists of two 11-foot shared left-turn/through lanes, an 11-foot shared through/right-turn lane, and a 14-foot exclusive right-turn lane. Parking is not permitted in the vicinity of the intersection.

New Chardon Street/Canal Street is a three-leg signalized intersection with two approaches and is under BTD jurisdiction. The New Chardon Street eastbound approach consists of a 12-foot through lane and a 13-foot through lane. The New Chardon Street westbound approach consists of an 11-foot through lane, a 10-foot through lane, and a 13-foot shared through/right-turn lane. Canal Street consists of one wide travel lane and runs one-way northbound. Metered parking is provided along Canal Street, but parking is not permitted on New Chardon Street in the vicinity of the intersection.

New Chardon Street/Congress Street/Merrimac Street/Government Center Garage North Entrance is an oblique four-way intersection with the Government Center Garage (Garage) North Entrance acting as the fifth leg of the intersection. New Chardon Street approaches the intersection from the east and west, while Congress Street forms the northbound approach and Merrimac Street forms the southbound approach. The New Chardon Street eastbound approach of consists of a 12-foot left-turn/through-lane and a 12-foot through/right-turn lane. New Chardon Street westbound consists of a 10-foot exclusive left-turn lane that is sometimes used for U-turns, a 12-foot left-turn/through-lane and a 12-foot through/right-turn lane. Congress Street northbound consists of a 10-foot exclusive left-turn lane, two 10-foot through-lanes, and a 17-foot channelized right-turn lane. Merrimac Street southbound consists of an 11-foot shared left-turn/through lane, an 11-foot through lane, a 10-foot through lane, and a channelized yield controlled right-turn lane. Sidewalks are available along all approaches. Crosswalks and pedestrian ramps are provided across each approach, including across the right-turn slip lanes on Merrimac Street. Median refuges are also provided on the Merrimac Street and Congress Street crossings and at the New Chardon westbound approach. Parking is prohibited in the vicinity of the intersection.

New Chardon Street/Government Center Garage North Exit is a two-leg intersection with one approach and is under BTD jurisdiction. The New Chardon Street eastbound approach consists of a 12-foot left-turn/through-lane and a 12-foot through/right-turn lane. Government Center Garage Exit consists of one wide travel lane and runs one-way northbound. Crosswalks and pedestrian ramps are provided across the Government Center Garage North Exit approach only. Parking is prohibited in the vicinity of the intersection.

New Chardon Street/Cambridge Street/Bowdoin Street is a four-way intersection, under BTD jurisdiction. Cambridge Street approaches the intersection from the east and west, while New Chardon Street forms the southbound approach and Bowdoin Street forms the northbound approach. Cambridge Street eastbound consists of two through-lanes and a right-turn lane. Cambridge Street westbound consists of a shared left-turn/through-lane and a shared through/right-turn lane. New Chardon Street southbound approach consists of a left-turn lane, a through lane, and a right-turn lane. The Bowdoin Street northbound approach consists of a left-turn lane, a through lane, and a right-turn lane. Sidewalks are available along all approaches. Crosswalks and pedestrian ramps are provided across each approach. Median refuges are also provided on the Cambridge Street crossings. Metered parking is provided along Cambridge Street and Bowdoin Street, but parking is not permitted on New Chardon Street in the vicinity of the intersection.

New Sudbury Street/Cambridge Street/Somerset Street is a four-leg signalized intersection with three approaches, under BTD jurisdiction. The Cambridge Street eastbound approach consists of two left-turn lanes, that are sometimes used for U-turns, a through-lane, and a thru/right-turn lane. The Cambridge Street westbound approach consists of a left-turn lane, which is sometimes used for U-turns, two through lanes, and a right-turn lane. Somerset Street northbound consists of a shared all-purpose lane. New Sudbury Street consists of two travel lanes and runs one-way northbound away from the intersection. Sidewalks are available along all approaches. Crosswalks and pedestrian ramps are provided across each approach. Raised medians provide pedestrian refuge crossing Cambridge Street crossings. Metered parking is provided along Cambridge Street but parking is not permitted on New Sudbury Street and Somerset Street in the vicinity of the intersection.

New Sudbury Street/Government Center Garage South Exit is a two-leg intersection with one approach and is under BTD jurisdiction. The New Sudbury Street eastbound approach consists of two through lanes. Government Center Garage South Exit consists of one wide travel lane and runs one-way southbound providing egress from the garage to New Sudbury Street. Crosswalks and pedestrian ramps are provided across the Government Center Exit approach only. On-Street public parking is not permitted in the vicinity of the intersection; reserved for police vehicles only.

New Sudbury Street/Government Center Garage South Entrance is a two-leg intersection with one approach and is under BTD jurisdiction. The New Sudbury Street eastbound approach consists of a left-turn lane and a through lane. Directly east of the intersection, New Sudbury Street widens to four lanes by restricting curbside parking, to include left and right turn lanes and two through lanes. Government Center Garage South Entrance consists of one wide travel lane and runs one-way northbound. Crosswalks and pedestrian ramps are provided across the Government Center Entrance approach only. On-Street public parking is not permitted in the vicinity of the intersection; reserved for police vehicles only.

New Sudbury Street/Congress Street is a four-leg signalized intersection with three approaches and is under BTD jurisdiction. The New Sudbury Street eastbound approach consists a 12-foot exclusive left-turn lane of about 100 feet in length, two 11-feet wide through lanes, and a 10-foot exclusive right-turn lane. The Congress Street northbound approach consists of two 11-foot through lanes and a 12-foot shared through/ right-turn lane. The Congress Street southbound approach consists of a 10-foot exclusive left-turn lane with a storage length of about 100 feet, an 11-foot through lane, and two 10-feet wide through lanes. At the Project Site, angled parking is provided for Boston Police Department vehicles along the north side of the New Sudbury Street eastbound approach.

New Sudbury Street/Surface Road is a five-leg signalized intersection with three approaches. The New Sudbury Street eastbound approach is under BTD jurisdiction and consists of two 13-feet wide through lanes and a 13-foot exclusive right-turn lane. The Surface Road southbound approach falls under MassDOT jurisdiction and consists of a 12-foot shared left-turn/through lane and a 12-foot through lane. The MBTA Haymarket bus facility southeast-bound approach falls under BTD jurisdiction and consists of a single 24-foot exclusive right-turn lane. Parking is not provided in the vicinity of the intersection

New Sudbury Street/Cross Street/I-93 Northbound On-ramp is three-leg signalized intersection with two approaches. The New Sudbury Street eastbound approach is under BTD jurisdiction and consists of a hard left-turn lane onto the I-93 Northbound On-ramp and a left-turn lane to Cross Street. Cross Street northbound approach consists of a bear left-turn lane onto the I-93 Northbound On-ramp and a through lane. I-93 On-ramp is under MassDOT jurisdiction and consists of one wide travel lane and runs one-way northbound away from the intersection. Crosswalks and pedestrian ramps are provided across each approach. Limited Parking is available on Cross Street from Noon-5 p.m. for a maximum of 2-hours.

4.4.3 Parking

An inventory of the on-street and off-street parking in the vicinity of the Project was collected. A description of each follows.

4.4.3.1 On-Street Parking and Curb Use

On-street parking and curb use immediately abutting the Proposed Project is shown in Figure 4.2. On-street curb use regulations around the Proposed Project are a mix of no parking/no stopping; parking reserved for police and court vehicles, commercial loading zones, and metered parking.

4.4.3.2 Off-Street Parking

The Garage has a total of approximately 2,310 parking spaces in nine above-ground levels. Of the total on-site parking supply, 1,865 are commercial public parking spaces and 445 are “exempt” employee parking. In addition to the Garage, approximately 12,617 off-street parking spaces are available in garages and lots within a ¼-mile (approximately seven-minute walk) of the PDA Site. Of these, approximately 5,457 are private spaces and 7,418 are public commercial parking spaces. Area garages account for 10,570 of these parking spaces and

2,305 spaces are in surface parking lots. These facilities are identified in Figure 4.3. Off-street parking structures within a ¼-mile of the PDA Site are listed in Table 4.1. Table 4.2 lists the off-street surface parking lots within ¼-mile of the PDA Site.

TABLE 4.1 OFF-STREET PARKING GARAGES WITHIN 1/4-MILE OF THE SITE

Map #	Address	Parking Facility	Private Capacity	Public Capacity
A	50 Cambridge Street	Center Plaza Garage	0	586
B	100 Cambridge Street	Saltonstall Building	466	0
C	19 Staniford Street	Hurley Building	180	0
D	City Hall	City Hall Executive Garage	28	0
E	City Hall	City Hall Garage	60	0
F	Congress Street	JFK Building Garage	180	0
G	Congress St Parcel 7	Parcel 7 Garage	0	310
H	Parmenter St/Prince St	MBTA North Station/TD Garden	70	0
J	101 Merrimac Street	101 Merrimac Street Garage	0	70
K	80 Causeway Street	MBTA North Station/TD Garden	54	1,221
L	35 Lomasney Way	TD Garden Garage	0	710
M	60 Staniford Street	Longfellow Place Garage	490	0
N	226–234 Causeway St	234 Strada	66	0
P	600 Commercial Street	North End Garage	445	200
Q	6 Medford Street	Ninety 8 North, LLC	9	0
R	130–140 Bowdoin St	Boston View Apartments	0	107
S	1 Bowdoin Square	Bowdoin Square Office Building	25	0
T	1 Ashburton Place	McCormack Building	482	0
U	Bowdoin St at Derne St	State House Garage	136	0
V	Cambridge Street	Charles River Plaza Garage	0	794
W	1 Beacon Street	One Beacon Street Garage	0	150
X	73 Tremont Street	73 Tremont Garage	0	120
Y	45 Province Street	45 Province Street	110	184
Z	275 Washington Street	Pi Alley Garage	0	600
AA	1 Devonshire Place	Devonshire Tower	109	87
AB	Causeway Street	Tip O'Neil Building Garage	239	0
AC	80–102 Fulton Street	Fulton Court Condo Trust	59	0
AD	28 State Street	28 State St LLC	150	0
AE	75 State Street	75 State Street Garage	0	700
AF	60 State Street	60 State Street Associates	78	227
AG	53 State Street	Exchange Place	93	0
AJ	Clinton Street	Clinton Street Garage	0	597
AH	200 State Street	Marketplace Center Garage	0	120
AI	The Victor	110 Beverly Street	142	0
AJ	Avenir	101 Canal Street	116	0

TABLE 4.2 OFF-STREET PARKING SURFACE LOTS WITHIN 1/4-MILE OF THE SITE

Map #	Address	Parking Facility	Private Capacity	Public Capacity
1	61 New Sudbury Street	JFK Lot	23	0
2	Alley 102	Alley 102	17	0
3	Creek Square	Creek Square Lot	10	0
4	Blackstone Street	BDPW Lot	14	0
5	Baldwin Place	Real Prop Lot	0	4
6	174 N. Richmond St	Richmond Street Lot	12	0
7	133–147 North Street	133–147 North Street	15	0
8	34 Cooper Street	D'Amore Parking	67	0
9	60 Endicott Street	Endicott at Stillman Street	10	0
10	55 Cooper Street	DCR Employee Lot	6	0
11	165 Canal Street	165 Canal Street	19	0
12	26–28 Lancaster Street	VIP Parking Lot	0	26
13	302–320 Friend Street	Friend Street Lot	0	41
14	200–204 Friend Street	Friend Street Lot	12	0
15	168 Friend Street	P & P	0	83
16	235–239 Friend Street	J & O Lot	0	26
17	70 Charter Street	Michael Angelo School Lot	10	0
18	57 Friend Street	57 Friend Street Lot	0	0
19	70 Lancaster Street	Stanihope – Lancaster Street	0	50
20	90 N. Washington St	Pinstripe Parking	0	47
21	181 N. Washington St	Ruggiero Lot	0	7
22	266 Causeway Street	234 Strada	0	14
23	Lovejoy Place	Lovejoy Place Parking Lot	0	47
24	580 Commercial Street	Commercial @ Charter St Lot	0	49
25	75 Nashua Street	MGH Lot	800	0
26	151 Beverly Street	Charton-Realty Parking Lot	0	53
27	20 Staniford Street	Staniford Street Lot	35	0
28	185 Cambridge Street	Charles River Plaza Lot	160	0
29	325 N. Bennet Street	N. Bennet Street Lot	30	0
30	12–14 Ashburton Place	Ashburton Place Lot	0	38
31	17 Beacon Street	Beacon Street Lot	0	24
32	219–223 North Street	120 Fulton Street Parking	13	0
33	56 Fulton Street	Fulton Street Lot	110	0
34	Cross St/Stillman St	N/A	0	4
35	9 Chatham Street	N/A	0	10
36	Hawthorne Place	Braman-Dow Lot	0	112
37	70 Fulton Street	N End Community Nursing HM	19	0
38	100 Nashua Street	Suffolk County	99	0
39	360 Cardinal O'Connell Way	Regina Cleri Lot	13	0

Map #	Address	Parking Facility	Private Capacity	Public Capacity
40	41 Blossom Street	N/A	25	0
41	585 Commercial Street	585 Commercial Street Lot	48	0
42	263 Beverly Street	DCR Employee Lot	73	0
43	60 Joy Street	Peter Faneuil School Lot	15	0
44	200 Cambridge Street	Boston Fire Department Lot	15	0

Car Sharing Services

Car sharing, which is predominantly provided by Zipcar in the Boston area, supplies easy access to vehicular transportation for those who do not own cars. Both Zipcar and Zipvan are currently located within the Garage. Enterprise Rent-A-Car has also started car sharing service in the Boston area, one of which currently exists in the Garage. Vehicles are rented on an hourly or daily basis, and all vehicle costs (gas, maintenance, insurance, and parking) are included in the rental fee. Vehicles are checked out for a specific time period and returned to their designated location. In addition, there are eight car sharing locations within a ¼-mile walk of the Proposed Project Site. The nearby car sharing locations are shown in Figure 4.4.

4.4.4 Existing Public Transportation

The Proposed Project Site is located in downtown Boston with abundant public transportation opportunities. The east side of the PDA Site is located above the MBTA Haymarket Station, which provides Orange and Green line subway service. Additionally, there are several other MBTA stations within a quarter-mile of the PDA Site, including those on the Blue Line at Bowdoin, Government Center, and State Street stations; the Orange Line at North Station and State Street station, and the Green Line at North Station and Government Center Station. North Station also provides access to the MBTA's regional commuter rail trains serving the northern and northwestern suburbs of Boston. The MBTA Haymarket Bus Station located on the East Parcel provides bus bays for service for the Route 111 buses to Chelsea/Revere and certain 400 series commuter buses serving the north shore communities of Salem, Lynn, Revere, Saugus and Melrose. MBTA public transportation services within the study area are shown on Figure 4.5 and listed in Table 4.3 below.

TABLE 4.3 EXISTING PUBLIC TRANSPORTATION SUMMARY

Service	Description	Rush Hour Headway (in minutes)
	Subway	
Orange Line	Forest Hills–Oak Grove	4–5
Blue Line	Bowdoin–Wonderland	5
Green Line	Boston College – Lechmere Cleveland Circle - Lechmere Riverside - Lechmere Heath Street – Lechmere	6–7
Orange Line	North Station-World Trade Center via Federal Courthouse and South Station	11-15
	Local Bus Routes	
Route 4	Assembly Sq. Mall–Downtown via Sullivan Sq., Main St. and Haymarket Station	15-18
Route 92	Sullivan Sq. Station–Downtown via Bunker Hill Street and Haymarket Station	7–8
Route 93	Woodlawn or Broadway and Park Avenue–Haymarket Station via Tobin Bridge	7-10
Route 111	North Station-World Trade Center via Federal Courthouse and South Station	11-15
	Express Bus Routes	
Route 325	Elm Street, Medford–Haymarket Station via Fellsway West, Salem Street, and I-93	15-20
Route 326	West Medford–Haymarket Station via Playstead Road, High Street, Medford, and I-93	12-20
Route 352	Burlington-Boston Via Route 128 and I-93	20-30
Route 354	Woburn Express-Boston Via Woburn Square and I-93	15-20
Route 424	Eastern Avenue and Essex Street–Haymarket Station Wonderland Salem Depot–Haymarket Station Wonderland Salem Depot–Central Square, Lynn,	30
Route 426	Central Square, Lynn–Haymarket Station via Cliftondale	15-20
Route 428	Oaklandvale–Haymarket Station via Granada Highlands	30-40
Route 434	Peabody–Haymarket Express via Goodwin's Circle	1 daily roundtrip
Route 450	Eastern Avenue and Essex Street–Haymarket Station Wonderland Salem Depot–Haymarket Station Wonderland Salem Depot–Central Square, Lynn	30

A combination of nine express buses and four local bus routes currently stop at or adjacent to the MBTA Haymarket Station as a terminus or an intermediate stop. Five of the express buses run only during peak AM and PM periods, and one express bus only runs one daily round trip. Out of these 13 bus routes, only one local bus (Route 111) and five express buses (the Route 400's to the inner suburbs) actually utilize the MBTA Haymarket bus facility bays. All other buses that are scheduled to stop at MBTA Haymarket Station do so curbside along the approaches to the Congress Street (4, 92, 93, 325, and 326) and New Sudbury Street (352 and 354) intersection. Of those buses that actually enter the Haymarket bus facility, approximately 65 percent of the total daily bus trips are from the Route 111 buses (Chelsea/Revere) contributing to well over 75 percent of all patrons using the MBTA's Haymarket bus facility.

The MBTA operates for 20 hours of the day with the commuter peak periods being the busiest. The peak periods of use at the MBTA Haymarket bus facility are more limited to being only on weekdays between 7:00 and 8:30 AM and 4:30 and 6:00 PM. Due to the low frequency of service for the 400 series routes during the typical weekday non-peak commuter periods (and none on the weekends), the MBTA Haymarket bus facility is primarily utilized by the Route 111 buses during non-peak commuter periods.

4.4.5 Existing Traffic Data

Traffic volume data was collected at the study area intersections on Wednesday, September 23, 2015. Turning Movement Counts (TMCs) and vehicle classification counts were conducted during the weekday a.m. and weekday p.m. peak periods (7:00 – 9:00 a.m. and 4:00 – 6:00 p.m., respectively). The traffic classification counts included car, heavy vehicle, pedestrian, and bicycle movements. The detailed traffic counts are provided in Appendix B.

4.4.5.1 Existing Pedestrian Volumes and Accommodations

In general, sidewalks are provided along all roadways in the vicinity of the Proposed Project Site and are in good condition. Crosswalks are provided at all study area intersections, including pedestrian signal equipment at the signalized study area intersections.

To determine the amount of pedestrian activity within the study area, pedestrian counts were conducted as part of the TMCs at the study area intersection. The weekday a.m. peak hour and the weekday p.m. peak hour pedestrian volumes are presented in Figure 4.6. As shown in the figure, peak commuter hour pedestrian activity is heavy throughout the study area.

4.4.5.2 Existing Bicycle Volumes and Accommodations

In recent years, bicycle use has increased dramatically throughout the City of Boston. The Proposed Project Site is conveniently located in close proximity to several bicycle facilities. The roadways adjacent to the Site currently do not have any designated bicycle accommodations. According to the "Bike Routes of Boston" website issued by the City of Boston, Congress Street, Cambridge Street, Merrimac Street, Cross Street, and Martha Road are designated "advanced" level bike routes suitable for experienced and traffic-confident cyclists. State Street, Causeway Street, Commercial Street, and Endicott Street are designated as "intermediate" level routes, suitable for riders with some on-road experience. The pathway from Chatham Street to North Street between Faneuil Hall and the Quincy Marketplace, Thoreau Path in Charles River Park, and a pathway through North Station to the Charles River bike paths are designated as shared-use bike paths. Bicycle counts were conducted as part of the TMCs. The weekday a.m. peak hour and the weekday p.m. peak hour bicycle volumes are presented in Figure 4.7.

Bicycle Sharing Services

The Proposed Project Site is located in proximity to a bicycle sharing station provided by Hubway. Hubway is the bicycle sharing system in the Boston area, which was launched in 2011 and consists of over 140 stations and 1,300 bicycles. As shown in Figure 4.8, there are 6 Hubway bicycle sharing stations located within a ¼ mile of the Proposed Project Site.

4.4.5.3 Existing Vehicular Traffic Volumes

The TMCs conducted showed that in the study area the vehicle weekday a.m. peak hour occurred from 7:00 – 9:00 a.m. and the weekday p.m. peak hour occurred from 5:00 – 6:00 p.m.

Seasonal Adjustment

To account for seasonal variation in traffic volumes throughout the year, data provided by MassDOT was reviewed. The most recent (2011) MassDOT Weekday Seasonal Factors were used to determine the need for seasonal adjustments to the September TMCs. The seasonal adjustment factor for roadways similar to the study area (Group 6) is below 1.0 for the month of September. This indicates that average month traffic volumes are less than the traffic volumes that were collected. The traffic data were not adjusted downward to reflect average month conditions and will therefore provide a conservatively high analysis consistent with the peak season traffic volumes.

The existing traffic volumes that were collected were used to develop the Existing (2015) Condition traffic volumes. The Existing (2015) weekday a.m. peak hour and weekday p.m. peak hour traffic volumes are shown in Figures 4.9a and Figure 4.9b, respectively.

4.4.6 Existing (2015) Condition Traffic Operations Analysis

The criterion for evaluating traffic operations is level of service (LOS), which is determined by assessing average delay experienced by vehicles at intersections and along intersection approaches. Trafficware's Synchro (version 9) 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).

LOS designations are based on average delay per vehicle for all vehicles entering an intersection. Table 4.4 displays the intersection LOS criteria. LOS A indicates the most favorable condition, with minimum traffic delay, while LOS F represents the worst condition, with significant traffic delay. LOS D or better is typically considered desirable during the peak hours of traffic in urban and suburban settings.

TABLE 4.4 VEHICLE LEVEL OF SERVICE CRITERIA

Level Of Service	Signalized Intersections	Unsignalized Intersections
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

Source: 2000 Highway Capacity Manual, Transportation Research Board.

In addition to delay and LOS, the operational capacity and vehicular queues are calculated and used to further quantify traffic operations at intersections. The following describes these other calculated measures.

The volume-to-capacity (v/c) ratio is a measure of congestion at an intersection approach. A v/c ratio below one indicates that the intersection approach has adequate capacity to process the arriving traffic volumes over the course of an hour. A v/c ratio of one or greater indicates that the traffic volume on the intersection approach exceeds capacity.

The 95th percentile queue, measured in feet, denotes the farthest extent of the vehicle queue (to the last stopped vehicle) upstream from the stop line. This maximum queue occurs five percent, or less, of the time during the peak hour and typically does not develop during off-peak hours. Since volumes fluctuate throughout the hour, the 95th percentile queue represents what can be considered a "worst case" condition. Queues at an intersection are generally below the 95th percentile length throughout most of the peak hour. It is also unlikely that 95th percentile queues for each approach to an intersection occur simultaneously.

Tables 4.5 and 4.6 summarize the Existing (2015) Condition capacity analysis for the study area intersection during the weekday a.m. peak hour and weekday p.m. peak hour, respectively. The shaded cells in the tables indicate an operating condition below LOS D. The detailed analysis sheets are provided in Appendix B.

TABLE 4.5 EXISTING (2015) CONDITION, CAPACITY ANALYSIS SUMMARY, WEEKDAY A.M. PEAK HOUR

Intersection Approach	LOS	Delay (sec)	v/c	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Signalized Intersections					
North Washington Street/New Chardon Street/Sumner Tunnel Off-ramp/I-93 SB & Callahan Tunnel On-ramps/Surface Road	**E**	**57.2**			
New Chardon EB thru/thru | thru/right	D	38.1	0.50	157	172
I-93 Off-Ramp WB left/thru | thru	F	126.5	1.16	~372	#445
N. Washington SB left	C	33.4	0.77	314	467
N. Washington SB left/thru | thru/right	C	29.5	0.80	330	354
N. Washington SB right	C	32.2	0.75	196	403
New Chardon Street/Canal Street	**A**	**4.1**			
New Chardon EB thru/thru	A	3.5	0.25	46	57
New Chardon WB thru/thru | thru/right	A	4.5	0.33	0	m0
Merrimac Street/Congress Street/New Chardon Street/Garage Entrance	**D**	**35.0**			
New Chardon EB left/thru | thru/right	D	38.2	0.76	15	#51
New Chardon WB left	D	53.3	0.86	165	#434
New Chardon WB left/thru | thru/right	C	32.2	0.78	165	201
Congress NB left	C	31.4	0.75	124	m#313
Congress NB left/thru | thru	C	26.3	0.77	131	200
Congress NB right	A	9.7	0.30	71	117
Merrimac SB left/thru | thru/thru	E	60.1	0.78	113	145
Merrimac SB right	A	8.3	0.43	0	20
New Chardon Street/ Garage Exit	**B**	**13.3**			
New Chardon EB thru/thru	D	53.4	0.54	85	116
New Chardon WB thru/thru	A	1.7	0.33	8	18
Garage NB left/right	D	44.0	0.02	3	4
Cambridge Street/New Chardon Street/Bowdoin Street	**C**	**23.6**			
Cambridge EB thru/thru | thru/right	C	26.6	0.41	24	210
Cambridge WB left/thru | thru/right	A	9.9	0.24	23	33
Bowdoin NB left	C	25.8	0.51	57	95
Bowdoin NB thru	D	51.3	0.66	82	140
Bowdoin NB right	A	4.5	0.34	0	16
New Chardon SB left	C	29.8	0.71	136	199
New Chardon SB thru	C	33.6	0.48	97	150
New Chardon SB right	A	6.8	0.51	0	59

Intersection Approach	LOS	Delay (sec)	v/c	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Cambridge Street/New Sudbury Street/Somerset Street	**D**	**43.7**			
Cambridge EB left/left	D	44.4	0.78	79	134
Cambridge EB thru/thru	D	50.3	0.97	210	#323
Cambridge WB left	E	66.7	0.79	75	#204
Cambridge WB thru/thru	C	26.0	0.24	52	81
Cambridge WB right	A	7.9	0.37	0	41
Somerset NB left/thru/right	D	41.7	0.49	44	64
Congress Street/New Sudbury Street	**C**	**33.8**			
New Sudbury EB left	E	61.8	0.68	122	#208
New Sudbury EB thru/thru	D	49.3	0.52	96	140
New Sudbury EB right	C	22.8	0.70	0	#97
Congress NB thru/thru | thru/right	D	35.3	0.71	239	294
Congress SB left	E	58.9	0.59	80	m99
Congress SB thru/thru/thru	B	15.4	0.26	106	m127
Surface Road/New Sudbury Street/Haymarket Bus Exit	**C**	**26.6**			
Haymarket EB thru/thru	C	27.7	0.29	84	120
Haymarket EB right	A	6.8	0.29	0	41
Surface SB left/thru | thru	C	30.0	0.44	134	173
Haymarket Bus SB left/right	D	40.5	0.18	19	32
Cross Street/New Sudbury Street/I-93 NB On-Ramp	**A**	**4.4**			
Haymarket EB left/left	A	1.5	0.26	0	2
Cross NB left/thru | thru	A	5.7	0.54	183	225
Unsignalized Intersections					
Government Center Garage Exit/New Sudbury Street					
New Sudbury Street EB thru/thru	A	0.0	0.13	-	0
Garage SB right	B	10.3	0.21	-	20

m – Volumes for 95th percentile queue is metered by upstream signal
~ – 50th percentile queue exceeds capacity, queue shown is maximum after two cycles
# – 95th percentile queue exceeds capacity, queue shown is maximum after two cycles

TABLE 4.6 EXISTING (2015) CONDITION, CAPACITY ANALYSIS SUMMARY, WEEKDAY P.M. PEAK HOUR

Intersection Approach	LOS	Delay (sec)	v/c	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Signalized Intersections					
North Washington Street/New Chardon Street/Sumner Tunnel Off-ramp/I-93 SB & Callahan Tunnel On-ramps/Surface Road	**D**	**43.3**			
New Chardon EB thru/thru | thru/right	C	27.9	0.72	237	#293
I-93 Off-Ramp WB left/thru | thru	D	37.1	0.57	155	214
N. Washington SB left	E	79.0	1.01	~440	#689
N. Washington SB left/thru | thru/right	D	47.4	0.98dl	337	#454
N. Washington SB right	C	28.5	0.56	126	235
New Chardon Street/Canal Street	**A**	**5.0**			
New Chardon EB thru/thru	A	7.8	0.41	146	169
New Chardon WB thru/thru | thru/right	A	1.3	0.23	0	m14
Merrimac Street/Congress Street/New Chardon Street/Garage Entrance	**D**	**50.9**			
New Chardon EB left/thru | thru/right	C	31.7	0.85	28	#207
New Chardon WB left	F	142.0	1.09	~200	#364
New Chardon WB left/thru | thru/right	F	93.2	0.98	185	#285
Congress NB left	C	25.5	0.44	52	m72
Congress NB left/thru | thru	C	23.6	0.44	54	m72
Congress NB right	A	8.5	0.48	53	m61
Merrimac SB left/thru | thru/thru	D	50.8	1.08dl	163	210
Merrimac SB right	A	1.1	0.17	0	0
New Chardon Street/ Garage Exit	**B**	**19.1**			
New Chardon EB thru/thru	D	45.9	0.61	126	177
New Chardon WB thru/thru	A	1.5	0.27	6	m6
Garage NB left/right	C	22.5	0.28	26	68
Cambridge Street/New Chardon Street/Bowdoin Street	**C**	**28.4**			
Cambridge EB thru/thru | thru/right	C	21.8	0.51	64	186
Cambridge WB left/thru | thru/right	B	15.7	0.45	39	m55
Bowdoin NB left	C	23.9	0.55	87	144
Bowdoin NB thru	E	56.8	0.87	186	#322
Bowdoin NB right	B	12.0	0.36	16	65
New Chardon SB left	D	53.2	0.89	102	#240
New Chardon SB thru	C	34.7	0.46	90	153
New Chardon SB right	A	7.2	0.41	0	55

Intersection Approach	LOS	Delay (sec)	v/c	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Cambridge Street/New Sudbury Street/Somerset Street	**C**	**34.4**			
Cambridge EB left/left	D	43.0	0.84	90	m#143
Cambridge EB thru/thru	C	31.5	0.65	163	m#297
Cambridge WB left	E	67.9	0.70	40	#90
Cambridge WB thru/thru	C	24.8	0.22	62	106
Cambridge WB right	A	8.0	0.39	0	56
Somerset NB left/thru/right	D	51.9	0.77	116	188
Congress Street/New Sudbury Street	**D**	**37.8**			
New Sudbury EB left	D	49.4	0.58	104	177
New Sudbury EB thru/thru	D	50.9	0.75	150	208
New Sudbury EB right	C	20.6	0.68	0	#102
Congress NB thru/thru | thru/right	C	28.7	0.90	82	#349
Congress SB left	F	139.9	1.02	~121	m#149
Congress SB thru/thru/thru	B	16.3	0.27	78	m87
Surface Road/New Sudbury Street/Haymarket Bus Exit	**D**	**53.6**			
Haymarket EB thru/thru	E	70.7	0.55	222	m263
Haymarket EB right	A	9.2	0.33	25	m43
Surface SB left/thru | thru	D	36.1	0.48	98	m125
Haymarket Bus SB left/right	D	49.9	0.33	28	55
Cross Street/New Sudbury Street/I-93 NB On-Ramp	**A**	**8.1**			
Haymarket EB left/left/left	A	4.6	0.65	4	17
Cross NB thru/thru	B	10.4	0.85	425	532
Unsignalized Intersections					
Government Center Garage Exit/New Sudbury Street					
New Sudbury Street EB thru/thru	A	0.0	0.18	-	0
Garage SB right	B	11.0	0.25	-	24

As shown in Table 4.5 and Table 4.6, under the Existing (2015) Condition:

The intersection of **North Washington/New Chardon Street/I-93 Ramps** operates at LOS E during the a.m. peak hour and LOS D during the p.m. peak hour. The I-93 Off-Ramp westbound left/thru | thru approach operates at LOS F during the a.m. peak hour. The North Washington Street southbound left approach operates at LOS E during the p.m. peak hour.

The intersection of **Merrimac Street/Congress Street/New Chardon Street/Garage Entrance** operates under capacity during both the a.m. and p.m. peak hours. The New Chardon westbound approaches operate at LOS F during the p.m. peak hour. The Merrimac southbound left/thru | thru/thru approach operates at LOS E during the a.m. peak hour. The longest queues occur at the New Chardon westbound left approach during both the a.m. and p.m. peak hours.

The intersection of **Cambridge Street/New Chardon Street/Bowdoin Street** operates under capacity during both the a.m. and p.m. peak hours. The Bowdoin northbound thru approach operates at LOS E during the p.m. peak hour.

The intersection of **Cambridge Street/Sudbury Street/Somerset Street** operates under capacity during both the a.m. and p.m. peak hours. The Cambridge Street westbound left approach operates at LOS E during both the a.m. and p.m. peak hours. The longest queues occur at the Cambridge eastbound thru/thru approach during both the a.m. and p.m. peak hours.

The intersection of **Congress Street/Sudbury Street** operates under capacity during both the a.m. and p.m. peak hours. The Sudbury Street eastbound left-turn approach operates at LOS E during the a.m. peak hour. The Congress Street southbound left-turn approach operates at LOS E during the a.m. peak hour and LOS F during the p.m. peak hour.

The intersection of **Surface Street/Sudbury Street/Haymarket Bus Exit** operates under capacity during both the a.m. and p.m. peak hours. The Sudbury Street eastbound thru/thru approach operates at LOS E during the p.m. peak hour. The longest queues occur at the Surface Street southbound left/thru | thru approach during the a.m. peak hour and Sudbury Street eastbound thru/thru during the p.m. peak hour.

4.5 No-Build (2020) Condition

The No-Build (2020) Condition reflects a future scenario that incorporates anticipated traffic volume changes associated with background traffic growth independent of any specific project; traffic associated with other planned specific background developments, and planned infrastructure improvements that will affect travel patterns throughout the study area. These infrastructure improvements include roadway, public transportation, pedestrian and bicycle improvements.

4.5.1 Background Traffic Growth

The methodology to account for generic future background traffic growth, independent of this Proposed Project, may be affected by changes in demographics, smaller scale development projects, or projects unforeseen at this time. Based on a review of recent and historic traffic data collected recently and to account for any additional unforeseen traffic growth, a traffic growth rate of ½ percent per year, compounded annually, was used.

4.5.2 Specific Development Traffic Growth

Traffic volumes associated with the larger or closer known development projects can affect traffic patterns throughout the study area within the future analysis time horizon. Eight such projects were specifically accounted for in the traffic volumes for future scenarios while others were included in the general background traffic growth. A few projects that had previously been included in the Development Plan Project's traffic studies (most notably Avenir, Victor, and Suffolk University's 20 Somerset building) were constructed and occupied as of the new data collection in September 2015. The Proposed Project Site-specific background projects are listed below and are mapped on Figure 4.10:

– Bulfinch Parcel 1B and 1C – This project, located on Beverly Street, involves the construction of a new, mixed-use project including 231 apartments, 219 hotel rooms, 8,800 sf of ground floor retail, and 176 garage parking spaces. Trips generated by this project were distributed to the study area intersections.
– One Canal Street – Currently under construction, this project includes for 320 residential units and 22,000 square feet of commercial/retail use. Trips generated by this project were distributed to the study area intersections.
– 121-127 Portland Street (Forecaster 121) – Known as the Forecaster Building and currently under construction, this project will add two floors to an existing six-story building. The project includes 54 loft dwelling units and 42 parking spaces. Trips generated by project were distributed to the study area intersections.
– Lovejoy Wharf – This project is located at 160 North Washington Street (Hoffman Building) and 131 Beverly Street. As of the date of the data collection, the office redevelopment of the Hoffman Building had been constructed and was occupied. The residential portion of the project is currently under construction. This portion of the project will consist of approximately 175 residential condominium units.
– Garden Garage – This site is located at 35 Lomasney Way on approximately three acres of land in Boston's West End. According to the Notice of Project Change filed with the BRA on October 6, 2015, the project proposes to construct an approximately 44-story residential building on the site of the existing above-ground Garden Garage. The Project would create approximately 470 residential units and 2,300 sf of ground floor retail space. In addition, the existing 650-space garage will be replaced with an 830-space underground parking structure, resulting in a net increase of 180 new spaces. Trips generated by this project were distributed to the study area intersections
– Massachusetts General Hospital Institutional Master Plan Building for the 3rd Century. MGH is constructing a new ambulatory care building on a site of several former hospital buildings. One phase of the project, the Yawkey Outpatient Center, is already complete and includes a 725-space parking garage. Both the garage and Yawkey Center are operational. A second 150-bed addition, permitted through the Institutional Master Plan, is under construction and is expected to be fully occupied by 2012. No new parking is to be built as part of the second phase. Trips generated by this project were distributed to the study area intersections
– Nashua Street Residences – Currently under construction, this project includes the development of a 503-unit residential tower with 3,575 sf of retail space and 219 parking

spaces. Vehicle trips generated by the project were distributed to the study area intersections.

– The Boston Garden – This mixed-use transit-oriented project currently proposed will include residential, office, hotel, and retail space. This development is expected to occur over the course several years and extend beyond the traffic study horizon year of this study. The full-build project includes 497 residential units, a 306 room hotel, 810,000 sf of office space, 235,000 sf of retail/restaurant space including a neighborhood grocery store, and over 65,000 sf in expansions to elevators, lobbies, concessions, and an atrium hall for TD Garden and the North Station's use. An addition of 800 parking spaces are planned to be added beneath the site and will be connected to the existing 1,275 parking space garage underneath the Boston Garden. Trips generated by Phase 1, which includes approximately 306 hotel rooms; approximately 142,000 sf of flex office space; approximately 235,000 sf of commercial/retail/restaurant space to include a grocery store, were distributed to the study area intersections.

4.5.3 Proposed Infrastructure Improvements

A review of planned improvements to roadway, transit, bicycle, and pedestrian facilities was conducted to determine if there are any nearby improvement projects in the vicinity of the study area. Based on this review, it was determined that there are several proposed roadway improvement projects to be constructed by others located in the immediate vicinity of the Project. These include the Connect Historic Boston project; final roadway circulation improvements in the Bulfinch Triangle as proposed with the Central Artery/Tunnel Surface Transportation Action Forum (STAF) recommendations; reconstruction of Cambridge Street as part of the MBTA's improvements to its Government Center Station; and bicycle accommodation (bike lanes) along various corridors by BTD's Boston Bike Network project. All these improvements are assumed to be completed by the time of Project completion and are incorporated into the No-Build (2020) Condition.

4.5.4 No Build Traffic Volumes

The 0.5 percent per year annual growth rate, compounded annually, was applied to the Existing (2015) Condition traffic volumes, then the traffic volumes associated with the specific development projects listed above was added to determine the No-Build (2020) Condition traffic volumes. The No-Build (2020) weekday a.m. peak hour and weekday p.m. peak hour traffic volumes are shown on Figures 4.11a and Figure 4.11b, respectively.

4.5.5 No-Build (2020) Condition Traffic Operations Analysis

The No-Build (2020) Condition analysis uses the same methodology as the Existing (2015) Condition capacity analysis. Table 4.7 and Table 4.8 present the No-Build (2020) Condition operations analysis for the weekday a.m. peak hour and weekday p.m. peak hour, respectively. The shaded cells in the tables indicate a decrease in LOS between the Existing (2015)

Condition and the No-Build (2020) Condition to an LOS below LOS D. The detailed analysis sheets are provided in Appendix B.

TABLE 4.7 NO-BUILD (2020) CONDITION, CAPACITY ANALYSIS SUMMARY WEEKDAY A.M. PEAK HOUR

Intersection Approach	LOS	Delay (sec)	v/c	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Signalized Intersections					
North Washington Street/New Chardon Street/Sumner Tunnel Off-ramp/I-93 SB & Callahan Tunnel On-ramps/Surface Road	**E**	**65.0**			
New Chardon EB thru/thru | thru/right	D	39.4	0.52	163	177
I-93 Off-Ramp WB left/thru | thru	F	147.4	1.21	~395	#467
N. Washington SB left	D	39.7	0.83	370	#565
N. Washington SB left/thru | thru/right	C	34.5	0.85	361	456
N. Washington SB right	D	35.4	0.77	297	458
New Chardon Street/Canal Street	**A**	**4.4**			
New Chardon EB thru/thru	A	3.5	0.26	48	m59
New Chardon WB thru/thru | thru/right	A	4.9	0.34	0	m0
Merrimac Street/Congress Street/New Chardon Street/Garage Entrance	**D**	**37.3**			
New Chardon EB left/thru | thru/right	D	42.3	0.79	18	#60
New Chardon WB left	E	59.2	0.89	171	#457
New Chardon WB left/thru | thru/right	C	34.4	0.80	170	210
Congress NB left	C	32.5	0.76	126	m#314
Congress NB left/thru | thru	C	27.6	0.79	135	218
Congress NB right	A	9.7	0.31	71	m115
Merrimac SB left/thru | thru/thru	E	62.1	0.81	118	150
Merrimac SB right	A	8.7	0.43	0	21
New Chardon Street/ Garage Exit	**B**	**13.5**			
New Chardon EB thru/thru	D	53.9	0.56	88	121
New Chardon WB thru/thru	A	1.8	0.34	8	m18
Garage NB left/right	D	44.0	0.02	3	4
Cambridge Street/New Chardon Street/Bowdoin Street	**C**	**23.9**			
Cambridge EB thru/thru | thru/right	C	26.8	0.43	26	221
Cambridge WB left/thru | thru/right	A	9.9	0.25	23	34
Bowdoin NB left	C	26.5	0.53	60	100
Bowdoin NB thru	D	52.0	0.67	84	144
Bowdoin NB right	A	4.7	0.35	0	19
New Chardon SB left	C	30.5	0.73	139	204
New Chardon SB thru	C	33.8	0.49	100	154
New Chardon SB right	A	6.8	0.52	0	59

Intersection Approach	LOS	Delay (sec)	v/c	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Cambridge Street/New Sudbury Street/Somerset Street	**D**	**49.1**			
Cambridge EB left/left	D	45.0	0.80	82	#139
Cambridge EB thru/thru	E	59.4	1.01	~221	#346
Cambridge WB left	E	78.0	0.86	80	#212
Cambridge WB thru/thru	C	26.2	0.26	55	84
Cambridge WB right	A	7.9	0.38	0	42
Somerset NB left/thru/right	D	42.0	0.50	46	66
Congress Street/New Sudbury Street	**C**	**34.4**			
New Sudbury EB left	E	63.3	0.70	126	#218
New Sudbury EB thru/thru	D	49.9	0.55	101	145
New Sudbury EB right	C	22.8	0.70	0	#102
Congress NB thru/thru | thru/right	D	36.4	0.73	249	306
Congress SB left	E	58.6	0.60	82	m99
Congress SB thru/thru/thru	B	15.4	0.27	110	m129
Surface Road/New Sudbury Street/Haymarket Bus Exit	**C**	**26.9**			
Haymarket EB thru/thru	C	27.9	0.30	86	124
Haymarket EB right	A	6.8	0.30	0	41
Surface SB left/thru | thru	C	30.5	0.46	143	183
Haymarket Bus SB left/right	D	40.8	0.19	20	34
Cross Street/New Sudbury Street/I-93 NB On-Ramp	**A**	**5.5**			
Haymarket EB left/left	A	1.5	0.26	0	2
Cross NB left/thru | thru	A	7.2	0.59	204	250
Unsignalized Intersections					
Government Center Garage Exit/New Sudbury Street					
New Sudbury Street EB thru/thru	A	0.0	0.14	-	0
Garage SB right	B	10.3	0.22	-	21

TABLE 4.8 NO-BUILD (2020) CONDITION, CAPACITY ANALYSIS SUMMARY WEEKDAY P.M. PEAK HOUR

Intersection Approach	LOS	Delay (sec)	v/c	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Signalized Intersections					
North Washington Street/New Chardon Street/Sumner Tunnel Off-ramp/I-93 SB & Callahan Tunnel On-ramps/Surface Road	**E**	**56.1**			
New Chardon EB thru/thru | thru/right	C	28.9	0.74	246	#336
I-93 Off-Ramp WB left/thru | thru	D	37.7	0.59	160	222
N. Washington SB left	F	108.7	1.13	~562	#805
N. Washington SB left/thru | thru/right	E	70.2	1.09dl	383	#529
N. Washington SB right	C	29.9	0.57	131	248
New Chardon Street/Canal Street	**A**	**5.5**			
New Chardon EB thru/thru	A	8.5	0.42	151	m173
New Chardon WB thru/thru | thru/right	A	1.5	0.23	5	m20
Merrimac Street/Congress Street/New Chardon Street/Garage Entrance	**D**	**54.0**			
New Chardon EB left/thru | thru/right	D	35.0	0.88	30	#218
New Chardon WB left	F	151.3	1.13	~209	#371
New Chardon WB left/thru | thru/right	F	100.4	1.01	~193	#293
Congress NB left	C	26.3	0.46	59	m74
Congress NB left/thru | thru	C	24.5	0.47	61	m74
Congress NB right	A	8.6	0.49	55	m61
Merrimac SB left/thru | thru/thru	D	52.7	1.11dl	170	#230
Merrimac SB right	A	1.1	0.17	0	0
New Chardon Street/ Garage Exit	**B**	**19.6**			
New Chardon EB thru/thru	D	46.6	0.64	132	184
New Chardon WB thru/thru	A	1.5	0.27	6	m6
Garage NB left/right	C	23.2	0.29	28	70
Cambridge Street/New Chardon Street/Bowdoin Street	**C**	**29.3**			
Cambridge EB thru/thru | thru/right	C	22.1	0.53	67	191
Cambridge WB left/thru | thru/right	B	15.7	0.47	41	m56
Bowdoin NB left	C	24.5	0.57	91	149
Bowdoin NB thru	E	58.2	0.88	192	#333
Bowdoin NB right	B	12.5	0.36	18	67
New Chardon SB left	E	58.3	0.92	105	#254
New Chardon SB thru	C	34.9	0.47	92	157
New Chardon SB right	A	7.1	0.42	0	56

Intersection Approach	LOS	Delay (sec)	v/c	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Cambridge Street/New Sudbury Street/Somerset Street	**D**	**35.6**			
Cambridge EB left/left	D	45.1	0.86	95	m#149
Cambridge EB thru/thru	C	33.2	0.68	170	m#312
Cambridge WB left	E	69.0	0.71	41	#94
Cambridge WB thru/thru	C	25.4	0.24	66	111
Cambridge WB right	A	8.1	0.40	0	57
Somerset NB left/thru/right	D	52.7	0.78	120	194
Congress Street/New Sudbury Street	**D**	**41.8**			
New Sudbury EB left	D	51.0	0.62	112	185
New Sudbury EB thru/thru	D	54.0	0.80	162	#231
New Sudbury EB right	C	21.2	0.70	0	#104
Congress NB thru/thru | thru/right	D	37.2	0.94	86	#375
Congress SB left	F	137.5	1.04	~126	m#144
Congress SB thru/thru/thru	B	16.2	0.28	81	m87
Surface Road/New Sudbury Street/Haymarket Bus Exit	**D**	**54.0**			
Haymarket EB thru/thru	E	70.8	0.57	232	m268
Haymarket EB right	A	9.6	0.34	29	m42
Surface SB left/thru | thru	D	37.7	0.51	111	m124
Haymarket Bus SB left/right	D	50.5	0.35	30	57
Cross Street/New Sudbury Street/I-93 NB On-Ramp	**B**	**11.4**			
Haymarket EB left/left	A	5.3	0.67	6	20
Cross NB left/thru | thru	B	15.3	0.90	503	#624
Unsignalized Intersections					
Government Center Garage Exit/New Sudbury Street					
New Sudbury Street EB thru/thru	A	0.0	0.18	-	0
Garage SB right	B	11.1	0.25	-	25

As shown in Table 4.7 and Table 4.8, under the No-Build (2020) Condition:

The intersection of **North Washington/New Chardon Street/I-93 Ramps** worsens from the Existing (2015) Condition from LOS D to LOS E during the p.m. peak hour. The North Washington Street southbound left approach decrease from LOS E to LOS F during the p.m. peak hour. The North Washington Street southbound left/thru | thru/right approach decrease from LOS D to LOS E during the p.m. peak hour.

The intersection of **Merrimac Street/Congress Street/New Chardon Street/Garage Entrance** continues to operate at the same LOS as the Existing (2015) Condition. The New

Chardon Street westbound left-turn approach decrease from LOS D to E during the a.m. peak hour.

The intersection of **Cambridge Street/New Chardon Street/Bowdoin Street** continues to operate at the same LOS as the Existing (2015) Condition. The New Chardon Street southbound left approach decrease from LOS D to LOS E during the p.m. peak hour.

The intersection of **Cambridge Street/New Sudbury Street/Somerset Street** continues to operate at the same LOS as the Existing (2015) Condition. The Cambridge Street eastbound thru | thru approach decrease from LOS D to LOS E during the a.m. peak hour.

4.6 Build (2020) Condition

As previously mentioned, the Proposed Project entails the development of up to 486 residential apartments and approximately 1,300 square feet of ground floor retail. Parking for the Proposed Project will be provided within the current excess capacity at the Garage and will have minimal impact on the existing Garage operations. In order to accommodate the Proposed Project footprint, New Sudbury Street will be modified. The angled parking along the south side of the PDA Site will be relocated into the Garage. In addition, the eastbound New Sudbury Street approach to Congress Street will be reduced to three lanes (a left turn lane, a through lane, and shared through/right turn lane).

4.6.1 Site Access and Vehicle Circulation

The Proposed Project will be located on the southwest corner of the West Parcel. Primary pedestrian access will be from New Sudbury Street into the residential lobby. The entrance to the retail space will be located to the east of the residential lobby, with access also along New Sudbury Street. Vehicular access to the Garage will remain unaltered from the existing condition. The Proposed Project's site access plan is shown in Figure 4.12.

4.6.2 Loading and Service Accommodations

As shown in Figure 4.12, deliveries to the Proposed Project will occur at the off-street service area along New Sudbury Street just to the east of the retail component. Delivery estimates for the Proposed Project are based on data provided in the Truck Trip Generation Rates by Land Use in the Central Artery/Tunnel Project Study Area report[1]. A summary of anticipated loading/service activity by land use is presented in Table 4.9.

Residential units primarily generate delivery trips related to small packages and prepared food. Based on the CTPS report, residential uses generate approximately 0.01 light truck/car trips per 1,000 square feet of gross floor area and 0.001 medium/heavy truck trips per 1,000 square feet of gross floor area. Retail/commercial uses depend on more frequent deliveries from smaller

▼

[1] Truck Trip Generation Rates by Land Use in the Central Artery/Tunnel Project Study Area; Central Transportation Planning Staff; September 1993.

vehicles. Based on the CTPS report, retail/commercial uses generate approximately 0.15 light truck/car trips per 1,000 sf of floor area and 0.15 medium/heavy truck trips per 1,000 sf of gross floor area.

TABLE 4.9 EXPECTED DELIVERY ACTIVITY

Land Use	Number of Deliveries	General Delivery Times
Residential	5	10% before 7:00 a.m.
Retail	1	70% between 7:00 a.m. and 1:00 p.m.
Total	6	20% after 1:00 p.m.

Based on the CTPS data, the Proposed Project is expected to generate an average of approximately 6 deliveries per day. The CTPS numbers do not include trash pick-up trips. It is anticipated that the majority of these will occur between 7:00 a.m. and 1:00 p.m.

The low number of anticipated deliveries will have minimal impact on the vehicular operations in the study area. The Proposed Project will limit and schedule deliveries during non-commuter peak periods to minimize traffic and pedestrian conflicts at the service areas.

4.6.3 Parking

The overall parking capacity of the Garage will be reduced to approximately 2,115 spaces due to the displacement of parking caused by construction of the Proposed Project in the southwest corner of the garage along with the garage enabling work being done prior to, and in support of, both the overall Development Plan Project and the Proposed Project. The garage enabling work includes the relocation of 42 on-street BPD parking spaces to a new lower level of the Garage as shown in Figure 4.13. The BPD-designated parking relocated to this dedicated nested area of the Garage with direct access to Bowker Street at Hawkins Street includes the 26 angled spaces along New Sudbury Street at the Proposed Project and 15 spaces along Bowker Street.

4.6.3.1 Proposed Project Parking Demand

The Proposed Project's parking demand will be fully accommodated in the Garage's previously noted existing surplus capacity. No alterations are proposed to Garage access under the Proposed Project and there is not expected to be any impact to garage operations.

According to an unpublished survey conducted by HSH in the summer of 2010 of the new residential developments in several downtown neighborhoods, based on current downtown Boston parking demand trends, certain land uses exhibit lower ratios than the BTD maximum guidelines. The results show that the actual parking demand ratio for residential apartments is about 0.50 spaces per unit. Parking demand for apartments is lower than the BTD maximum guideline of 1.0 per residential unit for this area of Boston. The parking demand of the Proposed Project is therefore expected to be approximately 245 spaces. This rate is consistent with the parking demand for apartment units noted in the in the August 2013 2013 DPIR for the Development Plan Project.

4.6.4 Bicycle Accommodations

The Proponent supports the City's efforts in advancing bicycle travel by introducing on-site bicycle accommodations. The Proponent will encourage the use of bicycles to/from the Proposed Project as an alternative to single-occupancy vehicles by providing extensive on-site bicycle storage, including at-grade bicycle racks for short-term bicycle parking by visitors and secure long-term bicycle parking for residents. The approximately 30 short-term public bicycle parking spaces will be provided at the primary entrances to the Proposed Project's uses. An interim 496-space bicycle parking facility, as shown in Figure 4.14, will be provided in the Garage for secure long-term bicycle parking for residents of the Proposed Project. The interim facility will be replaced by the WP-B2 larger, permanent 850-space facility, which will include bicycle parking for WP-B1 and the entire Development Plan Project. In addition, the Proposed Project will include the installation of a Hubway bike sharing station at Haymarket Station on the east parcel of the PDA Site.

4.6.5 Trip Generation Methodology

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

To estimate the number of trips expected to be generated by the Proposed Project, data published by the Institute of Transportation Engineers (ITE) in the latest edition of the manual, Trip Generation (9th Edition, 2012) were used. ITE provides data to estimate the total number of unadjusted vehicular trips associated with the Proposed 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 Proposed Project, the following ITE land use code (LUCs) was used:

- Land Use Code 222 – High-Rise Apartment**.** This land use code is described as rental dwelling units located in one common building that has 10 levels (floors) or more as well as multiple elevators. These apartments may be studio or one-four bedroom apartments.
- Land Use Code 820 – Shopping Center. The shopping center land use is defined as an integrated group of commercial establishments that is planned, developed, owned and managed as one unit. Trip generation estimates are based on average vehicular rates per 1,000 sf of gross leasable area.

4.6.6 Mode Share

The ITE rates produce vehicle trip estimates, which are converted to person trips based on average vehicle occupancy rates. The unadjusted vehicular trips were converted to person trips by using vehicle occupancy rates published by the Federal Highway Administration (FHWA). Using BTD's mode split data for Area 2 and local vehicle occupancy rates, shown in Table 4.10, the person trips are then reallocated to walk/bike, transit and vehicle mode shares.

4.10 TRAVEL MODE SHARES AND VEHICLE OCCUPANCY RATES

Land Use		Walk/Bike Share	Transit Share	Vehicle Share	Vehicle Occupancy Rate
			Daily		
Residential	In	42%	30%	28%	1.13
	Out	42%	30%	28%	1.13
Retail	In	59%	20%	21%	1.78
	Out	59%	20%	21%	1.78
			Weekday a.m. Peak Hour		
Residential	In	7%	52%	41%	1.13
	Out	51%	18%	31%	1.13
Retail	In	14%	46%	40%	1.78
	Out	58%	10%	32%	1.78
			Weekday p.m. Peak Hour		
Residential	In	51%	18%	31%	1.13
	Out	7%	52%	41%	1.13
Retail	In	58%	10%	32%	1.78
	Out	14%	46%	40%	1.78

4.6.7 Proposed Project Trip Generation

The mode share percentages shown in Table 4.10 were applied to the number of person trips to develop walk/bicycle, transit, and vehicle trip generation estimates. The trip generation for the Proposed Project by mode is shown in Table 4.11. The detailed trip generation calculations are in Appendix B.

TABLE 4.11 NET PROJECT TRIP GENERATION

Land Use		Walk/Bike Trips	Transit Trips	Vehicle Trips
Daily				
Residential	In	485	346	286
	Out	485	346	286
Retail	In	30	10	6
	Out	30	10	6
Weekday a.m. Peak Hour				
Residential	In	3	22	15
	Out	63	22	34
Retail	In	0	1	0
	Out	0	0	0
Weekday p.m. Peak Hour				
Residential	In	60	21	32
	Out	5	39	27
Retail	In	2	0	1
	Out	1	2	1

As shown in Table 4.11, the Proposed Project is expected to generate approximately 1,030 pedestrian trips, 712 transit trips, and 584 vehicle trips throughout the day. During the a.m. peak hour there is expected to be 66 pedestrian trips (3 in and 63 out), 45 transit trips (23 in and 22 out), and 49 vehicle trips (15 in and 34 out). During the p.m. peak hour there is expected to be 68 pedestrian trips (62 in and 6 out), 62 transit trips (21 in and 41 out), and 61 vehicle trips (33 in and 28 out).

4.6.8 Trip Distribution

The trip distribution identifies the various travel paths for vehicles associated with the Proposed Project. Trip distribution patterns for the Proposed Project were based on BTD's origin-destination data for Area 2 and trip distribution patterns presented in traffic studies for nearby projects. All vehicle trips are assigned to the Garage with the vehicle trip distribution entering the Garage, shown in Figure 4.15 and the vehicle trip distribution exiting the Garage, shown in Figure 4.16. The majority of vehicle traffic will use the regional highway system to access the Proposed Project.

4.6.9 Build Traffic Volumes

The vehicle trips were distributed through the study area. The Proposed Project-generated vehicle trips for the weekday a.m. peak hour and weekday p.m. peak hour are shown in Figure 4.17a and Figure 4.17b, respectively. The vehicle trip assignments were added to the No-Build (2020) Condition vehicular traffic volumes to develop the Build (2020) Condition vehicular traffic volumes. The Build (2020) Condition weekday a.m. peak hour and weekday p.m. peak hour traffic volumes are shown on Figure 4.18a and Figure 4.18b, respectively.

4.6.10 Build Condition Traffic Operations Analysis

The Build (2020) Condition analysis uses the same methodology as the Existing (2015) Condition and No-Build (2020) Condition analysis. Tables 4.12 and 4.13 present the Build (2020) Condition capacity analysis for the a.m. and p.m. peak hours, respectively. The shaded cells in the tables indicate a worsening in LOS between the No-Build (2020) Condition and the Build (2020) Condition. The detailed analysis sheets are provided in Appendix B.

TABLE 4.12 BUILD (2020) CONDITION, CAPACITY ANALYSIS SUMMARY WEEKDAY A.M. PEAK HOUR

Intersection Approach	LOS	Delay (sec)	v/c	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Signalized Intersections					
North Washington Street/New Chardon Street/Sumner Tunnel Off-ramp/I-93 SB & Callahan Tunnel On-ramps/Surface Road	**E**	**66.8**			
New Chardon EB thru/thru | thru/right	D	41.3	0.54	169	183
I-93 Off-Ramp WB left/thru | thru	F	153.2	1.22	~398	#471
N. Washington SB left	D	39.7	0.83	371	#567
N. Washington SB left/thru | thru/right	C	34.6	0.85	361	456
N. Washington SB right	D	35.6	0.77	298	454
New Chardon Street/Canal Street	**A**	**4.7**			
New Chardon EB thru/thru	A	4.1	0.27	62	69
New Chardon WB thru/thru | thru/right	A	5.0	0.34	0	m0
Merrimac Street/Congress Street/New Chardon Street/Garage Entrance	**D**	**37.8**			
New Chardon EB left/thru | thru/right	D	44.1	0.84	23	#61
New Chardon WB left	E	59.2	0.89	172	#457
New Chardon WB left/thru | thru/right	C	34.7	0.81	171	209
Congress NB left	C	33.4	0.78	129	m#323
Congress NB left/thru | thru	C	27.9	0.80	136	#226
Congress NB right	A	9.5	0.31	71	m111
Merrimac SB left/thru | thru/thru	E	62.5	0.81	119	#152
Merrimac SB right	A	8.7	0.43	0	21
New Chardon Street/ Garage Exit	**B**	**13.8**			
New Chardon EB thru/thru	D	54.2	0.56	88	121
New Chardon WB thru/thru	A	1.8	0.34	8	18
Garage NB left/right	B	17.5	0.32	11	0
Cambridge Street/New Chardon Street/Bowdoin Street	**C**	**23.9**			
Cambridge EB thru/thru | thru/right	C	26.8	0.43	26	221
Cambridge WB left/thru | thru/right	A	9.9	0.25	23	34

Intersection Approach	LOS	Delay (sec)	v/c	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Bowdoin NB left	C	26.5	0.53	60	100
Bowdoin NB thru	D	52.0	0.67	84	144
Bowdoin NB right	A	4.7	0.35	0	19
New Chardon SB left	C	30.5	0.73	139	204
New Chardon SB thru	C	33.8	0.49	100	154
New Chardon SB right	A	6.9	0.52	0	59
Cambridge Street/New Sudbury Street/Somerset Street	**D**	**49.1**			
Cambridge EB left/left	D	45.1	0.80	82	#140
Cambridge EB thru/thru	E	59.4	1.01	~221	#346
Cambridge WB left	E	78.2	0.86	80	#212
Cambridge WB thru/thru	C	26.2	0.26	55	84
Cambridge WB right	A	7.9	0.38	0	42
Somerset NB left/thru/right	D	42.0	0.50	46	66
Congress Street/New Sudbury Street	**D**	**42.3**			
New Sudbury EB left	E	63.3	0.70	126	#218
New Sudbury EB thru | thru/right	F	85.9	1.02	~157	#267
Congress NB thru | thru | thru/right	C	34.0	0.74	253	317
Congress SB left	E	58.1	0.60	82	m97
Congress SB thru/thru/thru	B	15.5	0.27	109	m129
Surface Road/New Sudbury Street/Haymarket Bus Exit	**C**	**27.0**			
Haymarket EB thru/thru	C	28.2	0.31	90	129
Haymarket EB right	A	6.8	0.30	0	41
Surface SB left/thru | thru	C	30.5	0.46	143	183
Haymarket Bus SB left/right	D	40.8	0.19	20	34
Cross Street/New Sudbury Street/I-93 NB On-Ramp	**A**	**5.4**			
Haymarket EB left/left	A	1.5	0.27	0	2
Cross NB left/thru | thru	A	7.2	0.59	204	250
Government Center Garage Exit/New Sudbury Street					
New Sudbury Street EB thru/thru	A	0.0	0.14	-	0
Garage SB right	B	10.4	0.23	-	23

TABLE 4.13 BUILD (2020) CONDITION, CAPACITY ANALYSIS SUMMARY WEEKDAY P.M. PEAK HOUR

Intersection Approach	LOS	Delay (sec)	v/c	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Signalized Intersections					
North Washington Street/New Chardon Street/Sumner Tunnel Off-ramp/I-93 SB & Callahan Tunnel On-ramps/Surface Road	**E**	**56.2**			
New Chardon EB thru/thru | thru/right	C	29.4	0.74	252	#343
I-93 Off-Ramp WB left/thru | thru	D	37.9	0.60	162	223
N. Washington SB left	F	108.7	1.13	~560	#807
N. Washington SB left/thru | thru/right	E	70.2	1.09dl	383	#530
N. Washington SB right	C	30.1	0.58	132	252
New Chardon Street/Canal Street	**A**	**5.5**			
New Chardon EB thru/thru	A	8.5	0.43	148	m171
New Chardon WB thru/thru | thru/right	A	1.6	0.23	5	m21
Merrimac Street/Congress Street/New Chardon Street/Garage Entrance	**E**	**55.3**			
New Chardon EB left/thru | thru/right	D	39.8	0.91	35	#234
New Chardon WB left	F	155.7	1.14	~216	#374
New Chardon WB left/thru | thru/right	F	101.2	1.02	~196	#295
Congress NB left	C	26.7	0.48	62	m75
Congress NB left/thru | thru	C	25.0	0.49	64	m75
Congress NB right	A	8.4	0.49	54	m59
Merrimac SB left/thru | thru/thru	D	53.5	1.12dl	172	#234
Merrimac SB right	A	1.1	0.17	0	0
New Chardon Street/ Garage Exit	**B**	**19.7**			
New Chardon EB thru/thru	D	46.7	0.64	135	185
New Chardon WB thru/thru	A	1.5	0.27	6	m6
Garage NB left/right	C	23.3	0.34	34	82
Cambridge Street/New Chardon Street/Bowdoin Street	**C**	**29.3**			
Cambridge EB thru/thru | thru/right	C	22.2	0.54	67	192
Cambridge WB left/thru | thru/right	B	15.7	0.47	41	m56
Bowdoin NB left	C	24.5	0.57	91	149
Bowdoin NB thru	E	58.5	0.89	193	#337
Bowdoin NB right	B	12.4	0.36	18	67
New Chardon SB left	E	58.1	0.91	105	#254
New Chardon SB thru	C	34.8	0.46	92	157
New Chardon SB right	A	7.1	0.42	0	56

Intersection Approach	LOS	Delay (sec)	v/c	50th Percentile Queue (ft.)	95th Percentile Queue (ft.)
Cambridge Street/New Sudbury Street/Somerset Street	**D**	**35.7**			
Cambridge EB left/left	D	45.4	0.86	97	m#151
Cambridge EB thru/thru	C	33.2	0.69	170	m#312
Cambridge WB left	E	69.0	0.71	41	#94
Cambridge WB thru/thru	C	25.4	0.24	66	111
Cambridge WB right	A	8.1	0.40	0	57
Somerset NB left/thru/right	D	52.7	0.78	120	194
Congress Street/New Sudbury Street	**E**	**78.4**			
New Sudbury EB left	D	51.0	0.62	112	185
New Sudbury EB thru | thru/right	F	188.2	1.31	~298	#411
Congress NB thru/thru | thru/right	D	41.7	0.95	315	#384
Congress SB left	F	134.8	1.04	~126	m#141
Congress SB thru/thru/thru	B	16.2	0.28	81	m86
Surface Road/New Sudbury Street/Haymarket Bus Exit	**D**	**52.7**			
Haymarket EB thru/thru	E	68.9	0.57	230	m207
Haymarket EB right	A	7.4	0.34	22	m21
Surface SB left/thru | thru	D	37.7	0.51	111	m124
Haymarket Bus SB left/right	D	50.5	0.35	30	57
Cross Street/New Sudbury Street/I-93 NB On-Ramp	**B**	**11.5**			
Haymarket EB left/left	A	5.5	0.68	7	20
Cross NB left/thru | thru	B	15.3	0.90	503	#624
Government Center Garage Exit/New Sudbury Street					
New Sudbury Street EB thru/thru	A	0.0	0.18	-	0
Garage SB right	B	11.2	0.27	-	27

As shown in Table 4.12 and Table 4.13, under the Build (2020) Condition:

The intersection of **Merrimac Street/Congress Street/New Chardon Street/Garage Entrance** worsens from the No-Build (2020) Condition from LOS D to LOS E during the p.m. peak hour. All the approaches at this intersection continue to operate at the same LOS as the No-Build (2020) Condition.

The intersection of **Congress Street/New Sudbury Street** worsens from the No-Build (2020) Condition from LOS D to LOS E during the p.m. peak hour. The New Sudbury Street eastbound thru | thru/right approach decreases from LOS D to LOS F during both the a.m. and p.m. peak hours.

4.7 Transportation Demand Management

The Proponent is committed to implementing Transportation Demand Management (TDM) measures to minimize automobile usage and Proposed Project related traffic impacts. TDM will be facilitated by the nature of the Proposed Project, which does not generate significant peak hour trips, and its proximity to numerous public transit alternatives.

On-site management will keep a supply of transit information (schedules, maps, and fare information) to be made available to the residents and patrons of the Proposed Project. The Proponent will work with the City to develop a TDM program appropriate to the Proposed Project and consistent with its level of impact.

The Proponent is prepared to take advantage of good transit access in marketing the Proposed Project to future residents by working with them to implement the following TDM measures to encourage the use of non-vehicular modes of travel.

The TDM measures for the Proposed Project may include but are not limited to the following:

- The Proponent will designate a transportation coordinator to oversee transportation issues, including parking, service and loading, and deliveries, and will work with residents as they move in to raise awareness of public transportation, bicycling, and walking opportunities;
- The Proponent will provide orientation packets to new tenants containing information on available transportation choices, including transit routes/schedules and nearby vehicle sharing and bicycle sharing locations. On-site management will work with residents and tenants as they move in to help facilitate transportation for new arrivals;
- Join and participate in a local Transportation Management Association on behalf of commercial tenants and residents;
- Installation of a Hubway bike sharing station at Haymarket Station.
- Provide electric vehicle charging stations for 10 spaces in the garage;
- Designate up to 5 percent of the parking spaces as preferred parking for low emission vehicles;
- Provide information on travel alternatives for employees and visitors via the Internet and in the building lobby;
- Continue to offer car share spaces in the Garage.

4.8 Proposed Transportation Mitigation

While the traffic impacts associated with the new trips are minimal (generating approximately one vehicle trip per minute during the peak hours), the Proponent will continue to work with the City of Boston so that the Project efficiently serves vehicle trips, improves the pedestrian environment, and encourages transit and bicycle use.

Minor modifications to traffic signal timings and lane usage are proposed to address any Proposed Project impacts, which are negligible, as well as improve existing traffic operations deficiencies in the area that have long-existed. Signal timing modifications to the intersection of North Washington Street/New Chardon Street/ Sumner Tunnel Off-ramps/I-93 Southbound and Callahan Tunnel On-ramps/Surface Road will improve the traffic operations throughout the area. The North Washington Street southbound approach currently includes two lanes directed to the On-ramps, a shared through (to Surface Road)/right turn lane, and an additional right turn lane. Modifying the lane usage (and associated signal heads) to include two right turn lanes (to New Chardon Street), a shared bear left (to the on-ramps)/through (to Surface Road), and a second dedicated lane to the on-ramps) allows for the removal of the exclusive pedestrian phase. Pedestrians crossing North Washington Street on the north side of the intersection can cross during the Sumner Off-ramp westbound phase. Pedestrians crossing New Chardon Street could cross during a southbound through only phase. Both concurrent pedestrian phases would operate as protected since right turns do not occur from the Sumner Off-ramp and the double right turn lanes from North Washington Street would be under a red arrow indicator during the pedestrian phase. The adjacent pedestrian crossing at Canal Street would also go during the 'New Chardon Street pedestrian crossing/North Washington Street southbound through' phase.

With the improved operations at this location, coupled with updated coordinated phases and offsets at the other coordinated signals, the Proposed Project will not only mitigate its negligible impacts, but will improve the existing traffic operations in the area.

Tables 4.14 and 4.15 present a comparison of the Build (2020) Condition capacity analysis and the Build (2020) With Mitigation Condition capacity analysis for the a.m. and p.m. peak hours, respectively. The grey shaded cells in the tables indicate the minor worsening in LOS between the two conditions while the hatched cells indicate the major improvements between the two conditions. The detailed analysis sheets are provided in Appendix B.

TABLE 4.14 BUILD (2020) WITH MITIGATION CONDITION, CAPACITY ANALYSIS SUMMARY WEEKDAY A.M. PEAK HOUR

Intersection Approach	LOS	Delay (sec)	v/c	LOS	Delay (sec)	v/c
	Build (2020) Condition			**Build-Mitigated (2020) Condition**		
Signalized Intersections						
North Washington Street/New Chardon Street/Sumner Tunnel Off-ramp/I-93 SB & Callahan Tunnel On-ramps/Surface Road	**E**	**66.8**		**D**	**38.9**	
New Chardon EB thru/thru | thru/right	D	41.3	0.54	B	18.2	0.42
I-93 Off-Ramp WB left/thru | thru	F	153.2	1.22	D	49.5	0.90
N. Washington SB left	D	39.7	0.83	B	11.3	0.56
N. Washington SB left/thru | thru/right	C	34.6	0.85	D	50.5	1.01
N. Washington SB right	D	35.6	0.77	D	54.6	0.80
New Chardon Street/Canal Street	**A**	**4.7**		**A**	**5.5**	
New Chardon EB thru/thru	A	4.1	0.27	A	9.4	0.32
New Chardon WB thru/thru | thru/right	A	5.0	0.34	A	3.4	0.40
Merrimac Street/Congress Street/New Chardon Street/Garage Entrance	**D**	**37.8**		**D**	**43.6**	
New Chardon EB left/thru | thru/right	D	44.1	0.84	C	24.3	0.73
New Chardon WB left	E	59.2	0.89	E	75.9	1.01
New Chardon WB left/thru | thru/right	C	34.7	0.81	D	41.8	0.92
Congress NB left	C	33.4	0.78	D	38.0	0.72
Congress NB left/thru | thru	C	27.9	0.80	C	33.5	0.73
Congress NB right	A	9.5	0.31	A	3.5	0.31
Merrimac SB left/thru | thru/thru	E	62.5	0.81	F	83.5	0.97
Merrimac SB right	A	8.7	0.43	A	7.1	0.44
New Chardon Street/Garage Exit	**B**	**13.8**		**B**	**12.4**	
New Chardon EB thru/thru	D	54.2	0.56	D	45.7	0.49
New Chardon WB thru/thru	A	1.8	0.34	A	2.1	0.33
Garage NB left/right	B	17.5	0.32	B	18.4	0.35
Cambridge Street/New Chardon Street/Bowdoin Street	**C**	**23.9**		**B**	**17.5**	
Cambridge EB thru/thru | thru/right	C	26.8	0.43	A	5.2	0.43
Cambridge WB left/thru | thru/right	A	9.9	0.25	C	20.1	0.25
Bowdoin NB left	C	26.5	0.53	C	26.5	0.53
Bowdoin NB thru	D	52.0	0.67	D	52.0	0.67
Bowdoin NB right	A	4.7	0.35	A	4.7	0.35
New Chardon SB left	C	30.5	0.73	C	30.5	0.73
New Chardon SB thru	C	33.8	0.49	C	33.8	0.49
New Chardon SB right	A	6.9	0.52	A	6.9	0.52

Intersection Approach	LOS	Delay (sec)	v/c	LOS	Delay (sec)	v/c
	Build (2020) Condition			**Build-Mitigated (2020) Condition**		
Cambridge Street/New Sudbury Street/Somerset Street	**D**	**49.1**		**C**	**21.0**	
Cambridge EB left/left	D	45.1	0.80	A	7.7	0.13
Cambridge EB thru/thru	E	59.4	1.01	A	9.3	0.44
Cambridge WB left	E	78.2	0.86	E	58.7	0.65
Cambridge WB thru/thru	C	26.2	0.26	D	48.7	0.55
Cambridge WB right	A	7.9	0.38	B	11.5	0.45
Somerset NB left/thru/right	D	42.0	0.50	E	56.1	0.57
Congress Street/New Sudbury Street	**D**	**42.3**		**B**	**19.5**	
New Sudbury EB left	E	63.3	0.70	C	31.3	0.42
New Sudbury EB thru | thru/right	F	85.9	1.02	C	23.9	0.61
Congress NB thru | thru | thru/right	C	34.0	0.74	C	20.9	0.65
Congress SB left	E	58.1	0.60	D	49.0	0.48
Congress SB thru/thru/thru	B	15.5	0.27	A	5.3	0.23
Surface Road/New Sudbury Street/Haymarket Bus Exit	**C**	**27.0**		**C**	**21.6**	
Haymarket EB thru/thru	C	28.2	0.31	C	26.1	0.31
Haymarket EB right	A	6.8	0.30	B	7.5	0.30
Surface SB left/thru | thru	C	30.5	0.46	C	20.9	0.46
Haymarket Bus SB left/right	D	40.8	0.19	D	40.8	0.19
Cross Street/New Sudbury Street/I-93 NB On-Ramp	**A**	**5.4**		**A**	**1.9**	
Haymarket EB left/left	A	1.5	0.27	A	1.0	0.27
Cross NB left/thru | thru	A	7.2	0.59	A	2.2	0.59

TABLE 4.15 BUILD (2020) WITH MITIGATION CONDITION, CAPACITY ANALYSIS SUMMARY WEEKDAY P.M. PEAK HOUR

Intersection Approach	LOS	Delay (sec)	v/c	LOS	Delay (sec)	v/c
	Build (2020) Condition			Build-Mitigated (2020) Condition		
Signalized Intersections						
North Washington Street/New Chardon Street/Sumner Tunnel Off-ramp/I-93 SB & Callahan Tunnel On-ramps/Surface Road	**E**	**56.2**		**C**	**34.3**	
New Chardon EB thru/thru | thru/right	C	29.4	0.74	E	56.5	0.84
I-93 Off-Ramp WB left/thru | thru	D	37.9	0.60	D	42.1	0.71
N. Washington SB left	F	108.7	1.13	B	15.0	0.69
N. Washington SB left/thru | thru/right	E	70.2	1.09dl	A	9.7	0.58
N. Washington SB right	C	30.1	0.58	E	58.3	0.78
New Chardon Street/Canal Street	**A**	**5.5**		**A**	**8.9**	
New Chardon EB thru/thru	A	8.5	0.43	B	13.4	0.53
New Chardon WB thru/thru | thru/right	A	1.6	0.23	A	2.8	0.29
Merrimac Street/Congress Street/New Chardon Street/Garage Entrance	**E**	**55.3**		**D**	**51.1**	
New Chardon EB left/thru | thru/right	D	39.8	0.91	D	42.4	0.91
New Chardon WB left	F	155.7	1.14	F	140.6	1.14
New Chardon WB left/thru | thru/right	F	101.2	1.02	F	83.1	1.02
Congress NB left	C	26.7	0.48	C	24.7	0.48
Congress NB left/thru | thru	C	25.0	0.49	C	22.4	0.49
Congress NB right	A	8.4	0.49	A	8.5	0.49
Merrimac SB left/thru | thru/thru	D	53.5	1.12dl	D	53.7	1.12dl
Merrimac SB right	A	1.1	0.17	A	1.1	0.17
New Chardon Street/ Garage Exit	**B**	**19.7**		**B**	**19.7**	
New Chardon EB thru/thru	D	46.7	0.64	D	46.7	0.64
New Chardon WB thru/thru	A	1.5	0.27	A	1.5	0.27
Garage NB left/right	C	23.3	0.34	C	23.3	0.34
Cambridge Street/New Chardon Street/Bowdoin Street	**C**	**29.3**		**C**	**29.3**	
Cambridge EB thru/thru | thru/right	C	22.2	0.54	C	22.2	0.54
Cambridge WB left/thru | thru/right	B	15.7	0.47	B	15.7	0.47
Bowdoin NB left	C	24.5	0.57	C	24.5	0.57
Bowdoin NB thru	E	58.5	0.89	E	58.5	0.89
Bowdoin NB right	B	12.4	0.36	B	12.4	0.36
New Chardon SB left	E	58.1	0.91	E	58.1	0.91
New Chardon SB thru	C	34.8	0.46	C	34.8	0.46
New Chardon SB right	A	7.1	0.42	A	7.1	0.42

Intersection Approach	LOS	Delay (sec)	v/c	LOS	Delay (sec)	v/c
	Build (2020) Condition			**Build-Mitigated (2020) Condition**		
Cambridge Street/New Sudbury Street/Somerset Street	**D**	**35.7**		**D**	**35.7**	
Cambridge EB left/left	D	45.4	0.86	D	45.4	0.86
Cambridge EB thru/thru	C	33.2	0.69	C	33.2	0.69
Cambridge WB left	E	69.0	0.71	E	69.0	0.71
Cambridge WB thru/thru	C	25.4	0.24	C	25.4	0.24
Cambridge WB right	A	8.1	0.40	A	8.1	0.40
Somerset NB left/thru/right	D	52.7	0.78	D	52.7	0.78
Congress Street/New Sudbury Street	**E**	**78.4**		**C**	**24.9**	
New Sudbury EB left	D	51.0	0.62	D	36.7	0.44
New Sudbury EB thru | thru/right	F	188.2	1.31	D	53.0	0.91
Congress NB thru | thru | thru/right	D	41.7	0.95	B	12.5	0.78
Congress SB left	F	134.8	1.04	D	49.6	0.66
Congress SB thru/thru/thru	B	16.2	0.28	A	6.1	0.21
Surface Road/New Sudbury Street/Haymarket Bus Exit	**D**	**52.7**		**C**	**32.8**	
Haymarket EB thru/thru	E	68.9	0.57	D	38.3	0.57
Haymarket EB right	A	7.4	0.34	A	4.0	0.34
Surface SB left/thru | thru	D	37.7	0.51	C	30.5	0.51
Haymarket Bus SB left/right	D	50.5	0.35	D	50.5	0.35
Cross Street/New Sudbury Street/I-93 NB On-Ramp	**B**	**11.5**		**B**	**13.1**	
Haymarket EB left/left/left	A	5.5	0.68	A	8.5	0.68
Cross NB thru/thru	B	15.3	0.90	B	16.1	0.90

As part of the Proposed Project, the Proponent will also bring abutting sidewalks and pedestrian ramps to the City of Boston standards in accordance with the Boston Complete Streets design guidelines. This will include the reconstruction and widening of the sidewalks where possible, the installation of new, accessible ramps, improvements to street lighting where necessary, and planting of street trees surrounding the Proposed Project Site, where appropriate. In addition, as previously mentioned, extensive bicycle accommodations, both public and private, will be included as part of the Proposed Project, as well as car sharing services, and electronic vehicle charging stations. More extensive roadway improvement mitigation measures are expected to be associated with later phases of the Development Plan Project.

The Proponent is responsible for preparation of the Transportation Access Plan Agreement (TAPA), a formal legal agreement between the Proponent and the BTD. The TAPA formalizes the findings of the transportation study, mitigation commitments, elements of access and physical design, travel demand management measures, and any other responsibilities that are agreed to by both the Proponent and the BTD. Because the TAPA must incorporate the results of the technical analysis, it must be executed after these other processes have been completed. The proposed measures listed above and any additional transportation improvements to be undertaken as part of this Project will be defined and documented in the TAPA.

4.9 Evaluation of Short-term Construction Impacts

The Proponent will develop a Construction Management Plan (CMP) for review and approval by BTD for the Proposed. The CMP will detail the schedule, staging, parking, delivery, and other associated impacts of the construction of the Project. A description of a conceptual CMP for the Proposed Project is provided in Section 5. 8 of Chapter 5, *Environmental Protection*.

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 CMP 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 CMP:

- 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 Proposed Project Site each day.

The CMP, to be developed in coordination and executed with the City prior to commencement of construction, will document all committed measures.

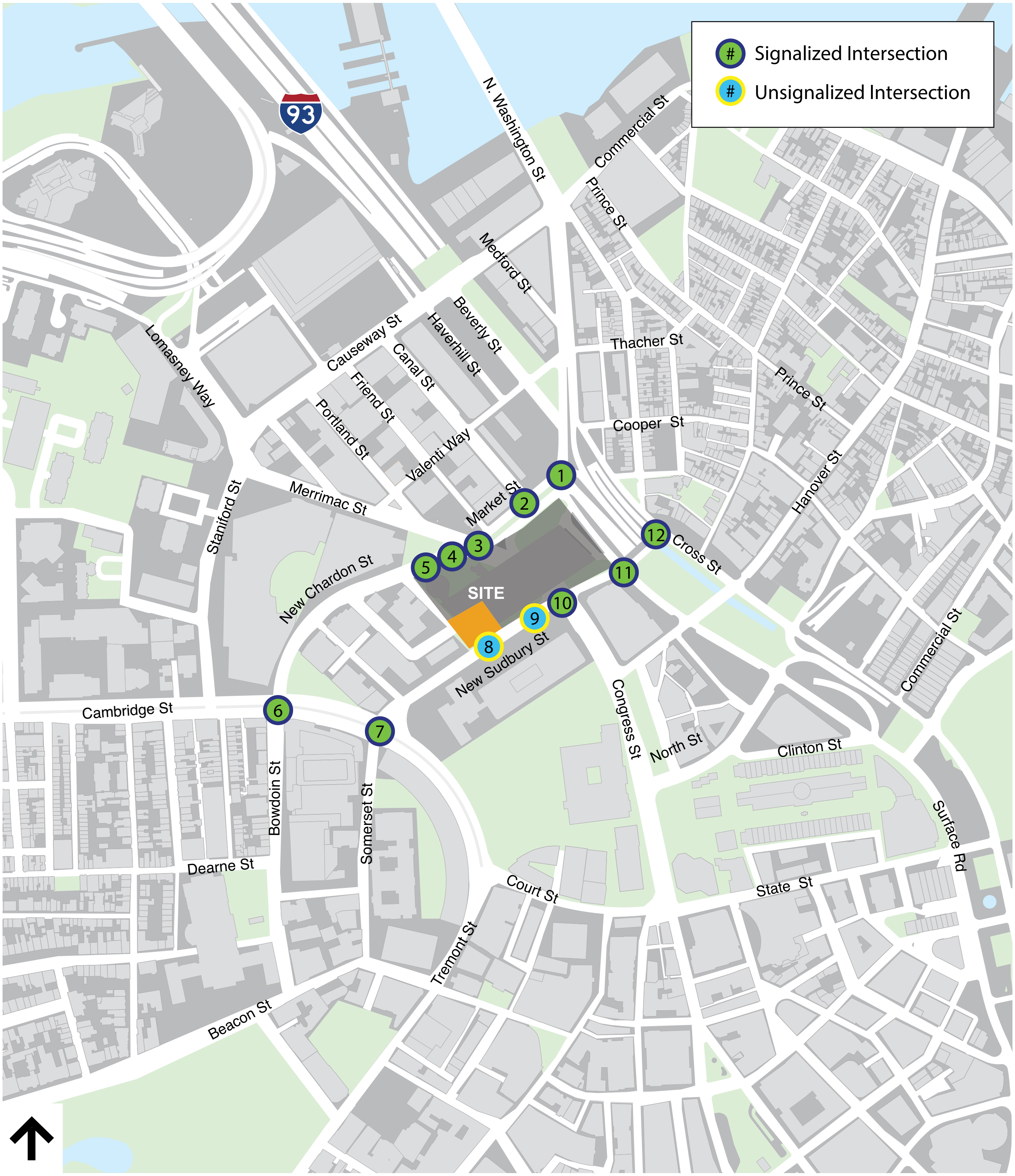


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Figure 4.1

Traffic Study Area Intersections

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)

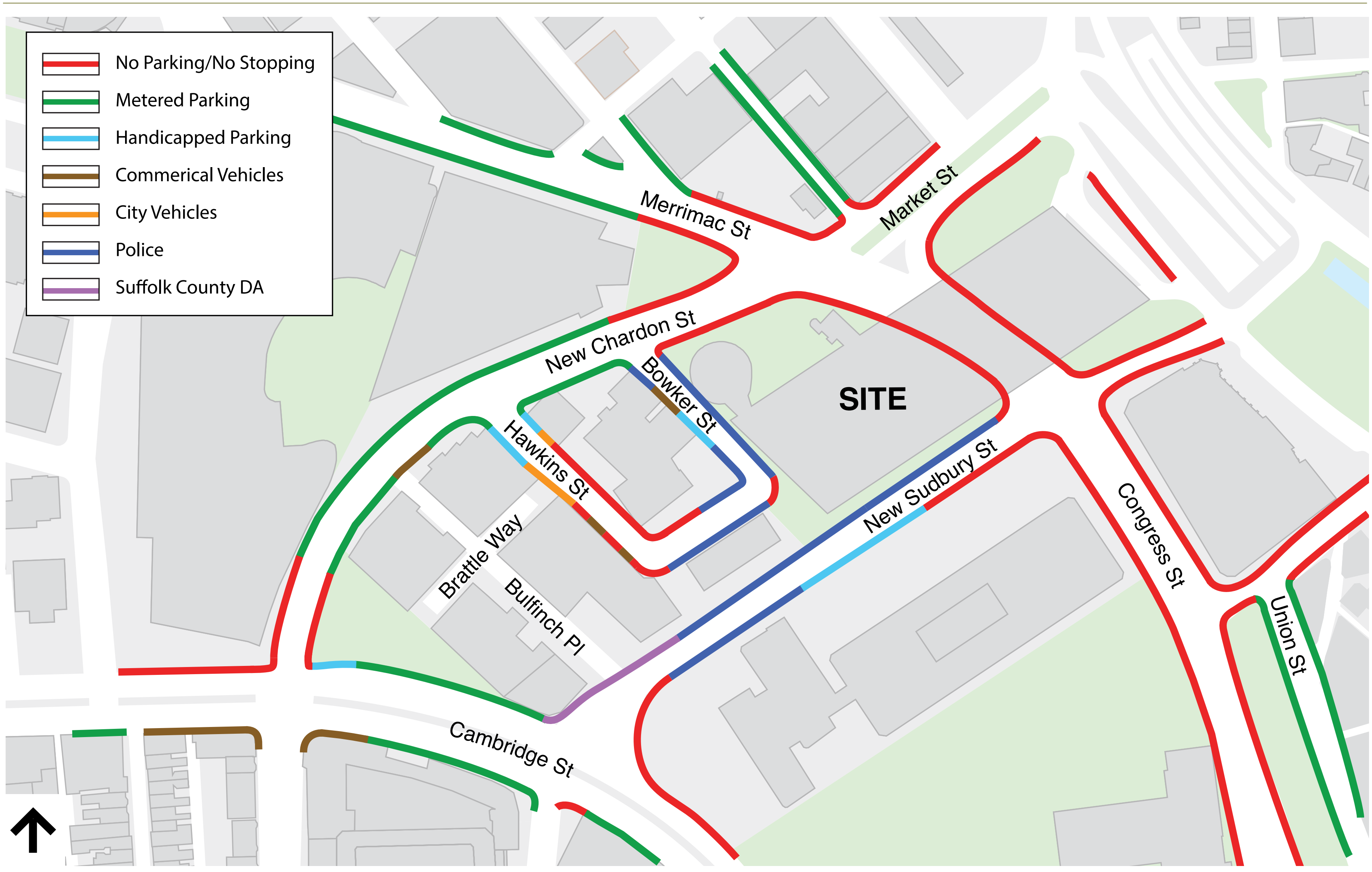

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Figure 4.2

Existing On-Street Parking and Curbside Inventory

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)

Figure 4.3

Existing Off-Street Parking

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Redevelopment of the Government Center Garage
WP-B1 (Residential Building)

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Figure 4.4

Existing Car Share Locations

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)

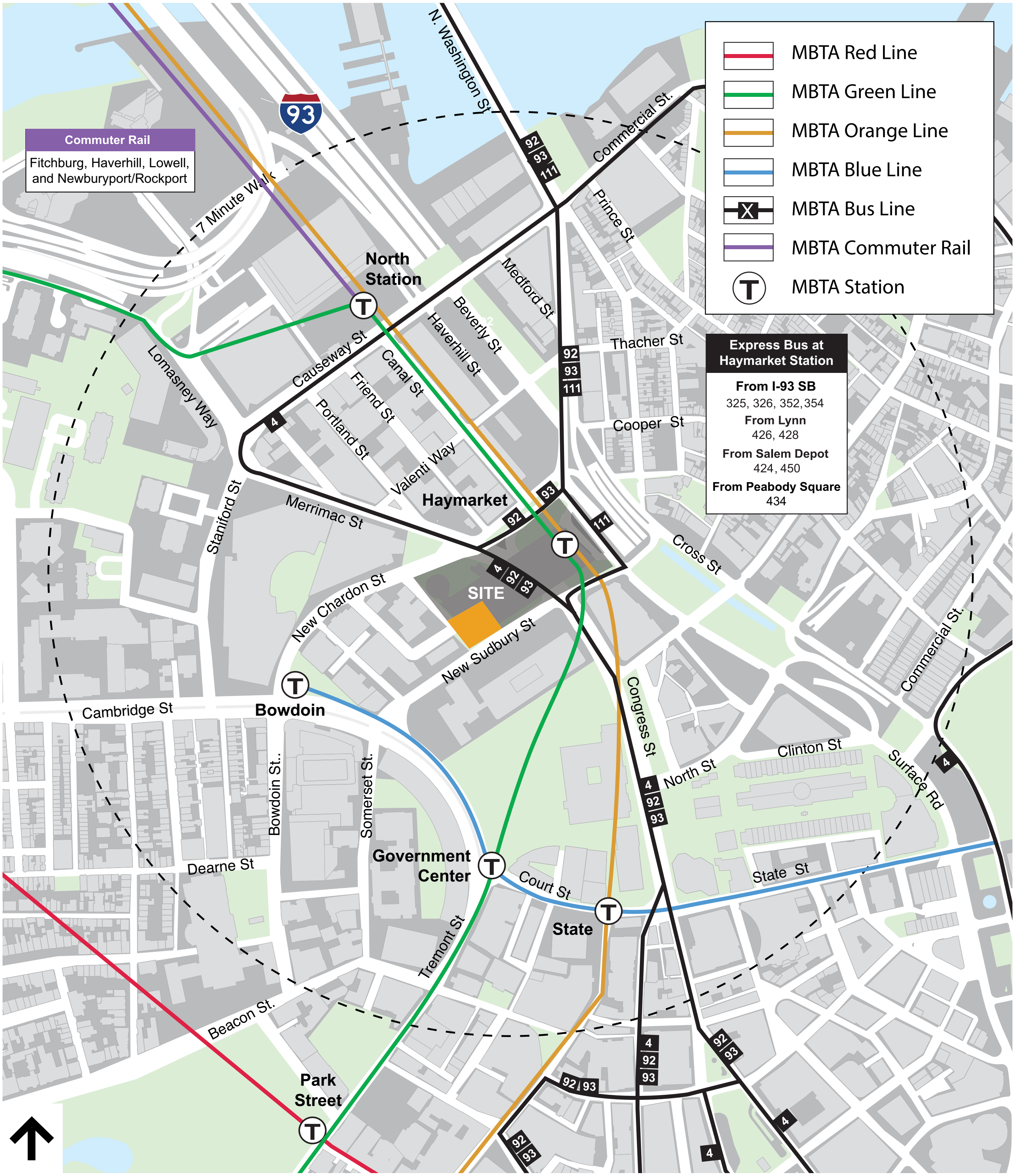

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Figure 4.5
Public Transportation

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)

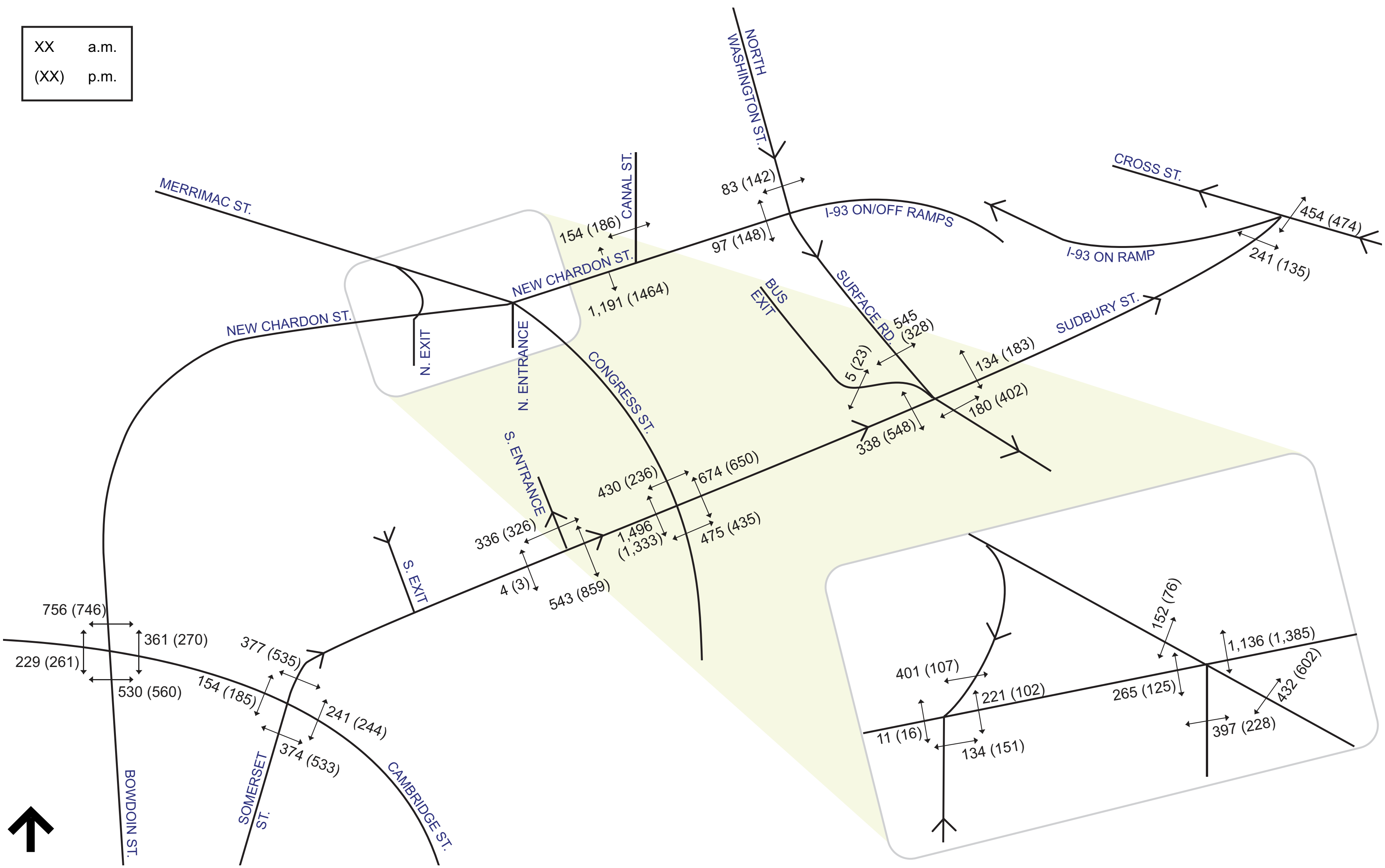

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Figure 4.6

Existing (2015) Pedestrian Volumes, Weekday a.m. and p.m. Peak Hour

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)

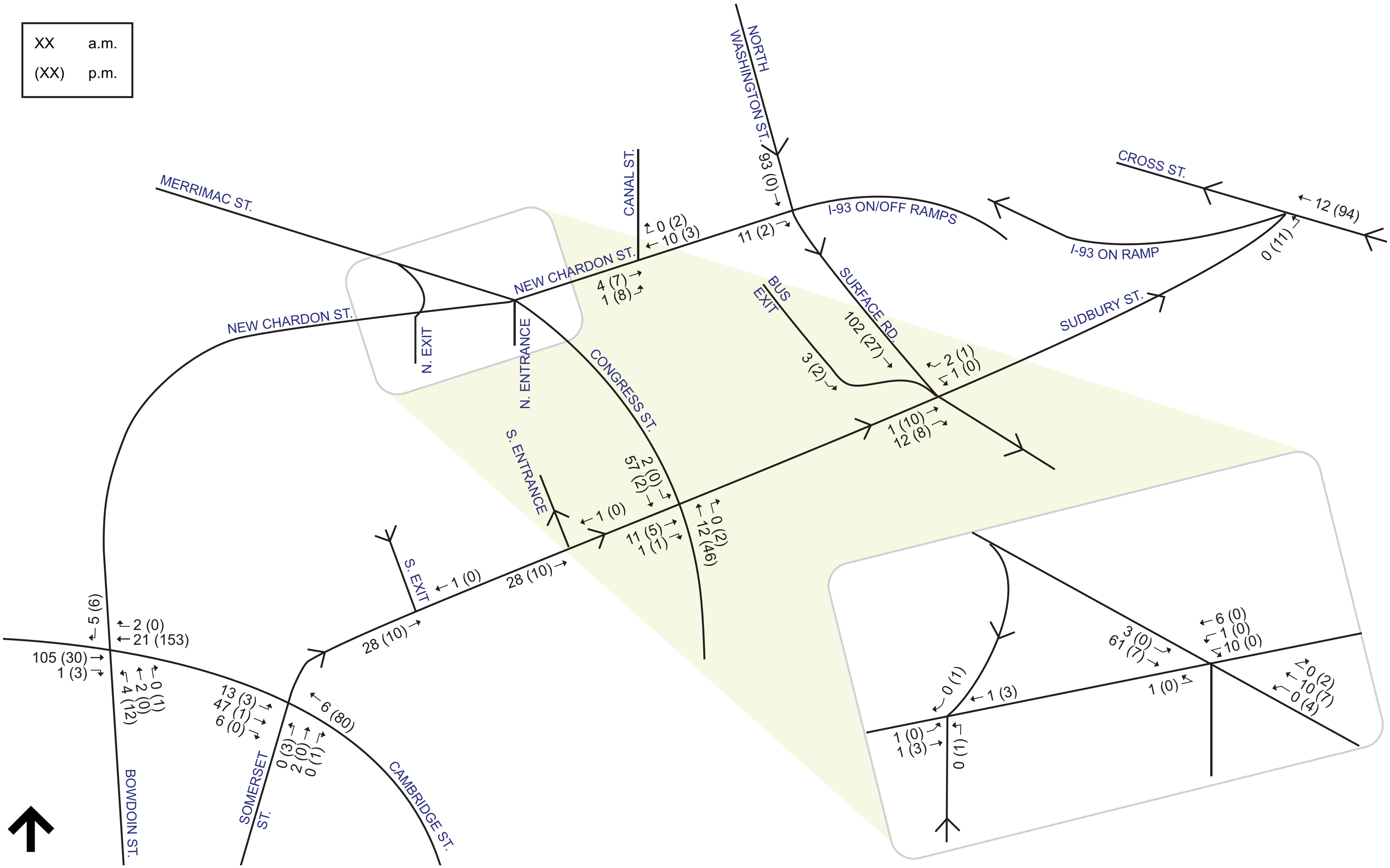

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Figure 4.7

Existing (2015) Bicycle Volumes,
Weekday a.m. and p.m. Peak Hour

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)

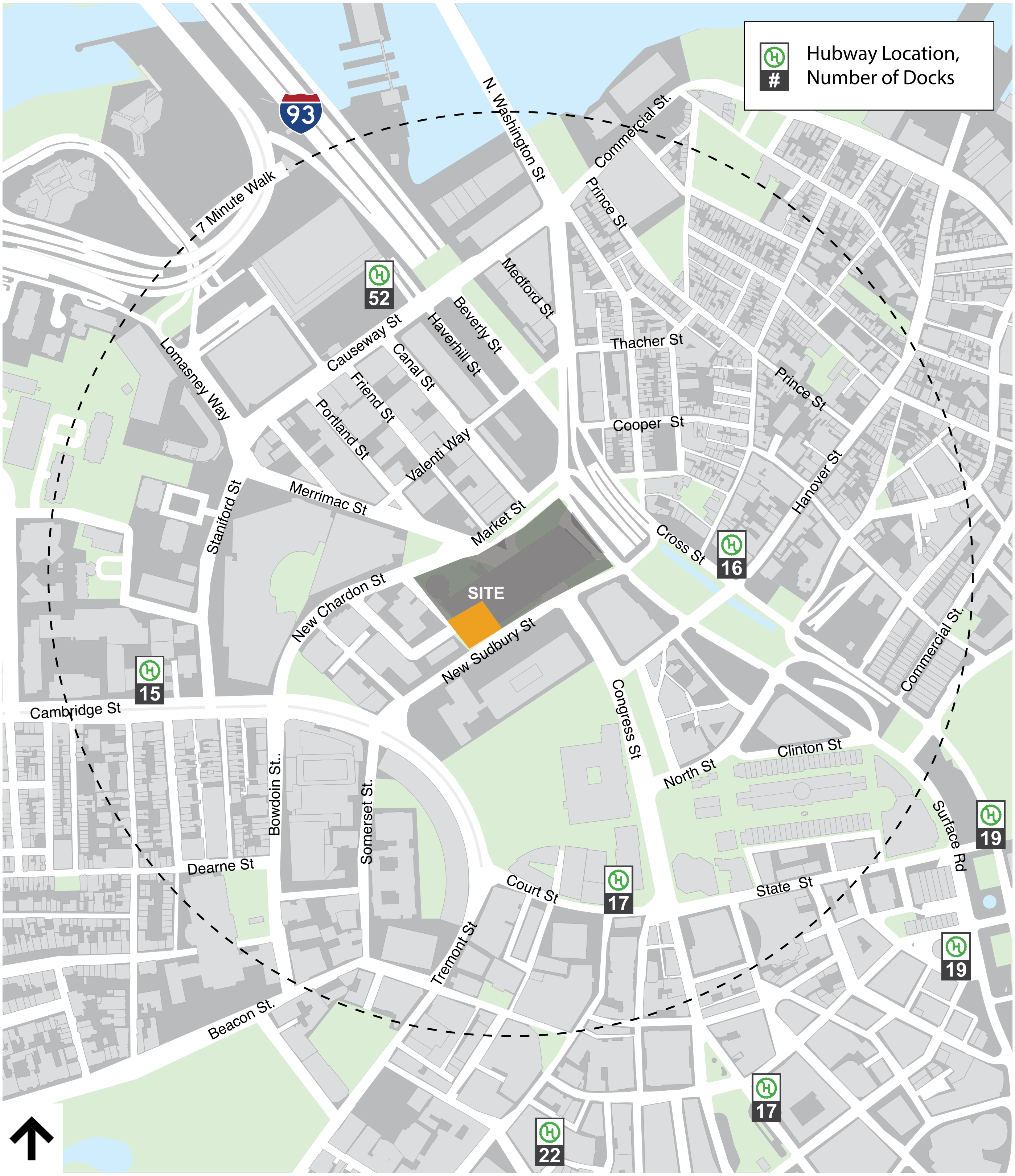

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Figure 4.8

Existing Bicycle Share Locations

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)

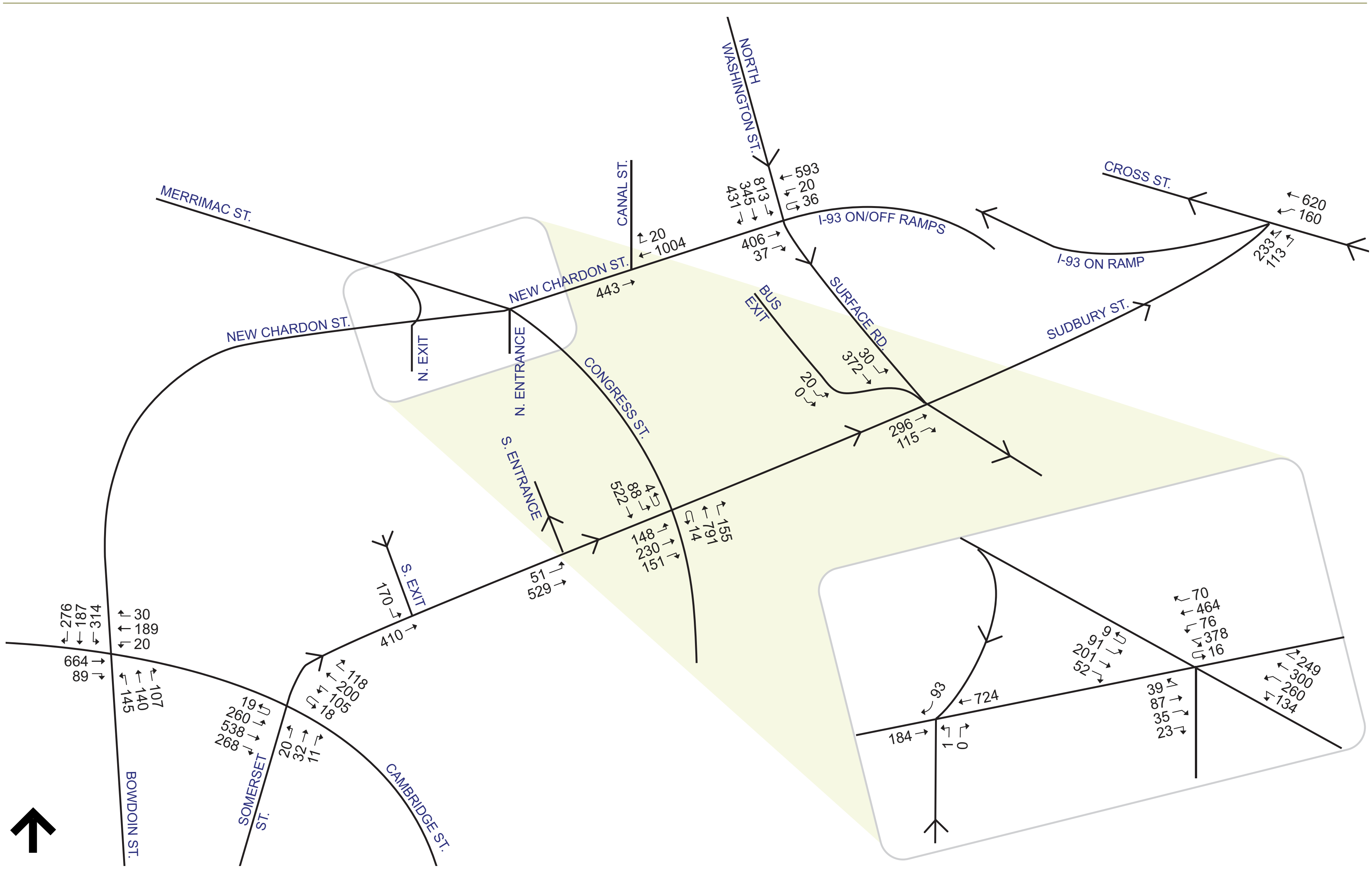

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Figure 4.9a

Existing (2015) Condition Traffic Volumes,
Weekday a.m. Peak Hour

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)

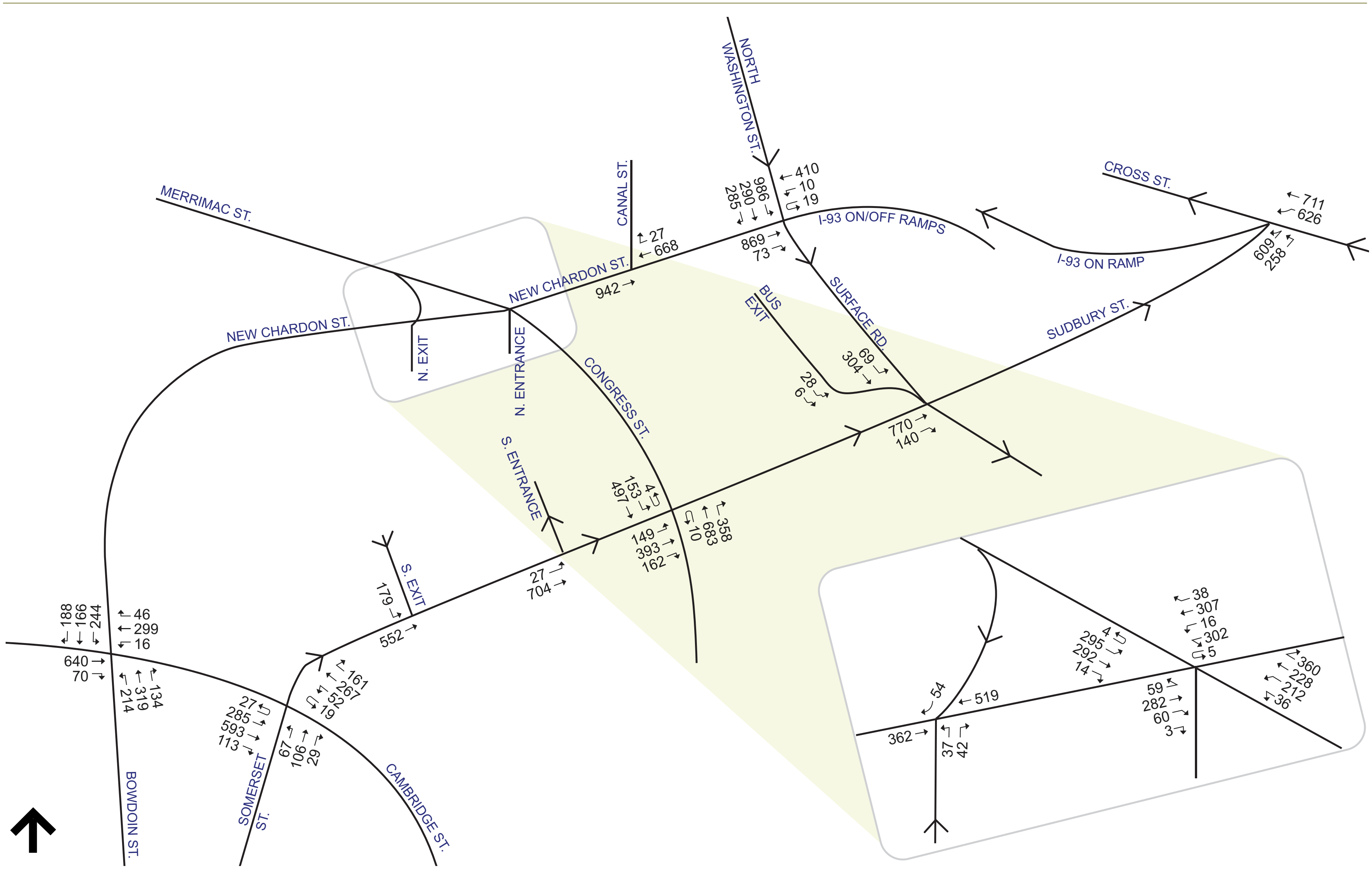

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Figure 4.9b

Existing (2015) Condition Traffic Volumes, Weekday p.m. Peak Hour

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)

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Figure 4.10

Site Specific Development Project Locations

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)

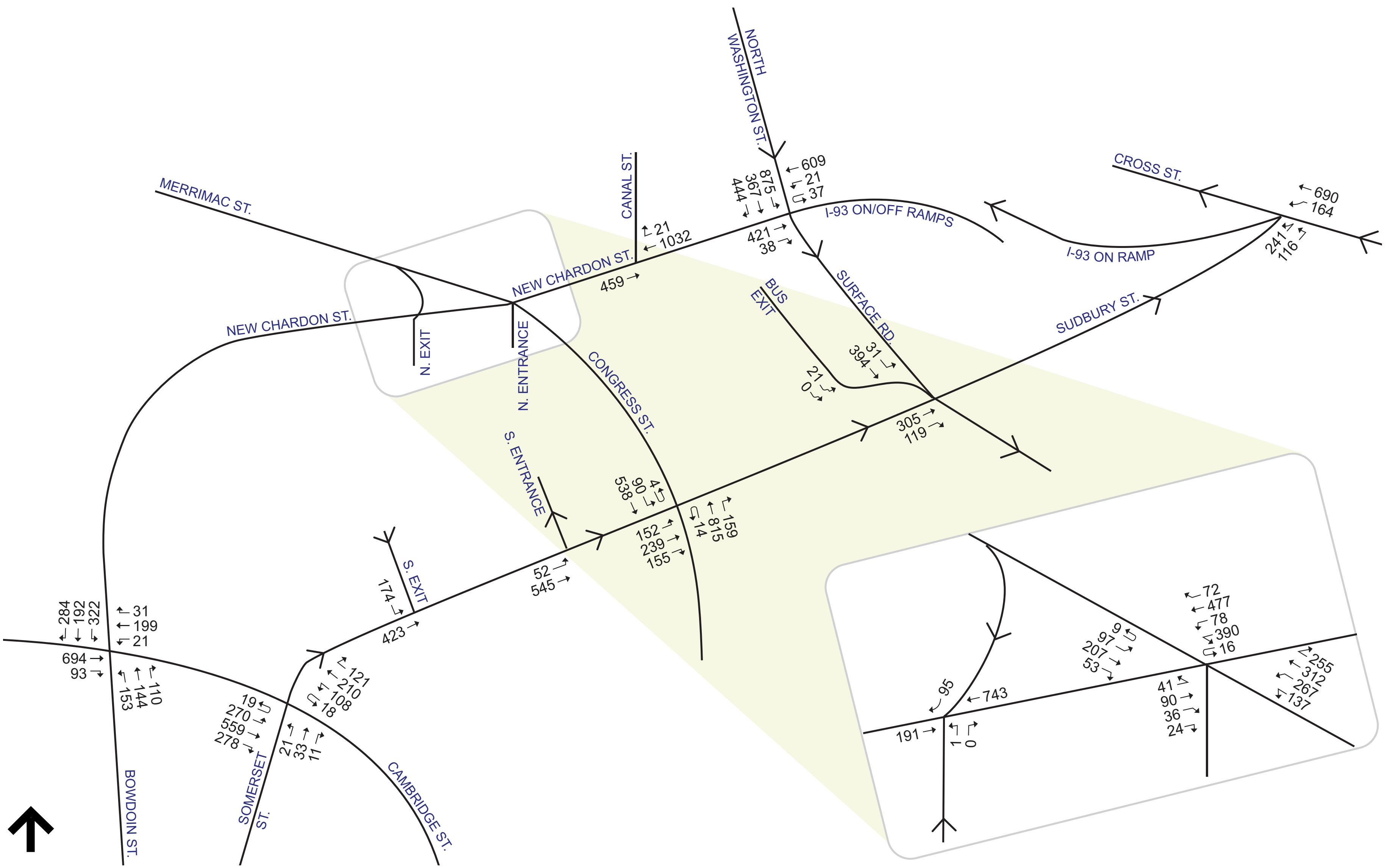

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Figure 4.11a

No-Build (2020) Condition Traffic Volumes, Weekday a.m. Peak Hour

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)

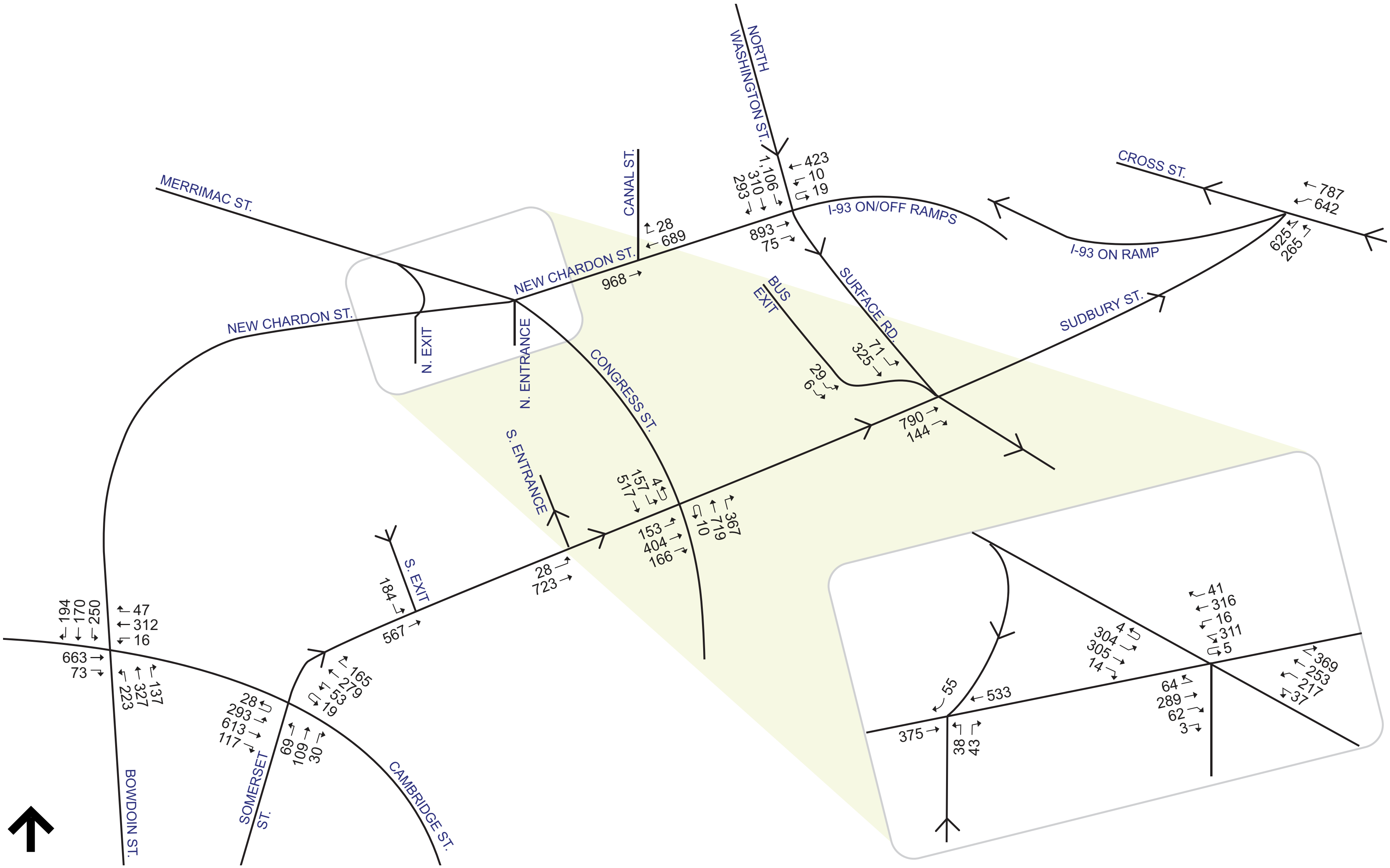

Figure 4.11b

No-Build (2020) Condition Traffic Volumes, Weekday p.m. Peak Hour

Redevelopment of the Government Center Garage WP-B1 (Residential Building)

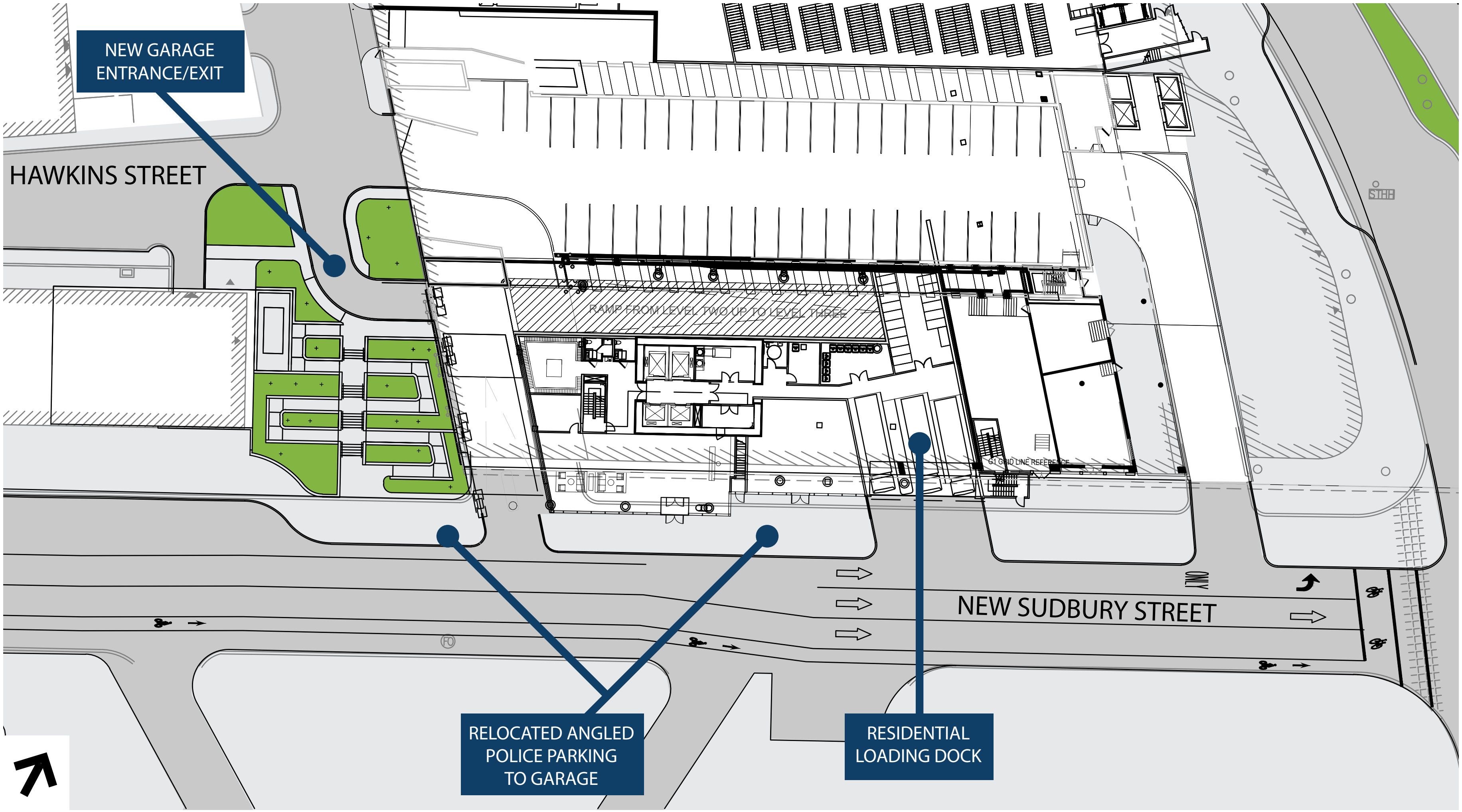

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Figure 4.12

Proposed Access and Circulation Plan

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)

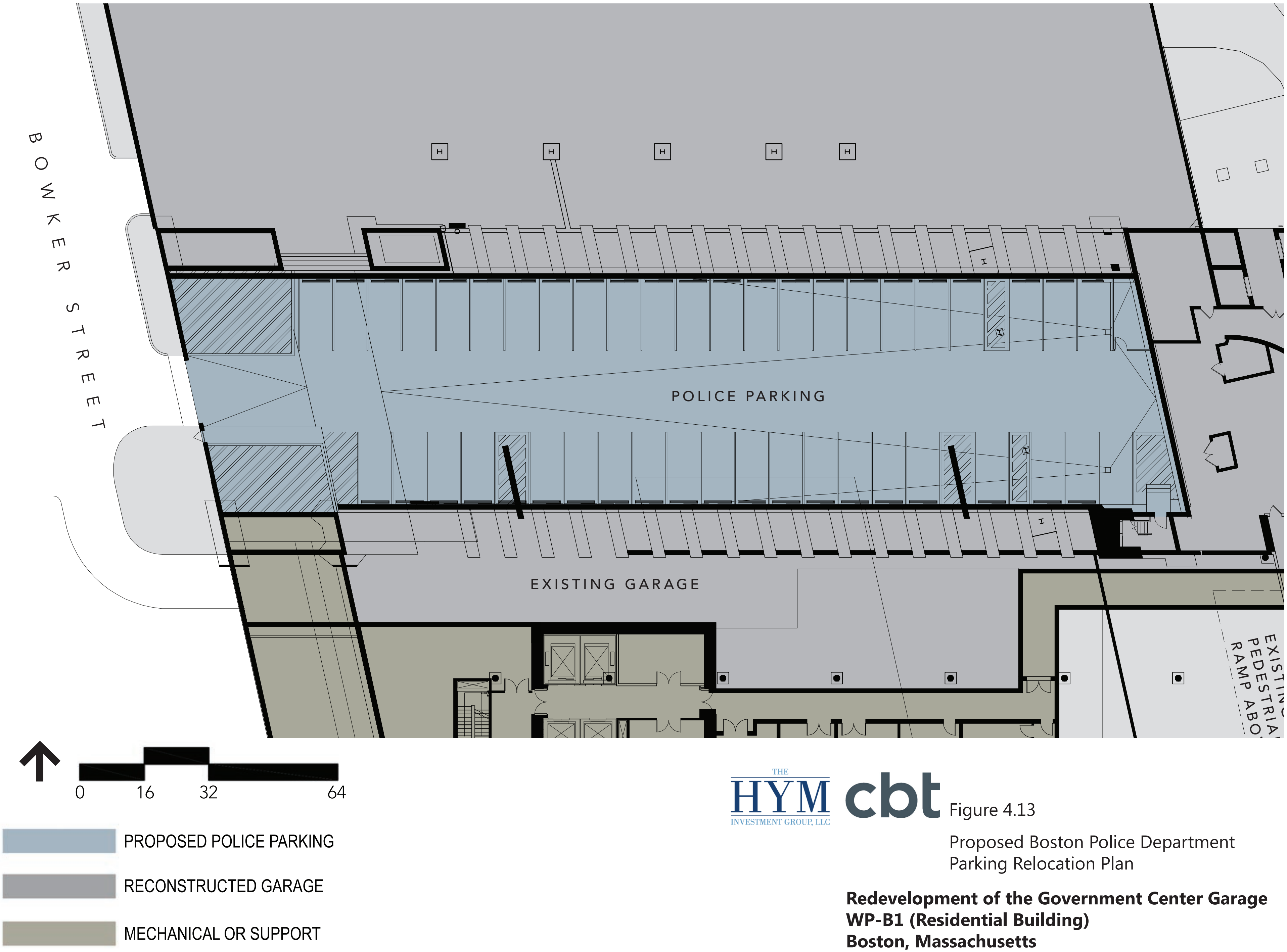

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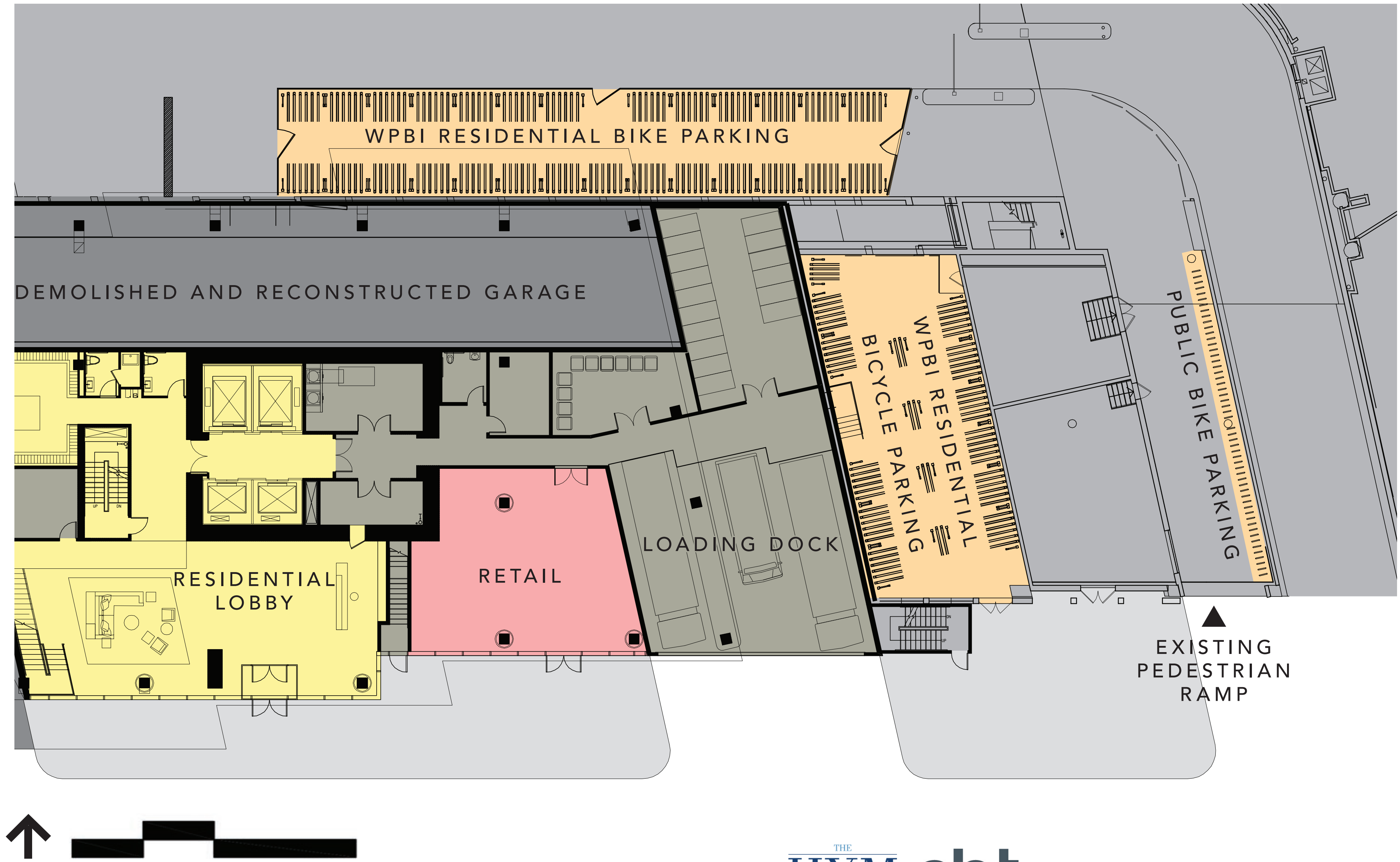
Figure 4.13

Proposed Boston Police Department Parking Relocation Plan

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



Source Info

PROPOSED BIKE ACCOMMODATIONS

EXISTING GARAGE

RECONSTRUCTED GARAGE

RESIDENTIAL CIRCULATION

RETAIL

MECHANICAL OR SUPPORT

THE HYM INVESTMENT GROUP, LLC

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Figure 4.14

Proposed Bike Accommodations - Interim

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

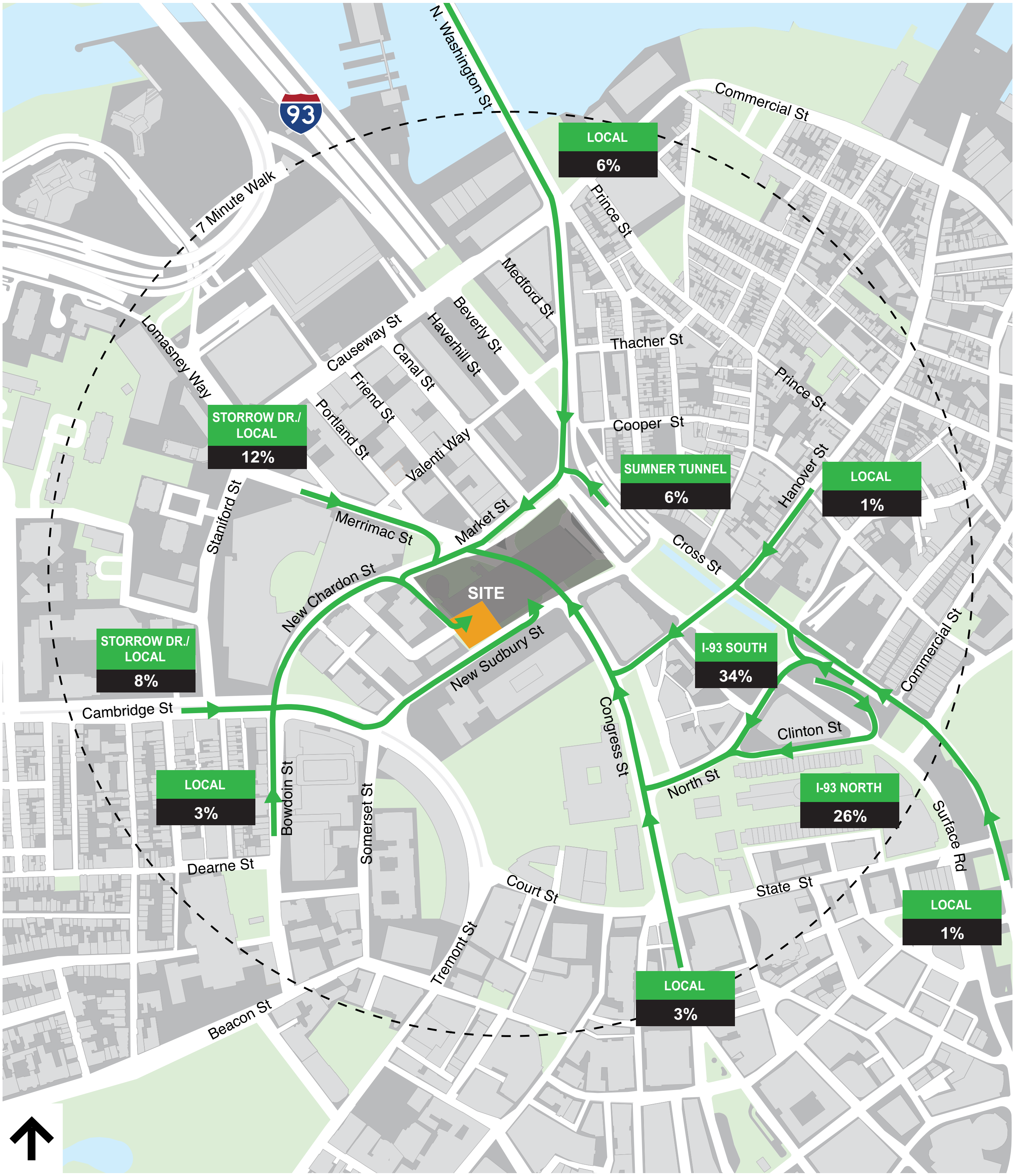

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Figure 4.15

Vehicle Trip Distribution Entering

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)

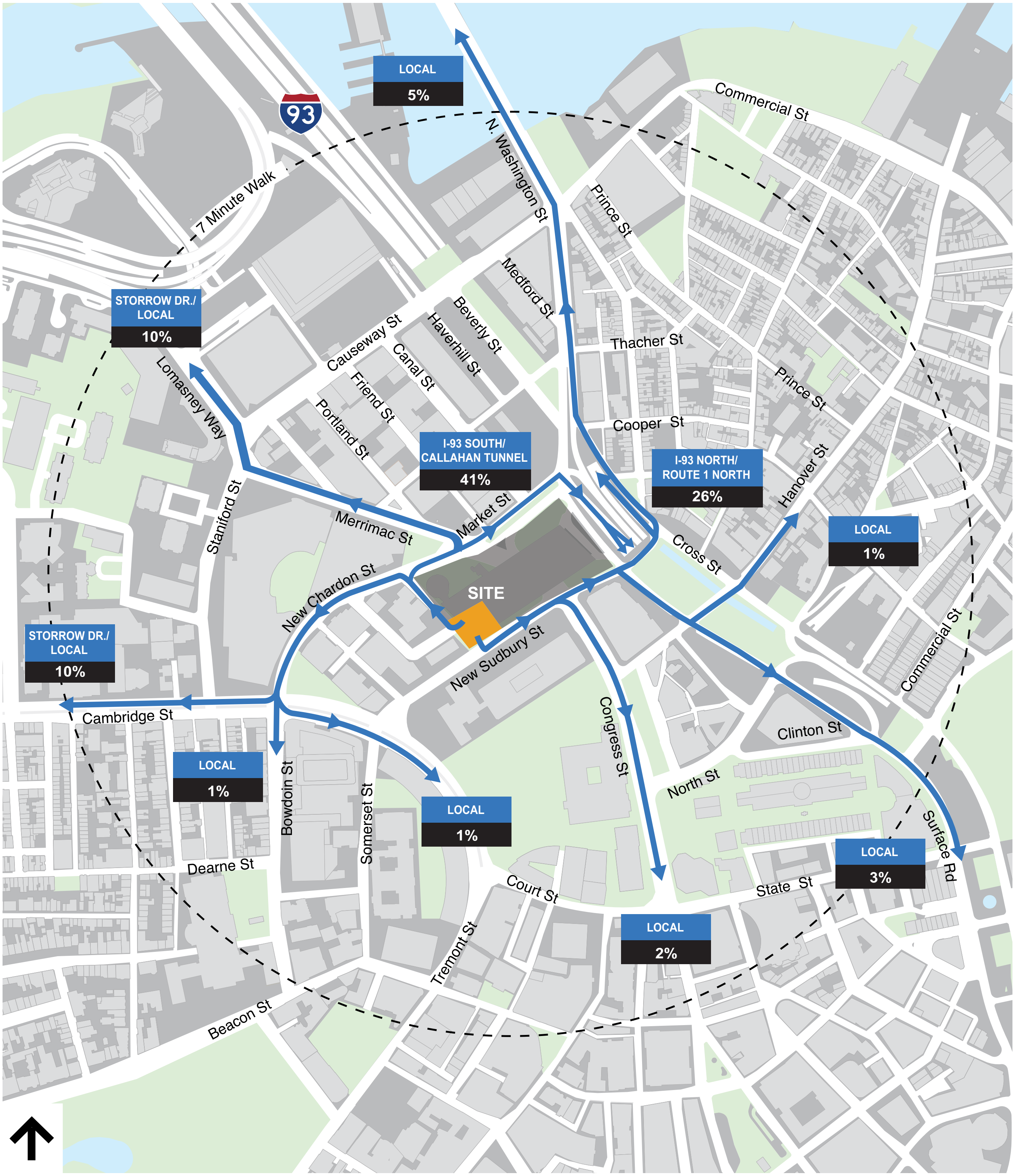

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Figure 4.16
Vehicle Trip Distribution Exiting

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)

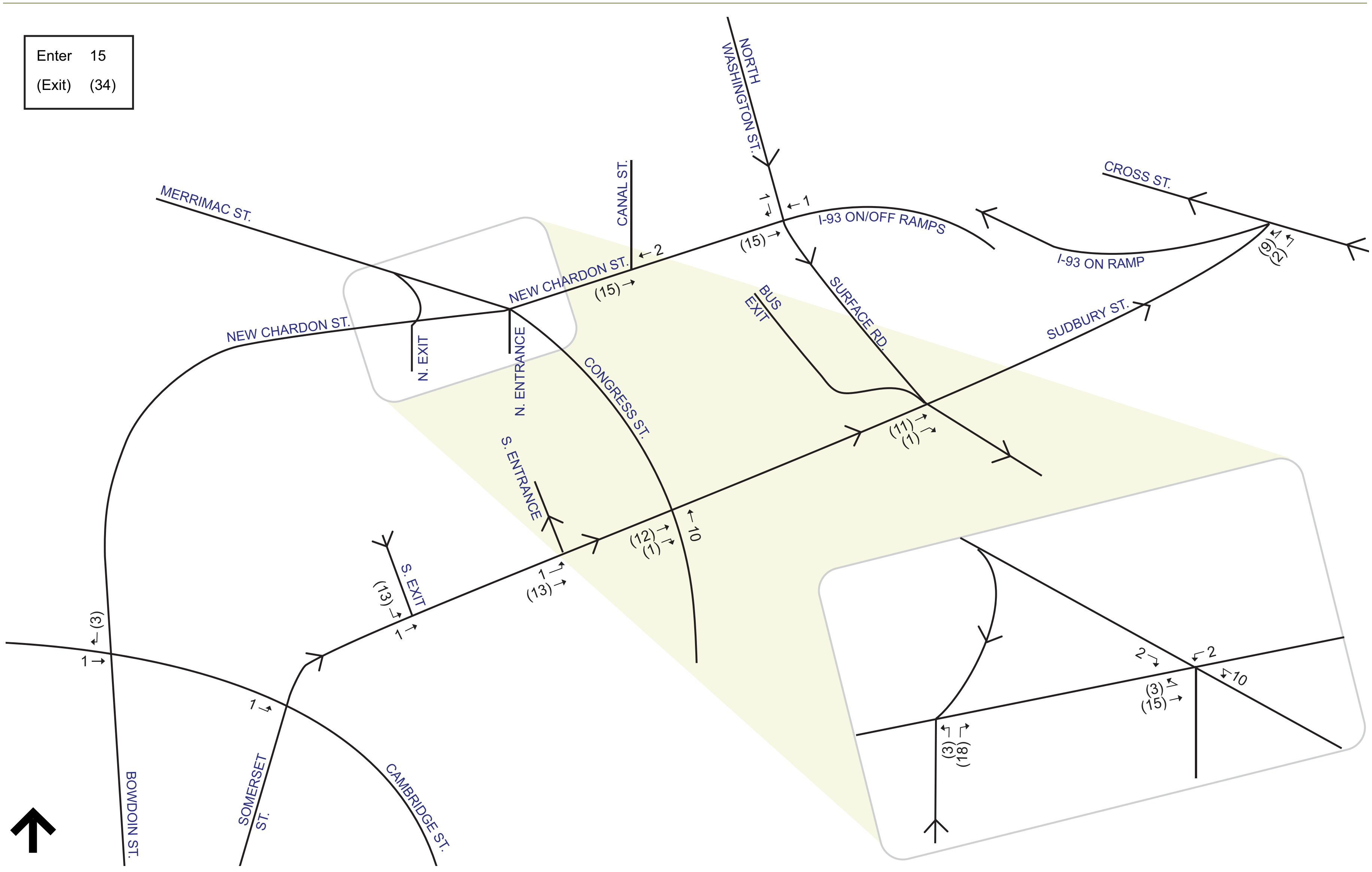

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Figure 4.17a

Vehicle Trip Assignment, Weekday a.m. Peak Hour

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)

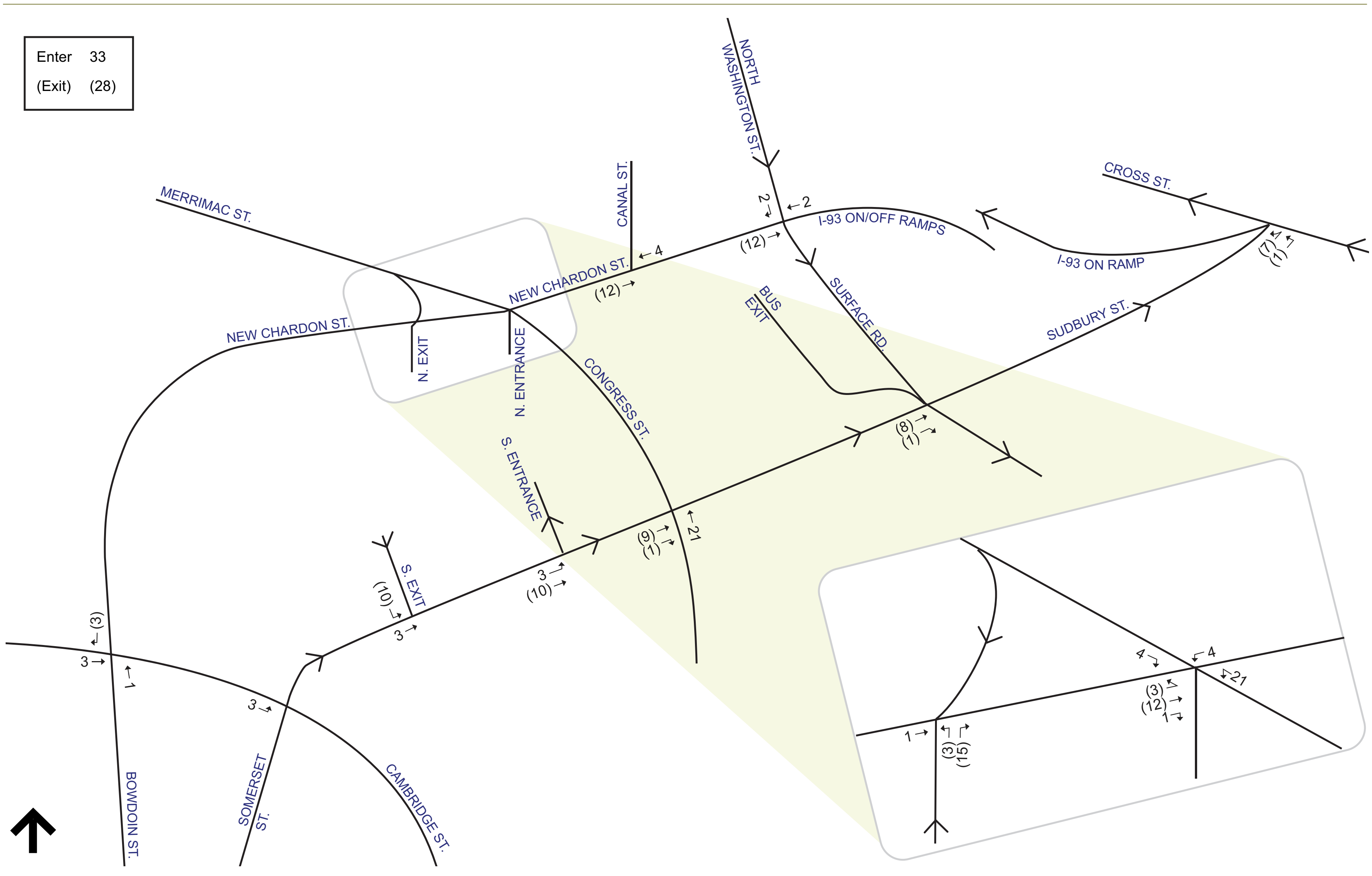

Figure 4.17b

Vehicle Trip Assignment, Weekday p.m. Peak Hour

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)

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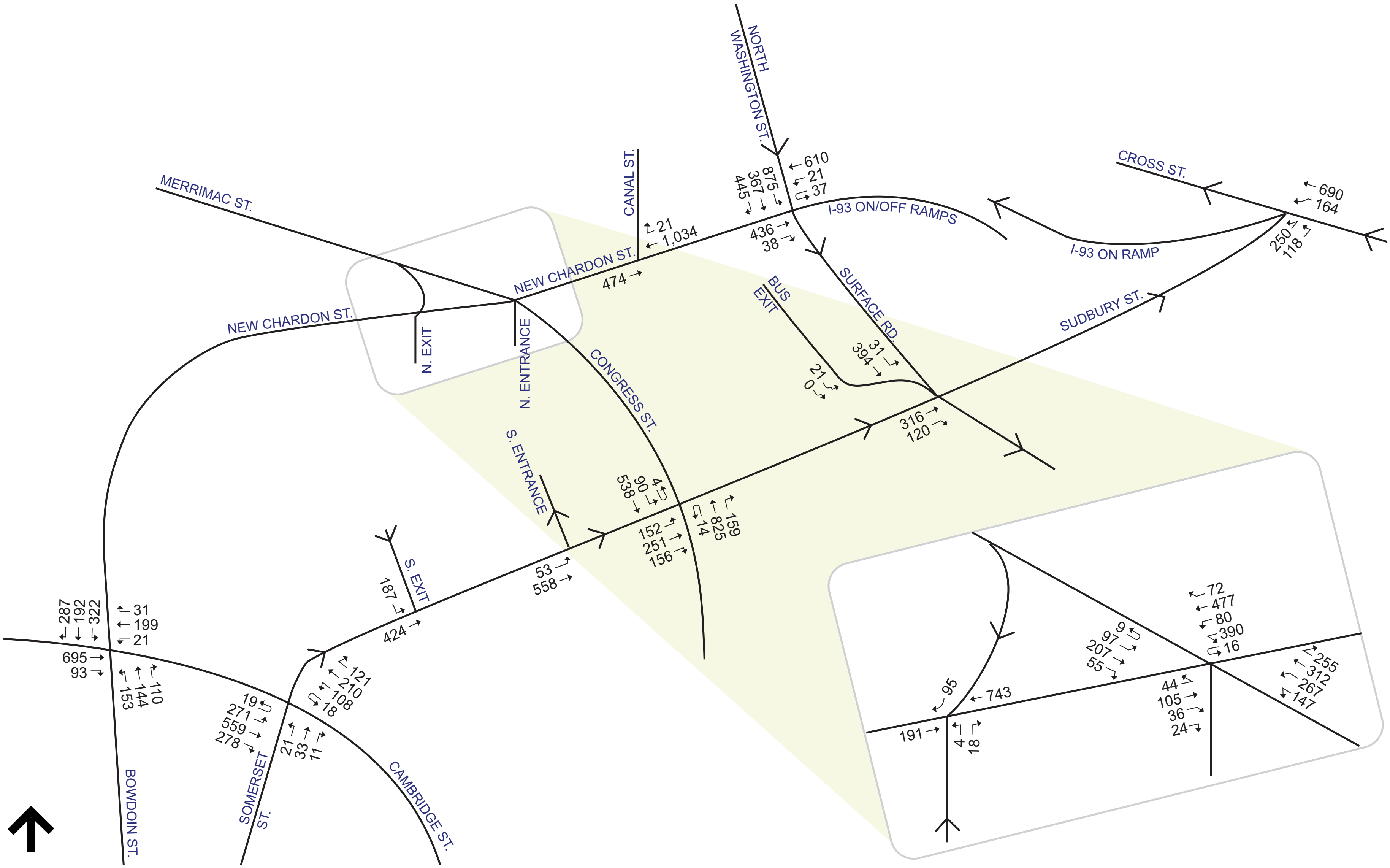

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Figure 4.18a

Build (2020) Condition Traffic Volumes, Weekday a.m. Peak Hour

Redevelopment of the Government Center Garage WP-B1 (Residential Building)

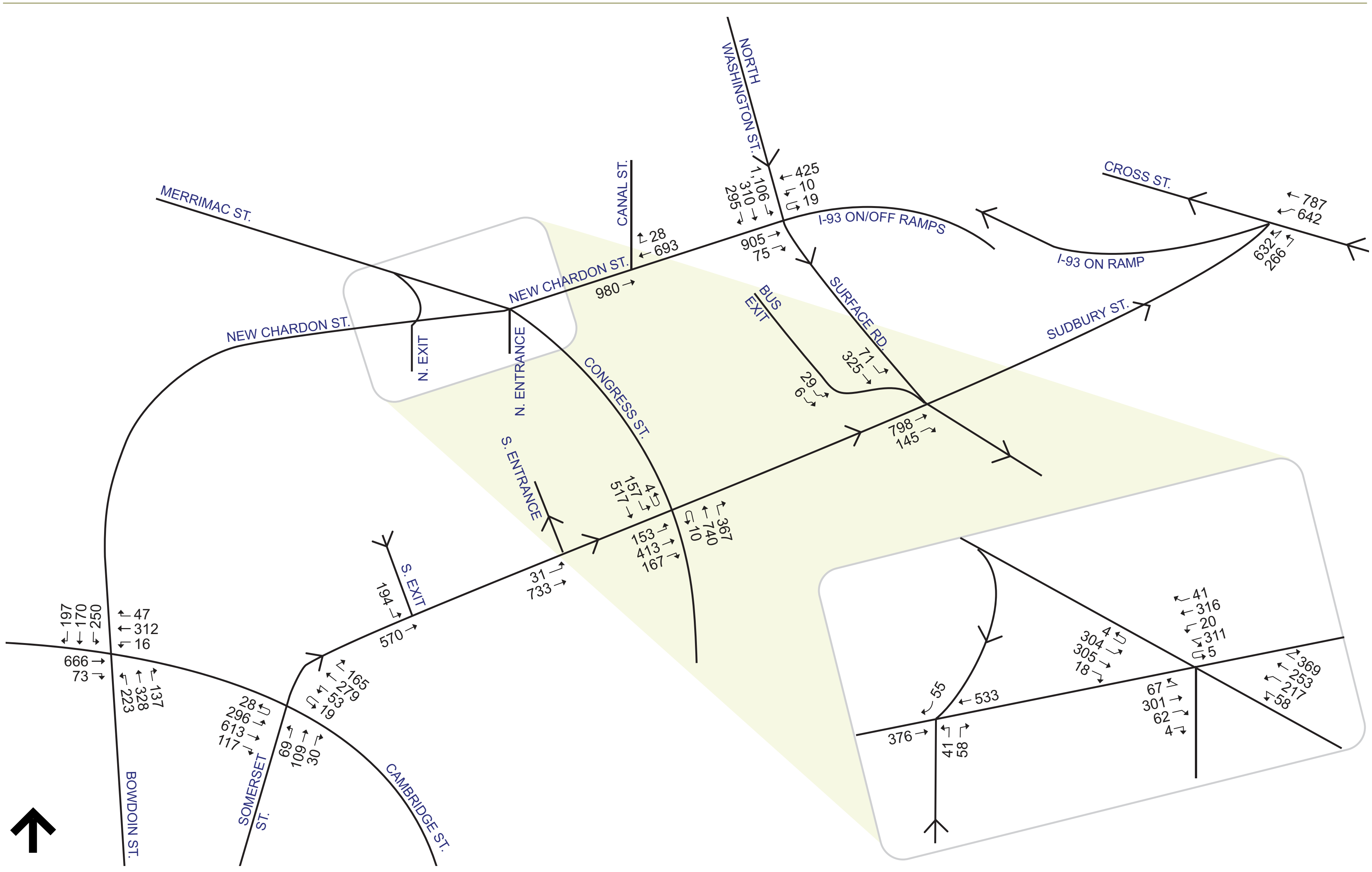

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Figure 4.18b

Build (2020) Condition Traffic Volumes,
Weekday p.m. Peak Hour

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)

5

Environmental Protection

An assessment of potential environmental impacts was conducted as part of the previous City of Boston Article 80 and state MEPA review filings for the Development Plan Project. In accordance with the approved PDA, this chapter presents updated findings from the environmental categories re-evaluated based on the current building design. As summarized previously in Table 2.4 of Chapter 2, *General Information and Regulatory Context*, the following environmental categories have been re-evaluated for the Proposed Project:

- Wind
- Shadow
- Daylight
- Solar Glare
- Air Quality (stationary source)
- Temporary Construction Impacts

5.1 Key Findings

The key findings related to environmental protection include:

- With the addition of the Project and landscaping along New Sudbury Street, overall wind conditions are expected to be either similar or better than under the No-Build Condition, which meet BRA standards.
- While the heights of the buildings remain consistent with the approved Development Plan Project, the massing (i.e., building shape) has been refined so that it steps back to provide a more interesting design and to provide resident amenities, such as balconies. Because of this, a two-level mechanical room configuration with taller mechanical screens is required and, as a result, net new shadows are created over some portions of the surrounding city fabric than compared to the Development Plan Project under some conditions. This is the result of the design team's efforts to adjust the massing of the proposed residential tower to better fit within the context of the neighborhood and provide a more interesting contribution to the city skyline.
- The majority of the skyplane is already obstructed from both New Sudbury and Bowker Streets due to the existing Garage (over 70 percent and over 80 percent, respectively). Therefore, the Proposed Project would not result in a significant increase in the amount of obstructed skyplane from these two adjacent public ways.

- Levels of reflections created by the Proposed Project are typical of what is found in an urban environment and the planar nature of the building means the reflections emanating from it are not focusing in any particular area. The solar glare study demonstrates that the Proposed Project as it is currently designed would not cause significant, or “High”, visual glare impacts on sensitive receptors surrounding the Proposed Project Site (i.e., building facades, drivers, and pedestrians).
- The air quality study demonstrates that the combined operation of the building mechanical systems (i.e., boilers and the emergency generator) will comply with the National Ambient Air Quality Standards (NAAQS).
- Construction-related impacts are temporary in nature and are typically related to truck traffic, air (dust), noise, stormwater runoff, solid waste and vibration. All temporary construction-period impacts associated with the Proposed Project will be managed to minimize disruption to the surrounding neighborhood through a comprehensive Construction Management Plan and in coordination with the appropriate city agencies.

5.2 Development Plan Project Review Overview

In June 2013, the Proponent filed a PNF with the BRA that addressed potential impacts related to Wind (a qualitative assessment), Shadows, Solar Glare (a qualitative assessment), Water Quality, Groundwater/Geotechnical, Flood Hazard Zone, Solid and Hazardous Waste, and Green Building/Sustainability. Subsequently, the 2013 DPIR provided supplemental environmental impact studies based on the revised Project, such as Wind, Shadows, Daylight, Air Quality, Noise, Rodent Control Post-Construction and Temporary Construction Impacts. In accordance with the BRA Scoping Determination, the 2013 DPIR also provided an expanded shadow studies as well as an update on the sustainable design approach. When compared to the 2013 PNF, the revised Development Plan Project generally results in a lesser degree of environmental impacts.

For Wind, the previous 2013 PNF provided a preliminary qualitative assessment by phase to begin to understand the potential for high wind activity and/or channeling wind flows around and/or through the PDA Site. A key goal was to continue to assess potential wind impacts in order to mitigate though updated design of each of the Project Components. The subsequent 2013 DPIR included a pedestrian wind tunnel study analysis for the No-Build, Build, and Build with Mitigation Conditions based on the revised 2013 DPIR program. The wind tunnel results were based on preliminary massing and were meant to identify areas potential problem area to be mitigated through building design. The Proponent committed to undergoing wind tunnel studies for each Project Component under future individual Article 80B reviews to ensure that the BRA wind criteria guidelines are met.

For Shadows, the previous 2013 PNF presented a preliminary shadow impact assessment for the Development Plan Project based on early building height and massing. The subsequent 2013 DPIR provided updated shadow studies based on the lower/rearrange the height and density of the buildings in response to BRA, community, and other public entities feedback and comment (as discussed in Section 3.1 of Chapter 3, *Urban Design*), which resulted in reduced net new shadow under a number of conditions. Per the request of the BRA, an expanded shadow study was conducted to further detail net new shadows on the two Rose Kennedy Greenway North End Parks, Charles River, Boston Harbor, and other major public open spaces in the vicinity of the PDA Site.

The 2013 DPIR included a comprehensive assessment of potential localized (microscale, or "hot spot") air quality impacts due to induced traffic on local roadways as a result of the Development Plan Project. This analysis evaluated the Project-related concentrations (from vehicles traveling through congested intersections in the study area) of carbon monoxide (CO) and particulate matter ($PM_{2.5}$ and PM_{10}) at sensitive receptor locations. The air quality assessment also evaluated Ultra-Fine Particulates and a stationary analysis of the Garage ventilation to determine the potential change in air pollution for the Development Plan Project. The air quality evaluation demonstrates that the Development Plan Project complied with city, state, and federal air quality requirements.

The 2013 DPIR included a noise assessment associated with the Development Plan Project, which included noise monitoring to determine existing sound levels and calculations of future sound levels associated with potential building mechanical equipment. The noise assessment conducted as part of the 2013 DPIR to demonstrate the Development Plan Project would not generate sound levels that exceed the City's noise standards. Based on the noise monitoring, the existing sound levels are greater than the City's nighttime standard of 50 dB(A) and since the building mechanical equipment will be located within mechanical penthouses on the rooftops of each building, the sound levels generated by the Project's building mechanical equipment resulted in an overall sound level change (increase) by one decibel at only six of the 13 sensitive receptor locations, which is in compliance with the City of Boston noise standards. Additionally, by ultimately enclosing three sides of the Garage, the Development Plan Project provides a significant noise benefit as it will screen existing noise internal to the Garage (i.e., engine noise, car alarms). And, since a majority of the service and loading activities will be serviced on-site and within the proposed buildings, noise impacts to the sensitive receptor locations will be negligible.

Through 2014, the potential environmental impacts associated with the Development Plan Project was also reviewed by state agencies under MEPA and its implementing regulations. The MEPA filings also provided additional supporting analysis and clarifications in response to reviewer comments.

5.3 Pedestrian Wind

A pedestrian wind tunnel study was conducted to assess the effect of the Proposed Project on pedestrian-level wind conditions around the Proposed Project Site and to provide recommendations for minimizing adverse effects. The following configurations were simulated:

- Future No-Build Configuration: includes the full Garage in place with all existing surrounding buildings; and
- Build Configuration: includes the Proposed Project with the eastern portion of the Garage to remain and all existing surrounding buildings, including mitigation measures.

5.3.1 Methodology

A scale model was equipped with specially designed wind speed sensors at 121 grade level locations, chosen in consultation with the BRA prior to the 2013 DPIR submission, which recorded the mean and fluctuating components of wind speed at a full-scale height of five (5) feet above-grade in pedestrian areas throughout the Proposed Project Site. The results were then combined with long-term meteorological data, recorded during the years 1981 to 2011 at Boston's Logan International Airport, in order to predict full scale wind conditions. Meteorological data in the form of wind roses are shown in the supporting documentation provided in Appendix C. The prevailing winds are from directions between southwest and northwest. In the case of strong winds, northeast and west-northwest are the dominant wind directions.

The interaction of these winds with major buildings, especially those that protrude above their surroundings, often cause increased local wind speeds at the pedestrian level. Typically, wind speeds increase with elevation above the ground surface, and taller buildings intercept these faster winds and deflect them down to the pedestrian level (Downwashing flows). The funneling of wind through gaps between buildings (channeling flows) and the acceleration of wind around corners of buildings may also cause increases in wind speed. Conversely, if a building is surrounded by others of equivalent height, it may be protected from the prevailing upper-level winds, resulting in no significant changes to the local pedestrian-level wind environment.

5.3.1.1 Pedestrian Wind Comfort 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 miles per hour (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 location is based on the work of Melbourne.[1] 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 one percent of the time (i.e., the 99th percentile mean wind speed). They are presented in Table 5.1.

1 1 Melbourne, W.H., 1978, "Criteria for Environmental Wind Conditions", Journal of Industrial Aerodynamics, 3 (1978) 241 – 249.

TABLE 5.1 BOSTON REDEVELOPMENT AUTHORITY MEAN WIND CRITERIA*

Melbourne Category	Criteria*
1. Comfortable for Sitting	<12 miles per hour
2. Comfortable for Standing	>12 and <15 miles per hour
3. Comfortable for Walking	>15 and <19 miles per hour
4. Uncomfortable for Walking	>19 and <27 miles per hour
5. Dangerous	<12 miles per hour

Source: Boston Redevelopment Authority
*Applicable to the hourly mean wind speed exceeded one percent of the time.

The wind climate found in a typical urban 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, the general wind climate in an urban downtown location is likely to be uncomfortable for more passive activities, such as sitting.

5.3.2 Pedestrian Wind Findings

Figure 5.1a and Figure 5.1b graphically depict the wind comfort conditions at each wind measurement location based on the annual winds for each configuration for the No-Build and Build Conditions, respectively. Typically the summer and fall winds tend to be more comfortable than the annual winds while the winter and spring winds are less comfortable than the annual winds. The following sections summarize the pedestrian wind comfort conditions is based on the annual winds for each simulated configuration.

5.3.2.1 No-Build Wind Conditions

Under the No-Build Condition, pedestrian-level wind conditions for the Proposed Project Site and its surroundings would be comfortable for walking or better, in general, with some exceptions. Winds at the northeast corner of the intersection of New Chardon Street and Canal Street would be at an uncomfortable level. Uncomfortable wind conditions would also exist to the southwest of the PDA Site along New Sudbury Street and Cambridge Street. Winds at five (5) of these locations are also in exceedance of the effective gust criterion (refer to Figure 4a of Appendix C).

5.3.2.2 Build Wind Conditions

To assess the Build Condition, the proposed building was simulated along with wind mitigation measures. Such measures included the addition of approximately 5-inch caliper marcescent trees[2] located on-site as well as along municipal sidewalks surrounding the Proposed Project Site. With the addition of the Project and landscaping along New Sudbury

2 Marcescent trees are on the City of Boston's approved tree list tend to maintain foliage throughout the winter.

Street, overall wind conditions are expected to be either similar or better than under the No-Build Condition, which meet BRA standards. Uncomfortable winds were detected at a reduced number of locations along New Sudbury Street, New Chardon Street, and Cambridge Street. Under the mitigated Build Condition, the effective gust criterion was met annually at all test locations except for two locations to the south and southwest of the Project, which represents a decrease from four locations identified in the No-Build Condition. The proposed off-site tree planting would provide benefits beyond wind mitigation in terms of beautifying the public realm as well as reducing heat island and air pollution effects.

5.4 Shadow

The Proposed Project, like any new building in Boston, will cast shadow on areas to its west, northwest, north, northeast and east. This extensive study indicated minimal net new shadow impact on the Greenway Parks from March to August, and on the Charles River, Boston Harbor, Beacon Hill, North End, and West End in different times of a year.

Figures 5.2 through 5.5 present shadows for the Proposed Project, as required under Article 80B. In addition, these figures indicate the changes in shadows compared to the conceptual massing shown in the 2013 DPIR shadow studies. All buildings under construction and any proposed buildings anticipated to be completed prior to the completion of the Proposed Project were included in the study model.

5.4.1 Methodology

The shadow study was prepared using methodologies consistent with accepted practices for such studies completed under Article 80 review. A computer model of the Proposed Project and surrounding urban area was developed. Using software called Revit, a number of days and times were analyzed, as required under Article 80. The analysis used “clear sky” solar data at the location of Boston’s Logan International Airport, which means that no cloud cover ever occurs providing a “worst case” scenario showing the full extent of when and where shadow could occur.

The shadow study provides a comparison of the No-Build and Build Conditions to identify “net new” shadow associated with the Proposed Project based on current building design. The shadow study then compares the net new shadow to the 2013 DPIR massing net new shadows. The conditions were compared for the spring and fall equinoxes, and the summer and winter solstices at 9:00 AM, 12:00 Noon and 3:00 PM, and at 6:00 PM for the summer solstice and equinoxes.

5.4.2 Potential Shadow Impacts

Shadows from existing structures were accounted for and “net new” shadow is indicated graphically in Figures 5.2 through 5.5 using a deeper shade of blue. Shadow improvements, or new daylight, expected as a result of the changes in the building shape compared to the conceptual massing used in the 2013 DPIR shadow studies (shown in yellow).

When the sun shines any object on the landscape will cast a shadow. Depending where the shadow falls, the time of year, and what the weather conditions are will determine if the shade is welcome or not. The Proposed Project will cast shadows; however, when compared to the conceptual massing of the 2013 DPIR, there are only slight differences, and in some cases daylight is created, as indicated in yellow on the diagrams.

The Development Plan Project massing assumed a modest penthouse one-level above zoning for mechanical space and screening. While the heights of the buildings remain consistent with the approved Development Plan Project, the massing (i.e., building shape) has been refined from what was assumed in the 2013 DPIR shadow study. A key design change includes shaping the building with reduced upper floorplate sizes so that it steps back to provide a more interesting design and to provide resident amenities, such as balconies. Because of this, a two-level mechanical room configuration with taller mechanical screens is required. As a result, additional shadow is created over some portions of the surrounding city fabric than compared to the Development Plan Project under some conditions. This is the result of the design team’s efforts to adjust the massing of the proposed residential tower to better fit within the context of the neighborhood and provide a more interesting contribution to the city skyline.

As with the Development Plan Project, the updated shadow studies demonstrate that the new residential building as currently designed will not impact the Boston Common and will have minimal to no shadow impacts to the west towards Beacon Hill and the West End. Additionally, the Proposed Project will not result in any net shadows on other major open spaces, including City Hall Plaza, Cardinal Cushing Park, and the park behind the Brooke Courthouse. This is mainly due to the buildings adjacent to those public spaces already casting shadow on them. Refer to Section 8.4.2 of Chapter 8, *Historic Resources* for a discussion of net new shadow on the Bulfinch Triangle Historic District.

5.4.2.1 March 21

Refer to figures 5.2a-d for the spring equinox shadow conditions. At this time of year, the sun is still relatively low in the sky. In the morning net new shadow primarily falls on existing roofs. At 12PM the shadow falls on the intersection of New Chardon Street and Merrimac/Congress Street. By 6PM, shadow extends across the North End where the net new shadow is cast primarily over building roof tops.

5.4.2.2 June 21

Refer to Figures 5.3a-d for the summer solstice shadow conditions. On early summer mornings, the Proposed Project will add a small amount of incremental shadow to the north end of Bowker Street, but by noon and through the afternoon the shade will fall mostly on the existing Garage roof. In the late afternoon, new shadow will fall across part of Congress Street and onto the roof of the MBTA Haymarket Station bus facility.

5.4.2.3 September 21

Refer to Figures 5.4a-d for the fall equinox shadow conditions. At this time of year, the sun is still relatively low in the sky. In the morning the shadow falls primarily on existing roofs and then extends across the North End by 6PM. The net new shadow cast primarily falls on roof tops but then extends into the harbor similar to many other buildings during this time of year. The proposed building shadow more or less matches the shadow cast by the conceptual massing represented in the 2013 DPIR.

5.4.2.4 December 21

Refer to Figures 5.5a-c for the winter solstice shadow conditions. Winter shadows, cast by sun low in the sky, are very long everywhere, including under the existing conditions. Also, during this time of the year, the days are less bright and there is much less contrast between shaded and unshaded areas. Given these environmental conditions, net new shadow from the project is fairly minimal falling on Portland Street for about an hour in mid-morning. Additional winter shadow will primarily fall on rooftops.

5.4.2.5 Rose F. Kennedy Greenway North End Parcels

For the months of January, February, September, October, November and December, the Proposed Project has no shadow impact on the Greenway Parks as the graphic reveals. For other months, the shadow impact on the Greenway Parks, which shadow impact varies in size and does not start typically until after 4:00 PM, ranges from less than 2 hours in March to 3 hours 30 minutes on June 21st.

- March: Part of the Greenway Parks is under the shadow of the proposed development between 16:30 to 18:15 for less than 2 hours.
- April: Part of the Greenway Parks is under the shadow of the proposed development between 16:00 to 18:45 for 2 hours 45 minutes.
- May: Part of the Greenway Parks is under the shadow of the proposed development between 16:30 to 19:45 for 3 hours 15 minutes.
- June: Part of the Greenway Parks is under the shadow of the proposed development between 16:30 to 20:00 for 3 hours 30 minutes.
- July: Part of the Greenway Parks is under the shadow of the proposed development between 16:30 to 19:45 for 3 hours 15 minutes.
- August: Part of the Greenway Parks is under the shadow of the proposed development between 16:00 to 19:00 for 3 hours.

Again, it is important to note, that the shadow impact on the two Greenway Parks, does not cover the entire area of the two parks and varies both in area and duration through the time periods identified above.

To better understand what impact these late day shadows would have on the Greenway Parks, the Proponent engaged a landscape consultant to review the type of plantings currently found within the North End Parks of the Rose Kennedy Greenway and to assess the potential shadow impact on the existing landscape based on the area and duration of those shadows. After review, the consultant concluded that there would be no material adverse impacts to those plantings caused by the net new shadow. The planting mix in those parcels includes evergreen shrubs and a mix of flowering perennials. The species represented within these zones, such as Perovskia, Buxus, and Rosa spp. and are ones that are classified as full-sun species. Full-sun is typically understood as 6 hours or more of daylight per day. Even at its most extreme (June 21st) the net new shadow on the longest day would still allow for more than 9 hours of daylight, the Greenway area receives more than enough sunlight to maintain those plants.

5.4.2.6 Boston Harbor

Shadow impacts on Boston Harbor are only noticed in the late afternoon before the sunset from January to April, and from August to October as exhibited below. The maximum length of impact is less than one hour. During May, June, July, November, and December, when dates are closer to Solstice, there is no shadow impact due to the northwestern sunset angle in the summer and the earlier sunset time in the winter.

- January: From 16:00 to 16:35 Sunset
- February: From 17:00 to 17:18 Sunset
- March: From 18:00 to 18:53 Sunset
- April: From 19:00 to 19:27 Sunset
- May: No Impact
- June: No Impact
- July: No Impact
- August: From 19:00 to 19:28 Sunset
- September: From 18:00 to 18:36 Sunset
- October: From 17:00 to 17:46 Sunset
- November: No Impact
- December: No Impact

5.4.2.7 Charles River

Shadow impacts on Charles River are only noticed in the early morning 8:00 shadow study of January, October, November and December. At no other time is an impact noticed. Since the shadow moves quickly in the morning, the maximum duration of impact is less than one hour.

5.4.2.8 Other Major Public Open Spaces

Other major open space areas considered include: City Hall Plaza; Cardinal Cushing Park; and the park behind the Brooke Courthouse. The shadow studies do not find any net shadow impact on the major open spaces including City Hall Plaza, Cardinal Cushing Park, and the park behind the Brooke Courthouse. This is mainly due to the buildings adjacent to those public spaces already casting shadow on them.

5.5 Daylight

The following section describes the anticipated effect on daylight coverage at the Proposed Project Site as a result of the Project. An analysis of the percentage of skyplane obstructed under the Build and No-Build conditions is a requirement of the Article 80 Large Project Review as part of the Environmental Protection component (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 of the City of Boston Zoning Code. The results of the analysis are presented in Figures 5.6a-c.

5.5.1 Methodology

The Proposed Project was analyzed using the BRADA and by comparing the Existing/No-Build Condition and Build Condition. This section provides a description of the methodology used for the analysis.

5.5.1.1 BRADA Software

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 skydome obstruction and provides a graphic depicting the analysis conditions.

The model inputs used for the study presented in this EPNF were taken from a combination of the BRA City model, an existing conditions survey prepared by VHB, Inc., and schematic design plans prepared by CBT Architects dated October 2015. 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 skydome 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.

5.5.1.2 Viewpoints

The following viewpoints were used for this daylight analysis:

- New Sudbury Street – This viewpoint is located on the centerline of the street on the southern façade of Garage and proposed building.
- Bowker Street – This viewpoint is located on the centerline of the street on the western façade of Garage and proposed building.
- New Chardon Street – This viewpoint is located on the centerline of the street on the northern façade of Garage and proposed building.

The viewpoint represents existing and proposed building façades when viewed from the adjacent pubic way.

5.5.2 Daylight Conditions

Table 5.2 below presents the percentage of skyplane that is expected to be obstructed with and without the Proposed Project from each viewpoint. Figures 5.6a-c graphically show the Project-related daylight impacts for the viewpoints from adjacent public streets.

TABLE 5.2 WP-B1 EXISTING/NO-BUILD AND BUILD DAYLIGHT CONDITIONS*

Viewpoint	Existing/No-Build Skyplane Obstruction	Build Skyplane Obstruction
New Sudbury Street	72.4%	76.6%
Bowker Street	82.0%	82.8%
New Chardon Street	14.8%	33.7%

*Refer to Figures 5.6a-c.

Under the Existing/No-Build Condition, the majority of the skyplane is already obstructed from both New Sudbury and Bowker Streets due to the existing Garage (over 70 percent and over 80 percent, respectively). Therefore, the Proposed Project would not result in a significant increase in the amount of obstructed skyplane from these two adjacent public ways.

From the New Chardon Street viewpoint, the Proposed Project is expected to increase the amount of skyplane obstruction from approximately 15 percent to 34 percent due to the increased height of the new residential building compared to the existing Garage. This effect is to be expected as the Garage is set back from New Chardon Street and is replacing a 11-story structure with a single taller building; however, for only a small portion of the span of the vantage (Figure 5.6c). This change as well as from the other adjacent public streets is well within the expected level of view obstruction when considered in the context of the City's planning objectives and the Proponent's redevelopment goals. Consistent with the approved PDA, the desired density and massing of the Proposed Project necessitates obstructing a portion of daylight at the Proposed Project Site.

5.6 Solar Glare

A solar glare study was conducted on the Proposed Project. The objective of the study was to assess the impact solar reflections emanating from the building facades on the surrounding urban terrain and buildings.

5.6.1 Methodology

A computer model of the Proposed Project and surrounding urban area was developed. Using proprietary software called Eclipse[3] a number of receptor locations were analyzed. Three types of receptors were identified to understand the visual (glare) impacts on drivers, pedestrians and building facades. The analysis used "clear sky" solar data at the location of Boston's Logan International Airport. This analysis assumes that no cloud cover ever occurs, which provides a "worst case" scenario showing the full extent of when and where glare could occur. Finally, a statistical analysis was performed to assess the frequency, intensity and duration of the glare events. Reflections from existing structures were not accounted for, although shadows from these structures were factored in.

Glazed surfaces were modeled as clear float glass with Low-E coating, which has a visible and full spectrum reflectance of 11 and 30 percent, respectfully. The metal panel portions of the façade will be non-reflective as they will be painted with low luster finish in shades of gray.

Appendix D provides visual impact diagrams for each receptor point.

5.6.2 Solar Glare Study Findings

Levels of reflections created by the Proposed Project are typical of what is found in an urban environment and the planar nature of the building means the reflections emanating from it are not focusing in any particular area. The solar glare study results demonstrate that no significant, or "High", visual glare impacts on sensitive receptors surrounding the Proposed Project Site (i.e., building facades, drivers, and pedestrians) would result from the proposed residential building as it is currently designed.

Only brief visible glare instances are expected to fall onto the drivers travelling southeast along Merrimac Street (receptor D2, as identified in the Solar Glare Study in Appendix D) in the mornings (between 8:00 am to 10:00 am) during spring and autumn. These reflections are

3 Developed by RWDI Consulting Engineers & Scientists

considered to be a "Low" visual impact since they are not expected to fall within the driver's required 20 degree cone of vision at that location.

Some "Moderate" levels of reflection, also typical in urban environments, are predicted to occur immediately to the south and southeast on adjacent buildings (specifically, the JFK Federal building; receptors F11 and F12) and pedestrian sidewalks on the southern edge of New Sudbury Street (receptor P20). However, these reflections are typically occurring at high angles and usually last only 10 to 30 minutes in duration causing only a minor distraction or nuisance and could easily be remedied by pulling the blinds or diverting one's gaze. A more detailed report of the solar glare findings are included in Appendix D.

5.7 Air Quality

The 2013 DPIR microscale air quality assessment was based on the entire Development Plan Project program and, therefore, represents a more comprehensive analysis. Because the number of new vehicle trips associated with only WP-B1 is lower when compared to the vehicular traffic estimated for the 2013 DPIR program at full build-out, a microscale, or "hot spot", air quality study analysis was not re-evaluated. This section considers stationary sources (i.e., building mechanical systems) associated with the Proposed Project. Appendix E provide supporting documentation to the stationary source air quality analysis.

5.7.1 Stationary Source Air Quality Analysis

The purpose of the stationary source analysis is to demonstrate that operation of the Proposed Project (i.e., operation of the boilers and emergency generators) will not cause or contribute to a violation of any applicable National Ambient Air Quality Standards (NAAQS). The air quality analysis includes a dispersion modeling analysis that evaluates concentrations of CO, nitrogen dioxide (NO_2), PM2.5, PM10 and sulfur dioxide (SO_2) associated with this equipment. Table 5.3 below lists the equipment proposed as part of the Proposed Project and considered as part of the stationary source air quality analysis.

TABLE 5.3 WP-B1 EMISSION SOURCES

Type of Emission Source	Size
Emergency Standby Diesel Generator	1,500 kW
Four (4) Natural Gas Boilers	5,000 MBH each

5.7.1.1 Methodology

MassDEP requires that a stationary source air quality impact analysis be included as part of the permitting process. Refined dispersion modeling (AERMOD) requires detailed emissions data, information regarding stack and building geometry, meteorological data, and surrounding terrain data. AERMOD[4] is an air dispersion computer program designed to assess emissions generated by stationary sources and takes into consideration the complexities of multiple sources, meteorological data, and varying terrain geometry. AERMOD modeling procedures follow EPA guidance for evaluating stationary source emissions. The use of this model is appropriate for chemically stable, gaseous or fine particulate pollutants, such as CO, NO_2, PM, and SO_2. AERMOD incorporates multiple sources, meteorological data, source emission data, stack and building geometry, and detailed surrounding land use and topography. These data were incorporated into AERMOD to generate concentrations that demonstrate whether or not the Proposed Project would comply with the NAAQS.

Emission Source Data

The manufacturer's specifications for the emergency standby diesel generators and heating boilers typically provide the emission source data. The source data include the type, emission rate, stack height, stack diameter, exit velocity (flow rate), and exit temperature. Typical parameters for the generator and boilers have been assumed for modeling purposes and are presented in Table 5.4 below. As the building design progresses, the air quality modeling would have to be updated with the specific project equipment parameters through the air quality permitting process (Self-Certification, or Environmental Results Program (ERP)). It has been assumed that the emergency generator will have a separate stack, while the four boilers exhaust into one stack. The air quality study evaluated pollution concentrations under worst-case full-load operating conditions for the emergency standby diesel generators and heating boilers.

TABLE 5.4 WP-B1 EMISSION SOURCE DATA

	Proposed 1,500 kW Generator	Four 5,000 MBH Natural Gas Boilers[1]
CO Emission Rate (grams[g]/second[sec])	0.270	0.04536
NOx Emission Rate (g/sec)	0.10548	0.21672
$PM_{2.5}$ Emission Rate (g/sec)	0.0176	0.08316
PM_{10} Emission Rate (g/sec)	0.0176	0.08316
SO_2 Emission Rate (g/sec)	0.002807	0.003721
Stack Height above ground (feet[ft])	529.8 (10 feet above roof)	513.9 (10 feet above roof)
Stack Diameter (inches)	14	42
Exit Velocity (ft/sec)	170	6.9
Exit Temp. (^{0}F)	759	440

Note: These emission parameters are typical parameters.

1 These values represent the total emissions out of the exhaust stack venting the exhaust of all four (4) boilers.

4 AERMOD Dispersion Model, Version 15181.

Background Concentrations

The total concentrations that receptor locations will experience include background concentrations from other surrounding emission sources. Background concentrations are ambient pollution levels from other stationary, mobile, and area sources. EPA maintains an air quality monitoring network and produces annual air quality reports that include monitoring data for CO, NO_2, $PM_{10,}$ $PM_{2.5}$ and SO_2. MassDEP recommends that a background site within 10 kilometers be identified. The closest monitoring site was used for all criteria pollutants. This location was Kenmore Square, Boston, Massachusetts for all pollutants except $PM_{2.5}$ and PM_{10}. Background concentrations for $PM_{2.5}$ were based on the monitoring site at 174 North Street, Boston, Massachusetts and based on the monitoring site at One City Square, Boston for PM_{10}. For background concentrations, MassDEP recommends using the 98th percentile value averaged over three years for 24-hour $PM_{2.5}$, the 98th percentile value averaged over 3 years for 1-hour NO_2, and the 99th percentile value averaged over three years for 1-hour SO_2. For long-term averaging times (annual), the highest annual mean recorded in the three most recent years shall be used for NO_2, while the average of the annual mean recorded in the three most recent years shall be used for $PM_{2.5}$.

The background concentration values of the pollutants modeled in this air quality analysis over the three most recent years are shown in Table 5.5.

TABLE 5.5 WP-B1 BACKGROUND CONCENTRATIONS

Pollutant	Averaging Time	Background Concentration
Carbon Monoxide (CO)	1-Hour[1]	1,514.1 μg/m^3
	8-Hour[1]	1,048.3 μg/m^3
Nitrogen Dioxide (NO_2)	Annual[2]	36.5 μg/m^3
	1-Hour[3]	93.1 μg/m^3
Particulate Matter (PM_{10})	24-Hour[4]	47.7 μg/m^3
Particulate Matter ($PM_{2.5}$)	Annual[5]	8.4 μg/m^3
	24-Hour[6]	18.2 μg/m^3
Sulfur Dioxide (SO_2)	1-Hour[7]	31.0 μg/m^3

1 Reflects the highest second-high value of the three most recent years (2012-2014) from Kenmore Square in Boston.
2 Reflects the highest annual mean value of the three most recent years (2012-2014) from Kenmore Square in Boston.

3 Reflects the average of the 98th percentile values of the three most recent years (2012-2014) from Kenmore Square in Boston.
4 Reflects the average second-high values of the three most recent years (2012-2014) from One City Square in Boston.
5 Reflects the average of the annual mean values of the three most recent years (2012-2014) from 174 North Street in Boston.
6 Reflects the average of the 98th percentile values of the three most recent years (2012-2014) from 174 North Street in Boston.
7 Reflects the average of the 99th percentile values of the three most recent years (2012-2014) from Kenmore Square in Boston.

5.7.1.2 Stationary Source Analysis Results

Using the air dispersion model AERMOD, concentrations for all pollutants at various distances away from the stack were calculated to ensure that the highest concentrations were identified and the potential WP-B1 emission sources would not cause harm to public health and the environment. Aerial and elevation data obtained from the United States Geological Survey (USGS) and Google Earth™ were used to identify the elevations and distances to the receptor locations.

The air quality analysis calculated the worst-case concentrations of the five (5) criteria pollutants (CO, NO_2, $PM_{2.5}$, PM_{10}, and SO_2), associated with the operation of the emergency standby diesel generator and boilers operating at full load conditions. The worst-case concentrations from the "project impacts" determined through the AERMOD analysis were added to the background concentrations and compared to the NAAQS. Table 5.6 summarizes the existing ambient background concentrations, project impacts, and total concentrations.

TABLE 5.6 WP-B1 TOTAL POLLUTANT CONCENTRATIONS

Pollutant	Averaging Time	Background Concentrations ($\mu g/m^3$)	Project Impacts[1] ($\mu g/m^3$)	Total Concentrations[2] ($\mu g/m^3$)	Criteria: NAAQS ($\mu g/m^3$)
Carbon Monoxide[3] (CO)	1-Hour	1,514.10	7.70	1,521.80	40,000
	8-Hour	1,048.30	5.74	1,054.04	10,000
Nitrogen Dioxide[3] (NO_2)	Annual	36.50	0.88	37.38	100
	1-Hour	93.10	12.29	105.39	189
Particulate Matter[4] (PM_{10})	24-Hour	47.67	2.19	49.86	150
Particulate Matter[5] ($PM_{2.5}$)	Annual	8.40	0.37	8.77	12
	24-Hour	18.20	1.72	19.92	35
Sulfur Dioxide[3] (SO_2)	1-Hour	31.00	0.30	31.30	196

1 Project Impacts represent the maximum concentrations from all of the Phase 1 West Parcel B1 Government Center emission sources.
2 Total Concentrations represent the total of the background concentration and project impacts.
3 Background concentrations based on data from Kenmore Square station in Boston
4 Background concentrations based on data from One City Square station in Boston.
5 Background concentrations based on data from 174 North Street station in Boston.

Carbon Monoxide

The air quality analysis calculated the worst-case 1-hour and 8-hour CO concentrations for the emergency standby diesel generator and boilers at full load operation including ambient background concentrations. As summarized in Table 5-6, the highest 1-hour CO concentration is 1,521.80 μg/m3, while the highest 8 hour CO concentration is 1,054.04 μg/m3. These values comply with and are well under the NAAQS of 40,000 μg/m3 and 10,000 μg/m3, respectively.

Nitrogen Dioxide

Modeling full load operation of the emergency standby diesel generator and boilers resulted in a maximum annual NO2 concentration of 37.38 μg/m3 and 1-hour concentrations of 105.39 μg/m3. All predicted NO2 concentrations comply with the NAAQS of 100 μg/m3 and 189 μg/m3, respectively. The NO2 results are presented in Table 5.6 above.

Particulate Matter 2.5

The air quality analysis calculated the worst case annual and 24-hour $PM_{2.5}$ concentrations for the emergency standby diesel generator and boilers at full load operation. The highest annual $PM_{2.5}$ concentration is 8.77 μg/m^3, while the highest 24-hour $PM_{2.5}$ concentration is 19.92 μg/m^3. The annual and 24-hour value $PM_{2.5}$ complies with the NAAQS of 12 μg/m^3 and 35 μg/m^3, respectively. The $PM_{2.5}$ results are presented in Table 5.6 above.

Particulate Matter 10

The air quality analysis calculated the worst case 24-hour PM_{10} concentrations for the emergency standby diesel generator and boilers at full load operation. The highest 24-hour PM_{10} concentration is 49.86 μg/m^3, which complies with the NAAQS of 150 μg/m^3. The PM_{10} results are presented in Table 5.6 above.

Sulfur Dioxide

The air quality analysis calculated the worst case 1-hour SO_2 concentrations for the emergency standby diesel generator and boilers at full load operation. For SO2, the highest 1-hour concentration is 31.30 μg/m^3, which complies with the NAAQS of 196 μg/m^3. The SO_2 results are presented in Table 5.6 above.

5.7.1.3 Conclusion

The results of the stationary source air quality modeling demonstrate that all of the modeled CO, NO_2, PM and SO_2 concentrations for the full load operating conditions comply with the NAAQS. The results demonstrate that operating the emission sources (emergency standby diesel generator and boilers) will not cause or contribute to violations of the NAAQS. The analysis was conducted using typical emission parameters for the equipment currently planned. A detailed analysis with the chosen final equipment will be required to show compliance with the NAAQS for the MassDEP ERP program.

5.8 Construction Management Plan

Construction-related impacts associated with the Proposed Project construction activities are temporary in nature and typically related to truck traffic, air (dust), noise, stormwater runoff, solid waste and vibration. All temporary construction-period impacts associated with WP-B1 will be managed to minimize disruption to the surrounding neighborhood. The following section generally describes the potential construction-period impacts and proposed Construction Management Plan (CMP) elements. Figure 5.7 illustrates the proposed construction logistics plan.

As the design of WP-B1 progresses, the Construction Manager (CM) will refine and expand the CMP to address sub-phases and reflect the input of the regulatory authorities having jurisdiction over construction management plans, including the Boston Fire Department (BFD) and BTD.

5.8.1 Scope of Work/Construction Timing and Sequencing

As described in Chapter 1, *Project Description*, the Proposed Project includes construction of a new residential building and demolition of a portion of the Garage in the southwest corner for the new work. The total construction duration is anticipated to be approximately 38 months.

Demolition will be completed utilizing cranes to remove the precast concrete structure. Precast concrete tee sections of the Garage will be removed one piece at a time from the top to the bottom. Demolition of the existing office floors will be completed with small equipment and the demolition material removed from the roof utilizing scale pans and cranes. The cast in place concrete elements of the Garage will be processed with hydraulic excavators. The new residential building will be erected with a tower crane where assist cranes will be required at periodic times. The construction area work zone will be confined by jersey barriers and fencing.

Typical hours of construction are from 7:00 AM to 6:00 PM, Monday through Friday. It is anticipated that some shift work may be required. But no significant noise generating activity will occur prior to 7AM. There may be occasions where work on selected Saturdays or Sundays is necessary. These specific instances will be identified and necessary permits will be obtained from the City of Boston, and adequate notice will be provided to abutters in the vicinity of the Proposed Project site.

5.8.2 Site Preparation and Staging

Construction site access will be from New Sudbury Street. The existing Garage exit onto New Sudbury Street will be relocated to the existing entrance. The existing Garage entrance controls will be reconfigured and will serve as the parking Garage entrance and exit on to New Sudbury Street until the new exit is constructed. The existing New Chardon Street Garage entrance and exit will remain operational at all times.

The construction area work zone will be confined by jersey barriers and fencing along New Sudbury Street. The construction site fenced area will include the existing BPD parking area and adjacent travel lane on New Sudbury Street. Truck track mat will be utilized during below-grade construction. Crane picks will be made from New Sudbury Street within the fenced in area (Figure 5.7).

Prior to the start of construction, existing utilities will be surveyed and mapped. No excavations will be performed until Dig Safe has been notified, and utilities marked. Existing public and private infrastructure located within the public right-of-way will be protection during construction. The installation of proposed utilities within the public way will be in accordance with the MWRA, BWSC, Boston Public Works, Dig Safe and the governing utility company requirements, as applicable. All necessary permits will be obtained before the commencement of the specific utility installation. Specific methods for constructing proposed utilities will be reviewed by BWSC as part of its Site Plan Review process.

5.8.3 Pedestrian Safety and Access

Public safety is the primary consideration in all our construction planning and building processes. Specific pedestrian crosswalks and re-routing measures will be taken to allow for adequate egress around the active construction zones.

The sidewalk along the north side of New Sudbury Street will be closed during construction. The pedestrian stairs connecting New Sudbury Street to Bowker Street will also be closed temporarily to protect pedestrians from WP-B1 construction activities and during construction of the enhancements proposed as part of the Bowker Street Pedestrian Connection (as described in Section 3.6.3 of Chapter 3, *Urban Design*). Pedestrians will be re-routed the south side of New Sudbury Street at the intersection of Congress Street and Cambridge Street. Temporary fencing will be installed for protection and access walkway overhead protection and routes will be secured by barriers.

As shown on Figure 5.7, the WP-B1 construction zone is located on the west side of Congress Street and, therefore, no impacts to the MBTA existing operations at Haymarket Station are expected.

5.8.4 Construction Traffic and Parking

Truck Routes have been developed for Proposed Project. Refer to Figure 5.8 for the proposed truck routes. The Truck Delivery Routes will occur within the designated construction zone (Figure 5.7). Site fencing will be erected in accordance with sidewalk and road closure permits. Best efforts will be made to schedule major deliveries on non-peak traffic hours. Signage will be prevalent throughout the Proposed Project Site and surrounding streets informing vehicular and construction truck traffic alike of detours.

It is the intent of the Proponent to minimize the impact on traffic and parking in the PDA Site area. No on-site construction parking will be made available to subcontractors and all trade workers will be encouraged to utilize readily accessible MBTA services. If workers cannot take advantage of existing public transportation services, they will be encouraged to park in local, off-street private parking lots.

5.8.4.1 Truck Traffic Management

Arrivals

From the South and West, construction vehicles will travel on I-93 North and take Exit 23 – Aquarium (toward Quincy Market), merge onto North Street, and take a right onto Congress Street. From there, they will pass under the Garage and take a left onto New Chardon Street, then a left onto Cambridge Street, and, finally, a left onto New Sudbury Street.

From the North, construction vehicles will take I-93 Exit 24A - Government Center, then a slight right on Clinton Street and left onto North Street. From there, they will take a right onto Congress Street, a left onto New Chardon Street, then a left onto Cambridge Street, and, finally, a left onto New Sudbury Street.

Departures

To go north, construction vehicles will continue on New Sudbury Street and take left onto I-93 North ramp.

To go south, construction vehicles will take a left onto Congress and a take a right onto New Chardon Street and take I-93 South ramp.

Surrounding Local Streets

Access to the WP-B1 construction site will be located on New Sudbury Street (Figure 5.7). A detailed CMP and Traffic Control Plan will be developed. As described in Chapter 4, *Transportation and Parking*, it is anticipated that the existing BPD parking lane and one travel lane on New Sudbury will be utilized for vehicle and site access. No other impacts to surrounding streets are anticipated for construction of WP-B1.

5.8.5 Air Quality/Dust

Overall, air quality in the vicinity of the Proposed Project Site is not expected to be substantially affected by construction of WP-B1 because of emission control procedures and the temporary nature of construction activities. Emissions from the operation of construction machinery (i.e., CO, nitrogen oxides [NOx], PM, volatile organic compounds [VOCs], and GHGs) are short-term and not generally considered substantial.

During construction, emission controls for construction vehicle emissions will be employed, including, as appropriate, proper maintenance of all motor vehicles, machinery, and equipment associated with construction activities (i.e., the maintenance of manufacture's muffler equipment or other regulatory-required emissions control devices). The state's anti-idling law will be enforced during construction of the Proposed Project with the installation of on-site anti-idling signage at loading and drop-off/pick-up/waiting areas. In addition, the Proponent is committed to meeting the requirements the DEP State Revolving Fund (SRF) for diesel construction equipment. These require that all non-road diesel equipment rated 50 horsepower or greater that will be used on a project site meet EPA's Tier 4 emission limits or be retrofitted with appropriate emission reduction equipment. Emission reduction equipment includes EPA-verified, CARB-verified or DEP-approved diesel oxidation catalysts or diesel particulate filters.

The construction air quality will be mostly influenced by the control of fugitive dust and construction vehicle/equipment emissions. Proposed air quality control measures include:

- Eliminate idling of construction vehicles to reduce exhaust emissions,
- Utilize appropriate mufflers on construction vehicles and insure that they are functioning properly,
- Utilize electric powered tower cranes
- Utilize electric welding equipment in lieu of gas-fired equipment,
- Contain construction operations, such as sprayed on fireproofing, to eliminate migration of dust.

The CMP will include methods to mitigate the fugitive dust and soils that will be generated during the course of construction. Mitigation measures to reduce fugitive dust will include:

- Dust will be primarily controlled by means of hosing down with water employed during the demolition and foundation phases.
- Utilize wetting agents where hosing down with water is not practical.
- Provision of mechanical street sweeping during the performance of the building and utility and excavation/backfill work.

- Make every effort to insure that trucks removing materials from the construction site will be free of mud and debris from their tires, prior to departure through use of rumble plates/wheel-wash station as appropriate.
- Trucks leaving the construction site with construction debris or soils will be fully covered.

5.8.6 Construction Noise

Every reasonable effort will be made to minimize the noise impact of the construction activities. Mitigation measures will include:

- No equipment start-up prior to 7:00 AM.
- Eliminate idling of construction vehicles.
- Utilize appropriate mufflers on all equipment and perform on-going maintenance to assure that intake and exhaust are functioning properly.
- Locate noisy equipment as far as possible from sensitive areas.
- Shield or encapsulate noisy equipment as practicable.

5.8.7 Stormwater Runoff/Erosion Control

While a federal National Pollutant Discharge Elimination System (NPDES) General Construction Permit is not required because construction of WP-B1 is not anticipated to disturb over an acre of land, the CM will be required to take measures to prevent erosion and to control sediments during the construction phase. These measures will likely include perimeter silt fence/straw barrier protection, dust control, and drain inlet protection. Any construction dewatering discharges will be appropriately controlled and discharged in accordance with the NPDES state and local dewatering standards. An overall site-specific Storm Water Pollution Prevention Plan (SWPPP) will be developed in accordance with local (BWSC) regulatory agency requirements. If the scope changes, the Proponent will review the federal NPDES requirements.

5.8.8 Construction Waste Management

The CM will take an active role in regard to the processing and recycling of construction waste and will have in-place a Construction Waste Management Plan (CWMP) for the Proposed Project. The CWMP will require the CM to contract with a licensed waste hauler that has off-site sorting capabilities. All construction debris will be taken off-site by the waste hauler, sorted as either recycled debris or waste debris and sent to the proper recycling center or waste facility. Construction debris shall be wetted and covered to minimize air born dust particles. Prior to construction, in accordance with the LEED goals established (discussed in Chapter 6, *Sustainability/Green Building and Climate Change Preparedness*). Where possible, construction and demolition debris will be diverted away from landfills and incineration facilities, and will be sought to reuse materials.

Asbestos containing material (ACM) is not expected to have been used in the Garage; however, if ACM is encountered during demolition of any portion of the existing Garage structure it will be handled appropriately, and in accordance with state and local regulations. The Proponent is aware of the U.S. EPA Remediation General Permit program and, if applicable, will apply for permit coverage.

5.8.9 Hazardous Materials

Scope of work includes demolition of a portion of the Garage in the southwest corner. While no hazardous materials are anticipated to be encountered during demolition, the CM will secure appropriate permits for chemical cleaning and/or abrasive blasting, if required.

5.8.10 Odor and Rodent Control

A formal Certified Pest Control Plan will be implemented in accordance with the City's requirements. Other than potential emissions from construction equipment, additional odor issues are not anticipated during construction.

5.8.11 Vibration

Prior to and during construction, the Proponent will implement a monitoring program to document pre-construction conditions, and to detect construction effects on adjacent structures, if any. Acceptable vibration criteria will be established prior to demolition/construction, and vibration will be monitored to ensure compliance with the agreed-upon standard. The program will identify adjacent buildings most likely to be impacted by the proposed construction and include conducting preconstruction condition surveys of these adjacent structures. In addition the program will incorporate an instrumentation program which would include:

- Elevation reference points on adjacent buildings and structures.
- Monitoring gages on cracks that may be identified in adjacent building.
- Survey points to monitor lateral deflection of the excavation support system.
- Vibration monitoring during vibration generating activities such as Garage demolition.

5.8.12 Coordination with Abutters/Community and Other Projects

The CM will participate in keeping neighborhood associations aware of provide schedule impact updates to keep surrounding communities appropriately informed up upcoming work activity.

There are likely to be several other development projects in the areas adjacent to the Proposed Project Site. The Proponent is committed to participating in coordinated construction management planning efforts that may be sponsored by the City and/or groups, such as the Downtown North Association and A Better City.

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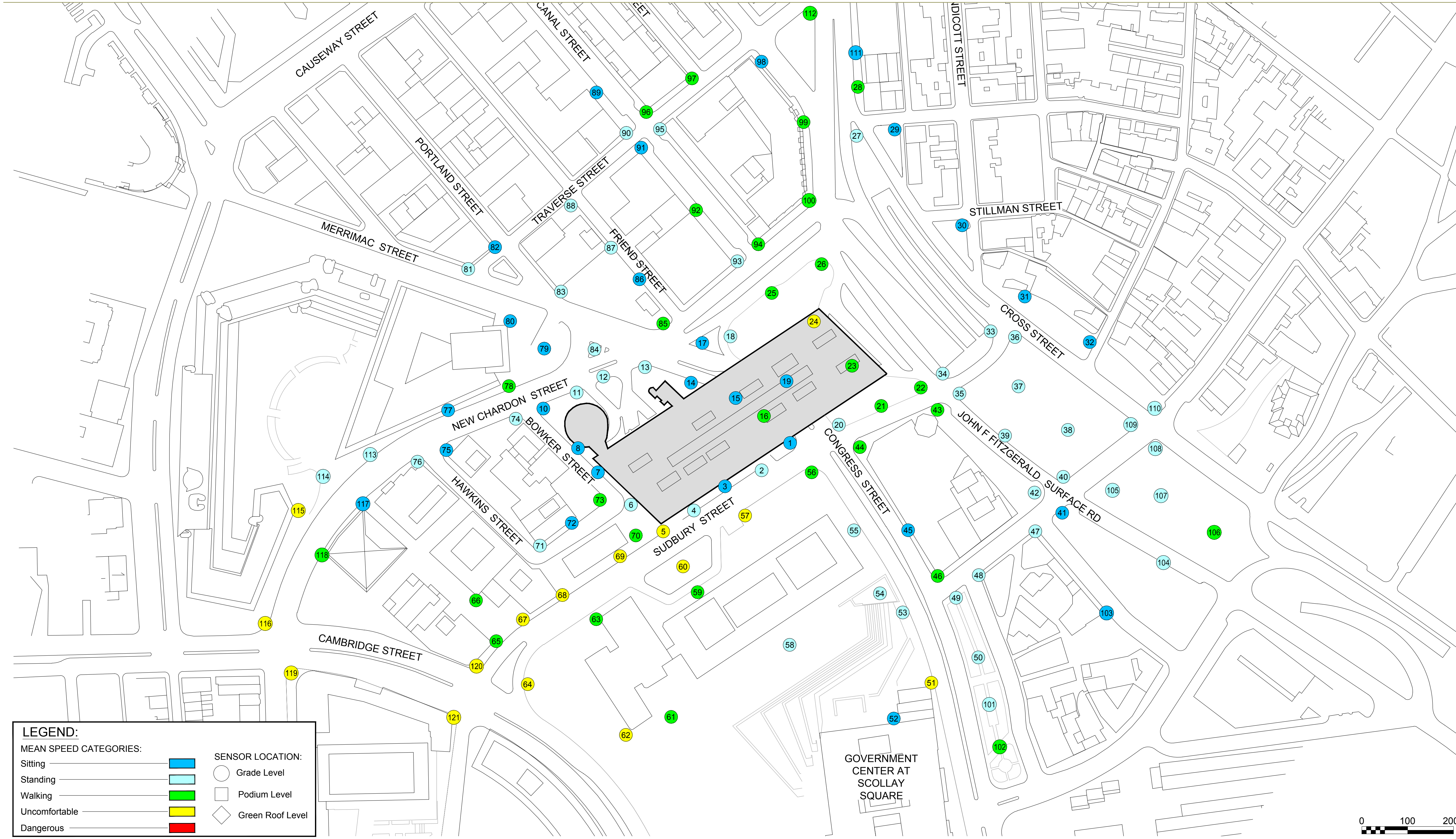

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Figure 5.1a

No-Build Pedestrian Wind Conditions

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

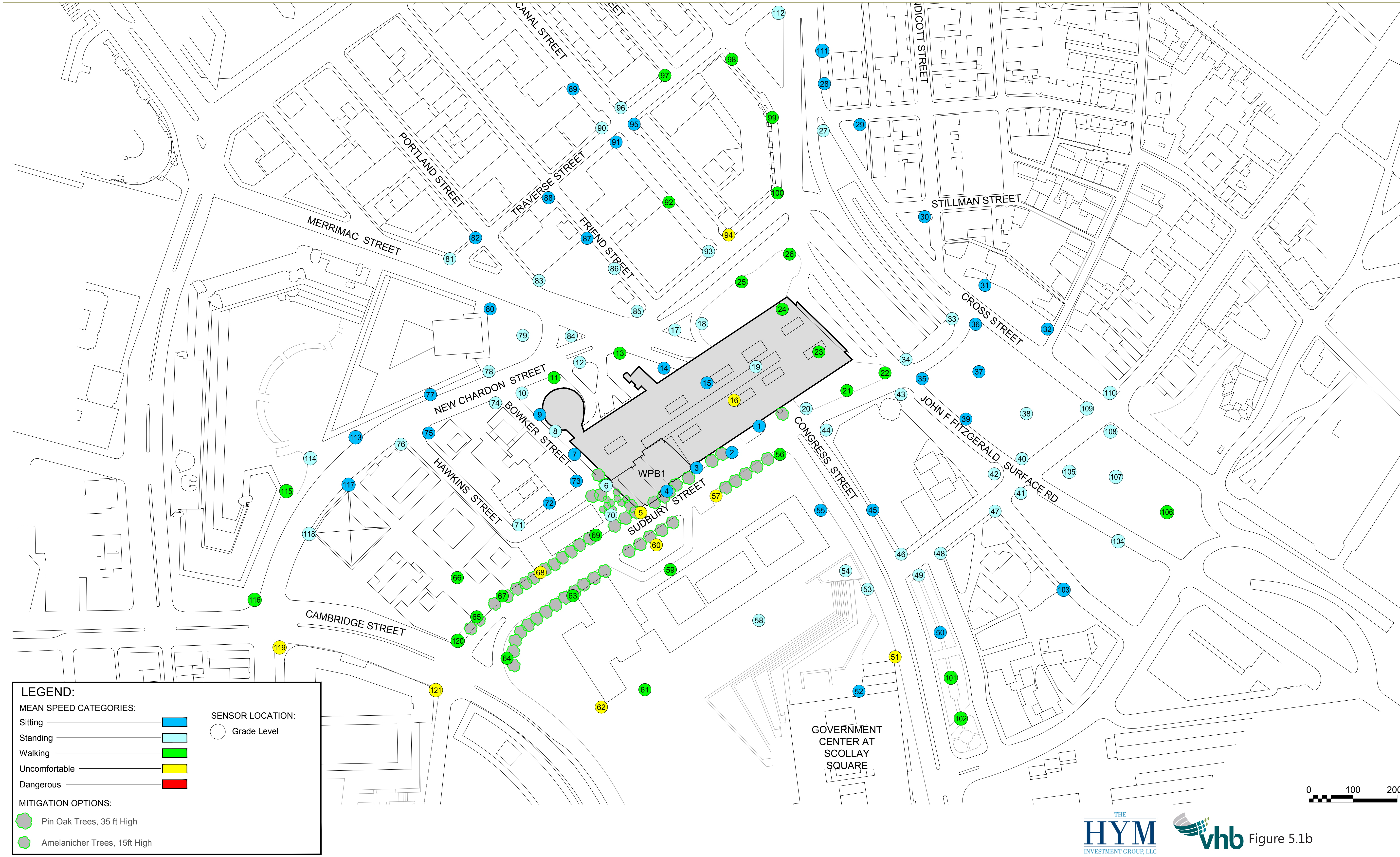

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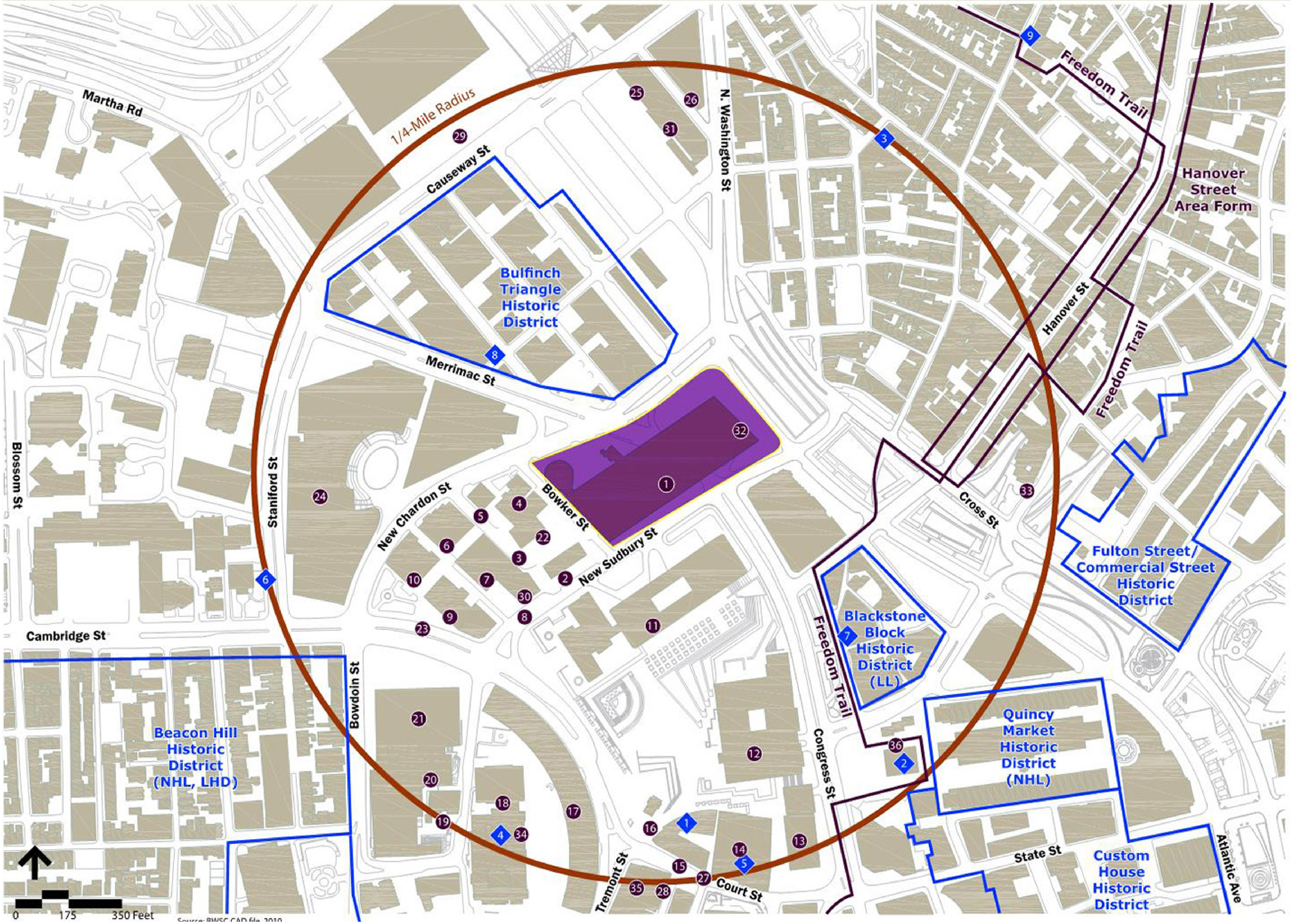
Figure 5.1b

WP-B1 Build Pedestrian Wind Conditions

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



NET NEW SHADOW (STREET LEVEL)

NET NEW SHADOW (ROOF TOP)

NET NEW SHADOW (FACADE)

PUBLIC OPEN/GREEN SPACE

SHADOW IMPROVEMENT COMPARED TO DPIR

DPIR MASSING

National Register Individually Listed Properties

1. Sears Crescent and Block
2. Faneuil Hall (NHL, PR, LL)
3. Vermont Building
4. John Adams Courthouse
5. Ames Building (LL)
6. Old West Church (NHL, PR)
7. Union Oyster House (NHL, LL)
8. 138-142 Portland Street
9. The Old North Church

MHC Individually Inventoried Properties

1. Government Center Parking Garage
2. District 1 Police Station
3. Boston Edison Substation
4. Overseers of the Public Welfare Building
5. O'Neal Building (Jewish Family and Children's Services)
6. Royal Globe Insurance Company
7. R.K.O. General Building
8. One Bulfinch Place
9. New England Telephone and Telegraph
10. Bulfinch Building
11. JFK Federal Building
12. Boston City Hall
13. New England Merchants National Bank
14. One Washington Mall
15. City Bank and Trust Building
16. Government Center MBTA Station
17. One, Two and Three Center Plaza
18. Suffolk County Courthouse Addition
19. Metropolitan District Commission Building
20. McCormack Office Building
21. Leverett Saltonstall Building
22. Temporary Home for Women
23. Bowdoin Street MBTA Station
24. Lindemann Mental Health Center
25. Dow Braman and Company Building
26. Keaney Square Building
27. Old Colony Trust Building
28. United States Trust Company Building
29. North Station MBTA Substation and Signal Tower
30. Capital Bank Building
31. 6-24 Medford Street
32. Haymarket MBTA Station
33. Traffic Tunnel Administration Building
34. Rufus Choate Statue
35. Hemenway Building
36. Faneuil Hall Greenhouses

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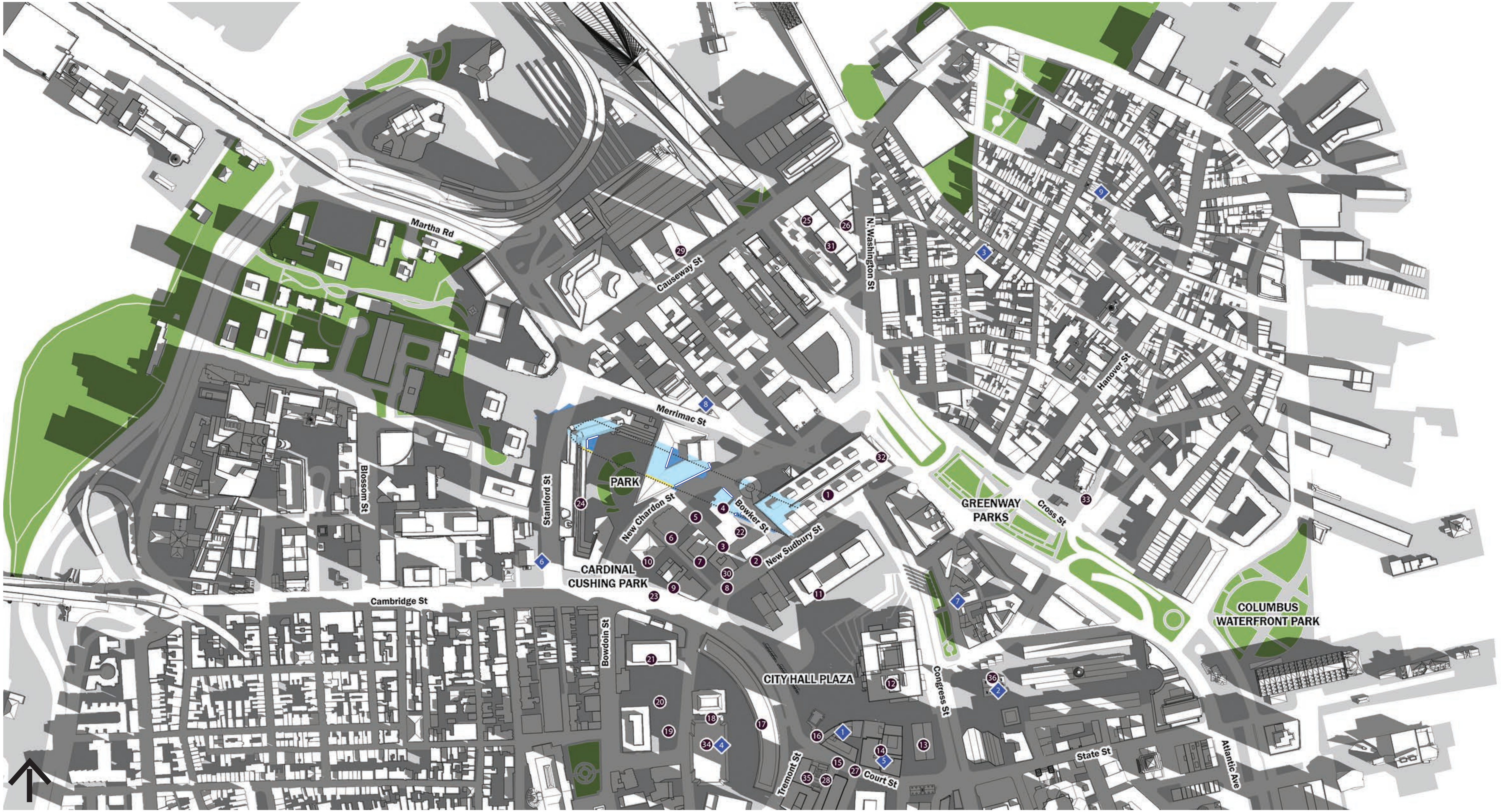
Figure 5.2

WP-B1 Shadow Impacts
Historic Sites - Key Map

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



NET NEW SHADOW (STREET LEVEL)
NET NEW SHADOW (ROOF TOP)
NET NEW SHADOW (FACADE)
PUBLIC OPEN/GREEN SPACE
SHADOW IMPROVEMENT COMPARED TO DPIR
DPIR MASSING

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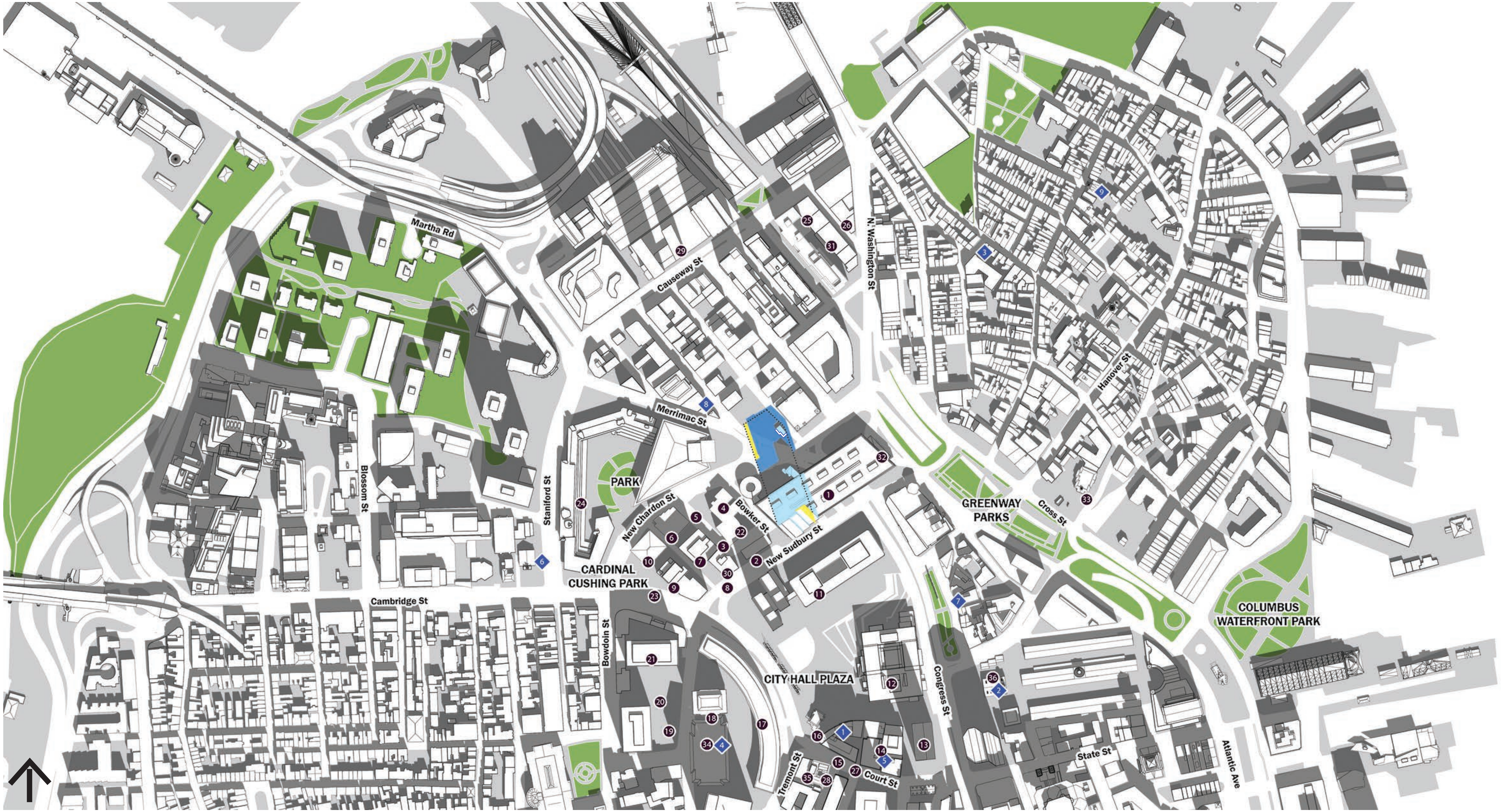
Figure 5.2a

WP-B1 Shadow Impacts
March 21 9AM

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



NET NEW SHADOW (STREET LEVEL)
NET NEW SHADOW (ROOF TOP)
NET NEW SHADOW (FACADE)
PUBLIC OPEN/GREEN SPACE
SHADOW IMPROVEMENT COMPARED TO DPIR
DPIR MASSING

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Figure 5.2b
WP-B1 Shadow Impacts
March 21 12PM

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

NET NEW SHADOW (STREET LEVEL)

NET NEW SHADOW (ROOF TOP)

NET NEW SHADOW (FACADE)

PUBLIC OPEN/GREEN SPACE

SHADOW IMPROVEMENT COMPARED TO DPIR

DPIR MASSING

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Figure 5.2c

WP-B1 Shadow Impacts
March 21 3PM

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

NET NEW SHADOW (STREET LEVEL)
NET NEW SHADOW (ROOF TOP)
NET NEW SHADOW (FACADE)
PUBLIC OPEN/GREEN SPACE
SHADOW IMPROVEMENT COMPARED TO DPIR
DPIR MASSING

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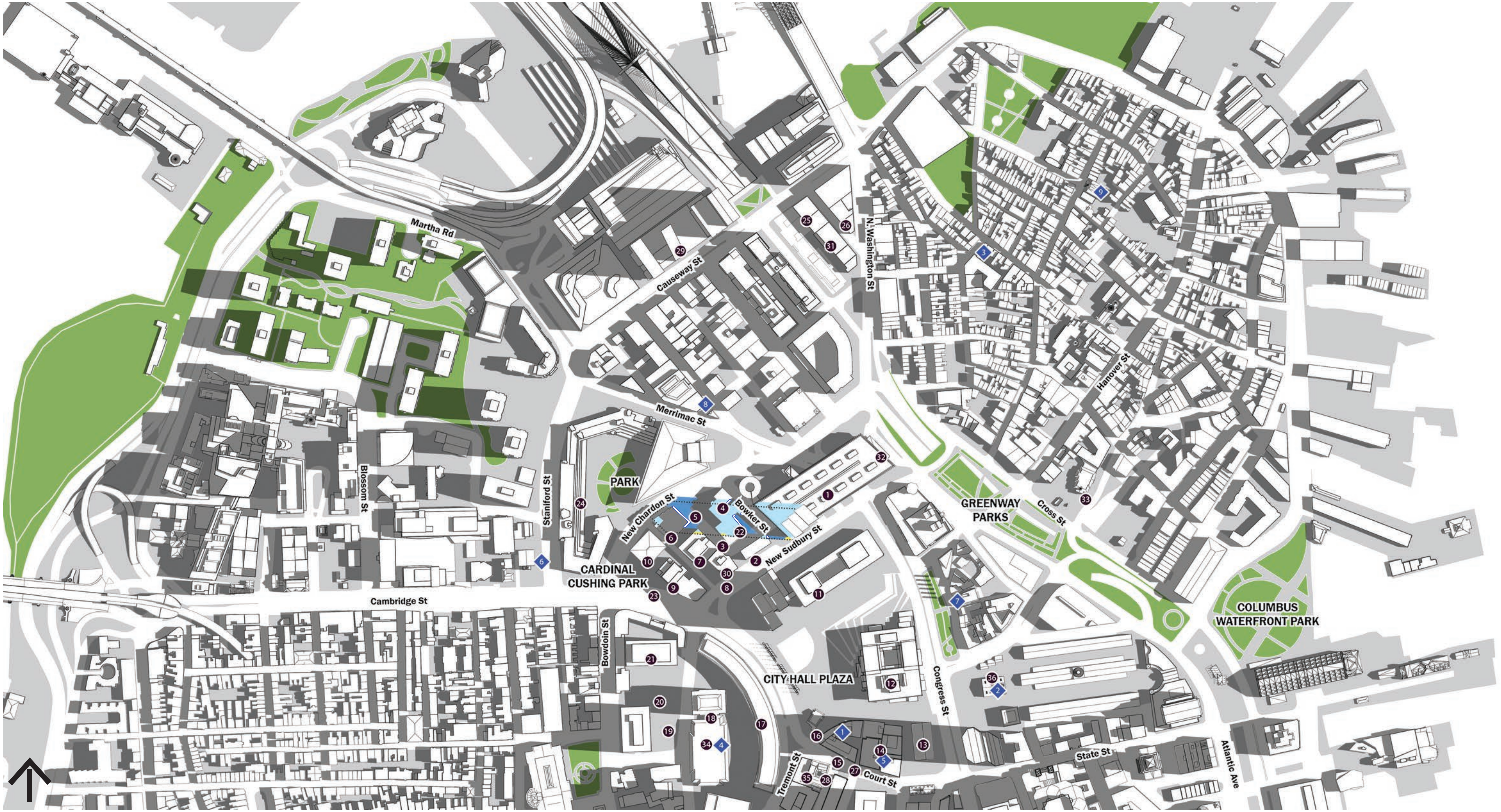
Figure 5.2d

WP-B1 Shadow Impacts
March 21 6PM

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

Source Info



NET NEW SHADOW (STREET LEVEL)

NET NEW SHADOW (ROOF TOP)

NET NEW SHADOW (FACADE)

PUBLIC OPEN/GREEN SPACE

SHADOW IMPROVEMENT COMPARED TO DPIR

DPIR MASSING

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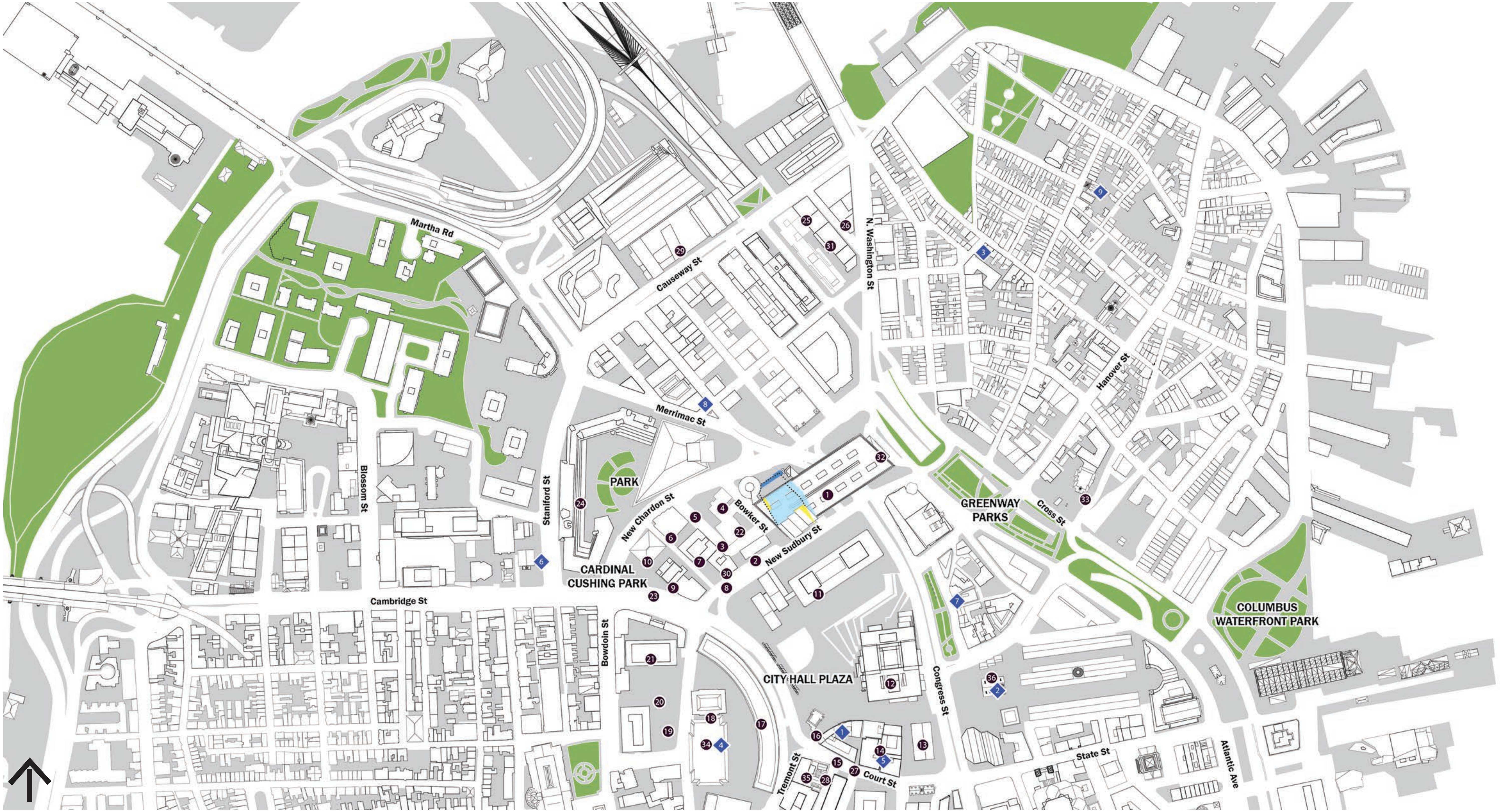
Figure 5.3a

WP-B1 Shadow Impacts
June 21 9AM

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



NET NEW SHADOW (STREET LEVEL)

NET NEW SHADOW (ROOF TOP)

NET NEW SHADOW (FACADE)

PUBLIC OPEN/GREEN SPACE

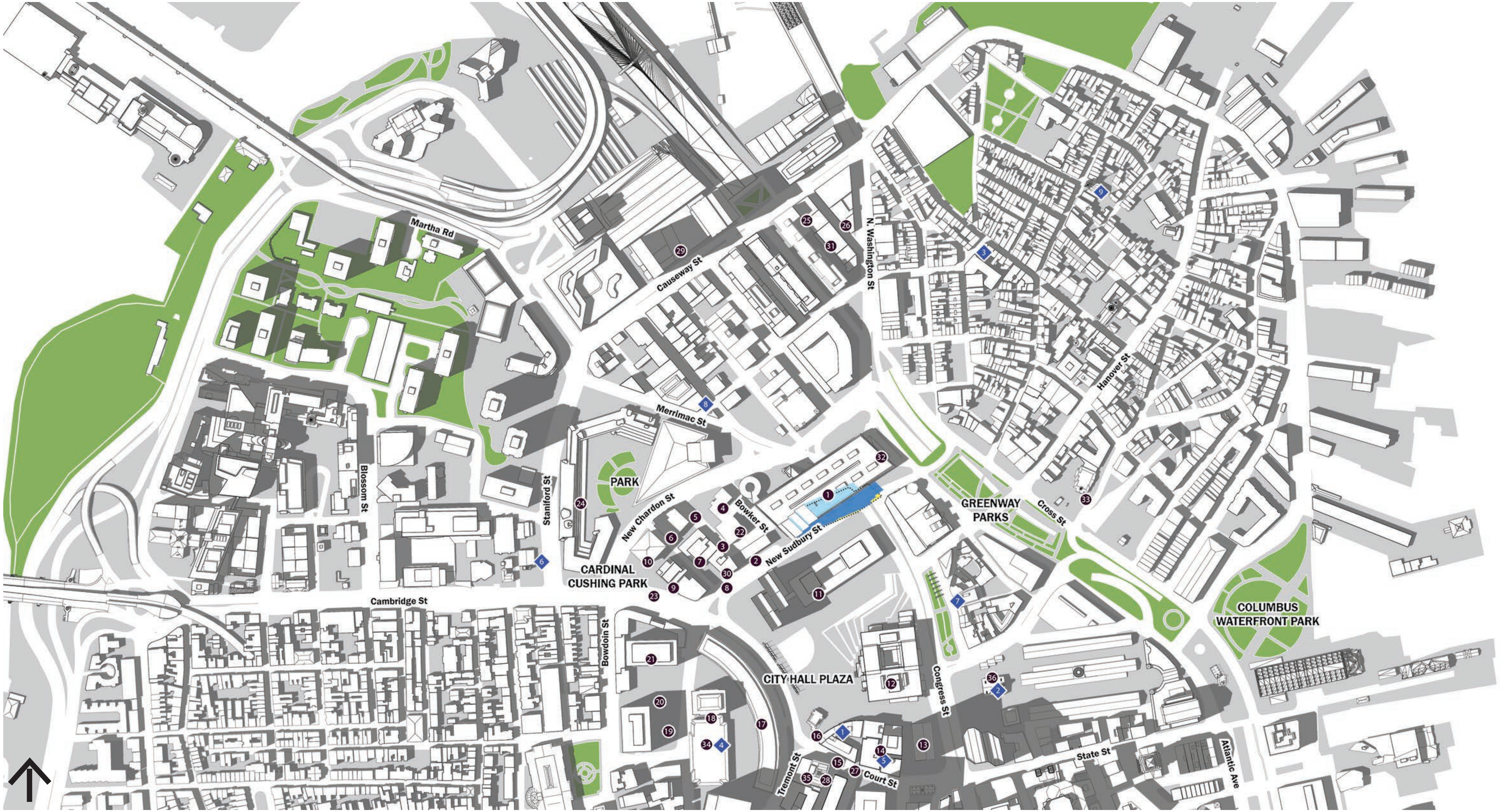
SHADOW IMPROVEMENT COMPARED TO DPIR

DPIR MASSING

Figure 5.3b

WP-B1 Shadow Impacts
June 21 12PM

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



NET NEW SHADOW (STREET LEVEL)

NET NEW SHADOW (ROOF TOP)

NET NEW SHADOW (FACADE)

PUBLIC OPEN/GREEN SPACE

SHADOW IMPROVEMENT COMPARED TO DPIR

DPIR MASSING

THE HYM INVESTMENT GROUP, LLC

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Figure 5.3c

WP-B1 Shadow Impacts
June 21 3PM

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

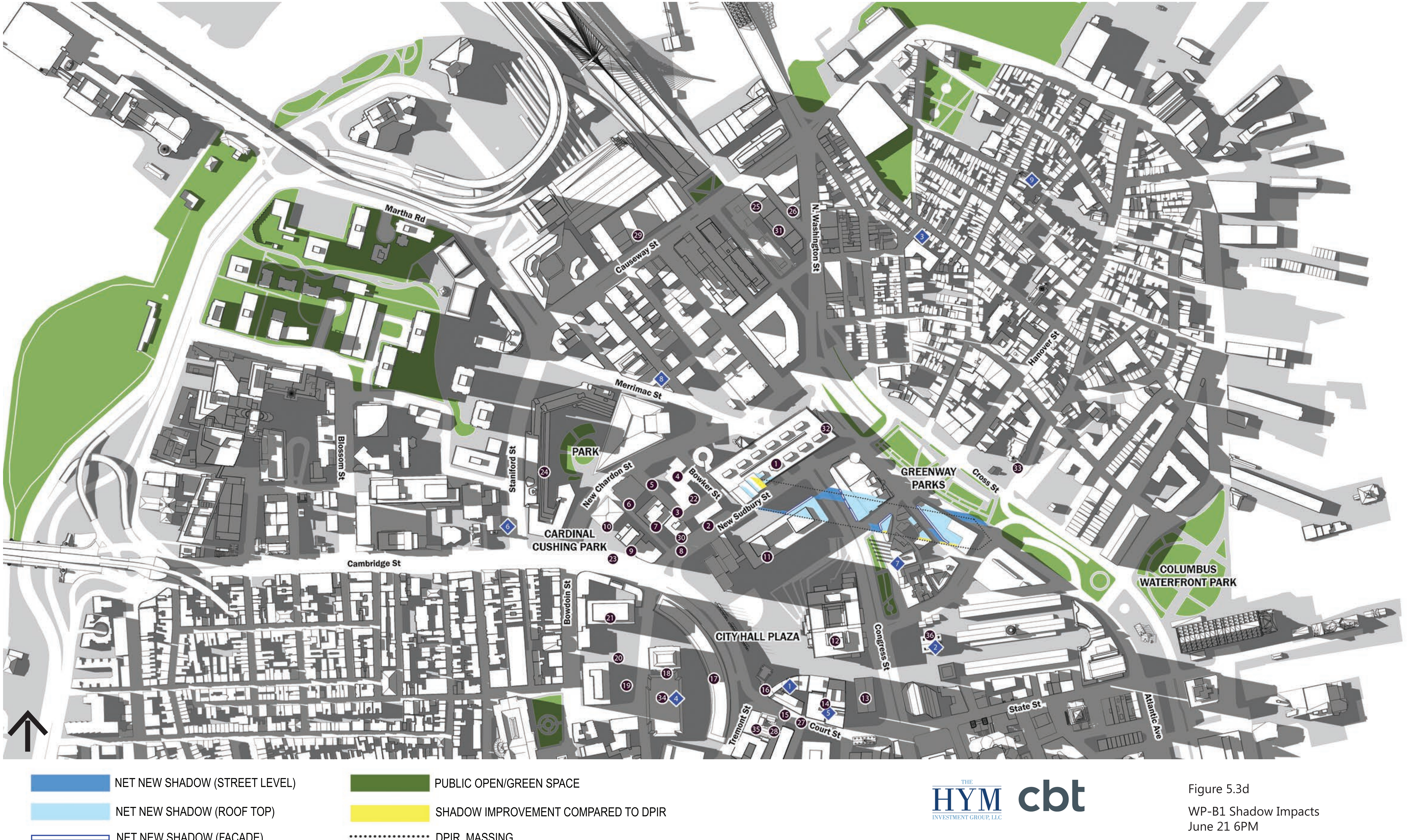

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Figure 5.3d

WP-B1 Shadow Impacts
June 21 6PM

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

NET NEW SHADOW (STREET LEVEL)

NET NEW SHADOW (ROOF TOP)

NET NEW SHADOW (FACADE)

PUBLIC OPEN/GREEN SPACE

SHADOW IMPROVEMENT COMPARED TO DPIR

DPIR MASSING

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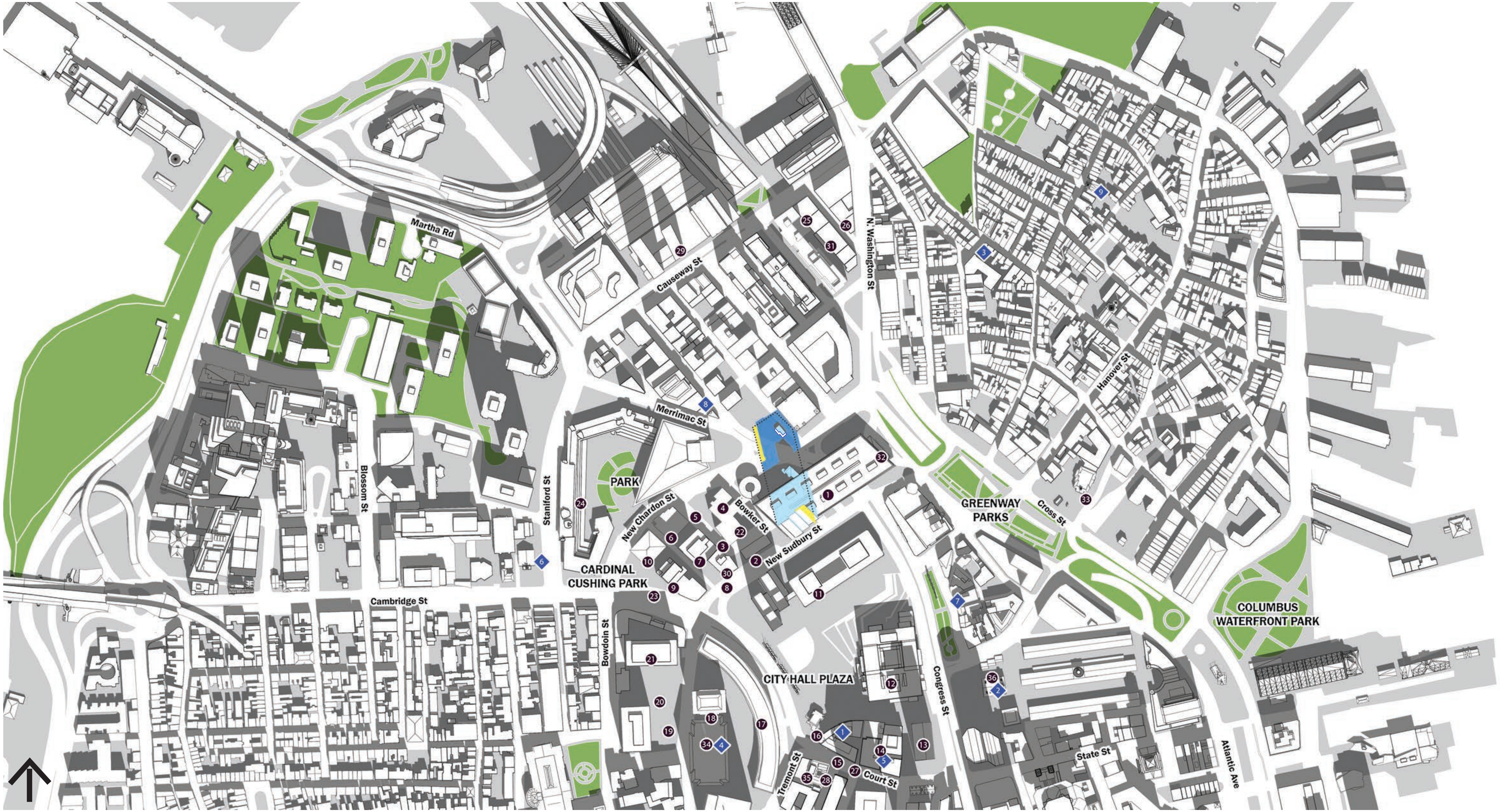
Figure 5.4a

WP-B1 Shadow Impacts
September 21 9AM

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



NET NEW SHADOW (STREET LEVEL)

NET NEW SHADOW (ROOF TOP)

NET NEW SHADOW (FACADE)

PUBLIC OPEN/GREEN SPACE

SHADOW IMPROVEMENT COMPARED TO DPIR

DPIR MASSING

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Figure 5.4b

WP-B1 Shadow Impacts
September 21 12PM

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

NET NEW SHADOW (STREET LEVEL)

NET NEW SHADOW (ROOF TOP)

NET NEW SHADOW (FACADE)

PUBLIC OPEN/GREEN SPACE

SHADOW IMPROVEMENT COMPARED TO DPIR

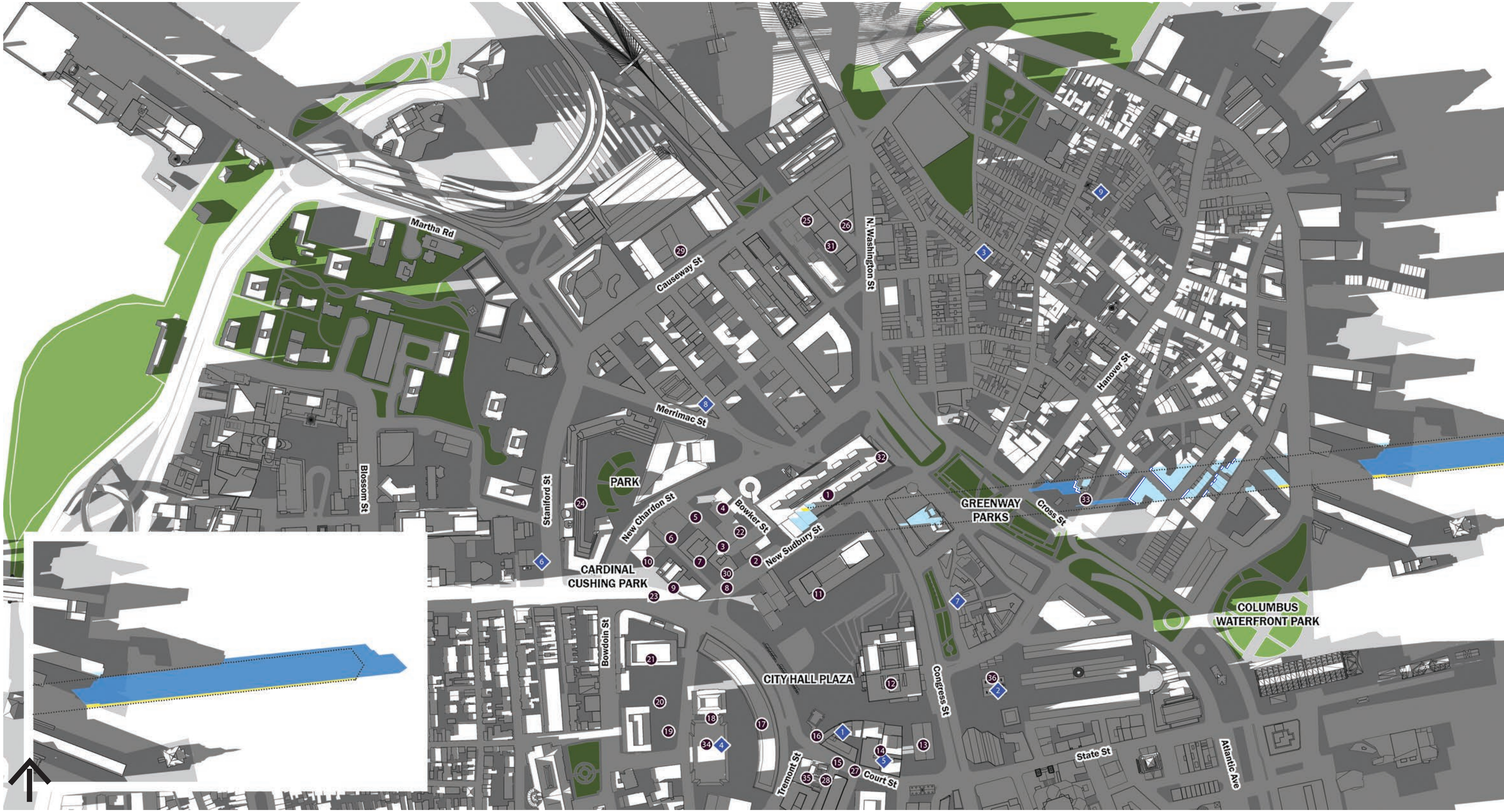
DPIR MASSING

THE HYM INVESTMENT GROUP, LLC cbt

Figure 5.4c

WP-B1 Shadow Impacts
September 21 3PM

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



NET NEW SHADOW (STREET LEVEL)

NET NEW SHADOW (ROOF TOP)

NET NEW SHADOW (FACADE)

PUBLIC OPEN/GREEN SPACE

SHADOW IMPROVEMENT COMPARED TO DPIR

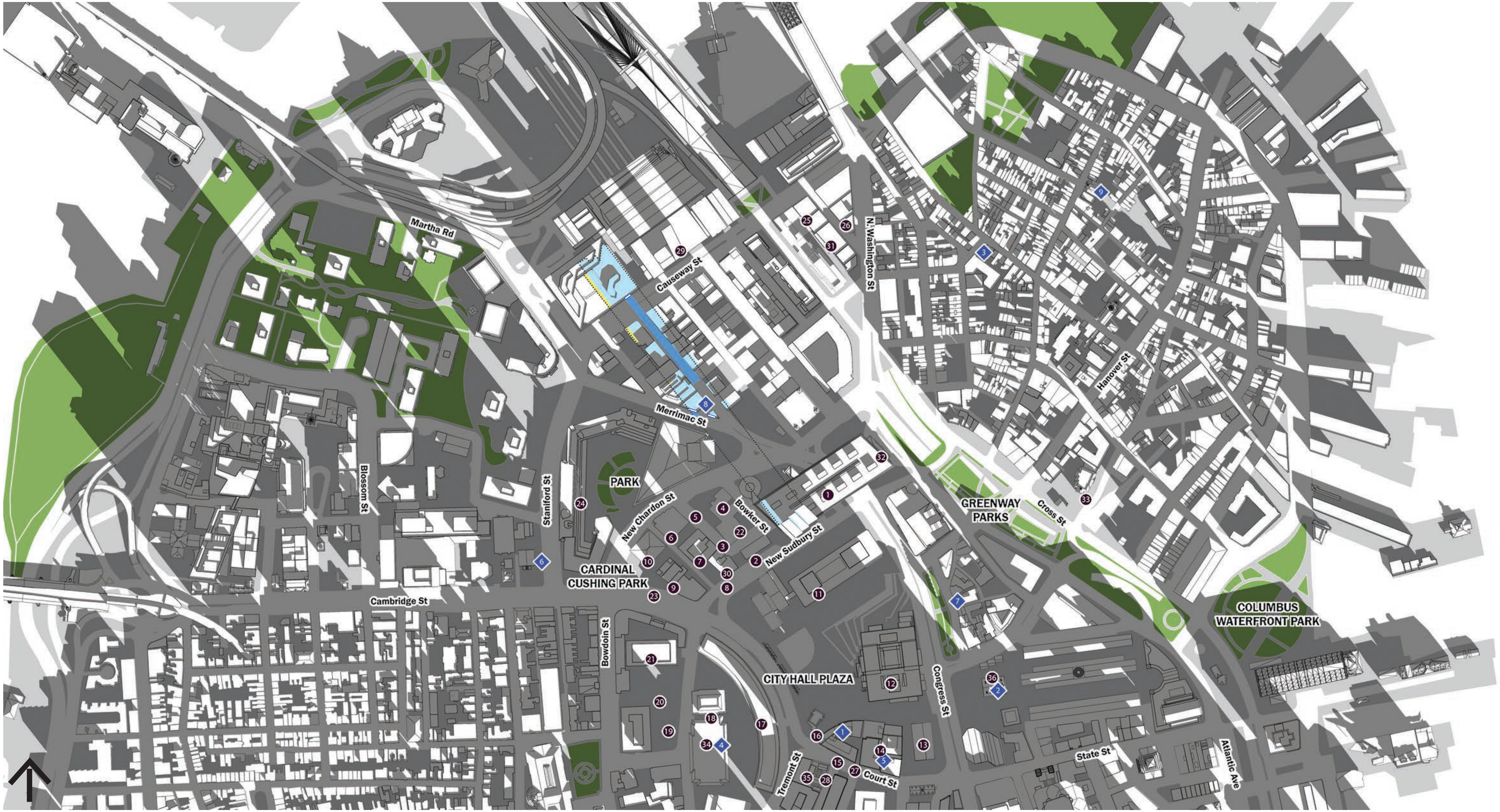
DPIR MASSING

THE HYM INVESTMENT GROUP, LLC cbt

Figure 5.4d

WP-B1 Shadow Impacts
September 21 6PM

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



NET NEW SHADOW (STREET LEVEL)
NET NEW SHADOW (ROOF TOP)
NET NEW SHADOW (FACADE)
PUBLIC OPEN/GREEN SPACE
SHADOW IMPROVEMENT COMPARED TO DPIR
DPIR MASSING

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Figure 5.5a

WP-B1 Shadow Impacts
December 21 9AM

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

NET NEW SHADOW (STREET LEVEL)

NET NEW SHADOW (ROOF TOP)

NET NEW SHADOW (FACADE)

PUBLIC OPEN/GREEN SPACE

SHADOW IMPROVEMENT COMPARED TO DPIR

DPIR MASSING

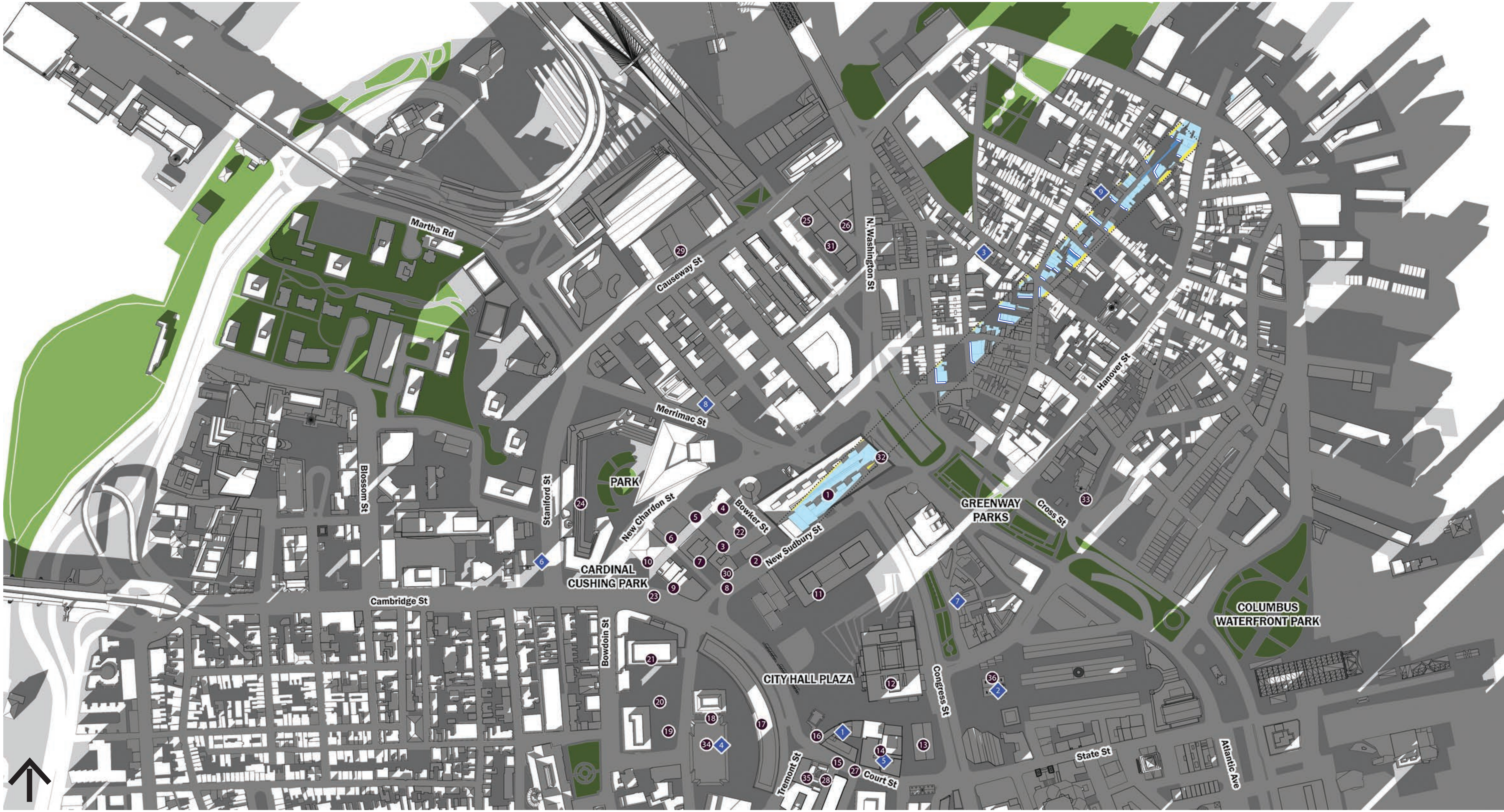
THE HYM INVESTMENT GROUP, LLC

cbt

Figure 5.5b

WP-B1 Shadow Impacts
December 21 12PM

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



NET NEW SHADOW (STREET LEVEL)

NET NEW SHADOW (ROOF TOP)

NET NEW SHADOW (FACADE)

PUBLIC OPEN/GREEN SPACE

SHADOW IMPROVEMENT COMPARED TO DPIR

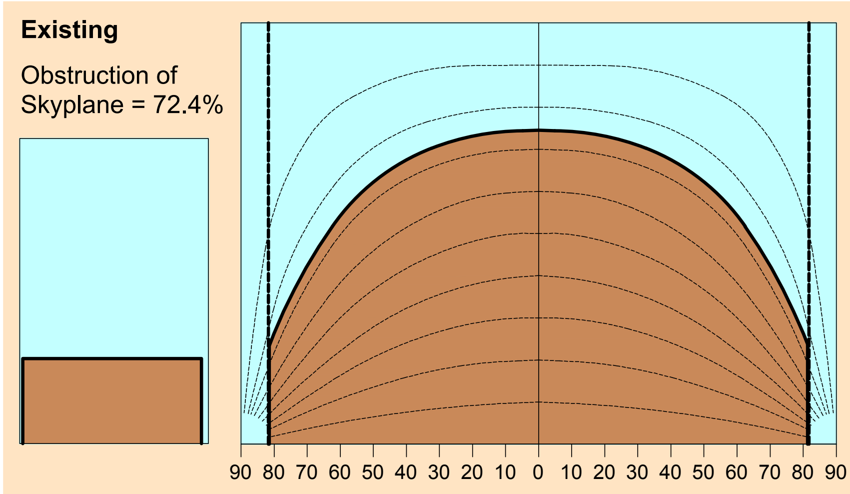
DPIR MASSING

THE HYM INVESTMENT GROUP, LLC cbt

Figure 5.5c

WP-B1 Shadow Impacts
December 21 3PM

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



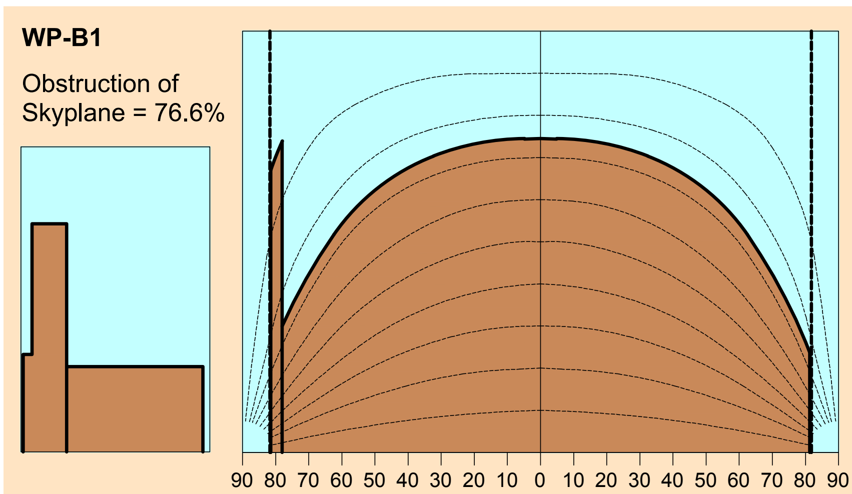


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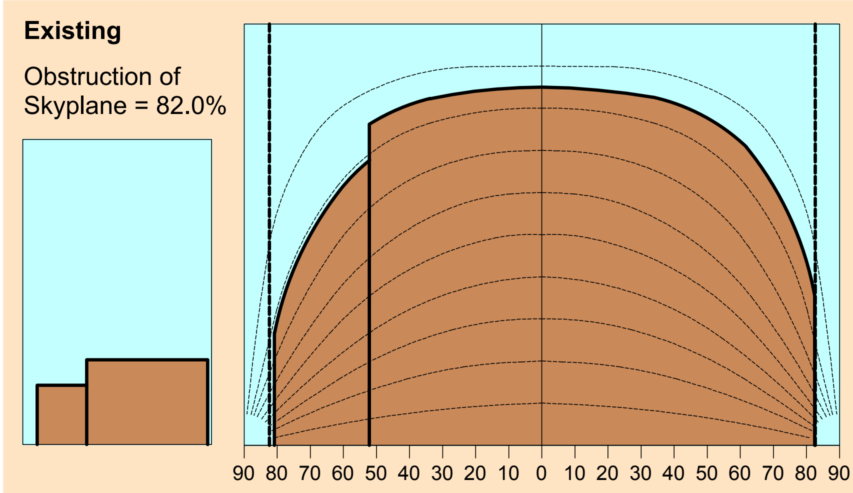
Figure 5.6a

Daylight Analysis
Center of New Sudbury Street

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



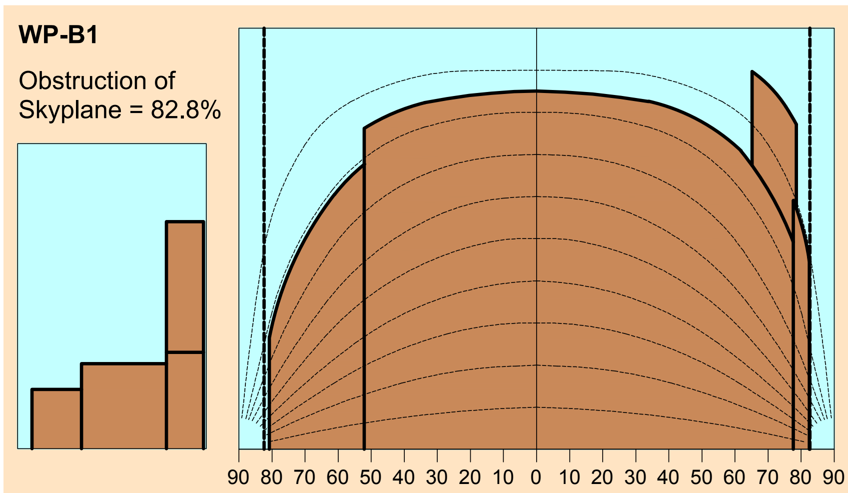
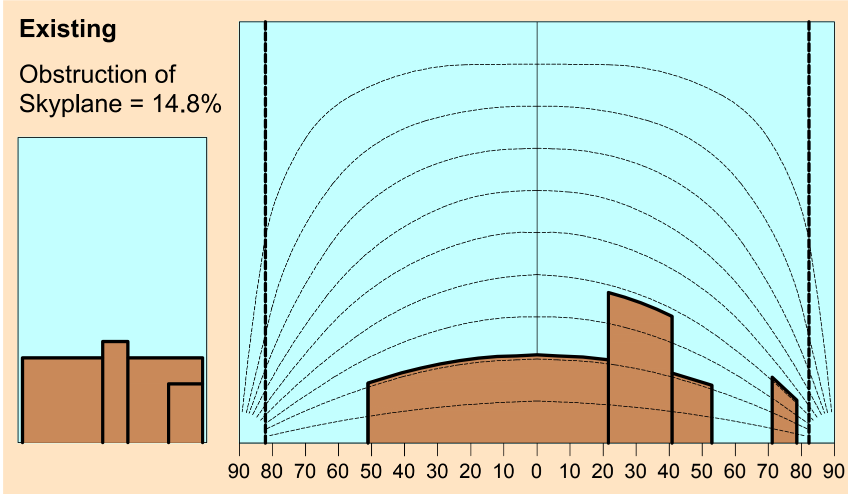


Figure 5.6b

Daylight Analysis
Center of Bowker Street

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



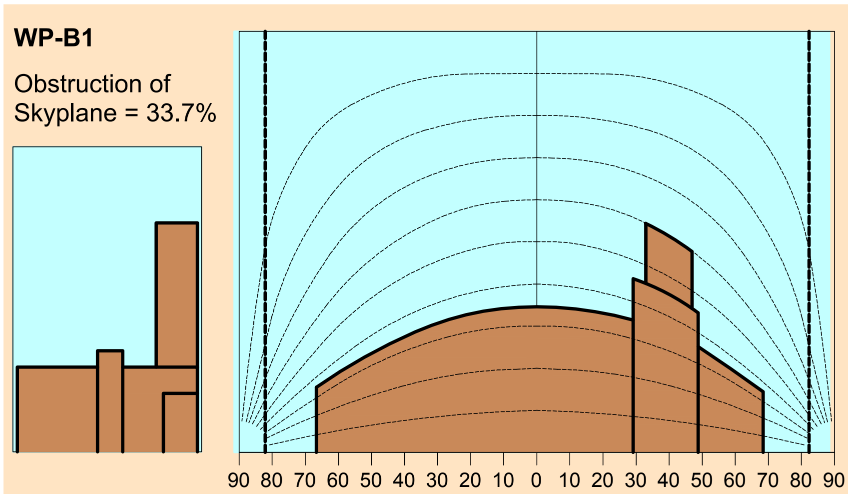
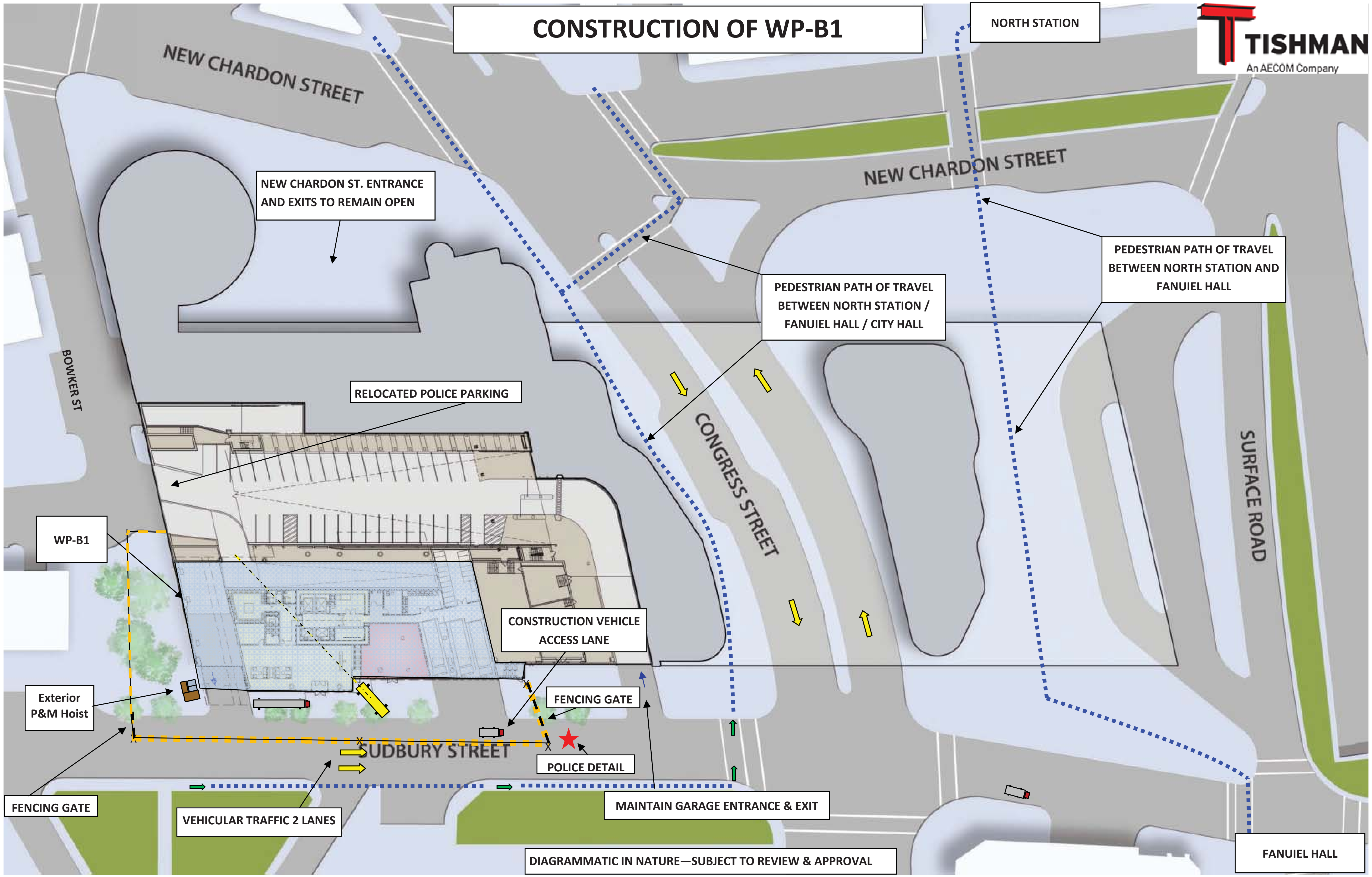


Figure 5.6c

Daylight Analysis
Center of New Chardon Street

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts



THE HYM INVESTMENT GROUP, LLC

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Figure 5.7
WP-B1 Construction Logistics Plan

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

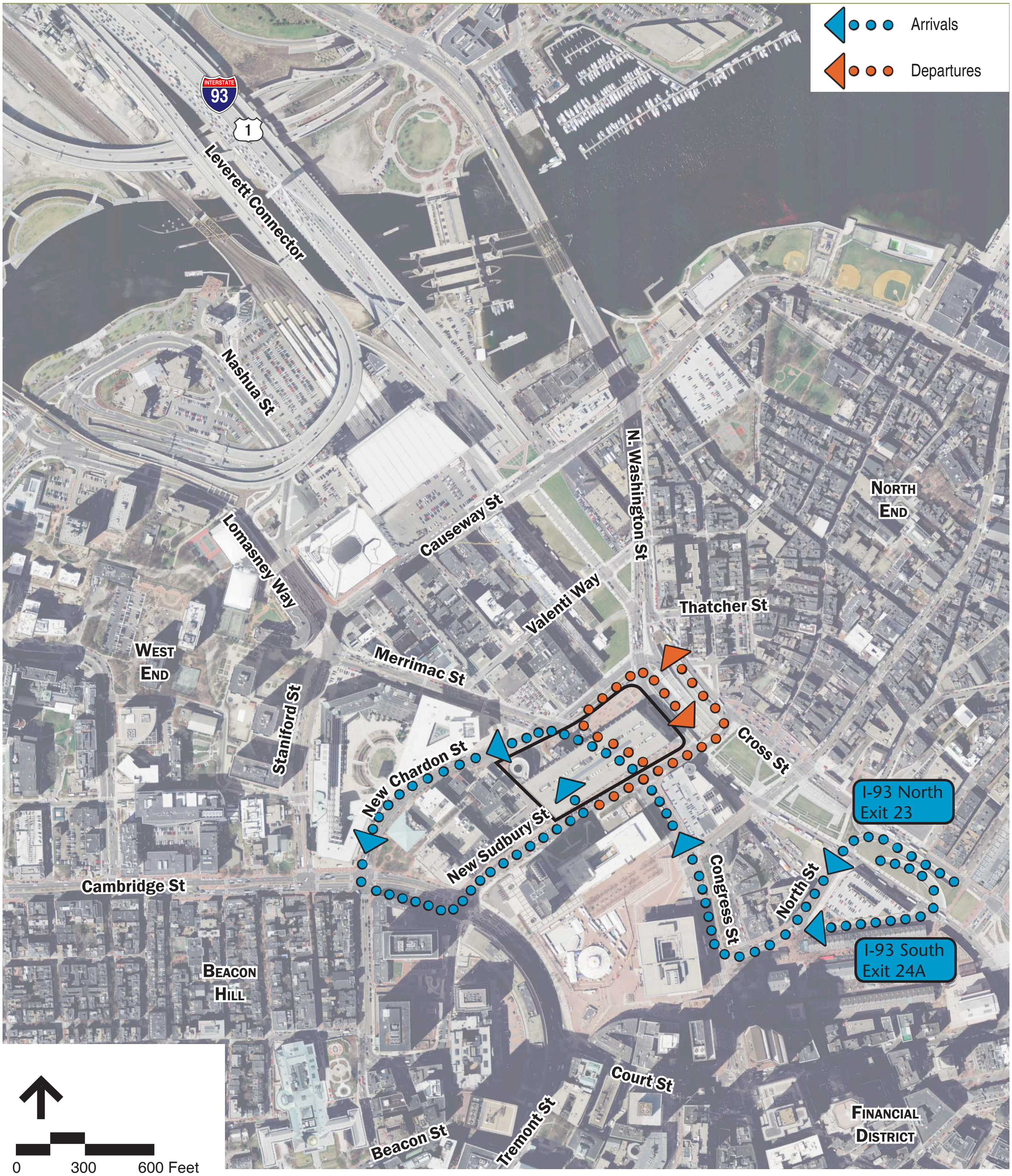

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Figure 5.8

WP-B1 Proposed Construction Truck Routes

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

6

Sustainability/Green Building and Climate Change Preparedness

Based on conceptual design, an overall sustainable design approach and a preliminary assessment of green building design was provided in both the PNF, dated June 2013, and DPIR, dated August 2013, for Article 80B review of the Development Plan Project, in compliance with the requirements of Article 37 of the Boston Zoning Code relative to the City's Green Building policies and procedures (Article 37). The following chapter provides an update to the sustainable design elements being considered for the Proposed Project based on a more advanced design of WP-B1 to continue to demonstrate compliance with the requirements of Article 37. In addition to compliance with Article 37 and consistent with the approved PDA, the Proponent intends to target a Gold rating using the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED®) Green Building Rating System for New Construction and Major Renovations (LEED-NC).

This chapter also discusses the approach to preparing for changes in climate change, in accordance with the BRA Climate Change Resiliency and Preparedness Policy (the "Resiliency Policy"). The required Climate Change Resiliency and Preparedness Checklist (the "Resiliency Checklist") has been completed for the Project and is provided in Appendix F.

6.1 Key Findings

The key related to sustainability/green building design and climate change preparedness include:

- The Proposed Project is inherently sustainable as it aims to utilize land efficiently through redevelopment of an underutilized, above-grade parking garage with a dense mixed-use development, promote the use of alternative modes of transportation, encourage pedestrian activity, provide new public outdoor space, and reduce environmental impacts both locally and globally through sustainable design.
- In addition to compliance with Article 37 and consistent with the Development Plan Project, the Proponent intends to target a LEED Gold rating for WP-B1, as demonstrated

by the enclosed draft LEED scorecard (Figure 6.1). This represents a noteworthy increase in LEED points compared to 40 points for a Certified rating, as required by Article 37.

- In support of Boston's GHG emissions reductions goals, the Proponent has estimated energy usage based on a preliminary building energy model, which demonstrates that it is feasible for the Proposed Project to comply with the potential future Stretch Energy Code requirements. Based on the preliminary design parameters assumed in the Design Case, the proposed residential building would achieve an energy savings of approximately 25.6 percent when compared to the Base Case. This would result in a GHG emissions reduction of 15.5 percent (from an estimated 2,791 tons per year CO_2 emissions to 2,357 tons per year).
- Potential impacts associated with predicted future sea level rise, increased frequency and intensity of precipitation events, and extreme heat events to the Proposed Project were considered during early stages of design.

6.2 Development Plan Project Review Overview

As part of the Article 80 review process for the Development Plan Project, based on conceptual design, preliminary LEED scorecards were provided to demonstrate that the key components—residential and office uses—could be LEED certifiable under LEED-NC and LEED for Core and Shell (LEED-CS), respectively, as demonstrated in the 2013 DPIR. Based on this initial LEED credit evaluation, the Proponent set an overall design goal of achieving LEED certification for the Project Components targeting a Gold rating under LEED-CS for the commercial components and Silver rating under LEED-NC for residential components. Supporting narratives on the overall sustainable approach for the Development Plan Project were also included in the 2013 PNF and DPIR filings (Chapters 4 and 5, respectively).

In the early stages of the Development Plan Project, the Proponent took efforts to develop a long-term sustainability vision and set priorities for the overall redevelopment. As a result, key drivers, or goals, and more specific objectives were defined to guide design, construction, and, ultimately, operations of the buildings. The Proponent committed to further evaluating sustainable design strategies and incorporating such strategies into the design, construction, and operation of each Project Component, where feasible and reasonable. This includes a commitment to an overall design goal of achieving some level of LEED certification beyond the requirements of Article 37 (i.e., LEED certifiable) for all the Project Components. As part of the PDA approval, the full build-out must include the construction of one (1) building to a LEED Platinum rating, four (4) buildings to a LEED Gold rating, and one (1) building to a LEED Silver rating. This is a significant commitment by the Proponent to sustainability. The Proponent will determine which LEED rating is appropriate and applicable at the time each Project Component is advanced through the City's design review and approval process.

Under the MEPA review process, the Development Plan Project was required to comply with the MEPA Greenhouse Gas Emissions Policy and Protocol (the "MEPA GHG Policy"). Consistent with the current MEPA GHG Policy dated May 5, 2010, the Development Plan Project was evaluated for both stationary and mobile source GHG emissions, which requires preliminary building energy modeling. Through this process, the Proponent further evaluated/tested potential Energy Conservation Measures (ECMs) based on conceptual design of the Project Components. In addition, to address MEPA's draft Climate Change Adaptation and Resiliency Policy, both the MEPA DEIR and FEIR evaluated the potential for climate change impacts (specifically, sea level rise, intense flooding) and presented possible strategies for resilience, where applicable and feasible, as it is their intent to lease and operate the buildings in a sustainable manner.

6.3 Regulatory Context

The following sections discuss the regulatory context as it relates to sustainability/green building design and climate change adaptation for the Proposed Project.

6.3.1 Boston Zoning Code Article 37, Green Buildings

Any project that is subject to Article 80B, Large Project Review is also subject to the requirements of Article 37. Initial Article 80 review filings must include preliminary information on the Project's sustainable/green building design approach to be reviewed by the Interagency Green Building Committee (IGBC). The IGBC consists of at least one representative of city agencies, including the BRA, BED, BTD, the Inspectional Services Department and the Mayor's Office.

The Article 37 submittal requirements includes completing a LEED scorecard (using a rating system applicable to the project) that demonstrates a project would meet the minimum requirements to achieve a LEED Certified level (all LEED Pre-requisites and achieve at least 40 points) without registering the project with the USGBC, or "LEED certifiable."

Additionally, in support of Boston's GHG emissions reductions goals, project filings must also include preliminary building energy model/estimated energy usage, clean/renewable energy evaluation, and energy efficiency assistance programs that may be available to a project.

6.3.1.1 Boston Green Building Credits

Appendix A of Article 37 lists Boston Green Building Credits, which are credits that may be included in the calculation toward achieving a LEED certifiable project. These credits were developed by the City and are intended to address local issues unique to development within Boston. The credits include the following categories: Modern Grid; Historic Preservation; Groundwater Recharge; and Modern Mobility.

6.3.2 BRA Climate Change Preparedness and Resiliency Policy

In November 2013, in conformance with the Mayor's 2011 Climate Action Leadership Committee's recommendations, the BRA adopted policy for all development projects subject to Boston Zoning Article 80 Small and Large Project Review to complete the Resiliency

Checklist with responses regarding consideration of potential adverse impacts that might arise under future climate conditions, and any project resiliency, preparedness, and/or mitigation measures identified early in the design stage. The Resiliency Checklist is reviewed by the IGBC.

6.3.3 Massachusetts Stretch Energy Code

As part of the Green Communities Act of 2008, Massachusetts developed an optional building code that gives cities and towns the ability to choose stronger energy performance in buildings than the state building code (the "Stretch Energy Code"). Codified by the Board of Building Regulations and Standards (BBRS) as 780 CMR Appendix 115.AA of the 8th edition Massachusetts Building Code, the Stretch Energy Code is an appendix to the Massachusetts building code, based on further amendments to the International Energy Conservation Code (IECC). The Stretch Energy Code increases the energy efficiency code requirements for new construction and major residential renovations or additions in municipalities that adopt it. The Stretch Energy Code applies to both residential and commercial buildings and, specifically, for new commercial buildings over 5,000 square feet in size, including multi-family residential buildings over three (3) stories.

In 2010, the City of Boston was designated a Green Community under the Green Communities Designation and Grant Program—an initiative of the Massachusetts Department of Energy Resources. In order to be designated a Green Community and, therefore, eligible for grant money available annually, communities are required to meet five rigorous qualification criteria one of which includes minimizing life-cycle costs, such as adopt and implement the Stretch Energy Code. The goal of the grant program is for a municipality to use grant money to assist residents, businesses, and the municipality departments/facilities in reducing energy use or installing renewable energy systems. For the City of Boston, the Stretch Energy Code was adopted and became mandatory on July 1, 2011.

The current Stretch Energy Code requires projects to achieve at minimum a 20 percent energy efficiency compared to the state's energy code (the "Base Energy Code") by either meeting the performance standard of 20 percent better than ASHRAE 90.1-2007, or using a prescriptive energy code. On July 1, 2014, the IECC2009 and ASHRAE 90.1-2007 ceased to be a code option for non-Stretch Energy Code communities, and the IECC 2012 and ASHRAE standard 90.1-2010 became the new/updated state-wide Base Energy Code. It is expected that an updated Stretch Energy Code, if/when enacted, will require additional energy reductions beyond these standards and that Green Communities, such as Boston will automatically adopt any updates to the Stretch Energy Code (unless they vote to change their bylaw to no longer be a stretch code community). At the time of this EPNF filing, the updated Stretch Energy Code requirements have not been published; however, they are expected to be issued in 2016.

6.4 Overview of Approach to Sustainability

The Proposed Project is inherently sustainable as it aims to utilize land efficiently through redevelopment of an obsolete above-grade parking garage site with a dense mixed-use development, promote the use of alternative modes of transportation, encourage pedestrian activity, promote the use of local materials, provide for a high-quality indoor environment for users, and reduce environmental impacts both locally and globally. The Proponent is committed to incorporating many key aspects of sustainability and high-performance building design, where applicable and feasible.

A key objective of the overall Development Plan Project is maintaining a substantial portion of the Garage intact and in use, which results in a significant savings in embodied energy and materials. Keeping the western portion of the Garage significantly reduces the need for raw materials and associated energy to transport new materials and rebuild a parking structure in addition to reducing the amount of construction waste created in demolition. Additionally, in later phases, the Development Plan Project aims to incorporate a substantial amount of green roof and roof garden/deck area on the West Parcel as a shared outdoor amenity for the future residents and office tenants/employees associated with WP-B2, as well an environmental benefit. The proposed green roofs/roof gardens will continue to allow for material reduction of heat island effect and help manage stormwater runoff.

As required by the PDA, the Proponent is committed to providing "a unique and sustainable project through the redevelopment and reuse of the existing garage and by utilizing the LEED." The Proponent is aiming to achieve a LEED Gold rating for the Proposed Project, which is consistent with the PDA. In order to incorporate sustainability into the Proposed Project, the Proponent will not only apply the LEED-CS Green Building Rating System, but will also rely on the overall sustainability vision and priorities established for the Development Plan Project to guide sustainability for the Proposed Project. Very early on in the design process the Proponent brought on a sustainability consultant, which led the design team in a comprehensive sustainability workshop. The workshop's primary focus was to develop a sustainability vision and to set priorities for the Project. The key sustainable drivers, or goals, that resulted are as follows:

1. Positive contribution to the community and built environment
2. Model for transit oriented development
3. Ability to cope with future climate change
4. Energy Efficiency
5. Resource Efficiency (i.e. water, waste and materials)
6. Sustainable Operations

6.4.1 Key Sustainable Drivers/Goals and Objectives

With the sustainability framework for the Project identified (described above), specific goals have preliminarily been established for each framework component, as described below.

Goal #1: Positive contribution to the community and built environment

Objectives:

a. Enhance pedestrian experience on site, 'pedestrian first' design
b. Increase pedestrian connectivity from North Station to Greenway

c. Create comfortable microclimate for exterior spaces

Goal #2: Model for transit oriented development

Objectives:

a. Exemplar for Boston's Complete Streets Program
b. Reduce auto use by residents and office occupants
c. Improve traffic flows around site

Goal #3: Energy Efficiency

Objectives:

a. Reduce energy use beyond minimum requirement
b. Optimize major plant systems and reduce peak loads

Goal #4: Resource Efficiency - Water

Objectives:

a. Explore reduction of potable water consumption beyond minimum LEED requirement
b. Use available water for non-potable uses in a cost effective manner

Goal #4: Resource Efficiency – Waste and Materials

Objectives:

a. Use building materials efficiently
b. Use building materials with low environmental impacts
c. Reuse portion of existing garage to reduce environmental impacts and embodied energy

Goal #5: Ability to Cope with Future Climate Change

Objectives:

a. Resilient to flooding
b. Resilient to extreme heat
c. Create comfortable microclimate for exterior spaces

Goal #6: Sustainable Operations

Objectives:

a. Easy to maintain
b. Able to measure, manage and improve energy, water and waste use
c. Attracts sustainable tenants

6.5 Green Building Design/Compliance with Article 37

Consistent with the sustainable goals for the Development Plan Project and requirements of Article 37, the Proponent and design team have continued to work to incorporate sustainable design and construction principles and practices into the Proposed Project. Multiple "sustainability focus/coordination meetings" have been held since the 2013 DPIR as design progressed. Consistent with the approved PDA, the Proponent intends to target a LEED Gold rating under LEED-NC version 3 (2009). The preliminary LEED-NC Scorecard presented in

Figure 6.1 is tracking 60 'yes' points and 11 'maybe' points on track for a Gold rating. The 'maybe' points represent credits that will continue to be evaluated as design progresses. This represents a noteworthy increase in LEED points compared to 40 'yes' points for a Certified rating, as required by Article 37 and helps to fulfill the PDA requirement for achieving a LEED Gold rating for up to four buildings. The Proponent intends to register the Proposed Project with the Green Business Certification Inc., or GBCI, for LEED certification.[1]

The design team for the Project includes several LEED Accredited Professionals (AP), including the Architect of Record, David Hancock, AIA, LEED AP with CBT Architects. Other team members with LEED accreditation include the Paul Crisalli, Director of Operations with HYM and the sustainability consultants, Chris Schaffner, PE, LEED Fellow, Principal and Founder, and Sarah Michelman, RA, LEED AP BD+C, Senior Project Manager of The Green Engineer, Inc. The Proponent and project design team has and will continue to evaluate and incorporate sustainable design and energy conservation as the design process continues.

6.5.1 LEED Master Site Credit Approach

The comprehensive Development Plan Project is comprised of two distinct parcels of land on either side of Congress Street each parcel (the West Parcel and East Parcel) includes multiple new buildings with shared public transit services, infrastructure, pedestrian-oriented circulation and public open space. Due to the arrangement of multiple buildings on a shared site, a Master Site LEED documentation approach is proposed for the buildings on the West Parcel, including the Proposed Project and WP-B2, as currently designed, and the future WP-B3 residential building.

The USGBC provides sites with multiple buildings the opportunity to pursue the majority of the Sustainable Sites credits and a few other Prerequisites for the entire parcel using a Master Site documentation approach. This approach streamlines the documentation process where applicable LEED Prerequisites and Credits are documented only one time under the Master Site project. While the Master Site project is registered with the USGBC through LEED Online, it does not pursue LEED Certification. Each individual project associated with the Master Site must attempt individual LEED Certification using the most appropriate LEED rating system, such as Core and Shell, New Construction, or Retail. The Proponent will register a Master Site project for the West Parcel. LEED Prerequisites and Credits available to be documented through the Master Site process are as follows:

- Sustainable Sites (SS) Credit 1 – Site Selection
- SS Credit 2 – Development Density and Community Connectivity
- SS s 4.1, 4.2, 4.3 & 4.4 – Alternative Transportation
- SS Credit 5.2 – Site Development, Maximize Open Space

▼

1 The GBCI exclusively administers project certifications as well as professional credentials and certificates within the framework of the USGBC's LEED green building rating systems.

- SS Credit 6 – Stormwater Design
- SS Credit 7.1 – Heat Island Effect, Non-Roof
- SS Credit 8 – Light Pollution Reduction
- Energy & Atmosphere (EA) Prerequisite 3 – Fundamental Refrigerant Management
- Indoor Environmental Quality (IEQ) Prerequisite 2 – Environmental Tobacco Smoke (ETS) Control
- Innovation in Design (ID) Credit(s) (where applicable to the Master Site)

6.5.2 Sustainable Sites (SS)

The Proposed Project Site located in a densely developed area of downtown Boston. Future residents of the Proposed Project will have extensive access to multiple modes of public transportation including the Orange and Green MBTA subway lines, the commuter rail and multiple MBTA bus routes. The Proposed Project Site is located on New Sudbury Street slightly west of Congress Street and the MBTA Haymarket subway and bus stations, and is within walking distance (about a ¼-mile) of the North Station commuter rail transit hub (Figure 4.5). The Proposed Project includes retaining a portion of the existing parking garage for use by the new residents, visitors, and others.

- **SSp1 Construction Activity Pollution Prevention:** The project construction documents will include erosion and sedimentation control guidance for on-site implementation by the Construction Manager, (CM). The CM is required to implement a compliant erosion and sedimentation control plan that meets local requirements and the U.S. Environmental Protection Agency (EPA) Construction General Permit (Phase I and II) of the National Pollutant Discharge Elimination System (NPDES) Program.
- **SSc1 Site Selection:** The Proposed Project Site is a previously developed urban parcel in a densely developed neighborhood. The parcel does not meet any of the prohibited development site criteria. This credit will be documented as part of the West Parcel Master Site project.
- **SSc2 Development Density and Community Connectivity:** The Proposed Project meets the criteria for Option 2, Community Connectivity. The immediate neighborhood has more than 10 services with pedestrian access including restaurants, grocery stores, banks, and a post office. This credit will be documented as part of the West Parcel Master Site project.
- **SSc4.1 Alternative Transportation, Access to Public Transit:** The Proposed Project Site is located on New Sudbury Street just up from Congress Street and the MBTA Haymarket subway and bus stations with access to the Orange and Green Lines and several bus routes, respectively. Also, it is within walking distance (about a ¼-mile) of the North Station commuter rail transit hub. This credit will be documented as part of the West Parcel Master Site project.
- **SSc4.2 Alternative Transportation, Bicycle Storage and Changing Rooms:** To meet the LEED requirements, the Proposed Project must provide 156 covered bicycle storage spaces on-site for the residential units and 16 short-term spaces for the retail use. In accordance

with BTD's bike storage guidelines, approximately 486 secure/covered bike parking storage spaces will be provided on-site for the residents. An additional 30 short-term bike parking (at-grade bike racks) will be located near building entrances.

In the future, as part of the construction of WP-B2, a significant portion of the first level of the Garage will be dedicated to bike storage for up to 850 bikes to serve residents, employees, and visitors. This facility, which will include a compliant quantity of showers and changing rooms as well as on-site bicycle repair, and potential bicycle sales and other services, will be the largest ever built in the City of Boston. The Proponent will seek to engage a manager/operator for the bike parking facility. This credit will be documented as part of the West Parcel Master Site project.

- **SSc4.3 Alternative Transportation, Low Emitting Fuel Efficient Vehicles:** The Garage will include preferred parking spaces for low-emitting/fuel-efficient vehicles and Electric Vehicle (EV) charging stations for use by future residents, office employees, and others. This credit will be documented as part of the West Parcel Master Site project.
- **SSc4.4 Alternative Transportation, Parking Capacity:** With the future removal of the eastern portion of the existing garage structure, the future quantity of on-site parking will be reduced by over 1,100 parking spaces. Additionally, designated parking spaces for high-occupancy vehicles (carpools and vanpools) will be included throughout the Garage to remain. This credit will be documented as part of the West Parcel Master Site project.
- **SSc5.2 Site Development Maximize Open Space:** This credit may be attainable through the creation of new at-grade public open space and proposed rooftop open spaces/green roofs. Collectively, these spaces must exceed requirements by 25 percent. If attainable, this credit will be documented as part of the West Parcel Master Site project.
- **SSc6.1 Stormwater Design – Quantity Control & SSc6.2 Stormwater Design – Quality Control:** The Proposed Project is targeting a 25 percent reduction through rainwater harvesting tanks and groundwater injection wells. Additionally, because the stormwater runoff will be collected on-site and will be directed through a Vortech water treatment system prior to being released into the city's drainage system, SSc6.2 may be attainable. This credit will be documented as part of the West Parcel Master Site project.
- **SSc7.1 Heat Island Effect – Non-Roof:** The Proposed Project will meet the criteria for this credit by providing 100 percent of the parking under cover. This credit will be documented as part of the West Parcel Master Site project.
- **SSc7.2 Heat Island Effect – Roof:** An SRI-compliant roof membrane product for the highest roof area and membrane portions of the lower roof where not vegetated has been specified for the residential building. In combination, the Proposed Project will meet or exceed the requirements of this credit.
- **SSc8 Light Pollution Reduction:** The Proposed Project will endeavor to meet the LEED v4 Light Pollution Reduction requirements through the specification of compliant exterior and site light fixtures, and minimizing light trespass from the site. This credit will be pursued as part of the West Parcel Master Site project.

6.5.3 Water Efficiency (WE)

- **WEp1/WEc1 Water Use Reduction:** Through the specification of low-flow high-efficiency plumbing fixtures, the Proposed Project will exceed the required 20 percent annual potable water use reduction and will target reducing the annual potable water use by up to 35 percent.
- **WEc1 Water Efficient Landscaping:** The at-grade landscape design and vegetated roofs will use a mixture of trees, shrubs, and groundcover all of which grow well in the urban environment. Additionally, rainwater harvesting for irrigation is being explored as a stormwater management measure to control site runoff. Therefore, the proposed irrigation system will be designed use 50 percent less potable water when compared to a mid-summer baseline.

  The Proponent will continue to evaluate/consider using zero potable water for irrigation purposes for two additional points.

6.5.4 Energy & Atmosphere (EA)

The proposed residential building systems will be designed to optimize energy performance and will not use refrigerants that are harmful to the environment. The project will incorporate gas-fired condensing boilers and energy recovery units for use in supplying ventilation air to the common areas, amenity areas and circulation spaces. A central plant will house energy efficient cooling towers, chillers, a heat exchanger and condensing boilers. The apartments will have vertical heat pump units. Amenity spaces and lobby areas will be heated and cooled through horizontal heat pump units. Ventilation air will be provided by 100 percent outside air packaged energy recovery units. Throughout the building the targeted lighting power density will be 15 to 20 percent below code requirements. A DDC Building Automation System will be included in the design.

- **EAp1/EAc3 Commissioning:** The building owner has and will continue to engage a Commissioning Agent during all phases of the project to review the proposed design and ultimately confirm the building systems are installed and function as intended and desired.
- **EAp2/EAc1 Energy Performance:** Preliminary energy modeling results indicate the proposed design will result in an estimated 10 percent energy cost savings when compared to a baseline building performance as calculated using the rating method in Appendix G of ANSI/ASHREA/IESNA Standard 90.1-2007.

  This requirement is met by installing efficient mechanical equipment. Additionally, an improved building envelope design and efficient lighting will be integral to the design and help the project achieve this minimum. The team developed a whole building energy model to demonstrate the expected performance rating of the designed building systems. As design progresses the energy models will be updated. The project team anticipates the annual cost savings estimate to increase to approximately 14 percent.
- **EAp3 Fundamental Refrigerant Management:** As per the prerequisite requirements, the specifications for refrigerants used in the building HVAC & R systems will not permit the

use of CFC-based refrigerants. This credit will be documented as part of the West Parcel Master Site project.

- **EAc4 Enhanced Refrigerant Management:** Once the mechanical cooling equipment has been specified, submitted, and approved, final calculations will be run to confirm if credit requirements are met.
- **EAc5 Measurement and Verification:** The owner will register an Energy Star Portfolio Manager account to enable the USGBC to review whole building energy and water use for five years after occupancy.
- **EAc6 Green Power:** The Proponent will explore the purchase of 'green power' for a 2-year period renewable energy contract to provide a minimum of 35% of the building's electricity from renewable sources.

6.5.5 Materials and Resources (MR)

The project will specify materials and products with recycled content, those made with certified wood and regionally procurable products to the extent possible. Throughout the construction phase of the project the Construction Management team will endeavor to divert Construction and Demolition (C&D) waste from area landfills and procure materials that are made with FSC-certified wood, have recycled content and/or are harvested, extracted and manufactured within 500 miles of the Proposed Project Site.

- **MRp1 Storage and Collection of Recyclables:** Storage of collected recyclables will be accommodated on the ground floor of the residential building in an area adjacent to the loading dock area located off of New Sudbury Street. Residents will bring their recyclables to this central storage room. The recyclables will be collected by a contracted waste management company on a regular basis.
- **MRc2.1/MRc2.2 Construction Waste Management:** The Construction Manager (CM) will develop and implement a Construction Waste Management Plan (CWMP). The CM will endeavor to divert as much demolition debris and construction waste from area landfills as possible with a minimum diversion rate of 75% overall.
- **MRc4 Recycled Content:** The design specifications will require certain materials to include pre- and/or post-consumer recycled content. The Proponent has established a target for 10 percent of the materials and products installed to be materials with recycled content based on overall project materials costs.

  The CM will track the building materials with a goal of achieving the 20 percent recycled content materials threshold for an additional LEED point.
- **MRc5 Regional Materials, Extracted, Processed and Manufactured Regionally:** The design specifications include some materials to be extracted, harvested, recovered and manufactured within a 500 mile radius of the job site. The Proponent has established a target for 10 percent of the materials and products installed to be regional materials based on overall project materials costs.

The CM will track the building materials with a goal of achieving the 20 percent regional materials threshold for an additional LEED point.

- **MRc7 Certified Wood:** The design specifications will include wood materials to be from FSC-certified forests and from compliant manufacturers and millwork shops. The CM will track the submitted and installed wood materials and products with a goal to achieve the 50 percent (by cost) threshold based on overall wood materials costs.

6.5.6 Indoor Environmental Quality (IEQ)

The interior air quality will be monitored during the construction phase of the Proposed Project and prior to occupancy. Low emitting materials, (low-Volatile Organic Compound, or VOC), will be used throughout construction to maintain and improve air quality within the base building. The residential units are laid out to maximize exposure to views and daylight. The residential units will have a combination of natural and mechanical ventilation.

- **IEQp1 Minimum IAQ Performance:** The building mechanical systems are designed to meet or exceed the requirements of ASHRAE Standard 62.1-2007 sections 4 through 7 and applicable natural ventilation requirements. Ventilation air will be provided to all lobbies, amenity spaces, public areas and corridors as well as directly to each residential unit for exhaust makeup and ventilation requirements.
- **IEQp2 Environmental Tobacco Smoke Control:** The entire building and the associated site will be non-smoking. This policy will be enforced through posted signage.
- **IEQc3.1 Indoor Air Quality Management Plan – During Construction:** The CM will develop and implement a compliant Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the project to meet/exceed the recommended Control Measures of the SMACNA IAQ Guidelines for Occupied buildings Under Construction 2nd Edition 2007, ANSI/SMACNA 008-2008 (Chapter3).
- **IEQc3.2 Indoor Air Quality Management Plan – Before Occupancy:** The Proponent or building owner may choose to implement air quality testing prior to occupancy in order to comply with this credit for one additional LEED point.
- **IEQc4.1 Low Emitting Materials, Adhesives and Sealants:** The design specifications for adhesives and sealants used inside the building envelope will include requirements for compliance with the low VOC criteria for adhesives and sealants as established in the South Coast Air Quality Management District (SCAQMD) Rule #1168.
- **IEQc4.2 Low Emitting Materials, Paints and Coatings:** The design specifications will include requirements for paints and coatings to meet low-VOC criteria for paints and coatings in accordance with applicable sections of Green Seal Standard GS-11, Green Seal Standard GC-03 and SCQAMD Rule #1113.
- **IEQc4.3 Low Emitting Materials, Flooring Systems:** The design specifications will include compliant flooring materials that meet the applicable requirements of FloorScore certification or the Carpet Rug Institute Green label program.
- **IEQc4.4 Low Emitting Materials, Composite Wood:** The design specifications will include composite wood and agrifiber products that contain no added urea-formaldehyde.

- **Credit 5 Indoor Chemical and Pollutant Source Control:** The project team will design to minimize and control the entry of pollutants into the building and to contain chemical use areas.
- **Credit: 6.1 Controllability of Systems, Lighting:** The proposed design will include lighting controls in the residential units. The controls in the amenity spaces and common areas include vacancy/occupancy sensors and daylight dimming controls. Multi-occupant user spaces will have multi-level lighting controls for modifying light levels as necessary for the various uses. The management offices will have lighting controls appropriate for the room use.
- **Credit 6.2: Controllability of Systems, Thermal Comfort:** The proposed design will include temperature controls for the apartment units (i.e., thermostats and operable windows) and regularly occupied amenity spaces. The management offices and tenant lease spaces also have temperature controls.
- **IEQc7 Thermal Comfort – Design:** The design team will ensure the building systems are designed to meet the requirements of ASHRAE 55-2004 for all applicable mechanically-ventilated regularly occupied spaces.
- **IEQc8.2 Daylight and Views, Views:** The residential building envelope is a high-performance system with extensive areas of windows with ample access to daylight and views. It is assumed that over 90 percent of the regularly occupied space within the residential units will have access to views.

6.5.7 Innovation in Design (ID)

- **IDc1 Innovation and Design:** Under the LEED Master Site Credit approach (described previously in Section 6.5.1), the Proposed Project will attempt to achieve up to three Exemplary Performance site-related credits: SSc2 – Development Density and Community Connectivity; SSc4.1 – Alternative Transportation, Access to Public Transit; and SSc7.1 – Heat Island Effect, Non-Roof.

  Two ID credits remain to be determined at this time. Possible ID credits include Low Mercury Lighting, Integrated Pest Management, and Green Housekeeping.
- **IDc2 LEED Accredited Professional:** There are several LEED APs on the project team.

6.5.8 Regional Priority Credits (RPC)

Applicable RPCs for the Proposed Project include:

- SSc3 Brownfield Development;
- SSc6.1 Stormwater Management, Quantity,
- SSc7.1 Heat Island Effect – Non-roof;
- SSc7.2 Heat Island Effect- Roof;
- EAc2 On-Site Renewable Energy; and
- MRc1.1 Building Reuse.

LEED credit SSc3 is not available to the Proposed Project. The Proposed Project will attempt to achieve two RP credits related to heat island effect: SSc7.1 and SSc7.2.

6.5.9 Boston Green Building Credits

At this preliminary design stage, the Proposed Project may achieve two of the four available Boston Green Building credits (Appendix A of Article 37):

- **Historic Preservation** – One point would be awarded for preservation and reuse of a portion of the Garage, which is not yet 50 years of age, but was originally inventoried by the BLC in 1980 with an updated form prepared in 2009.
- **Modern Mobility** – One point would be awarded for the robust TDM Plan proposed.

6.6 Greenhouse Gas Emissions Reduction Strategies

In support of Boston's GHG reduction goals and consistent with the Development Plan Project sustainability goal #3, the Proponent has evaluated and incorporated strategies to minimize energy consumption associated with the Proposed Project through building energy modeling based on conceptual design as well as considered clean/renewable energy sources. Also, the Proponent has begun to engage utility providers to better understand available alternative/cleaner energy sources and grants/rebates.

6.6.1 Preliminary Building Energy Model

The computer-based eQUEST model was used to estimate the amount of overall energy consumed by the proposed residential building from its projected electricity and gas usage based on assumptions for the Project's building elements, such as (but not limited to) the specific type of use(s) and users of the buildings, building configuration and architecture type, building envelope (walls/windows), interior fit-out (where known), and HVAC equipment efficiency ratings.[2] To estimate associated stationary source GHG emissions, the amount of consumed energy is then converted into the amount of CO_2 emitted using the standardized conversion factor.[3]

As discussed previously under Section 6.3.3, the Stretch Energy Code is expected to be updated requiring additional energy reductions beyond these standards. Therefore, the more stringent requirements of this future potential Stretch Energy Code were considered by using the current state energy code as the baseline for which to compare energy savings to (the "Base Case"). The current state base energy code defaults to the 2012 version of the International Energy Conservation Code (IECC) and ASHRAE standard 90.1-20103 approved by the BBRS on July 9, 2013 and effective on July 1, 2014. For the purposes of the stationary

2 eQUEST (the Quick Energy Simulation Tool), version 3.60 release from James J. Hirsch, DBA James J. Hirsch & Associates, Camarillo, CA.

3 719 lb CO2/MWh was used to convert electricity consumption into the amount of CO2 emissions (2012 ISO-New England Marginal Emissions Report). 117.08 lb CO2/Mbtu was used to convert gas consumption into the amount of CO2 emissions (The Energy Information Administration Documentation for Emissions for GHG).

source GHG emissions assessment, the Proposed Project was designed to meet the requirements of the future potential Stretch Energy Code requirements under consideration by the BBRS in the near future (the "Design Case").

Key energy savings features include upgraded more efficient building materials (walls and windows), high efficiency HVAC system, high efficiency condensing boilers, high efficiency domestic water heaters and a condenser water plant that exceeds base energy code efficiency with variable speed technology, and energy recovery for exhaust. The building system for WP-B1 will also be designed with actual consumption controlled technology and, therefore, the consumption will likely be reduced by individual unit metering.

The results of the preliminary energy model results demonstrate that it is feasible for the Proposed Project to comply with the potential future Stretch Energy Code requirements. Based on the preliminary design parameters assumed in the Design Case, the proposed residential building would achieve an energy savings of approximately 25.6 percent when compared to the Base Case. This would result in a reduction in stationary source GHG emissions of 15.5 percent (from an estimated 2,791 tons per year CO_2 emissions to 2,357 tons per year). The estimated stationary source GHG emissions reductions and associated energy savings represent performance criteria as established through the MEPA review process for the Proposed Project.

6.6.2 On-Site Clean/Renewable Energy Analysis

6.6.2.1 Combine Heat and Power

The team has confirmed with the electric utility (Eversource) that it does not allow Combined Heat and Power (CHP) systems to connect to their network in the Project area due to protection concerns from the utility. This precludes an important financial and efficiency element of a CHP which is to sell electricity back to the grid during non-peak on-site demand. However, in the event the utility company changes in stance on CHP within the Proposed Project Site, this section presents a conceptual analysis of a CHP system to serve the Proposed Project.

CHP systems are most advantageous for facilities such as this one that have a hot water demand year-round. Therefore, a smaller sized 75kW CHP system to power the base electrical load of the building has been considered. This CHP system would operate via natural gas to produce hot water and electricity and would primarily serve the domestic hot water while also being connected to the heating plant. With involvement and input from the utility, including the utility's approval to connect back into the grid, such a system could be further evaluated. However, it is important to note that such a system is not expected to result in a significant amount of additional energy savings (or associated stationary source GHG emissions reductions) compared to the energy conservation measures assumed in the Design Case. Based on the preliminary building energy modeling the building would exceed the potential future Stretch Energy Code requirements and will contribute to high levels of LEED certification.

Due to the electric utility's stance on CHP, the Proponent is committed to investing in energy conservation measures through design, which based on preliminary building energy modeling is expected to exceed future potential Stretch Energy Code requirements. In addition, given the project phasing timeframe, it is anticipated that energy conservation technologies will advance providing additional, potentially more viable options than a CHP system. However, consistent with the Project's overall sustainability goals, the Proponent is committed to continuing to evaluate feasible and beneficial ECMs.

6.6.2.2 Rooftop Photovoltaic Solar Evaluation

For the purposes of gaining a better understanding of their potential contribution to on-site power generation, all Development Plan Project building rooftops were assessed for the potential for solar photovoltaic (PV) systems. This evaluation determined that building rooftop space on the West Parcel is very limited given the space requirements for the building rooftop mechanical units and the small resident roof deck proposed for WP-B1. The assessment concluded that the proposed office building on the East Parcel (EP-B2) was the best location for rooftop solar and this location continues to be designated for such.

6.6.2.3 Transpired Solar Collectors

Transpired solar collectors were considered, but found not beneficial as an ECM for the Proposed Project because it will be equipped with energy recovery wheels to preheat all outside air entering the building. The energy recovery wheels recover heat from building return air that would otherwise be exhausted. Since the residential units are naturally ventilated with operable windows, installing a solar collector would not be a cost-effective solution.

6.6.2.4 Geothermal

There are several factors as to why geothermal energy, or Ground Source Heat Pumps (GSHPs), are not feasible for the Proposed Project. These include:

- The Proposed Project is located in a dense urban set-up with subway tunnels and existing city infrastructure running below the ground.
- The remaining western portion of the Garage and Proposed Project will occupy a portion of the West Parcel ground plane prohibiting the inclusion of geothermal wells.
- The well field area required for such a system is large and location of the Proposed Project makes it infeasible to install the GSHP system. Based on load estimates, WP-B1 would require a well field of approximately 3.7 acres of open land area.

The above conclusions are based on 500-square foot per ton of cooling and 2.5 ton per well cooling available. To be able to provide cooling for the Proposed Project, 440 wells are required. Each well needs to be placed 20 feet apart and a total of 160,000 square feet area requirement, which is not feasible given the urban location of the Proposed Project Site.

6.6.2.5 Steam

Steam is available to the Proposed Project via a district energy plant located in downtown Boston, which is produced from a Combined Heat and Power (CHP) system. The CHP District Steam plant is powered via natural gas and produces both electricity and steam. Past experience has shown that using district steam will reduce the overall GHG emissions; however, it may not necessarily reduce the overall energy cost for the owner. The Proponent has continued to discuss with Veolia the possibility of utilizing steam for the Proposed Project.

The results of the steam evaluation show the use of district steam for heating could potentially reduce source energy consumption. Specifically, the potential use of steam for the residential uses of the Development Plan Project may an additional positive benefit given the majority of current load on the Veolia steam system is commercial buildings, which have peak loads during the day. Any added residential buildings would have peak loads in other time periods. The use of steam would likely reduce installation costs; however, its long term effect on operating costs would need to be studied. The feasibility of the use of district steam is highly dependent on a detailed on additional to more fully understand the benefits of using district steam. The Proponent will continue to evaluate the use of steam through continued direct discussions with Veolia as the building design advances.

6.6.3 Energy Efficiency Assistance

The Proponent is aware that the Proposed Project's electrical and natural gas service providers may potentially offer technical assistance and incentives for implementing energy efficiency measures. By working with these utilities throughout the design process, the Proponent will evaluate additional energy conservation strategies and, therefore, additional energy savings and associated GHG emissions reductions may be achieved. The Proposed Project will participate in the Mass Save New Construction Program which is designed to target energy efficiency opportunities in new commercial, industrial, and governmental facilities. The program provides financial incentives and technical assistance to developers, customers, and design professionals to encourage the use of design features and equipment that optimize energy efficiency in the new construction projects. The measures are treated either under the prescriptive track or custom track of the program. When a project does not fit in to a prescriptive track, it is put in to a custom track. The custom track utilizes industry accepted computer building modeling and custom spreadsheets to calculate potential energy savings. Furthermore, the Proponent is committed to meeting the applicable requirements of the future City of Boston Building Energy Reporting and Disclosure Ordinance once the residential building is in operation. By tracking energy usage during building operations, future energy efficiency improvements are likely to be implemented to maintain/improve energy savings.

6.7 Climate Change Preparedness and Resiliency

As required by the BRA for all Large Project Review projects, the project team has considered anticipated changes in climate by completing the BRA Climate Change Resiliency and Preparedness Checklist, which is provided in Appendix F. Climate change is expected to result in rising sea levels, more frequent extreme storms, and more extreme weather events. The following sections describe what has been considered as it relates to climate change impacts as part of the early stages of project design.

6.7.1 Anticipated Sea Level Rise and Flooding

The Proponent began to consider and address climate change impacts and planning for resilience during the early stages of planned and design.

The Proponent has evaluated the findings outlined in *Sea Level Rise: Understanding and Applying Trends and Future Scenarios for Analysis and Planning* by the Massachusetts Office of Coastal Zone Management.[4] Potential sea level rise scenarios were evaluated by CZM for four different climate change scenarios in Boston, Massachusetts: Lowest, Intermediate Low, Intermediate High and Highest. These scenarios result in a range of sea level rise from 0.81 feet to 6.83 feet in the year 2100.

These sea level rise estimates were applied to the 100-year flood elevation of approximately elevation 16.5 (Boston City Base (BCB)) presented in the FEMA flood Map 25025C008J; effective date 3/16/2016 and resulted in the following elevations:

- Lowest Scenario – Elevation 17.3 BCB
- Intermediate Low Scenario – Elevation 18.4 BCB
- Intermediate High Scenario – Elevation 20.7 BCB
- Highest Scenario – Elevation 23.3 BCB

As a comparison, the project team evaluated the findings of the recent Intergovernmental Panel on Climate Change's *5th Assessment Report*.[5] Figure 13.23 of that report presents different sea level rise projections based on various climate change scenarios for New York City. These sea level rise estimates range from approximately one (1) foot to four (4) feet.

Given the expected useful life of the Proposed Project is less than the time horizons studied in the two referenced reports and given the difference in the highest sea level rise estimates, the Proponent elected to evaluate the impacts of a 3-foot sea level rise applied to the preliminary 100-year flood elevation. The resultant study elevation is 19.5 BCB, which is midway between the Intermediate Low and Intermediate High scenarios.

4 Office of Coastal Zone Management, Sea Level Rise: Understanding and Applying Trends and Future Scenarios for Analysis and Planning, December 2013.
5 Intergovernmental Panel on Climate Change, 5th Assessment Report, 2013.

Refer to Figure 6.2 for an illustration of how this sea level rise scenario would impact the Proposed Project Site. This is not a typical occurrence, but still important to evaluate given the ability to prepare the proposed residential building through design to mitigate potential damage to critical building infrastructure. Given the Proposed Project Site's topography, the southernmost corner of the Project Site (where Bowker Street meets New Sudbury Street), the proposed residential building is not projected to be impacted by a 3-foot sea level rise.

6.7.2 Extreme Weather Conditions

In addition to sea level rise, additional climate change issues predicted for Massachusetts, per the 2011 Massachusetts Climate Change Adaptation Report, include an increase in extreme weather events which could consist of drought, tropical rainfall patterns (i.e., increased precipitation) and extreme heat and cold stretches, increase in the number of days with extreme heat (i.e., temperatures greater than 90°F and 100°F) and/or fewer days of snow yet increased winter precipitation.[6] Project-related resiliency measures aimed at addressing these potential events are discussed below.

6.7.3 Potential Resiliency Measures

The project team plans to use the results of the above climate change impact assessment to evaluate potential design elements to mitigate the effects of this potential sea level rise on the Proposed Project. These elements are related to both building and site design.

6.7.3.1 Building Design Measures

Although the Proposed Project does not fall within the projected 100-Year Floodplain (based on a 3-foot sea level rise), the Proponent has chosen to locate the transformers as well as sensitive mechanical and electrical equipment above the ground floor in order to support the building during extreme weather or flash flooding conditions.

The following additional design and planning measures will be explored to mitigate for rising temperature impacts:

- Designing the residential units for improved natural ventilation (i.e., operable windows) to reduce the reliance on mechanical ventilation systems; and
- As part of the energy modeling process, climate files that reflect the predicted increase in temperature can be used to better understand how the buildings and their systems would perform under different climate conditions. (This understanding can then be taken into account when designing major plant and overall HVAC systems.)

6 Executive Office of Energy and Environmental Affairs and Adaptation Advisory Committee, Massachusetts Climate Change Adaptation Report, September 2011.

During power outages, building emergency and life safety systems (i.e., fire-pump pressurizing sprinkler and standpipe systems, egress lighting, smoke evacuation systems, heat and smoke detection and alarm systems, emergency communications and first-responder's elevator systems) will all be powered by diesel emergency generators in each building and the Garage. Emergency generators will be sized to operate long enough to safely fight a fire or to evacuate the building (i.e., 8-10 hours), as required by code. Generally, the emergency generators will be roof-mounted and air-cooled. All fuel supplies will be protected from the effects of extreme weather and potential flooding, and could be enhanced to provide running time greater than required by current codes in order to provide continued safety features for extended periods to account for the possibility that fuel supply to fill the tanks could be interrupted. To run for longer periods, emergency generators require bigger fuel tanks, which add expense and take up valuable building space making them cost- prohibitive as they would stand idle majority of the time. As design progresses, the Proponent is committed to exploring expanding the size of emergency generators to allow for select common areas and other emergency and life safety systems to remain operational for a period of time beyond the code requirement, specifically in residential buildings. Additionally, the residential building will be designed with operable windows, which help mitigate power disruptions by providing fresh air when mechanical systems are down.

6.7.3.2 Site Design Measures

As previously discussed, a significant amount of existing roof area will be repurposed for green roof area, providing an ecosystem-based retrofit measure. Green roofs help mitigate extreme heat waves and heat island effect as well as reduce stormwater runoff. At the street level, the Proponent aims to reduce heat island effect through the integration of greenery, such as tree canopy cover and at-grade multi-tiered planting. Also, green strips and infiltration strips will be incorporated as part of the proposed roadway improvements of the streets surrounding the Project Site, in accordance with Boston's Complete Street Guidelines. In addition, as discussed in Chapter 7, *Infrastructure*, the Proponent will be retaining the first inch of rainwater for the Project Site, in part to reduce phosphorus entering the Charles River, which also mitigates the amount of stormwater run-off from the Project Site. This harvested rainwater stormwater will be used for on-site irrigation and mechanical uses; thereby, reducing water demand during periods of drought.

To address more tropical rainfall patterns, the Project will evaluate inlet capacities during short-duration, high-intensity rain events. The project team will work with BWSC to understand the parameters for future analyses.

LEED 2009 for New Construction and Major Renovations

Project Checklist

Redevelopment of the Government Center Garage - WP-B1 Residential Building

One Congress Street, Boston

Draft October 2015

Sustainable Sites — Possible Points: 26

Y	?	N			
23	1	2		Sustainable Sites	Possible Points: 26
Y			Prereq 1	Construction Activity Pollution Prevention	
1			Credit 1	Site Selection	1
5			Credit 2	Development Density and Community Connectivity	5
		1	Credit 3	Brownfield Redevelopment	1
6			Credit 4.1	Alternative Transportation—Public Transportation Access	6
1			Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3			Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2			Credit 4.4	Alternative Transportation—Parking Capacity	2
		1	Credit 5.1	Site Development—Protect or Restore Habitat	1
1			Credit 5.2	Site Development—Maximize Open Space	1
	1		Credit 6.1	Stormwater Design—Quantity Control	1
1			Credit 6.2	Stormwater Design—Quality Control	1
1			Credit 7.1	Heat Island Effect—Non-roof	1
1			Credit 7.2	Heat Island Effect—Roof	1
1			Credit 8	Light Pollution Reduction	1

Water Efficiency — Possible Points: 10

Y	?	N			
5	3	2		Water Efficiency	Possible Points: 10
Y			Prereq 1	Water Use Reduction—20% Reduction	
2	2		Credit 1	Water Efficient Landscaping	2 to 4
		2	Credit 2	Innovative Wastewater Technologies	2
3	1		Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere — Possible Points: 35

Y	?	N			
8	4	23		Energy and Atmosphere	Possible Points: 35
Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
3	2	14	Credit 1	Optimize Energy Performance	1 to 19
		7	Credit 2	On-Site Renewable Energy	1 to 7
2			Credit 3	Enhanced Commissioning	2
		2	Credit 4	Enhanced Refrigerant Management	2
1	2		Credit 5	Measurement and Verification	3
2			Credit 6	Green Power	2

Materials and Resources — Possible Points: 14

Y	?	N			
6	1	7		Materials and Resources	Possible Points: 14
Y			Prereq 1	Storage and Collection of Recyclables	
		3	Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
		1	Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
2			Credit 2	Construction Waste Management	1 to 2
		2	Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

Y	?	N			
2			Credit 4	Recycled Content	1 to 2
2			Credit 5	Regional Materials	1 to 2
		1	Credit 6	Rapidly Renewable Materials	1
	1		Credit 7	Certified Wood	1

Indoor Environmental Quality — Possible Points: 15

Y	?	N			
10	1	4		Indoor Environmental Quality	Possible Points: 15
Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
		1	Credit 1	Outdoor Air Delivery Monitoring	1
		1	Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan—During Construction	1
	1		Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1			Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1			Credit 5	Indoor Chemical and Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems—Lighting	1
1			Credit 6.2	Controllability of Systems—Thermal Comfort	1
1			Credit 7.1	Thermal Comfort—Design	1
		1	Credit 7.2	Thermal Comfort—Verification	1
		1	Credit 8.1	Daylight and Views—Daylight	1
1			Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

Y	?	N			
6				Innovation and Design Process	Possible Points: 6
1			Credit 1.1	Innovation in Design: Exemplary Performance for SSc2	1
1			Credit 1.2	Innovation in Design: Exemplary Performance for SSc4.1	1
1			Credit 1.3	Innovation in Design: Exemplary Performance for SSc7.1	1
1			Credit 1.4	Innovation in Design: Pest Management	1
1			Credit 1.5	Innovation in Design: TBD	1
1			Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

Y	?	N			
2	1	1		Regional Priority Credits	Possible Points: 4
		1	Credit 1.1	Regional Priority: SSc3	1
	1		Credit 1.2	Regional Priority: SSc6.1	1
1			Credit 1.3	Regional Priority: SSc7.1	1
1			Credit 1.4	Regional Priority: SSc7.2	1

Total — Possible Points: 110

Y	?	N		
60	11	39	Total	Possible Points: 110

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

Boston Green Building Credits — Possible Points: 4

Y	?	N				
	3	1			Boston Green Building Credits	Possible Points: 4
Y			d	Prereq 1	Retrofit Diesel Construction Vehicles	
Y			d	Prereq 2	Outdoor Construction Management Plan	
Y			d	Prereq 3	Integrated Pest Management Plan	
	1		d/C	Credit 1.1	Modern Grid	1
		1	d/C	Credit 1.2	Historic Preservation	1
	1		d/C	Credit 1.3	Groundwater Recharge	1
	1		d/C	Credit 1.4	Modern Mobility	1

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Figure 6.1

WP-B1 Preliminary LEED Scorcard

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

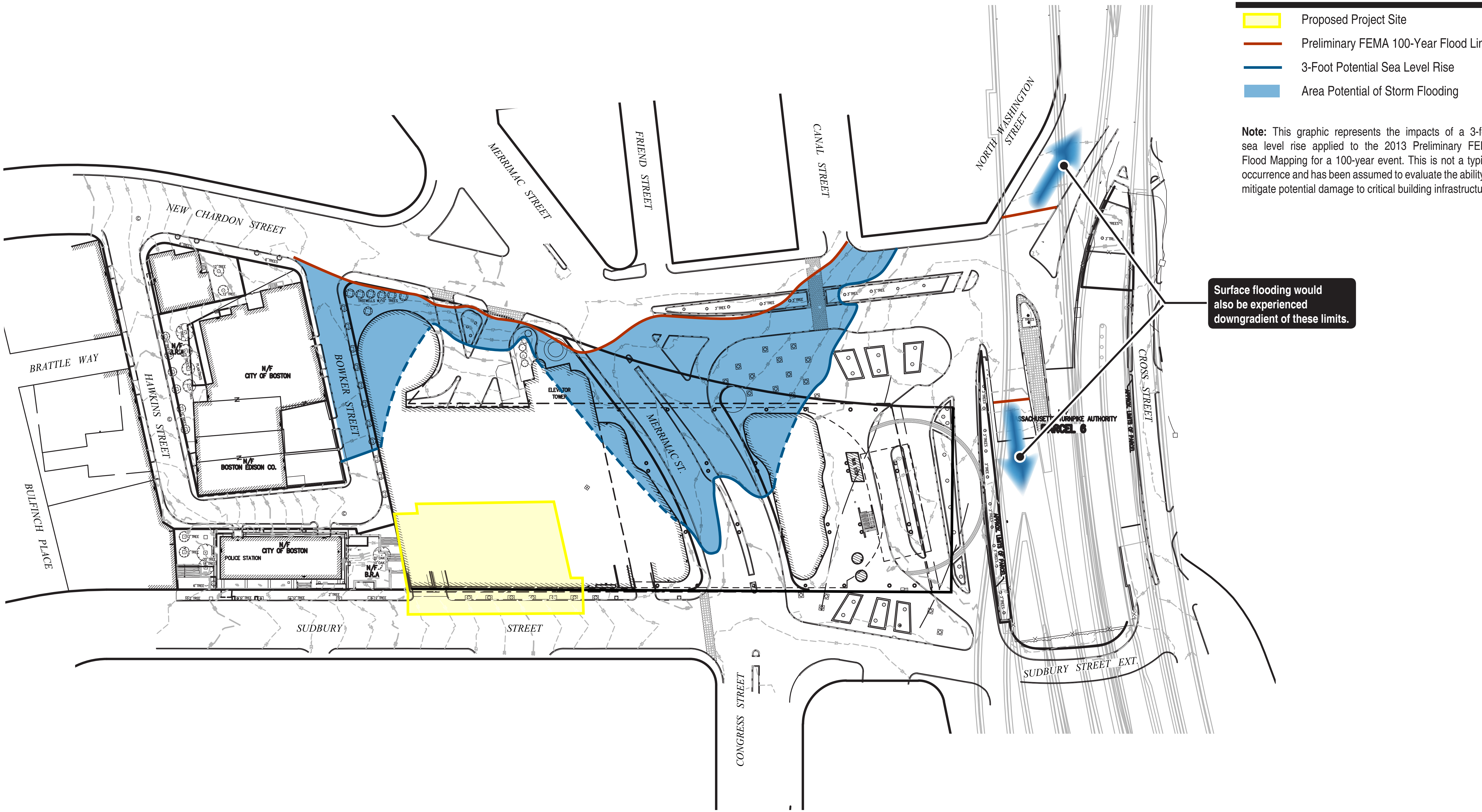

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Figure 6.2

Predicted Sea Level Rise

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

7

Infrastructure

An assessment of infrastructure demands of the Development Plan Project was conducted as part of the previous City of Boston Article 80 and state MEPA review filings. In accordance with the approved PDA, this chapter presents an update on the infrastructure demands based on the more specific design and program of the Proposed Project. This chapter provides a comparison of the infrastructure demands of current Proposed Project versus the program presented in the 2013 DPIR. The Proposed Project development program presented herein represents an increase the number of residential units by 22 units and a reduction in retail space by 1,300 square feet. The additional residential units are not expected to significantly increase overall utility demands from the Development Plan Project projections.

As with the Development Plan Project, the Proposed Project will utilize the existing water, sewer, electrical and natural gas systems available in public streets adjacent to the Proposed Project Site. These systems, as shown on Figure 7.1, include those owned or managed by the Boston Water and Sewer Commission (BWSC), private utility companies, and on-site infrastructure systems. Research indicates that these services are available at the Proposed Project Site frontage.

7.1 Key Findings

The key findings related to infrastructure systems include:

- The Proposed Project, as defined in Chapter 1, *Project Description*, does not substantially change the infrastructure requirements from those presented in the 2013 DPIR. The additional approximately 22 residential units will be offset by an identical unit reduction in the future WP-B3 project.
- The Project Site is currently serviced by the BWSC for domestic and fire protection water and sanitary sewage conveyance.
- Based upon sewage generation rates outlined in the DEP Sewer Connection and Extension Regulations, 310 CMR 15.203.f, the Proposed Project is estimated to generate approximately 54,738 gallons per day (net new) of sanitary sewage and will require approximately 60,212 gallons of water per day (net new).

- Construction of the Proposed Project will incorporate on-site stormwater management and treatment systems that will improve water quality, reduce runoff volume, and control peak rates of runoff in comparison to existing conditions. This system will comply with the 2008 DEP Stormwater Management Policy and Standards.
- As part of the overall sustainability plan, the Proposed Project may utilize harvested rainwater for demands such as irrigation, cooling tower or other mechanical make-up water. The Project is currently planning to provide at least 8,500 gallons of storage to harvest the first 1-inch of rainfall.
- In order to reduce water usage, the Proponent is planning to install low-flow and low-consumption plumbing fixtures, in compliance with Article 37 of the Zoning Code.
- Direct metering and payment of utilities by users has been shown to reduce actual usage of those utilities. Therefore, as a way to encourage energy and water conservation, the Proponent is proposing to sub-meter water and electrical usage for the residential units and bill back to the residential tenants.

7.2 Sanitary Sewer

Local sanitary sewer service is provided by BWSC via the following systems (Figure 7.1):

- An 18-inch sanitary sewer located in New Sudbury Street to Merrimac Street (also known as Congress Street for this portion of the roadway), which flows to the Merrimac Street/New Chardon Street intersection, ultimately connecting to the West Side Interceptor; and
- 12-inch sanitary sewers in Bowker Street that connect to a 15-inch sanitary sewer in New Chardon Street that ultimately connects to the West Side Interceptor.

Both sanitary sewer systems eventually discharge to the Deer Island Treatment Plant for treatment and disposal.

Based on conceptual design, the 2013 DPIR estimated that WP-B1 (residential building) would generate approximately 51,158 gallons per day of sanitary sewer. The minor proposed changes in the program associated with the current building design (assuming 1.5 bedrooms per additional unit) would increase sanitary sewer generation by approximately 3,580 gallons per day for a total of 54,738 gallons per day. The sanitary sewer pipes available in the adjacent public streets have full-flow capacities ranging from approximately 1,850,000 gallons per day to 8,380,000 gallons per day. These capacities are far in excess of Project-generated wastewater.

Sanitary sewer connections for the Project are likely to be on New Sudbury Street. Sanitary sewers are available along the Proposed Project Site frontage and should be available at numerous locations. Individual building connections will be determined as the design advances and will be included in BWSC Site Plan approval filings. The Proponent will submit a

General Service Application and site plan to the BWSC for review at the appropriate time of design.

As discussed in the MEPA filings, the Proponent will work with BWSC to develop an Infiltration and Inflow (I/I) mitigation plan with the likely mechanism being a contribution to BWSC's I/I mitigation fund, using 4:1 ratio as the basis.

7.3 Water Supply

Domestic and fire protection water at the Proposed Project Site is provided by BWSC in the following streets and sizes (Figure 7.1):

- A 16-inch fire service main in New Sudbury Street;
- A 12-inch Southern High (SH) main in New Sudbury Street;
- 12-inch SH mains in Bowker Street; and
- 12-inch and 8-inch SL mains in Bowker Street.

Domestic water demand is based on estimated sewage generation with an added factor of 10 percent for consumption, system losses and other use. Based upon sewage generation rates outlined in the MassDEP Sewer Connection and Extension Regulations, 310 CMR 15.203.f, the Project will require approximately 60,212 gallons per day of domestic water. The BWSC has robust water infrastructure in the streets surrounding the Proposed Project.

Regarding air conditioning make-up water, the Proposed Project is in the schematic stage and specific MEP equipment has not been selected. Also, as noted in the 2013 DPIR, the Proponent is exploring the use of harvested rainwater to provide air conditioning make-up water. Other water conservation measures being considered or incorporated into the Proposed Project design and operations are described more fully in Chapter 6, *Sustainability/Green Building and Climate Change Preparedness*. Such potential water conservation measures include:

- Installation of low-flow and low-consumption plumbing fixtures and appliances in all residential units to achieve a minimum 20 percent water efficiency with a target to reduce water usage by up to 35 percent;
- Harvesting of rainwater for irrigation purposes;
- Rainfall sensors for irrigated roof deck areas; and
- Sensor operated faucets and lavatories for common area restrooms.

The Proponent is also proposing to sub-meter water usage for the residential units and retail tenants that have high water usage. This water usage would then be billed back directly to the residential tenants and high-water demand retail tenants. Direct metering and payment of utilities by users has been shown to reduce actual usage of those utilities.

7.4 Stormwater Management

The Proposed Project is located in a densely developed urban area consisting mostly of impervious rooftops and impervious paved surfaces. BWSC owns and maintains an extensive system of catch basins, manholes, and drain pipes in the area immediately adjacent to the Proposed Project Site. This system of pipes, catch basins and manholes drains to specific areas within the Charles River Watershed.

The storm drainage system serving the Proposed Project Site drains primarily to the Charles River. The surface drainage for New Sudbury Street, Merrimac Street/Congress Street, New Chardon Street and Bowker Street drains to Combined Sewer Outfall (CSO) 049 in Charles River near the Nashua Street Jail.

Local storm drain service is provided to the Proposed Project Site by BWSC via a 15-inch storm drain in Bowker Street connects to a 36-inch storm drain in New Chardon Street; and a 30-inch storm drain in New Sudbury Street connects to a 42-inch storm drain in Merrimac Street (Figure 7.1).

The Proposed Project will not result in significant changes in the stormwater management approach from that proposed in the approved 2013 DPIR. As discussed in the 2013 DPIR, the Proposed Project will introduce stormwater control measures that will both improve water quality and reduce runoff. The specific stormwater controls to be incorporated into the Proposed Project will be defined and submitted to BWSC as part of the Site Plan Approval Process.

In order to address treatment of the first inch of stormwater runoff over the Proposed Project Site, per BWSC requirements and Lower Charles TMDL standards (equivalent to an estimated volume of 8,500 gallons), the Proponent is exploring the use of stormwater control measures, as follows:

- *Subsurface infiltration systems* – the Proponent is evaluating the use of vertical injection wells to provide stormwater recharge.
- *Green roofs* – the Proponent is including green roofs.
- *Rainwater harvesting* – the Proponent is evaluating the harvesting of roof runoff for use in mechanical make-up water, and irrigation. The Proposed Project currently includes a harvesting tank sized for 8,500 gallons (equivalent to the 1st 1-inch of precipitation).
- *Sidewalk infiltration* - the use of permeable pavement strips and/or tree pit filtration along curb lines is being considered as a method to improve sidewalk runoff water quality.
- *Proprietary treatment devices* – proprietary filter devices (i.e. JellyFish, Vortechnics, etc.) may also be used as a method to improve stormwater quality.

Given that, under existing conditions, the Proposed Project Site is virtually impervious, the new residential building is not expected to result in the introduction of any additional peak flows, volumes, pollutants or sediments that would potentially impact the receiving waters of the BWSC's stormwater drainage system. In fact, with the introduction of the stormwater control measures currently planned, runoff rates and volumes will be reduced, lessening the Proposed Project Site's impact on BWSC's system, and, therefore, stormwater runoff quality will be improved.

The MEPA DEIR demonstrated how the Development Plan Project intends to be consistent with applicable MassDEP Stormwater Management Standards. As presented herein, the Proposed Project is not proposing any changes to the stormwater conditions analyzed in the previous filings.

7.5 Energy

7.5.1 Electricity

Eversource operates underground electric systems in New Sudbury Street and Bowker Street. These systems include primary power serving an existing electrical substation on Hawkins Street. The daily electrical demand of the Proposed Project is estimated to be approximately 4,000 kilowatt (kW). The Proponent and NSTAR have met concerning the Proposed Project and NSTAR will provide service from New Sudbury Street. As design progresses, the Proponent and NSTAR will coordinate the final design and installation of electrical service.

7.5.2 Natural Gas

The estimated natural gas demand for the Proposed Project is estimated to be approximately 23,000 cubic foot per hour (CFH). Should the Proponent elect to use steam as an energy source, natural gas demand would be reduced, as evaluated in Section 6.6.2.4 of Chapter 6, *Sustainability/Green Building and Climate Change Preparedness*. Alternatively, a 75-kW CHP system is also being considered, which would increase the natural gas demand by 930 to 1,860 cubic feet per hour depending on if one or two CHP systems are utilized. This would require approval from the electric utility.

National Grid has two existing natural gas mains that could potentially serve the Proposed Project: a 6-inch main in Bowker Street; and a 16-inch main in New Sudbury Street. The Proponent has met with National Grid and has identified that the intermediate pressure 16-inch main in New Sudbury Street can serve the Proposed Project. As design progresses, the Proponent will further coordinate with National Grid to further define the service requirements.

7.5.3 Steam

Veolia/Trigen owns underground steam system in the vicinity of the Proposed Project Site, including:

- A 14-inch main in Merrimac Street/Congress Street;

- A 12-inch main in New Chardon Street; and
- A 6-inch main in Bowker Street.

The Proponent and Veolia/Trigen have met numerous times to discuss the possibility of utilizing steam for the Proposed Project, which would require an estimated 24,000 pounds per hour. To serve the Proposed Project, a service lateral in New Sudbury Street may be required. Should the Proponent elect to use Veolia/Trigen steam for heating and/or hot water needs, the Proponent and Veolia will coordinate the final design and installation of steam infrastructure.

7.6 Other Utilities

The Proponent will select private telecommunications companies to provide telephone, cable and data services. There are several potential candidates with substantial downtown Boston networks capable of providing service and there are numerous duct bank systems in the streets abutting the Proposed Project Site. Upon selection of a provider or providers, the Proponent will coordinate service connection locations and obtain appropriate approvals. Comcast has indicated it can provide service to the Proposed Project via existing infrastructure in Bowker Street. Other telecommunications providers currently provide service to the Proposed Project Site.

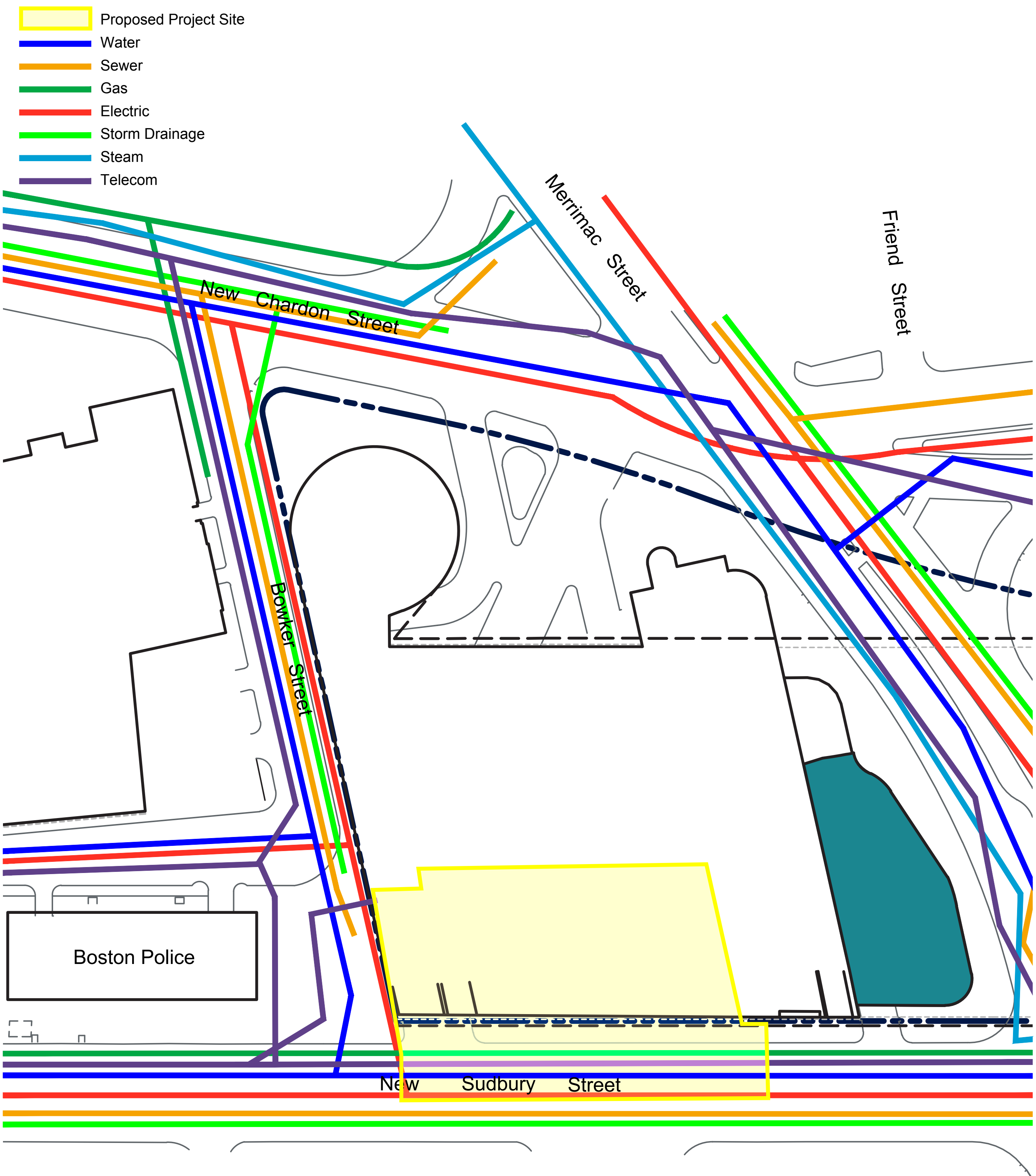


Figure 7.1
Existing Utility Infrastructure

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

8

Historic Resources

This chapter provides information on the inventoried and listed historic properties that are on and within a ¼-mile radius of the Proposed Project Site and possible impacts to them as a result. Inventoried and listed property information was obtained from the Boston Landmarks Commission (BLC), the Massachusetts Historical Commission (MHC), the Massachusetts Cultural Resource Information System (MACRIS), and the MHC on-line database.

8.1 Key Findings

The key findings related to historic and cultural resources include:

- The Proposed Project Site includes the Government Center Garage (MACRIS Inventory Number: BOS.2024), which is not yet 50 years of age, but was originally inventoried by the BLC in 1980 and evaluated for probable significance in 2009.
- Because the Proposed Project Site consists of a building from 1966 it is assumed that there is no potential for archaeological resources as a result of extensive ground disturbance.
- The single National Register of Historic Places resource is the Bulfinch Triangle Historic District, which is within ¼-mile of the Proposed Project Site located to the north (Figure 8.1).
- The potential impacts related to pedestrian-level wind, shadows, vehicle traffic, and views on surrounding historic resources as a result of the Proposed Project remain insignificant, as with the Development Plan Project.
- As with the Development Plan Project, the refined design of the new building and surrounding public realm upgrades will improve the overall urban design setting of the area, in contrast to the current setting that is dominated by the Garage and its associated limited and deteriorated streetscape elements along the adjacent public ways (New Sudbury and Bowker Streets).

8.2 Development Plan Project Review Overview

The 2013 PNF assessed the potential Proposed Project-related impacts on historic resources related to pedestrian-level wind, shadows, vehicle traffic, and views. As demonstrated in the 2013 DPIR, the revised building heights resulted in a reduction in shadows and vehicle traffic and, therefore, the Proposed Project will continue to have limited to no impacts associated with net new shadow and vehicle trips on the surrounding historic properties. The findings of the pedestrian wind study conducted as part of the 2013 DPIR showed potential for high wind activity and/or channeling flows at the PDA Site. Therefore, a key goal of project design has been to continue to assess and test mitigation for potential adverse wind conditions at the ground plane within and nearby to the PDA Site through design. The results of the updated pedestrian-level wind study for the WP-B1 building as the first phase of the Development Plan Project are presented in Section 5.3 of Chapter 5, *Environmental Protection*.

The Proponent also held informational meetings with the Boston Environment Department (BED) during their review of the 2013 DPIR as well as Boston Landmarks Commission (BLC) staff. The meeting with the BED resulted in a better understanding of the potential shadow impacts. BLC staff members were updated on the ongoing MHC review under the MEPA process and were provided all supplemental information submitted in response to MHC's review comments. At the BLC meeting, it was confirmed that the Government Center Garage building is not subject to Article 85 (Demolition Delay) of the Boston Zoning Code because only partial demolition is proposed.

In accordance with the PDA, updated building design/architectural details and environmental impact studies, including understanding potential impacts on historic resources based on a more refined building design is required as part of the Article 80B, Large Project Review for the Proposed Project. Specific measures intended to mitigate, limit, or minimize impacts, where appropriate, as required by local, state, and federal regulation are also discussed herein. Additionally, the Proponent plans to meet with the BLC staff to present the design update.

8.2.1 MHC Review of Proposed Project Effects

In December 2013, the Proponent submitted the EENF to commence MHC's review of the Development Plan Project in place of submitting a separate Project Notification Form. On January 14, 2014, MHC issued a comment letter on the EENF requesting additional information in order to determine what effect the Development Plan Project may have on surrounding historic resources. Specifically, MHC requested printouts of the shadow and visual studies originally completed as part of the BRA 2013 DPIR filing and included in Appendix B of the EENF (provided electronically on a CD-ROM). On February 7, 2014, the Proponent provided a hardcopy of this extensive shadow study. The Proponent also enclosed hard copies of building elevations and site sections to provide a sense of size, scale, and massing of the Development Plan Project as well as the view impact studies, including pedestrian level view perspectives. MHC reviewed these materials and issued a comment letter dated March 7, 2014 requesting additional visual studies, which the Proponent provided on April 15, 2014. The additional representative perspectives were developed from specified properties listed in the State and National Register to assist MHC in determining what effect the size, scale, and massing the Proposed Project may have on the character and setting of the nearby historic properties.

In its determination letter dated May 27, 2014 and, again, in a June 19, 2014 comment letter on the DEIR, MHC requested additional information to eliminate or minimize the adverse effect of the Development Plan Project on the Bulfinch Triangle and Blackstone Block Historic Districts, and the Sears' Crescent and Sears' Block buildings. The Proponent issued a response on July 10, 2014 requesting MHC arrange a meeting with consulting parties to discuss appropriate ways to mitigate potential adverse effects of the Development Plan Project. On August 8, 2014, MHC issued a response letter requesting additional information (design alternatives) in preparation for the consultation meeting. The Proponent is currently preparing the supplemental information requested by MHC. In accordance with the determination, beyond the conclusion of the MEPA review process, the Proponent is committed to participating in the consultation process, pursuant to 950 CMR 71.00.

8.3 Existing Historic Resources

The Proposed Project Site is located in the 1964 Government Center Urban Renewal District, which was the focus of clearance and new construction for a nexus of local, state, and federal government offices and other related facilities in the 1960s and 1970s. The Proposed Project Site is surrounded by numerous older neighborhoods and districts of Boston, including the Bulfinch Triangle to the north, the North End to the east, and Government Center and Faneuil Hall to the south.

The inventoried and listed districts and properties on and within a ¼-mile radius are shown on Figure 8.1. The list is arranged by the following designations:

- National Register districts
- National Register individually listed properties
- MHC inventoried areas (documented on Form A or a BLC street inventory form)
- MHC individually inventoried properties, outside of the North End
- MHC individually inventoried properties within the North End (that are within the ¼-mile radius)

For greater context, Figure 8.2 identifies all of the inventoried properties within the ¼-mile radius as well as National-Register listed properties within a larger area of the downtown area.

8.3.1 Government Center Garage (BOS.2024)

The Government Center Garage (BOS.2024) was originally inventoried by the BLC in 1980. Additional information on the building and a consultant evaluation of possible significance when it reaches the age of 50 years (2016) was completed in June 2009 for the BLC. The evaluation of significance noted the free-standing nature of the Garage, which is rare for a Downtown Boston garage structure in the mid-to-late 20th century and its unusual multi-modal functions, its association with the firm of Kallman, McKinnell & Knowles (who designed Boston's City Hall) and Samuel Glaser & Associates, and as an element of the Government Center mid-20th century urban renewal development.

The building, which dates to 1966, was jointly designed by Saul Glaser & Associates and Boston City Hall's architects, Kallman, McKinnell & Knowles. The large scale building with some ground-level retail covers two city blocks and spans Congress Street. Designed in the Brutalist style, the building is composed of pre-cast concrete elements that include beams, columns piers, and spandrels.

8.3.2 Adjacent and Nearby Inventoried and Listed Properties

The MBTA Haymarket Station on the East Parcel has been assigned two MHC inventory numbers (BOS.920 and BOS. 923), but no forms were found at either the BLC or the MHC. The station elements were recorded as part of the MBTA Phase I Survey. The date assigned to BOS.920 is 1905, while BOS.923 has a date of 1898. These construction dates certainly do not correspond to the above-ground infrastructure of the station, which dates to the 1960s and more recent alterations.

Directly west of the Garage on the west side of Bowker Street are four inventoried properties: the District 1 Police Station (BOS.2023), a 1968 structure which fronts on New Sudbury Street; the Temporary Home for Women (BOS.1904) at 40-50 Bowker Street, which dates to 1924; Overseers of the Public Welfare Building (BOS. 1783), which carries the address of 35 Hawkins Street and also dates to 1924; and the Boston Edison substation (BOS.948) at 33 Hawkins Street, which was built in 1927 (Figure 8.1). In previous reviews of the Proposed Project Site, MHC stated that the last two named properties (Overseers of the Public Welfare Building and the Boston Edison Substation) were eligible for the National Register of Historic Places under Criterion A (association with significant events) at the local level (Brona Simon to Secretary Ian A. Bowles, April 21, 2009).

South of the Proposed Project Site is the John F. Kennedy Federal Office Building (BOS.1617), which also dates to 1966 and shares the mid-20th century urban renewal story of this area (Figure 8.1). The building has not been subject to an official evaluation of its National Register eligibility, due to its age; the 2009 update of the inventory form for the building recommended an assessment of its eligibility when it reached 50 years of age (2016).

Only one National Register of Historic Places district is in the vicinity of the Proposed Project Site—the Bulfinch Triangle Historic District (the "District"). The District is located north of the Proposed Project Site (Figure 8.1). The District contains a collection of mainly late 19th and early 20th century brick warehouse and commercial buildings.

8.3.3 Archeological Resources

As the Proposed Project Site consists of a building from 1966, it is assumed that there is no potential for archaeological resources as a result of extensive ground disturbance. With regard to archaeology, the Garage is located at the southern end of the former Mill Pond, the location of significant industrial pursuits of Colonial Boston from 1643 through the filling of the area in the early 19th century. The present Garage structure straddles the shoreline of the former 1629 Shawmut Peninsula and the bay area of Mill Pond. The southwestern end of the Garage, the location of the Proposed Project, along what is now New Sudbury Street, is located on the original landmass of Boston.

According to BLC comments on the EENF, archaeological investigations for the Central Artery Tunnel project were conducted between 1987 and 1989, which recovered intact archaeological remains associated with wharves and wharf-related sites, landfill, and structures in the parcel immediately adjacent to the Garage. This archaeological site, the Mill Pond site (BOS-HA-14), produced valuable historical data relating to the period between 1630 and 1830. Due to the proximity of the Garage to this archaeological site and its similar environs, it is highly likely that the location of the Garage once contained similar important deposits. But, is it assumed that the construction of the Garage, the tunneling of the Boston and Maine Railroad, and later MBTA lines, and finally the dense brick structures located on the western portion of the project area in the late 19th century all have caused enough probable damage to the archaeological resources to not warrant archaeological survey.

8.4 Potential Project Impacts to Historic Resources

As described previously in Chapter 1, *Project Description*, the Proposed Project will cover/enclose the majority of the south-facing edge along New Sudbury Street from the southwest corner portion of the western half of the Garage to the pedestrian and vehicular access ramps with a new building façade along New Sudbury Street (refer to Figure 3.2a). The new building will wrap around a portion of the west-facing side of the Garage along Bowker Street where the rest of the Garage will remain a partially open parking garage with new (Figure 3.2a). While the Garage is an inventoried property, it has not been subjected to an official evaluation of its historic significance due to its relatively recent date of construction.

Based on a more refined building design, potential impacts of with the new residential building on surrounding historic resources in the vicinity of the Proposed Project Site have been considered and are discussed in the following sections. Specific measures intended to mitigate, limit, or minimize impacts, where appropriate, as required by local, state, and federal regulation is also discussed.

8.4.1 Design and Public Realm

As described in Chapter 3, *Urban Design*, the design of the new building and surrounding public realm upgrades will improve the overall urban design setting of the area, in contrast to the current setting that is dominated by the Garage and its associated limited and deteriorated streetscape elements along the New Sudbury Street frontage. Additionally, the extensive improvements associated with the proposed Bowker Street Pedestrian Connection aims to provide a new and inviting pedestrian connection and ease the scale of the adjacent structures. Per the BLC's request, the new building will have a dated cornerstone to allow those who are attentive to and value the architecture of the City to appreciate the historical context in which structures were conceived and built.

8.4.2 Shadow

As presented in Section 5.4 of Chapter 5, *Environmental Protection*, updated shadow studies have been provide that evaluate the shadows cast based on the current design of the Proposed Project compared to the 2013 DPIR shadows based on the conceptual massing. While the height of the building remains consistent with the approved Development Plan Project, the massing (i.e., building shape) has been refined from what was assumed in the 2013 2013 DPIR shadow study, as discussed in Section 3.3.1 of Chapter 3, *Urban Design*. When compared to the 2013 DPIR shadows, there are only slight differences in the net new shadow associated with the Proposed Project and, under some conditions, the shadow impact is improved (as indicated in yellow in Figure 5.2 through Figure 5.5).

As with the Development Plan Project, net new shadow is anticipated primarily on rooftops of buildings in the District starting in the morning during the winter (December 21 at 9AM). Under all three winter conditions, the shaping of the proposed residential building would result in an improvement in net new shadow on building rooftops compared to the 2013 DPIR massing (Figures 5.5a-c). Furthermore, as in the 2013 DPIR, the winter shadow conditions demonstrate that during the colder months (existing and net new) shadow moves across the District west to east starting at 8:00/9:00 AM and passing over the District by 1:00/2:00 PM providing for afternoon sunlight over the District. This afternoon sunlight would reduce the potential for ice damage on facades or roofs of historic structures. Under the rest of the conditions, new shadows are generally shorter over the District. Under all conditions, some of these buildings begin to be shaded by the existing buildings across Merrimac Street late in the afternoon. Therefore, the Proposed Project is not expected to significantly impact nearby historic properties from a shadow impact perspective.

8.4.3 Wind

Section 5.3 of Chapter 5, *Environmental Protection* (and Appendix C) presents the updated wind tunnel results based on the currently propose residential building design. The pedestrian-level wind study gave special attention was given to potential wind impacts on nearby historic resources, specifically the Bowker Street historic properties northwest of the Proposed Project Site.

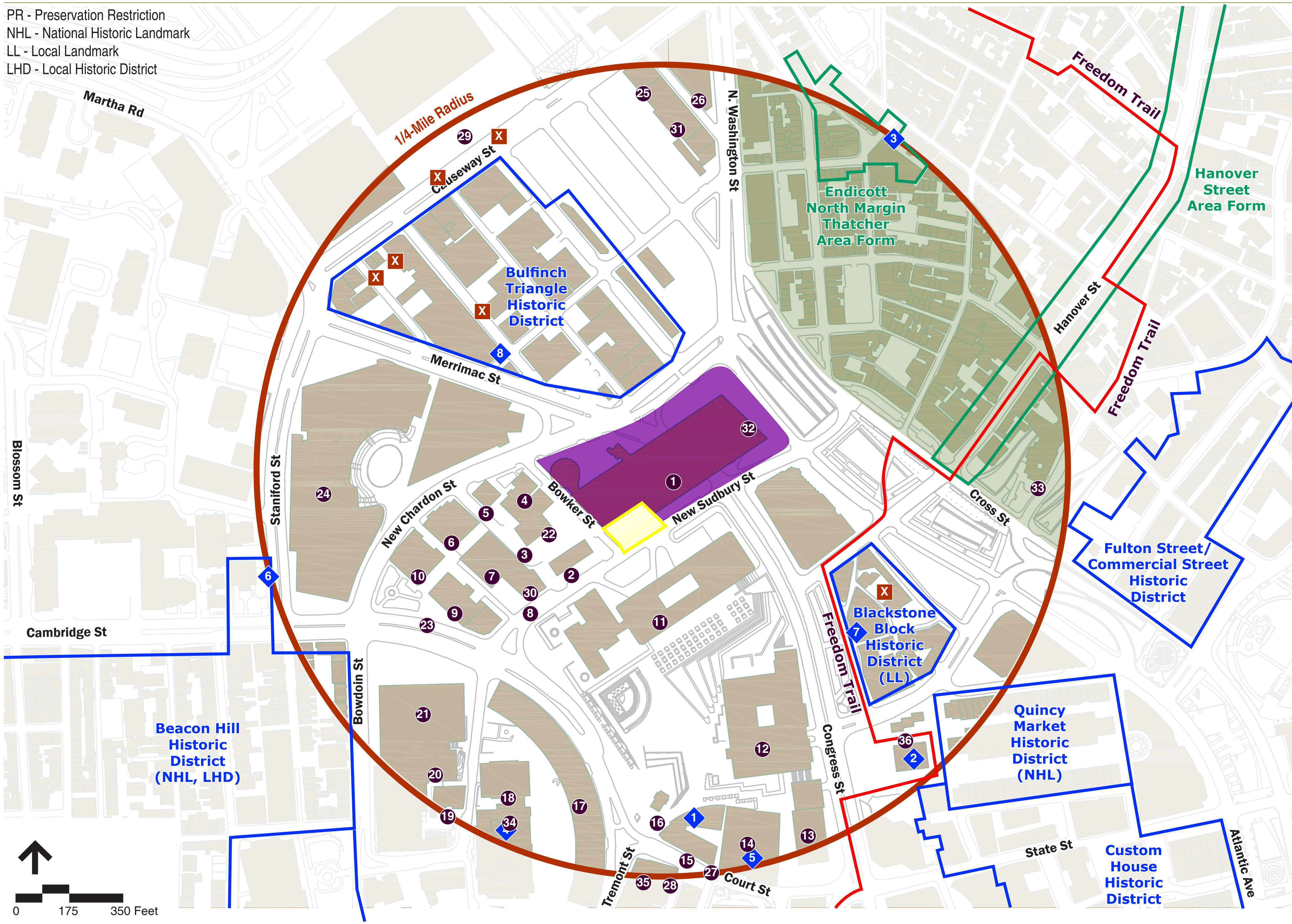
Under the mitigated Build Condition (with the addition of the Proposed Project and landscaping along New Sudbury Street), pedestrian-level wind comfort, overall wind conditions are expected to be either similar or better than under the No-Build Condition. As demonstrated by the wind study, the Proposed Project is not expected to significantly impact nearby historic properties from a pedestrian wind perspective.

8.4.4 View Corridors

Figures 3.6a through 3.6i present the updated view perspectives based on the currently proposed residential building design. These visual studies aim to illustrate the potential effect of the size, scale, and massing of the proposed buildings on historic properties in the vicinity of the Proposed Project.

As demonstrated by these illustrations, the Proposed Project is not expected to have a negative view impact in the historical context of the District or other surrounding historic properties. Views of the existing garage structure from the National Register-listed Bulfinch Triangle Historic District were not among the characteristics for which the resource was listed. Similarly, views of the Proposed Project from the Bowker and Hawkins Street properties will not affect these properties as any significance they might possess does not include their setting. Additionally, their current setting has been greatly altered since their original construction.

PR - Preservation Restriction
NHL - National Historic Landmark
LL - Local Landmark
LHD - Local Historic District



PDA Site
Proposed Project Site
National Register Historic Districts
MHC Inventoried Area

National Register Individually Listed Properties

1. Sears Crescent and Block
2. Faneuil Hall (NHL, PR, LL)
3. Vermont Building
4. John Adams Courthouse
5. Ames Building (LL)
6. Old West Church (NHL, PR)
7. Union Oyster House (NHL, LL)
8. 138-142 Portland Street

MHC Individually Inventoried Properties

1. Government Center Parking Garage
2. District 1 Police Station
3. Boston Edison Substation
4. Overseers of the Public Welfare Building
5. O'Neal Building (Jewish Family and Children's Services)
6. Royal Globe Insurance Company
7. R.K.O. General Building
8. One Bulfinch Place
9. New England Telephone and Telegraph
10. Bulfinch Building
11. JFK Federal Building
12. Boston City Hall
13. New England Merchants National Bank
14. One Washington Mall
15. City Bank and Trust Building
16. Government Center MBTA Station
17. One, Two and Three Center Plaza
18. Suffolk County Courthouse Addition
19. Metropolitan District Commission Building
20. McCormack Office Building
21. Leverett Saltonstall Building
22. Temporary Home for Women
23. Bowdoin Street MBTA Station
24. Lindemann Mental Health Center
25. Dow Braman and Company Building
26. Keaney Square Building
27. Old Colony Trust Building
28. United States Trust Company Building
29. North Station MBTA Substation and Signal Tower
30. Capital Bank Building
31. 6-24 Medford Street
32. Haymarket MBTA Station
33. Traffic Tunnel Administration Building
34. Rufus Choate Statue
35. Hemenway Building
36. Faneuil Hall Greenhouses

X MHC Individually Inventoried Properties Demolished

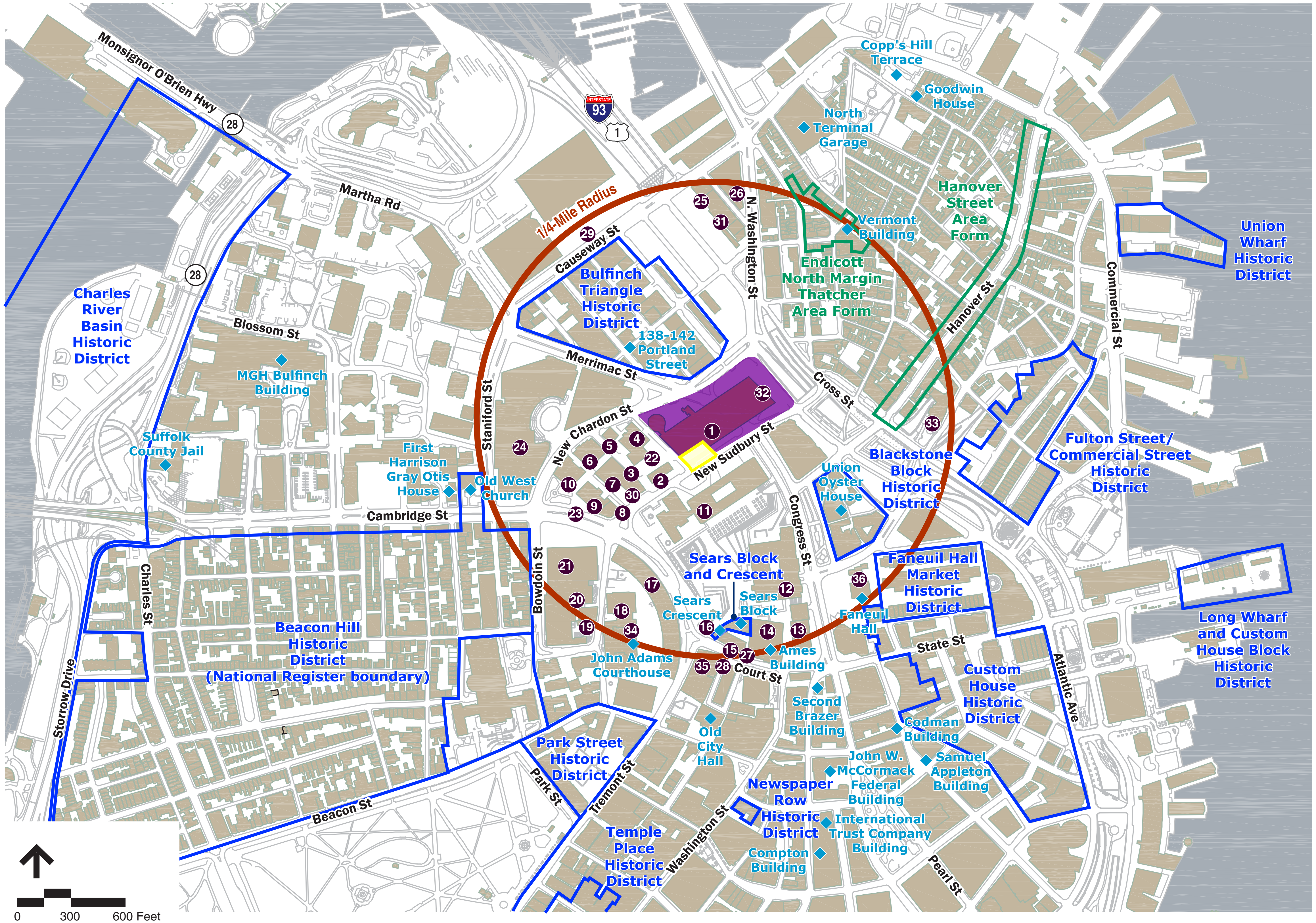
North End - Please see Table 8-1 for list of properties

Figure 8.1

Historic Resources in the Vicinity of the Project Site

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

Source: BWSC CAD file, 2010



PDA Site

Proposed Project Site

National Register Historic Districts

Area Form

MHC Inventoried Properties within a 1/4-Mile radius of Project Site (see list of properties on Figure 8.1)

National Register Individually Listed Properties

THE HYM INVESTMENT GROUP, LLC

vhb Figure 8.2

Inventoried and Designated Resources within the 1/4-mile radius of the Project Site and National Register Districts and Individually-Listed Properties in the Vicinity

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts

Source: BWSC CAD file, 2010

9

Project Certification

This Expanded Project Notification Form, or EPNF, has been submitted to the Boston Redevelopment Authority, as required by Article 80B of the Zoning Code, on the 16th of November, 2015.

Proponent

The HYM Investment Group, LLC

Thomas O'Brien

Managing Partner

Preparer

Vanasse Hangen Brustlin, Inc.

Lauren DeVoe, AICP, LEED AP BD+C

Senior Environmental Planner

APPENDIX A: Letter of Intent

Bulfinch Congress Holdings, LLC
c/o The HYM Investment Group, LLC
One Congress Street
Boston, MA 02114

June 3, 2014

BY HAND

Brian P. Golden, Acting Director
Boston Redevelopment Authority
9th Floor City Hall
One City Hall Plaza
Boston, MA 02201-1007

Re: Letter of Intent to File Project Notification Form
Government Center Garage Phase 1 - Residential Project

Dear Mr. Golden:

In accordance with the Mayor's Executive Order entitled "An Order Relative To The Provision Of Mitigation By Development Projects In Boston", Article 80 of the Boston Zoning Code ("Code") and the provisions of the Development Plan for Planned Development Area No. 96, Redevelopment of the Government Center Garage ("Garage"), approved by the Boston Redevelopment Authority ("BRA") on November 14, 2013 ("Development Plan") and approved by the Boston Zoning Commission on December ("BZC") on December 11, 2013, this Letter of Intent is submitted to the BRA on behalf of Bulfinch Congress Holdings LLC ("BCH"), represented by The HYM Investment Group, LLC ("HYM"), for the Government Center Garage Phase 1- Residential Project ("Project").

The Government Center Garage Phase 1 - Residential Project (aka: West Parcel Building One Component or WPB1) involves the development of a 480 foot tall residential building, consisting of approximately 543,300 square feet of gross floor area and approximately 464 dwelling units, to be located on the southwest corner of the Garage site, along New Sudbury Street, all as consistent with the parameters of the approved Development Plan.

In accordance with the Development Plan, BCH is submitting this Letter of Intent within six (6) months after the approval of the Development Plan by the BZC on December 11, 2013.

The Project will provide the following improvements and benefits to the area:

1. The Project will commence the transformation of the underutilized Garage into a new vibrant mixed use development and is the first step towards removing the existing Garage from its current prominent position over Congress Street and close to the Rose Kennedy Greenway.

2. The Project will add approximately 550 - 650 residents to an area that often has little activity after 5:00 pm, greatly improving the vibrancy and economic activity of the area.

3. The Project will enhance and activate a major portion of New Sudbury Street with new streetscape improvements and a new residential lobby, which will enliven a key downtown pedestrian corridor that connects Beacon Hill to the North End.

4. The Project will incorporate a number of key bicycle improvements including a new Hubway Station at Haymarket Station, bicycle lanes on New Sudbury Street, bicycle parking for the Project residents and short term bicycle parking near the residential lobby.

5. The Project will enhance the existing neglected and degraded public pedestrian mid-block connection at Sudbury Street and Bowker Street, an important pedestrian cross connection from Chardon Street to Sudbury Street.

6. The Project will comply with Boston's Inclusionary Housing Policy.

7. The Project will be at the forefront of sustainability and is targeting LEED Gold, which will be one of four (4) LEED Gold buildings of the overall redevelopment, as committed to by HYM and BCH during the PDA approval process last year.

8. The Project will employ a development approach and schedule that will allow the construction of the Project and keep the existing Garage operational, ensuring a continued parking supply for the area and neighborhoods.

9. The Project will also create approximately 500 construction jobs and approximately $1.5 million in new annual tax revenue for the City.

HYM and BCH are very excited to commence this first phase of the redevelopment of the Government Center Garage and look forward to a close working relationship with the BRA, the Impact Advisory Group ("IAG"), neighborhood stakeholders, and city agencies during the Article 80 review of the Project.

Thank you for your consideration of this letter.

Very truly yours,

Thomas N. O'Brien

cc: Jeffrey J. Kanne
Eva H. Hill
Doug Manz
John Hurley
James H. Greene, Esquire

1498191_1

APPENDIX B: Transportation Supporting Documentation

N/S: North Washington/Surface Road
E/SE/W: I-93 Offramp/Onramp/New Chardon
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

File Name : 154673 D
Site Code : 2007190
Start Date : 9/23/2015

Groups Printed- Cars - Heavy Vehicles

	North Washington Street From North					I-93 Offramp From East					I-93/1-A Onramp From Southeast					Surface Road From South					New Chardon Street From West					
Start Time	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Int. Total
07:00 AM	108	80	222	0	0	0	102	3	7	0	0	0	0	0	0	0	0	0	0	0	6	95	0	0	0	623
07:15 AM	107	83	249	0	0	0	109	10	15	0	0	0	0	0	0	0	0	0	0	0	8	68	0	0	0	649
07:30 AM	118	84	219	0	0	0	121	5	13	0	0	0	0	0	0	0	0	0	0	0	6	92	0	0	0	658
07:45 AM	103	76	250	0	0	0	153	4	6	0	0	0	0	0	0	0	0	0	0	0	6	78	0	0	0	676
Total	436	323	940	0	0	0	485	22	41	0	0	0	0	0	0	0	0	0	0	0	26	333	0	0	0	2606
08:00 AM	116	79	207	0	0	0	137	1	10	0	0	0	0	0	0	0	0	0	0	0	15	115	0	0	0	680
08:15 AM	104	98	229	0	0	0	168	12	12	0	0	0	0	0	0	0	0	0	0	0	8	77	0	0	0	708
08:30 AM	108	92	200	0	0	0	135	3	8	0	0	0	0	0	0	0	0	0	0	0	21	94	0	0	0	661
08:45 AM	133	74	199	0	0	0	137	7	4	0	0	0	0	0	0	0	0	0	0	0	11	66	0	0	0	631
Total	461	343	835	0	0	0	577	23	34	0	0	0	0	0	0	0	0	0	0	0	55	352	0	0	0	2680
Grand Total	897	666	1775	0	0	0	1062	45	75	0	0	0	0	0	0	0	0	0	0	0	81	685	0	0	0	5286
Apprch %	26.9	20	53.2	0	0	0	89.8	3.8	6.3	0	0	0	0	0	0	0	0	0	0	0	10.6	89.4	0	0	0	
Total %	17	12.6	33.6	0	0	0	20.1	0.9	1.4	0	0	0	0	0	0	0	0	0	0	0	1.5	13	0	0	0	
Cars	821	565	1617	0	0	0	1040	43	70	0	0	0	0	0	0	0	0	0	0	0	68	637	0	0	0	4861
% Cars	91.5	84.8	91.1	0	0	0	97.9	95.6	93.3	0	0	0	0	0	0	0	0	0	0	0	84	93	0	0	0	92
Heavy Vehicles	76	101	158	0	0	0	22	2	5	0	0	0	0	0	0	0	0	0	0	0	13	48	0	0	0	425
% Heavy Vehicles	8.5	15.2	8.9	0	0	0	2.1	4.4	6.7	0	0	0	0	0	0	0	0	0	0	0	16	7	0	0	0	8

	North Washington Street From North						I-93 Offramp From East						I-93/1-A Onramp From Southeast						Surface Road From South						New Chardon Street From West						
Start Time	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	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	103	76	250	0	0	429	0	153	4	6	0	163	0	0	0	0	0	0	0	0	0	0	0	0	6	78	0	0	0	84	676
08:00 AM	116	79	207	0	0	402	0	137	1	10	0	148	0	0	0	0	0	0	0	0	0	0	0	0	15	115	0	0	0	130	680
08:15 AM	104	98	229	0	0	431	0	168	12	12	0	192	0	0	0	0	0	0	0	0	0	0	0	0	8	77	0	0	0	85	708
08:30 AM	108	92	200	0	0	400	0	135	3	8	0	146	0	0	0	0	0	0	0	0	0	0	0	0	21	94	0	0	0	115	661
Total Volume	431	345	886	0	0	1662	0	593	20	36	0	649	0	0	0	0	0	0	0	0	0	0	0	0	50	364	0	0	0	414	2725
% App. Total	25.9	20.8	53.3	0	0		0	91.4	3.1	5.5	0		0	0	0	0	0		0	0	0	0	0		12.1	87.9	0	0	0		
PHF	.929	.880	.886	.000	.000	.964	.000	.882	.417	.750	.000	.845	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.595	.791	.000	.000	.000	.796	.962
Cars	402	290	799	0	0	1491	0	589	19	32	0	640	0	0	0	0	0	0	0	0	0	0	0	0	42	337	0	0	0	379	2510
% Cars	93.3	84.1	90.2	0	0	89.7	0	99.3	95.0	88.9	0	98.6	0	0	0	0	0	0	0	0	0	0	0	0	84.0	92.6	0	0	0	91.5	92.1
Heavy Vehicles	29	55	87	0	0	171	0	4	1	4	0	9	0	0	0	0	0	0	0	0	0	0	0	0	8	27	0	0	0	35	215
% Heavy Vehicles	6.7	15.9	9.8	0	0	10.3	0	0.7	5.0	11.1	0	1.4	0	0	0	0	0	0	0	0	0	0	0	0	16.0	7.4	0	0	0	8.5	7.9

N/S: North Washington/Surface Road
E/SE/W: I-93 Offramp/Onramp/New Chardon
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION
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File Name : 154673 D
Site Code : 2007190
Start Date : 9/23/2015

Groups Printed- Peds and Bikes

	North Washington Street From North						I-93 Offramp From East						I-93/1-A Onramp From Southeast						Surface Road From South						New Chardon Street From West						
Start Time	Right	Thru	Bear Left	Left	Peds EB	Peds WB	Right	Thru	Left	Hard Left	Peds SB	Peds NB	Hard Right	Bear Right	Bear Left	Hard Left	Peds SWB	Peds NEB	Hard Right	Right	Thru	Left	Peds WB	Peds EB	Right	Bear Right	Thru	Left	Peds NB	Peds SB	Int. Total
07:00 AM	5	6	0	0	3	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	4	24
07:15 AM	5	10	0	0	4	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	16	57
07:30 AM	3	13	0	0	1	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	10	39
07:45 AM	2	23	0	0	1	30	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	4	27	92
Total	15	52	0	0	9	60	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	11	57	212
08:00 AM	2	22	0	0	4	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	17	64
08:15 AM	1	25	0	0	3	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	2	10	53
08:30 AM	3	23	0	0	6	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	9	25	85
08:45 AM	5	24	0	0	5	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	6	15	75
Total	11	94	0	0	18	56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	0	0	0	20	67	277
Grand Total	26	146	0	0	27	116	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	17	0	0	0	31	124	489
Apprch %	8.3	46.3	0	0	8.6	36.8	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	9.9	0	0	0	18	72.1	
Total %	5.3	29.9	0	0	5.5	23.7	0	0	0	0	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	3.5	0	0	0	6.3	25.4	

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

	North Washington Street From North							I-93 Offramp From East							I-93/1-A Onramp From Southeast							Surface Road From South							New Chardon Street From West							
Start Time	Right	Thru	Bear Left	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Hard Left	Peds SB	Peds NB	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds SWB	Peds NEB	App. Total	Hard Right	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Bear Right	Thru	Left	Peds NB	Peds SB	App. Total	Int. Total
07:45 AM	2	23	0	0	1	30	56	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	4	27	34	92
08:00 AM		22				15	43	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	17	21	64
08:15 AM		25																																10	15	53
08:30 AM		23				15	47	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	9	25	38	85
Total Volume		93			14	69	184	0	0	0	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11				18	79	108	294
% App. Total	4.3	50.5			7.6	37.5		0	0	0	0	100	0		0	0	0	0	0	0		0	0	0	0	0	0		10.2				16.7	73.1		
PHF	.667	.930	.000	.000	.583	.575	.821	.000	.000	.000	.000	.250	.000	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.688	.000	.000	.000	.500	.731	.711	.799

N/S: North Washington/Surface Road
E/SE/W: I-93 Offramp/Onramp/New Chardon
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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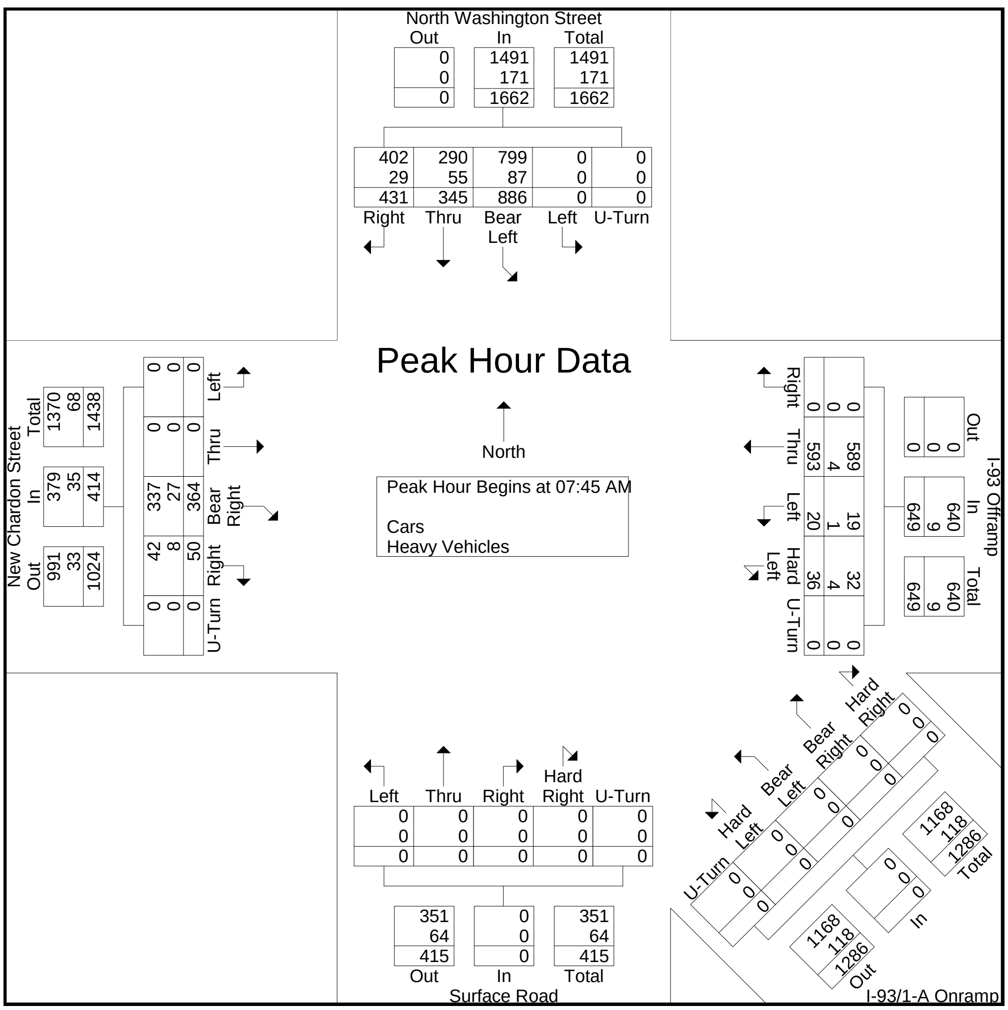
File Name : 154673 D
Site Code : 2007190
Start Date : 9/23/2015

	North Washington Street From North						I-93 Offramp From East						I-93/1-A Onramp From Southeast						Surface Road From South						New Chardon Street From West						
Start Time	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	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	103	76	250	0	0	429	0	153	4	6	0	163	0	0	0	0	0	0	0	0	0	0	0	0	6	78	0	0	0	84	676
08:00 AM	116	79	207	0	0	402	0	137	1	10	0	148	0	0	0	0	0	0	0	0	0	0	0	0	15	115	0	0	0	130	680
08:15 AM	104	98	229	0	0	431	0	168	12	12	0	192	0	0	0	0	0	0	0	0	0	0	0	0	8	77	0	0	0	85	708
08:30 AM	108	92	200	0	0	400	0	135	3	8	0	146	0	0	0	0	0	0	0	0	0	0	0	0	21	94	0	0	0	115	661
Total Volume	431	345	886	0	0	1662	0	593	20	36	0	649	0	0	0	0	0	0	0	0	0	0	0	0	50	364	0	0	0	414	2725
% App. Total	25.9	20.8	53.3	0	0		0	91.4	3.1	5.5	0		0	0	0	0	0		0	0	0	0	0		12.1	87.9	0	0	0		
PHF	.929	.880	.886	.000	.000	.964	.000	.882	.417	.750	.000	.845	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.595	.791	.000	.000	.000	.796	.962
Cars	402	290	799	0	0	1491	0	589	19	32	0	640	0	0	0	0	0	0	0	0	0	0	0	0	42	337	0	0	0	379	2510
% Cars	93.3	84.1	90.2	0	0	89.7	0	99.3	95.0	88.9	0	98.6	0	0	0	0	0	0	0	0	0	0	0	0	84.0	92.6	0	0	0	91.5	92.1
Heavy Vehicles	29	55	87	0	0	171	0	4	1	4	0	9	0	0	0	0	0	0	0	0	0	0	0	0	8	27	0	0	0	35	215
% Heavy Vehicles	6.7	15.9	9.8	0	0	10.3	0	0.7	5.0	11.1	0	1.4	0	0	0	0	0	0	0	0	0	0	0	0	16.0	7.4	0	0	0	8.5	7.9



N/S: North Washington/Surface Road
E/SE/W: I-93 Offramp/Onramp/New Chardon
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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File Name : 154673 DD
Site Code : 2007190
Start Date : 9/23/2015
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	North Washington Street From North					I-93 Offramp From East					I-93/1-A Onramp From Southeast					Surface Road From South					New Chardon Street From West					
Start Time	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Int. Total
04:00 PM	70	76	268	0	0	0	101	2	3	0	0	0	0	0	0	0	0	0	0	0	18	197	0	0	0	735
04:15 PM	76	74	263	0	0	0	88	2	1	0	0	0	0	0	0	0	0	0	0	0	13	228	0	0	0	745
04:30 PM	67	66	209	0	0	0	93	0	3	0	0	0	0	0	0	0	0	0	0	0	17	221	0	0	0	676
04:45 PM	62	79	248	0	0	0	100	2	4	0	0	0	0	0	0	0	0	0	0	0	30	224	0	0	0	749
Total	275	295	988	0	0	0	382	6	11	0	0	0	0	0	0	0	0	0	0	0	78	870	0	0	0	2905
05:00 PM	57	72	229	0	0	0	106	2	8	0	0	0	0	0	0	0	0	0	0	0	11	211	0	0	0	696
05:15 PM	82	80	260	0	0	0	108	4	2	0	0	0	0	0	0	0	0	0	0	0	10	214	0	0	0	760
05:30 PM	84	88	249	0	0	0	96	2	5	0	0	0	0	0	0	0	0	0	0	0	22	198	0	0	0	744
05:45 PM	65	65	186	0	0	0	103	0	1	0	0	0	0	0	0	0	0	0	0	0	23	204	0	0	0	647
Total	288	305	924	0	0	0	413	8	16	0	0	0	0	0	0	0	0	0	0	0	66	827	0	0	0	2847
Grand Total	563	600	1912	0	0	0	795	14	27	0	0	0	0	0	0	0	0	0	0	0	144	1697	0	0	0	5752
Apprch %	18.3	19.5	62.2	0	0	0	95.1	1.7	3.2	0	0	0	0	0	0	0	0	0	0	0	7.8	92.2	0	0	0	
Total %	9.8	10.4	33.2	0	0	0	13.8	0.2	0.5	0	0	0	0	0	0	0	0	0	0	0	2.5	29.5	0	0	0	
Cars	513	500	1784	0	0	0	770	14	24	0	0	0	0	0	0	0	0	0	0	0	134	1678	0	0	0	5417
% Cars	91.1	83.3	93.3	0	0	0	96.9	100	88.9	0	0	0	0	0	0	0	0	0	0	0	93.1	98.9	0	0	0	94.2
Heavy Vehicles	50	100	128	0	0	0	25	0	3	0	0	0	0	0	0	0	0	0	0	0	10	19	0	0	0	335
% Heavy Vehicles	8.9	16.7	6.7	0	0	0	3.1	0	11.1	0	0	0	0	0	0	0	0	0	0	0	6.9	1.1	0	0	0	5.8

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:45 PM

	North Washington Street From North						I-93 Offramp From East						I-93/1-A Onramp From Southeast						Surface Road From South						New Chardon Street From West						
Start Time	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Int. Total
04:45 PM	62	79	248	0	0	389	0	100	2	4	0	106	0	0	0	0	0	0	0	0	0	0	0	0	30	224	0	0	0	254	749
05:00 PM	57	72	229	0	0	358	0	106	2	8	0	116	0	0	0	0	0	0	0	0	0	0	0	0	11	211	0	0	0	222	696
05:15 PM	82	80	260	0	0	422	0	108	4	2	0	114	0	0	0	0	0	0	0	0	0	0	0	0	10	214	0	0	0	224	760
05:30 PM	84	88	249	0	0	421	0	96	2	5	0	103	0	0	0	0	0	0	0	0	0	0	0	0	22	198	0	0	0	220	744
Total Volume	285	319	986	0	0	1590	0	410	10	19	0	439	0	0	0	0	0	0	0	0	0	0	0	0	73	847	0	0	0	920	2949
% App. Total	17.9	20.1	62	0	0		0	93.4	2.3	4.3	0		0	0	0	0	0		0	0	0	0	0		7.9	92.1	0	0	0		
PHF	.848	.906	.948	.000	.000	.942	.000	.949	.625	.594	.000	.946	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.608	.945	.000	.000	.000	.906	.970
Cars	260	266	919	0	0	1445	0	397	10	17	0	424	0	0	0	0	0	0	0	0	0	0	0	0	67	837	0	0	0	904	2773
% Cars	91.2	83.4	93.2	0	0	90.9	0	96.8	100	89.5	0	96.6	0	0	0	0	0	0	0	0	0	0	0	0	91.8	98.8	0	0	0	98.3	94.0
Heavy Vehicles	25	53	67	0	0	145	0	13	0	2	0	15	0	0	0	0	0	0	0	0	0	0	0	0	6	10	0	0	0	16	176
% Heavy Vehicles	8.8	16.6	6.8	0	0	9.1	0	3.2	0	10.5	0	3.4	0	0	0	0	0	0	0	0	0	0	0	0	8.2	1.2	0	0	0	1.7	6.0

N/S: North Washington/Surface Road
E/SE/W: I-93 Offramp/Onramp/New Chardon
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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Groups Printed- Peds and Bikes

	North Washington Street From North						I-93 Offramp From East						I-93/1-A Onramp From Southeast						Surface Road From South						New Chardon Street From West						
Start Time	Right	Thru	Bear Left	Left	Peds EB	Peds WB	Right	Thru	Left	Hard Left	Peds SB	Peds NB	Hard Right	Bear Right	Bear Left	Hard Left	Peds SWB	Peds NEB	Hard Right	Right	Thru	Left	Peds WB	Peds EB	Right	Bear Right	Thru	Left	Peds NB	Peds SB	Int. Total
04:00 PM	0	4	0	0	7	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	6	17	49
04:15 PM	1	3	0	0	6	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	6	8	34
04:30 PM	0	1	0	0	9	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	10	46
04:45 PM	0	3	0	0	12	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	18	19	74
Total	1	11	0	0	34	62	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	2	0	0	0	38	54	203
05:00 PM	0	0	0	0	19	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	20	75
05:15 PM	3	0	0	0	18	19	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	23	19	84
05:30 PM	0	0	0	0	16	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	19	66
05:45 PM	2	2	0	0	16	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	16	17	69
Total	5	2	0	0	69	71	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	69	75	294
Grand Total	6	13	0	0	103	133	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	4	0	0	0	107	129	497
Apprch %	2.4	5.1	0	0	40.4	52.2	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	100	0	1.7	0	0	0	44.6	53.8	
Total %	1.2	2.6	0	0	20.7	26.8	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0.2	0	0.8	0	0	0	21.5	26	

	North Washington Street From North							I-93 Offramp From East							I-93/1-A Onramp From Southeast							Surface Road From South							New Chardon Street From West							
Start Time	Right	Thru	Bear Left	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Hard Left	Peds SB	Peds NB	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds SWB	Peds NEB	App. Total	Hard Right	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Bear Right	Thru	Left	Peds NB	Peds SB	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 04:45 PM

Start Time	Right	Thru	Bear Left	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Hard Left	Peds SB	Peds NB	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds SWB	Peds NEB	App. Total	Hard Right	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Bear Right	Thru	Left	Peds NB	Peds SB	App. Total	Int. Total
04:45 PM	0	3	0	0	12	21	36	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	18	19	38	74
05:00 PM					19	18	37	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	18	20	38	75
05:15 PM					18	19	40	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	23	19	43	84
05:30 PM					16	19	35	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	19	31	66
Total Volume					65	77	148	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	71	77	150	299
% App. Total					43.9	52		0	0	0	0	0	100		0	0	0	0	0	0		0	0	0	0	0	0		1.3				47.3	51.3		
PHF	.250	.250	.000	.000	.855	.917	.925	.000	.000	.000	.000	.000	.250	.250	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.500	.000	.000	.000	.772	.963	.872	.890

N/S: North Washington/Surface Road
E/SE/W: I-93 Offramp/Onramp/New Chardon
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
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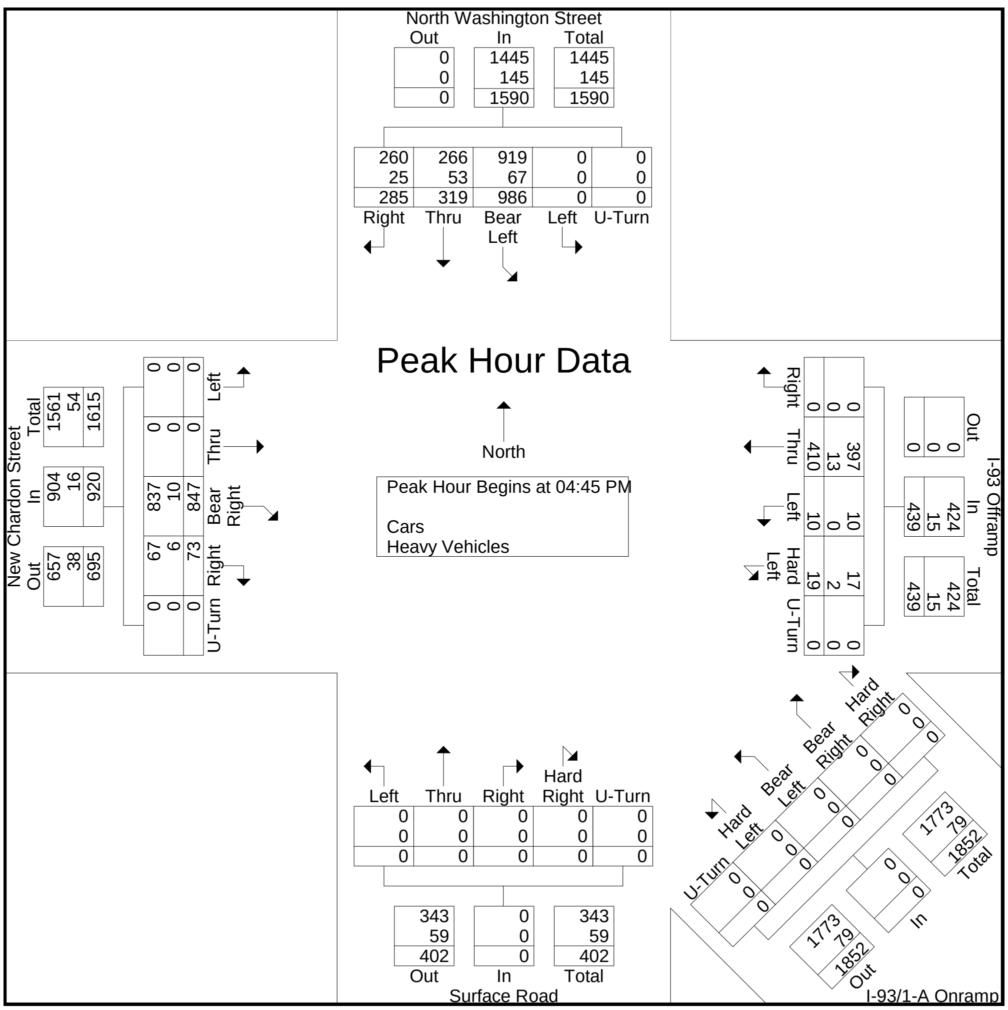
Email: datarequests@pdillc.com

File Name : 154673 DD
Site Code : 2007190
Start Date : 9/23/2015

	North Washington Street From North						I-93 Offramp From East						I-93/1-A Onramp From Southeast						Surface Road From South						New Chardon Street From West						
Start Time	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	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 04:45 PM																															
04:45 PM	62	79	248	0	0	389	0	100	2	4	0	106	0	0	0	0	0	0	0	0	0	0	0	0	30	224	0	0	0	254	749
05:00 PM	57	72	229	0	0	358	0	106	2	8	0	116	0	0	0	0	0	0	0	0	0	0	0	0	11	211	0	0	0	222	696
05:15 PM	82	80	260	0	0	422	0	108	4	2	0	114	0	0	0	0	0	0	0	0	0	0	0	0	10	214	0	0	0	224	760
05:30 PM	84	88	249	0	0	421	0	96	2	5	0	103	0	0	0	0	0	0	0	0	0	0	0	0	22	198	0	0	0	220	744
Total Volume	285	319	986	0	0	1590	0	410	10	19	0	439	0	0	0	0	0	0	0	0	0	0	0	0	73	847	0	0	0	920	2949
% App. Total	17.9	20.1	62	0	0		0	93.4	2.3	4.3	0		0	0	0	0	0		0	0	0	0	0		7.9	92.1	0	0	0		
PHF	.848	.906	.948	.000	.000	.942	.000	.949	.625	.594	.000	.946	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.608	.945	.000	.000	.000	.906	.970
Cars	260	266	919	0	0	1445	0	397	10	17	0	424	0	0	0	0	0	0	0	0	0	0	0	0	67	837	0	0	0	904	2773
% Cars	91.2	83.4	93.2	0	0	90.9	0	96.8	100	89.5	0	96.6	0	0	0	0	0	0	0	0	0	0	0	0	91.8	98.8	0	0	0	98.3	94.0
Heavy Vehicles	25	53	67	0	0	145	0	13	0	2	0	15	0	0	0	0	0	0	0	0	0	0	0	0	6	10	0	0	0	16	176
% Heavy Vehicles	8.8	16.6	6.8	0	0	9.1	0	3.2	0	10.5	0	3.4	0	0	0	0	0	0	0	0	0	0	0	0	8.2	1.2	0	0	0	1.7	6.0



N: Canal Street
E/W: New Chardon Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION
DATA
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P.O. Box 301 Berlin, MA 01503
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Email: datarequests@pdillc.com

File Name : 154673 E
Site Code : 2007190
Start Date : 9/23/2015

Groups Printed- Cars - Heavy Vehicles

	Canal Street From North			New Chardon Street From East			New Chardon Street From West			
Start Time	Right	Left	U-Turn	Right	Thru	U-Turn	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	0	6	192	0	100	0	0	298
07:15 AM	0	0	0	5	223	0	84	0	0	312
07:30 AM	0	0	0	4	235	0	95	0	0	334
07:45 AM	0	0	0	20	227	0	90	0	0	337
Total	0	0	0	35	877	0	369	0	0	1281
08:00 AM	0	0	0	8	253	0	123	0	0	384
08:15 AM	0	0	0	7	254	0	92	0	0	353
08:30 AM	0	0	0	5	241	0	103	0	0	349
08:45 AM	0	0	0	7	256	0	79	0	0	342
Total	0	0	0	27	1004	0	397	0	0	1428
Grand Total	0	0	0	62	1881	0	766	0	0	2709
Apprch %	0	0	0	3.2	96.8	0	100	0	0	
Total %	0	0	0	2.3	69.4	0	28.3	0	0	
Cars	0	0	0	54	1791	0	711	0	0	2556
% Cars	0	0	0	87.1	95.2	0	92.8	0	0	94.4
Heavy Vehicles	0	0	0	8	90	0	55	0	0	153
% Heavy Vehicles	0	0	0	12.9	4.8	0	7.2	0	0	5.6

	Canal Street From North				New Chardon Street From East				New Chardon Street From West				
Start Time	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	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	0	0	0	0	8	253	0	261	123	0	0	123	384
08:15 AM	0	0	0	0	7	254	0	261	92	0	0	92	353
08:30 AM	0	0	0	0	5	241	0	246	103	0	0	103	349
08:45 AM	0	0	0	0	7	256	0	263	79	0	0	79	342
Total Volume	0	0	0	0	27	1004	0	1031	397	0	0	397	1428
% App. Total	0	0	0		2.6	97.4	0		100	0	0		
PHF	.000	.000	.000	.000	.844	.980	.000	.980	.807	.000	.000	.807	.930
Cars	0	0	0	0	24	967	0	991	365	0	0	365	1356
% Cars	0	0	0	0	88.9	96.3	0	96.1	91.9	0	0	91.9	95.0
Heavy Vehicles	0	0	0	0	3	37	0	40	32	0	0	32	72
% Heavy Vehicles	0	0	0	0	11.1	3.7	0	3.9	8.1	0	0	8.1	5.0

N: Canal Street
E/W: New Chardon Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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File Name : 154673 E
Site Code : 2007190
Start Date : 9/23/2015

Groups Printed- Peds and Bikes

	Canal Street From North				New Chardon Street From East				New Chardon Street From West				
Start Time	Right	Left	Peds EB	Peds WB	Right	Thru	Peds SB	Peds NB	Thru	Left	Peds NB	Peds SB	Int. Total
07:00 AM	0	0	6	4	0	4	2	0	0	0	14	128	158
07:15 AM	0	0	3	2	0	2	0	0	3	0	27	130	167
07:30 AM	0	0	3	9	0	2	0	0	0	0	26	153	193
07:45 AM	0	0	1	28	0	2	0	0	2	1	33	267	334
Total	0	0	13	43	0	10	2	0	5	1	100	678	852
08:00 AM	0	0	10	23	0	2	0	0	0	0	24	240	299
08:15 AM	0	0	13	33	0	3	1	0	0	0	40	268	358
08:30 AM	0	0	9	37	0	3	1	0	2	0	38	281	371
08:45 AM	0	0	8	32	0	4	0	0	0	0	47	222	313
Total	0	0	40	125	0	12	2	0	2	0	149	1011	1341
Grand Total	0	0	53	168	0	22	4	0	7	1	249	1689	2193
Apprch %	0	0	24	76	0	84.6	15.4	0	0.4	0.1	12.8	86.8	
Total %	0	0	2.4	7.7	0	1	0.2	0	0.3	0	11.4	77	

	Canal Street From North					New Chardon Street From East					New Chardon Street From West					
Start Time	Right	Left	Peds EB	Peds WB	App. Total	Right	Thru	Peds SB	Peds NB	App. Total	Thru	Left	Peds NB	Peds SB	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	0	1	28	29	0	2	0	0	2	2	1	33	267	303	334
08:00 AM	0	0	10	23	33	0	2	0	0	2	0	0	24	240	264	299
08:15 AM	0	0	13	33	46	0	3	1	0	4	0	0	40	268	308	358
08:30 AM	0	0	9	37	46	0	3	1	0	4	2	0	38	281	321	371
Total Volume	0	0	33	121	154	0	10	2	0	12	4	1	135	1056	1196	1362
% App. Total	0	0	21.4	78.6		0	83.3	16.7	0		0.3	0.1	11.3	88.3		
PHF	.000	.000	.635	.818	.837	.000	.833	.500	.000	.750	.500	.250	.844	.940	.931	.918

N: Canal Street
E/W: New Chardon Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION
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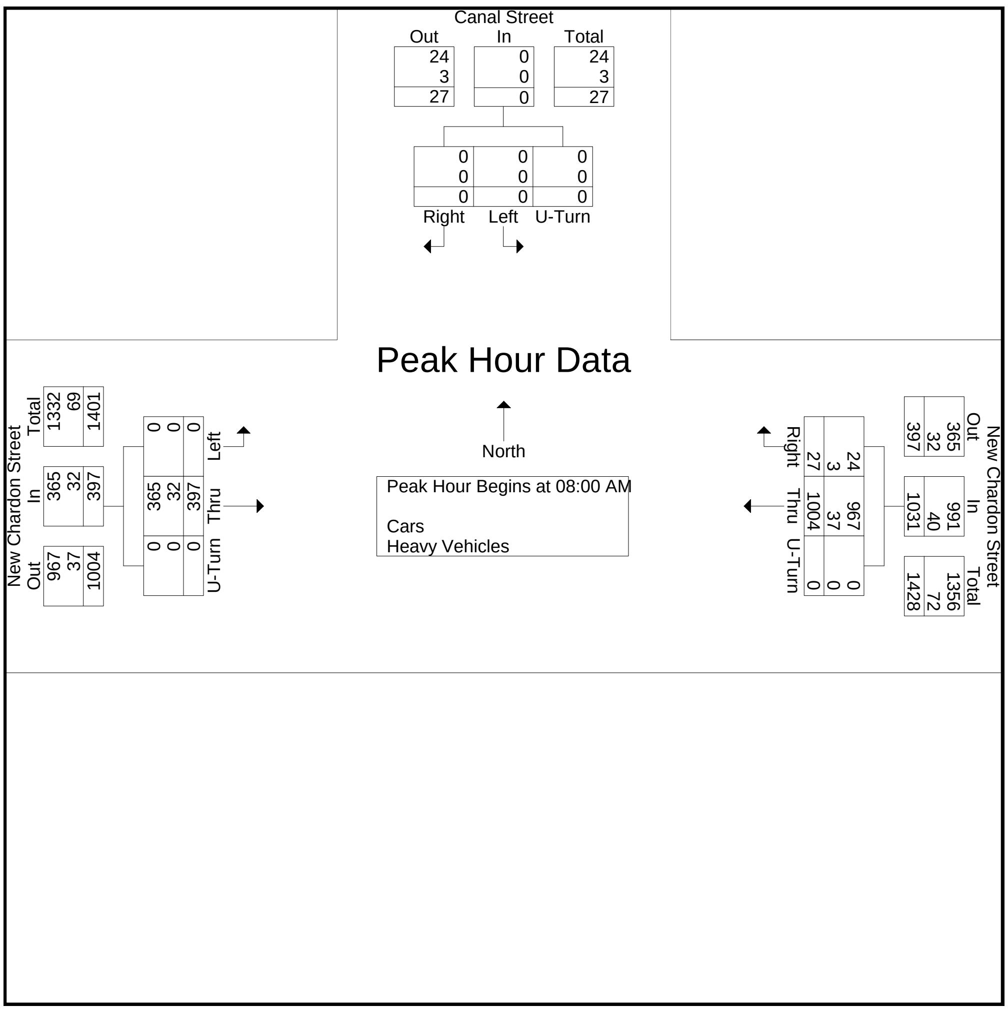
File Name : 154673 E
Site Code : 2007190
Start Date : 9/23/2015
Page No : 1

	Canal Street From North				New Chardon Street From East				New Chardon Street From West				
Start Time	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	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	0	0	0	0	8	253	0	261	123	0	0	123	384
08:15 AM	0	0	0	0	7	254	0	261	92	0	0	92	353
08:30 AM	0	0	0	0	5	241	0	246	103	0	0	103	349
08:45 AM	0	0	0	0	7	256	0	263	79	0	0	79	342
Total Volume	0	0	0	0	27	1004	0	1031	397	0	0	397	1428
% App. Total	0	0	0		2.6	97.4	0		100	0	0		
PHF	.000	.000	.000	.000	.844	.980	.000	.980	.807	.000	.000	.807	.930
Cars	0	0	0	0	24	967	0	991	365	0	0	365	1356
% Cars	0	0	0	0	88.9	96.3	0	96.1	91.9	0	0	91.9	95.0
Heavy Vehicles	0	0	0	0	3	37	0	40	32	0	0	32	72
% Heavy Vehicles	0	0	0	0	11.1	3.7	0	3.9	8.1	0	0	8.1	5.0



N: Canal Street
E/W: New Chardon Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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Email: datarequests@pdillc.com

File Name : 154673 EE
Site Code : 2007190
Start Date : 9/23/2015

Groups Printed- Cars - Heavy Vehicles

	Canal Street From North			New Chardon Street From East			New Chardon Street From West			
Start Time	Right	Left	U-Turn	Right	Thru	U-Turn	Thru	Left	U-Turn	Int. Total
04:00 PM	0	0	0	6	157	0	219	0	0	382
04:15 PM	0	0	0	12	152	0	228	0	0	392
04:30 PM	0	0	0	12	150	0	229	0	0	391
04:45 PM	0	0	0	9	148	0	244	0	0	401
Total	0	0	0	39	607	0	920	0	0	1566
05:00 PM	1	0	0	6	154	0	236	0	0	397
05:15 PM	0	0	0	6	184	0	247	0	0	437
05:30 PM	0	0	0	7	177	0	227	0	0	411
05:45 PM	1	0	0	8	162	0	232	0	0	403
Total	2	0	0	27	677	0	942	0	0	1648
Grand Total	2	0	0	66	1284	0	1862	0	0	3214
Apprch %	100	0	0	4.9	95.1	0	100	0	0	
Total %	0.1	0	0	2.1	40	0	57.9	0	0	
Cars	2	0	0	64	1209	0	1831	0	0	3106
% Cars	100	0	0	97	94.2	0	98.3	0	0	96.6
Heavy Vehicles	0	0	0	2	75	0	31	0	0	108
% Heavy Vehicles	0	0	0	3	5.8	0	1.7	0	0	3.4

	Canal Street From North				New Chardon Street From East				New Chardon Street From West				
Start Time	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	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	1	0	0	1	6	154	0	160	236	0	0	236	397
05:15 PM	0	0	0	0	6	184	0	190	247	0	0	247	437
05:30 PM	0	0	0	0	7	177	0	184	227	0	0	227	411
05:45 PM	1	0	0	1	8	162	0	170	232	0	0	232	403
Total Volume	2	0	0	2	27	677	0	704	942	0	0	942	1648
% App. Total	100	0	0		3.8	96.2	0		100	0	0		
PHF	.500	.000	.000	.500	.844	.920	.000	.926	.953	.000	.000	.953	.943
Cars	2	0	0	2	26	641	0	667	930	0	0	930	1599
% Cars	100	0	0	100	96.3	94.7	0	94.7	98.7	0	0	98.7	97.0
Heavy Vehicles	0	0	0	0	1	36	0	37	12	0	0	12	49
% Heavy Vehicles	0	0	0	0	3.7	5.3	0	5.3	1.3	0	0	1.3	3.0

N: Canal Street
E/W: New Chardon Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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File Name : 154673 EE
Site Code : 2007190
Start Date : 9/23/2015

Groups Printed- Peds and Bikes

	Canal Street From North				New Chardon Street From East				New Chardon Street From West				
Start Time	Right	Left	Peds EB	Peds WB	Right	Thru	Peds SB	Peds NB	Thru	Left	Peds NB	Peds SB	Int. Total
04:00 PM	1	0	52	10	0	1	0	0	0	0	167	43	274
04:15 PM	0	0	59	12	0	1	0	0	0	0	98	57	227
04:30 PM	1	0	70	5	0	0	0	1	0	0	111	49	237
04:45 PM	0	0	95	7	0	0	0	0	1	0	120	35	258
Total	2	0	276	34	0	2	0	1	1	0	496	184	996
05:00 PM	0	0	46	7	0	0	0	0	0	2	339	55	449
05:15 PM	0	0	45	9	2	1	0	0	4	1	391	58	511
05:30 PM	0	0	38	7	0	0	0	0	3	3	328	72	451
05:45 PM	0	0	23	11	0	2	0	0	0	2	170	51	259
Total	0	0	152	34	2	3	0	0	7	8	1228	236	1670
Grand Total	2	0	428	68	2	5	0	1	8	8	1724	420	2666
Apprch %	0.4	0	85.9	13.7	25	62.5	0	12.5	0.4	0.4	79.8	19.4	
Total %	0.1	0	16.1	2.6	0.1	0.2	0	0	0.3	0.3	64.7	15.8	

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

	Canal Street From North					New Chardon Street From East					New Chardon Street From West					
Start Time	Right	Left	Peds EB	Peds WB	App. Total	Right	Thru	Peds SB	Peds NB	App. Total	Thru	Left	Peds NB	Peds SB	App. Total	Int. Total
05:00 PM	0	0	46	7	53	0	0	0	0	0	0	2	339	55	396	449
05:15 PM	0	0	45	9	54	2	1	0	0	3	4	1	391	58	454	511
05:30 PM	0	0	38	7	45	0	0	0	0	0	3	3	328	72	406	451
05:45 PM	0	0	23	11	34	0	2	0	0	2	0	2	170	51	223	259
Total Volume	0	0	152	34	186	2	3	0	0	5	7	8	1228	236	1479	1670
% App. Total	0	0	81.7	18.3		40	60	0	0		0.5	0.5	83	16		
PHF	.000	.000	.826	.773	.861	.250	.375	.000	.000	.417	.438	.667	.785	.819	.814	.817

N: Canal Street
E/W: New Chardon Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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Site Code : 2007190
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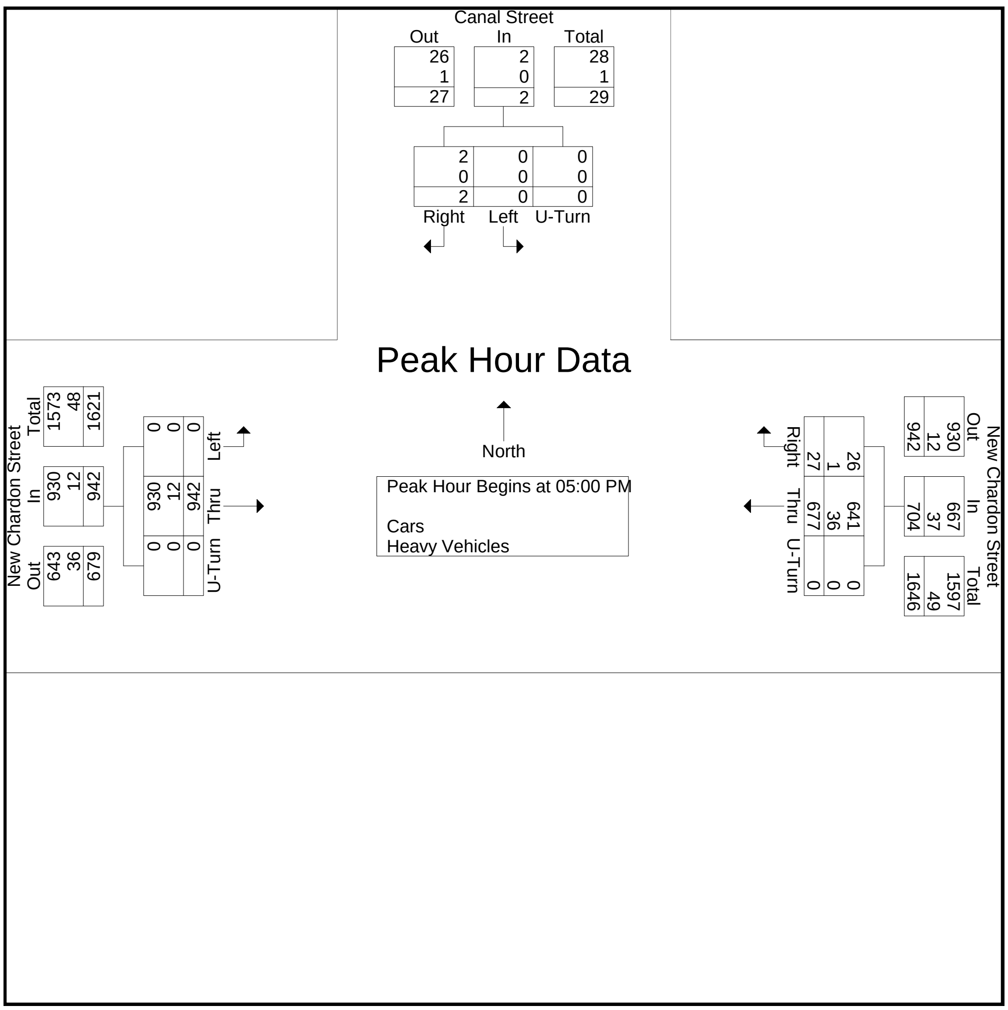
Page No : 1

	Canal Street From North				New Chardon Street From East				New Chardon Street From West				
Start Time	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	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	1	0	0	1	6	154	0	160	236	0	0	236	397
05:15 PM	0	0	0	0	6	184	0	190	247	0	0	247	437
05:30 PM	0	0	0	0	7	177	0	184	227	0	0	227	411
05:45 PM	1	0	0	1	8	162	0	170	232	0	0	232	403
Total Volume	2	0	0	2	27	677	0	704	942	0	0	942	1648
% App. Total	100	0	0		3.8	96.2	0		100	0	0		
PHF	.500	.000	.000	.500	.844	.920	.000	.926	.953	.000	.000	.953	.943
Cars	2	0	0	2	26	641	0	667	930	0	0	930	1599
% Cars	100	0	0	100	96.3	94.7	0	94.7	98.7	0	0	98.7	97.0
Heavy Vehicles	0	0	0	0	1	36	0	37	12	0	0	12	49
% Heavy Vehicles	0	0	0	0	3.7	5.3	0	5.3	1.3	0	0	1.3	3.0



N/S: Merrimac St/Congress St
E/W/SW: New Chardon St/ Garage Entrance
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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File Name : 154673 F
Site Code : 2007190
Start Date : 9/23/2015
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Merrimac Street From North					New Chardon Street From East					Congress Street From South					Garage Entrance From Southwest					New Chardon Street From West					
Start Time	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	2	43	30	3	21	101	8	55	1	56	61	45	11	0	0	0	0	0	0	0	7	13	4	0	461
07:15 AM	0	7	47	22	1	23	113	16	81	1	40	54	38	20	0	0	0	0	0	0	1	5	21	8	0	498
07:30 AM	0	6	33	30	0	23	110	16	73	5	45	62	63	11	0	0	0	0	0	0	1	4	14	3	0	499
07:45 AM	0	8	63	25	2	30	109	12	79	2	43	69	64	22	0	0	0	0	0	0	4	8	22	11	0	573
Total	0	23	186	107	6	97	433	52	288	9	184	246	210	64	0	0	0	0	0	0	6	24	70	26	0	2031
08:00 AM	0	11	48	22	2	20	123	23	89	5	68	94	76	29	0	0	0	0	0	0	5	12	27	11	0	665
08:15 AM	0	14	46	22	1	17	123	13	87	4	44	80	69	38	0	0	0	0	0	0	7	7	22	10	0	604
08:30 AM	0	13	50	27	2	17	110	17	106	6	52	80	78	38	0	0	0	0	0	0	5	6	23	9	0	639
08:45 AM	0	14	67	20	4	19	108	23	96	1	45	77	73	29	0	0	0	0	0	0	6	14	15	5	0	616
Total	0	52	211	91	9	73	464	76	378	16	209	331	296	134	0	0	0	0	0	0	23	39	87	35	0	2524
Grand Total	0	75	397	198	15	170	897	128	666	25	393	577	506	198	0	0	0	0	0	0	29	63	157	61	0	4555
Apprch %	0	10.9	58	28.9	2.2	9	47.6	6.8	35.3	1.3	23.5	34.5	30.2	11.8	0	0	0	0	0	0	9.4	20.3	50.6	19.7	0	
Total %	0	1.6	8.7	4.3	0.3	3.7	19.7	2.8	14.6	0.5	8.6	12.7	11.1	4.3	0	0	0	0	0	0	0.6	1.4	3.4	1.3	0	
Cars	0	75	341	184	14	160	863	128	622	24	371	528	462	196	0	0	0	0	0	0	29	55	136	54	0	4242
% Cars	0	100	85.9	92.9	93.3	94.1	96.2	100	93.4	96	94.4	91.5	91.3	99	0	0	0	0	0	0	100	87.3	86.6	88.5	0	93.1
Heavy Vehicles	0	0	56	14	1	10	34	0	44	1	22	49	44	2	0	0	0	0	0	0	0	8	21	7	0	313
% Heavy Vehicles	0	0	14.1	7.1	6.7	5.9	3.8	0	6.6	4	5.6	8.5	8.7	1	0	0	0	0	0	0	0	12.7	13.4	11.5	0	6.9

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

	Merrimac Street From North						New Chardon Street From East						Congress Street From South						Garage Entrance From Southwest						New Chardon Street From West						
Start Time	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Int. Total
08:00 AM	0	11	48	22	2	83	20	123	23	89	5	260	68	94	76	29	0	267	0	0	0	0	0	0	5	12	27	11	0	55	665
08:15 AM	0	14	46	22	1	83	17	123	13	87	4	244	44	80	69	38	0	231	0	0	0	0	0	0	7	7	22	10	0	46	604
08:30 AM	0	13	50	27	2	92	17	110	17	106	6	256	52	80	78	38	0	248	0	0	0	0	0	0	5	6	23	9	0	43	639
08:45 AM	0	14	67	20	4	105	19	108	23	96	1	247	45	77	73	29	0	224	0	0	0	0	0	0	6	14	15	5	0	40	616
Total Volume	0	52	211	91	9	363	73	464	76	378	16	1007	209	331	296	134	0	970	0	0	0	0	0	0	23	39	87	35	0	184	2524
% App. Total	0	14.3	58.1	25.1	2.5		7.2	46.1	7.5	37.5	1.6		21.5	34.1	30.5	13.8	0		0	0	0	0	0		12.5	21.2	47.3	19	0		
PHF	.000	.929	.787	.843	.563	.864	.913	.943	.826	.892	.667	.968	.768	.880	.949	.882	.000	.908	.000	.000	.000	.000	.000	.000	.821	.696	.806	.795	.000	.836	.949
Cars	0	52	182	83	8	325	70	452	76	356	16	970	198	310	275	134	0	917	0	0	0	0	0	0	23	35	75	30	0	163	2375
% Cars	0	100	86.3	91.2	88.9	89.5	95.9	97.4	100	94.2	100	96.3	94.7	93.7	92.9	100	0	94.5	0	0	0	0	0	0	100	89.7	86.2	85.7	0	88.6	94.1
Heavy Vehicles	0	0	29	8	1	38	3	12	0	22	0	37	11	21	21	0	0	53	0	0	0	0	0	0	0	4	12	5	0	21	149
% Heavy Vehicles	0	0	13.7	8.8	11.1	10.5	4.1	2.6	0	5.8	0	3.7	5.3	6.3	7.1	0	0	5.5	0	0	0	0	0	0	0	10.3	13.8	14.3	0	11.4	5.9

N/S: Merrimac St/Congress St
E/W/SW: New Chardon St/ Garage Entrance
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION DATA INDUSTRIES, LLC
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File Name : 154673 F
Site Code : 2007190
Start Date : 9/23/2015
Page No : 1

Groups Printed- Peds and Bikes

	Merrimac Street From North						New Chardon Street From East						Congress Street From South					
Start Time	Right	Bear Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Bear Left	Left	Peds SB	Peds NB	Right	Thru	Left	Hard Left	Peds WB	Peds EB
07:00 AM	0	0	2	0	1	4	0	0	0	4	50	22	1	0	0	0	31	8
07:15 AM	0	0	6	3	3	2	0	0	0	4	62	17	0	1	0	0	32	7
07:30 AM	0	0	13	0	5	11	0	1	0	1	134	36	0	1	0	0	40	8
07:45 AM	0	0	7	1	8	17	0	1	0	3	230	34	1	1	0	0	81	7
Total	0	0	28	4	17	34	0	2	0	12	476	109	2	3	0	0	184	30
08:00 AM	0	0	8	0	3	23	0	2	0	2	236	56	0	2	0	0	90	20
08:15 AM	0	0	13	1	5	34	0	0	0	2	126	65	0	4	0	0	74	11
08:30 AM	0	0	20	1	9	35	0	4	0	2	213	80	1	2	0	0	90	24
08:45 AM	0	0	20	1	12	31	0	0	1	4	269	91	1	2	0	0	102	21
Total	0	0	61	3	29	123	0	6	1	10	844	292	2	10	0	0	356	76
Grand Total	0	0	89	7	46	157	0	8	1	22	1320	401	4	13	0	0	540	106
Apprch %	0	0	29.8	2.3	15.4	52.5	0	0.5	0.1	1.3	75.3	22.9	0.6	2	0	0	81.4	16
Total %	0	0	2.4	0.2	1.3	4.3	0	0.2	0	0.6	36.3	11	0.1	0.4	0	0	14.9	2.9

	Garage Entrance From Southwest						New Chardon Street From West						
Start Time	Hard Right	Bear Right	Bear Left	Hard Left	Peds NWB	Peds SEB	Hard Right	Right	Thru	Left	Peds NB	Peds SB	Int. Total
07:00 AM	0	0	0	0	14	12	0	0	0	0	5	6	160
07:15 AM	0	0	0	0	14	14	0	0	0	0	9	15	189
07:30 AM	0	0	0	0	20	25	0	0	0	0	12	22	329
07:45 AM	0	0	0	0	22	26	0	0	0	0	14	29	482
Total	0	0	0	0	70	77	0	0	0	0	40	72	1160
08:00 AM	0	0	0	0	37	36	0	0	0	0	23	25	563
08:15 AM	0	0	0	0	62	31	0	0	0	1	37	22	488
08:30 AM	0	0	0	0	73	39	0	0	0	0	46	29	668
08:45 AM	0	0	0	0	67	52	0	0	0	0	45	38	757
Total	0	0	0	0	239	158	0	0	0	1	151	114	2476
Grand Total	0	0	0	0	309	235	0	0	0	1	191	186	3636
Apprch %	0	0	0	0	56.8	43.2	0	0	0	0.3	50.5	49.2	
Total %	0	0	0	0	8.5	6.5	0	0	0	0	5.3	5.1	

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

	Merrimac Street From North							New Chardon Street From East						
Start Time	Right	Bear Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Bear Left	Left	Peds SB	Peds NB	App. Total
08:00 AM	0	0	8	0	3	23	34	0	2	0	2	236	56	296
08:15 AM			13	1	5	34	53	0	0	0	2	126	65	193
08:30 AM			20	1	9	35	65	0	4	0	2	213	80	299
08:45 AM			20	1	12	31	64	0	0	1	4	269	91	365
Total Volume			61	3	29	123	216	0	6	1	10	844	292	1153
% App. Total			28.2	1.4	13.4	56.9		0	0.5	0.1	0.9	73.2	25.3	
PHF	.000	.000	.763	.750	.604	.879	.831	.000	.375	.250	.625	.784	.802	.790

	Congress Street From South							Garage Entrance From Southwest						
Start Time	Right	Thru	Left	Hard Left	Peds WB	Peds EB	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds NWB	Peds SEB	App. Total
08:00 AM	0	2	0	0	90	20	112	0	0	0	0	37	36	73
08:15 AM					74	11						62	31	93
08:30 AM					90	24	117	0	0	0	0	73	39	112
08:45 AM					102	21	126	0	0	0	0	67	52	119
Total Volume		10	0	0	356	76	444	0	0	0	0	239	158	397
% App. Total	0.5	2.3	0	0	80.2	17.1						60.2	39.8	
PHF	.500	.625	.000	.000	.873	.792	.881	.000	.000	.000	.000	.818	.760	.834

	New Chardon Street From West							
Start Time	Hard Right	Right	Thru	Left	Peds NB	Peds SB	App. Total	Int. Total
08:00 AM	0	0	0	0	23	25	48	563
08:15 AM	0	0	0	1	37	22	60	488
08:30 AM	0	0	0	0	46	29	75	668
08:45 AM	0	0	0	0	45	38	83	757
Total Volume	0	0	0	1	151	114	266	2476
% App. Total	0	0	0	0.4	56.8	42.9		
PHF	.000	.000	.000	.250	.821	.750	.801	.818

N/S: Merrimac St/Congress St
E/W/SW: New Chardon St/ Garage Entrance
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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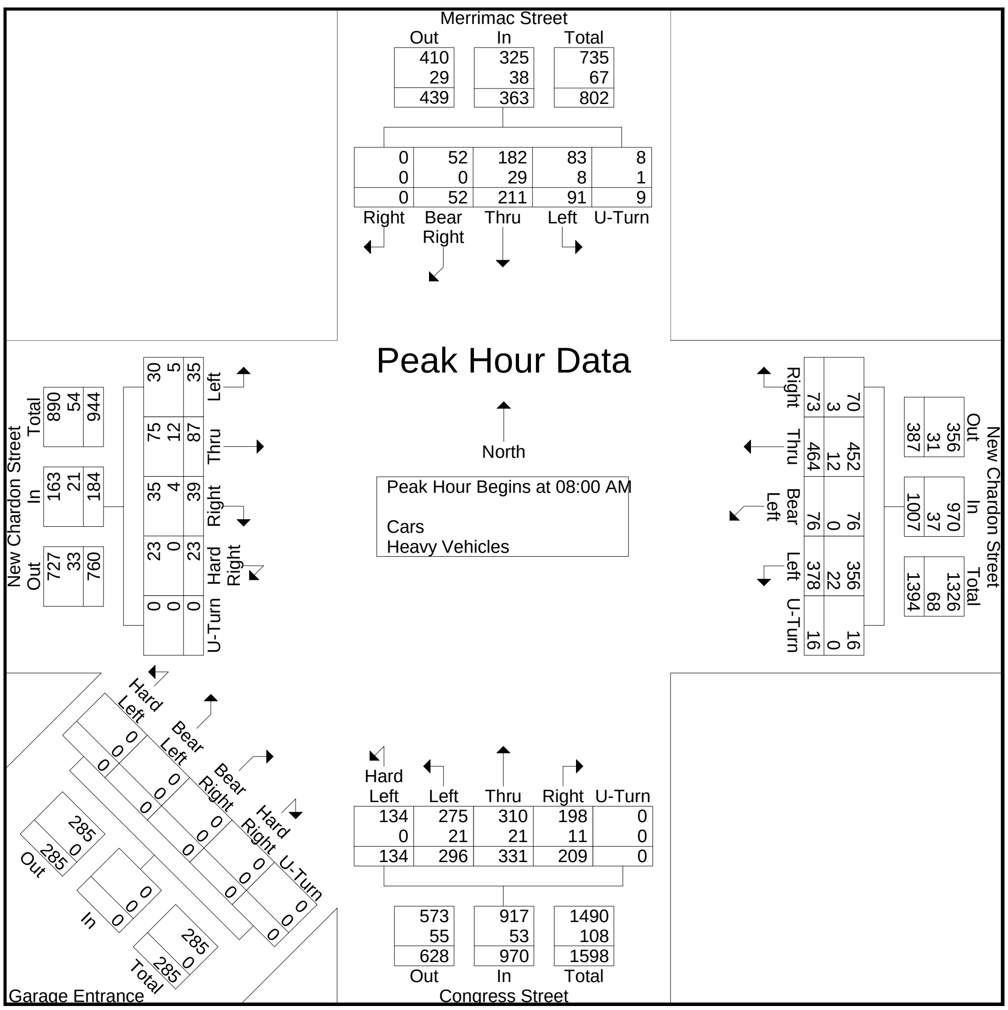
	Merrimac Street From North						New Chardon Street From East						Congress Street From South						Garage Entrance From Southwest						New Chardon Street From West						
Start Time	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	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	0	11	48	22	2	83	20	123	23	89	5	260	68	94	76	29	0	267	0	0	0	0	0	0	5	12	27	11	0	55	665
08:15 AM	0	14	46	22	1	83	17	123	13	87	4	244	44	80	69	38	0	231	0	0	0	0	0	0	7	7	22	10	0	46	604
08:30 AM	0	13	50	27	2	92	17	110	17	106	6	256	52	80	78	38	0	248	0	0	0	0	0	0	5	6	23	9	0	43	639
08:45 AM	0	14	67	20	4	105	19	108	23	96	1	247	45	77	73	29	0	224	0	0	0	0	0	0	6	14	15	5	0	40	616
Total Volume	0	52	211	91	9	363	73	464	76	378	16	1007	209	331	296	134	0	970	0	0	0	0	0	0	23	39	87	35	0	184	2524
% App. Total	0	14.3	58.1	25.1	2.5		7.2	46.1	7.5	37.5	1.6		21.5	34.1	30.5	13.8	0		0	0	0	0	0		12.5	21.2	47.3	19	0		
PHF	.000	.929	.787	.843	.563	.864	.913	.943	.826	.892	.667	.968	.768	.880	.949	.882	.000	.908	.000	.000	.000	.000	.000	.000	.821	.696	.806	.795	.000	.836	.949
Cars	0	52	182	83	8	325	70	452	76	356	16	970	198	310	275	134	0	917	0	0	0	0	0	0	23	35	75	30	0	163	2375
% Cars	0	100	86.3	91.2	88.9	89.5	95.9	97.4	100	94.2	100	96.3	94.7	93.7	92.9	100	0	94.5	0	0	0	0	0	0	100	89.7	86.2	85.7	0	88.6	94.1
Heavy Vehicles	0	0	29	8	1	38	3	12	0	22	0	37	11	21	21	0	0	53	0	0	0	0	0	0	0	4	12	5	0	21	149
% Heavy Vehicles	0	0	13.7	8.8	11.1	10.5	4.1	2.6	0	5.8	0	3.7	5.3	6.3	7.1	0	0	5.5	0	0	0	0	0	0	0	10.3	13.8	14.3	0	11.4	5.9



N/S: Merrimac St/Congress St
E/W/SW: New Chardon St/ Garage Entrance
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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File Name : 154673 FF
Site Code : 2007190
Start Date : 9/23/2015
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Merrimac Street From North					New Chardon Street From East					Congress Street From South					Garage Entrance From Southwest					New Chardon Street From West					
Start Time	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Hard Right	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	2	79	65	2	13	63	6	73	2	82	65	54	12	0	0	0	0	0	0	1	19	71	17	0	626
04:15 PM	0	5	66	65	0	8	77	2	69	1	90	52	54	8	0	0	0	0	0	0	0	19	77	12	0	605
04:30 PM	0	6	69	83	0	7	69	5	70	1	90	52	53	12	0	0	0	0	0	0	1	12	66	14	0	610
04:45 PM	1	1	78	82	2	7	70	3	63	1	98	59	51	4	0	0	0	0	0	0	1	11	70	16	0	618
Total	1	14	292	295	4	35	279	16	275	5	360	228	212	36	0	0	0	0	0	0	3	61	284	59	0	2459
05:00 PM	0	1	52	38	0	12	70	5	62	3	91	66	47	8	0	0	0	0	0	0	2	9	86	15	0	567
05:15 PM	1	3	48	67	0	18	90	5	71	1	108	55	38	9	0	0	0	0	0	0	1	16	68	10	0	609
05:30 PM	0	1	59	56	0	11	79	13	78	0	98	108	53	17	0	0	0	0	0	0	0	12	64	10	0	659
05:45 PM	1	2	58	49	0	9	86	8	58	4	95	54	47	11	0	0	0	0	0	0	0	14	82	8	0	586
Total	2	7	217	210	0	50	325	31	269	8	392	283	185	45	0	0	0	0	0	0	3	51	300	43	0	2421
Grand Total	3	21	509	505	4	85	604	47	544	13	752	511	397	81	0	0	0	0	0	0	6	112	584	102	0	4880
Apprch %	0.3	2	48.8	48.5	0.4	6.6	46.7	3.6	42.1	1	43.2	29.4	22.8	4.7	0	0	0	0	0	0	0.7	13.9	72.6	12.7	0	
Total %	0.1	0.4	10.4	10.3	0.1	1.7	12.4	1	11.1	0.3	15.4	10.5	8.1	1.7	0	0	0	0	0	0	0.1	2.3	12	2.1	0	
Cars	3	20	457	494	4	79	574	47	502	13	741	479	381	81	0	0	0	0	0	0	6	108	572	99	0	4660
% Cars	100	95.2	89.8	97.8	100	92.9	95	100	92.3	100	98.5	93.7	96	100	0	0	0	0	0	0	100	96.4	97.9	97.1	0	95.5
Heavy Vehicles	0	1	52	11	0	6	30	0	42	0	11	32	16	0	0	0	0	0	0	0	0	4	12	3	0	220
% Heavy Vehicles	0	4.8	10.2	2.2	0	7.1	5	0	7.7	0	1.5	6.3	4	0	0	0	0	0	0	0	0	3.6	2.1	2.9	0	4.5

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:00 PM

	Merrimac Street From North						New Chardon Street From East						Congress Street From South						Garage Entrance From Southwest						New Chardon Street From West						
Start Time	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Int. Total
04:00 PM	0	2	79	65	2	148	13	63	6	73	2	157	82	65	54	12	0	213	0	0	0	0	0	0	1	19	71	17	0	108	626
04:15 PM	0	5	66	65	0	136	8	77	2	69	1	157	90	52	54	8	0	204	0	0	0	0	0	0	0	19	77	12	0	108	605
04:30 PM	0	6	69	83	0	158	7	69	5	70	1	152	90	52	53	12	0	207	0	0	0	0	0	0	1	12	66	14	0	93	610
04:45 PM	1	1	78	82	2	164	7	70	3	63	1	144	98	59	51	4	0	212	0	0	0	0	0	0	1	11	70	16	0	98	618
Total Volume	1	14	292	295	4	606	35	279	16	275	5	610	360	228	212	36	0	836	0	0	0	0	0	0	3	61	284	59	0	407	2459
% App. Total	0.2	2.3	48.2	48.7	0.7		5.7	45.7	2.6	45.1	0.8		43.1	27.3	25.4	4.3	0		0	0	0	0	0		0.7	15	69.8	14.5	0		
PHF	.250	.583	.924	.889	.500	.924	.673	.906	.667	.942	.625	.971	.918	.877	.981	.750	.000	.981	.000	.000	.000	.000	.000	.000	.750	.803	.922	.868	.000	.942	.982
Cars	1	13	262	287	4	567	34	263	16	248	5	566	354	214	201	36	0	805	0	0	0	0	0	0	3	59	277	57	0	396	2334
% Cars	100	92.9	89.7	97.3	100	93.6	97.1	94.3	100	90.2	100	92.8	98.3	93.9	94.8	100	0	96.3	0	0	0	0	0	0	100	96.7	97.5	96.6	0	97.3	94.9
Heavy Vehicles	0	1	30	8	0	39	1	16	0	27	0	44	6	14	11	0	0	31	0	0	0	0	0	0	0	2	7	2	0	11	125
% Heavy Vehicles	0	7.1	10.3	2.7	0	6.4	2.9	5.7	0	9.8	0	7.2	1.7	6.1	5.2	0	0	3.7	0	0	0	0	0	0	0	3.3	2.5	3.4	0	2.7	5.1

N/S: Merrimac St/Congress St
E/W/SW: New Chardon St/ Garage Entrance
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION DATA INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
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File Name : 154673 FF
Site Code : 2007190
Start Date : 9/23/2015
Page No : 1

Groups Printed- Peds and Bikes

	Merrimac Street From North						New Chardon Street From East						Congress Street From South					
Start Time	Right	Bear Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Bear Left	Left	Peds SB	Peds NB	Right	Thru	Left	Hard Left	Peds WB	Peds EB
04:00 PM	0	0	3	0	7	3	0	1	0	1	51	126	1	0	0	0	21	78
04:15 PM	0	0	0	0	23	13	0	0	0	0	53	140	0	1	0	0	9	69
04:30 PM	0	0	3	0	21	6	0	1	0	0	83	122	0	2	0	0	20	66
04:45 PM	0	0	3	0	7	9	0	0	0	0	59	233	0	1	0	0	10	121
Total	0	0	9	0	58	31	0	2	0	1	246	621	1	4	0	0	60	334
05:00 PM	0	0	0	0	11	9	0	0	0	0	83	288	0	2	1	0	24	152
05:15 PM	0	0	1	0	15	5	0	0	0	0	67	351	0	3	1	0	16	158
05:30 PM	0	0	3	0	13	7	0	0	0	0	68	236	2	1	2	0	18	103
05:45 PM	0	0	4	0	10	3	0	1	0	0	37	102	0	6	2	0	20	43
Total	0	0	8	0	49	24	0	1	0	0	255	977	2	12	6	0	78	456
Grand Total	0	0	17	0	107	55	0	3	0	1	501	1598	3	16	6	0	138	790
Apprch %	0	0	9.5	0	59.8	30.7	0	0.1	0	0	23.8	76	0.3	1.7	0.6	0	14.5	82.9
Total %	0	0	0.4	0	2.7	1.4	0	0.1	0	0	12.8	40.9	0.1	0.4	0.2	0	3.5	20.2

	Garage Entrance From Southwest						New Chardon Street From West						
Start Time	Hard Right	Bear Right	Bear Left	Hard Left	Peds NWB	Peds SEB	Hard Right	Right	Thru	Left	Peds NB	Peds SB	Int. Total
04:00 PM	0	0	0	0	18	39	0	0	0	0	7	23	379
04:15 PM	0	0	0	0	8	43	0	0	0	0	14	33	406
04:30 PM	0	0	0	0	11	35	0	0	0	0	11	19	400
04:45 PM	0	0	0	0	15	38	0	0	0	0	12	13	521
Total	0	0	0	0	52	155	0	0	0	0	44	88	1706
05:00 PM	1	0	0	0	16	42	0	0	0	0	10	18	657
05:15 PM	0	0	0	0	27	34	0	0	0	0	29	12	719
05:30 PM	0	0	0	0	36	20	0	0	0	0	22	9	540
05:45 PM	1	0	0	0	14	18	0	0	0	0	16	8	285
Total	2	0	0	0	93	114	0	0	0	0	77	47	2201
Grand Total	2	0	0	0	145	269	0	0	0	0	121	135	3907
Apprch %	0.5	0	0	0	34.9	64.7	0	0	0	0	47.3	52.7	
Total %	0.1	0	0	0	3.7	6.9	0	0	0	0	3.1	3.5	

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:45 PM

	Merrimac Street From North							New Chardon Street From East							Congress Street From South						
Start Time	Right	Bear Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Bear Left	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Hard Left	Peds WB	Peds EB	App. Total
04:45 PM	0	0	3	0	7	9	19	0	0	0	0	59	233	292	0	1	0	0	10	121	132
05:00 PM					11							83	288	371					24	152	179
05:15 PM					15							67	351	418					16	158	178
05:30 PM					13							68	236	304					18	103	126
Total Volume	0	0	7	0	46	30	83	0	0	0	0	277	1108	1385	2	7	4	0	68	534	615
% App. Total			8.4	0	55.4	36.1		0	0	0	0	20	80		0.3	1.1	0.7		11.1	86.8	
PHF	.000	.000	.583	.000	.767	.833	.902	.000	.000	.000	.000	.834	.789	.828	.250	.583	.500	.000	.708	.845	.859

	Garage Entrance From Southwest							New Chardon Street From West							
Start Time	Hard Right	Bear Right	Bear Left	Hard Left	Peds NWB	Peds SEB	App. Total	Hard Right	Right	Thru	Left	Peds NB	Peds SB	App. Total	Int. Total
04:45 PM	0	0	0	0	15	38	53	0	0	0	0	12	13	25	521
05:00 PM	1	0	0	0	16	42	59	0	0	0	0	10	18	28	657
05:15 PM	0	0	0	0	27	34	61	0	0	0	0	29	12	41	719
05:30 PM	0	0	0	0	36	20	56	0	0	0	0	22	9	31	540
Total Volume	1	0	0	0	94	134	229	0	0	0	0	73	52	125	2437
% App. Total	0.4	0	0	0	41	58.5		0	0	0	0	58.4	41.6		
PHF	.250	.000	.000	.000	.653	.798	.939	.000	.000	.000	.000	.629	.722	.762	.847

N/S: Merrimac St/Congress St
E/W/SW: New Chardon St/ Garage Entrance
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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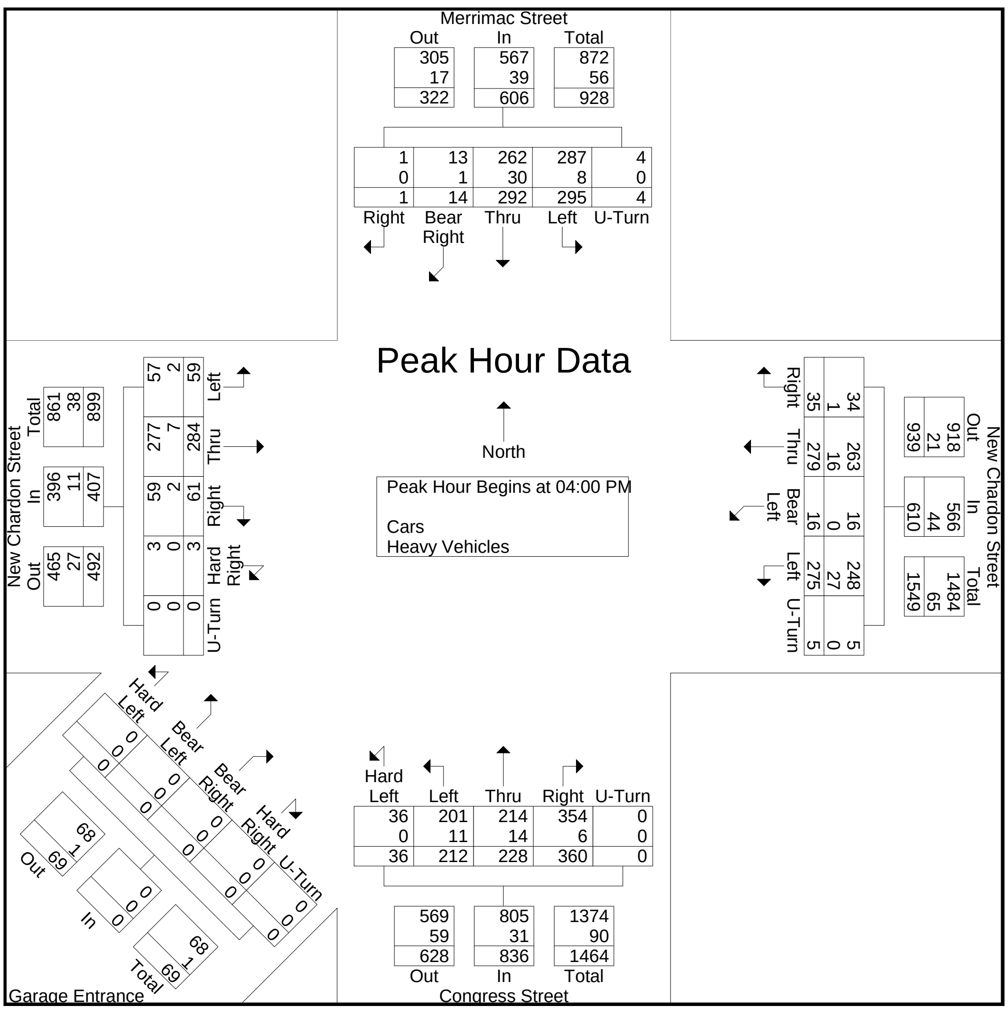
	Merrimac Street From North						New Chardon Street From East						Congress Street From South					
Start Time	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																		
Peak Hour for Entire Intersection Begins at 04:00 PM																		
04:00 PM	0	2	79	65	2	148	13	63	6	73	2	157	82	65	54	12	0	213
04:15 PM	0	5	66	65	0	136	8	77	2	69	1	157	90	52	54	8	0	204
04:30 PM	0	6	69	83	0	158	7	69	5	70	1	152	90	52	53	12	0	207
04:45 PM	1	1	78	82	2	164	7	70	3	63	1	144	98	59	51	4	0	212
Total Volume	1	14	292	295	4	606	35	279	16	275	5	610	360	228	212	36	0	836
% App. Total	0.2	2.3	48.2	48.7	0.7		5.7	45.7	2.6	45.1	0.8		43.1	27.3	25.4	4.3	0	
PHF	.250	.583	.924	.889	.500	.924	.673	.906	.667	.942	.625	.971	.918	.877	.981	.750	.000	.981
Cars	1	13	262	287	4	567	34	263	16	248	5	566	354	214	201	36	0	805
% Cars	100	92.9	89.7	97.3	100	93.6	97.1	94.3	100	90.2	100	92.8	98.3	93.9	94.8	100	0	96.3
Heavy Vehicles	0	1	30	8	0	39	1	16	0	27	0	44	6	14	11	0	0	31
% Heavy Vehicles	0	7.1	10.3	2.7	0	6.4	2.9	5.7	0	9.8	0	7.2	1.7	6.1	5.2	0	0	3.7

	Garage Entrance From Southwest						New Chardon Street From West						
Start Time	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Hard Right	Right	Thru	Left	U-Turn	App. Total	Int. Total
04:00 PM	0	0	0	0	0	0	1	19	71	17	0	108	626
04:15 PM	0	0	0	0	0	0	0	19	77	12	0	108	605
04:30 PM	0	0	0	0	0	0	1	12	66	14	0	93	610
04:45 PM	0	0	0	0	0	0	1	11	70	16	0	98	618
Total Volume	0	0	0	0	0	0	3	61	284	59	0	407	2459
% App. Total	0	0	0	0	0		0.7	15	69.8	14.5	0		
PHF	.000	.000	.000	.000	.000	.000	.750	.803	.922	.868	.000	.942	.982
Cars	0	0	0	0	0	0	3	59	277	57	0	396	2334
% Cars	0	0	0	0	0	0	100	96.7	97.5	96.6	0	97.3	94.9
Heavy Vehicles	0	0	0	0	0	0	0	2	7	2	0	11	125
% Heavy Vehicles	0	0	0	0	0	0	0	3.3	2.5	3.4	0	2.7	5.1



N/S: Merimack St (Channel)/ Garage Exit
E/W: New Chardon Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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File Name : 154673 G
Site Code : 2007190
Start Date : 9/23/2015
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Merrimac Street (Channellized Right) From North				New Chardon Street From East				Garage Exit From South				New Chardon Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	9	0	0	0	0	142	0	0	0	0	0	0	0	24	0	1	176
07:15 AM	10	0	1	0	0	157	0	0	0	0	1	0	0	33	0	0	202
07:30 AM	10	0	0	0	0	165	0	0	1	0	0	0	0	21	0	0	197
07:45 AM	19	0	0	0	0	175	0	0	1	0	0	0	0	40	0	0	235
Total	48	0	1	0	0	639	0	0	2	0	1	0	0	118	0	1	810
08:00 AM	18	0	0	0	0	187	0	1	0	0	0	0	0	55	0	1	262
08:15 AM	18	0	0	0	0	203	0	0	0	0	0	0	0	44	0	0	265
08:30 AM	29	0	0	0	0	174	0	0	0	0	0	0	0	50	0	0	253
08:45 AM	28	0	0	0	0	191	0	0	0	0	1	0	0	35	0	0	255
Total	93	0	0	0	0	755	0	1	0	0	1	0	0	184	0	1	1035
Grand Total	141	0	1	0	0	1394	0	1	2	0	2	0	0	302	0	2	1845
Apprch %	99.3	0	0.7	0	0	99.9	0	0.1	50	0	50	0	0	99.3	0	0.7	
Total %	7.6	0	0.1	0	0	75.6	0	0.1	0.1	0	0.1	0	0	16.4	0	0.1	
Cars	134	0	1	0	0	1314	0	1	1	0	2	0	0	267	0	2	1722
% Cars	95	0	100	0	0	94.3	0	100	50	0	100	0	0	88.4	0	100	93.3
Heavy Vehicles	7	0	0	0	0	80	0	0	1	0	0	0	0	35	0	0	123
% Heavy Vehicles	5	0	0	0	0	5.7	0	0	50	0	0	0	0	11.6	0	0	6.7

	Merrimac Street (Channellized Right) From North					New Chardon Street From East					Garage Exit From South					New Chardon Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	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	18	0	0	0	18	0	187	0	1	188	0	0	0	0	0	0	55	0	1	56	262
08:15 AM	18	0	0	0	18	0	203	0	0	203	0	0	0	0	0	0	44	0	0	44	265
08:30 AM	29	0	0	0	29	0	174	0	0	174	0	0	0	0	0	0	50	0	0	50	253
08:45 AM	28	0	0	0	28	0	191	0	0	191	0	0	1	0	1	0	35	0	0	35	255
Total Volume	93	0	0	0	93	0	755	0	1	756	0	0	1	0	1	0	184	0	1	185	1035
% App. Total	100	0	0	0		0	99.9	0	0.1		0	0	100	0		0	99.5	0	0.5		
PHF	.802	.000	.000	.000	.802	.000	.930	.000	.250	.931	.000	.000	.250	.000	.250	.000	.836	.000	.250	.826	.976
Cars	88	0	0	0	88	0	721	0	1	722	0	0	1	0	1	0	162	0	1	163	974
% Cars	94.6	0	0	0	94.6	0	95.5	0	100	95.5	0	0	100	0	100	0	88.0	0	100	88.1	94.1
Heavy Vehicles	5	0	0	0	5	0	34	0	0	34	0	0	0	0	0	0	22	0	0	22	61
% Heavy Vehicles	5.4	0	0	0	5.4	0	4.5	0	0	4.5	0	0	0	0	0	0	12.0	0	0	11.9	5.9

N/S: Merimack St (Channel)/ Garage Exit
E/W: New Chardon Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION
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File Name : 154673 G
Site Code : 2007190
Start Date : 9/23/2015

Groups Printed- Peds and Bikes

	Merrimac Street (Channellized Right) From North					New Chardon Street From East					Garage Exit From South					New Chardon Street From West					
Start Time	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	Int. Total
07:00 AM	0	0	0	3	8	0	0	0	7	5	0	0	0	12	8	0	0	0	1	1	45
07:15 AM	0	0	0	13	12	0	0	0	14	9	0	0	0	6	6	0	0	0	0	1	61
07:30 AM	0	0	0	16	14	0	0	0	19	10	0	0	0	9	8	0	0	0	1	3	80
07:45 AM	0	0	0	16	15	0	1	0	25	13	0	0	0	14	8	0	1	0	3	3	99
Total	0	0	0	48	49	0	1	0	65	37	0	0	0	41	30	0	1	0	5	8	285
08:00 AM	0	0	0	27	41	0	1	0	22	22	0	0	0	17	14	0	0	1	1	0	146
08:15 AM	0	0	0	24	67	0	0	0	16	31	0	0	0	15	11	0	1	0	3	3	171
08:30 AM	0	0	0	36	75	0	0	0	23	33	0	0	0	27	12	0	0	0	0	1	207
08:45 AM	0	0	0	45	86	0	0	0	29	45	0	0	0	17	21	0	0	0	2	1	246
Total	0	0	0	132	269	0	1	0	90	131	0	0	0	76	58	0	1	1	6	5	770
Grand Total	0	0	0	180	318	0	2	0	155	168	0	0	0	117	88	0	2	1	11	13	1055
Apprch %	0	0	0	36.1	63.9	0	0.6	0	47.7	51.7	0	0	0	57.1	42.9	0	7.4	3.7	40.7	48.1	
Total %	0	0	0	17.1	30.1	0	0.2	0	14.7	15.9	0	0	0	11.1	8.3	0	0.2	0.1	1	1.2	

	Merrimac Street (Channellized Right) From North						New Chardon Street From East						Garage Exit From South						New Chardon Street From West						
Start Time	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	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	0	0	0	27	41	68	0	1	0	22	22	45	0	0	0	17	14	31	0	0	1	1	0	2	146
08:15 AM	0	0	0	24	67	91	0	0	0	16	31	47	0	0	0	15	11	26	0	1	0	3	3	7	171
08:30 AM	0	0	0	36	75	111	0	0	0	23	33	56	0	0	0	27	12	39	0	0	0	0	1	1	207
08:45 AM	0	0	0	45	86	131	0	0	0	29	45	74	0	0	0	17	21	38	0	0	0	2	1	3	246
Total Volume	0	0	0	132	269	401	0	1	0	90	131	222	0	0	0	76	58	134	0	1	1	6	5	13	770
% App. Total	0	0	0	32.9	67.1		0	0.5	0	40.5	59		0	0	0	56.7	43.3		0	7.7	7.7	46.2	38.5		
PHF	.000	.000	.000	.733	.782	.765	.000	.250	.000	.776	.728	.750	.000	.000	.000	.704	.690	.859	.000	.250	.250	.500	.417	.464	.783

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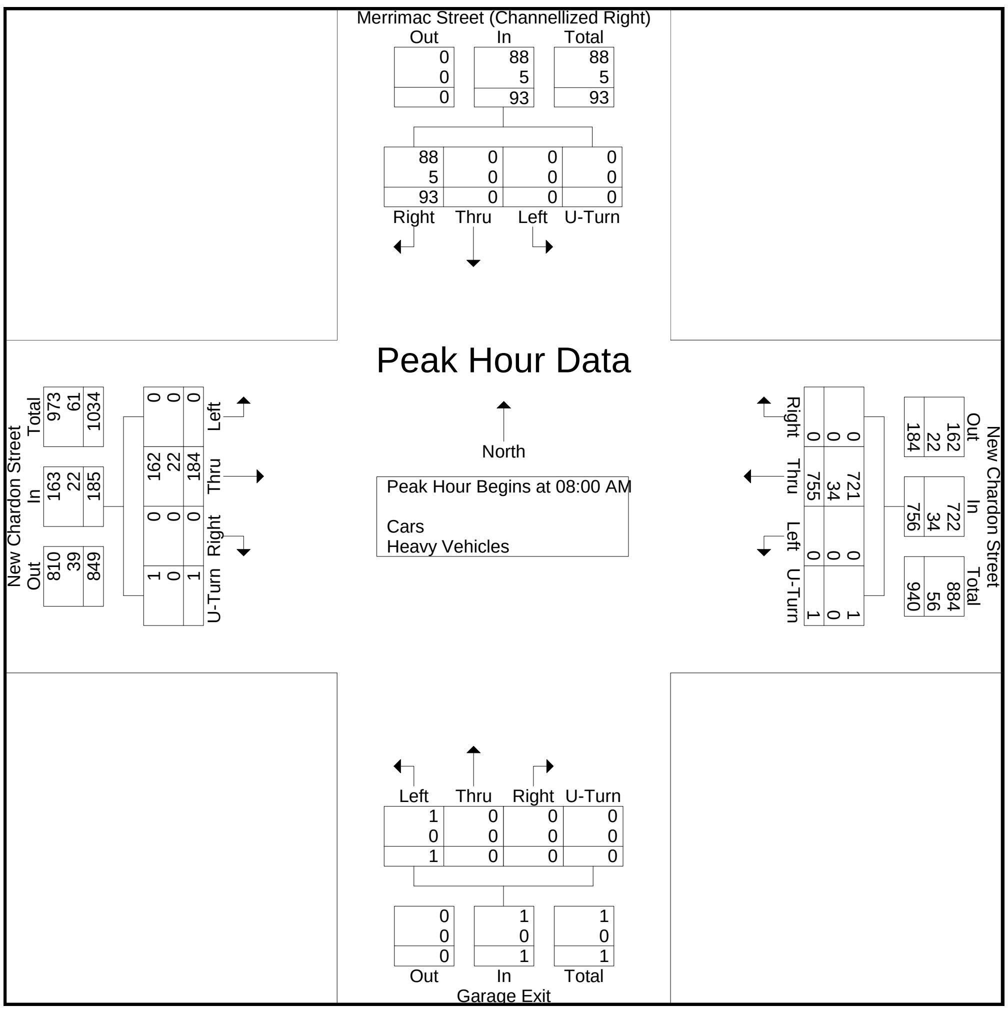
	Merrimac Street (Channellized Right) From North					New Chardon Street From East					Garage Exit From South					New Chardon Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
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	18	0	0	0	18	0	187	0	1	188	0	0	0	0	0	0	55	0	1	56	262
08:15 AM	18	0	0	0	18	0	203	0	0	203	0	0	0	0	0	0	44	0	0	44	265
08:30 AM	29	0	0	0	29	0	174	0	0	174	0	0	0	0	0	0	50	0	0	50	253
08:45 AM	28	0	0	0	28	0	191	0	0	191	0	0	1	0	1	0	35	0	0	35	255
Total Volume	93	0	0	0	93	0	755	0	1	756	0	0	1	0	1	0	184	0	1	185	1035
% App. Total	100	0	0	0		0	99.9	0	0.1		0	0	100	0		0	99.5	0	0.5		
PHF	.802	.000	.000	.000	.802	.000	.930	.000	.250	.931	.000	.000	.250	.000	.250	.000	.836	.000	.250	.826	.976
Cars	88	0	0	0	88	0	721	0	1	722	0	0	1	0	1	0	162	0	1	163	974
% Cars	94.6	0	0	0	94.6	0	95.5	0	100	95.5	0	0	100	0	100	0	88.0	0	100	88.1	94.1
Heavy Vehicles	5	0	0	0	5	0	34	0	0	34	0	0	0	0	0	0	22	0	0	22	61
% Heavy Vehicles	5.4	0	0	0	5.4	0	4.5	0	0	4.5	0	0	0	0	0	0	12.0	0	0	11.9	5.9



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Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Merrimac Street (Channellized Right) From North				New Chardon Street From East				Garage Exit From South				New Chardon Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	14	0	0	0	0	118	0	0	13	0	8	0	0	93	0	0	246
04:15 PM	14	0	0	0	0	139	0	0	15	0	8	0	0	93	0	0	269
04:30 PM	14	0	0	0	0	121	0	0	5	0	11	0	0	89	0	0	240
04:45 PM	12	0	0	0	0	123	0	0	9	0	10	0	0	87	1	0	242
Total	54	0	0	0	0	501	0	0	42	0	37	0	0	362	1	0	997
05:00 PM	12	0	2	0	0	108	0	0	17	0	8	0	0	93	0	0	240
05:15 PM	10	0	0	0	0	124	0	0	12	0	16	0	0	86	0	0	248
05:30 PM	9	0	0	0	0	144	0	0	9	0	6	0	0	74	0	0	242
05:45 PM	7	0	0	0	0	136	0	0	10	0	13	0	0	97	0	0	263
Total	38	0	2	0	0	512	0	0	48	0	43	0	0	350	0	0	993
Grand Total	92	0	2	0	0	1013	0	0	90	0	80	0	0	712	1	0	1990
Apprch %	97.9	0	2.1	0	0	100	0	0	52.9	0	47.1	0	0	99.9	0.1	0	
Total %	4.6	0	0.1	0	0	50.9	0	0	4.5	0	4	0	0	35.8	0.1	0	
Cars	87	0	2	0	0	966	0	0	90	0	78	0	0	692	1	0	1916
% Cars	94.6	0	100	0	0	95.4	0	0	100	0	97.5	0	0	97.2	100	0	96.3
Heavy Vehicles	5	0	0	0	0	47	0	0	0	0	2	0	0	20	0	0	74
% Heavy Vehicles	5.4	0	0	0	0	4.6	0	0	0	0	2.5	0	0	2.8	0	0	3.7

	Merrimac Street (Channellized Right) From North					New Chardon Street From East					Garage Exit From South					New Chardon Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	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 04:00 PM																					
04:00 PM	14	0	0	0	14	0	118	0	0	118	13	0	8	0	21	0	93	0	0	93	246
04:15 PM	14	0	0	0	14	0	139	0	0	139	15	0	8	0	23	0	93	0	0	93	269
04:30 PM	14	0	0	0	14	0	121	0	0	121	5	0	11	0	16	0	89	0	0	89	240
04:45 PM	12	0	0	0	12	0	123	0	0	123	9	0	10	0	19	0	87	1	0	88	242
Total Volume	54	0	0	0	54	0	501	0	0	501	42	0	37	0	79	0	362	1	0	363	997
% App. Total	100	0	0	0		0	100	0	0		53.2	0	46.8	0		0	99.7	0.3	0		
PHF	.964	.000	.000	.000	.964	.000	.901	.000	.000	.901	.700	.000	.841	.000	.859	.000	.973	.250	.000	.976	.927
Cars	49	0	0	0	49	0	473	0	0	473	42	0	35	0	77	0	350	1	0	351	950
% Cars	90.7	0	0	0	90.7	0	94.4	0	0	94.4	100	0	94.6	0	97.5	0	96.7	100	0	96.7	95.3
Heavy Vehicles	5	0	0	0	5	0	28	0	0	28	0	0	2	0	2	0	12	0	0	12	47
% Heavy Vehicles	9.3	0	0	0	9.3	0	5.6	0	0	5.6	0	0	5.4	0	2.5	0	3.3	0	0	3.3	4.7

N/S: Merimack St (Channel)/ Garage Exit
E/W: New Chardon Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION DATA INDUSTRIES, LLC
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File Name : 154673 GG
Site Code : 2007190
Start Date : 9/23/2015

Groups Printed- Peds and Bikes

	Merrimac Street (Channellized Right) From North					New Chardon Street From East					Garage Exit From South					New Chardon Street From West					
Start Time	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	Int. Total
04:00 PM	0	0	0	22	5	0	2	0	14	0	0	0	0	18	25	0	1	0	6	1	94
04:15 PM	0	0	0	21	10	0	0	0	21	0	0	0	0	5	20	0	3	0	0	3	83
04:30 PM	0	0	0	20	6	0	1	0	17	1	0	0	0	7	20	0	1	0	4	2	79
04:45 PM	0	0	0	21	8	0	0	0	19	3	0	0	1	7	20	0	1	0	2	0	82
Total	0	0	0	84	29	0	3	0	71	4	0	0	1	37	85	0	6	0	12	6	338
05:00 PM	0	0	0	11	3	0	1	0	14	4	0	0	0	10	32	0	0	0	6	0	81
05:15 PM	1	0	0	10	15	0	1	0	14	26	0	0	0	10	32	0	2	0	4	0	115
05:30 PM	0	0	0	16	23	0	1	0	8	14	0	0	0	20	20	0	0	0	2	2	106
05:45 PM	0	0	0	7	11	1	2	0	12	13	0	0	0	12	21	0	0	0	1	0	80
Total	1	0	0	44	52	1	5	0	48	57	0	0	0	52	105	0	2	0	13	2	382
Grand Total	1	0	0	128	81	1	8	0	119	61	0	0	1	89	190	0	8	0	25	8	720
Apprch %	0.5	0	0	61	38.6	0.5	4.2	0	63	32.3	0	0	0.4	31.8	67.9	0	19.5	0	61	19.5	
Total %	0.1	0	0	17.8	11.2	0.1	1.1	0	16.5	8.5	0	0	0.1	12.4	26.4	0	1.1	0	3.5	1.1	

	Merrimac Street (Channellized Right) From North						New Chardon Street From East						Garage Exit From South						New Chardon Street From West						
Start Time	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	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 04:45 PM																									
04:45 PM	0	0	0	21	8	29	0	0	0	19	3	22	0	0	1	7	20	28	0	1	0	2	0	3	82
05:00 PM	0	0	0	11	3	14	0	1	0	14	4	19	0	0	0	10	32	42	0	0	0	6	0	6	81
05:15 PM	1	0	0	10	15	26	0	1	0	14	26	41	0	0	0	10	32	42	0	2	0	4	0	6	115
05:30 PM	0	0	0	16	23	39	0	1	0	8	14	23	0	0	0	20	20	40	0	0	0	2	2	4	106
Total Volume	1	0	0	58	49	108	0	3	0	55	47	105	0	0	1	47	104	152	0	3	0	14	2	19	384
% App. Total	0.9	0	0	53.7	45.4		0	2.9	0	52.4	44.8		0	0	0.7	30.9	68.4		0	15.8	0	73.7	10.5		
PHF	.250	.000	.000	.690	.533	.692	.000	.750	.000	.724	.452	.640	.000	.000	.250	.588	.813	.905	.000	.375	.000	.583	.250	.792	.835

N/S: Merimack St (Channel)/ Garage Exit
E/W: New Chardon Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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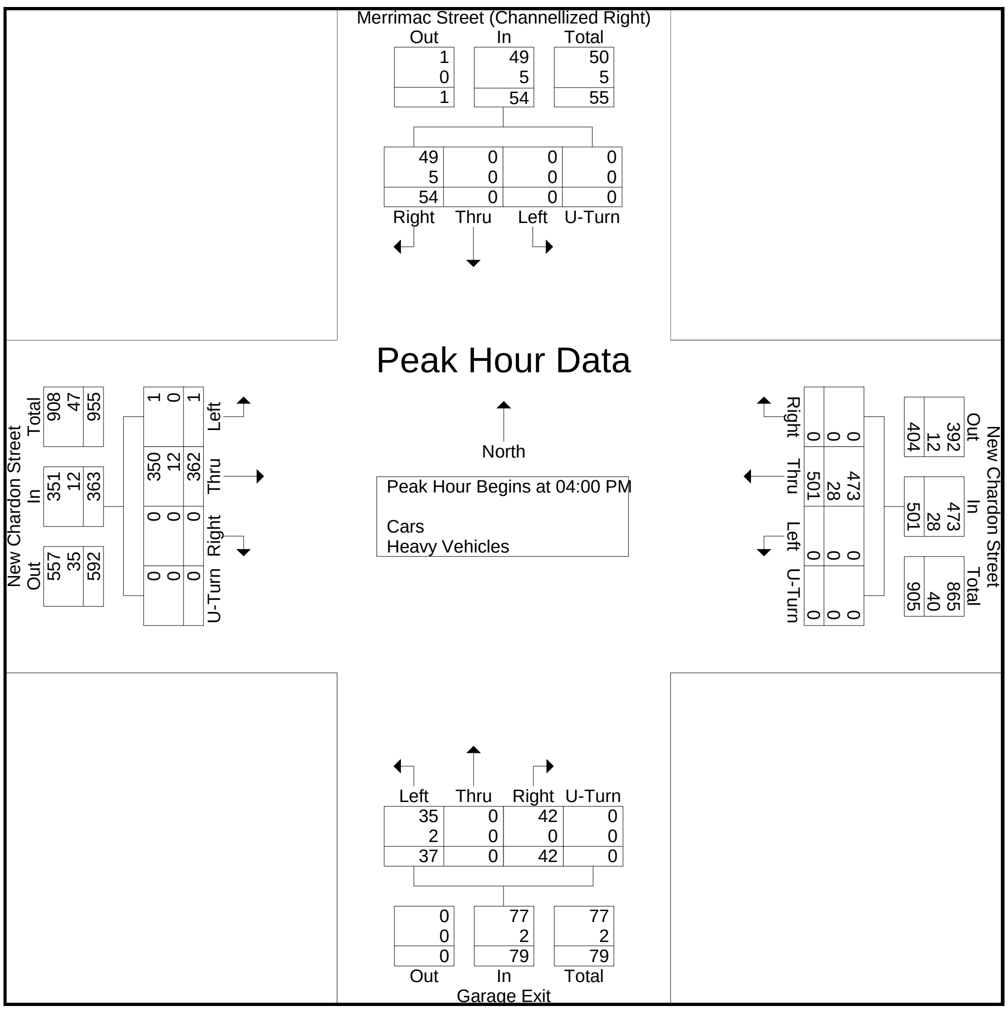
File Name : 154673 GG
Site Code : 2007190
Start Date : 9/23/2015

	Merrimac Street (Channellized Right) From North					New Chardon Street From East					Garage Exit From South					New Chardon Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	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 04:00 PM																					
04:00 PM	14	0	0	0	14	0	118	0	0	118	13	0	8	0	21	0	93	0	0	93	246
04:15 PM	14	0	0	0	14	0	139	0	0	139	15	0	8	0	23	0	93	0	0	93	269
04:30 PM	14	0	0	0	14	0	121	0	0	121	5	0	11	0	16	0	89	0	0	89	240
04:45 PM	12	0	0	0	12	0	123	0	0	123	9	0	10	0	19	0	87	1	0	88	242
Total Volume	54	0	0	0	54	0	501	0	0	501	42	0	37	0	79	0	362	1	0	363	997
% App. Total	100	0	0	0		0	100	0	0		53.2	0	46.8	0		0	99.7	0.3	0		
PHF	.964	.000	.000	.000	.964	.000	.901	.000	.000	.901	.700	.000	.841	.000	.859	.000	.973	.250	.000	.976	.927
Cars	49	0	0	0	49	0	473	0	0	473	42	0	35	0	77	0	350	1	0	351	950
% Cars	90.7	0	0	0	90.7	0	94.4	0	0	94.4	100	0	94.6	0	97.5	0	96.7	100	0	96.7	95.3
Heavy Vehicles	5	0	0	0	5	0	28	0	0	28	0	0	2	0	2	0	12	0	0	12	47
% Heavy Vehicles	9.3	0	0	0	9.3	0	5.6	0	0	5.6	0	0	5.4	0	2.5	0	3.3	0	0	3.3	4.7



N/S: New Chardon Street/ Bowdoin Street
E/W: Cambridge Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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File Name : 154673 H
Site Code : 2007190
Start Date : 9/23/2015
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	New Chardon Street From North				Cambridge Street From East				Bowdoin Street From South				Cambridge Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	49	36	61	0	9	30	1	1	25	16	23	0	16	89	0	0	356
07:15 AM	56	35	51	0	10	31	1	0	18	20	38	0	18	122	0	1	401
07:30 AM	67	38	71	0	8	44	4	0	18	13	34	0	22	109	0	0	428
07:45 AM	47	50	68	0	4	40	1	0	22	34	31	0	15	128	0	0	440
Total	219	159	251	0	31	145	7	1	83	83	126	0	71	448	0	1	1625
08:00 AM	81	41	71	0	6	56	3	1	23	36	42	0	23	159	1	0	543
08:15 AM	61	46	84	0	8	45	0	0	29	34	31	0	28	162	0	0	528
08:30 AM	58	40	81	0	7	44	6	0	26	30	42	0	17	135	0	1	487
08:45 AM	64	52	64	0	7	38	5	1	25	33	30	0	21	160	0	0	500
Total	264	179	300	0	28	183	14	2	103	133	145	0	89	616	1	1	2058
Grand Total	483	338	551	0	59	328	21	3	186	216	271	0	160	1064	1	2	3683
Apprch %	35.2	24.6	40.2	0	14.4	79.8	5.1	0.7	27.6	32.1	40.3	0	13	86.7	0.1	0.2	
Total %	13.1	9.2	15	0	1.6	8.9	0.6	0.1	5.1	5.9	7.4	0	4.3	28.9	0	0.1	
Cars	453	323	513	0	44	308	18	3	167	199	233	0	149	998	0	2	3410
% Cars	93.8	95.6	93.1	0	74.6	93.9	85.7	100	89.8	92.1	86	0	93.1	93.8	0	100	92.6
Heavy Vehicles	30	15	38	0	15	20	3	0	19	17	38	0	11	66	1	0	273
% Heavy Vehicles	6.2	4.4	6.9	0	25.4	6.1	14.3	0	10.2	7.9	14	0	6.9	6.2	100	0	7.4

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

	New Chardon Street From North					Cambridge Street From East					Bowdoin Street From South					Cambridge Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
08:00 AM	81	41	71	0	193	6	56	3	1	66	23	36	42	0	101	23	159	1	0	183	543
08:15 AM	61	46	84	0	191	8	45	0	0	53	29	34	31	0	94	28	162	0	0	190	528
08:30 AM	58	40	81	0	179	7	44	6	0	57	26	30	42	0	98	17	135	0	1	153	487
08:45 AM	64	52	64	0	180	7	38	5	1	51	25	33	30	0	88	21	160	0	0	181	500
Total Volume	264	179	300	0	743	28	183	14	2	227	103	133	145	0	381	89	616	1	1	707	2058
% App. Total	35.5	24.1	40.4	0		12.3	80.6	6.2	0.9		27	34.9	38.1	0		12.6	87.1	0.1	0.1		
PHF	.815	.861	.893	.000	.962	.875	.817	.583	.500	.860	.888	.924	.863	.000	.943	.795	.951	.250	.250	.930	.948
Cars	248	173	284	0	705	21	179	11	2	213	94	122	127	0	343	84	576	0	1	661	1922
% Cars	93.9	96.6	94.7	0	94.9	75.0	97.8	78.6	100	93.8	91.3	91.7	87.6	0	90.0	94.4	93.5	0	100	93.5	93.4
Heavy Vehicles	16	6	16	0	38	7	4	3	0	14	9	11	18	0	38	5	40	1	0	46	136
% Heavy Vehicles	6.1	3.4	5.3	0	5.1	25.0	2.2	21.4	0	6.2	8.7	8.3	12.4	0	10.0	5.6	6.5	100	0	6.5	6.6

N/S: New Chardon Street/ Bowdoin Street
E/W: Cambridge Street
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Client: Howard Stein-Hudson/ B. Beisel

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File Name : 154673 H
Site Code : 2007190
Start Date : 9/23/2015
Page No : 1

Groups Printed- Peds and Bikes

	New Chardon Street From North					Cambridge Street From East					Bowdoin Street From South					Cambridge Street From West					
Start Time	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	Int. Total
07:00 AM	0	0	0	26	75	0	2	0	24	5	0	0	0	17	29	0	7	0	10	12	207
07:15 AM	0	0	0	30	71	0	1	0	28	21	0	0	0	22	38	1	5	0	8	16	241
07:30 AM	0	0	1	43	88	0	1	0	46	14	0	1	2	29	41	0	19	0	20	19	324
07:45 AM	0	0	0	53	99	0	2	0	60	28	0	0	1	37	80	0	22	0	23	25	430
Total	0	0	1	152	333	0	6	0	158	68	0	1	3	105	188	1	53	0	61	72	1202
08:00 AM	2	0	0	59	127	0	2	0	57	21	0	0	0	42	90	0	26	0	27	30	483
08:15 AM	1	0	0	68	112	2	5	0	59	24	0	0	1	43	76	0	28	0	39	21	479
08:30 AM	2	0	0	93	93	0	9	0	64	28	0	1	2	39	100	1	22	0	33	27	514
08:45 AM	0	0	0	96	108	0	5	0	78	30	0	1	1	47	93	0	29	0	24	28	540
Total	5	0	0	316	440	2	21	0	258	103	0	2	4	171	359	1	105	0	123	106	2016
Grand Total	5	0	1	468	773	2	27	0	416	171	0	3	7	276	547	2	158	0	184	178	3218
Apprch %	0.4	0	0.1	37.5	62	0.3	4.4	0	67.5	27.8	0	0.4	0.8	33.1	65.7	0.4	30.3	0	35.2	34.1	
Total %	0.2	0	0	14.5	24	0.1	0.8	0	12.9	5.3	0	0.1	0.2	8.6	17	0.1	4.9	0	5.7	5.5	

	New Chardon Street From North						Cambridge Street From East						Bowdoin Street From South						Cambridge Street From West						
Start Time	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	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	2	0	0	59	127	188	0	2	0	57	21	80	0	0	0	42	90	132	0	26	0	27	30	83	483
08:15 AM	1	0	0	68	112	181	2	5	0	59	24	90	0	0	1	43	76	120	0	28	0	39	21	88	479
08:30 AM	2	0	0	93	93	188	0	9	0	64	28	101	0	1	2	39	100	142	1	22	0	33	27	83	514
08:45 AM	0	0	0	96	108	204	0	5	0	78	30	113	0	1	1	47	93	142	0	29	0	24	28	81	540
Total Volume	5	0	0	316	440	761	2	21	0	258	103	384	0	2	4	171	359	536	1	105	0	123	106	335	2016
% App. Total	0.7	0	0	41.5	57.8		0.5	5.5	0	67.2	26.8		0	0.4	0.7	31.9	67		0.3	31.3	0	36.7	31.6		
PHF	.625	.000	.000	.823	.866	.933	.250	.583	.000	.827	.858	.850	.000	.500	.500	.910	.898	.944	.250	.905	.000	.788	.883	.952	.933

N/S: New Chardon Street/ Bowdoin Street
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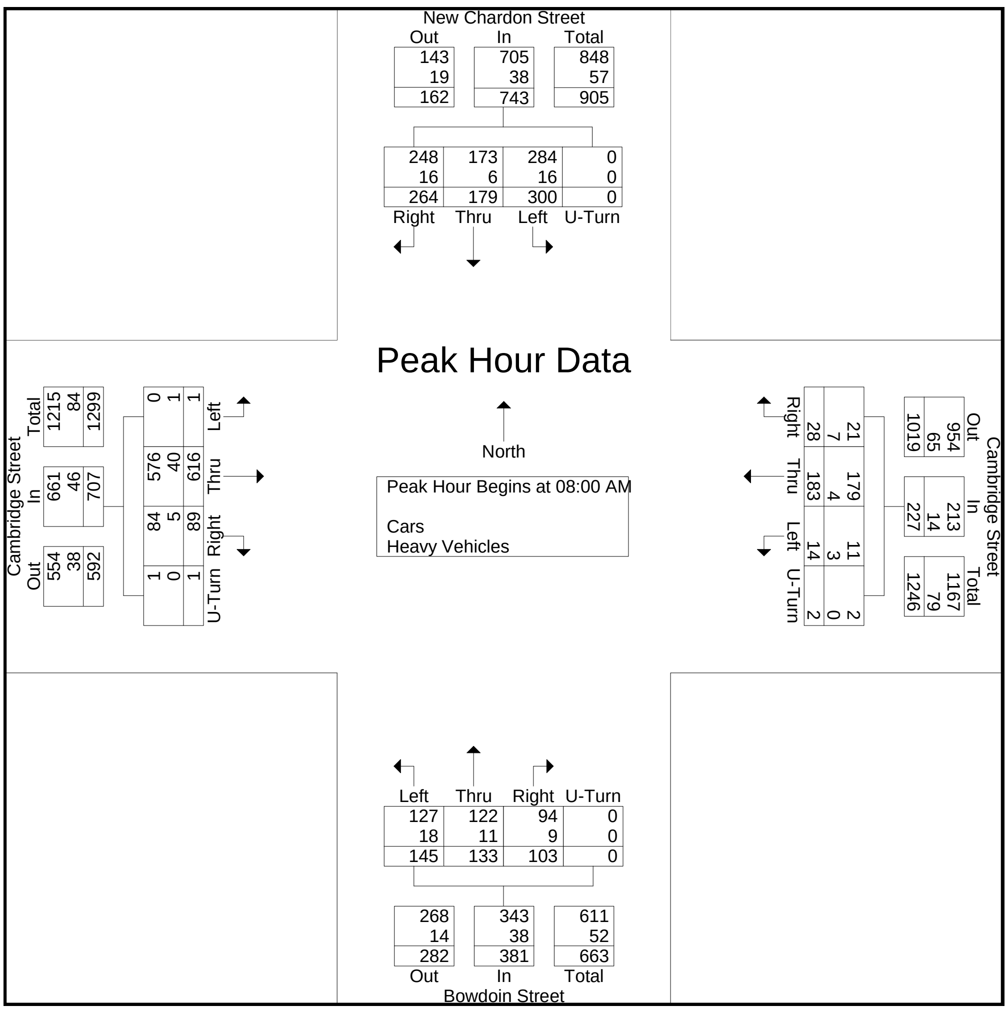
	New Chardon Street From North					Cambridge Street From East					Bowdoin Street From South					Cambridge Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis 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	81	41	71	0	193	6	56	3	1	66	23	36	42	0	101	23	159	1	0	183	543
08:15 AM	61	46	84	0	191	8	45	0	0	53	29	34	31	0	94	28	162	0	0	190	528
08:30 AM	58	40	81	0	179	7	44	6	0	57	26	30	42	0	98	17	135	0	1	153	487
08:45 AM	64	52	64	0	180	7	38	5	1	51	25	33	30	0	88	21	160	0	0	181	500
Total Volume	264	179	300	0	743	28	183	14	2	227	103	133	145	0	381	89	616	1	1	707	2058
% App. Total	35.5	24.1	40.4	0		12.3	80.6	6.2	0.9		27	34.9	38.1	0		12.6	87.1	0.1	0.1		
PHF	.815	.861	.893	.000	.962	.875	.817	.583	.500	.860	.888	.924	.863	.000	.943	.795	.951	.250	.250	.930	.948
Cars	248	173	284	0	705	21	179	11	2	213	94	122	127	0	343	84	576	0	1	661	1922
% Cars	93.9	96.6	94.7	0	94.9	75.0	97.8	78.6	100	93.8	91.3	91.7	87.6	0	90.0	94.4	93.5	0	100	93.5	93.4
Heavy Vehicles	16	6	16	0	38	7	4	3	0	14	9	11	18	0	38	5	40	1	0	46	136
% Heavy Vehicles	6.1	3.4	5.3	0	5.1	25.0	2.2	21.4	0	6.2	8.7	8.3	12.4	0	10.0	5.6	6.5	100	0	6.5	6.6



N/S: New Chardon Street/ Bowdoin Street
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PRECISION DATA INDUSTRIES, LLC

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Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

File Name : 154673 HH
Site Code : 2007190
Start Date : 9/23/2015
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	New Chardon Street From North				Cambridge Street From East				Bowdoin Street From South				Cambridge Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	37	34	54	0	12	58	0	0	35	65	46	0	21	155	2	0	519
04:15 PM	57	33	63	0	9	63	3	0	35	52	47	0	25	166	1	0	554
04:30 PM	64	34	46	0	15	56	3	0	35	69	45	0	13	147	2	0	529
04:45 PM	44	35	60	0	7	69	2	1	34	70	56	0	9	158	2	0	547
Total	202	136	223	0	43	246	8	1	139	256	194	0	68	626	7	0	2149
05:00 PM	42	43	59	0	13	62	2	0	27	77	50	0	26	152	0	0	553
05:15 PM	44	40	57	0	10	51	6	0	30	66	71	0	13	167	0	0	555
05:30 PM	54	44	62	0	10	70	3	1	30	64	37	0	22	157	0	0	554
05:45 PM	50	44	46	0	9	75	3	0	33	77	52	0	18	113	1	0	521
Total	190	171	224	0	42	258	14	1	120	284	210	0	79	589	1	0	2183
Grand Total	392	307	447	0	85	504	22	2	259	540	404	0	147	1215	8	0	4332
Apprch %	34.2	26.8	39	0	13.9	82.2	3.6	0.3	21.5	44.9	33.6	0	10.7	88.7	0.6	0	
Total %	9	7.1	10.3	0	2	11.6	0.5	0	6	12.5	9.3	0	3.4	28	0.2	0	
Cars	381	301	413	0	76	494	22	2	244	529	368	0	142	1162	8	0	4142
% Cars	97.2	98	92.4	0	89.4	98	100	100	94.2	98	91.1	0	96.6	95.6	100	0	95.6
Heavy Vehicles	11	6	34	0	9	10	0	0	15	11	36	0	5	53	0	0	190
% Heavy Vehicles	2.8	2	7.6	0	10.6	2	0	0	5.8	2	8.9	0	3.4	4.4	0	0	4.4

	New Chardon Street From North					Cambridge Street From East					Bowdoin Street From South					Cambridge Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	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 04:45 PM																					
04:45 PM	44	35	60	0	139	7	69	2	1	79	34	70	56	0	160	9	158	2	0	169	547
05:00 PM	42	43	59	0	144	13	62	2	0	77	27	77	50	0	154	26	152	0	0	178	553
05:15 PM	44	40	57	0	141	10	51	6	0	67	30	66	71	0	167	13	167	0	0	180	555
05:30 PM	54	44	62	0	160	10	70	3	1	84	30	64	37	0	131	22	157	0	0	179	554
Total Volume	184	162	238	0	584	40	252	13	2	307	121	277	214	0	612	70	634	2	0	706	2209
% App. Total	31.5	27.7	40.8	0		13	82.1	4.2	0.7		19.8	45.3	35	0		9.9	89.8	0.3	0		
PHF	.852	.920	.960	.000	.913	.769	.900	.542	.500	.914	.890	.899	.754	.000	.916	.673	.949	.250	.000	.981	.995
Cars	180	157	219	0	556	36	248	13	2	299	113	272	194	0	579	68	609	2	0	679	2113
% Cars	97.8	96.9	92.0	0	95.2	90.0	98.4	100	100	97.4	93.4	98.2	90.7	0	94.6	97.1	96.1	100	0	96.2	95.7
Heavy Vehicles	4	5	19	0	28	4	4	0	0	8	8	5	20	0	33	2	25	0	0	27	96
% Heavy Vehicles	2.2	3.1	8.0	0	4.8	10.0	1.6	0	0	2.6	6.6	1.8	9.3	0	5.4	2.9	3.9	0	0	3.8	4.3

N/S: New Chardon Street/ Bowdoin Street
E/W: Cambridge Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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Page No : 1

Groups Printed- Peds and Bikes

	New Chardon Street From North					Cambridge Street From East					Bowdoin Street From South					Cambridge Street From West					
Start Time	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	Int. Total
04:00 PM	3	1	0	100	71	0	11	0	15	47	2	1	1	52	53	0	2	0	36	21	416
04:15 PM	0	1	0	101	53	0	12	0	20	47	0	2	0	56	43	1	3	0	21	18	378
04:30 PM	0	0	2	133	51	0	17	0	14	59	0	0	0	60	38	0	3	0	27	35	439
04:45 PM	2	0	0	108	73	1	17	0	13	52	0	0	3	55	44	0	6	0	33	7	414
Total	5	2	2	442	248	1	57	0	62	205	2	3	4	223	178	1	14	0	117	81	1647
05:00 PM	2	0	0	123	55	0	23	0	19	81	0	0	2	93	50	1	12	0	50	25	536
05:15 PM	0	0	0	140	69	0	59	0	23	54	0	0	4	95	58	0	10	0	66	27	605
05:30 PM	2	0	0	113	71	0	35	0	13	47	0	0	5	70	58	1	3	0	42	14	474
05:45 PM	2	0	0	115	60	0	36	0	17	16	1	0	1	95	41	1	5	0	20	17	427
Total	6	0	0	491	255	0	153	0	72	198	1	0	12	353	207	3	30	0	178	83	2042
Grand Total	11	2	2	933	503	1	210	0	134	403	3	3	16	576	385	4	44	0	295	164	3689
Apprch %	0.8	0.1	0.1	64.3	34.7	0.1	28.1	0	17.9	53.9	0.3	0.3	1.6	58.6	39.2	0.8	8.7	0	58.2	32.3	
Total %	0.3	0.1	0.1	25.3	13.6	0	5.7	0	3.6	10.9	0.1	0.1	0.4	15.6	10.4	0.1	1.2	0	8	4.4	

	New Chardon Street From North						Cambridge Street From East						Bowdoin Street From South						Cambridge Street From West						
Start Time	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	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	2	0	0	123	55	180	0	23	0	19	81	123	0	0	2	93	50	145	1	12	0	50	25	88	536
05:15 PM	0	0	0	140	69	209	0	59	0	23	54	136	0	0	4	95	58	157	0	10	0	66	27	103	605
05:30 PM	2	0	0	113	71	186	0	35	0	13	47	95	0	0	5	70	58	133	1	3	0	42	14	60	474
05:45 PM	2	0	0	115	60	177	0	36	0	17	16	69	1	0	1	95	41	138	1	5	0	20	17	43	427
Total Volume	6	0	0	491	255	752	0	153	0	72	198	423	1	0	12	353	207	573	3	30	0	178	83	294	2042
% App. Total	0.8	0	0	65.3	33.9		0	36.2	0	17	46.8		0.2	0	2.1	61.6	36.1		1	10.2	0	60.5	28.2		
PHF	.750	.000	.000	.877	.898	.900	.000	.648	.000	.783	.611	.778	.250	.000	.600	.929	.892	.912	.750	.625	.000	.674	.769	.714	.844

N/S: New Chardon Street/ Bowdoin Street
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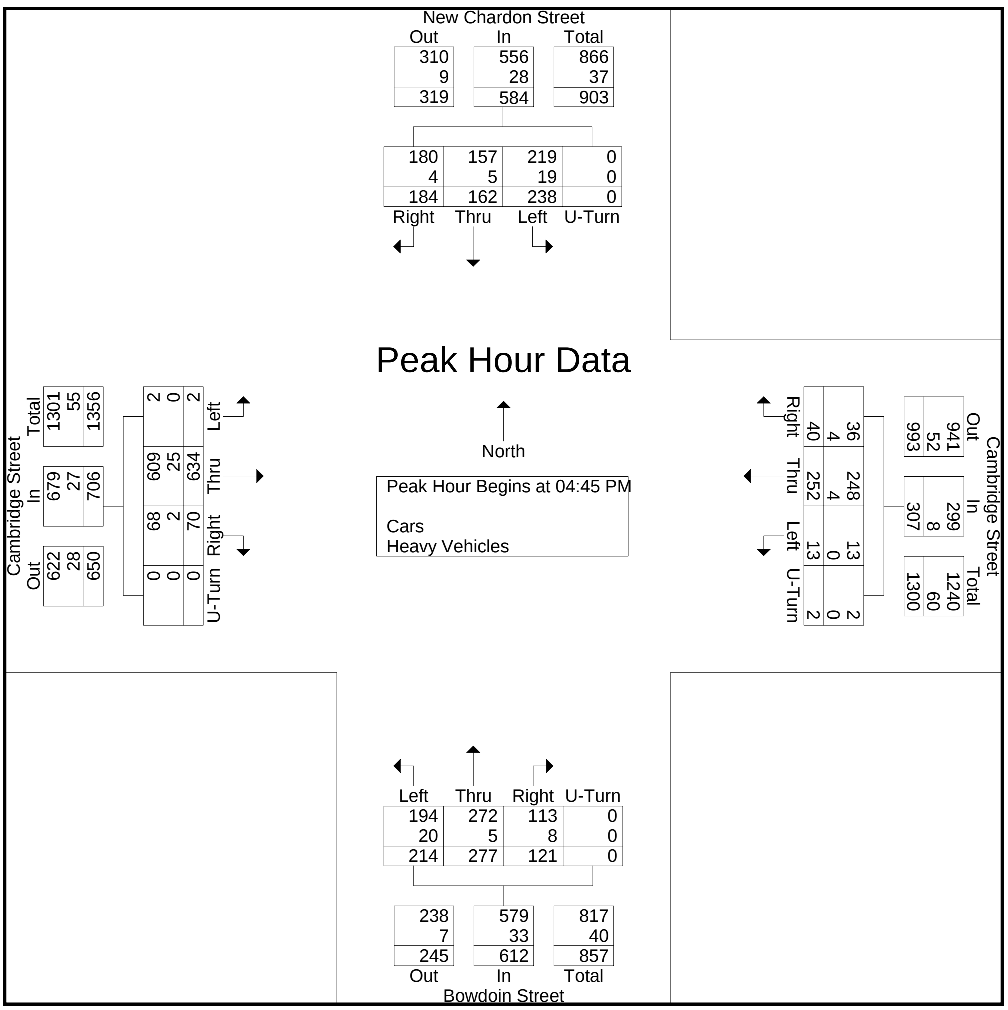
Site Code : 2007190
Start Date : 9/23/2015

	New Chardon Street From North					Cambridge Street From East					Bowdoin Street From South					Cambridge Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	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 04:45 PM																					
04:45 PM	44	35	60	0	139	7	69	2	1	79	34	70	56	0	160	9	158	2	0	169	547
05:00 PM	42	43	59	0	144	13	62	2	0	77	27	77	50	0	154	26	152	0	0	178	553
05:15 PM	44	40	57	0	141	10	51	6	0	67	30	66	71	0	167	13	167	0	0	180	555
05:30 PM	54	44	62	0	160	10	70	3	1	84	30	64	37	0	131	22	157	0	0	179	554
Total Volume	184	162	238	0	584	40	252	13	2	307	121	277	214	0	612	70	634	2	0	706	2209
% App. Total	31.5	27.7	40.8	0		13	82.1	4.2	0.7		19.8	45.3	35	0		9.9	89.8	0.3	0		
PHF	.852	.920	.960	.000	.913	.769	.900	.542	.500	.914	.890	.899	.754	.000	.916	.673	.949	.250	.000	.981	.995
Cars	180	157	219	0	556	36	248	13	2	299	113	272	194	0	579	68	609	2	0	679	2113
% Cars	97.8	96.9	92.0	0	95.2	90.0	98.4	100	100	97.4	93.4	98.2	90.7	0	94.6	97.1	96.1	100	0	96.2	95.7
Heavy Vehicles	4	5	19	0	28	4	4	0	0	8	8	5	20	0	33	2	25	0	0	27	96
% Heavy Vehicles	2.2	3.1	8.0	0	4.8	10.0	1.6	0	0	2.6	6.6	1.8	9.3	0	5.4	2.9	3.9	0	0	3.8	4.3



N/S: New Sudbury Street/ Somerset Street
E/W: Cambridge Street
City, State: Boston, MA
Client: Howard/Stein-Hudson/ K. Chronley

PRECISION
D A T A
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File Name : 133264 C
Site Code : 2007190.
Start Date : 3/27/2013

Groups Printed- Cars - Heavy Vehicles

	New Sudbury Street From North				Cambridge Street From East				Somerset Street From South				Cambridge Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	21	34	14	5	1	4	8	0	33	93	45	1	259
07:15 AM	0	0	0	0	18	37	11	3	2	5	6	0	44	110	55	5	296
07:30 AM	0	0	0	0	23	50	12	1	1	5	7	0	51	103	64	3	320
07:45 AM	0	0	0	0	26	51	21	3	2	4	9	0	53	147	76	3	395
Total	0	0	0	0	88	172	58	12	6	18	30	0	181	453	240	12	1270
08:00 AM	0	0	0	0	38	66	27	2	2	6	5	0	58	126	82	4	416
08:15 AM	0	0	0	0	25	49	22	6	2	14	10	0	71	133	62	7	401
08:30 AM	0	0	0	0	28	84	29	2	2	10	5	0	68	129	69	4	430
08:45 AM	0	0	0	0	36	54	26	8	5	7	4	0	75	140	64	4	423
Total	0	0	0	0	127	253	104	18	11	37	24	0	272	528	277	19	1670
Grand Total	0	0	0	0	215	425	162	30	17	55	54	0	453	981	517	31	2940
Apprch %	0	0	0	0	25.8	51.1	19.5	3.6	13.5	43.7	42.9	0	22.9	49.5	26.1	1.6	
Total %	0	0	0	0	7.3	14.5	5.5	1	0.6	1.9	1.8	0	15.4	33.4	17.6	1.1	
Cars	0	0	0	0	192	397	150	30	16	52	54	0	446	915	494	31	2777
% Cars	0	0	0	0	89.3	93.4	92.6	100	94.1	94.5	100	0	98.5	93.3	95.6	100	94.5
Heavy Vehicles	0	0	0	0	23	28	12	0	1	3	0	0	7	66	23	0	163
% Heavy Vehicles	0	0	0	0	10.7	6.6	7.4	0	5.9	5.5	0	0	1.5	6.7	4.4	0	5.5

	New Sudbury Street From North					Cambridge Street From East					Somerset Street From South					Cambridge Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	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

Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
08:00 AM	0	0	0	0	0	**38**	66	27	2	133	2	6	5	0	13	58	126	**82**	4	270	416
08:15 AM	0	0	0	0	0	25	49	22	6	102	2	**14**	**10**	0	**26**	71	133	62	**7**	273	401
08:30 AM	0	0	0	0	0	28	**84**	**29**	2	**143**	2	10	5	0	17	68	129	69	4	270	**430**
08:45 AM	0	0	0	0	0	36	54	26	**8**	124	**5**	7	4	0	16	**75**	**140**	64	4	**283**	423
Total Volume	0	0	0	0	0	127	253	104	18	502	11	37	24	0	72	272	528	277	19	1096	1670
% App. Total	0	0	0	0		25.3	50.4	20.7	3.6		15.3	51.4	33.3	0		24.8	48.2	25.3	1.7		
PHF	.000	.000	.000	.000	.000	.836	.753	.897	.563	.878	.550	.661	.600	.000	.692	.907	.943	.845	.679	.968	.971
Cars	0	0	0	0	0	113	235	96	18	462	10	35	24	0	69	268	496	264	19	1047	1578
% Cars	0	0	0	0	0	89.0	92.9	92.3	100	92.0	90.9	94.6	100	0	95.8	98.5	93.9	95.3	100	95.5	94.5
Heavy Vehicles	0	0	0	0	0	14	18	8	0	40	1	2	0	0	3	4	32	13	0	49	92
% Heavy Vehicles	0	0	0	0	0	11.0	7.1	7.7	0	8.0	9.1	5.4	0	0	4.2	1.5	6.1	4.7	0	4.5	5.5

N/S: New Sudbury Street/ Somerset Street
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Groups Printed- Peds and Bicycles

	New Sudbury Street From North				Cambridge Street From East				Somerset Street From South				Cambridge Street From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
07:00 AM	0	0	0	30	0	1	0	18	0	0	0	41	0	2	0	11	103
07:15 AM	0	0	0	43	0	1	0	18	0	0	0	46	0	3	0	17	128
07:30 AM	0	0	0	65	0	2	0	21	0	0	0	73	0	5	1	19	186
07:45 AM	0	0	0	77	0	0	0	46	0	0	0	101	0	4	4	28	260
Total	0	0	0	215	0	4	0	103	0	0	0	261	0	14	5	75	677
08:00 AM	0	0	0	82	0	0	0	49	0	0	0	111	0	8	3	22	275
08:15 AM	0	0	0	88	0	3	0	40	0	0	0	115	3	9	0	33	291
08:30 AM	0	0	0	115	0	1	0	48	0	0	0	95	1	16	5	35	316
08:45 AM	0	0	0	92	0	2	0	104	0	2	0	53	2	14	5	64	338
Total	0	0	0	377	0	6	0	241	0	2	0	374	6	47	13	154	1220
Grand Total	0	0	0	592	0	10	0	344	0	2	0	635	6	61	18	229	1897
Apprch %	0	0	0	100	0	2.8	0	97.2	0	0.3	0	99.7	1.9	19.4	5.7	72.9	
Total %	0	0	0	31.2	0	0.5	0	18.1	0	0.1	0	33.5	0.3	3.2	0.9	12.1	

	New Sudbury Street From North					Cambridge Street From East					Somerset Street From South					Cambridge Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	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	0	0	0	82	82	0	0	0	49	49	0	0	0	111	111	0	8	3	22	33	275
08:15 AM	0	0	0	88	88	0	**3**	0	40	43	0	0	0	**115**	**115**	**3**	9	0	33	45	291
08:30 AM	0	0	0	**115**	**115**	0	1	0	48	49	0	0	0	95	95	1	**16**	**5**	35	57	316
08:45 AM	0	0	0	92	92	0	2	0	**104**	**106**	0	**2**	0	53	55	2	14	5	**64**	**85**	**338**
Total Volume	0	0	0	377	377	0	6	0	241	247	0	2	0	374	376	6	47	13	154	220	1220
% App. Total	0	0	0	100		0	2.4	0	97.6		0	0.5	0	99.5		2.7	21.4	5.9	70		
PHF	.000	.000	.000	.820	.820	.000	.500	.000	.579	.583	.000	.250	.000	.813	.817	.500	.734	.650	.602	.647	.902

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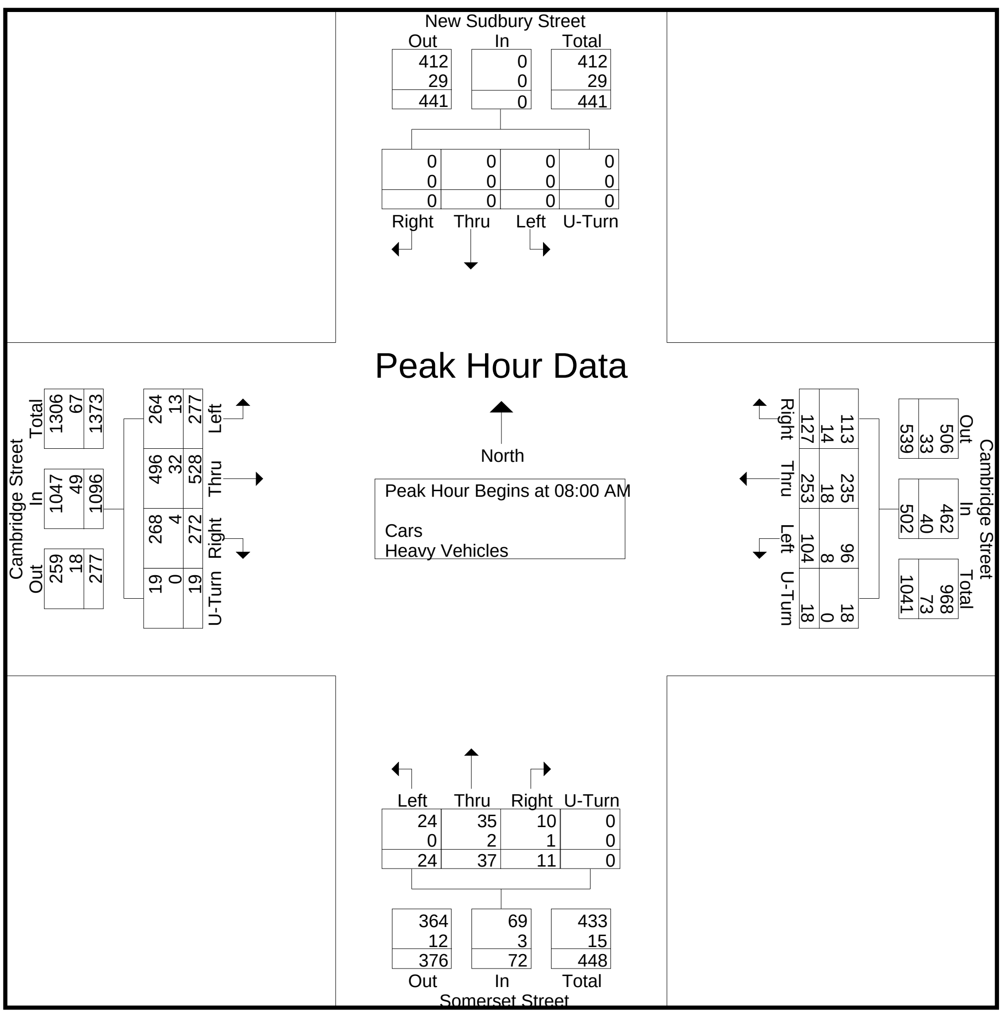
	New Sudbury Street From North					Cambridge Street From East					Somerset Street From South					Cambridge Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis 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	0	0	0	0	0	**38**	66	27	2	133	2	6	5	0	13	58	126	**82**	4	270	416
08:15 AM	0	0	0	0	0	25	49	22	6	102	2	**14**	**10**	0	**26**	71	133	62	**7**	273	401
08:30 AM	0	0	0	0	0	28	**84**	**29**	2	**143**	2	10	5	0	17	68	129	69	4	270	**430**
08:45 AM	0	0	0	0	0	36	54	26	**8**	124	**5**	7	4	0	16	**75**	**140**	64	4	**283**	423
Total Volume	0	0	0	0	0	127	253	104	18	502	11	37	24	0	72	272	528	277	19	1096	1670
% App. Total	0	0	0	0		25.3	50.4	20.7	3.6		15.3	51.4	33.3	0		24.8	48.2	25.3	1.7		
PHF	.000	.000	.000	.000	.000	.836	.753	.897	.563	.878	.550	.661	.600	.000	.692	.907	.943	.845	.679	.968	.971
Cars	0	0	0	0	0	113	235	96	18	462	10	35	24	0	69	268	496	264	19	1047	1578
% Cars	0	0	0	0	0	89.0	92.9	92.3	100	92.0	90.9	94.6	100	0	95.8	98.5	93.9	95.3	100	95.5	94.5
Heavy Vehicles	0	0	0	0	0	14	18	8	0	40	1	2	0	0	3	4	32	13	0	49	92
% Heavy Vehicles	0	0	0	0	0	11.0	7.1	7.7	0	8.0	9.1	5.4	0	0	4.2	1.5	6.1	4.7	0	4.5	5.5



N/S: New Sudbury Street/ Somerset Street
E/W: Cambridge Street
City, State: Boston, MA
Client: Howard/Stein-Hudson/ K. Chronley

PRECISION
D A T A
INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

File Name : 133264 CC
Site Code : 2007190.
Start Date : 3/27/2013

Groups Printed- Cars - Heavy Vehicles

	New Sudbury Street From North				Cambridge Street From East				Somerset Street From South				Cambridge Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	42	58	14	7	6	14	20	0	37	140	106	6	450
04:15 PM	0	0	0	0	34	62	13	8	12	25	13	0	37	134	93	7	438
04:30 PM	0	0	0	0	29	63	12	10	6	33	26	0	32	134	104	9	458
04:45 PM	0	0	0	0	25	74	4	9	8	30	17	0	33	148	91	5	444
Total	0	0	0	0	130	257	43	34	32	102	76	0	139	556	394	27	1790
05:00 PM	0	0	0	0	38	82	12	2	6	24	24	0	38	162	88	7	483
05:15 PM	0	0	0	0	46	93	5	6	6	29	26	0	32	161	108	5	517
05:30 PM	0	0	0	0	47	83	16	4	7	32	19	0	29	175	86	9	507
05:45 PM	0	0	0	0	31	89	18	7	10	22	17	0	27	159	103	6	489
Total	0	0	0	0	162	347	51	19	29	107	86	0	126	657	385	27	1996
Grand Total	0	0	0	0	292	604	94	53	61	209	162	0	265	1213	779	54	3786
Apprch %	0	0	0	0	28	57.9	9	5.1	14.1	48.4	37.5	0	11.5	52.5	33.7	2.3	
Total %	0	0	0	0	7.7	16	2.5	1.4	1.6	5.5	4.3	0	7	32	20.6	1.4	
Cars	0	0	0	0	273	598	94	52	60	208	160	0	258	1186	756	54	3699
% Cars	0	0	0	0	93.5	99	100	98.1	98.4	99.5	98.8	0	97.4	97.8	97	100	97.7
Heavy Vehicles	0	0	0	0	19	6	0	1	1	1	2	0	7	27	23	0	87
% Heavy Vehicles	0	0	0	0	6.5	1	0	1.9	1.6	0.5	1.2	0	2.6	2.2	3	0	2.3

	New Sudbury Street From North					Cambridge Street From East					Somerset Street From South					Cambridge Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	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	0	0	0	0	38	82	12	2	134	6	24	24	0	54	**38**	162	88	7	295	483
05:15 PM	0	0	0	0	0	46	**93**	5	6	**150**	6	29	**26**	0	**61**	32	161	**108**	5	**306**	**517**
05:30 PM	0	0	0	0	0	**47**	83	16	4	150	7	**32**	19	0	58	29	**175**	86	**9**	299	507
05:45 PM	0	0	0	0	0	31	89	**18**	**7**	145	**10**	22	17	0	49	27	159	103	6	295	489
Total Volume	0	0	0	0	0	162	347	51	19	579	29	107	86	0	222	126	657	385	27	1195	1996
% App. Total	0	0	0	0		28	59.9	8.8	3.3		13.1	48.2	38.7	0		10.5	55	32.2	2.3		
PHF	.000	.000	.000	.000	.000	.862	.933	.708	.679	.965	.725	.836	.827	.000	.910	.829	.939	.891	.750	.976	.965
Cars	0	0	0	0	0	154	344	51	19	568	28	107	85	0	220	121	646	375	27	1169	1957
% Cars	0	0	0	0	0	95.1	99.1	100	100	98.1	96.6	100	98.8	0	99.1	96.0	98.3	97.4	100	97.8	98.0
Heavy Vehicles	0	0	0	0	0	8	3	0	0	11	1	0	1	0	2	5	11	10	0	26	39
% Heavy Vehicles	0	0	0	0	0	4.9	0.9	0	0	1.9	3.4	0	1.2	0	0.9	4.0	1.7	2.6	0	2.2	2.0

N/S: New Sudbury Street/ Somerset Street
E/W: Cambridge Street
City, State: Boston, MA
Client: Howard/Stein-Hudson/ K. Chronley

PRECISION
D A T A
INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

File Name : 133264 CC
Site Code : 2007190.
Start Date : 3/27/2013

Groups Printed- Peds and Bicycles

	New Sudbury Street From North				Cambridge Street From East				Somerset Street From South				Cambridge Street From West				
Start Time	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Right	Thru	Left	Peds	Int. Total
04:00 PM	0	0	0	86	0	1	0	64	0	0	0	128	0	6	0	72	357
04:15 PM	0	0	0	75	0	7	0	62	0	0	0	93	0	0	0	25	262
04:30 PM	0	0	0	102	0	8	1	48	0	0	0	109	0	4	0	64	336
04:45 PM	0	0	0	71	0	2	0	55	0	0	0	91	0	1	0	57	277
Total	0	0	0	334	0	18	1	229	0	0	0	421	0	11	0	218	1232
05:00 PM	0	0	0	141	0	20	0	83	1	0	0	139	0	0	0	60	444
05:15 PM	0	0	0	160	0	17	0	73	0	0	1	149	0	0	2	49	451
05:30 PM	0	0	0	111	0	19	0	42	0	0	1	133	0	0	0	45	351
05:45 PM	0	0	0	123	0	24	0	46	0	0	1	112	0	1	1	31	339
Total	0	0	0	535	0	80	0	244	1	0	3	533	0	1	3	185	1585
Grand Total	0	0	0	869	0	98	1	473	1	0	3	954	0	12	3	403	2817
Apprch %	0	0	0	100	0	17.1	0.2	82.7	0.1	0	0.3	99.6	0	2.9	0.7	96.4	
Total %	0	0	0	30.8	0	3.5	0	16.8	0	0	0.1	33.9	0	0.4	0.1	14.3	

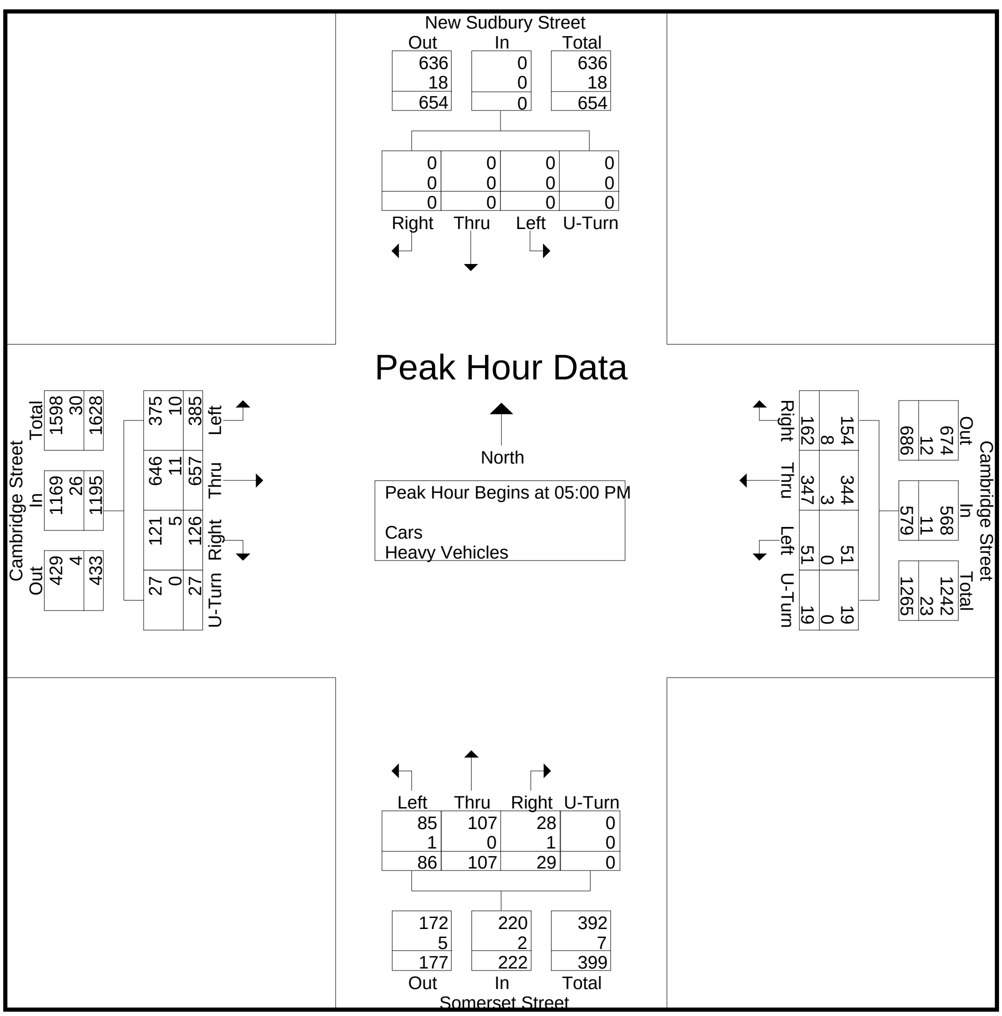
	New Sudbury Street From North					Cambridge Street From East					Somerset Street From South					Cambridge Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 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	0	0	141	141	0	20	0	**83**	**103**	**1**	0	0	139	140	0	0	0	**60**	**60**	444
05:15 PM	0	0	0	**160**	**160**	0	17	0	73	90	0	0	**1**	**149**	**150**	0	0	**2**	49	51	**451**
05:30 PM	0	0	0	111	111	0	19	0	42	61	0	0	1	133	134	0	0	0	45	45	351
05:45 PM	0	0	0	123	123	0	**24**	0	46	70	0	0	1	112	113	0	**1**	1	31	33	339
Total Volume	0	0	0	535	535	0	80	0	244	324	1	0	3	533	537	0	1	3	185	189	1585
% App. Total	0	0	0	100		0	24.7	0	75.3		0.2	0	0.6	99.3		0	0.5	1.6	97.9		
PHF	.000	.000	.000	.836	.836	.000	.833	.000	.735	.786	.250	.000	.750	.894	.895	.000	.250	.375	.771	.788	.879

N/S: New Sudbury Street/ Somerset Street
E/W: Cambridge Street
City, State: Boston, MA
Client: Howard/Stein-Hudson/ K. Chronley

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

File Name : 133264 CC
Site Code : 2007190.
Start Date : 3/27/2013

	New Sudbury Street From North					Cambridge Street From East					Somerset Street From South					Cambridge Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	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	0	0	0	0	38	82	12	2	134	6	24	24	0	54	**38**	162	88	7	295	483
05:15 PM	0	0	0	0	0	46	**93**	5	6	**150**	6	29	**26**	0	**61**	32	161	**108**	5	**306**	**517**
05:30 PM	0	0	0	0	0	**47**	83	16	4	150	7	**32**	19	0	58	29	**175**	86	**9**	299	507
05:45 PM	0	0	0	0	0	31	89	**18**	**7**	145	**10**	22	17	0	49	27	159	103	6	295	489
Total Volume	0	0	0	0	0	162	347	51	19	579	29	107	86	0	222	126	657	385	27	1195	1996
% App. Total	0	0	0	0		28	59.9	8.8	3.3		13.1	48.2	38.7	0		10.5	55	32.2	2.3		
PHF	.000	.000	.000	.000	.000	.862	.933	.708	.679	.965	.725	.836	.827	.000	.910	.829	.939	.891	.750	.976	.965
Cars	0	0	0	0	0	154	344	51	19	568	28	107	85	0	220	121	646	375	27	1169	1957
% Cars	0	0	0	0	0	95.1	99.1	100	100	98.1	96.6	100	98.8	0	99.1	96.0	98.3	97.4	100	97.8	98.0
Heavy Vehicles	0	0	0	0	0	8	3	0	0	11	1	0	1	0	2	5	11	10	0	26	39
% Heavy Vehicles	0	0	0	0	0	4.9	0.9	0	0	1.9	3.4	0	1.2	0	0.9	4.0	1.7	2.6	0	2.2	2.0



N: Garage
E/W: Sudbury Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION DATA INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

File Name : 154673 N
Site Code : 2007190
Start Date : 9/23/2015

Groups Printed- Cars - Heavy Vehicles

	Garage From North			Sudbury Street From East			Sudbury Street From West			
Start Time	Right	Left	U-Turn	Right	Thru	U-Turn	Thru	Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	0	116	6	0	122
07:15 AM	0	0	0	0	0	0	120	7	0	127
07:30 AM	0	0	0	0	0	0	130	10	0	140
07:45 AM	0	0	0	0	0	0	152	14	0	166
Total	0	0	0	0	0	0	518	37	0	555
08:00 AM	0	0	0	0	0	0	139	8	0	147
08:15 AM	0	0	0	0	0	0	143	19	0	162
08:30 AM	0	0	0	0	0	0	100	12	0	112
08:45 AM	0	0	0	0	0	0	126	19	0	145
Total	0	0	0	0	0	0	508	58	0	566
Grand Total	0	0	0	0	0	0	1026	95	0	1121
Apprch %	0	0	0	0	0	0	91.5	8.5	0	
Total %	0	0	0	0	0	0	91.5	8.5	0	
Cars	0	0	0	0	0	0	961	95	0	1056
% Cars	0	0	0	0	0	0	93.7	100	0	94.2
Heavy Vehicles	0	0	0	0	0	0	65	0	0	65
% Heavy Vehicles	0	0	0	0	0	0	6.3	0	0	5.8

	Garage From North				Sudbury Street From East				Sudbury Street From West				
Start Time	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	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 07:30 AM													
07:30 AM	0	0	0	0	0	0	0	0	130	10	0	140	140
07:45 AM	0	0	0	0	0	0	0	0	152	14	0	166	166
08:00 AM	0	0	0	0	0	0	0	0	139	8	0	147	147
08:15 AM	0	0	0	0	0	0	0	0	143	19	0	162	162
Total Volume	0	0	0	0	0	0	0	0	564	51	0	615	615
% App. Total	0	0	0		0	0	0		91.7	8.3	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.928	.671	.000	.926	.926
Cars	0	0	0	0	0	0	0	0	527	51	0	578	578
% Cars	0	0	0	0	0	0	0	0	93.4	100	0	94.0	94.0
Heavy Vehicles	0	0	0	0	0	0	0	0	37	0	0	37	37
% Heavy Vehicles	0	0	0	0	0	0	0	0	6.6	0	0	6.0	6.0

N: Garage
E/W: Sudbury Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION DATA INDUSTRIES, LLC

P.O. Box 301 Berlin, MA 01503
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Email: datarequests@pdillc.com

File Name : 154673 N
Site Code : 2007190
Start Date : 9/23/2015
Page No : 1

Groups Printed- Peds and Bikes

	Garage From North				Sudbury Street From East				Sudbury Street From West				
Start Time	Right	Left	Peds EB	Peds WB	Right	Thru	Peds SB	Peds NB	Thru	Left	Peds NB	Peds SB	Int. Total
07:00 AM	0	0	10	37	0	1	51	8	1	0	0	1	109
07:15 AM	0	0	16	40	0	1	68	13	0	0	0	1	139
07:30 AM	0	0	14	52	0	0	81	17	4	0	0	4	172
07:45 AM	0	0	20	75	0	1	125	24	6	0	0	0	251
Total	0	0	60	204	0	3	325	62	11	0	0	6	671
08:00 AM	0	0	21	66	0	0	133	19	5	0	0	2	246
08:15 AM	0	0	21	50	0	0	94	43	8	0	0	1	217
08:30 AM	0	0	25	58	0	0	110	45	9	0	0	1	248
08:45 AM	0	0	26	51	0	0	124	43	5	0	0	1	250
Total	0	0	93	225	0	0	461	150	27	0	0	5	961
Grand Total	0	0	153	429	0	3	786	212	38	0	0	11	1632
Apprch %	0	0	26.3	73.7	0	0.3	78.5	21.2	77.6	0	0	22.4	
Total %	0	0	9.4	26.3	0	0.2	48.2	13	2.3	0	0	0.7	

	Garage From North					Sudbury Street From East					Sudbury Street From West					
Start Time	Right	Left	Peds EB	Peds WB	App. Total	Right	Thru	Peds SB	Peds NB	App. Total	Thru	Left	Peds NB	Peds SB	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	0	20	75	95	0	1	125	24	150	6	0	0	0	6	251
08:00 AM	0	0	21	66	87	0	0	133	19	152	5	0	0	2	7	246
08:15 AM	0	0	21	50	71	0	0	94	43	137	8	0	0	1	9	217
08:30 AM	0	0	25	58	83	0	0	110	45	155	9	0	0	1	10	248
Total Volume	0	0	87	249	336	0	1	462	131	594	28	0	0	4	32	962
% App. Total	0	0	25.9	74.1		0	0.2	77.8	22.1		87.5	0	0	12.5		
PHF	.000	.000	.870	.830	.884	.000	.250	.868	.728	.958	.778	.000	.000	.500	.800	.958

N: Garage
E/W: Sudbury Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
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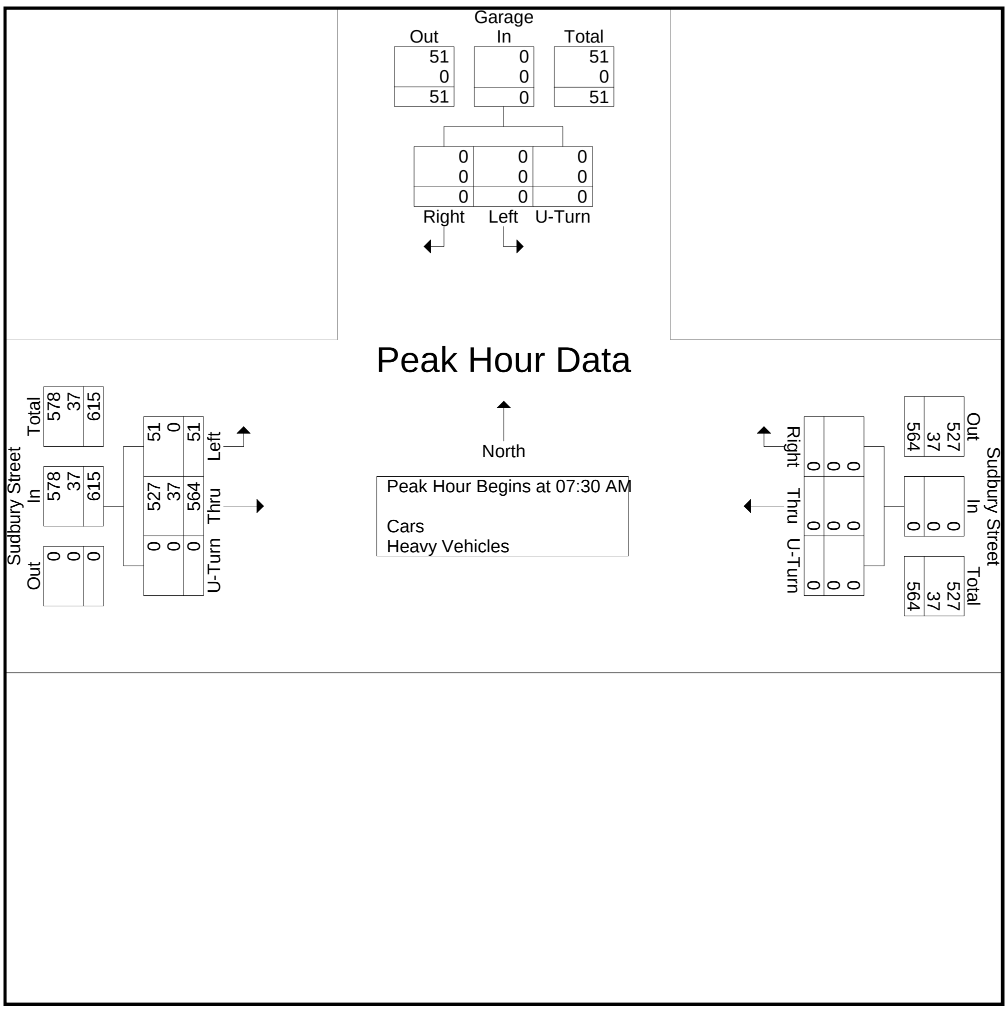
File Name : 154673 N
Site Code : 2007190
Start Date : 9/23/2015

	Garage From North				Sudbury Street From East				Sudbury Street From West				
Start Time	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	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 07:30 AM													
07:30 AM	0	0	0	0	0	0	0	0	130	10	0	140	140
07:45 AM	0	0	0	0	0	0	0	0	152	14	0	166	166
08:00 AM	0	0	0	0	0	0	0	0	139	8	0	147	147
08:15 AM	0	0	0	0	0	0	0	0	143	19	0	162	162
Total Volume	0	0	0	0	0	0	0	0	564	51	0	615	615
% App. Total	0	0	0		0	0	0		91.7	8.3	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.928	.671	.000	.926	.926
Cars	0	0	0	0	0	0	0	0	527	51	0	578	578
% Cars	0	0	0	0	0	0	0	0	93.4	100	0	94.0	94.0
Heavy Vehicles	0	0	0	0	0	0	0	0	37	0	0	37	37
% Heavy Vehicles	0	0	0	0	0	0	0	0	6.6	0	0	6.0	6.0



N: Garage
E/W: Sudbury Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION
D A T A
INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
Office: 508.481.3999 Fax: 508.545.1234
Email: datarequests@pdillc.com

File Name : 154673 NN
Site Code : 2007190
Start Date : 9/23/2015

Groups Printed- Cars - Heavy Vehicles

	Garage From North			Sudbury Street From East			Sudbury Street From West			
Start Time	Right	Left	U-Turn	Right	Thru	U-Turn	Thru	Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	0	0	174	0	0	174
04:15 PM	0	0	0	0	0	0	138	3	0	141
04:30 PM	0	0	0	0	0	0	168	0	0	168
04:45 PM	0	0	0	0	0	0	150	2	0	152
Total	0	0	0	0	0	0	630	5	0	635
05:00 PM	0	0	0	0	0	0	130	1	0	131
05:15 PM	0	0	0	0	0	0	185	5	0	190
05:30 PM	0	0	0	0	0	0	164	14	0	178
05:45 PM	0	0	0	0	0	0	171	7	0	178
Total	0	0	0	0	0	0	650	27	0	677
Grand Total	0	0	0	0	0	0	1280	32	0	1312
Apprch %	0	0	0	0	0	0	97.6	2.4	0	
Total %	0	0	0	0	0	0	97.6	2.4	0	
Cars	0	0	0	0	0	0	1216	32	0	1248
% Cars	0	0	0	0	0	0	95	100	0	95.1
Heavy Vehicles	0	0	0	0	0	0	64	0	0	64
% Heavy Vehicles	0	0	0	0	0	0	5	0	0	4.9

	Garage From North				Sudbury Street From East				Sudbury Street From West				
Start Time	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	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	0	0	0	0	0	0	0	130	1	0	131	131
05:15 PM	0	0	0	0	0	0	0	0	185	5	0	190	190
05:30 PM	0	0	0	0	0	0	0	0	164	14	0	178	178
05:45 PM	0	0	0	0	0	0	0	0	171	7	0	178	178
Total Volume	0	0	0	0	0	0	0	0	650	27	0	677	677
% App. Total	0	0	0		0	0	0		96	4	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.878	.482	.000	.891	.891
Cars	0	0	0	0	0	0	0	0	620	27	0	647	647
% Cars	0	0	0	0	0	0	0	0	95.4	100	0	95.6	95.6
Heavy Vehicles	0	0	0	0	0	0	0	0	30	0	0	30	30
% Heavy Vehicles	0	0	0	0	0	0	0	0	4.6	0	0	4.4	4.4

N: Garage
E/W: Sudbury Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION DATA INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
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Email: datarequests@pdillc.com

File Name : 154673 NN
Site Code : 2007190
Start Date : 9/23/2015

Groups Printed- Peds and Bikes

	Garage From North				Sudbury Street From East				Sudbury Street From West				
Start Time	Right	Left	Peds EB	Peds WB	Right	Thru	Peds SB	Peds NB	Thru	Left	Peds NB	Peds SB	Int. Total
04:00 PM	0	0	41	18	0	0	44	85	2	0	1	0	191
04:15 PM	0	0	28	20	0	0	59	46	0	0	0	1	154
04:30 PM	0	0	43	25	0	0	30	44	1	0	3	0	146
04:45 PM	0	0	35	20	0	0	50	140	2	0	0	0	247
Total	0	0	147	83	0	0	183	315	5	0	4	1	738
05:00 PM	0	0	72	35	0	0	42	184	2	0	0	0	335
05:15 PM	0	0	57	27	0	0	46	211	3	0	1	0	345
05:30 PM	0	0	49	31	0	0	34	152	3	0	0	2	271
05:45 PM	0	0	35	26	0	0	38	53	1	0	0	1	154
Total	0	0	213	119	0	0	160	600	9	0	1	3	1105
Grand Total	0	0	360	202	0	0	343	915	14	0	5	4	1843
Apprch %	0	0	64.1	35.9	0	0	27.3	72.7	60.9	0	21.7	17.4	
Total %	0	0	19.5	11	0	0	18.6	49.6	0.8	0	0.3	0.2	

	Garage From North					Sudbury Street From East					Sudbury Street From West					
Start Time	Right	Left	Peds EB	Peds WB	App. Total	Right	Thru	Peds SB	Peds NB	App. Total	Thru	Left	Peds NB	Peds SB	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 04:45 PM																
04:45 PM	0	0	35	20	55	0	0	50	140	190	2	0	0	0	2	247
05:00 PM	0	0	72	35	107	0	0	42	184	226	2	0	0	0	2	335
05:15 PM	0	0	57	27	84	0	0	46	211	257	3	0	1	0	4	345
05:30 PM	0	0	49	31	80	0	0	34	152	186	3	0	0	2	5	271
Total Volume	0	0	213	113	326	0	0	172	687	859	10	0	1	2	13	1198
% App. Total	0	0	65.3	34.7		0	0	20	80		76.9	0	7.7	15.4		
PHF	.000	.000	.740	.807	.762	.000	.000	.860	.814	.836	.833	.000	.250	.250	.650	.868

N: Garage
E/W: Sudbury Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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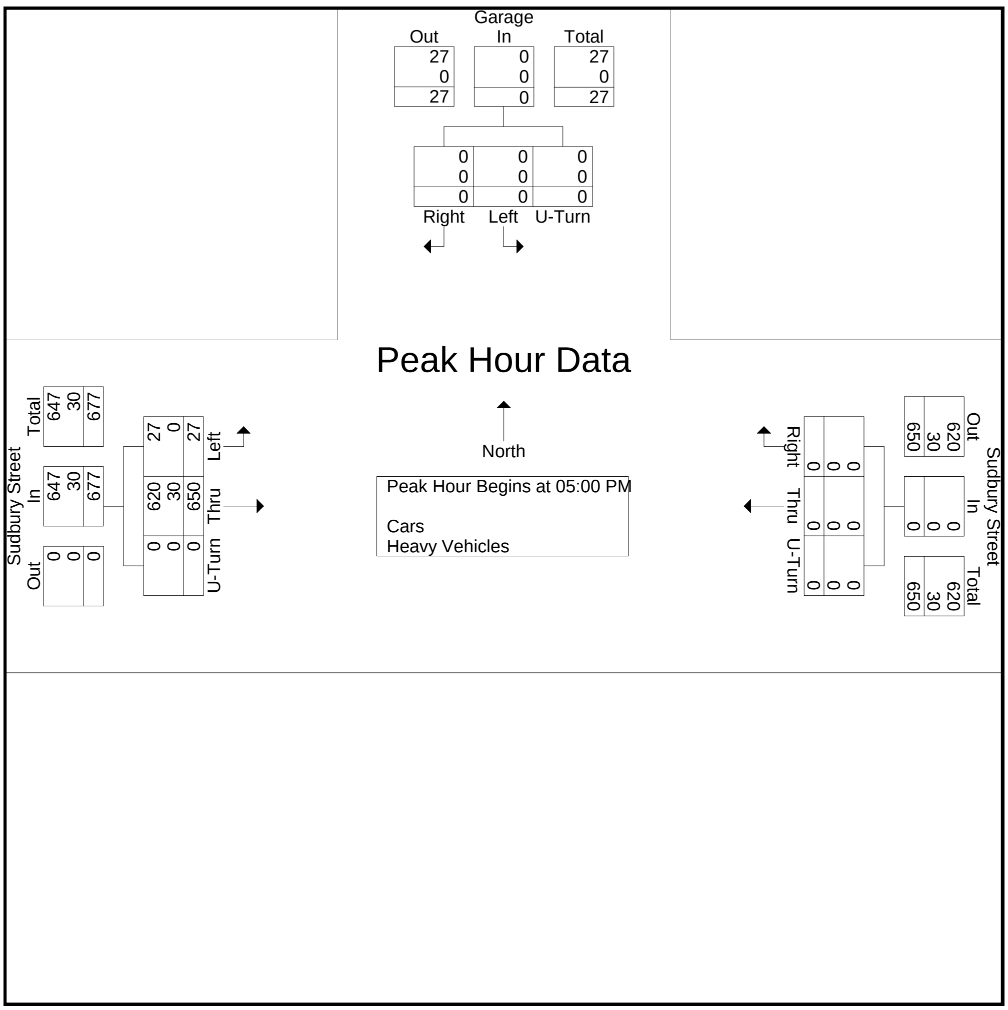
File Name : 154673 NN
Site Code : 2007190
Start Date : 9/23/2015

	Garage From North				Sudbury Street From East				Sudbury Street From West				
Start Time	Right	Left	U-Turn	App. Total	Right	Thru	U-Turn	App. Total	Thru	Left	U-Turn	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	0	0	0	0	0	0	0	130	1	0	131	131
05:15 PM	0	0	0	0	0	0	0	0	185	5	0	190	190
05:30 PM	0	0	0	0	0	0	0	0	164	14	0	178	178
05:45 PM	0	0	0	0	0	0	0	0	171	7	0	178	178
Total Volume	0	0	0	0	0	0	0	0	650	27	0	677	677
% App. Total	0	0	0		0	0	0		96	4	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.878	.482	.000	.891	.891
Cars	0	0	0	0	0	0	0	0	620	27	0	647	647
% Cars	0	0	0	0	0	0	0	0	95.4	100	0	95.6	95.6
Heavy Vehicles	0	0	0	0	0	0	0	0	30	0	0	30	30
% Heavy Vehicles	0	0	0	0	0	0	0	0	4.6	0	0	4.4	4.4



N/S: Congress Street
E/W: Sudbury Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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File Name : 154673 I
Site Code : 2007190
Start Date : 9/23/2015
Page No : 1

Groups Printed- Cars - Heavy Vehicles

	Congress Street From North				Sudbury Street From East				Congress Street From South				Sudbury Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
07:00 AM	0	80	14	3	0	0	0	0	31	130	0	3	26	48	34	0	369
07:15 AM	0	116	22	1	0	0	0	0	28	134	0	4	43	48	38	0	434
07:30 AM	0	94	15	0	0	0	0	0	35	133	0	3	28	53	36	0	397
07:45 AM	0	138	23	0	0	0	0	0	34	155	0	7	37	61	54	0	509
Total	0	428	74	4	0	0	0	0	128	552	0	17	134	210	162	0	1709
08:00 AM	0	125	22	0	0	0	0	0	33	199	0	0	36	46	50	0	511
08:15 AM	0	130	13	0	0	0	0	0	40	219	0	3	39	62	40	0	546
08:30 AM	0	128	20	1	0	0	0	0	44	223	0	5	24	47	21	0	513
08:45 AM	0	139	33	3	0	0	0	0	50	200	0	6	40	59	37	0	567
Total	0	522	88	4	0	0	0	0	167	841	0	14	139	214	148	0	2137
Grand Total	0	950	162	8	0	0	0	0	295	1393	0	31	273	424	310	0	3846
Apprch %	0	84.8	14.5	0.7	0	0	0	0	17.2	81	0	1.8	27.1	42.1	30.8	0	
Total %	0	24.7	4.2	0.2	0	0	0	0	7.7	36.2	0	0.8	7.1	11	8.1	0	
Cars	0	863	154	7	0	0	0	0	250	1290	0	31	257	396	294	0	3542
% Cars	0	90.8	95.1	87.5	0	0	0	0	84.7	92.6	0	100	94.1	93.4	94.8	0	92.1
Heavy Vehicles	0	87	8	1	0	0	0	0	45	103	0	0	16	28	16	0	304
% Heavy Vehicles	0	9.2	4.9	12.5	0	0	0	0	15.3	7.4	0	0	5.9	6.6	5.2	0	7.9

	Congress Street From North					Sudbury Street From East					Congress Street From South					Sudbury Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	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	0	125	22	0	147	0	0	0	0	0	33	199	0	0	232	36	46	50	0	132	511
08:15 AM	0	130	13	0	143	0	0	0	0	0	40	219	0	3	262	39	62	40	0	141	546
08:30 AM	0	128	20	1	149	0	0	0	0	0	44	223	0	5	272	24	47	21	0	92	513
08:45 AM	0	139	33	3	175	0	0	0	0	0	50	200	0	6	256	40	59	37	0	136	567
Total Volume	0	522	88	4	614	0	0	0	0	0	167	841	0	14	1022	139	214	148	0	501	2137
% App. Total	0	85	14.3	0.7		0	0	0	0		16.3	82.3	0	1.4		27.7	42.7	29.5	0		
PHF	.000	.939	.667	.333	.877	.000	.000	.000	.000	.000	.835	.943	.000	.583	.939	.869	.863	.740	.000	.888	.942
Cars	0	478	85	4	567	0	0	0	0	0	144	789	0	14	947	134	202	141	0	477	1991
% Cars	0	91.6	96.6	100	92.3	0	0	0	0	0	86.2	93.8	0	100	92.7	96.4	94.4	95.3	0	95.2	93.2
Heavy Vehicles	0	44	3	0	47	0	0	0	0	0	23	52	0	0	75	5	12	7	0	24	146
% Heavy Vehicles	0	8.4	3.4	0	7.7	0	0	0	0	0	13.8	6.2	0	0	7.3	3.6	5.6	4.7	0	4.8	6.8

N/S: Congress Street
E/W: Sudbury Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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File Name : 154673 I
Site Code : 2007190
Start Date : 9/23/2015
Page No : 1

Groups Printed- Peds and Bikes

	Congress Street From North					Sudbury Street From East					Congress Street From South					Sudbury Street From West					
Start Time	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	Int. Total
07:00 AM	0	6	0	6	45	0	0	1	139	29	0	1	0	31	6	0	0	0	7	49	320
07:15 AM	0	9	0	7	44	0	0	0	136	16	0	1	0	38	17	0	0	0	13	70	351
07:30 AM	0	12	0	7	51	0	0	0	199	30	0	1	0	68	13	1	0	0	16	88	486
07:45 AM	0	6	0	8	74	0	0	0	311	28	0	0	0	63	7	0	2	0	23	141	663
Total	0	33	0	28	214	0	0	1	785	103	0	3	0	200	43	1	2	0	59	348	1820
08:00 AM	0	6	0	17	112	0	0	0	341	26	0	5	0	64	25	0	1	0	17	137	751
08:15 AM	0	14	2	15	75	0	0	0	286	58	0	3	0	87	9	1	3	0	53	119	725
08:30 AM	0	16	0	28	92	0	0	0	356	46	0	1	0	130	29	0	4	0	36	123	861
08:45 AM	0	21	0	22	69	0	0	0	341	42	0	3	0	97	34	0	3	0	44	145	821
Total	0	57	2	82	348	0	0	0	1324	172	0	12	0	378	97	1	11	0	150	524	3158
Grand Total	0	90	2	110	562	0	0	1	2109	275	0	15	0	578	140	2	13	0	209	872	4978
Apprch %	0	11.8	0.3	14.4	73.6	0	0	0	88.4	11.5	0	2	0	78.9	19.1	0.2	1.2	0	19.1	79.6	
Total %	0	1.8	0	2.2	11.3	0	0	0	42.4	5.5	0	0.3	0	11.6	2.8	0	0.3	0	4.2	17.5	

	Congress Street From North						Sudbury Street From East						Congress Street From South						Sudbury Street From West						
Start Time	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	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	0	6	0	17	112	135	0	0	0	341	26	367	0	5	0	64	25	94	0	1	0	17	137	155	751
08:15 AM	0	14	2	15	75	106	0	0	0	286	58	344	0	3	0	87	9	99	1	3	0	53	119	176	725
08:30 AM	0	16	0	28	92	136	0	0	0	356	46	402	0	1	0	130	29	160	0	4	0	36	123	163	861
08:45 AM	0	21	0	22	69	112	0	0	0	341	42	383	0	3	0	97	34	134	0	3	0	44	145	192	821
Total Volume	0	57	2	82	348	489	0	0	0	1324	172	1496	0	12	0	378	97	487	1	11	0	150	524	686	3158
% App. Total	0	11.7	0.4	16.8	71.2		0	0	0	88.5	11.5		0	2.5	0	77.6	19.9		0.1	1.6	0	21.9	76.4		
PHF	.000	.679	.250	.732	.777	.899	.000	.000	.000	.930	.741	.930	.000	.600	.000	.727	.713	.761	.250	.688	.000	.708	.903	.893	.917

N/S: Congress Street
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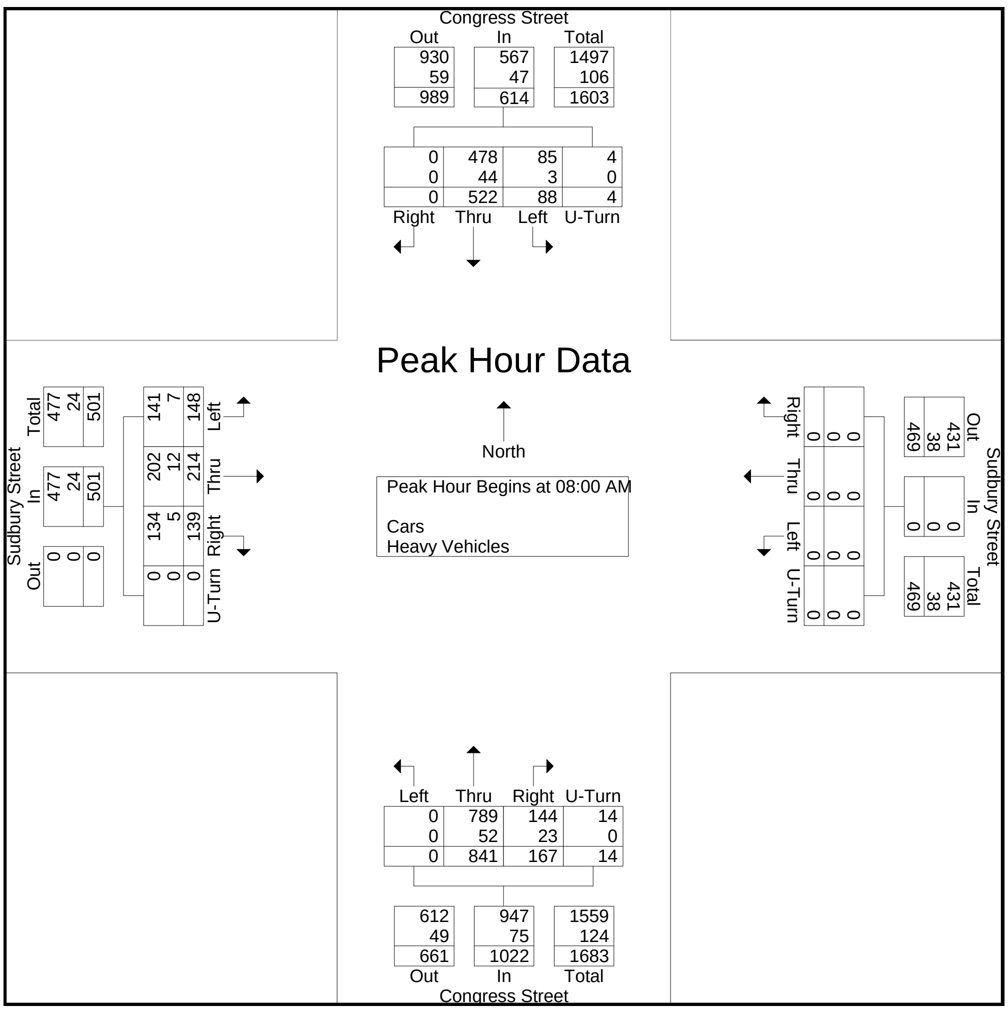
	Congress Street From North					Sudbury Street From East					Congress Street From South					Sudbury Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	0	125	22	0	147	0	0	0	0	0	33	199	0	0	232	36	46	50	0	132	511
08:15 AM	0	130	13	0	143	0	0	0	0	0	40	219	0	3	262	39	62	40	0	141	546
08:30 AM	0	128	20	1	149	0	0	0	0	0	44	223	0	5	272	24	47	21	0	92	513
08:45 AM	0	139	33	3	175	0	0	0	0	0	50	200	0	6	256	40	59	37	0	136	567
Total Volume	0	522	88	4	614	0	0	0	0	0	167	841	0	14	1022	139	214	148	0	501	2137
% App. Total	0	85	14.3	0.7		0	0	0	0		16.3	82.3	0	1.4		27.7	42.7	29.5	0		
PHF	.000	.939	.667	.333	.877	.000	.000	.000	.000	.000	.835	.943	.000	.583	.939	.869	.863	.740	.000	.888	.942
Cars	0	478	85	4	567	0	0	0	0	0	144	789	0	14	947	134	202	141	0	477	1991
% Cars	0	91.6	96.6	100	92.3	0	0	0	0	0	86.2	93.8	0	100	92.7	96.4	94.4	95.3	0	95.2	93.2
Heavy Vehicles	0	44	3	0	47	0	0	0	0	0	23	52	0	0	75	5	12	7	0	24	146
% Heavy Vehicles	0	8.4	3.4	0	7.7	0	0	0	0	0	13.8	6.2	0	0	7.3	3.6	5.6	4.7	0	4.8	6.8



N/S: Congress Street
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Client: Howard Stein-Hudson/ B. Beisel

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File Name : 154673 II
Site Code : 2007190
Start Date : 9/23/2015

Groups Printed- Cars - Heavy Vehicles

	Congress Street From North				Sudbury Street From East				Congress Street From South				Sudbury Street From West				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Int. Total
04:00 PM	0	138	31	0	1	0	0	0	77	183	0	3	43	90	47	0	613
04:15 PM	0	108	35	0	0	0	0	0	91	182	0	5	37	73	32	0	563
04:30 PM	0	124	32	3	0	0	0	0	102	174	0	2	45	86	37	0	605
04:45 PM	0	127	28	1	0	0	0	0	88	180	0	0	37	83	33	0	577
Total	0	497	126	4	1	0	0	0	358	719	0	10	162	332	149	0	2358
05:00 PM	0	91	26	0	0	0	0	0	110	195	0	1	37	81	33	0	574
05:15 PM	0	84	30	0	0	0	0	0	91	173	0	0	28	94	43	0	543
05:30 PM	0	93	30	1	0	0	0	0	115	184	0	0	26	94	43	0	586
05:45 PM	0	87	36	1	0	0	0	0	106	170	0	0	26	108	30	0	564
Total	0	355	122	2	0	0	0	0	422	722	0	1	117	377	149	0	2267
Grand Total	0	852	248	6	1	0	0	0	780	1441	0	11	279	709	298	0	4625
Apprch %	0	77	22.4	0.5	100	0	0	0	34.9	64.6	0	0.5	21.7	55.1	23.2	0	
Total %	0	18.4	5.4	0.1	0	0	0	0	16.9	31.2	0	0.2	6	15.3	6.4	0	
Cars	0	764	241	6	1	0	0	0	736	1399	0	11	269	674	283	0	4384
% Cars	0	89.7	97.2	100	100	0	0	0	94.4	97.1	0	100	96.4	95.1	95	0	94.8
Heavy Vehicles	0	88	7	0	0	0	0	0	44	42	0	0	10	35	15	0	241
% Heavy Vehicles	0	10.3	2.8	0	0	0	0	0	5.6	2.9	0	0	3.6	4.9	5	0	5.2

Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 04:00 PM

	Congress Street From North					Sudbury Street From East					Congress Street From South					Sudbury Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
04:00 PM	0	138	31	0	169	1	0	0	0	1	77	183	0	3	263	43	90	47	0	180	613
04:15 PM	0	108	35	0	143	0	0	0	0	0	91	182	0	5	278	37	73	32	0	142	563
04:30 PM	0	124	32	3	159	0	0	0	0	0	102	174	0	2	278	45	86	37	0	168	605
04:45 PM	0	127	28	1	156	0	0	0	0	0	88	180	0	0	268	37	83	33	0	153	577
Total Volume	0	497	126	4	627	1	0	0	0	1	358	719	0	10	1087	162	332	149	0	643	2358
% App. Total	0	79.3	20.1	0.6		100	0	0	0		32.9	66.1	0	0.9		25.2	51.6	23.2	0		
PHF	.000	.900	.900	.333	.928	.250	.000	.000	.000	.250	.877	.982	.000	.500	.978	.900	.922	.793	.000	.893	.962
Cars	0	440	123	4	567	1	0	0	0	1	334	696	0	10	1040	153	314	141	0	608	2216
% Cars	0	88.5	97.6	100	90.4	100	0	0	0	100	93.3	96.8	0	100	95.7	94.4	94.6	94.6	0	94.6	94.0
Heavy Vehicles	0	57	3	0	60	0	0	0	0	0	24	23	0	0	47	9	18	8	0	35	142
% Heavy Vehicles	0	11.5	2.4	0	9.6	0	0	0	0	0	6.7	3.2	0	0	4.3	5.6	5.4	5.4	0	5.4	6.0

N/S: Congress Street
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Groups Printed- Peds and Bikes

	Congress Street From North					Sudbury Street From East					Congress Street From South					Sudbury Street From West					
Start Time	Right	Thru	Left	Peds EB	Peds WB	Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Left	Peds WB	Peds EB	Right	Thru	Left	Peds NB	Peds SB	Int. Total
04:00 PM	0	5	0	12	5	0	0	0	85	279	0	7	0	27	68	0	0	0	78	36	602
04:15 PM	0	2	0	23	9	0	0	0	94	165	0	6	0	23	71	0	1	0	62	46	502
04:30 PM	0	1	0	30	7	0	0	0	88	194	0	7	0	23	77	0	1	0	60	33	521
04:45 PM	0	1	0	27	10	0	0	0	92	194	0	11	0	26	64	0	2	0	91	39	557
Total	0	9	0	92	31	0	0	0	359	832	0	31	0	99	280	0	4	0	291	154	2182
05:00 PM	0	1	0	53	17	0	0	0	89	267	1	11	0	22	81	1	0	0	156	36	735
05:15 PM	0	0	0	65	15	0	0	0	80	313	0	7	0	41	87	0	0	0	138	32	778
05:30 PM	0	0	0	39	10	0	0	0	64	234	1	17	0	44	70	0	3	0	131	27	640
05:45 PM	0	3	0	26	18	0	0	0	57	109	0	11	0	28	71	0	1	0	60	28	412
Total	0	4	0	183	60	0	0	0	290	923	2	46	0	135	309	1	4	0	485	123	2565
Grand Total	0	13	0	275	91	0	0	0	649	1755	2	77	0	234	589	1	8	0	776	277	4747
Apprch %	0	3.4	0	72.6	24	0	0	0	27	73	0.2	8.5	0	25.9	65.3	0.1	0.8	0	73.1	26.1	
Total %	0	0.3	0	5.8	1.9	0	0	0	13.7	37	0	1.6	0	4.9	12.4	0	0.2	0	16.3	5.8	

	Congress Street From North						Sudbury Street From East						Congress Street From South						Sudbury Street From West						
Start Time	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Peds NB	Peds SB	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 04:45 PM																									
04:45 PM	0	1	0	27	10	38	0	0	0	92	194	286	0	11	0	26	64	101	0	2	0	91	39	132	557
05:00 PM	0	1	0	53	17	71	0	0	0	89	267	356	1	11	0	22	81	115	1	0	0	156	36	193	735
05:15 PM	0	0	0	65	15	80	0	0	0	80	313	393	0	7	0	41	87	135	0	0	0	138	32	170	778
05:30 PM	0	0	0	39	10	49	0	0	0	64	234	298	1	17	0	44	70	132	0	3	0	131	27	161	640
Total Volume	0	2	0	184	52	238	0	0	0	325	1008	1333	2	46	0	133	302	483	1	5	0	516	134	656	2710
% App. Total	0	0.8	0	77.3	21.8		0	0	0	24.4	75.6		0.4	9.5	0	27.5	62.5		0.2	0.8	0	78.7	20.4		
PHF	.000	.500	.000	.708	.765	.744	.000	.000	.000	.883	.805	.848	.500	.676	.000	.756	.868	.894	.250	.417	.000	.827	.859	.850	.871

N/S: Congress Street
E/W: Sudbury Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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DATA
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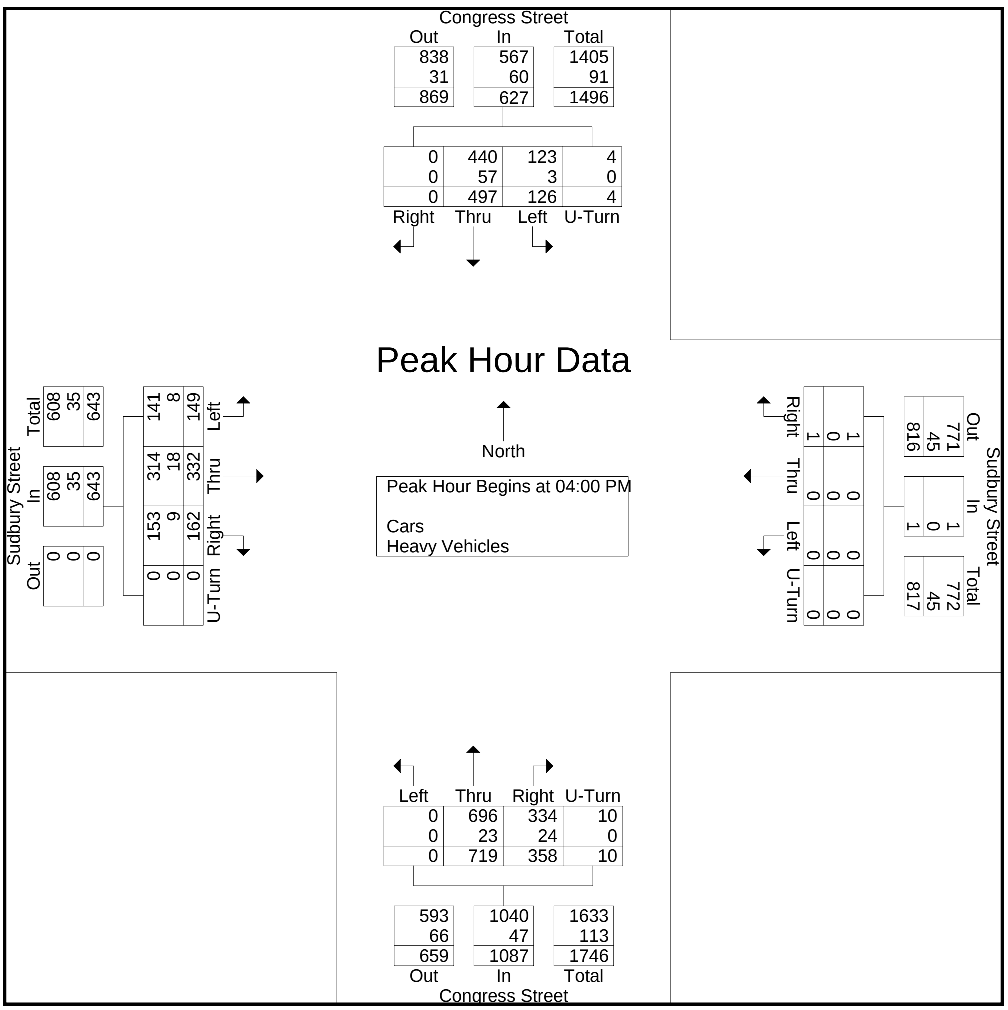
File Name : 154673 II
Site Code : 2007190
Start Date : 9/23/2015
Page No : 1

	Congress Street From North					Sudbury Street From East					Congress Street From South					Sudbury Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	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 04:00 PM																					
04:00 PM	0	138	31	0	169	1	0	0	0	1	77	183	0	3	263	43	90	47	0	180	613
04:15 PM	0	108	35	0	143	0	0	0	0	0	91	182	0	5	278	37	73	32	0	142	563
04:30 PM	0	124	32	3	159	0	0	0	0	0	102	174	0	2	278	45	86	37	0	168	605
04:45 PM	0	127	28	1	156	0	0	0	0	0	88	180	0	0	268	37	83	33	0	153	577
Total Volume	0	497	126	4	627	1	0	0	0	1	358	719	0	10	1087	162	332	149	0	643	2358
% App. Total	0	79.3	20.1	0.6		100	0	0	0		32.9	66.1	0	0.9		25.2	51.6	23.2	0		
PHF	.000	.900	.900	.333	.928	.250	.000	.000	.000	.250	.877	.982	.000	.500	.978	.900	.922	.793	.000	.893	.962
Cars	0	440	123	4	567	1	0	0	0	1	334	696	0	10	1040	153	314	141	0	608	2216
% Cars	0	88.5	97.6	100	90.4	100	0	0	0	100	93.3	96.8	0	100	95.7	94.4	94.6	94.6	0	94.6	94.0
Heavy Vehicles	0	57	3	0	60	0	0	0	0	0	24	23	0	0	47	9	18	8	0	35	142
% Heavy Vehicles	0	11.5	2.4	0	9.6	0	0	0	0	0	6.7	3.2	0	0	4.3	5.6	5.4	5.4	0	5.4	6.0



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N/S/NW: Surface Road/ MBTA Exit
E/W: Sudbury Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

File Name : 154673 K
Site Code : 2007190
Start Date : 9/23/2015

Groups Printed- Cars - Heavy Vehicles

	Surface Road From North					Sudbury Street From East					Surface Road From South					Sudbury Street From West					MBTA Exit From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
07:00 AM	0	0	81	6	0	0	0	0	0	0	0	0	0	0	0	22	57	0	0	0	0	1	7	0	0	174
07:15 AM	0	0	84	7	0	0	0	0	0	0	0	0	0	0	0	29	50	0	0	0	0	2	4	0	0	176
07:30 AM	0	0	80	9	0	0	0	0	0	0	0	0	0	0	0	40	60	0	0	0	0	2	3	0	0	194
07:45 AM	0	0	78	6	0	0	0	0	0	0	0	0	0	0	0	33	72	0	0	0	0	1	4	0	0	194
Total	0	0	323	28	0	0	0	0	0	0	0	0	0	0	0	124	239	0	0	0	0	6	18	0	0	738
08:00 AM	0	0	80	7	0	0	0	0	0	0	0	0	0	0	0	25	68	0	0	0	0	0	2	0	0	182
08:15 AM	0	0	108	9	0	0	0	0	0	0	0	0	0	0	0	36	60	0	0	0	0	2	6	0	0	221
08:30 AM	0	0	106	8	0	0	0	0	0	0	0	0	0	0	0	33	63	0	0	0	0	3	7	0	0	220
08:45 AM	0	0	76	7	0	0	0	0	0	0	0	0	0	0	0	40	53	0	0	0	0	0	8	0	0	184
Total	0	0	370	31	0	0	0	0	0	0	0	0	0	0	0	134	244	0	0	0	0	5	23	0	0	807
Grand Total	0	0	693	59	0	0	0	0	0	0	0	0	0	0	0	258	483	0	0	0	0	11	41	0	0	1545
Apprch %	0	0	92.2	7.8	0	0	0	0	0	0	0	0	0	0	0	34.8	65.2	0	0	0	0	21.2	78.8	0	0	
Total %	0	0	44.9	3.8	0	0	0	0	0	0	0	0	0	0	0	16.7	31.3	0	0	0	0	0.7	2.7	0	0	
Cars	0	0	626	53	0	0	0	0	0	0	0	0	0	0	0	234	425	0	0	0	0	0	2	0	0	1340
% Cars	0	0	90.3	89.8	0	0	0	0	0	0	0	0	0	0	0	90.7	88	0	0	0	0	0	4.9	0	0	86.7
Heavy Vehicles	0	0	67	6	0	0	0	0	0	0	0	0	0	0	0	24	58	0	0	0	0	11	39	0	0	205
% Heavy Vehicles	0	0	9.7	10.2	0	0	0	0	0	0	0	0	0	0	0	9.3	12	0	0	0	0	100	95.1	0	0	13.3

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

	Surface Road From North						Sudbury Street From East						Surface Road From South						Sudbury Street From West						MBTA Exit From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
07:45 AM	0	0	78	6	0	84	0	0	0	0	0	0	0	0	0	0	0	0	33	72	0	0	0	105	0	1	4	0	0	5	194
08:00 AM	0	0	80	7	0	87	0	0	0	0	0	0	0	0	0	0	0	0	25	68	0	0	0	93	0	0	2	0	0	2	182
08:15 AM	0	0	108	9	0	117	0	0	0	0	0	0	0	0	0	0	0	0	36	60	0	0	0	96	0	2	6	0	0	8	221
08:30 AM	0	0	106	8	0	114	0	0	0	0	0	0	0	0	0	0	0	0	33	63	0	0	0	96	0	3	7	0	0	10	220
Total Volume	0	0	372	30	0	402	0	0	0	0	0	0	0	0	0	0	0	0	127	263	0	0	0	390	0	6	19	0	0	25	817
% App. Total	0	0	92.5	7.5	0		0	0	0	0	0		0	0	0	0	0		32.6	67.4	0	0	0		0	24	76	0	0		
PHF	.000	.000	.861	.833	.000	.859	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.882	.913	.000	.000	.000	.929	.000	.500	.679	.000	.000	.625	.924
Cars	0	0	330	27	0	357	0	0	0	0	0	0	0	0	0	0	0	0	115	231	0	0	0	346	0	0	1	0	0	1	704
% Cars	0	0	88.7	90.0	0	88.8	0	0	0	0	0	0	0	0	0	0	0	0	90.6	87.8	0	0	0	88.7	0	0	5.3	0	0	4.0	86.2
Heavy Vehicles	0	0	42	3	0	45	0	0	0	0	0	0	0	0	0	0	0	0	12	32	0	0	0	44	0	6	18	0	0	24	113
% Heavy Vehicles	0	0	11.3	10.0	0	11.2	0	0	0	0	0	0	0	0	0	0	0	0	9.4	12.2	0	0	0	11.3	0	100	94.7	0	0	96.0	13.8

N/S/NW: Surface Road/ MBTA Exit
E/W: Sudbury Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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File Name : 154673 K
Site Code : 2007190
Start Date : 9/23/2015
Page No : 1

Groups Printed- Peds and Bikes

	Surface Road From North						Sudbury Street From East						Surface Road From South						Sudbury Street From West						MBTA Exit From Northwest						
Start Time	Hard Right	Right	Thru	Left	Peds EB	Peds WB	Right	Bear Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Bear Left	Left	Peds WB	Peds EB	Right	Thru	Left	Hard Left	Peds NB	Peds SB	Hard Right	Bear Right	Bear Left	Hard Left	Peds NEB	Peds SWB	Int. Total
07:00 AM	0	0	6	0	27	54	0	0	0	0	17	2	0	0	0	0	11	9	0	0	0	0	8	23	0	0	0	0	0	0	157
07:15 AM	0	0	8	0	20	75	0	0	0	0	16	6	0	0	0	0	17	21	3	0	0	0	16	26	0	0	0	0	0	3	211
07:30 AM	0	0	15	0	29	102	0	0	0	0	23	6	0	0	0	0	16	21	0	0	0	0	19	39	0	0	0	0	1	0	271
07:45 AM	0	0	27	0	31	111	0	0	0	0	15	14	0	0	0	0	25	19	1	1	0	0	25	62	0	0	0	0	0	1	332
Total	0	0	56	0	107	342	0	0	0	0	71	28	0	0	0	0	69	70	4	1	0	0	68	150	0	0	0	0	1	4	971
08:00 AM	0	0	22	0	32	121	0	0	0	0	26	19	0	0	0	0	16	21	2	0	0	0	26	49	0	2	0	0	0	1	337
08:15 AM	0	0	28	0	37	89	0	0	0	0	18	17	0	0	0	0	29	17	3	0	0	0	24	72	0	1	0	0	2	0	337
08:30 AM	0	0	25	0	30	94	0	2	0	1	19	6	0	0	0	0	32	21	6	0	0	0	15	65	0	0	0	0	0	1	317
08:45 AM	0	0	27	0	33	55	0	0	0	0	36	13	0	0	0	0	16	10	5	2	0	0	11	58	0	0	1	0	1	1	269
Total	0	0	102	0	132	359	0	2	0	1	99	55	0	0	0	0	93	69	16	2	0	0	76	244	0	3	1	0	3	3	1260
Grand Total	0	0	158	0	239	701	0	2	0	1	170	83	0	0	0	0	162	139	20	3	0	0	144	394	0	3	1	0	4	7	2231
Apprch %	0	0	14.4	0	21.8	63.8	0	0.8	0	0.4	66.4	32.4	0	0	0	0	53.8	46.2	3.6	0.5	0	0	25.7	70.2	0	20	6.7	0	26.7	46.7	
Total %	0	0	7.1	0	10.7	31.4	0	0.1	0	0	7.6	3.7	0	0	0	0	7.3	6.2	0.9	0.1	0	0	6.5	17.7	0	0.1	0	0	0.2	0.3	

	Surface Road From North							Sudbury Street From East							Surface Road From South							Sudbury Street From West							MBTA Exit From Northwest							
Start Time	Hard Right	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Bear Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Bear Left	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Hard Left	Peds NB	Peds SB	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds NEB	Peds SWB	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

Start Time	Hard Right	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Bear Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Bear Left	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Hard Left	Peds NB	Peds SB	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds NEB	Peds SWB	App. Total	Int. Total
07:45 AM	0	0	27	0	31	111	169	0	0	0	0	15	14	29	0	0	0	0	25	19	44	1	1	0	0	25	62	89	0	0	0	0	0	1	1	332
08:00 AM			22	0	32	121	175	0	0	0	0	26	19	45	0	0	0	0	16	21						26	49	77	0	2	0	0	0	1	3	337
08:15 AM			28	0	37	89	154	0	0	0	0	18	17	35	0	0	0	0	29	17						24	72	99	0	1	0	0	2	0	3	337
08:30 AM			25	0	30	94	149	0	2	0	1	19	6	28	0	0	0	0	32	21						15	65	86	0	0	0	0	0	1	1	317
Total Volume			102	0	130	415	647	0	2	0	1	78	56	137					102	78	180	12	1	0	0	90	248	351	0	3	0	0	2	3	8	1323
% App. Total			15.8	0	20.1	64.1		0	1.5	0	0.7	56.9	40.9		0	0	0	0	56.7	43.3		3.4	0.3			25.6	70.7		0	37.5	0	0	25	37.5		
PHF	.000	.000	.911	.000	.878	.857	.924	.000	.250	.000	.250	.750	.737	.761	.000	.000	.000	.000	.797	.929	.849	.500	.250	.000	.000	.865	.861	.886	.000	.375	.000	.000	.250	.750	.667	.981

N/S/NW: Surface Road/ MBTA Exit
E/W: Sudbury Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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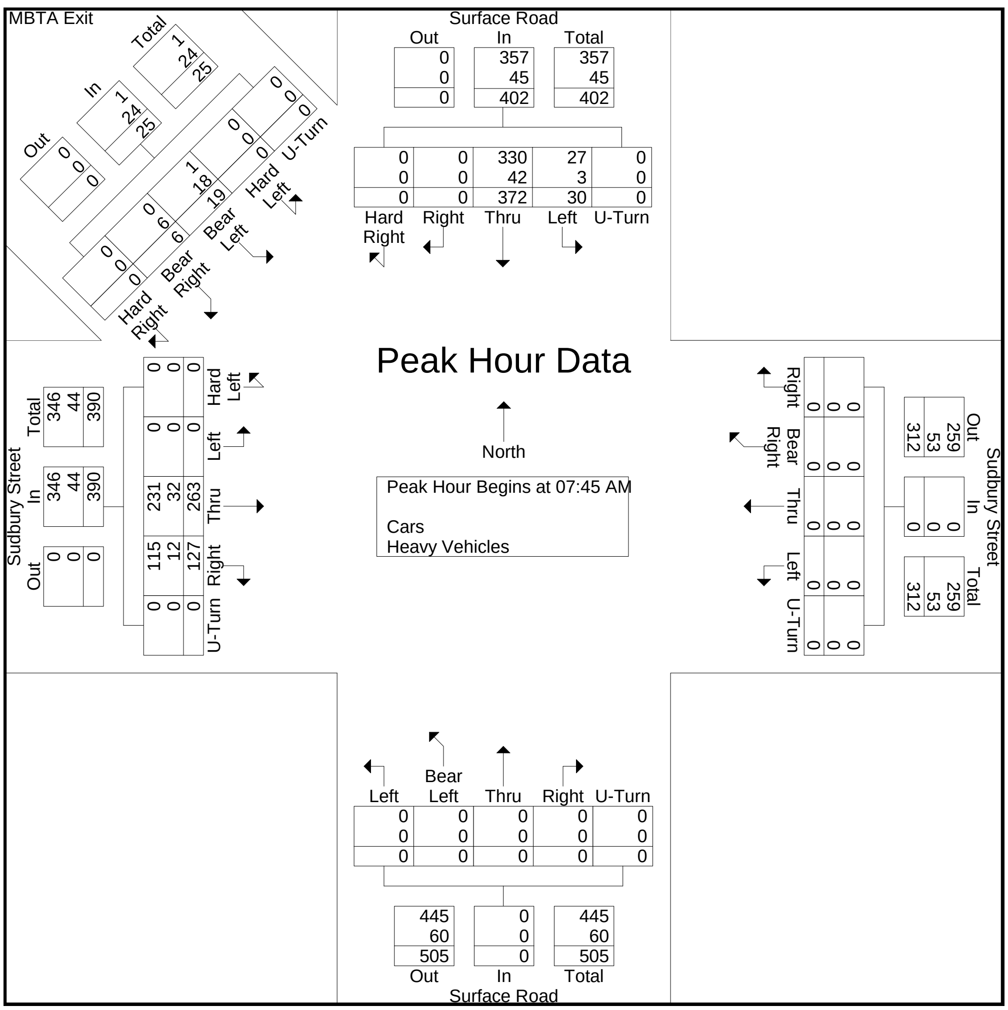
File Name : 154673 K
Site Code : 2007190
Start Date : 9/23/2015

	Surface Road From North						Sudbury Street From East						Surface Road From South						Sudbury Street From West						MBTA Exit From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	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	0	78	6	0	84	0	0	0	0	0	0	0	0	0	0	0	0	33	72	0	0	0	105	0	1	4	0	0	5	194
08:00 AM	0	0	80	7	0	87	0	0	0	0	0	0	0	0	0	0	0	0	25	68	0	0	0	93	0	0	2	0	0	2	182
08:15 AM	0	0	108	9	0	117	0	0	0	0	0	0	0	0	0	0	0	0	36	60	0	0	0	96	0	2	6	0	0	8	221
08:30 AM	0	0	106	8	0	114	0	0	0	0	0	0	0	0	0	0	0	0	33	63	0	0	0	96	0	3	7	0	0	10	220
Total Volume	0	0	372	30	0	402	0	0	0	0	0	0	0	0	0	0	0	0	127	263	0	0	0	390	0	6	19	0	0	25	817
% App. Total	0	0	92.5	7.5	0		0	0	0	0	0		0	0	0	0	0		32.6	67.4	0	0	0		0	24	76	0	0		
PHF	.000	.000	.861	.833	.000	.859	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.882	.913	.000	.000	.000	.929	.000	.500	.679	.000	.000	.625	.924
Cars	0	0	330	27	0	357	0	0	0	0	0	0	0	0	0	0	0	0	115	231	0	0	0	346	0	0	1	0	0	1	704
% Cars	0	0	88.7	90.0	0	88.8	0	0	0	0	0	0	0	0	0	0	0	0	90.6	87.8	0	0	0	88.7	0	0	5.3	0	0	4.0	86.2
Heavy Vehicles	0	0	42	3	0	45	0	0	0	0	0	0	0	0	0	0	0	0	12	32	0	0	0	44	0	6	18	0	0	24	113
% Heavy Vehicles	0	0	11.3	10.0	0	11.2	0	0	0	0	0	0	0	0	0	0	0	0	9.4	12.2	0	0	0	11.3	0	100	94.7	0	0	96.0	13.8



N/S/NW: Surface Road/ MBTA Exit
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File Name : 154673 KK
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Groups Printed- Cars - Heavy Vehicles

	Surface Road From North					Sudbury Street From East					Surface Road From South					Sudbury Street From West					MBTA Exit From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
04:00 PM	0	0	76	13	0	0	0	0	0	0	0	0	0	0	0	58	140	0	0	0	0	1	6	0	0	294
04:15 PM	0	0	66	15	0	0	0	0	0	0	0	0	0	0	0	61	148	0	0	0	0	1	5	0	0	296
04:30 PM	0	0	70	15	0	0	0	0	0	0	0	0	0	0	0	52	185	0	0	0	0	2	6	0	0	330
04:45 PM	0	0	79	17	0	0	0	0	0	0	0	0	0	0	0	60	163	0	0	0	0	0	5	0	0	324
Total	0	0	291	60	0	0	0	0	0	0	0	0	0	0	0	231	636	0	0	0	0	4	22	0	0	1244
05:00 PM	0	0	66	10	0	0	0	0	0	0	0	0	0	0	0	32	185	0	0	0	0	2	6	0	0	301
05:15 PM	0	0	67	19	0	0	0	0	0	0	0	0	0	0	0	40	175	0	0	0	0	2	9	0	0	312
05:30 PM	0	0	68	24	0	0	0	0	0	0	0	0	0	0	0	34	208	0	0	0	0	1	6	0	0	341
05:45 PM	0	0	53	16	0	0	0	0	0	0	0	0	0	0	0	34	218	0	0	0	0	1	7	0	0	329
Total	0	0	254	69	0	0	0	0	0	0	0	0	0	0	0	140	786	0	0	0	0	6	28	0	0	1283
Grand Total	0	0	545	129	0	0	0	0	0	0	0	0	0	0	0	371	1422	0	0	0	0	10	50	0	0	2527
Apprch %	0	0	80.9	19.1	0	0	0	0	0	0	0	0	0	0	0	20.7	79.3	0	0	0	0	16.7	83.3	0	0	
Total %	0	0	21.6	5.1	0	0	0	0	0	0	0	0	0	0	0	14.7	56.3	0	0	0	0	0.4	2	0	0	
Cars	0	0	498	126	0	0	0	0	0	0	0	0	0	0	0	357	1353	0	0	0	0	0	2	0	0	2336
% Cars	0	0	91.4	97.7	0	0	0	0	0	0	0	0	0	0	0	96.2	95.1	0	0	0	0	0	4	0	0	92.4
Heavy Vehicles	0	0	47	3	0	0	0	0	0	0	0	0	0	0	0	14	69	0	0	0	0	10	48	0	0	191
% Heavy Vehicles	0	0	8.6	2.3	0	0	0	0	0	0	0	0	0	0	0	3.8	4.9	0	0	0	0	100	96	0	0	7.6

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

	Surface Road From North						Sudbury Street From East						Surface Road From South						Sudbury Street From West						MBTA Exit From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
05:00 PM	0	0	66	10	0	76	0	0	0	0	0	0	0	0	0	0	0	0	32	185	0	0	0	217	0	2	6	0	0	8	301
05:15 PM	0	0	67	19	0	86	0	0	0	0	0	0	0	0	0	0	0	0	40	175	0	0	0	215	0	2	9	0	0	11	312
05:30 PM	0	0	68	24	0	92	0	0	0	0	0	0	0	0	0	0	0	0	34	208	0	0	0	242	0	1	6	0	0	7	341
05:45 PM	0	0	53	16	0	69	0	0	0	0	0	0	0	0	0	0	0	0	34	218	0	0	0	252	0	1	7	0	0	8	329
Total Volume	0	0	254	69	0	323	0	0	0	0	0	0	0	0	0	0	0	0	140	786	0	0	0	926	0	6	28	0	0	34	1283
% App. Total	0	0	78.6	21.4	0		0	0	0	0	0		0	0	0	0	0		15.1	84.9	0	0	0		0	17.6	82.4	0	0		
PHF	.000	.000	.934	.719	.000	.878	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.875	.901	.000	.000	.000	.919	.000	.750	.778	.000	.000	.773	.941
Cars	0	0	233	68	0	301	0	0	0	0	0	0	0	0	0	0	0	0	135	750	0	0	0	885	0	0	2	0	0	2	1188
% Cars	0	0	91.7	98.6	0	93.2	0	0	0	0	0	0	0	0	0	0	0	0	96.4	95.4	0	0	0	95.6	0	0	7.1	0	0	5.9	92.6
Heavy Vehicles	0	0	21	1	0	22	0	0	0	0	0	0	0	0	0	0	0	0	5	36	0	0	0	41	0	6	26	0	0	32	95
% Heavy Vehicles	0	0	8.3	1.4	0	6.8	0	0	0	0	0	0	0	0	0	0	0	0	3.6	4.6	0	0	0	4.4	0	100	92.9	0	0	94.1	7.4

N/S/NW: Surface Road/ MBTA Exit
E/W: Sudbury Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION
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INDUSTRIES, LLC
P.O. Box 301 Berlin, MA 01503
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File Name : 154673 KK
Site Code : 2007190
Start Date : 9/23/2015
Page No : 1

Groups Printed- Peds and Bikes

	Surface Road From North						Sudbury Street From East						Surface Road From South						Sudbury Street From West						MBTA Exit From Northwest						
Start Time	Hard Right	Right	Thru	Left	Peds EB	Peds WB	Right	Bear Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Bear Left	Left	Peds WB	Peds EB	Right	Thru	Left	Hard Left	Peds NB	Peds SB	Hard Right	Bear Right	Bear Left	Hard Left	Peds NEB	Peds SWB	Int. Total
04:00 PM	0	0	1	0	18	38	0	0	0	0	11	9	0	0	0	0	23	38	0	2	0	0	75	34	0	0	0	0	3	0	252
04:15 PM	0	0	2	0	29	24	0	0	0	0	23	13	0	0	0	0	40	40	1	1	0	0	92	28	0	1	0	0	0	0	294
04:30 PM	0	0	1	0	35	18	0	0	0	0	26	9	0	0	0	0	25	43	1	0	0	1	80	37	0	0	0	0	2	2	280
04:45 PM	0	0	0	0	44	18	0	0	0	0	19	10	0	0	0	0	35	37	4	2	0	0	89	26	0	2	0	0	3	0	289
Total	0	0	4	0	126	98	0	0	0	0	79	41	0	0	0	0	123	158	6	5	0	1	336	125	0	3	0	0	8	2	1115
05:00 PM																							115								
05:15 PM	0	0	3	0	53	17	0	0	0	0	29	10	0	0	0	0	59	52	4	1	0	0	118	35	0	0	0	0	3	1	385
05:30 PM	0	0	8	0	62	17	0	0	0	0	28	19	0	0	0	0	46	66	1	4	0	0	111	35	0	0	0	0	2	3	402
05:45 PM	0	0	7	0	74	27	0	1	0	0	29	20	0	0	0	0	40	64	2	2	0	0	81	32	0	2	0	0	5	2	388
Total	0	0	27	0	237	91	0	1	0	0	116	67	0	0	0	0	175	227	8	10	0	0	425	123	0	2	0	0	17	6	1532
Grand Total	0	0	31	0	363	189	0	1	0	0	195	108	0	0	0	0	298	385	14	15	0	1	761	248	0	5	0	0	25	8	2647
Apprch %	0	0	5.3	0	62.3	32.4	0	0.3	0	0	64.1	35.5	0	0	0	0	43.6	56.4	1.3	1.4	0	0.1	73.2	23.9	0	13.2	0	0	65.8	21.1	
Total %	0	0	1.2	0	13.7	7.1	0	0	0	0	7.4	4.1	0	0	0	0	11.3	14.5	0.5	0.6	0	0	28.7	9.4	0	0.2	0	0	0.9	0.3	

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

	Surface Road From North							Sudbury Street From East							Surface Road From South							Sudbury Street From West							MBTA Exit From Northwest							
Start Time	Hard Right	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Bear Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Bear Left	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Hard Left	Peds NB	Peds SB	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds NEB	Peds SWB	App. Total	Int. Total
05:00 PM	0	0	9	0	48	30	87	0	0	0	0	30	18	48	0	0	0	0	30	45	75	1	3	0	0	115	21	140	0	0	0	0	7	0	7	357
05:15 PM					53	17	73	0	0	0	0	29	10	39	0	0	0	0	59	52	111	4	1	0	0	118	35	158	0	0	0	0	3	1	4	385
05:30 PM					62	17	87	0	0	0	0	28	19	47	0	0	0	0	46	66	112	1	4	0	0	111	35	151	0	0	0	0	2	3	5	402
05:45 PM					74	27	108	0	1	0	0	29	20	50	0	0	0	0	40	64	104	2	2	0	0	81	32	117	0	2	0	0	5	2	9	388
Total Volume			27	0	237	91	355	0	1	0	0	116	67	184					175	227	402	8	10			425	123	566	0	2	0	0	17	6	25	1532
% App. Total			7.6	0	66.8	25.6		0	0.5	0	0	63	36.4		0	0	0	0	43.5	56.5		1.4	1.8			75.1	21.7		0	8	0	0	68	24		
PHF	.000	.000	.750	.000	.801	.758	.822	.000	.250	.000	.000	.967	.838	.920	.000	.000	.000	.000	.742	.860	.897	.500	.625	.000	.000	.900	.879	.896	.000	.250	.000	.000	.607	.500	.694	.953

N/S/NW: Surface Road/ MBTA Exit
E/W: Sudbury Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

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DATA
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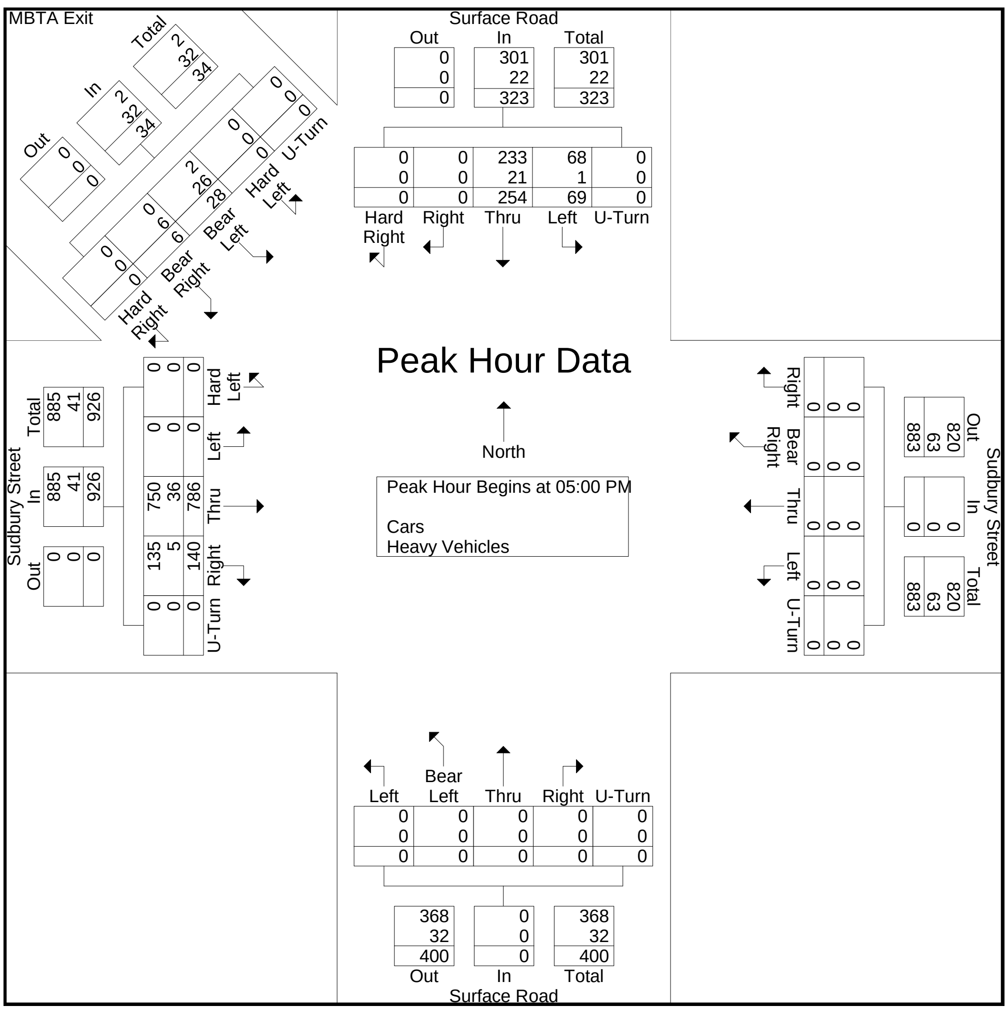
File Name : 154673 KK
Site Code : 2007190
Start Date : 9/23/2015

	Surface Road From North						Sudbury Street From East						Surface Road From South						Sudbury Street From West						MBTA Exit From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	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	0	66	10	0	76	0	0	0	0	0	0	0	0	0	0	0	0	32	185	0	0	0	217	0	2	6	0	0	8	301
05:15 PM	0	0	67	19	0	86	0	0	0	0	0	0	0	0	0	0	0	0	40	175	0	0	0	215	0	2	9	0	0	11	312
05:30 PM	0	0	68	24	0	92	0	0	0	0	0	0	0	0	0	0	0	0	34	208	0	0	0	242	0	1	6	0	0	7	341
05:45 PM	0	0	53	16	0	69	0	0	0	0	0	0	0	0	0	0	0	0	34	218	0	0	0	252	0	1	7	0	0	8	329
Total Volume	0	0	254	69	0	323	0	0	0	0	0	0	0	0	0	0	0	0	140	786	0	0	0	926	0	6	28	0	0	34	1283
% App. Total	0	0	78.6	21.4	0		0	0	0	0	0		0	0	0	0	0		15.1	84.9	0	0	0		0	17.6	82.4	0	0		
PHF	.000	.000	.934	.719	.000	.878	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.875	.901	.000	.000	.000	.919	.000	.750	.778	.000	.000	.773	.941
Cars	0	0	233	68	0	301	0	0	0	0	0	0	0	0	0	0	0	0	135	750	0	0	0	885	0	0	2	0	0	2	1188
% Cars	0	0	91.7	98.6	0	93.2	0	0	0	0	0	0	0	0	0	0	0	0	96.4	95.4	0	0	0	95.6	0	0	7.1	0	0	5.9	92.6
Heavy Vehicles	0	0	21	1	0	22	0	0	0	0	0	0	0	0	0	0	0	0	5	36	0	0	0	41	0	6	26	0	0	32	95
% Heavy Vehicles	0	0	8.3	1.4	0	6.8	0	0	0	0	0	0	0	0	0	0	0	0	3.6	4.6	0	0	0	4.4	0	100	92.9	0	0	94.1	7.4



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Groups Printed- Cars - Heavy Vehicles

	Cross Street From North					Driveway From East					Cross Street From South					Sudbury Street From West					I-93 Onramp From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
07:00 AM	0	0	0	0	0	0	1	0	0	0	1	152	28	0	0	0	1	30	38	0	0	0	0	0	0	251
07:15 AM	0	0	0	0	0	0	0	0	0	0	0	152	25	0	0	0	0	14	43	0	0	0	0	0	0	234
07:30 AM	0	0	0	0	0	0	0	0	0	0	0	131	34	0	0	0	0	19	53	0	0	0	0	0	0	237
07:45 AM	0	0	0	0	0	0	0	0	0	0	2	171	49	0	0	0	0	27	59	0	0	0	0	0	0	308
Total	0	0	0	0	0	0	1	0	0	0	3	606	136	0	0	0	1	90	193	0	0	0	0	0	0	1030
08:00 AM	0	0	0	0	0	3	0	0	0	0	0	164	40	0	0	0	1	21	55	0	0	0	0	0	0	284
08:15 AM	0	0	0	0	0	2	0	0	0	0	0	185	37	0	0	0	0	33	42	0	0	0	0	0	0	299
08:30 AM	0	0	0	0	0	1	0	0	0	0	0	175	34	0	0	0	0	32	44	0	0	0	0	0	0	286
08:45 AM	0	0	0	0	0	0	0	0	0	0	0	154	35	0	0	0	0	31	39	0	0	0	0	0	0	259
Total	0	0	0	0	0	6	0	0	0	0	0	678	146	0	0	0	1	117	180	0	0	0	0	0	0	1128
Grand Total	0	0	0	0	0	6	1	0	0	0	3	1284	282	0	0	0	2	207	373	0	0	0	0	0	0	2158
Apprch %	0	0	0	0	0	85.7	14.3	0	0	0	0.2	81.8	18	0	0	0	0.3	35.6	64.1	0	0	0	0	0	0	
Total %	0	0	0	0	0	0.3	0	0	0	0	0.1	59.5	13.1	0	0	0	0.1	9.6	17.3	0	0	0	0	0	0	
Cars	0	0	0	0	0	5	1	0	0	0	3	1133	273	0	0	0	2	139	343	0	0	0	0	0	0	1899
% Cars	0	0	0	0	0	83.3	100	0	0	0	100	88.2	96.8	0	0	0	100	67.1	92	0	0	0	0	0	0	88
Heavy Vehicles	0	0	0	0	0	1	0	0	0	0	0	151	9	0	0	0	0	68	30	0	0	0	0	0	0	259
% Heavy Vehicles	0	0	0	0	0	16.7	0	0	0	0	0	11.8	3.2	0	0	0	0	32.9	8	0	0	0	0	0	0	12

	Cross Street From North						Driveway From East						Cross Street From South						Sudbury Street From West						I-93 Onramp From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	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	0	0	0	0	0	0	0	0	0	0	0	2	171	49	0	0	222	0	0	27	59	0	86	0	0	0	0	0	0	308
08:00 AM	0	0	0	0	0	0	3	0	0	0	0	3	0	164	40	0	0	204	0	1	21	55	0	77	0	0	0	0	0	0	284
08:15 AM	0	0	0	0	0	0	2	0	0	0	0	2	0	185	37	0	0	222	0	0	33	42	0	75	0	0	0	0	0	0	299
08:30 AM	0	0	0	0	0	0	1	0	0	0	0	1	0	175	34	0	0	209	0	0	32	44	0	76	0	0	0	0	0	0	286
Total Volume	0	0	0	0	0	0	6	0	0	0	0	6	2	695	160	0	0	857	0	1	113	200	0	314	0	0	0	0	0	0	1177
% App. Total	0	0	0	0	0		100	0	0	0	0		0.2	81.1	18.7	0	0		0	0.3	36	63.7	0		0	0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.500	.000	.000	.000	.000	.500	.250	.939	.816	.000	.000	.965	.000	.250	.856	.847	.000	.913	.000	.000	.000	.000	.000	.000	.955
Cars	0	0	0	0	0	0	5	0	0	0	0	5	2	624	154	0	0	780	0	1	78	185	0	264	0	0	0	0	0	0	1049
% Cars	0	0	0	0	0	0	83.3	0	0	0	0	83.3	100	89.8	96.3	0	0	91.0	0	100	69.0	92.5	0	84.1	0	0	0	0	0	0	89.1
Heavy Vehicles	0	0	0	0	0	0	1	0	0	0	0	1	0	71	6	0	0	77	0	0	35	15	0	50	0	0	0	0	0	0	128
% Heavy Vehicles	0	0	0	0	0	0	16.7	0	0	0	0	16.7	0	10.2	3.8	0	0	9.0	0	0	31.0	7.5	0	15.9	0	0	0	0	0	0	10.9

N/S/NW: Cross Street/ I-93 Onramp
E/W: Driveway/ Sudbury Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION
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File Name : 154673 L
Site Code : 2007190
Start Date : 9/23/2015

Groups Printed- Peds and Bikes

	Cross Street From North						Driveway From East						Cross Street From South						Sudbury Street From West						I-93 Onramp From Northwest						
Start Time	Hard Right	Right	Thru	Left	Peds EB	Peds WB	Right	Bear Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Bear Left	Left	Peds WB	Peds EB	Right	Thru	Left	Hard Left	Peds NB	Peds SB	Hard Right	Bear Right	Bear Left	Hard Left	Peds NEB	Peds SWB	Int. Total
07:00 AM	0	0	0	0	0	2	0	0	0	0	32	3	0	1	0	0	31	10	0	0	0	0	30	4	0	0	0	0	0	2	115
07:15 AM	0	0	0	0	0	0	0	0	0	0	28	10	0	2	0	0	43	24	0	0	0	0	46	5	0	0	0	0	0	0	158
07:30 AM	0	0	0	0	0	0	0	0	0	0	53	6	0	3	0	0	58	13	0	0	0	0	63	4	0	0	0	0	0	0	200
07:45 AM	0	0	0	0	0	0	0	0	0	0	74	11	0	1	0	0	76	14	0	0	0	0	50	8	0	0	0	0	0	0	234
Total	0	0	0	0	0	2	0	0	0	0	187	30	0	7	0	0	208	61	0	0	0	0	189	21	0	0	0	0	0	2	707
08:00 AM	0	0	0	0	0	0	0	0	0	0	74	16	0	2	0	0	88	26	0	0	0	0	60	4	0	0	0	0	0	0	270
08:15 AM	0	0	0	0	0	0	0	0	0	0	74	26	0	5	0	0	99	30	0	0	0	0	55	9	0	0	0	0	0	0	298
08:30 AM	0	0	0	0	0	0	0	0	0	0	101	38	0	4	0	0	98	23	0	0	0	0	51	4	0	0	0	0	0	0	319
08:45 AM	0	0	0	0	0	0	0	0	0	0	68	22	0	4	0	0	75	23	0	0	1	0	20	0	0	0	0	0	0	0	213
Total	0	0	0	0	0	0	0	0	0	0	317	102	0	15	0	0	360	102	0	0	1	0	186	17	0	0	0	0	0	0	1100
Grand Total	0	0	0	0	0	2	0	0	0	0	504	132	0	22	0	0	568	163	0	0	1	0	375	38	0	0	0	0	0	2	1807
Apprch %	0	0	0	0	0	100	0	0	0	0	79.2	20.8	0	2.9	0	0	75.4	21.6	0	0	0.2	0	90.6	9.2	0	0	0	0	0	100	
Total %	0	0	0	0	0	0.1	0	0	0	0	27.9	7.3	0	1.2	0	0	31.4	9	0	0	0.1	0	20.8	2.1	0	0	0	0	0	0.1	

	Cross Street From North							Driveway From East							Cross Street From South							Sudbury Street From West							I-93 Onramp From Northwest							
Start Time	Hard Right	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Bear Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Bear Left	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Hard Left	Peds NB	Peds SB	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds NEB	Peds SWB	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

Start Time	Hard Right	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Bear Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Bear Left	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Hard Left	Peds NB	Peds SB	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds NEB	Peds SWB	App. Total	Int. Total
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	74	11	85	0	1	0	0	76	14	91	0	0	0	0	50	8	58	0	0	0	0	0	0	0	234
08:00 AM												74	16	90	0	2	0	0	88	26	116	0	0	0	0	60										270
08:15 AM												74	26	100					99	30	134	0	0	0	0	55										298
08:30 AM												101	38	139					98	23	125	0	0	0	0	51										319
Total Volume												323	91	414		12	0	0	361	93	466	0	0	0	0	216	25	241	0	0	0	0	0	0	0	1121
% App. Total												78	22		0	2.6	0	0	77.5	20						89.6	10.4		0	0	0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.800	.599	.745	.000	.600	.000	.000	.912	.775	.869	.000	.000	.000	.000	.900	.694	.941	.000	.000	.000	.000	.000	.000	.000	.879

N/S/NW: Cross Street/ I-93 Onramp
E/W: Driveway/ Sudbury Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION DATA INDUSTRIES, LLC
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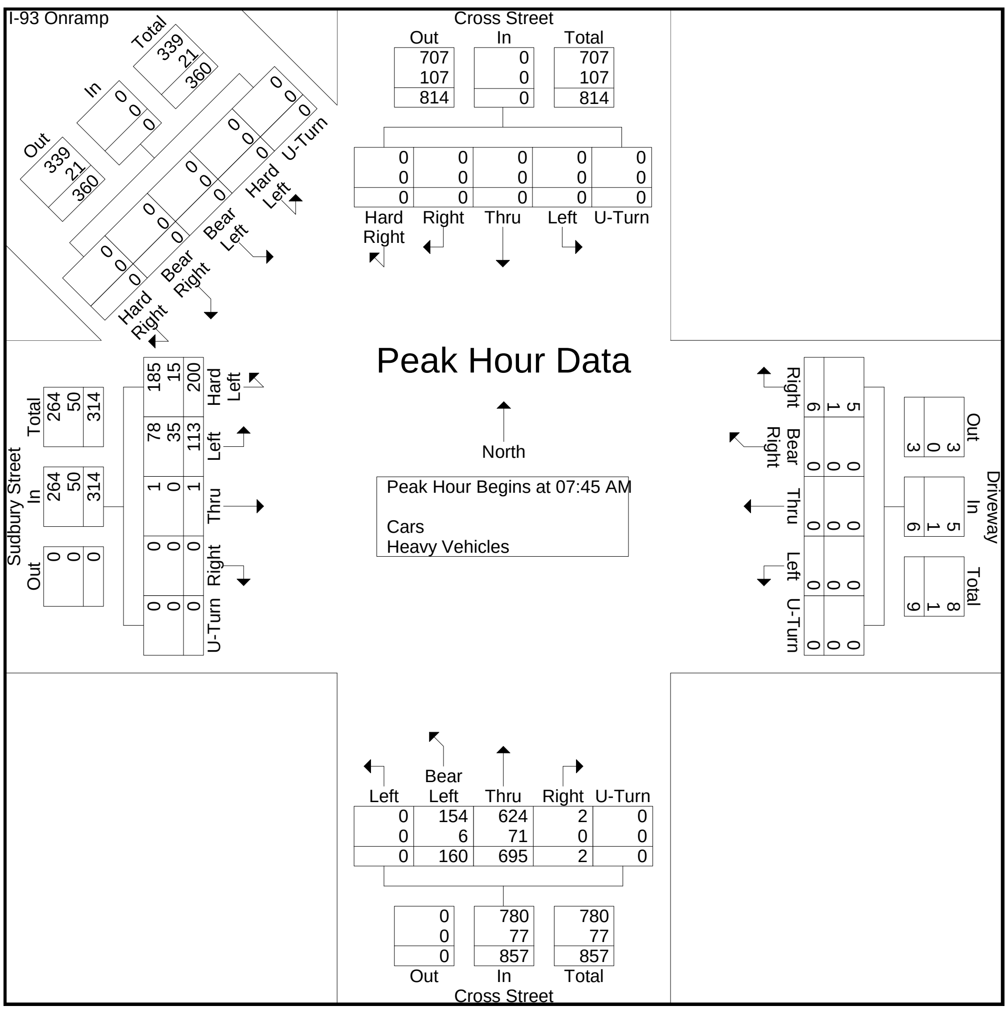
File Name : 154673 L
Site Code : 2007190
Start Date : 9/23/2015

	Cross Street From North						Driveway From East						Cross Street From South						Sudbury Street From West						I-93 Onramp From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	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	0	0	0	0	0	0	0	0	0	0	0	2	171	49	0	0	222	0	0	27	59	0	86	0	0	0	0	0	0	308
08:00 AM	0	0	0	0	0	0	3	0	0	0	0	3	0	164	40	0	0	204	0	1	21	55	0	77	0	0	0	0	0	0	284
08:15 AM	0	0	0	0	0	0	2	0	0	0	0	2	0	185	37	0	0	222	0	0	33	42	0	75	0	0	0	0	0	0	299
08:30 AM	0	0	0	0	0	0	1	0	0	0	0	1	0	175	34	0	0	209	0	0	32	44	0	76	0	0	0	0	0	0	286
Total Volume	0	0	0	0	0	0	6	0	0	0	0	6	2	695	160	0	0	857	0	1	113	200	0	314	0	0	0	0	0	0	1177
% App. Total	0	0	0	0	0		100	0	0	0	0		0.2	81.1	18.7	0	0		0	0.3	36	63.7	0		0	0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.500	.000	.000	.000	.000	.500	.250	.939	.816	.000	.000	.965	.000	.250	.856	.847	.000	.913	.000	.000	.000	.000	.000	.000	.955
Cars	0	0	0	0	0	0	5	0	0	0	0	5	2	624	154	0	0	780	0	1	78	185	0	264	0	0	0	0	0	0	1049
% Cars	0	0	0	0	0	0	83.3	0	0	0	0	83.3	100	89.8	96.3	0	0	91.0	0	100	69.0	92.5	0	84.1	0	0	0	0	0	0	89.1
Heavy Vehicles	0	0	0	0	0	0	1	0	0	0	0	1	0	71	6	0	0	77	0	0	35	15	0	50	0	0	0	0	0	0	128
% Heavy Vehicles	0	0	0	0	0	0	16.7	0	0	0	0	16.7	0	10.2	3.8	0	0	9.0	0	0	31.0	7.5	0	15.9	0	0	0	0	0	0	10.9



N/S/NW: Cross Street/ I-93 Onramp
E/W: Driveway/ Sudbury Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION DATA INDUSTRIES, LLC
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File Name : 154673 LL
Site Code : 2007190
Start Date : 9/23/2015

Groups Printed- Cars - Heavy Vehicles

	Cross Street From North					Driveway From East					Cross Street From South					Sudbury Street From West					I-93 Onramp From Northwest					
Start Time	Hard Right	Right	Thru	Left	U-Turn	Right	Bear Right	Thru	Left	U-Turn	Right	Thru	Bear Left	Left	U-Turn	Right	Thru	Left	Hard Left	U-Turn	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	0	208	100	0	0	0	0	61	94	0	0	0	0	0	0	463
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	188	120	0	0	0	0	71	99	0	0	0	0	0	0	478
04:30 PM	0	0	0	0	0	0	0	0	0	0	0	162	132	0	0	0	0	67	130	0	0	0	0	0	0	491
04:45 PM	0	0	0	0	0	0	1	0	0	0	0	164	147	0	0	0	0	74	119	0	0	0	0	0	0	505
Total	0	0	0	0	0	0	1	0	0	0	0	722	499	0	0	0	0	273	442	0	0	0	0	0	0	1937
05:00 PM	0	0	0	0	0	2	0	0	0	0	0	194	128	0	0	0	0	56	146	0	0	0	0	0	0	526
05:15 PM	0	0	0	0	0	1	0	0	0	0	0	160	165	0	0	0	0	62	137	0	0	0	0	0	0	525
05:30 PM	0	0	0	0	0	1	0	0	0	0	0	186	172	0	0	0	0	66	165	0	0	0	0	0	0	590
05:45 PM	0	0	0	0	0	3	0	0	0	0	0	200	161	0	0	0	0	74	161	0	0	0	0	0	0	599
Total	0	0	0	0	0	7	0	0	0	0	0	740	626	0	0	0	0	258	609	0	0	0	0	0	0	2240
Grand Total	0	0	0	0	0	7	1	0	0	0	0	1462	1125	0	0	0	0	531	1051	0	0	0	0	0	0	4177
Apprch %	0	0	0	0	0	87.5	12.5	0	0	0	0	56.5	43.5	0	0	0	0	33.6	66.4	0	0	0	0	0	0	
Total %	0	0	0	0	0	0.2	0	0	0	0	0	35	26.9	0	0	0	0	12.7	25.2	0	0	0	0	0	0	
Cars	0	0	0	0	0	7	1	0	0	0	0	1346	1108	0	0	0	0	453	1010	0	0	0	0	0	0	3925
% Cars	0	0	0	0	0	100	100	0	0	0	0	92.1	98.5	0	0	0	0	85.3	96.1	0	0	0	0	0	0	94
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	116	17	0	0	0	0	78	41	0	0	0	0	0	0	252
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	7.9	1.5	0	0	0	0	14.7	3.9	0	0	0	0	0	0	6

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

	Cross Street From North						Driveway From East						Cross Street From South						Sudbury Street From West						I-93 Onramp From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	App. Total	Int. Total
05:00 PM	0	0	0	0	0	0	2	0	0	0	0	2	0	194	128	0	0	322	0	0	56	146	0	202	0	0	0	0	0	0	526
05:15 PM	0	0	0	0	0	0	1	0	0	0	0	1	0	160	165	0	0	325	0	0	62	137	0	199	0	0	0	0	0	0	525
05:30 PM	0	0	0	0	0	0	1	0	0	0	0	1	0	186	172	0	0	358	0	0	66	165	0	231	0	0	0	0	0	0	590
05:45 PM	0	0	0	0	0	0	3	0	0	0	0	3	0	200	161	0	0	361	0	0	74	161	0	235	0	0	0	0	0	0	599
Total Volume	0	0	0	0	0	0	7	0	0	0	0	7	0	740	626	0	0	1366	0	0	258	609	0	867	0	0	0	0	0	0	2240
% App. Total	0	0	0	0	0		100	0	0	0	0		0	54.2	45.8	0	0		0	0	29.8	70.2	0		0	0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.583	.000	.000	.000	.000	.583	.000	.925	.910	.000	.000	.946	.000	.000	.872	.923	.000	.922	.000	.000	.000	.000	.000	.000	.935
Cars	0	0	0	0	0	0	7	0	0	0	0	7	0	690	618	0	0	1308	0	0	219	586	0	805	0	0	0	0	0	0	2120
% Cars	0	0	0	0	0	0	100	0	0	0	0	100	0	93.2	98.7	0	0	95.8	0	0	84.9	96.2	0	92.8	0	0	0	0	0	0	94.6
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	50	8	0	0	58	0	0	39	23	0	62	0	0	0	0	0	0	120
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	6.8	1.3	0	0	4.2	0	0	15.1	3.8	0	7.2	0	0	0	0	0	0	5.4

N/S/NW: Cross Street/ I-93 Onramp
E/W: Driveway/ Sudbury Street
City, State: Boston, MA
Client: Howard Stein-Hudson/ B. Beisel

PRECISION
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File Name : 154673 LL
Site Code : 2007190
Start Date : 9/23/2015
Page No : 1

Groups Printed- Peds and Bikes

	Cross Street From North						Driveway From East						Cross Street From South						Sudbury Street From West						I-93 Onramp From Northwest						
Start Time	Hard Right	Right	Thru	Left	Peds EB	Peds WB	Right	Bear Right	Thru	Left	Peds SB	Peds NB	Right	Thru	Bear Left	Left	Peds WB	Peds EB	Right	Thru	Left	Hard Left	Peds NB	Peds SB	Hard Right	Bear Right	Bear Left	Hard Left	Peds NEB	Peds SWB	Int. Total
04:00 PM	0	0	0	0	0	0	0	0	0	0	42	31	0	7	0	0	34	41	0	0	3	0	15	3	0	0	0	0	0	0	176
04:15 PM	0	0	0	0	0	0	0	0	0	0	28	37	0	10	0	0	32	38	0	0	0	0	11	12	0	0	0	0	0	0	168
04:30 PM	0	0	0	0	0	0	0	0	0	0	25	51	0	13	0	0	30	61	0	0	0	0	18	15	0	0	0	0	0	0	213
04:45 PM	0	0	0	0	0	0	0	0	0	0	35	49	0	19	0	0	39	47	0	0	0	0	9	11	0	0	0	0	0	0	209
Total	0	0	0	0	0	0	0	0	0	0	130	168	0	49	0	0	135	187	0	0	3	0	53	41	0	0	0	0	0	0	766
05:00 PM	0	0	0	0	0	0	0	0	0	0	41	67	0	17	0	0	38	61	0	0	4	0	9	19	0	0	0	0	0	0	256
05:15 PM	0	0	0	0	0	0	0	0	0	0	50	101	0	31	0	0	31	70	0	0	2	0	7	26	0	0	0	0	0	0	318
05:30 PM	0	0	0	0	0	0	0	0	0	0	56	88	0	24	0	0	59	101	0	0	3	0	9	26	0	0	0	0	0	0	366
05:45 PM	0	0	0	0	0	0	0	0	0	0	54	69	0	22	0	0	39	75	0	0	2	0	6	33	0	0	0	0	0	0	300
Total	0	0	0	0	0	0	0	0	0	0	201	325	0	94	0	0	167	307	0	0	11	0	31	104	0	0	0	0	0	0	1240
Grand Total	0	0	0	0	0	0	0	0	0	0	331	493	0	143	0	0	302	494	0	0	14	0	84	145	0	0	0	0	0	0	2006
Apprch %	0	0	0	0	0	0	0	0	0	0	40.2	59.8	0	15.2	0	0	32.2	52.6	0	0	5.8	0	34.6	59.7	0	0	0	0	0	0	
Total %	0	0	0	0	0	0	0	0	0	0	16.5	24.6	0	7.1	0	0	15.1	24.6	0	0	0.7	0	4.2	7.2	0	0	0	0	0	0	

	Cross Street From North							Driveway From East							Cross Street From South							Sudbury Street From West							I-93 Onramp From Northwest							
Start Time	Hard Right	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Bear Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Bear Left	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Hard Left	Peds NB	Peds SB	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds NEB	Peds SWB	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

Start Time	Hard Right	Right	Thru	Left	Peds EB	Peds WB	App. Total	Right	Bear Right	Thru	Left	Peds SB	Peds NB	App. Total	Right	Thru	Bear Left	Left	Peds WB	Peds EB	App. Total	Right	Thru	Left	Hard Left	Peds NB	Peds SB	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	Peds NEB	Peds SWB	App. Total	Int. Total
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	41	67	108	0	17	0	0	38	61	116	0	0	4	0	9	19	32	0	0	0	0	0	0	0	256
05:15 PM												50	101	151		31	0	0	31	70	132	0	0	2	0	7	26	35	0	0	0	0	0	0	0	318
05:30 PM												56	88	144		24	0	0	59	101	184	0	0	3	0	9	26	38	0	0	0	0	0	0	0	366
05:45 PM												54	69	123		22	0	0	39	75	136	0	0	2	0	6	33	41	0	0	0	0	0	0	0	300
Total Volume												201	325	526		94	0	0	167	307	568	0	0	11	0	31	104	146	0	0	0	0	0	0	0	1240
% App. Total												38.2	61.8		0	16.5	0	0	29.4	54				7.5	0	21.2	71.2		0	0	0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.897	.804	.871	.000	.758	.000	.000	.708	.760	.772	.000	.000	.688	.000	.861	.788	.890	.000	.000	.000	.000	.000	.000	.000	.847

N/S/NW: Cross Street/ I-93 Onramp
E/W: Driveway/ Sudbury Street
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File Name : 154673 LL
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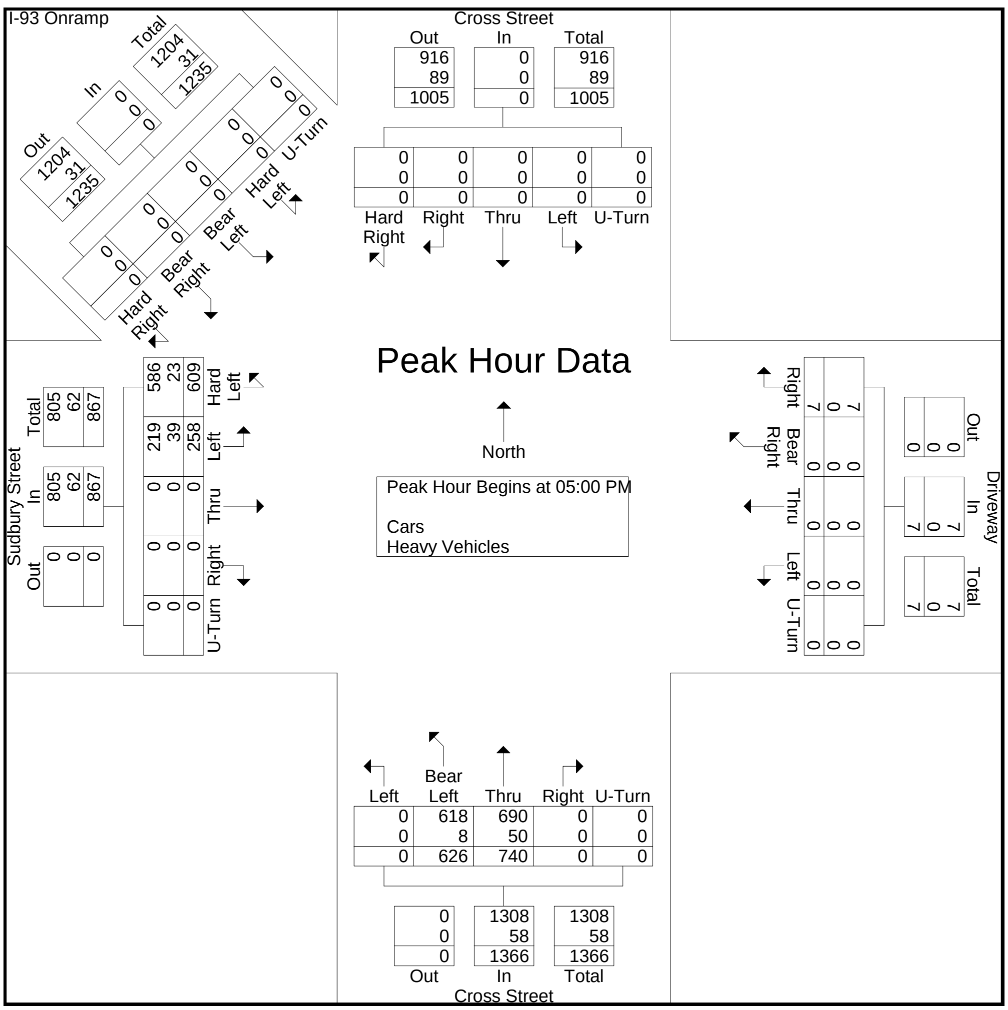
Start Date : 9/23/2015

	Cross Street From North						Driveway From East						Cross Street From South						Sudbury Street From West						I-93 Onramp From Northwest						
Start Time	Hard Right	Right	Thru	Left	U-Turn	App. Total	Right	Bear Right	Thru	Left	U-Turn	App. Total	Right	Thru	Bear Left	Left	U-Turn	App. Total	Right	Thru	Left	Hard Left	U-Turn	App. Total	Hard Right	Bear Right	Bear Left	Hard Left	U-Turn	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	0	0	0	0	0	2	0	0	0	0	2	0	194	128	0	0	322	0	0	56	146	0	202	0	0	0	0	0	0	526
05:15 PM	0	0	0	0	0	0	1	0	0	0	0	1	0	160	165	0	0	325	0	0	62	137	0	199	0	0	0	0	0	0	525
05:30 PM	0	0	0	0	0	0	1	0	0	0	0	1	0	186	172	0	0	358	0	0	66	165	0	231	0	0	0	0	0	0	590
05:45 PM	0	0	0	0	0	0	3	0	0	0	0	3	0	200	161	0	0	361	0	0	74	161	0	235	0	0	0	0	0	0	599
Total Volume	0	0	0	0	0	0	7	0	0	0	0	7	0	740	626	0	0	1366	0	0	258	609	0	867	0	0	0	0	0	0	2240
% App. Total	0	0	0	0	0		100	0	0	0	0		0	54.2	45.8	0	0		0	0	29.8	70.2	0		0	0	0	0	0		
PHF	.000	.000	.000	.000	.000	.000	.583	.000	.000	.000	.000	.583	.000	.925	.910	.000	.000	.946	.000	.000	.872	.923	.000	.922	.000	.000	.000	.000	.000	.000	.935
Cars	0	0	0	0	0	0	7	0	0	0	0	7	0	690	618	0	0	1308	0	0	219	586	0	805	0	0	0	0	0	0	2120
% Cars	0	0	0	0	0	0	100	0	0	0	0	100	0	93.2	98.7	0	0	95.8	0	0	84.9	96.2	0	92.8	0	0	0	0	0	0	94.6
Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	50	8	0	0	58	0	0	39	23	0	62	0	0	0	0	0	0	120
% Heavy Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	6.8	1.3	0	0	4.2	0	0	15.1	3.8	0	7.2	0	0	0	0	0	0	5.4



One Congress Street
Trip Generation Assessment

HOWARD/STEIN-HUDSON ASSOCIATES
20-Oct-15

Auto %	Taxi %
100%	0%

Land Use	Size	Category	Trip Rates (Trips/ksf or unit)	Unadjusted Vehicle Trips	Assumed national vehicle occupancy rate[1]	Converted to Person trips	Internal Trips	Person Trips Less Internal	Transit Share[2]	Transit Trips	Walk/Bike/ Other Share[2]	Walk/ Bike/ Other Trips	Vehicle Share[2]	Total Vehicle Person Trips	Auto[7] Person Trips	Taxi[7] Person Trips	Assumed local auto occupancy rate for autos[4A]	Assumed local auto occupancy rate for taxis[4B]	Total Adjusted Auto Trips	Total Adjusted Taxi Trips	Total Adjusted Auto + Taxi Trips
Daily Peak Hour																					
Apartment[5]	486	Total	4.20	2,042	1.13	**2,308**		**2,308**		**692**		**970**		**646**	646	0	1.13	1.13	**572**	**0**	**572**
	units	In	2.10	1,021	1.13	**1,154**		**1,154**	30%	**346**	42%	**485**	28%	**323**	323	0	1.13	1.13	**286**	**0**	**286**
		Out	2.10	1,021	1.13	**1,154**		**1,154**	30%	**346**	42%	**485**	28%	**323**	323	0	1.13	1.13	**286**	**0**	**286**
Retail[6]	1.3	Total	43.08	56	1.78	**100**		**100**		**20**		**60**		**21**	21	0	1.78	1.78	**12**	**0**	**12**
	KSF	In	21.54	28	1.78	**50**		**50**	20%	**10**	59%	**30**	21%	**11**	11	0	1.78	1.78	**6**	**0**	**6**
		Out	21.54	28	1.78	**50**		**50**	20%	**10**	59%	**30**	21%	**11**	11	0	1.78	1.78	**6**	**0**	**6**
Total		Total		**2,098**		**2,408**		**2,408**		**712**		**1,030**		**667**					**584**	**0**	**584**
		In		**1,049**		**1,204**		**1,204**		**356**		**515**		**334**					**292**	**0**	**292**
		Out		**1,049**		**1,204**		**1,204**		**356**		**515**		**334**					**292**	**0**	**292**
AM Peak Hour																					
Apartment[5]	486	Total	0.30	146	1.13	**165**		**165**		**44**		**66**		**55**	55	0	1.13	1.13	**49**	**0**	**49**
	units	In	0.08	37	1.13	**42**		**42**	52%	**22**	7%	**3**	41%	**17**	17	0	1.13	1.13	**15**	**0**	**15**
		Out	0.22	109	1.13	**123**		**123**	18%	**22**	51%	**63**	31%	**38**	38	0	1.13	1.13	**34**	**0**	**34**
Retail[6]	1.3	Total	0.77	1	1.78	**2**		**2**		**1**		**0**		**1**	1	0	1.78	1.78	**0**	**0**	**0**
	KSF	In	0.77	1	1.78	**2**		**2**	46%	**1**	14%	**0**	40%	**1**	1	0	1.78	1.78	**0**	**0**	**0**
		Out	0.00	0	1.78	**0**		**0**	10%	**0**	58%	**0**	32%	**0**	0	0	1.78	1.78	**0**	**0**	**0**
Total		Total		**147**		**167**		**167**		**45**		**66**		**56**					**49**	**0**	**49**
		In		**38**		**44**		**44**		**23**		**3**		**18**					**15**	**0**	**15**
		Out		**109**		**123**		**123**		**22**		**63**		**38**					**34**	**0**	**34**
PM Peak Hour																					
Apartment[5]	486	Total	0.35	170	1.13	**193**		**193**		**60**		**65**		**67**	67	0	1.13	1.13	**59**	**0**	**59**
	units	In	0.21	104	1.13	**118**		**118**	18%	**21**	51%	**60**	31%	**37**	37	0	1.13	1.13	**32**	**0**	**32**
		Out	0.14	66	1.13	**75**		**75**	52%	**39**	7%	**5**	41%	**31**	31	0	1.13	1.13	**27**	**0**	**27**
Retail[6]	1.3	Total	3.85	5	1.78	**9**		**9**		**2**		**3**		**3**	3	0	1.78	1.78	**2**	**0**	**2**
	KSF	In	1.54	2	1.78	**4**		**4**	10%	**0**	58%	**2**	32%	**1**	1	0	1.78	1.78	**1**	**0**	**1**
		Out	2.31	3	1.78	**5**		**5**	46%	**2**	14%	**1**	40%	**2**	2	0	1.78	1.78	**1**	**0**	**1**
Total		Total		**175**		**202**		**202**		**62**		**68**		**71**					**61**	**0**	**61**
		In		**106**		**122**		**122**		**21**		**62**		**38**					**33**	**0**	**33**
		Out		**69**		**80**		**80**		**41**		**6**		**33**					**28**	**0**	**28**

1. 2009 National vehicle occupancy rates - 1.13:home to work; 1.84: family/personal business; 1.78: shopping; 2.2 social/recreational
2. Mode shares based on peak-hour BTD Data for Area 2
3. Local vehicle occupancy rates based on 2009 National vehicle occupancy rates.
4. For taxi cabs, 1.2 passengers per cab. (2.2 minus 1 driver equals 1.2)
5. ITE Trip Generation Rate, 9th Edition, LUC 222 (High Rise Apartment), average rate
6. ITE Trip Generation Rate, 9th Edition, LUC 820 (Shopping Center), average rate

Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations														
Traffic Volume (vph)	0	406	37	36	20	593	0	0	0	0	813	345	431	
Future Volume (vph)	0	406	37	36	20	593	0	0	0	0	813	345	431	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	14	12	12	12	12	12	11	13	
Lane Util. Factor	1.00	0.91	0.91	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.91	0.86	0.91	
Ped Bike Factor		1.00				1.00					1.00	0.98		
Frt		0.988										0.992	0.850	
Flt Protected						0.996					0.950	0.976		
Satd. Flow (prot)	0	4275	0	0	0	3395	0	0	0	0	1344	2398	1277	
Flt Permitted						0.760					0.950	0.976		
Satd. Flow (perm)	0	4275	0	0	0	2590	0	0	0	0	1341	2395	1277	
Right Turn on Red			No				Yes			Yes			No	
Satd. Flow (RTOR)														
Link Speed (mph)		25				25			25			25		
Link Distance (ft)		184				338			438			242		
Travel Time (s)		5.0				9.2			11.9			6.6		
Confl. Peds. (#/hr)			1		1						1		191	
Confl. Bikes (#/hr)													93	
Peak Hour Factor	0.80	0.80	0.80	0.84	0.84	0.84	0.84	0.92	0.92	0.92	0.96	0.96	0.96	
Heavy Vehicles (%)	0%	7%	16%	11%	5%	1%	0%	0%	0%	0%	10%	16%	7%	
Adj. Flow (vph)	0	508	46	43	24	706	0	0	0	0	847	359	449	
Shared Lane Traffic (%)											48%		10%	
Lane Group Flow (vph)	0	554	0	0	0	773	0	0	0	0	440	811	404	
Turn Type		NA		Perm	Perm	NA					Split	NA	Prot	
Protected Phases		1				1					5	5	5	2
Permitted Phases				1	1									
Detector Phase		1		1	1	1					5	5	5	
Switch Phase														
Minimum Initial (s)		8.0		8.0	8.0	8.0					8.0	8.0	8.0	8.0
Minimum Split (s)		23.0		23.0	23.0	23.0					22.0	22.0	22.0	30.0
Total Split (s)		35.0		35.0	35.0	35.0					55.0	55.0	55.0	30.0
Total Split (%)		29.2%		29.2%	29.2%	29.2%					45.8%	45.8%	45.8%	25%
Maximum Green (s)		29.0		29.0	29.0	29.0					49.0	49.0	49.0	26.0
Yellow Time (s)		3.0		3.0	3.0	3.0					3.0	3.0	3.0	4.0
All-Red Time (s)		3.0		3.0	3.0	3.0					3.0	3.0	3.0	0.0
Lost Time Adjust (s)		-2.0				-2.0					-2.0	-2.0	-2.0	
Total Lost Time (s)		4.0				4.0					4.0	4.0	4.0	
Lead/Lag		Lead		Lead	Lead	Lead								Lag
Lead-Lag Optimize?														
Vehicle Extension (s)		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					Max	Max	Max	None
Walk Time (s)		7.0		7.0	7.0	7.0					7.0	7.0	7.0	7.0
Flash Dont Walk (s)		7.0		7.0	7.0	7.0					8.0	8.0	8.0	19.0
Pedestrian Calls (#/hr)		0		0	0	0					0	0	0	500
Act Effct Green (s)		31.0				31.0					51.0	51.0	51.0	
Actuated g/C Ratio		0.26				0.26					0.42	0.42	0.42	
v/c Ratio		0.50				1.16					0.77	0.80	0.75	
Control Delay		32.7				126.5					30.5	27.5	29.3	
Queue Delay		5.4				0.0					2.9	2.0	2.9	
Total Delay		38.1				126.5					33.4	29.5	32.2	
LOS		D				F					C	C	C	
Approach Delay		38.1				126.5						31.2		
Approach LOS		D				F						C		
Queue Length 50th (ft)		157				~372					314	330	196	
Queue Length 95th (ft)		172				#445					467	354	403	
Internal Link Dist (ft)		104				258			358			162		
Turn Bay Length (ft)														
Base Capacity (vph)		1104				669					571	1019	542	
Starvation Cap Reductn		477				0					60	97	65	
Spillback Cap Reductn		0				0					0	0	0	
Storage Cap Reductn		0				0					0	0	0	
Reduced v/c Ratio		0.88				1.16					0.86	0.88	0.85	

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 34 (28%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.16
Intersection Signal Delay: 57.2 Intersection LOS: E
Intersection Capacity Utilization 70.5% ICU Level of Service C
Analysis Period (min) 15
~ 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: 8: Surface Street & New Chardon Street/I-93 Ramps

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø1	Ø2	Ø5
Lane Configurations									
Traffic Volume (vph)	0	443	1004	20	0	0			
Future Volume (vph)	0	443	1004	20	0	0			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900			
Lane Util. Factor	1.00	0.95	0.91	0.91	1.00	1.00			
Ped Bike Factor			1.00						
Frt			0.997						
Flt Protected									
Satd. Flow (prot)	0	3008	4467	0	0	0			
Flt Permitted									
Satd. Flow (perm)	0	3008	4467	0	0	0			
Right Turn on Red				Yes		Yes			
Satd. Flow (RTOR)			6						
Link Speed (mph)		25	25		25				
Link Distance (ft)		287	184		238				
Travel Time (s)		7.8	5.0		6.5				
Confl. Bikes (#/hr)				10					
Peak Hour Factor	0.81	0.81	0.98	0.98	0.92	0.92			
Heavy Vehicles (%)	0%	8%	4%	11%	0%	0%			
Adj. Flow (vph)	0	547	1024	20	0	0			
Shared Lane Traffic (%)									
Lane Group Flow (vph)	0	547	1044	0	0	0			
Turn Type		NA	NA						
Protected Phases		1 5	1 5				1	2	5
Permitted Phases									
Detector Phase		1 5	1 5						
Switch Phase									
Minimum Initial (s)							8.0	8.0	8.0
Minimum Split (s)							23.0	30.0	22.0
Total Split (s)							35.0	30.0	55.0
Total Split (%)							29%	25%	46%
Maximum Green (s)							29.0	26.0	49.0
Yellow Time (s)							3.0	4.0	3.0
All-Red Time (s)							3.0	0.0	3.0
Lost Time Adjust (s)									
Total Lost Time (s)									
Lead/Lag							Lead	Lag	
Lead-Lag Optimize?									
Vehicle Extension (s)							2.0	2.0	2.0
Recall Mode							C-Max	None	Max
Walk Time (s)							7.0	7.0	7.0
Flash Dont Walk (s)							7.0	19.0	8.0
Pedestrian Calls (#/hr)							0	500	0
Act Effct Green (s)		86.0	86.0						
Actuated g/C Ratio		0.72	0.72						
v/c Ratio		0.25	0.33						
Control Delay		2.9	2.9						
Queue Delay		0.6	1.6						
Total Delay		3.5	4.5						
LOS		A	A						
Approach Delay		3.5	4.5						
Approach LOS		A	A						
Queue Length 50th (ft)		46	0						
Queue Length 95th (ft)		57	m0						
Internal Link Dist (ft)		207	104		158				
Turn Bay Length (ft)									
Base Capacity (vph)		2155	3203						
Starvation Cap Reductn		1172	1905						
Spillback Cap Reductn		624	70						
Storage Cap Reductn		0	0						
Reduced v/c Ratio		0.56	0.80						

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 34 (28%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.16
Intersection Signal Delay: 4.1 — Intersection LOS: A
Intersection Capacity Utilization 25.4% — ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: New Chardon Street & Canal Street

Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBU	SBL	SBT	SBR	SBR2
Lane Configurations																	
Traffic Volume (vph)	39	87	35	23	378	76	464	70	134	260	300	249	9	91	201	52	93
Future Volume (vph)	39	87	35	23	378	76	464	70	134	260	300	249	9	91	201	52	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	10	12	12	12	10	10	16	12	11	11	11	16
Storage Length (ft)	0		0			0		0		0		150		0		150	
Storage Lanes	0		0			1		0		1		1		0		1	
Taper Length (ft)	25					25				25				25			
Lane Util. Factor	0.95	0.95	0.95	0.95	0.91	0.91	0.91	0.95	0.95	0.91	0.91	1.00	0.91	0.91	0.91	0.91	1.00
Ped Bike Factor		0.70			0.61		0.86			0.71	0.93				0.83		0.59
Frt		0.953					0.984					0.850			0.978		0.850
Flt Protected		0.990			0.950		0.990			0.950	0.982				0.986		
Satd. Flow (prot)	0	1967	0	0	1302	0	2890	0	0	1341	2682	1569	0	0	3523	0	1647
Flt Permitted		0.990			0.950		0.990			0.950	0.982				0.986		
Satd. Flow (perm)	0	1913	0	0	800	0	2517	0	0	947	2483	1569	0	0	3259	0	967
Right Turn on Red				Yes				Yes				No					Yes
Satd. Flow (RTOR)		11					10										145
Link Speed (mph)		25					25				25				25		
Link Distance (ft)		204					287				468				998		
Travel Time (s)		5.6					7.8				12.8				27.2		
Confl. Peds. (#/hr)	152		432	317	432	317		152	317	265		1136		1136		317	265
Confl. Bikes (#/hr)			1	1				17				10				64	64
Peak Hour Factor	0.84	0.84	0.84	0.84	0.97	0.97	0.97	0.97	0.91	0.91	0.91	0.91	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	14%	14%	10%	0%	6%	0%	3%	4%	0%	7%	6%	5%	11%	9%	14%	0%	0%
Adj. Flow (vph)	46	104	42	27	390	78	478	72	147	286	330	274	10	106	234	60	108
Shared Lane Traffic (%)					14%					64%							
Lane Group Flow (vph)	0	219	0	0	335	0	683	0	0	250	513	274	0	0	410	0	108
Turn Type	Split	NA			Split	Split	NA		Split	Split	NA	pt+ov	Perm	Split	NA		Perm
Protected Phases	3	3			2	2	2		1	1	1	1 2		4	4		
Permitted Phases													4				4
Detector Phase	3	3			2	2	2		1	1	1	1 2	4	4	4		4
Switch Phase																	
Minimum Initial (s)	8.0	8.0			8.0	8.0	8.0		8.0	8.0	8.0		8.0	8.0	8.0		8.0
Minimum Split (s)	19.0	19.0			15.0	15.0	15.0		33.0	33.0	33.0		24.0	24.0	24.0		24.0
Total Split (s)	22.0	22.0			40.0	40.0	40.0		34.0	34.0	34.0		24.0	24.0	24.0		24.0
Total Split (%)	18.3%	18.3%			33.3%	33.3%	33.3%		28.3%	28.3%	28.3%		20.0%	20.0%	20.0%		20.0%
Maximum Green (s)	15.0	15.0			34.0	34.0	34.0		28.0	28.0	28.0		16.0	16.0	16.0		16.0
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0		3.0
All-Red Time (s)	4.0	4.0			3.0	3.0	3.0		3.0	3.0	3.0		5.0	5.0	5.0		5.0
Lost Time Adjust (s)		-2.0			-2.0		-2.0			-2.0	-2.0				-2.0		0.0
Total Lost Time (s)		5.0			4.0		4.0			4.0	4.0				6.0		8.0
Lead/Lag	Lag	Lag			Lead	Lead	Lead										
Lead-Lag Optimize?																	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0		2.0
Recall Mode	Max	Max			Max	Max	Max		C-Max	C-Max	C-Max		Max	Max	Max		Max
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)	4.0	4.0							17.0	17.0	17.0		8.0	8.0	8.0		8.0
Pedestrian Calls (#/hr)	0	0							0	0	0		0	0	0		0
Act Effct Green (s)		17.0			36.0		36.0			30.0	30.0	70.0			18.0		16.0
Actuated g/C Ratio		0.14			0.30		0.30			0.25	0.25	0.58			0.15		0.13
v/c Ratio		0.76			0.86		0.78			0.75	0.77	0.30			0.78		0.43
Control Delay		37.3			44.3		27.6			31.4	26.3	9.7			60.1		8.3
Queue Delay		1.0			9.0		4.7			0.0	0.0	0.0			0.0		0.0
Total Delay		38.2			53.3		32.2			31.4	26.3	9.7			60.1		8.3
LOS		D			D		C			C	C	A			E		A
Approach Delay		38.3					39.2				23.1				49.3		
Approach LOS		D					D				C				D		
Queue Length 50th (ft)		15			165		165			124	131	71			113		0
Queue Length 95th (ft)		#51			#434		201			m#313	200	117			145		20
Internal Link Dist (ft)		124					207				388				918		
Turn Bay Length (ft)												150					150
Base Capacity (vph)		288			390		874			335	670	915			528		254
Starvation Cap Reductn		9			37		130			0	0	0			0		0
Spillback Cap Reductn		0			0		0			0	0	0			0		0
Storage Cap Reductn		0			0		0			0	0	0			0		0
Reduced v/c Ratio		0.78			0.95		0.92			0.75	0.77	0.30			0.78		0.43

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 35.0 Intersection LOS: D
Intersection Capacity Utilization 78.9% ICU Level of Service D
Analysis Period (min) 15
\# 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: 10: GCG Entrance Driveway & Congress Street/Merrimac Street & New Chardon Street

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø1	Ø2
Lane Configurations								
Traffic Volume (vph)	184	0	0	724	1	0		
Future Volume (vph)	184	0	0	724	1	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	12	12	11	11		
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00		
Ped Bike Factor								
Frt								
Flt Protected					0.950			
Satd. Flow (prot)	2901	0	0	3094	1570	0		
Flt Permitted					0.950			
Satd. Flow (perm)	2901	0	0	3094	1570	0		
Right Turn on Red		Yes				Yes		
Satd. Flow (RTOR)								
Link Speed (mph)	25			25	25			
Link Distance (ft)	137			204	136			
Travel Time (s)	3.7			5.6	3.7			
Confl. Bikes (#/hr)		2						
Peak Hour Factor	0.83	0.83	0.93	0.93	0.25	0.25		
Heavy Vehicles (%)	12%	0%	0%	5%	0%	0%		
Adj. Flow (vph)	222	0	0	778	4	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	222	0	0	778	4	0		
Turn Type	NA			NA	Prot			
Protected Phases	3			1 2 3	4		1	2
Permitted Phases								
Detector Phase	3			1 2 3	4			
Switch Phase								
Minimum Initial (s)	8.0				8.0		8.0	8.0
Minimum Split (s)	19.0				24.0		33.0	15.0
Total Split (s)	22.0				24.0		34.0	40.0
Total Split (%)	18.3%				20.0%		28%	33%
Maximum Green (s)	15.0				16.0		28.0	34.0
Yellow Time (s)	3.0				3.0		3.0	3.0
All-Red Time (s)	4.0				5.0		3.0	3.0
Lost Time Adjust (s)	-2.0				-2.0			
Total Lost Time (s)	5.0				6.0			
Lead/Lag	Lag							Lead
Lead-Lag Optimize?								
Vehicle Extension (s)	2.0				2.0		2.0	2.0
Recall Mode	Max				Max		C-Max	Max
Walk Time (s)	7.0				7.0		7.0	
Flash Dont Walk (s)	4.0				8.0		17.0	
Pedestrian Calls (#/hr)	0				0		0	
Act Effct Green (s)	17.0			92.0	18.0			
Actuated g/C Ratio	0.14			0.77	0.15			
v/c Ratio	0.54			0.33	0.02			
Control Delay	53.4			0.8	44.0			
Queue Delay	0.0			0.9	0.0			
Total Delay	53.4			1.7	44.0			
LOS	D			A	D			
Approach Delay	53.4			1.7	44.0			
Approach LOS	D			A	D			
Queue Length 50th (ft)	85			8	3			
Queue Length 95th (ft)	116			18	4			
Internal Link Dist (ft)	57			124	56			
Turn Bay Length (ft)								
Base Capacity (vph)	410			2372	235			
Starvation Cap Reductn	0			1234	0			
Spillback Cap Reductn	0			0	0			
Storage Cap Reductn	0			0	0			
Reduced v/c Ratio	0.54			0.68	0.02			

Intersection Summary

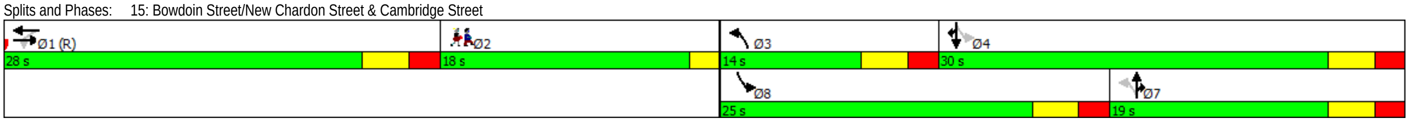
Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 13.3 Intersection LOS: B
Intersection Capacity Utilization 37.2% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 12: GCG Exit Driveway & New Chardon Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	664	89	20	189	30	145	140	107	314	187	276	
Future Volume (vph)	0	664	89	20	189	30	145	140	107	314	187	276	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	0		100	0		100	
Storage Lanes	0		0	0		0	1		1	1		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.91	0.91	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.95			0.95				0.61			0.75	
Frt		0.982			0.981				0.850			0.850	
Flt Protected					0.996		0.950			0.950			
Satd. Flow (prot)	0	4537	0	0	3135	0	1612	1759	1482	1719	1845	1524	
Flt Permitted					0.862		0.635			0.380			
Satd. Flow (perm)	0	4537	0	0	2713	0	1077	1759	909	688	1845	1136	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		26			17				170			288	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		236			438			364			579		
Travel Time (s)		5.4			10.0			8.3			13.2		
Confl. Peds. (#/hr)			530			756			361			229	
Confl. Bikes (#/hr)			105			21			6				
Peak Hour Factor	0.93	0.93	0.93	0.86	0.86	0.86	0.94	0.94	0.94	0.96	0.96	0.96	
Heavy Vehicles (%)	100%	7%	6%	21%	2%	25%	12%	8%	9%	5%	3%	6%	
Adj. Flow (vph)	0	714	96	23	220	35	154	149	114	327	195	288	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	810	0	0	278	0	154	149	114	327	195	288	
Turn Type		NA		Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom	
Protected Phases		1			1		3	7	7	8	4	4	2
Permitted Phases				1			7		7	4		4	
Detector Phase		1		1	1		3	7	7	8	4	4	
Switch Phase													
Minimum Initial (s)		8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	1.0
Minimum Split (s)		28.0		28.0	28.0		13.0	13.0	13.0	13.0	13.0	13.0	18.0
Total Split (s)		28.0		28.0	28.0		14.0	19.0	19.0	25.0	30.0	30.0	18.0
Total Split (%)		31.1%		31.1%	31.1%		15.6%	21.1%	21.1%	27.8%	33.3%	33.3%	20%
Maximum Green (s)		23.0		23.0	23.0		9.0	14.0	14.0	20.0	25.0	25.0	16.0
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)		2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	0.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag		Lead		Lead	Lead		Lead	Lag	Lag	Lead	Lag	Lag	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	2.0
Recall Mode		C-Max		C-Max	C-Max		None	None	None	None	None	None	None
Walk Time (s)		7.0		7.0	7.0								7.0
Flash Dont Walk (s)		16.0		16.0	16.0								9.0
Pedestrian Calls (#/hr)		0		0	0								20
Act Effct Green (s)		38.7			38.7		20.8	11.6	11.6	34.0	19.8	19.8	
Actuated g/C Ratio		0.43			0.43		0.23	0.13	0.13	0.38	0.22	0.22	
v/c Ratio		0.41			0.24		0.51	0.66	0.34	0.71	0.48	0.51	
Control Delay		26.0			9.9		25.8	51.3	4.5	29.8	33.6	6.8	
Queue Delay		0.6			0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		26.6			9.9		25.8	51.3	4.5	29.8	33.6	6.8	
LOS		C			A		C	D	A	C	C	A	
Approach Delay		26.6			9.9			29.1			22.6		
Approach LOS		C			A			C			C		
Queue Length 50th (ft)		24			23		57	82	0	136	97	0	
Queue Length 95th (ft)		210			33		95	140	16	199	150	59	
Internal Link Dist (ft)		156			358			284			499		
Turn Bay Length (ft)									100			100	
Base Capacity (vph)		1967			1177		307	273	374	489	512	631	
Starvation Cap Reductn		717			0		0	0	0	0	0	0	
Spillback Cap Reductn		0			12		0	0	0	0	0	1	
Storage Cap Reductn		0			0		0	0	0	0	0	0	
Reduced v/c Ratio		0.65			0.24		0.50	0.55	0.30	0.67	0.38	0.46	

Intersection Summary
Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 23.6 Intersection LOS: C
Intersection Capacity Utilization 64.9% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 15: Bowdoin Street/New Chardon Street & Cambridge Street



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	19	260	538	268	18	105	200	118	20	32	11	0	0	0
Future Volume (vph)	19	260	538	268	18	105	200	118	20	32	11	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0		100		100	0		0	0		0
Storage Lanes		2		0		1		1	0		0	0		0
Taper Length (ft)		25				25			25			25		
Lane Util. Factor	0.95	0.97	0.95	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.88					0.66		0.94				
Frt			0.950					0.850		0.976				
Flt Protected		0.950				0.950				0.984				
Satd. Flow (prot)	0	3346	2845	0	0	1689	3374	1455	0	1654	0	0	0	0
Flt Permitted		0.610				0.339				0.984				
Satd. Flow (perm)	0	2148	2845	0	0	603	3374	966	0	1654	0	0	0	0
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			95					134		11				
Link Speed (mph)			30				30			30			30	
Link Distance (ft)			438				763			259			584	
Travel Time (s)			10.0				17.3			5.9			13.3	
Confl. Peds. (#/hr)				154				377			241			
Confl. Bikes (#/hr)				60				6			2			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.88	0.88	0.88	0.88	0.69	0.69	0.69	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	6%	5%	0%	8%	7%	11%	0%	5%	9%	0%	0%	0%
Adj. Flow (vph)	20	268	555	276	20	119	227	134	29	46	16	0	0	0
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	288	831	0	0	139	227	134	0	91	0	0	0	0
Turn Type	custom	Prot	NA		custom	Prot	NA	Perm	Perm	NA				
Protected Phases		2	1			6	1			5				
Permitted Phases	2				6			1	5					
Detector Phase	2	2	1		6	6	1	1	5	5				
Switch Phase														
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0				
Minimum Split (s)	22.0	22.0	27.0		12.0	12.0	27.0	27.0	22.0	22.0				
Total Split (s)	22.0	22.0	29.0		12.0	12.0	29.0	29.0	27.0	27.0				
Total Split (%)	24.4%	24.4%	32.2%		13.3%	13.3%	32.2%	32.2%	30.0%	30.0%				
Maximum Green (s)	18.0	18.0	25.0		8.0	8.0	25.0	25.0	23.0	23.0				
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		0.0				
Total Lost Time (s)		4.0	4.0			4.0	4.0	4.0		4.0				
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lead	Lead	Lead	Lead				
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	None	None	C-Max		None	None	C-Max	C-Max	None	None				
Walk Time (s)	7.0	7.0	7.0				7.0	7.0	7.0	7.0				
Flash Dont Walk (s)	11.0	11.0	16.0				16.0	16.0	11.0	11.0				
Pedestrian Calls (#/hr)	0	0	0				0	0	0	0				
Act Effct Green (s)		15.4	25.0			26.4	25.0	25.0		9.7				
Actuated g/C Ratio		0.17	0.28			0.29	0.28	0.28		0.11				
v/c Ratio		0.78	0.97			0.79	0.24	0.37		0.49				
Control Delay		44.4	50.3			66.7	26.0	7.9		41.7				
Queue Delay		0.0	0.0			0.0	0.0	0.0		0.0				
Total Delay		44.4	50.3			66.7	26.0	7.9		41.7				
LOS		D	D			E	C	A		D				
Approach Delay			48.8				32.5			41.7				
Approach LOS			D				C			D				
Queue Length 50th (ft)		79	210			75	52	0		44				
Queue Length 95th (ft)		134	#323			#204	81	41		64				
Internal Link Dist (ft)			358				683			179			504	
Turn Bay Length (ft)						100		100						
Base Capacity (vph)		429	858			176	937	365		430				
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		0.67	0.97			0.79	0.24	0.37		0.21				

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 43.7 — Intersection LOS: D
Intersection Capacity Utilization 57.6% — ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 16: Somerset Street/Sudbury Street & Cambridge Street

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	410	0	0	170	0
Future Volume (Veh/h)	0	410	0	0	170	0
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)	0	446	0	0	185	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		584				
pX, platoon unblocked					0.95	
vC, conflicting volume	0				223	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				91	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				79	100
cM capacity (veh/h)	1636				864	1091

Direction, Lane #	EB 1	EB 2	SB 1
Volume Total	223	223	185
Volume Left	0	0	185
Volume Right	0	0	0
cSH	1700	1700	864
Volume to Capacity	0.13	0.13	0.21
Queue Length 95th (ft)	0	0	20
Control Delay (s)	0.0	0.0	10.3
Lane LOS			B
Approach Delay (s)	0.0		10.3
Approach LOS			B

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	27.4%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection Sign configuration not allowed in HCM analysis.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations														
Traffic Volume (vph)	148	230	151	0	0	0	14	0	791	155	88	522	0	
Future Volume (vph)	148	230	151	0	0	0	14	0	791	155	88	522	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	11	10	12	12	12	12	11	11	11	10	11	11	
Storage Length (ft)	0		0	0		0		0		0	100		0	
Storage Lanes	1		1	0		0		0		0	1		0	
Taper Length (ft)	25			25				25			25			
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	0.91	1.00	0.91	0.91	1.00	0.91	1.00	
Ped Bike Factor	0.46		0.46						0.94		0.87			
Frt			0.850						0.976					
Flt Protected	0.950								0.999		0.950			
Satd. Flow (prot)	1392	2815	1304	0	0	0	0	0	3873	0	1458	4178	0	
Flt Permitted	0.950								0.926		0.950			
Satd. Flow (perm)	641	2815	597	0	0	0	0	0	3590	0	1267	4178	0	
Right Turn on Red			Yes			Yes				No			Yes	
Satd. Flow (RTOR)			170											
Link Speed (mph)		25			25				25			25		
Link Distance (ft)		153			161				386			468		
Travel Time (s)		4.2			4.4				10.5			12.8		
Confl. Peds. (#/hr)	430		475							674	674			
Confl. Bikes (#/hr)			11							12			59	
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.94	0.94	0.94	0.94	0.88	0.88	0.88	
Heavy Vehicles (%)	5%	6%	4%	0%	0%	0%	0%	0%	6%	14%	4%	8%	0%	
Parking (#/hr)	0	0												
Adj. Flow (vph)	166	258	170	0	0	0	15	0	841	165	100	593	0	
Shared Lane Traffic (%)														
Lane Group Flow (vph)	166	258	170	0	0	0	0	0	1021	0	100	593	0	
Turn Type	Split	NA	Perm				Perm		NA		Prot	NA		
Protected Phases	5	5							1		6	1 6		2
Permitted Phases			5				1							
Detector Phase	5	5	5				1		1		6	1 6		
Switch Phase														
Minimum Initial (s)	8.0	8.0	8.0				10.0		10.0		7.0			7.0
Minimum Split (s)	15.0	15.0	15.0				17.0		17.0		14.0			26.0
Total Split (s)	25.0	25.0	25.0				51.0		51.0		18.0			26.0
Total Split (%)	20.8%	20.8%	20.8%				42.5%		42.5%		15.0%			22%
Maximum Green (s)	19.0	19.0	19.0				46.0		46.0		12.0			22.0
Yellow Time (s)	3.0	3.0	3.0				3.0		3.0		3.0			4.0
All-Red Time (s)	3.0	3.0	3.0				2.0		2.0		3.0			0.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0						-2.0		-2.0			
Total Lost Time (s)	4.0	4.0	4.0						3.0		4.0			
Lead/Lag	Lead	Lead	Lead				Lead		Lead		Lag			Lag
Lead-Lag Optimize?														
Vehicle Extension (s)	2.0	2.0	2.0				2.0		2.0		2.0			2.0
Recall Mode	Max	Max	Max				C-Max		C-Max		Max			Ped
Walk Time (s)	0.0	0.0	0.0											7.0
Flash Dont Walk (s)	8.0	8.0	8.0											15.0
Pedestrian Calls (#/hr)	0	0	0											500
Act Effct Green (s)	21.0	21.0	21.0						48.0		14.0	66.0		
Actuated g/C Ratio	0.18	0.18	0.18						0.40		0.12	0.55		
v/c Ratio	0.68	0.52	0.70						0.71		0.59	0.26		
Control Delay	61.8	49.3	22.8						33.6		58.9	15.4		
Queue Delay	0.0	0.0	0.0						1.7		0.0	0.0		
Total Delay	61.8	49.3	22.8						35.3		58.9	15.4		
LOS	E	D	C						D		E	B		
Approach Delay		45.2							35.3			21.6		
Approach LOS		D							D			C		
Queue Length 50th (ft)	122	96	0						239		80	106		
Queue Length 95th (ft)	#208	140	#97						294		m99	m127		
Internal Link Dist (ft)		73			81				306			388		
Turn Bay Length (ft)											100			
Base Capacity (vph)	243	492	244						1436		170	2297		
Starvation Cap Reductn	0	0	0						247		0	0		
Spillback Cap Reductn	0	0	0						0		0	0		
Storage Cap Reductn	0	0	0						0		0	0		
Reduced v/c Ratio	0.68	0.52	0.70						0.86		0.59	0.26		

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 102 (85%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.71
Intersection Signal Delay: 33.8 Intersection LOS: C
Intersection Capacity Utilization 53.2% ICU Level of Service A
Analysis Period (min) 15
\# 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: 19: Congress Street & Sudbury Street

Lane Group	EBT	EBR	SBL	SBT	SEL
Lane Configurations					
Traffic Volume (vph)	296	115	30	372	20
Future Volume (vph)	296	115	30	372	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12
Lane Util. Factor	0.95	1.00	0.95	0.95	1.00
Ped Bike Factor		0.66		0.98	
Frt		0.850			
Flt Protected				0.996	0.950
Satd. Flow (prot)	3116	1482	0	3241	926
Flt Permitted				0.996	0.950
Satd. Flow (perm)	3116	971	0	3164	926
Right Turn on Red		Yes	No		
Satd. Flow (RTOR)		124			
Link Speed (mph)	25			25	25
Link Distance (ft)	111			438	138
Travel Time (s)	3.0			11.9	3.8
Confl. Peds. (#/hr)		180	134		
Confl. Bikes (#/hr)		1			
Peak Hour Factor	0.93	0.93	0.86	0.86	0.62
Heavy Vehicles (%)	12%	9%	10%	11%	95%
Adj. Flow (vph)	318	124	35	433	32
Shared Lane Traffic (%)					
Lane Group Flow (vph)	318	124	0	468	32
Turn Type	NA	Perm	Perm	NA	Prot
Protected Phases	1			3	4
Permitted Phases		1	3		
Detector Phase	1	1	3	3	4
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	6.0
Minimum Split (s)	21.0	21.0	18.0	18.0	13.0
Total Split (s)	42.0	42.0	41.0	41.0	27.0
Total Split (%)	38.2%	38.2%	37.3%	37.3%	24.5%
Maximum Green (s)	38.0	38.0	35.0	35.0	21.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0		-2.0	0.0
Total Lost Time (s)	3.0	3.0		4.0	6.0
Lead/Lag			Lead	Lead	Lag
Lead-Lag Optimize?					
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0
Recall Mode	C-Max	C-Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	5.0	5.0	4.0	4.0	
Pedestrian Calls (#/hr)	0	0	25	25	
Act Effct Green (s)	39.0	39.0		37.0	21.0
Actuated g/C Ratio	0.35	0.35		0.34	0.19
v/c Ratio	0.29	0.29		0.44	0.18
Control Delay	26.4	6.4		30.0	40.5
Queue Delay	1.3	0.5		0.0	0.0
Total Delay	27.7	6.8		30.0	40.5
LOS	C	A		C	D
Approach Delay	21.8			30.0	40.5
Approach LOS	C			C	D
Queue Length 50th (ft)	84	0		134	19
Queue Length 95th (ft)	120	41		173	32
Internal Link Dist (ft)	31			358	58
Turn Bay Length (ft)					
Base Capacity (vph)	1104	424		1064	176
Starvation Cap Reductn	570	96		0	0
Spillback Cap Reductn	3	0		0	0
Storage Cap Reductn	0	0		0	0
Reduced v/c Ratio	0.60	0.38		0.44	0.18

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 10 (9%), Referenced to phase 1:EBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.44
Intersection Signal Delay: 26.6 Intersection LOS: C
Intersection Capacity Utilization 37.8% ICU Level of Service A
Analysis Period (min) 15

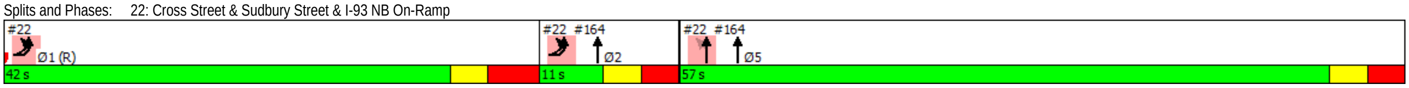
Splits and Phases: 21: Surface Street & Sudbury Street & Haymarket Bus Exit

Lane Group	EBL2	EBL	EBR	NBL	NBT	SBT	SBR	SEL	SER	Ø1	Ø2
Lane Configurations											
Traffic Volume (vph)	233	113	0	160	620	0	0	0	0		
Future Volume (vph)	233	113	0	160	620	0	0	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	13	12	12	11	12	12	12	12		
Lane Util. Factor	0.95	0.97	1.00	0.95	0.95	1.00	1.00	1.00	1.00		
Frt											
Flt Protected		0.950			0.990						
Satd. Flow (prot)	0	3133	0	0	3176	0	0	0	0		
Flt Permitted		0.950			0.990						
Satd. Flow (perm)	0	3133	0	0	3176	0	0	0	0		
Right Turn on Red	Yes		Yes								
Satd. Flow (RTOR)		256									
Link Speed (mph)		25			25	25		25			
Link Distance (ft)		191			203	568		237			
Travel Time (s)		5.2			5.5	15.5		6.5			
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.92	0.92	0.92	0.92		
Heavy Vehicles (%)	8%	31%	0%	4%	10%	0%	0%	0%	0%		
Adj. Flow (vph)	256	124	0	167	646	0	0	0	0		
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	380	0	0	813	0	0	0	0		
Turn Type	Prot	Prot		Perm	NA						
Protected Phases	1 2	1 2			5					1	2
Permitted Phases				5							
Detector Phase	1 2	1 2		5	5						
Switch Phase											
Minimum Initial (s)				10.0	10.0					10.0	4.0
Minimum Split (s)				18.0	18.0					25.0	11.0
Total Split (s)				57.0	57.0					42.0	11.0
Total Split (%)				51.8%	51.8%					38%	10%
Maximum Green (s)				51.0	51.0					35.0	5.0
Yellow Time (s)				3.0	3.0					3.0	3.0
All-Red Time (s)				3.0	3.0					4.0	3.0
Lost Time Adjust (s)					-1.0						
Total Lost Time (s)					5.0						
Lead/Lag										Lead	Lag
Lead-Lag Optimize?											
Vehicle Extension (s)				2.0	2.0					2.0	2.0
Recall Mode				Max	Max					C-Max	Max
Walk Time (s)				7.0	7.0					7.0	
Flash Dont Walk (s)				4.0	4.0					3.0	
Pedestrian Calls (#/hr)				30	30					0	
Act Effct Green (s)		47.0			52.0						
Actuated g/C Ratio		0.43			0.47						
v/c Ratio		0.26			0.54						
Control Delay		1.1			5.6						
Queue Delay		0.4			0.1						
Total Delay		1.5			5.7						
LOS		A			A						
Approach Delay		1.5			5.7						
Approach LOS		A			A						
Queue Length 50th (ft)		0			183						
Queue Length 95th (ft)		2			225						
Internal Link Dist (ft)		111			123	488		157			
Turn Bay Length (ft)											
Base Capacity (vph)		1485			1501						
Starvation Cap Reductn		643			111						
Spillback Cap Reductn		0			0						
Storage Cap Reductn		0			0						
Reduced v/c Ratio		0.45			0.58						

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 16 (15%), Referenced to phase 1:EBL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.54
Intersection Signal Delay: 4.4 Intersection LOS: A
Intersection Capacity Utilization 43.9% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 22: Cross Street & Sudbury Street & I-93 NB On-Ramp



Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations		↑↑↱				↰↑					↰	↰↑↱	↱	
Traffic Volume (vph)	0	869	73	19	10	410	0	0	0	0	986	290	285	
Future Volume (vph)	0	869	73	19	10	410	0	0	0	0	986	290	285	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	14	12	12	12	12	12	11	13	
Lane Util. Factor	1.00	0.91	0.91	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.91	0.86	0.91	
Ped Bike Factor												0.99		
Frt		0.988										0.995	0.850	
Flt Protected						0.997					0.950	0.971		
Satd. Flow (prot)	0	4542	0	0	0	3353	0	0	0	0	1382	2453	1254	
Flt Permitted						0.760					0.950	0.971		
Satd. Flow (perm)	0	4542	0	0	0	2556	0	0	0	0	1382	2453	1254	
Right Turn on Red			No				Yes			Yes			No	
Satd. Flow (RTOR)														
Link Speed (mph)		25				25			25			25		
Link Distance (ft)		184				394			438			242		
Travel Time (s)		5.0				10.7			11.9			6.6		
Confl. Peds. (#/hr)													148	
Peak Hour Factor	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.94	0.94	0.94	
Heavy Vehicles (%)	0%	1%	8%	0%	11%	3%	0%	0%	0%	0%	7%	17%	9%	
Adj. Flow (vph)	0	955	80	20	11	432	0	0	0	0	1049	309	303	
Shared Lane Traffic (%)											48%		10%	
Lane Group Flow (vph)	0	1035	0	0	0	463	0	0	0	0	545	843	273	
Turn Type		NA		Perm	Perm	NA					Split	NA	Prot	
Protected Phases		1				1					5	5	5	2
Permitted Phases				1	1									
Detector Phase		1		1	1	1					5	5	5	
Switch Phase														
Minimum Initial (s)		8.0		8.0	8.0	8.0					8.0	8.0	8.0	8.0
Minimum Split (s)		23.0		23.0	23.0	23.0					22.0	22.0	22.0	30.0
Total Split (s)		33.0		33.0	33.0	33.0					47.0	47.0	47.0	30.0
Total Split (%)		30.0%		30.0%	30.0%	30.0%					42.7%	42.7%	42.7%	27%
Maximum Green (s)		27.0		27.0	27.0	27.0					41.0	41.0	41.0	26.0
Yellow Time (s)		3.0		3.0	3.0	3.0					3.0	3.0	3.0	4.0
All-Red Time (s)		3.0		3.0	3.0	3.0					3.0	3.0	3.0	0.0
Lost Time Adjust (s)		-2.0				-2.0					-2.0	-2.0	-2.0	
Total Lost Time (s)		4.0				4.0					4.0	4.0	4.0	
Lead/Lag		Lead		Lead	Lead	Lead								Lag
Lead-Lag Optimize?														
Vehicle Extension (s)		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					Max	Max	Max	None
Walk Time (s)		7.0		7.0	7.0	7.0					7.0	7.0	7.0	7.0
Flash Dont Walk (s)		7.0		7.0	7.0	7.0					8.0	8.0	8.0	19.0
Pedestrian Calls (#/hr)		0		0	0	0					0	0	0	50
Act Effct Green (s)		35.0				35.0					43.0	43.0	43.0	
Actuated g/C Ratio		0.32				0.32					0.39	0.39	0.39	
v/c Ratio		0.72				0.57					1.01	0.98dl	0.56	
Control Delay		25.1				37.1					69.0	37.1	25.1	
Queue Delay		2.8				0.0					9.9	10.3	3.4	
Total Delay		27.9				37.1					79.0	47.4	28.5	
LOS		C				D					E	D	C	
Approach Delay		27.9				37.1						54.6		
Approach LOS		C				D						D		
Queue Length 50th (ft)		237				155					~440	337	126	
Queue Length 95th (ft)		#293				214					#689	#454	235	
Internal Link Dist (ft)		104				314			358			162		
Turn Bay Length (ft)														
Base Capacity (vph)		1445				812					540	958	490	
Starvation Cap Reductn		289				0					17	104	134	
Spillback Cap Reductn		0				0					0	0	0	
Storage Cap Reductn		0				0					0	0	0	
Reduced v/c Ratio		0.90				0.57					1.04	0.99	0.77	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 57 (52%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 43.3 Intersection LOS: D
Intersection Capacity Utilization 74.0% ICU Level of Service D
Analysis Period (min) 15
~ 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 8: Surface Street & New Chardon Street/I-93 Ramps

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø1	Ø2	Ø5
Lane Configurations									
Traffic Volume (vph)	0	942	668	27	0	0			
Future Volume (vph)	0	942	668	27	0	0			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900			
Lane Util. Factor	1.00	0.95	0.91	0.91	1.00	1.00			
Ped Bike Factor			1.00						
Frt			0.994						
Flt Protected									
Satd. Flow (prot)	0	3217	4400	0	0	0			
Flt Permitted									
Satd. Flow (perm)	0	3217	4400	0	0	0			
Right Turn on Red				Yes		Yes			
Satd. Flow (RTOR)			13						
Link Speed (mph)		25	25		25				
Link Distance (ft)		287	184		238				
Travel Time (s)		7.8	5.0		6.5				
Confl. Bikes (#/hr)				186					
Peak Hour Factor	0.95	0.95	0.93	0.93	0.92	0.92			
Heavy Vehicles (%)	0%	1%	5%	4%	0%	0%			
Adj. Flow (vph)	0	992	718	29	0	0			
Shared Lane Traffic (%)									
Lane Group Flow (vph)	0	992	747	0	0	0			
Turn Type		NA	NA						
Protected Phases		1 5	1 5				1	2	5
Permitted Phases									
Detector Phase		1 5	1 5						
Switch Phase									
Minimum Initial (s)							8.0	8.0	8.0
Minimum Split (s)							23.0	30.0	22.0
Total Split (s)							33.0	30.0	47.0
Total Split (%)							30%	27%	43%
Maximum Green (s)							27.0	26.0	41.0
Yellow Time (s)							3.0	4.0	3.0
All-Red Time (s)							3.0	0.0	3.0
Lost Time Adjust (s)									
Total Lost Time (s)									
Lead/Lag							Lead	Lag	
Lead-Lag Optimize?									
Vehicle Extension (s)							2.0	2.0	2.0
Recall Mode							C-Max	None	Max
Walk Time (s)							7.0	7.0	7.0
Flash Dont Walk (s)							7.0	19.0	8.0
Pedestrian Calls (#/hr)							0	50	0
Act Effct Green (s)		82.8	82.8						
Actuated g/C Ratio		0.75	0.75						
v/c Ratio		0.41	0.23						
Control Delay		7.1	1.1						
Queue Delay		0.6	0.2						
Total Delay		7.8	1.3						
LOS		A	A						
Approach Delay		7.8	1.3						
Approach LOS		A	A						
Queue Length 50th (ft)		146	0						
Queue Length 95th (ft)		169	m14						
Internal Link Dist (ft)		207	104		158				
Turn Bay Length (ft)									
Base Capacity (vph)		2421	3315						
Starvation Cap Reductn		952	1681						
Spillback Cap Reductn		965	68						
Storage Cap Reductn		0	0						
Reduced v/c Ratio		0.68	0.46						

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 57 (52%), Referenced to phase 1:EBWB, Start of Green	
Natural Cycle: 90	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 1.01	
Intersection Signal Delay: 5.0	Intersection LOS: A
Intersection Capacity Utilization 32.3%	ICU Level of Service A
Analysis Period (min) 15	

m Volume for 95th percentile queue is metered by upstream signal.

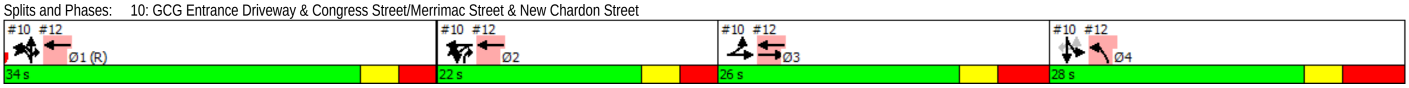
Splits and Phases: 9: New Chardon Street & Canal Street

Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBU	SBL	SBT	SBR	SBR2
Lane Configurations																	
Traffic Volume (vph)	59	282	60	3	302	16	307	38	36	212	228	360	4	295	292	14	54
Future Volume (vph)	59	282	60	3	302	16	307	38	36	212	228	360	4	295	292	14	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	10	12	12	12	10	10	16	12	11	11	11	16
Storage Length (ft)	0		0			0		0		0		150		0		150	
Storage Lanes	0		0			1		0		1		1		0		1	
Taper Length (ft)	25					25				25				25			
Lane Util. Factor	0.95	0.95	0.95	0.95	0.91	0.91	0.91	0.95	0.95	0.91	0.91	1.00	0.91	0.91	0.91	0.91	1.00
Ped Bike Factor		0.84			0.79		0.88			0.84	0.97				0.82		0.71
Frt		0.977					0.987					0.850			0.997		0.850
Flt Protected		0.993			0.950		0.989			0.950	0.986				0.976		
Satd. Flow (prot)	0	2631	0	0	1254	0	2822	0	0	1329	2709	1615	0	0	4070	0	1647
Flt Permitted		0.993			0.950		0.989			0.950	0.986				0.976		
Satd. Flow (perm)	0	2584	0	0	994	0	2508	0	0	1118	2623	1615	0	0	3381	0	1176
Right Turn on Red				Yes				Yes				No					Yes
Satd. Flow (RTOR)		1					7										159
Link Speed (mph)		25					25				25				25		
Link Distance (ft)		204					287				468				998		
Travel Time (s)		5.6					7.8				12.8				27.2		
Confl. Peds. (#/hr)	76		602	228	228	602		76	228	125		1385		1385		228	125
Confl. Bikes (#/hr)												11				7	7
Peak Hour Factor	0.94	0.94	0.94	0.94	0.97	0.97	0.97	0.97	0.98	0.98	0.98	0.98	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	0%	10%	0%	6%	3%	0%	5%	6%	2%	0%	3%	10%	7%	0%
Adj. Flow (vph)	63	300	64	3	311	16	316	39	37	216	233	367	4	321	317	15	59
Shared Lane Traffic (%)					28%					44%							
Lane Group Flow (vph)	0	430	0	0	224	0	458	0	0	158	328	367	0	0	657	0	59
Turn Type	Split	NA			Split	Split	NA		Split	Split	NA	pt+ov	Perm	Split	NA		Perm
Protected Phases	3	3			2	2	2		1	1	1	1 2		4	4		
Permitted Phases													4				4
Detector Phase	3	3			2	2	2		1	1	1	1 2	4	4	4		4
Switch Phase																	
Minimum Initial (s)	8.0	8.0			8.0	8.0	8.0		8.0	8.0	8.0		8.0	8.0	8.0		8.0
Minimum Split (s)	19.0	19.0			15.0	15.0	15.0		33.0	33.0	33.0		24.0	24.0	24.0		24.0
Total Split (s)	26.0	26.0			22.0	22.0	22.0		34.0	34.0	34.0		28.0	28.0	28.0		28.0
Total Split (%)	23.6%	23.6%			20.0%	20.0%	20.0%		30.9%	30.9%	30.9%		25.5%	25.5%	25.5%		25.5%
Maximum Green (s)	19.0	19.0			16.0	16.0	16.0		28.0	28.0	28.0		20.0	20.0	20.0		20.0
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0		3.0
All-Red Time (s)	4.0	4.0			3.0	3.0	3.0		3.0	3.0	3.0		5.0	5.0	5.0		5.0
Lost Time Adjust (s)		-2.0			-2.0		-2.0			-2.0	-2.0				-2.0		0.0
Total Lost Time (s)		5.0			4.0		4.0			4.0	4.0				6.0		8.0
Lead/Lag	Lag	Lag			Lead	Lead	Lead										
Lead-Lag Optimize?																	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0		2.0
Recall Mode	Max	Max			Max	Max	Max		C-Max	C-Max	C-Max		Max	Max	Max		Max
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)	4.0	4.0							17.0	17.0	17.0		8.0	8.0	8.0		8.0
Pedestrian Calls (#/hr)	0	0							0	0	0		0	0	0		0
Act Effct Green (s)		21.0			18.0		18.0			30.0	30.0	52.0			22.0		20.0
Actuated g/C Ratio		0.19			0.16		0.16			0.27	0.27	0.47			0.20		0.18
v/c Ratio		0.85			1.09		0.98			0.44	0.44	0.48			1.08dl		0.17
Control Delay		31.7			142.0		93.2			25.5	23.6	7.5			50.8		1.1
Queue Delay		0.0			0.0		0.0			0.0	0.0	1.0			0.0		0.0
Total Delay		31.7			142.0		93.2			25.5	23.6	8.5			50.8		1.1
LOS		C			F		F			C	C	A			D		A
Approach Delay		31.7					109.2				17.5				46.7		
Approach LOS		C					F				B				D		
Queue Length 50th (ft)		28			~200		185			52	54	53			163		0
Queue Length 95th (ft)		#207			#364		#285			m72	m72	m61			210		0
Internal Link Dist (ft)		124					207				388				918		
Turn Bay Length (ft)												150					150
Base Capacity (vph)		503			205		467			362	738	763			814		343
Starvation Cap Reductn		0			0		0			0	0	190			0		0
Spillback Cap Reductn		0			0		0			0	0	0			0		0
Storage Cap Reductn		0			0		0			0	0	0			0		0
Reduced v/c Ratio		0.85			1.09		0.98			0.44	0.44	0.64			0.81		0.17

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 79 (72%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 50.9 Intersection LOS: D
Intersection Capacity Utilization 83.7% ICU Level of Service E
Analysis Period (min) 15
~ 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 10: GCG Entrance Driveway & Congress Street/Merrimac Street & New Chardon Street

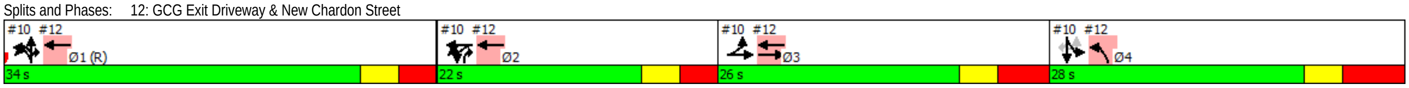


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø1	Ø2
Lane Configurations								
Traffic Volume (vph)	362	0	0	519	37	42		
Future Volume (vph)	362	0	0	519	37	42		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	12	12	11	11		
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00		
Ped Bike Factor					0.99			
Frt					0.928			
Flt Protected					0.977			
Satd. Flow (prot)	3154	0	0	3065	1454	0		
Flt Permitted					0.977			
Satd. Flow (perm)	3154	0	0	3065	1454	0		
Right Turn on Red		Yes				Yes		
Satd. Flow (RTOR)					47			
Link Speed (mph)	25			25	25			
Link Distance (ft)	137			204	136			
Travel Time (s)	3.7			5.6	3.7			
Confl. Bikes (#/hr)		3				1		
Peak Hour Factor	0.98	0.98	0.90	0.90	0.86	0.86		
Heavy Vehicles (%)	3%	0%	0%	6%	5%	0%		
Adj. Flow (vph)	369	0	0	577	43	49		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	369	0	0	577	92	0		
Turn Type	NA			NA	Prot			
Protected Phases	3			1 2 3	4		1	2
Permitted Phases								
Detector Phase	3			1 2 3	4			
Switch Phase								
Minimum Initial (s)	8.0				8.0		8.0	8.0
Minimum Split (s)	19.0				24.0		33.0	15.0
Total Split (s)	26.0				28.0		34.0	22.0
Total Split (%)	23.6%				25.5%		31%	20%
Maximum Green (s)	19.0				20.0		28.0	16.0
Yellow Time (s)	3.0				3.0		3.0	3.0
All-Red Time (s)	4.0				5.0		3.0	3.0
Lost Time Adjust (s)	-2.0				-2.0			
Total Lost Time (s)	5.0				6.0			
Lead/Lag	Lag							Lead
Lead-Lag Optimize?								
Vehicle Extension (s)	2.0				2.0		2.0	2.0
Recall Mode	Max				Max		C-Max	Max
Walk Time (s)	7.0				7.0		7.0	
Flash Dont Walk (s)	4.0				8.0		17.0	
Pedestrian Calls (#/hr)	0				0		0	
Act Effct Green (s)	21.0			78.0	22.0			
Actuated g/C Ratio	0.19			0.71	0.20			
v/c Ratio	0.61			0.27	0.28			
Control Delay	45.8			0.7	22.5			
Queue Delay	0.1			0.8	0.0			
Total Delay	45.9			1.5	22.5			
LOS	D			A	C			
Approach Delay	45.9			1.5	22.5			
Approach LOS	D			A	C			
Queue Length 50th (ft)	126			6	26			
Queue Length 95th (ft)	177			m6	68			
Internal Link Dist (ft)	57			124	56			
Turn Bay Length (ft)								
Base Capacity (vph)	602			2173	328			
Starvation Cap Reductn	0			1218	0			
Spillback Cap Reductn	10			0	0			
Storage Cap Reductn	0			0	0			
Reduced v/c Ratio	0.62			0.60	0.28			

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 79 (72%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 19.1 Intersection LOS: B
Intersection Capacity Utilization 30.9% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: GCG Exit Driveway & New Chardon Street

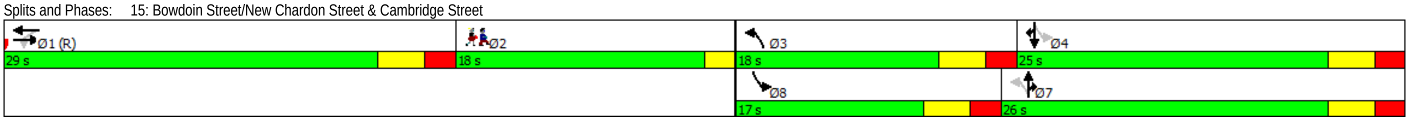


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations		↑↑↑↱			↰↑↱		↰	↑	↱	↰	↑	↱	
Traffic Volume (vph)	0	640	70	16	299	46	214	319	134	244	166	188	
Future Volume (vph)	0	640	70	16	299	46	214	319	134	244	166	188	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	0		100	0		100	
Storage Lanes	0		0	0		0	1		1	1		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.91	0.91	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		1.00			0.98								
Frt		0.985			0.981				0.850			0.850	
Flt Protected					0.998		0.950			0.950			
Satd. Flow (prot)	0	4899	0	0	3372	0	1656	1863	1509	1671	1845	1583	
Flt Permitted					0.903		0.552			0.210			
Satd. Flow (perm)	0	4899	0	0	3051	0	962	1863	1509	369	1845	1583	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		20			18				110			207	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		236			438			363			579		
Travel Time (s)		5.4			10.0			8.3			13.2		
Confl. Bikes (#/hr)			30			153			12				
Peak Hour Factor	0.98	0.98	0.98	0.91	0.91	0.91	0.92	0.92	0.92	0.91	0.91	0.91	
Heavy Vehicles (%)	0%	4%	3%	0%	2%	10%	9%	2%	7%	8%	3%	2%	
Adj. Flow (vph)	0	653	71	18	329	51	233	347	146	268	182	207	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	724	0	0	398	0	233	347	146	268	182	207	
Turn Type		NA		Perm	NA		pm+pt	NA	Prot	pm+pt	NA	Prot	
Protected Phases		1			1		3	7	7	8	4	4	2
Permitted Phases				1			7			4			
Detector Phase		1		1	1		3	7	7	8	4	4	
Switch Phase													
Minimum Initial (s)		8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	1.0
Minimum Split (s)		28.0		28.0	28.0		13.0	13.0	13.0	13.0	13.0	13.0	18.0
Total Split (s)		29.0		29.0	29.0		18.0	26.0	26.0	17.0	25.0	25.0	18.0
Total Split (%)		32.2%		32.2%	32.2%		20.0%	28.9%	28.9%	18.9%	27.8%	27.8%	20%
Maximum Green (s)		24.0		24.0	24.0		13.0	21.0	21.0	12.0	20.0	20.0	16.0
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)		2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	0.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag		Lead		Lead	Lead		Lead	Lag	Lag	Lead	Lag	Lag	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	2.0
Recall Mode		C-Max		C-Max	C-Max		None	Min	Min	None	Min	Min	Ped
Walk Time (s)		7.0		7.0	7.0								7.0
Flash Dont Walk (s)		16.0		16.0	16.0								9.0
Pedestrian Calls (#/hr)		0		0	0								20
Act Effct Green (s)		25.7			25.7		31.1	19.3	19.3	31.5	19.5	19.5	
Actuated g/C Ratio		0.29			0.29		0.35	0.21	0.21	0.35	0.22	0.22	
v/c Ratio		0.51			0.45		0.55	0.87	0.36	0.89	0.46	0.41	
Control Delay		21.2			15.3		23.9	56.8	12.0	53.2	34.7	7.1	
Queue Delay		0.6			0.4		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		21.8			15.7		23.9	56.8	12.0	53.2	34.7	7.2	
LOS		C			B		C	E	B	D	C	A	
Approach Delay		21.8			15.7			37.2			33.6		
Approach LOS		C			B			D			C		
Queue Length 50th (ft)		64			39		87	186	16	102	90	0	
Queue Length 95th (ft)		186			m55		144	#322	65	#240	153	55	
Internal Link Dist (ft)		156			358			283			499		
Turn Bay Length (ft)									100			100	
Base Capacity (vph)		1415			885		445	434	436	302	410	512	
Starvation Cap Reductn		344			0		0	0	0	0	0	0	
Spillback Cap Reductn		0			146		0	0	0	0	0	9	
Storage Cap Reductn		0			0		0	0	0	0	0	0	
Reduced v/c Ratio		0.68			0.54		0.52	0.80	0.33	0.89	0.44	0.41	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 28.4 Intersection LOS: C
Intersection Capacity Utilization 64.6% ICU Level of Service C
Analysis Period (min) 15
\# 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: 15: Bowdoin Street/New Chardon Street & Cambridge Street

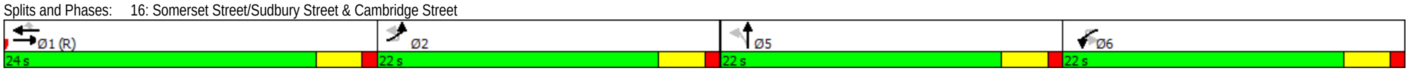


Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↰	↑↑			↰	↑↑	↱		✥				
Traffic Volume (vph)	27	285	593	113	19	52	267	161	67	106	29	0	0	0
Future Volume (vph)	27	285	593	113	19	52	267	161	67	106	29	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0		100		100	0		0	0		0
Storage Lanes		2		0		1		1	0		0	0		0
Taper Length (ft)		25				25			25			25		
Lane Util. Factor	0.95	0.97	0.95	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.90					0.60		0.95				
Frt			0.976					0.850		0.981				
Flt Protected		0.950				0.950				0.984				
Satd. Flow (prot)	0	3408	3103	0	0	1805	3574	1538	0	1736	0	0	0	0
Flt Permitted		0.581				0.378				0.984				
Satd. Flow (perm)	0	2085	3103	0	0	718	3574	921	0	1736	0	0	0	0
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			22					168		8				
Link Speed (mph)			30				30			30			30	
Link Distance (ft)			438				763			259			584	
Travel Time (s)			10.0				17.3			5.9			13.3	
Confl. Peds. (#/hr)				535				533			244			
Confl. Bikes (#/hr)				4				80			3			
Peak Hour Factor	0.98	0.98	0.98	0.98	0.96	0.96	0.96	0.96	0.91	0.91	0.91	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	2%	4%	0%	0%	1%	5%	1%	0%	3%	0%	0%	0%
Adj. Flow (vph)	28	291	605	115	20	54	278	168	74	116	32	0	0	0
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	319	720	0	0	74	278	168	0	222	0	0	0	0
Turn Type	custom	Prot	NA		custom	Prot	NA	Perm	Perm	NA				
Protected Phases		2	1			6	1			5				
Permitted Phases	2				6			1	5					
Detector Phase	2	2	1		6	6	1	1	5	5				
Switch Phase														
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0				
Minimum Split (s)	22.0	22.0	27.0		22.0	22.0	27.0	27.0	22.0	22.0				
Total Split (s)	22.0	22.0	24.0		22.0	22.0	24.0	24.0	22.0	22.0				
Total Split (%)	24.4%	24.4%	26.7%		24.4%	24.4%	26.7%	26.7%	24.4%	24.4%				
Maximum Green (s)	18.0	18.0	20.0		18.0	18.0	20.0	20.0	18.0	18.0				
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		0.0				
Total Lost Time (s)		4.0	4.0			4.0	4.0	4.0		4.0				
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lead	Lead	Lead	Lead				
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	None	None	C-Max		None	None	C-Max	C-Max	None	None				
Walk Time (s)	7.0	7.0	7.0				7.0	7.0						
Flash Dont Walk (s)	11.0	11.0	16.0				16.0	16.0						
Pedestrian Calls (#/hr)	0	0	0				0	0						
Act Effct Green (s)		16.5	31.9			13.3	31.9	31.9		14.7				
Actuated g/C Ratio		0.18	0.35			0.15	0.35	0.35		0.16				
v/c Ratio		0.84	0.65			0.70	0.22	0.39		0.77				
Control Delay		43.0	31.5			67.9	24.8	8.0		51.9				
Queue Delay		0.0	0.0			0.0	0.0	0.0		0.0				
Total Delay		43.0	31.5			67.9	24.8	8.0		51.9				
LOS		D	C			E	C	A		D				
Approach Delay			35.0				25.5			51.9				
Approach LOS			D				C			D				
Queue Length 50th (ft)		90	163			40	62	0		116				
Queue Length 95th (ft)		m#143	m#297			#90	106	56		188				
Internal Link Dist (ft)			358				683			179			504	
Turn Bay Length (ft)						100		100						
Base Capacity (vph)		417	1113			143	1266	434		353				
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		0.76	0.65			0.52	0.22	0.39		0.63				

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 34.4 Intersection LOS: C
Intersection Capacity Utilization 51.2% ICU Level of Service A
Analysis Period (min) 15
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: 16: Somerset Street/Sudbury Street & Cambridge Street



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↰	
Traffic Volume (veh/h)	0	552	0	0	179	0
Future Volume (Veh/h)	0	552	0	0	179	0
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)	0	600	0	0	195	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		584				
pX, platoon unblocked					0.95	
vC, conflicting volume	0				300	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				147	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				75	100
cM capacity (veh/h)	1636				791	1091

Direction, Lane #	EB 1	EB 2	SB 1
Volume Total	300	300	195
Volume Left	0	0	195
Volume Right	0	0	0
cSH	1700	1700	791
Volume to Capacity	0.18	0.18	0.25
Queue Length 95th (ft)	0	0	24
Control Delay (s)	0.0	0.0	11.0
Lane LOS			B
Approach Delay (s)	0.0		11.0
Approach LOS			B

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	31.8%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection Sign configuration not allowed in HCM analysis.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations	↰	↑↑	↱						↑↑↑↱		↰	↑↑↑		
Traffic Volume (vph)	149	393	162	0	0	0	10	0	683	358	153	497	0	
Future Volume (vph)	149	393	162	0	0	0	10	0	683	358	153	497	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	11	10	12	12	12	12	11	11	11	10	11	11	
Storage Length (ft)	0		0	0		0		0		0	100		0	
Storage Lanes	1		1	0		0		0		0	1		0	
Taper Length (ft)	25			25				25			25			
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	0.91	1.00	0.91	0.91	1.00	0.91	1.00	
Ped Bike Factor	0.57		0.46						0.88		0.88			
Frt			0.850						0.949					
Flt Protected	0.950										0.950			
Satd. Flow (prot)	1392	2842	1280	0	0	0	0	0	3592	0	1486	4029	0	
Flt Permitted	0.950								0.934		0.950			
Satd. Flow (perm)	787	2842	586	0	0	0	0	0	3355	0	1305	4029	0	
Right Turn on Red			Yes			Yes				No			Yes	
Satd. Flow (RTOR)			176											
Link Speed (mph)		25			25				25			25		
Link Distance (ft)		153			161				395			468		
Travel Time (s)		4.2			4.4				10.8			12.8		
Confl. Peds. (#/hr)	236		435							650	650			
Confl. Bikes (#/hr)			5							46			2	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.98	0.98	0.98	0.98	0.93	0.93	0.93	
Heavy Vehicles (%)	5%	5%	6%	0%	0%	0%	0%	0%	3%	7%	2%	12%	0%	
Parking (#/hr)	0	0												
Adj. Flow (vph)	162	427	176	0	0	0	10	0	697	365	165	534	0	
Shared Lane Traffic (%)														
Lane Group Flow (vph)	162	427	176	0	0	0	0	0	1072	0	165	534	0	
Turn Type	Split	NA	Perm				Perm		NA		Prot	NA		
Protected Phases	5	5							1		6	1 6		2
Permitted Phases			5				1							
Detector Phase	5	5	5				1		1		6	1 6		
Switch Phase														
Minimum Initial (s)	8.0	8.0	8.0				10.0		10.0		7.0			7.0
Minimum Split (s)	15.0	15.0	15.0				17.0		17.0		14.0			26.0
Total Split (s)	26.0	26.0	26.0				42.0		42.0		16.0			26.0
Total Split (%)	23.6%	23.6%	23.6%				38.2%		38.2%		14.5%			24%
Maximum Green (s)	20.0	20.0	20.0				37.0		37.0		10.0			22.0
Yellow Time (s)	3.0	3.0	3.0				3.0		3.0		3.0			4.0
All-Red Time (s)	3.0	3.0	3.0				2.0		2.0		3.0			0.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0						-2.0		-2.0			
Total Lost Time (s)	4.0	4.0	4.0						3.0		4.0			
Lead/Lag	Lead	Lead	Lead				Lead		Lead		Lag			Lag
Lead-Lag Optimize?														
Vehicle Extension (s)	2.0	2.0	2.0				2.0		2.0		2.0			2.0
Recall Mode	Max	Max	Max				C-Max		C-Max		Max			Ped
Walk Time (s)	0.0	0.0	0.0											7.0
Flash Dont Walk (s)	8.0	8.0	8.0											15.0
Pedestrian Calls (#/hr)	0	0	0											0
Act Effct Green (s)	22.0	22.0	22.0						39.0		12.0	55.0		
Actuated g/C Ratio	0.20	0.20	0.20						0.35		0.11	0.50		
v/c Ratio	0.58	0.75	0.68						0.90		1.02	0.27		
Control Delay	49.4	50.8	20.6						24.9		103.5	16.3		
Queue Delay	0.0	0.0	0.0						3.8		36.4	0.0		
Total Delay	49.4	50.9	20.6						28.7		139.9	16.3		
LOS	D	D	C						C		F	B		
Approach Delay		43.6							28.7			45.5		
Approach LOS		D							C			D		
Queue Length 50th (ft)	104	150	0						82		~121	78		
Queue Length 95th (ft)	177	208	#102						#349		m#149	m87		
Internal Link Dist (ft)		73			81				315			388		
Turn Bay Length (ft)											100			
Base Capacity (vph)	278	568	258						1189		162	2014		
Starvation Cap Reductn	0	0	0						4		0	0		
Spillback Cap Reductn	0	2	0						68		66	0		
Storage Cap Reductn	0	0	0						0		0	0		
Reduced v/c Ratio	0.58	0.75	0.68						0.96		1.72	0.27		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 70 (64%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 37.8 — Intersection LOS: D
Intersection Capacity Utilization 60.2% — ICU Level of Service B
Analysis Period (min) 15
~ 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: 19: Congress Street & Sudbury Street

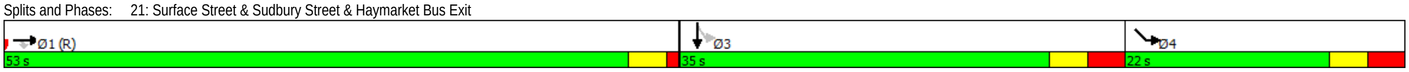
Ø1 (R)	Ø2	Ø5	Ø6
42 s	26 s	26 s	16 s

Lane Group	EBT	EBR	SBL	SBT	SEL	SER
Lane Configurations						
Traffic Volume (vph)	770	140	69	304	28	6
Future Volume (vph)	770	140	69	304	28	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Lane Util. Factor	0.95	1.00	0.95	0.95	1.00	1.00
Ped Bike Factor		0.53		0.94		
Frt		0.850			0.975	
Flt Protected				0.991	0.961	
Satd. Flow (prot)	3323	1553	0	3353	916	0
Flt Permitted				0.991	0.961	
Satd. Flow (perm)	3323	831	0	3136	916	0
Right Turn on Red		Yes	No			
Satd. Flow (RTOR)		152				
Link Speed (mph)	25			25	25	
Link Distance (ft)	111			438	138	
Travel Time (s)	3.0			11.9	3.8	
Confl. Peds. (#/hr)		402	183			
Confl. Bikes (#/hr)		10				
Peak Hour Factor	0.92	0.92	0.88	0.88	0.77	0.77
Heavy Vehicles (%)	5%	4%	1%	8%	93%	100%
Adj. Flow (vph)	837	152	78	345	36	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	837	152	0	423	44	0
Turn Type	NA	Perm	Perm	NA	Prot	
Protected Phases	1			3	4	
Permitted Phases		1	3			
Detector Phase	1	1	3	3	4	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	6.0	
Minimum Split (s)	21.0	21.0	18.0	18.0	13.0	
Total Split (s)	53.0	53.0	35.0	35.0	22.0	
Total Split (%)	48.2%	48.2%	31.8%	31.8%	20.0%	
Maximum Green (s)	49.0	49.0	29.0	29.0	16.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	1.0	1.0	3.0	3.0	3.0	
Lost Time Adjust (s)	-1.0	-1.0		-2.0	0.0	
Total Lost Time (s)	3.0	3.0		4.0	6.0	
Lead/Lag			Lead	Lead	Lag	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	
Recall Mode	C-Max	C-Max	Max	Max	Max	
Walk Time (s)	7.0	7.0	7.0	7.0		
Flash Dont Walk (s)	5.0	5.0	4.0	4.0		
Pedestrian Calls (#/hr)	0	0	25	25		
Act Effct Green (s)	50.0	50.0		31.0	16.0	
Actuated g/C Ratio	0.45	0.45		0.28	0.15	
v/c Ratio	0.55	0.33		0.48	0.33	
Control Delay	19.3	8.1		36.1	49.9	
Queue Delay	51.4	1.1		0.0	0.0	
Total Delay	70.7	9.2		36.1	49.9	
LOS	E	A		D	D	
Approach Delay	61.2			36.1	49.9	
Approach LOS	E			D	D	
Queue Length 50th (ft)	222	25		98	28	
Queue Length 95th (ft)	m263	m43		m125	55	
Internal Link Dist (ft)	31			358	58	
Turn Bay Length (ft)						
Base Capacity (vph)	1510	460		883	133	
Starvation Cap Reductn	757	152		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	1.11	0.49		0.48	0.33	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 69 (63%), Referenced to phase 1:EBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.55
Intersection Signal Delay: 53.6 Intersection LOS: D
Intersection Capacity Utilization 48.4% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: Surface Street & Sudbury Street & Haymarket Bus Exit

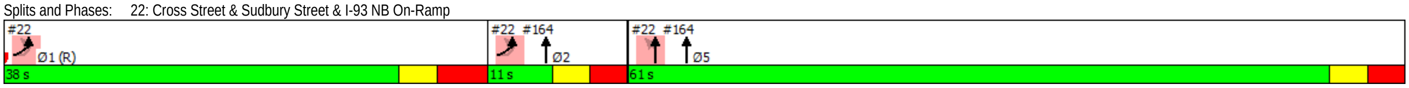


Lane Group	EBL2	EBL	EBR	NBL	NBT	SBT	SBR	SEL	SER	Ø1	Ø2
Lane Configurations											
Traffic Volume (vph)	609	258	0	626	711	0	0	0	0		
Future Volume (vph)	609	258	0	626	711	0	0	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	13	12	12	11	12	12	12	12		
Lane Util. Factor	0.95	0.97	1.00	0.95	0.95	1.00	1.00	1.00	1.00		
Ped Bike Factor											
Frt											
Flt Protected		0.950			0.977						
Satd. Flow (prot)	0	3373	0	0	3272	0	0	0	0		
Flt Permitted		0.950			0.977						
Satd. Flow (perm)	0	3373	0	0	3272	0	0	0	0		
Right Turn on Red	Yes		Yes								
Satd. Flow (RTOR)		200									
Link Speed (mph)		25			25	25		25			
Link Distance (ft)		191			203	568		237			
Travel Time (s)		5.2			5.5	15.5		6.5			
Confl. Bikes (#/hr)			11								
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.92	0.92	0.92	0.92		
Heavy Vehicles (%)	4%	15%	0%	1%	7%	0%	0%	0%	0%		
Adj. Flow (vph)	662	280	0	659	748	0	0	0	0		
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	942	0	0	1407	0	0	0	0		
Turn Type	Perm	Prot		Perm	NA						
Protected Phases		1 2			5					1	2
Permitted Phases	1 2			5							
Detector Phase	1 2	1 2		5	5						
Switch Phase											
Minimum Initial (s)				10.0	10.0					10.0	4.0
Minimum Split (s)				18.0	18.0					25.0	11.0
Total Split (s)				61.0	61.0					38.0	11.0
Total Split (%)				55.5%	55.5%					35%	10%
Maximum Green (s)				55.0	55.0					31.0	5.0
Yellow Time (s)				3.0	3.0					3.0	3.0
All-Red Time (s)				3.0	3.0					4.0	3.0
Lost Time Adjust (s)					-1.0						
Total Lost Time (s)					5.0						
Lead/Lag										Lead	Lag
Lead-Lag Optimize?											
Vehicle Extension (s)				2.0	2.0					2.0	2.0
Recall Mode				Max	Max					C-Max	Max
Walk Time (s)				7.0	7.0					7.0	
Flash Dont Walk (s)				4.0	4.0					3.0	
Pedestrian Calls (#/hr)				30	30					0	
Act Effct Green (s)		43.0			56.0						
Actuated g/C Ratio		0.39			0.51						
v/c Ratio		0.65			0.85						
Control Delay		4.5			10.4						
Queue Delay		0.1			0.0						
Total Delay		4.6			10.4						
LOS		A			B						
Approach Delay		4.6			10.4						
Approach LOS		A			B						
Queue Length 50th (ft)		4			425						
Queue Length 95th (ft)		17			532						
Internal Link Dist (ft)		111			123	488		157			
Turn Bay Length (ft)											
Base Capacity (vph)		1440			1665						
Starvation Cap Reductn		52			0						
Spillback Cap Reductn		0			0						
Storage Cap Reductn		0			0						
Reduced v/c Ratio		0.68			0.85						

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 74 (67%), Referenced to phase 1:EBL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 8.1 Intersection LOS: A
Intersection Capacity Utilization 80.8% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 22: Cross Street & Sudbury Street & I-93 NB On-Ramp



Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations														
Traffic Volume (vph)	0	421	38	37	21	609	0	0	0	0	875	367	444	
Future Volume (vph)	0	421	38	37	21	609	0	0	0	0	875	367	444	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	14	12	12	12	12	12	11	13	
Lane Util. Factor	1.00	0.91	0.91	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.91	0.86	0.91	
Ped Bike Factor		1.00				1.00					1.00	0.98		
Frt		0.987										0.992	0.850	
Flt Protected						0.996					0.950	0.975		
Satd. Flow (prot)	0	4271	0	0	0	3395	0	0	0	0	1344	2398	1277	
Flt Permitted						0.746					0.950	0.975		
Satd. Flow (perm)	0	4271	0	0	0	2542	0	0	0	0	1341	2395	1277	
Right Turn on Red			No				Yes			Yes			No	
Satd. Flow (RTOR)														
Link Speed (mph)		25				25			25			25		
Link Distance (ft)		184				338			438			242		
Travel Time (s)		5.0				9.2			11.9			6.6		
Confl. Peds. (#/hr)			1		1						1		191	
Confl. Bikes (#/hr)													93	
Peak Hour Factor	0.80	0.80	0.80	0.84	0.84	0.84	0.84	0.92	0.92	0.92	0.96	0.96	0.96	
Heavy Vehicles (%)	0%	7%	16%	11%	5%	1%	0%	0%	0%	0%	10%	16%	7%	
Adj. Flow (vph)	0	526	48	44	25	725	0	0	0	0	911	382	463	
Shared Lane Traffic (%)											48%		10%	
Lane Group Flow (vph)	0	574	0	0	0	794	0	0	0	0	474	865	417	
Turn Type		NA		Perm	Perm	NA					Split	NA	Prot	
Protected Phases		1				1					5	5	5	2
Permitted Phases				1	1									
Detector Phase		1		1	1	1					5	5	5	
Switch Phase														
Minimum Initial (s)		8.0		8.0	8.0	8.0					8.0	8.0	8.0	8.0
Minimum Split (s)		23.0		23.0	23.0	23.0					22.0	22.0	22.0	30.0
Total Split (s)		35.0		35.0	35.0	35.0					55.0	55.0	55.0	30.0
Total Split (%)		29.2%		29.2%	29.2%	29.2%					45.8%	45.8%	45.8%	25%
Maximum Green (s)		29.0		29.0	29.0	29.0					49.0	49.0	49.0	26.0
Yellow Time (s)		3.0		3.0	3.0	3.0					3.0	3.0	3.0	4.0
All-Red Time (s)		3.0		3.0	3.0	3.0					3.0	3.0	3.0	0.0
Lost Time Adjust (s)		-2.0				-2.0					-2.0	-2.0	-2.0	
Total Lost Time (s)		4.0				4.0					4.0	4.0	4.0	
Lead/Lag		Lead		Lead	Lead	Lead								Lag
Lead-Lag Optimize?														
Vehicle Extension (s)		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					Max	Max	Max	None
Walk Time (s)		7.0		7.0	7.0	7.0					7.0	7.0	7.0	7.0
Flash Dont Walk (s)		7.0		7.0	7.0	7.0					8.0	8.0	8.0	19.0
Pedestrian Calls (#/hr)		0		0	0	0					0	0	0	500
Act Effct Green (s)		31.0				31.0					51.0	51.0	51.0	
Actuated g/C Ratio		0.26				0.26					0.42	0.42	0.42	
v/c Ratio		0.52				1.21					0.83	0.85	0.77	
Control Delay		33.1				147.4					35.9	31.6	31.5	
Queue Delay		6.3				0.0					3.8	2.9	3.9	
Total Delay		39.4				147.4					39.7	34.5	35.4	
LOS		D				F					D	C	D	
Approach Delay		39.4				147.4						36.1		
Approach LOS		D				F						D		
Queue Length 50th (ft)		163				~395					370	361	297	
Queue Length 95th (ft)		177				#467					#565	456	458	
Internal Link Dist (ft)		104				258			358			162		
Turn Bay Length (ft)														
Base Capacity (vph)		1103				656					571	1019	542	
Starvation Cap Reductn		467				0					47	80	66	
Spillback Cap Reductn		0				0					0	0	0	
Storage Cap Reductn		0				0					0	0	0	
Reduced v/c Ratio		0.90				1.21					0.90	0.92	0.88	

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 34 (28%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.21
Intersection Signal Delay: 65.0 Intersection LOS: E
Intersection Capacity Utilization 72.9% ICU Level of Service C
Analysis Period (min) 15
~ 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: 8: Surface Street & New Chardon Street/I-93 Ramps

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø1	Ø2	Ø5
Lane Configurations		↑↑	↑↑↑↱						
Traffic Volume (vph)	0	459	1032	21	0	0			
Future Volume (vph)	0	459	1032	21	0	0			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900			
Lane Util. Factor	1.00	0.95	0.91	0.91	1.00	1.00			
Ped Bike Factor			1.00						
Frt			0.997						
Flt Protected									
Satd. Flow (prot)	0	3008	4467	0	0	0			
Flt Permitted									
Satd. Flow (perm)	0	3008	4467	0	0	0			
Right Turn on Red				Yes		Yes			
Satd. Flow (RTOR)			6						
Link Speed (mph)		25	25		25				
Link Distance (ft)		287	184		238				
Travel Time (s)		7.8	5.0		6.5				
Confl. Bikes (#/hr)				10					
Peak Hour Factor	0.81	0.81	0.98	0.98	0.92	0.92			
Heavy Vehicles (%)	0%	8%	4%	11%	0%	0%			
Adj. Flow (vph)	0	567	1053	21	0	0			
Shared Lane Traffic (%)									
Lane Group Flow (vph)	0	567	1074	0	0	0			
Turn Type		NA	NA						
Protected Phases		1 5	1 5				1	2	5
Permitted Phases									
Detector Phase		1 5	1 5						
Switch Phase									
Minimum Initial (s)							8.0	8.0	8.0
Minimum Split (s)							23.0	30.0	22.0
Total Split (s)							35.0	30.0	55.0
Total Split (%)							29%	25%	46%
Maximum Green (s)							29.0	26.0	49.0
Yellow Time (s)							3.0	4.0	3.0
All-Red Time (s)							3.0	0.0	3.0
Lost Time Adjust (s)									
Total Lost Time (s)									
Lead/Lag							Lead	Lag	
Lead-Lag Optimize?									
Vehicle Extension (s)							2.0	2.0	2.0
Recall Mode							C-Max	None	Max
Walk Time (s)							7.0	7.0	7.0
Flash Dont Walk (s)							7.0	19.0	8.0
Pedestrian Calls (#/hr)							0	500	0
Act Effct Green (s)		86.0	86.0						
Actuated g/C Ratio		0.72	0.72						
v/c Ratio		0.26	0.34						
Control Delay		2.9	3.0						
Queue Delay		0.6	2.0						
Total Delay		3.5	4.9						
LOS		A	A						
Approach Delay		3.5	4.9						
Approach LOS		A	A						
Queue Length 50th (ft)		48	0						
Queue Length 95th (ft)		59	m0						
Internal Link Dist (ft)		207	104		158				
Turn Bay Length (ft)									
Base Capacity (vph)		2155	3203						
Starvation Cap Reductn		1160	1914						
Spillback Cap Reductn		649	89						
Storage Cap Reductn		0	0						
Reduced v/c Ratio		0.57	0.83						

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 34 (28%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.21
Intersection Signal Delay: 4.4 Intersection LOS: A
Intersection Capacity Utilization 26.0% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: New Chardon Street & Canal Street

Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBU	SBL	SBT	SBR	SBR2
Lane Configurations																	
Traffic Volume (vph)	41	90	36	24	390	78	477	72	137	267	312	255	9	97	207	53	95
Future Volume (vph)	41	90	36	24	390	78	477	72	137	267	312	255	9	97	207	53	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	10	12	12	12	10	10	16	12	11	11	11	16
Storage Length (ft)	0		0			0		0		0		150		0		150	
Storage Lanes	0		0			1		0		1		1		0		1	
Taper Length (ft)	25					25				25				25			
Lane Util. Factor	0.95	0.95	0.95	0.95	0.91	0.91	0.91	0.95	0.95	0.91	0.91	1.00	0.91	0.91	0.91	0.91	1.00
Ped Bike Factor		0.70			0.62		0.86			0.71	0.93				0.83		0.59
Frt		0.953					0.984					0.850			0.978		0.850
Flt Protected		0.989			0.950		0.990			0.950	0.983				0.986		
Satd. Flow (prot)	0	1964	0	0	1302	0	2891	0	0	1341	2685	1569	0	0	3526	0	1647
Flt Permitted		0.989			0.950		0.990			0.950	0.983				0.986		
Satd. Flow (perm)	0	1910	0	0	806	0	2523	0	0	956	2492	1569	0	0	3263	0	967
Right Turn on Red				Yes				Yes				No					Yes
Satd. Flow (RTOR)		11					10										145
Link Speed (mph)		25					25				25				25		
Link Distance (ft)		204					287				468				998		
Travel Time (s)		5.6					7.8				12.8				27.2		
Confl. Peds. (#/hr)	152		432	317	432	317		152	317	265		1136		1136		317	265
Confl. Bikes (#/hr)			1	1				17				10				64	64
Peak Hour Factor	0.84	0.84	0.84	0.84	0.97	0.97	0.97	0.97	0.91	0.91	0.91	0.91	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	14%	14%	10%	0%	6%	0%	3%	4%	0%	7%	6%	5%	11%	9%	14%	0%	0%
Adj. Flow (vph)	49	107	43	29	402	80	492	74	151	293	343	280	10	113	241	62	110
Shared Lane Traffic (%)					14%					64%							
Lane Group Flow (vph)	0	228	0	0	346	0	702	0	0	256	531	280	0	0	426	0	110
Turn Type	Split	NA			Split	Split	NA		Split	Split	NA	pt+ov	Perm	Split	NA		Perm
Protected Phases	3	3			2	2	2		1	1	1	1 2		4	4		
Permitted Phases													4				4
Detector Phase	3	3			2	2	2		1	1	1	1 2	4	4	4		4
Switch Phase																	
Minimum Initial (s)	8.0	8.0			8.0	8.0	8.0		8.0	8.0	8.0		8.0	8.0	8.0		8.0
Minimum Split (s)	19.0	19.0			15.0	15.0	15.0		33.0	33.0	33.0		24.0	24.0	24.0		24.0
Total Split (s)	22.0	22.0			40.0	40.0	40.0		34.0	34.0	34.0		24.0	24.0	24.0		24.0
Total Split (%)	18.3%	18.3%			33.3%	33.3%	33.3%		28.3%	28.3%	28.3%		20.0%	20.0%	20.0%		20.0%
Maximum Green (s)	15.0	15.0			34.0	34.0	34.0		28.0	28.0	28.0		16.0	16.0	16.0		16.0
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0		3.0
All-Red Time (s)	4.0	4.0			3.0	3.0	3.0		3.0	3.0	3.0		5.0	5.0	5.0		5.0
Lost Time Adjust (s)		-2.0			-2.0		-2.0			-2.0	-2.0				-2.0		0.0
Total Lost Time (s)		5.0			4.0		4.0			4.0	4.0				6.0		8.0
Lead/Lag	Lag	Lag			Lead	Lead	Lead										
Lead-Lag Optimize?																	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0		2.0
Recall Mode	Max	Max			Max	Max	Max		C-Max	C-Max	C-Max		Max	Max	Max		Max
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)	4.0	4.0							17.0	17.0	17.0		8.0	8.0	8.0		8.0
Pedestrian Calls (#/hr)	0	0							0	0	0		0	0	0		0
Act Effct Green (s)		17.0			36.0		36.0			30.0	30.0	70.0			18.0		16.0
Actuated g/C Ratio		0.14			0.30		0.30			0.25	0.25	0.58			0.15		0.13
v/c Ratio		0.79			0.89		0.80			0.76	0.79	0.31			0.81		0.43
Control Delay		41.0			48.2		28.8			32.5	27.6	9.7			62.1		8.7
Queue Delay		1.3			11.0		5.6			0.0	0.0	0.0			0.0		0.0
Total Delay		42.3			59.2		34.4			32.5	27.6	9.7			62.1		8.7
LOS		D			E		C			C	C	A			E		A
Approach Delay		42.3					42.6				24.1				51.2		
Approach LOS		D					D				C				D		
Queue Length 50th (ft)		18			171		170			126	135	71			118		0
Queue Length 95th (ft)		#60			#457		209			m#314	218	m115			150		21
Internal Link Dist (ft)		124					207				388				918		
Turn Bay Length (ft)												150					150
Base Capacity (vph)		287			390		874			335	671	915			528		254
Starvation Cap Reductn		9			34		123			0	0	0			0		0
Spillback Cap Reductn		0			0		0			0	0	0			0		0
Storage Cap Reductn		0			0		0			0	0	0			0		0
Reduced v/c Ratio		0.82			0.97		0.93			0.76	0.79	0.31			0.81		0.43

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 37.3 Intersection LOS: D
Intersection Capacity Utilization 79.6% ICU Level of Service D
Analysis Period (min) 15
\# 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: 10: GCG Entrance Driveway & Congress Street/Merrimac Street & New Chardon Street

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø1	Ø2
Lane Configurations	↑↑			↑↑	Y			
Traffic Volume (vph)	191	0	0	743	1	0		
Future Volume (vph)	191	0	0	743	1	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	12	12	11	11		
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00		
Ped Bike Factor								
Frt								
Flt Protected					0.950			
Satd. Flow (prot)	2901	0	0	3094	1570	0		
Flt Permitted					0.950			
Satd. Flow (perm)	2901	0	0	3094	1570	0		
Right Turn on Red		Yes				Yes		
Satd. Flow (RTOR)								
Link Speed (mph)	25			25	25			
Link Distance (ft)	137			204	136			
Travel Time (s)	3.7			5.6	3.7			
Confl. Bikes (#/hr)		2						
Peak Hour Factor	0.83	0.83	0.93	0.93	0.25	0.25		
Heavy Vehicles (%)	12%	0%	0%	5%	0%	0%		
Adj. Flow (vph)	230	0	0	799	4	0		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	230	0	0	799	4	0		
Turn Type	NA			NA	Prot			
Protected Phases	3			1 2 3	4		1	2
Permitted Phases								
Detector Phase	3			1 2 3	4			
Switch Phase								
Minimum Initial (s)	8.0				8.0		8.0	8.0
Minimum Split (s)	19.0				24.0		33.0	15.0
Total Split (s)	22.0				24.0		34.0	40.0
Total Split (%)	18.3%				20.0%		28%	33%
Maximum Green (s)	15.0				16.0		28.0	34.0
Yellow Time (s)	3.0				3.0		3.0	3.0
All-Red Time (s)	4.0				5.0		3.0	3.0
Lost Time Adjust (s)	-2.0				-2.0			
Total Lost Time (s)	5.0				6.0			
Lead/Lag	Lag							Lead
Lead-Lag Optimize?								
Vehicle Extension (s)	2.0				2.0		2.0	2.0
Recall Mode	Max				Max		C-Max	Max
Walk Time (s)	7.0				7.0		7.0	
Flash Dont Walk (s)	4.0				8.0		17.0	
Pedestrian Calls (#/hr)	0				0		0	
Act Effct Green (s)	17.0			92.0	18.0			
Actuated g/C Ratio	0.14			0.77	0.15			
v/c Ratio	0.56			0.34	0.02			
Control Delay	53.9			0.8	44.0			
Queue Delay	0.0			1.0	0.0			
Total Delay	53.9			1.8	44.0			
LOS	D			A	D			
Approach Delay	53.9			1.8	44.0			
Approach LOS	D			A	D			
Queue Length 50th (ft)	88			8	3			
Queue Length 95th (ft)	121			18	4			
Internal Link Dist (ft)	57			124	56			
Turn Bay Length (ft)								
Base Capacity (vph)	410			2372	235			
Starvation Cap Reductn	0			1233	0			
Spillback Cap Reductn	0			0	0			
Storage Cap Reductn	0			0	0			
Reduced v/c Ratio	0.56			0.70	0.02			

Intersection Summary
Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 13.5 Intersection LOS: B
Intersection Capacity Utilization 37.8% ICU Level of Service A
Analysis Period (min) 15

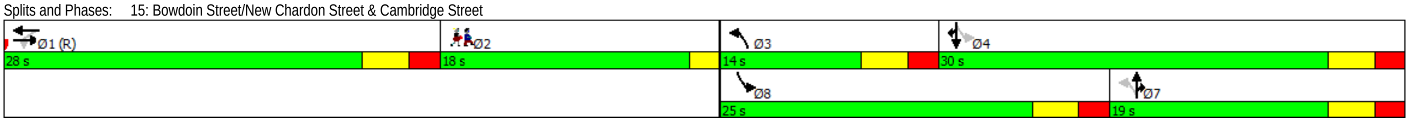
Splits and Phases: 12: GCG Exit Driveway & New Chardon Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	694	93	21	199	31	153	144	110	322	192	284	
Future Volume (vph)	0	694	93	21	199	31	153	144	110	322	192	284	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	0		100	0		100	
Storage Lanes	0		0	0		0	1		1	1		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.91	0.91	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.95			0.95				0.61			0.75	
Frt		0.982			0.981				0.850			0.850	
Flt Protected					0.996		0.950			0.950			
Satd. Flow (prot)	0	4538	0	0	3140	0	1612	1759	1482	1719	1845	1524	
Flt Permitted					0.856		0.632			0.370			
Satd. Flow (perm)	0	4538	0	0	2698	0	1072	1759	909	670	1845	1136	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		26			17				170			296	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		236			438			364			579		
Travel Time (s)		5.4			10.0			8.3			13.2		
Confl. Peds. (#/hr)			530			756			361			229	
Confl. Bikes (#/hr)			105			21			6				
Peak Hour Factor	0.93	0.93	0.93	0.86	0.86	0.86	0.94	0.94	0.94	0.96	0.96	0.96	
Heavy Vehicles (%)	100%	7%	6%	21%	2%	25%	12%	8%	9%	5%	3%	6%	
Adj. Flow (vph)	0	746	100	24	231	36	163	153	117	335	200	296	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	846	0	0	291	0	163	153	117	335	200	296	
Turn Type		NA		Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom	
Protected Phases		1			1		3	7	7	8	4	4	2
Permitted Phases				1			7		7	4		4	
Detector Phase		1		1	1		3	7	7	8	4	4	
Switch Phase													
Minimum Initial (s)		8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	1.0
Minimum Split (s)		28.0		28.0	28.0		13.0	13.0	13.0	13.0	13.0	13.0	18.0
Total Split (s)		28.0		28.0	28.0		14.0	19.0	19.0	25.0	30.0	30.0	18.0
Total Split (%)		31.1%		31.1%	31.1%		15.6%	21.1%	21.1%	27.8%	33.3%	33.3%	20%
Maximum Green (s)		23.0		23.0	23.0		9.0	14.0	14.0	20.0	25.0	25.0	16.0
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)		2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	0.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag		Lead		Lead	Lead		Lead	Lag	Lag	Lead	Lag	Lag	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	2.0
Recall Mode		C-Max		C-Max	C-Max		None	None	None	None	None	None	None
Walk Time (s)		7.0		7.0	7.0								7.0
Flash Dont Walk (s)		16.0		16.0	16.0								9.0
Pedestrian Calls (#/hr)		0		0	0								20
Act Effct Green (s)		38.5			38.5		21.0	11.6	11.6	34.3	19.9	19.9	
Actuated g/C Ratio		0.43			0.43		0.23	0.13	0.13	0.38	0.22	0.22	
v/c Ratio		0.43			0.25		0.53	0.67	0.35	0.73	0.49	0.52	
Control Delay		26.2			9.9		26.5	52.0	4.7	30.5	33.8	6.8	
Queue Delay		0.6			0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		26.8			9.9		26.5	52.0	4.7	30.5	33.8	6.8	
LOS		C			A		C	D	A	C	C	A	
Approach Delay		26.8			9.9			29.7			22.9		
Approach LOS		C			A			C			C		
Queue Length 50th (ft)		26			23		60	84	0	139	100	0	
Queue Length 95th (ft)		221			34		100	144	19	204	154	59	
Internal Link Dist (ft)		156			358			284			499		
Turn Bay Length (ft)									100			100	
Base Capacity (vph)		1956			1163		310	273	374	488	512	637	
Starvation Cap Reductn		687			0		0	0	0	0	0	0	
Spillback Cap Reductn		0			11		0	0	0	0	0	1	
Storage Cap Reductn		0			0		0	0	0	0	0	0	
Reduced v/c Ratio		0.67			0.25		0.53	0.56	0.31	0.69	0.39	0.47	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 23.9 Intersection LOS: C
Intersection Capacity Utilization 65.8% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 15: Bowdoin Street/New Chardon Street & Cambridge Street



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↰	↑↑			↰	↑↑	↱		✣				
Traffic Volume (vph)	19	270	559	278	18	108	210	121	21	33	11	0	0	0
Future Volume (vph)	19	270	559	278	18	108	210	121	21	33	11	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0		100		100	0		0	0		0
Storage Lanes		2		0		1		1	0		0	0		0
Taper Length (ft)		25				25			25			25		
Lane Util. Factor	0.95	0.97	0.95	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.88					0.66		0.95				
Frt			0.950					0.850		0.977				
Flt Protected		0.950				0.950				0.984				
Satd. Flow (prot)	0	3346	2845	0	0	1689	3374	1455	0	1660	0	0	0	0
Flt Permitted		0.603				0.328				0.984				
Satd. Flow (perm)	0	2124	2845	0	0	583	3374	966	0	1660	0	0	0	0
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			95					138		11				
Link Speed (mph)			30				30			30			30	
Link Distance (ft)			438				763			259			584	
Travel Time (s)			10.0				17.3			5.9			13.3	
Confl. Peds. (#/hr)				154				377			241			
Confl. Bikes (#/hr)				60				6			2			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.88	0.88	0.88	0.88	0.69	0.69	0.69	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	6%	5%	0%	8%	7%	11%	0%	5%	9%	0%	0%	0%
Adj. Flow (vph)	20	278	576	287	20	123	239	138	30	48	16	0	0	0
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	298	863	0	0	143	239	138	0	94	0	0	0	0
Turn Type	custom	Prot	NA		custom	Prot	NA	Perm	Perm	NA				
Protected Phases		2	1			6	1			5				
Permitted Phases	2				6			1	5					
Detector Phase	2	2	1		6	6	1	1	5	5				
Switch Phase														
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0				
Minimum Split (s)	22.0	22.0	27.0		12.0	12.0	27.0	27.0	22.0	22.0				
Total Split (s)	22.0	22.0	29.0		12.0	12.0	29.0	29.0	27.0	27.0				
Total Split (%)	24.4%	24.4%	32.2%		13.3%	13.3%	32.2%	32.2%	30.0%	30.0%				
Maximum Green (s)	18.0	18.0	25.0		8.0	8.0	25.0	25.0	23.0	23.0				
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		0.0				
Total Lost Time (s)		4.0	4.0			4.0	4.0	4.0		4.0				
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lead	Lead	Lead	Lead				
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	None	None	C-Max		None	None	C-Max	C-Max	None	None				
Walk Time (s)	7.0	7.0	7.0				7.0	7.0	7.0	7.0				
Flash Dont Walk (s)	11.0	11.0	16.0				16.0	16.0	11.0	11.0				
Pedestrian Calls (#/hr)	0	0	0				0	0	0	0				
Act Effct Green (s)		15.8	25.0			25.9	25.0	25.0		9.8				
Actuated g/C Ratio		0.18	0.28			0.29	0.28	0.28		0.11				
v/c Ratio		0.80	1.01			0.86	0.26	0.38		0.50				
Control Delay		45.0	59.4			78.0	26.2	7.9		42.0				
Queue Delay		0.0	0.0			0.0	0.0	0.0		0.0				
Total Delay		45.0	59.4			78.0	26.2	7.9		42.0				
LOS		D	E			E	C	A		D				
Approach Delay			55.7				35.6			42.0				
Approach LOS			E				D			D				
Queue Length 50th (ft)		82	~221			80	55	0		46				
Queue Length 95th (ft)		#139	#346			#212	84	42		66				
Internal Link Dist (ft)			358				683			179			504	
Turn Bay Length (ft)						100		100						
Base Capacity (vph)		424	858			167	937	368		432				
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		0.70	1.01			0.86	0.26	0.38		0.22				

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 49.1 Intersection LOS: D
Intersection Capacity Utilization 58.7% ICU Level of Service B
Analysis Period (min) 15
~ 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: 16: Somerset Street/Sudbury Street & Cambridge Street

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑			↰	
Traffic Volume (veh/h)	0	423	0	0	174	0
Future Volume (Veh/h)	0	423	0	0	174	0
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)	0	460	0	0	189	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		584				
pX, platoon unblocked					0.95	
vC, conflicting volume	0				230	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				89	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				78	100
cM capacity (veh/h)	1636				864	1091

Direction, Lane #	EB 1	EB 2	SB 1
Volume Total	230	230	189
Volume Left	0	0	189
Volume Right	0	0	0
cSH	1700	1700	864
Volume to Capacity	0.14	0.14	0.22
Queue Length 95th (ft)	0	0	21
Control Delay (s)	0.0	0.0	10.3
Lane LOS			B
Approach Delay (s)	0.0		10.3
Approach LOS			B

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	28.0%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection Sign configuration not allowed in HCM analysis.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations	↰	↑↑	↱						↑↑↑↱		↰	↑↑↑		
Traffic Volume (vph)	152	239	155	0	0	0	14	0	815	159	90	538	0	
Future Volume (vph)	152	239	155	0	0	0	14	0	815	159	90	538	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	11	10	12	12	12	12	11	11	11	10	11	11	
Storage Length (ft)	0		0	0		0		0		0	100		0	
Storage Lanes	1		1	0		0		0		0	1		0	
Taper Length (ft)	25			25				25			25			
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	0.91	1.00	0.91	0.91	1.00	0.91	1.00	
Ped Bike Factor	0.46		0.46						0.94		0.87			
Frt			0.850						0.976					
Flt Protected	0.950								0.999		0.950			
Satd. Flow (prot)	1392	2815	1304	0	0	0	0	0	3874	0	1458	4178	0	
Flt Permitted	0.950								0.926		0.950			
Satd. Flow (perm)	641	2815	597	0	0	0	0	0	3591	0	1275	4178	0	
Right Turn on Red			Yes			Yes				No			Yes	
Satd. Flow (RTOR)			174											
Link Speed (mph)		25			25				25			25		
Link Distance (ft)		153			161				386			468		
Travel Time (s)		4.2			4.4				10.5			12.8		
Confl. Peds. (#/hr)	430		475							674	674			
Confl. Bikes (#/hr)			11							12			59	
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.94	0.94	0.94	0.94	0.88	0.88	0.88	
Heavy Vehicles (%)	5%	6%	4%	0%	0%	0%	0%	0%	6%	14%	4%	8%	0%	
Parking (#/hr)	0	0												
Adj. Flow (vph)	171	269	174	0	0	0	15	0	867	169	102	611	0	
Shared Lane Traffic (%)														
Lane Group Flow (vph)	171	269	174	0	0	0	0	0	1051	0	102	611	0	
Turn Type	Split	NA	Perm				Perm		NA		Prot	NA		
Protected Phases	5	5							1		6	1 6		2
Permitted Phases			5				1							
Detector Phase	5	5	5				1		1		6	1 6		
Switch Phase														
Minimum Initial (s)	8.0	8.0	8.0				10.0		10.0		7.0			7.0
Minimum Split (s)	15.0	15.0	15.0				17.0		17.0		14.0			26.0
Total Split (s)	25.0	25.0	25.0				51.0		51.0		18.0			26.0
Total Split (%)	20.8%	20.8%	20.8%				42.5%		42.5%		15.0%			22%
Maximum Green (s)	19.0	19.0	19.0				46.0		46.0		12.0			22.0
Yellow Time (s)	3.0	3.0	3.0				3.0		3.0		3.0			4.0
All-Red Time (s)	3.0	3.0	3.0				2.0		2.0		3.0			0.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0						-2.0		-2.0			
Total Lost Time (s)	4.0	4.0	4.0						3.0		4.0			
Lead/Lag	Lead	Lead	Lead				Lead		Lead		Lag			Lag
Lead-Lag Optimize?														
Vehicle Extension (s)	2.0	2.0	2.0				2.0		2.0		2.0			2.0
Recall Mode	Max	Max	Max				C-Max		C-Max		Max			Ped
Walk Time (s)	0.0	0.0	0.0											7.0
Flash Dont Walk (s)	8.0	8.0	8.0											15.0
Pedestrian Calls (#/hr)	0	0	0											500
Act Effct Green (s)	21.0	21.0	21.0						48.0		14.0	66.0		
Actuated g/C Ratio	0.18	0.18	0.18						0.40		0.12	0.55		
v/c Ratio	0.70	0.55	0.70						0.73		0.60	0.27		
Control Delay	63.3	49.9	22.8						34.2		58.6	15.4		
Queue Delay	0.0	0.0	0.0						2.2		0.0	0.0		
Total Delay	63.3	49.9	22.8						36.4		58.6	15.4		
LOS	E	D	C						D		E	B		
Approach Delay		45.9							36.4			21.6		
Approach LOS		D							D			C		
Queue Length 50th (ft)	126	101	0						249		82	110		
Queue Length 95th (ft)	#218	145	#102						306		m99	m129		
Internal Link Dist (ft)		73			81				306			388		
Turn Bay Length (ft)											100			
Base Capacity (vph)	243	492	248						1436		170	2297		
Starvation Cap Reductn	0	0	0						244		0	0		
Spillback Cap Reductn	0	0	0						0		0	0		
Storage Cap Reductn	0	0	0						0		0	0		
Reduced v/c Ratio	0.70	0.55	0.70						0.88		0.60	0.27		

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 102 (85%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 34.4 Intersection LOS: C
Intersection Capacity Utilization 54.4% ICU Level of Service A
Analysis Period (min) 15
\# 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: 19: Congress Street & Sudbury Street

Lane Group	EBT	EBR	SBL	SBT	SEL
Lane Configurations					
Traffic Volume (vph)	305	119	31	394	21
Future Volume (vph)	305	119	31	394	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12
Lane Util. Factor	0.95	1.00	0.95	0.95	1.00
Ped Bike Factor		0.66		0.98	
Frt		0.850			
Flt Protected				0.996	0.950
Satd. Flow (prot)	3116	1482	0	3241	926
Flt Permitted				0.996	0.950
Satd. Flow (perm)	3116	971	0	3166	926
Right Turn on Red		Yes	No		
Satd. Flow (RTOR)		128			
Link Speed (mph)	25			25	25
Link Distance (ft)	111			438	138
Travel Time (s)	3.0			11.9	3.8
Confl. Peds. (#/hr)		180	134		
Confl. Bikes (#/hr)		1			
Peak Hour Factor	0.93	0.93	0.86	0.86	0.62
Heavy Vehicles (%)	12%	9%	10%	11%	95%
Adj. Flow (vph)	328	128	36	458	34
Shared Lane Traffic (%)					
Lane Group Flow (vph)	328	128	0	494	34
Turn Type	NA	Perm	Perm	NA	Prot
Protected Phases	1			3	4
Permitted Phases		1	3		
Detector Phase	1	1	3	3	4
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	6.0
Minimum Split (s)	21.0	21.0	18.0	18.0	13.0
Total Split (s)	42.0	42.0	41.0	41.0	27.0
Total Split (%)	38.2%	38.2%	37.3%	37.3%	24.5%
Maximum Green (s)	38.0	38.0	35.0	35.0	21.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0		-2.0	0.0
Total Lost Time (s)	3.0	3.0		4.0	6.0
Lead/Lag			Lead	Lead	Lag
Lead-Lag Optimize?					
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0
Recall Mode	C-Max	C-Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	5.0	5.0	4.0	4.0	
Pedestrian Calls (#/hr)	0	0	25	25	
Act Effct Green (s)	39.0	39.0		37.0	21.0
Actuated g/C Ratio	0.35	0.35		0.34	0.19
v/c Ratio	0.30	0.30		0.46	0.19
Control Delay	26.5	6.4		30.5	40.8
Queue Delay	1.4	0.5		0.0	0.0
Total Delay	27.9	6.8		30.5	40.8
LOS	C	A		C	D
Approach Delay	22.0			30.5	40.8
Approach LOS	C			C	D
Queue Length 50th (ft)	86	0		143	20
Queue Length 95th (ft)	124	41		183	34
Internal Link Dist (ft)	31			358	58
Turn Bay Length (ft)					
Base Capacity (vph)	1104	426		1064	176
Starvation Cap Reductn	568	96		0	0
Spillback Cap Reductn	2	0		0	0
Storage Cap Reductn	0	0		0	0
Reduced v/c Ratio	0.61	0.39		0.46	0.19

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 10 (9%), Referenced to phase 1:EBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.46
Intersection Signal Delay: 26.9 Intersection LOS: C
Intersection Capacity Utilization 38.5% ICU Level of Service A
Analysis Period (min) 15

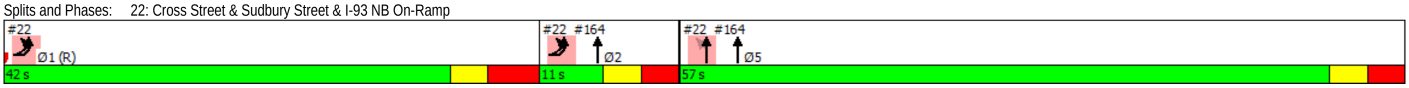
Splits and Phases: 21: Surface Street & Sudbury Street & Haymarket Bus Exit

Lane Group	EBL2	EBL	EBR	NBL	NBT	SBT	SBR	SEL	SER	Ø1	Ø2
Lane Configurations											
Traffic Volume (vph)	241	116	0	164	690	0	0	0	0		
Future Volume (vph)	241	116	0	164	690	0	0	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	13	12	12	11	12	12	12	12		
Lane Util. Factor	0.95	0.97	1.00	0.95	0.95	1.00	1.00	1.00	1.00		
Frt											
Flt Protected		0.950			0.990						
Satd. Flow (prot)	0	3134	0	0	3174	0	0	0	0		
Flt Permitted		0.950			0.990						
Satd. Flow (perm)	0	3134	0	0	3174	0	0	0	0		
Right Turn on Red	Yes		Yes								
Satd. Flow (RTOR)		265									
Link Speed (mph)		25			25	25		25			
Link Distance (ft)		191			203	568		237			
Travel Time (s)		5.2			5.5	15.5		6.5			
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.92	0.92	0.92	0.92		
Heavy Vehicles (%)	8%	31%	0%	4%	10%	0%	0%	0%	0%		
Adj. Flow (vph)	265	127	0	171	719	0	0	0	0		
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	392	0	0	890	0	0	0	0		
Turn Type	Prot	Prot		Perm	NA						
Protected Phases	1 2	1 2			5					1	2
Permitted Phases				5							
Detector Phase	1 2	1 2		5	5						
Switch Phase											
Minimum Initial (s)				10.0	10.0					10.0	4.0
Minimum Split (s)				18.0	18.0					25.0	11.0
Total Split (s)				57.0	57.0					42.0	11.0
Total Split (%)				51.8%	51.8%					38%	10%
Maximum Green (s)				51.0	51.0					35.0	5.0
Yellow Time (s)				3.0	3.0					3.0	3.0
All-Red Time (s)				3.0	3.0					4.0	3.0
Lost Time Adjust (s)					-1.0						
Total Lost Time (s)					5.0						
Lead/Lag										Lead	Lag
Lead-Lag Optimize?											
Vehicle Extension (s)				2.0	2.0					2.0	2.0
Recall Mode				Max	Max					C-Max	Max
Walk Time (s)				7.0	7.0					7.0	
Flash Dont Walk (s)				4.0	4.0					3.0	
Pedestrian Calls (#/hr)				30	30					0	
Act Effct Green (s)		47.0			52.0						
Actuated g/C Ratio		0.43			0.47						
v/c Ratio		0.26			0.59						
Control Delay		1.1			7.1						
Queue Delay		0.4			0.1						
Total Delay		1.5			7.2						
LOS		A			A						
Approach Delay		1.5			7.2						
Approach LOS		A			A						
Queue Length 50th (ft)		0			204						
Queue Length 95th (ft)		2			250						
Internal Link Dist (ft)		111			123	488		157			
Turn Bay Length (ft)											
Base Capacity (vph)		1490			1500						
Starvation Cap Reductn		630			47						
Spillback Cap Reductn		0			0						
Storage Cap Reductn		0			0						
Reduced v/c Ratio		0.46			0.61						

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 16 (15%), Referenced to phase 1:EBL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.59
Intersection Signal Delay: 5.5 Intersection LOS: A
Intersection Capacity Utilization 46.4% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 22: Cross Street & Sudbury Street & I-93 NB On-Ramp



Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations														
Traffic Volume (vph)	0	893	75	19	10	423	0	0	0	0	1106	310	293	
Future Volume (vph)	0	893	75	19	10	423	0	0	0	0	1106	310	293	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	14	12	12	12	12	12	11	13	
Lane Util. Factor	1.00	0.91	0.91	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.91	0.86	0.91	
Ped Bike Factor												0.99		
Frt		0.988										0.995	0.850	
Flt Protected						0.997					0.950	0.970		
Satd. Flow (prot)	0	4542	0	0	0	3353	0	0	0	0	1382	2455	1254	
Flt Permitted						0.752					0.950	0.970		
Satd. Flow (perm)	0	4542	0	0	0	2529	0	0	0	0	1382	2455	1254	
Right Turn on Red			No				Yes			Yes			No	
Satd. Flow (RTOR)														
Link Speed (mph)		25				25			25			25		
Link Distance (ft)		184				394			438			242		
Travel Time (s)		5.0				10.7			11.9			6.6		
Confl. Peds. (#/hr)													148	
Peak Hour Factor	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.94	0.94	0.94	
Heavy Vehicles (%)	0%	1%	8%	0%	11%	3%	0%	0%	0%	0%	7%	17%	9%	
Adj. Flow (vph)	0	981	82	20	11	445	0	0	0	0	1177	330	312	
Shared Lane Traffic (%)											48%		10%	
Lane Group Flow (vph)	0	1063	0	0	0	476	0	0	0	0	612	926	281	
Turn Type		NA		Perm	Perm	NA					Split	NA	Prot	
Protected Phases		1				1					5	5	5	2
Permitted Phases				1	1									
Detector Phase		1		1	1	1					5	5	5	
Switch Phase														
Minimum Initial (s)		8.0		8.0	8.0	8.0					8.0	8.0	8.0	8.0
Minimum Split (s)		23.0		23.0	23.0	23.0					22.0	22.0	22.0	30.0
Total Split (s)		33.0		33.0	33.0	33.0					47.0	47.0	47.0	30.0
Total Split (%)		30.0%		30.0%	30.0%	30.0%					42.7%	42.7%	42.7%	27%
Maximum Green (s)		27.0		27.0	27.0	27.0					41.0	41.0	41.0	26.0
Yellow Time (s)		3.0		3.0	3.0	3.0					3.0	3.0	3.0	4.0
All-Red Time (s)		3.0		3.0	3.0	3.0					3.0	3.0	3.0	0.0
Lost Time Adjust (s)		-2.0				-2.0					-2.0	-2.0	-2.0	
Total Lost Time (s)		4.0				4.0					4.0	4.0	4.0	
Lead/Lag		Lead		Lead	Lead	Lead								Lag
Lead-Lag Optimize?														
Vehicle Extension (s)		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					Max	Max	Max	None
Walk Time (s)		7.0		7.0	7.0	7.0					7.0	7.0	7.0	7.0
Flash Dont Walk (s)		7.0		7.0	7.0	7.0					8.0	8.0	8.0	19.0
Pedestrian Calls (#/hr)		0		0	0	0					0	0	0	50
Act Effct Green (s)		35.0				35.0					43.0	43.0	43.0	
Actuated g/C Ratio		0.32				0.32					0.39	0.39	0.39	
v/c Ratio		0.74				0.59					1.13	1.09dl	0.57	
Control Delay		25.7				37.7					108.7	49.6	26.0	
Queue Delay		3.1				0.0					0.0	20.6	3.9	
Total Delay		28.9				37.7					108.7	70.2	29.9	
LOS		C				D					F	E	C	
Approach Delay		28.9				37.7						76.9		
Approach LOS		C				D						E		
Queue Length 50th (ft)		246				160					~562	383	131	
Queue Length 95th (ft)		#336				222					#805	#529	248	
Internal Link Dist (ft)		104				314			358			162		
Turn Bay Length (ft)														
Base Capacity (vph)		1445				804					540	959	490	
Starvation Cap Reductn		275				0					0	74	134	
Spillback Cap Reductn		0				0					0	0	0	
Storage Cap Reductn		0				0					0	0	0	
Reduced v/c Ratio		0.91				0.59					1.13	1.05	0.79	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 57 (52%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.13
Intersection Signal Delay: 56.1 Intersection LOS: E
Intersection Capacity Utilization 78.0% ICU Level of Service D
Analysis Period (min) 15
~ 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 8: Surface Street & New Chardon Street/I-93 Ramps

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø1	Ø2	Ø5
Lane Configurations									
Traffic Volume (vph)	0	968	689	28	0	0			
Future Volume (vph)	0	968	689	28	0	0			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900			
Lane Util. Factor	1.00	0.95	0.91	0.91	1.00	1.00			
Ped Bike Factor			1.00						
Frt			0.994						
Flt Protected									
Satd. Flow (prot)	0	3217	4400	0	0	0			
Flt Permitted									
Satd. Flow (perm)	0	3217	4400	0	0	0			
Right Turn on Red				Yes		Yes			
Satd. Flow (RTOR)			13						
Link Speed (mph)		25	25		25				
Link Distance (ft)		287	184		238				
Travel Time (s)		7.8	5.0		6.5				
Confl. Bikes (#/hr)				186					
Peak Hour Factor	0.95	0.95	0.93	0.93	0.92	0.92			
Heavy Vehicles (%)	0%	1%	5%	4%	0%	0%			
Adj. Flow (vph)	0	1019	741	30	0	0			
Shared Lane Traffic (%)									
Lane Group Flow (vph)	0	1019	771	0	0	0			
Turn Type		NA	NA						
Protected Phases		1 5	1 5				1	2	5
Permitted Phases									
Detector Phase		1 5	1 5						
Switch Phase									
Minimum Initial (s)							8.0	8.0	8.0
Minimum Split (s)							23.0	30.0	22.0
Total Split (s)							33.0	30.0	47.0
Total Split (%)							30%	27%	43%
Maximum Green (s)							27.0	26.0	41.0
Yellow Time (s)							3.0	4.0	3.0
All-Red Time (s)							3.0	0.0	3.0
Lost Time Adjust (s)									
Total Lost Time (s)									
Lead/Lag							Lead	Lag	
Lead-Lag Optimize?									
Vehicle Extension (s)							2.0	2.0	2.0
Recall Mode							C-Max	None	Max
Walk Time (s)							7.0	7.0	7.0
Flash Dont Walk (s)							7.0	19.0	8.0
Pedestrian Calls (#/hr)							0	50	0
Act Effct Green (s)		82.8	82.8						
Actuated g/C Ratio		0.75	0.75						
v/c Ratio		0.42	0.23						
Control Delay		7.1	1.3						
Queue Delay		1.4	0.2						
Total Delay		8.5	1.5						
LOS		A	A						
Approach Delay		8.5	1.5						
Approach LOS		A	A						
Queue Length 50th (ft)		151	5						
Queue Length 95th (ft)		m173	m20						
Internal Link Dist (ft)		207	104		158				
Turn Bay Length (ft)									
Base Capacity (vph)		2421	3315						
Starvation Cap Reductn		957	1685						
Spillback Cap Reductn		1135	71						
Storage Cap Reductn		0	0						
Reduced v/c Ratio		0.79	0.47						

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 57 (52%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.13
Intersection Signal Delay: 5.5 Intersection LOS: A
Intersection Capacity Utilization 33.1% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

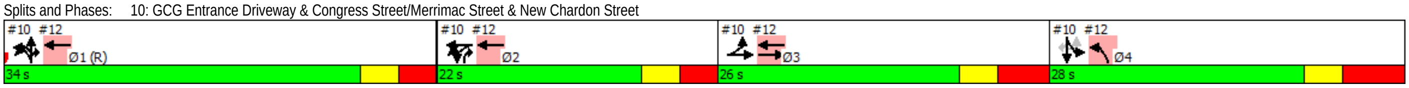
Splits and Phases: 9: New Chardon Street & Canal Street

Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBU	SBL	SBT	SBR	SBR2
Lane Configurations																	
Traffic Volume (vph)	64	289	62	3	311	16	316	41	37	217	253	369	4	304	305	14	55
Future Volume (vph)	64	289	62	3	311	16	316	41	37	217	253	369	4	304	305	14	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	10	12	12	12	10	10	16	12	11	11	11	16
Storage Length (ft)	0		0			0		0		0		150		0		150	
Storage Lanes	0		0			1		0		1		1		0		1	
Taper Length (ft)	25					25				25				25			
Lane Util. Factor	0.95	0.95	0.95	0.95	0.91	0.91	0.91	0.95	0.95	0.91	0.91	1.00	0.91	0.91	0.91	0.91	1.00
Ped Bike Factor		0.84			0.80		0.88			0.85	0.97				0.83		0.71
Frt		0.977					0.987					0.850			0.997		0.850
Flt Protected		0.992			0.950		0.989			0.950	0.987				0.976		
Satd. Flow (prot)	0	2629	0	0	1254	0	2821	0	0	1328	2711	1615	0	0	4071	0	1647
Flt Permitted		0.992			0.950		0.989			0.950	0.987				0.976		
Satd. Flow (perm)	0	2582	0	0	999	0	2514	0	0	1124	2636	1615	0	0	3407	0	1176
Right Turn on Red				Yes				Yes				No					Yes
Satd. Flow (RTOR)		1					8										159
Link Speed (mph)		25					25				25				25		
Link Distance (ft)		204					287				468				998		
Travel Time (s)		5.6					7.8				12.8				27.2		
Confl. Peds. (#/hr)	76		602	228	228	602		76	228	125		1385		1385		228	125
Confl. Bikes (#/hr)												11				7	7
Peak Hour Factor	0.94	0.94	0.94	0.94	0.97	0.97	0.97	0.97	0.98	0.98	0.98	0.98	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	0%	10%	0%	6%	3%	0%	5%	6%	2%	0%	3%	10%	7%	0%
Adj. Flow (vph)	68	307	66	3	321	16	326	42	38	221	258	377	4	330	332	15	60
Shared Lane Traffic (%)					28%					41%							
Lane Group Flow (vph)	0	444	0	0	231	0	474	0	0	168	349	377	0	0	681	0	60
Turn Type	Split	NA			Split	Split	NA		Split	Split	NA	pt+ov	Perm	Split	NA		Perm
Protected Phases	3	3			2	2	2		1	1	1	1 2		4	4		
Permitted Phases													4				4
Detector Phase	3	3			2	2	2		1	1	1	1 2	4	4	4		4
Switch Phase																	
Minimum Initial (s)	8.0	8.0			8.0	8.0	8.0		8.0	8.0	8.0		8.0	8.0	8.0		8.0
Minimum Split (s)	19.0	19.0			15.0	15.0	15.0		33.0	33.0	33.0		24.0	24.0	24.0		24.0
Total Split (s)	26.0	26.0			22.0	22.0	22.0		34.0	34.0	34.0		28.0	28.0	28.0		28.0
Total Split (%)	23.6%	23.6%			20.0%	20.0%	20.0%		30.9%	30.9%	30.9%		25.5%	25.5%	25.5%		25.5%
Maximum Green (s)	19.0	19.0			16.0	16.0	16.0		28.0	28.0	28.0		20.0	20.0	20.0		20.0
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0		3.0
All-Red Time (s)	4.0	4.0			3.0	3.0	3.0		3.0	3.0	3.0		5.0	5.0	5.0		5.0
Lost Time Adjust (s)		-2.0			-2.0		-2.0			-2.0	-2.0				-2.0		0.0
Total Lost Time (s)		5.0			4.0		4.0			4.0	4.0				6.0		8.0
Lead/Lag	Lag	Lag			Lead	Lead	Lead										
Lead-Lag Optimize?																	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0		2.0
Recall Mode	Max	Max			Max	Max	Max		C-Max	C-Max	C-Max		Max	Max	Max		Max
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)	4.0	4.0							17.0	17.0	17.0		8.0	8.0	8.0		8.0
Pedestrian Calls (#/hr)	0	0							0	0	0		0	0	0		0
Act Effct Green (s)		21.0			18.0		18.0			30.0	30.0	52.0			22.0		20.0
Actuated g/C Ratio		0.19			0.16		0.16			0.27	0.27	0.47			0.20		0.18
v/c Ratio		0.88			1.13		1.01			0.46	0.47	0.49			1.11dl		0.17
Control Delay		35.0			151.3		99.8			26.3	24.5	7.4			52.7		1.1
Queue Delay		0.0			0.0		0.6			0.0	0.0	1.1			0.0		0.0
Total Delay		35.0			151.3		100.4			26.3	24.5	8.6			52.7		1.1
LOS		D			F		F			C	C	A			D		A
Approach Delay		35.0					117.1				18.1				48.5		
Approach LOS		D					F				B				D		
Queue Length 50th (ft)		30			~209		~193			59	61	55			170		0
Queue Length 95th (ft)		#218			#371		#293			m74	m74	m61			#230		0
Internal Link Dist (ft)		124					207				388				918		
Turn Bay Length (ft)												150					150
Base Capacity (vph)		502			205		468			362	739	763			814		343
Starvation Cap Reductn		0			0		1			0	0	191			0		0
Spillback Cap Reductn		0			0		0			0	0	0			0		0
Storage Cap Reductn		0			0		0			0	0	0			0		0
Reduced v/c Ratio		0.88			1.13		1.01			0.46	0.47	0.66			0.84		0.17

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 79 (72%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.13
Intersection Signal Delay: 54.0 Intersection LOS: D
Intersection Capacity Utilization 85.3% ICU Level of Service E
Analysis Period (min) 15
~ 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 10: GCG Entrance Driveway & Congress Street/Merrimac Street & New Chardon Street

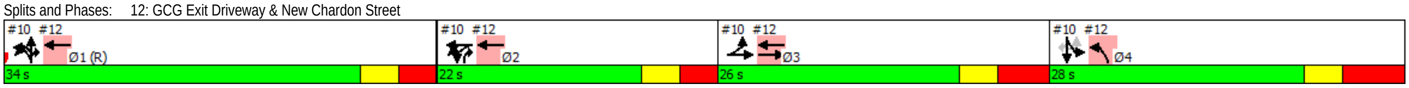


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø1	Ø2
Lane Configurations								
Traffic Volume (vph)	375	0	0	533	38	43		
Future Volume (vph)	375	0	0	533	38	43		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	12	12	11	11		
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00		
Ped Bike Factor					0.99			
Frt					0.928			
Flt Protected					0.977			
Satd. Flow (prot)	3154	0	0	3065	1454	0		
Flt Permitted					0.977			
Satd. Flow (perm)	3154	0	0	3065	1454	0		
Right Turn on Red		Yes				Yes		
Satd. Flow (RTOR)					46			
Link Speed (mph)	25			25	25			
Link Distance (ft)	137			204	136			
Travel Time (s)	3.7			5.6	3.7			
Confl. Bikes (#/hr)		3				1		
Peak Hour Factor	0.98	0.98	0.90	0.90	0.86	0.86		
Heavy Vehicles (%)	3%	0%	0%	6%	5%	0%		
Adj. Flow (vph)	383	0	0	592	44	50		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	383	0	0	592	94	0		
Turn Type	NA			NA	Prot			
Protected Phases	3			1 2 3	4		1	2
Permitted Phases								
Detector Phase	3			1 2 3	4			
Switch Phase								
Minimum Initial (s)	8.0				8.0		8.0	8.0
Minimum Split (s)	19.0				24.0		33.0	15.0
Total Split (s)	26.0				28.0		34.0	22.0
Total Split (%)	23.6%				25.5%		31%	20%
Maximum Green (s)	19.0				20.0		28.0	16.0
Yellow Time (s)	3.0				3.0		3.0	3.0
All-Red Time (s)	4.0				5.0		3.0	3.0
Lost Time Adjust (s)	-2.0				-2.0			
Total Lost Time (s)	5.0				6.0			
Lead/Lag	Lag							Lead
Lead-Lag Optimize?								
Vehicle Extension (s)	2.0				2.0		2.0	2.0
Recall Mode	Max				Max		C-Max	Max
Walk Time (s)	7.0				7.0		7.0	
Flash Dont Walk (s)	4.0				8.0		17.0	
Pedestrian Calls (#/hr)	0				0		0	
Act Effct Green (s)	21.0			78.0	22.0			
Actuated g/C Ratio	0.19			0.71	0.20			
v/c Ratio	0.64			0.27	0.29			
Control Delay	46.5			0.7	23.2			
Queue Delay	0.2			0.8	0.0			
Total Delay	46.6			1.5	23.2			
LOS	D			A	C			
Approach Delay	46.6			1.5	23.2			
Approach LOS	D			A	C			
Queue Length 50th (ft)	132			6	28			
Queue Length 95th (ft)	184			m6	70			
Internal Link Dist (ft)	57			124	56			
Turn Bay Length (ft)								
Base Capacity (vph)	602			2173	327			
Starvation Cap Reductn	0			1211	0			
Spillback Cap Reductn	17			0	0			
Storage Cap Reductn	0			0	0			
Reduced v/c Ratio	0.65			0.62	0.29			

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 79 (72%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.13
Intersection Signal Delay: 19.6 — Intersection LOS: B
Intersection Capacity Utilization 31.4% — ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: GCG Exit Driveway & New Chardon Street

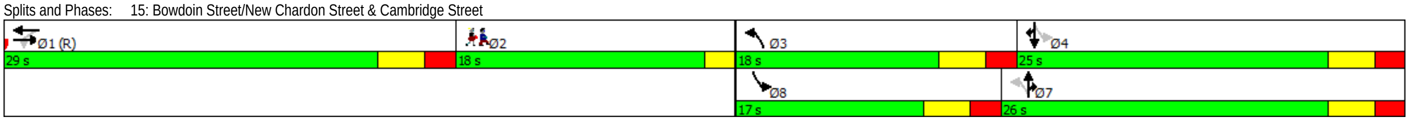


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	663	73	16	312	47	223	327	137	250	170	194	
Future Volume (vph)	0	663	73	16	312	47	223	327	137	250	170	194	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	0		100	0		100	
Storage Lanes	0		0	0		0	1		1	1		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.91	0.91	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		1.00			0.98								
Frt		0.985			0.981				0.850			0.850	
Flt Protected					0.998		0.950			0.950			
Satd. Flow (prot)	0	4899	0	0	3374	0	1656	1863	1509	1671	1845	1583	
Flt Permitted					0.903		0.539			0.204			
Satd. Flow (perm)	0	4899	0	0	3053	0	940	1863	1509	359	1845	1583	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		20			17				109			213	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		236			438			363			579		
Travel Time (s)		5.4			10.0			8.3			13.2		
Confl. Bikes (#/hr)			30			153			12				
Peak Hour Factor	0.98	0.98	0.98	0.91	0.91	0.91	0.92	0.92	0.92	0.91	0.91	0.91	
Heavy Vehicles (%)	0%	4%	3%	0%	2%	10%	9%	2%	7%	8%	3%	2%	
Adj. Flow (vph)	0	677	74	18	343	52	242	355	149	275	187	213	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	751	0	0	413	0	242	355	149	275	187	213	
Turn Type		NA		Perm	NA		pm+pt	NA	Prot	pm+pt	NA	Prot	
Protected Phases		1			1		3	7	7	8	4	4	2
Permitted Phases				1			7			4			
Detector Phase		1		1	1		3	7	7	8	4	4	
Switch Phase													
Minimum Initial (s)		8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	1.0
Minimum Split (s)		28.0		28.0	28.0		13.0	13.0	13.0	13.0	13.0	13.0	18.0
Total Split (s)		29.0		29.0	29.0		18.0	26.0	26.0	17.0	25.0	25.0	18.0
Total Split (%)		32.2%		32.2%	32.2%		20.0%	28.9%	28.9%	18.9%	27.8%	27.8%	20%
Maximum Green (s)		24.0		24.0	24.0		13.0	21.0	21.0	12.0	20.0	20.0	16.0
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)		2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	0.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag		Lead		Lead	Lead		Lead	Lag	Lag	Lead	Lag	Lag	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	2.0
Recall Mode		C-Max		C-Max	C-Max		None	Min	Min	None	Min	Min	Ped
Walk Time (s)		7.0		7.0	7.0								7.0
Flash Dont Walk (s)		16.0		16.0	16.0								9.0
Pedestrian Calls (#/hr)		0		0	0								20
Act Effct Green (s)		25.5			25.5		31.3	19.5	19.5	31.6	19.6	19.6	
Actuated g/C Ratio		0.28			0.28		0.35	0.22	0.22	0.35	0.22	0.22	
v/c Ratio		0.53			0.47		0.57	0.88	0.36	0.92	0.47	0.42	
Control Delay		21.4			15.3		24.5	58.2	12.5	58.3	34.9	7.1	
Queue Delay		0.7			0.4		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		22.1			15.7		24.5	58.2	12.5	58.3	34.9	7.1	
LOS		C			B		C	E	B	E	C	A	
Approach Delay		22.1			15.7			38.2			35.6		
Approach LOS		C			B			D			D		
Queue Length 50th (ft)		67			41		91	192	18	105	92	0	
Queue Length 95th (ft)		191			m56		149	#333	67	#254	157	56	
Internal Link Dist (ft)		156			358			283			499		
Turn Bay Length (ft)									100			100	
Base Capacity (vph)		1404			878		442	434	435	300	410	517	
Starvation Cap Reductn		335			0		0	0	0	0	0	0	
Spillback Cap Reductn		0			137		0	0	0	0	0	9	
Storage Cap Reductn		0			0		0	0	0	0	0	0	
Reduced v/c Ratio		0.70			0.56		0.55	0.82	0.34	0.92	0.46	0.42	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.92
Intersection Signal Delay: 29.3 Intersection LOS: C
Intersection Capacity Utilization 65.7% ICU Level of Service C
Analysis Period (min) 15
\# 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: 15: Bowdoin Street/New Chardon Street & Cambridge Street

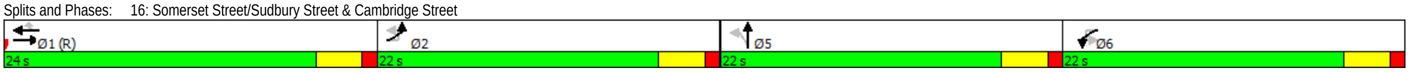


Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	28	293	613	117	19	53	279	165	69	109	30	0	0	0
Future Volume (vph)	28	293	613	117	19	53	279	165	69	109	30	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0		100		100	0		0	0		0
Storage Lanes		2		0		1		1	0		0	0		0
Taper Length (ft)		25				25			25			25		
Lane Util. Factor	0.95	0.97	0.95	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.90					0.60		0.95				
Frt			0.976					0.850		0.981				
Flt Protected		0.950				0.950				0.984				
Satd. Flow (prot)	0	3408	3103	0	0	1805	3574	1538	0	1736	0	0	0	0
Flt Permitted		0.574				0.369				0.984				
Satd. Flow (perm)	0	2059	3103	0	0	701	3574	921	0	1736	0	0	0	0
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			22					172		8				
Link Speed (mph)			30				30			30			30	
Link Distance (ft)			438				763			259			584	
Travel Time (s)			10.0				17.3			5.9			13.3	
Confl. Peds. (#/hr)				535				533			244			
Confl. Bikes (#/hr)				4				80			3			
Peak Hour Factor	0.98	0.98	0.98	0.98	0.96	0.96	0.96	0.96	0.91	0.91	0.91	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	2%	4%	0%	0%	1%	5%	1%	0%	3%	0%	0%	0%
Adj. Flow (vph)	29	299	626	119	20	55	291	172	76	120	33	0	0	0
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	328	745	0	0	75	291	172	0	229	0	0	0	0
Turn Type	custom	Prot	NA		custom	Prot	NA	Perm	Perm	NA				
Protected Phases		2	1			6	1			5				
Permitted Phases	2				6			1	5					
Detector Phase	2	2	1		6	6	1	1	5	5				
Switch Phase														
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0				
Minimum Split (s)	22.0	22.0	27.0		22.0	22.0	27.0	27.0	22.0	22.0				
Total Split (s)	22.0	22.0	24.0		22.0	22.0	24.0	24.0	22.0	22.0				
Total Split (%)	24.4%	24.4%	26.7%		24.4%	24.4%	26.7%	26.7%	24.4%	24.4%				
Maximum Green (s)	18.0	18.0	20.0		18.0	18.0	20.0	20.0	18.0	18.0				
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		0.0				
Total Lost Time (s)		4.0	4.0			4.0	4.0	4.0		4.0				
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lead	Lead	Lead	Lead				
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	None	None	C-Max		None	None	C-Max	C-Max	None	None				
Walk Time (s)	7.0	7.0	7.0				7.0	7.0						
Flash Dont Walk (s)	11.0	11.0	16.0				16.0	16.0						
Pedestrian Calls (#/hr)	0	0	0				0	0						
Act Effct Green (s)		16.7	31.2			13.6	31.2	31.2		14.9				
Actuated g/C Ratio		0.19	0.35			0.15	0.35	0.35		0.17				
v/c Ratio		0.86	0.68			0.71	0.24	0.40		0.78				
Control Delay		45.1	33.2			69.0	25.4	8.1		52.7				
Queue Delay		0.0	0.0			0.0	0.0	0.0		0.0				
Total Delay		45.1	33.2			69.0	25.4	8.1		52.7				
LOS		D	C			E	C	A		D				
Approach Delay			36.8				26.0			52.7				
Approach LOS			D				C			D				
Queue Length 50th (ft)		95	170			41	66	0		120				
Queue Length 95th (ft)		m#149	m#312			#94	111	57		194				
Internal Link Dist (ft)			358				683			179			504	
Turn Bay Length (ft)						100		100						
Base Capacity (vph)		411	1088			140	1237	431		353				
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		0.80	0.68			0.54	0.24	0.40		0.65				

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 35.6 Intersection LOS: D
Intersection Capacity Utilization 52.0% ICU Level of Service A
Analysis Period (min) 15
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: 16: Somerset Street/Sudbury Street & Cambridge Street



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	567	0	0	184	0
Future Volume (Veh/h)	0	567	0	0	184	0
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)	0	616	0	0	200	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		584				
pX, platoon unblocked					0.94	
vC, conflicting volume	0				308	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				147	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				75	100
cM capacity (veh/h)	1636				789	1091

Direction, Lane #	EB 1	EB 2	SB 1
Volume Total	308	308	200
Volume Left	0	0	200
Volume Right	0	0	0
cSH	1700	1700	789
Volume to Capacity	0.18	0.18	0.25
Queue Length 95th (ft)	0	0	25
Control Delay (s)	0.0	0.0	11.1
Lane LOS			B
Approach Delay (s)	0.0		11.1
Approach LOS			B

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection Sign configuration not allowed in HCM analysis.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations														
Traffic Volume (vph)	153	404	166	0	0	0	10	0	719	367	157	517	0	
Future Volume (vph)	153	404	166	0	0	0	10	0	719	367	157	517	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	11	10	12	12	12	12	11	11	11	10	11	11	
Storage Length (ft)	0		0	0		0		0		0	100		0	
Storage Lanes	1		1	0		0		0		0	1		0	
Taper Length (ft)	25			25				25			25			
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	1.00	0.91	1.00	0.91	0.91	1.00	0.91	1.00	
Ped Bike Factor	0.57		0.46						0.88		0.89			
Frt			0.850						0.950					
Flt Protected	0.950										0.950			
Satd. Flow (prot)	1392	2842	1280	0	0	0	0	0	3605	0	1486	4029	0	
Flt Permitted	0.950								0.934		0.950			
Satd. Flow (perm)	787	2842	586	0	0	0	0	0	3367	0	1317	4029	0	
Right Turn on Red			Yes			Yes				No			Yes	
Satd. Flow (RTOR)			187											
Link Speed (mph)		25			25				25			25		
Link Distance (ft)		153			161				395			468		
Travel Time (s)		4.2			4.4				10.8			12.8		
Confl. Peds. (#/hr)	236		435							650	650			
Confl. Bikes (#/hr)			5							46			2	
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.98	0.98	0.98	0.98	0.93	0.93	0.93	
Heavy Vehicles (%)	5%	5%	6%	0%	0%	0%	0%	0%	3%	7%	2%	12%	0%	
Parking (#/hr)	0	0												
Adj. Flow (vph)	172	454	187	0	0	0	10	0	734	374	169	556	0	
Shared Lane Traffic (%)														
Lane Group Flow (vph)	172	454	187	0	0	0	0	0	1118	0	169	556	0	
Turn Type	Split	NA	Perm				Perm		NA		Prot	NA		
Protected Phases	5	5							1		6	1 6		2
Permitted Phases			5				1							
Detector Phase	5	5	5				1		1		6	1 6		
Switch Phase														
Minimum Initial (s)	8.0	8.0	8.0				10.0		10.0		7.0			7.0
Minimum Split (s)	15.0	15.0	15.0				17.0		17.0		14.0			26.0
Total Split (s)	26.0	26.0	26.0				42.0		42.0		16.0			26.0
Total Split (%)	23.6%	23.6%	23.6%				38.2%		38.2%		14.5%			24%
Maximum Green (s)	20.0	20.0	20.0				37.0		37.0		10.0			22.0
Yellow Time (s)	3.0	3.0	3.0				3.0		3.0		3.0			4.0
All-Red Time (s)	3.0	3.0	3.0				2.0		2.0		3.0			0.0
Lost Time Adjust (s)	-2.0	-2.0	-2.0						-2.0		-2.0			
Total Lost Time (s)	4.0	4.0	4.0						3.0		4.0			
Lead/Lag	Lead	Lead	Lead				Lead		Lead		Lag			Lag
Lead-Lag Optimize?														
Vehicle Extension (s)	2.0	2.0	2.0				2.0		2.0		2.0			2.0
Recall Mode	Max	Max	Max				C-Max		C-Max		Max			Ped
Walk Time (s)	0.0	0.0	0.0											7.0
Flash Dont Walk (s)	8.0	8.0	8.0											15.0
Pedestrian Calls (#/hr)	0	0	0											0
Act Effct Green (s)	22.0	22.0	22.0						39.0		12.0	55.0		
Actuated g/C Ratio	0.20	0.20	0.20						0.35		0.11	0.50		
v/c Ratio	0.62	0.80	0.70						0.94		1.04	0.28		
Control Delay	51.0	53.7	21.2						29.5		105.9	16.2		
Queue Delay	0.0	0.3	0.0						7.7		31.6	0.0		
Total Delay	51.0	54.0	21.2						37.2		137.5	16.2		
LOS	D	D	C						D		F	B		
Approach Delay		45.8							37.2			44.5		
Approach LOS		D							D			D		
Queue Length 50th (ft)	112	162	0						86		~126	81		
Queue Length 95th (ft)	185	#231	#104						#375		m#144	m87		
Internal Link Dist (ft)		73			81				315			388		
Turn Bay Length (ft)											100			
Base Capacity (vph)	278	568	266						1193		162	2014		
Starvation Cap Reductn	0	0	0						4		0	0		
Spillback Cap Reductn	0	8	0						68		74	0		
Storage Cap Reductn	0	0	0						0		0	0		
Reduced v/c Ratio	0.62	0.81	0.70						0.99		1.92	0.28		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 70 (64%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.04
Intersection Signal Delay: 41.8 Intersection LOS: D
Intersection Capacity Utilization 61.9% ICU Level of Service B
Analysis Period (min) 15
~ 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.

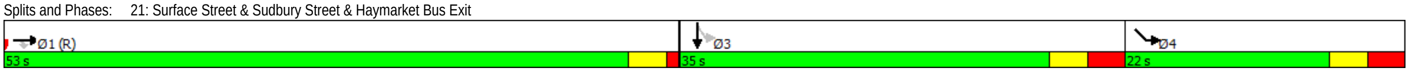
Splits and Phases: 19: Congress Street & Sudbury Street

Lane Group	EBT	EBR	SBL	SBT	SEL	SER
Lane Configurations						
Traffic Volume (vph)	790	144	71	325	29	6
Future Volume (vph)	790	144	71	325	29	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Lane Util. Factor	0.95	1.00	0.95	0.95	1.00	1.00
Ped Bike Factor		0.53		0.94		
Frt		0.850			0.977	
Flt Protected				0.991	0.960	
Satd. Flow (prot)	3323	1553	0	3352	918	0
Flt Permitted				0.991	0.960	
Satd. Flow (perm)	3323	831	0	3141	918	0
Right Turn on Red		Yes	No			
Satd. Flow (RTOR)		157				
Link Speed (mph)	25			25	25	
Link Distance (ft)	111			438	138	
Travel Time (s)	3.0			11.9	3.8	
Confl. Peds. (#/hr)		402	183			
Confl. Bikes (#/hr)		10				
Peak Hour Factor	0.92	0.92	0.88	0.88	0.77	0.77
Heavy Vehicles (%)	5%	4%	1%	8%	93%	100%
Adj. Flow (vph)	859	157	81	369	38	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	859	157	0	450	46	0
Turn Type	NA	Perm	Perm	NA	Prot	
Protected Phases	1			3	4	
Permitted Phases		1	3			
Detector Phase	1	1	3	3	4	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	6.0	
Minimum Split (s)	21.0	21.0	18.0	18.0	13.0	
Total Split (s)	53.0	53.0	35.0	35.0	22.0	
Total Split (%)	48.2%	48.2%	31.8%	31.8%	20.0%	
Maximum Green (s)	49.0	49.0	29.0	29.0	16.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	1.0	1.0	3.0	3.0	3.0	
Lost Time Adjust (s)	-1.0	-1.0		-2.0	0.0	
Total Lost Time (s)	3.0	3.0		4.0	6.0	
Lead/Lag			Lead	Lead	Lag	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	
Recall Mode	C-Max	C-Max	Max	Max	Max	
Walk Time (s)	7.0	7.0	7.0	7.0		
Flash Dont Walk (s)	5.0	5.0	4.0	4.0		
Pedestrian Calls (#/hr)	0	0	25	25		
Act Effct Green (s)	50.0	50.0		31.0	16.0	
Actuated g/C Ratio	0.45	0.45		0.28	0.15	
v/c Ratio	0.57	0.34		0.51	0.35	
Control Delay	19.4	8.4		37.7	50.5	
Queue Delay	51.4	1.2		0.0	0.0	
Total Delay	70.8	9.6		37.7	50.5	
LOS	E	A		D	D	
Approach Delay	61.4			37.7	50.5	
Approach LOS	E			D	D	
Queue Length 50th (ft)	232	29		111	30	
Queue Length 95th (ft)	m268	m42		m124	57	
Internal Link Dist (ft)	31			358	58	
Turn Bay Length (ft)						
Base Capacity (vph)	1510	463		885	133	
Starvation Cap Reductn	764	156		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	1.15	0.51		0.51	0.35	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 69 (63%), Referenced to phase 1:EBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 54.0 Intersection LOS: D
Intersection Capacity Utilization 49.5% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: Surface Street & Sudbury Street & Haymarket Bus Exit

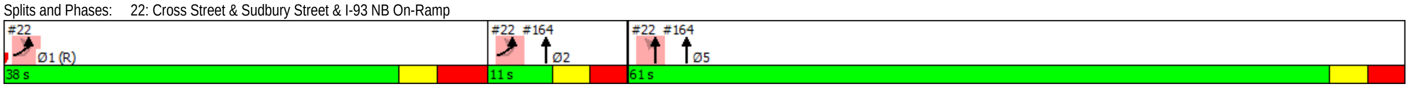


Lane Group	EBL2	EBL	EBR	NBL	NBT	SBT	SBR	SEL	SER	Ø1	Ø2
Lane Configurations											
Traffic Volume (vph)	625	265	0	642	787	0	0	0	0		
Future Volume (vph)	625	265	0	642	787	0	0	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	13	12	12	11	12	12	12	12		
Lane Util. Factor	0.95	0.97	1.00	0.95	0.95	1.00	1.00	1.00	1.00		
Ped Bike Factor											
Frt											
Flt Protected		0.950			0.978						
Satd. Flow (prot)	0	3373	0	0	3272	0	0	0	0		
Flt Permitted		0.950			0.978						
Satd. Flow (perm)	0	3373	0	0	3272	0	0	0	0		
Right Turn on Red	Yes		Yes								
Satd. Flow (RTOR)		192									
Link Speed (mph)		25			25	25		25			
Link Distance (ft)		191			203	568		237			
Travel Time (s)		5.2			5.5	15.5		6.5			
Confl. Bikes (#/hr)			11								
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.92	0.92	0.92	0.92		
Heavy Vehicles (%)	4%	15%	0%	1%	7%	0%	0%	0%	0%		
Adj. Flow (vph)	679	288	0	676	828	0	0	0	0		
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	967	0	0	1504	0	0	0	0		
Turn Type	Perm	Prot		Perm	NA						
Protected Phases		1 2			5					1	2
Permitted Phases	1 2			5							
Detector Phase	1 2	1 2		5	5						
Switch Phase											
Minimum Initial (s)				10.0	10.0					10.0	4.0
Minimum Split (s)				18.0	18.0					25.0	11.0
Total Split (s)				61.0	61.0					38.0	11.0
Total Split (%)				55.5%	55.5%					35%	10%
Maximum Green (s)				55.0	55.0					31.0	5.0
Yellow Time (s)				3.0	3.0					3.0	3.0
All-Red Time (s)				3.0	3.0					4.0	3.0
Lost Time Adjust (s)					-1.0						
Total Lost Time (s)					5.0						
Lead/Lag										Lead	Lag
Lead-Lag Optimize?											
Vehicle Extension (s)				2.0	2.0					2.0	2.0
Recall Mode				Max	Max					C-Max	Max
Walk Time (s)				7.0	7.0					7.0	
Flash Dont Walk (s)				4.0	4.0					3.0	
Pedestrian Calls (#/hr)				30	30					0	
Act Effct Green (s)		43.0			56.0						
Actuated g/C Ratio		0.39			0.51						
v/c Ratio		0.67			0.90						
Control Delay		5.1			15.3						
Queue Delay		0.1			0.0						
Total Delay		5.3			15.3						
LOS		A			B						
Approach Delay		5.3			15.3						
Approach LOS		A			B						
Queue Length 50th (ft)		6			503						
Queue Length 95th (ft)		20			#624						
Internal Link Dist (ft)		111			123	488		157			
Turn Bay Length (ft)											
Base Capacity (vph)		1435			1665						
Starvation Cap Reductn		53			0						
Spillback Cap Reductn		0			0						
Storage Cap Reductn		0			0						
Reduced v/c Ratio		0.70			0.90						

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 74 (67%), Referenced to phase 1:EBL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 11.4 — Intersection LOS: B
Intersection Capacity Utilization 84.2% — ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 22: Cross Street & Sudbury Street & I-93 NB On-Ramp



Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations														
Traffic Volume (vph)	0	436	38	37	21	610	0	0	0	0	875	367	445	
Future Volume (vph)	0	436	38	37	21	610	0	0	0	0	875	367	445	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	14	12	12	12	12	12	11	13	
Lane Util. Factor	1.00	0.91	0.91	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.91	0.86	0.91	
Ped Bike Factor		1.00				1.00					1.00	0.98		
Frt		0.988										0.992	0.850	
Flt Protected						0.996					0.950	0.975		
Satd. Flow (prot)	0	4276	0	0	0	3395	0	0	0	0	1344	2398	1277	
Flt Permitted						0.738					0.950	0.975		
Satd. Flow (perm)	0	4276	0	0	0	2515	0	0	0	0	1341	2395	1277	
Right Turn on Red			No				Yes			Yes			No	
Satd. Flow (RTOR)														
Link Speed (mph)		25				25			25			25		
Link Distance (ft)		184				338			438			242		
Travel Time (s)		5.0				9.2			11.9			6.6		
Confl. Peds. (#/hr)			1		1						1		191	
Confl. Bikes (#/hr)													93	
Peak Hour Factor	0.80	0.80	0.80	0.84	0.84	0.84	0.84	0.92	0.92	0.92	0.96	0.96	0.96	
Heavy Vehicles (%)	0%	7%	16%	11%	5%	1%	0%	0%	0%	0%	10%	16%	7%	
Adj. Flow (vph)	0	545	48	44	25	726	0	0	0	0	911	382	464	
Shared Lane Traffic (%)											48%		10%	
Lane Group Flow (vph)	0	593	0	0	0	795	0	0	0	0	474	865	418	
Turn Type		NA		Perm	Perm	NA					Split	NA	Prot	
Protected Phases		1				1					5	5	5	2
Permitted Phases				1	1									
Detector Phase		1		1	1	1					5	5	5	
Switch Phase														
Minimum Initial (s)		8.0		8.0	8.0	8.0					8.0	8.0	8.0	8.0
Minimum Split (s)		23.0		23.0	23.0	23.0					22.0	22.0	22.0	30.0
Total Split (s)		35.0		35.0	35.0	35.0					55.0	55.0	55.0	30.0
Total Split (%)		29.2%		29.2%	29.2%	29.2%					45.8%	45.8%	45.8%	25%
Maximum Green (s)		29.0		29.0	29.0	29.0					49.0	49.0	49.0	26.0
Yellow Time (s)		3.0		3.0	3.0	3.0					3.0	3.0	3.0	4.0
All-Red Time (s)		3.0		3.0	3.0	3.0					3.0	3.0	3.0	0.0
Lost Time Adjust (s)		-2.0				-2.0					-2.0	-2.0	-2.0	
Total Lost Time (s)		4.0				4.0					4.0	4.0	4.0	
Lead/Lag		Lead		Lead	Lead	Lead								Lag
Lead-Lag Optimize?														
Vehicle Extension (s)		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					Max	Max	Max	None
Walk Time (s)		7.0		7.0	7.0	7.0					7.0	7.0	7.0	7.0
Flash Dont Walk (s)		7.0		7.0	7.0	7.0					8.0	8.0	8.0	19.0
Pedestrian Calls (#/hr)		0		0	0	0					0	0	0	500
Act Effct Green (s)		31.0				31.0					51.0	51.0	51.0	
Actuated g/C Ratio		0.26				0.26					0.42	0.42	0.42	
v/c Ratio		0.54				1.22					0.83	0.85	0.77	
Control Delay		34.1				153.2					35.9	31.6	31.7	
Queue Delay		7.3				0.0					3.8	3.0	3.9	
Total Delay		41.3				153.2					39.7	34.6	35.6	
LOS		D				F					D	C	D	
Approach Delay		41.3				153.2						36.2		
Approach LOS		D				F						D		
Queue Length 50th (ft)		169				~398					371	361	298	
Queue Length 95th (ft)		183				#471					#567	456	454	
Internal Link Dist (ft)		104				258			358			162		
Turn Bay Length (ft)														
Base Capacity (vph)		1104				649					571	1019	542	
Starvation Cap Reductn		459				0					47	81	65	
Spillback Cap Reductn		0				0					0	0	0	
Storage Cap Reductn		0				0					0	0	0	
Reduced v/c Ratio		0.92				1.22					0.90	0.92	0.88	

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 34 (28%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.22
Intersection Signal Delay: 66.8 — Intersection LOS: E
Intersection Capacity Utilization 73.0% — ICU Level of Service C
Analysis Period (min) 15
~ 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: 8: Surface Street & New Chardon Street/I-93 Ramps

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø1	Ø2	Ø5
Lane Configurations									
Traffic Volume (vph)	0	474	1034	21	0	0			
Future Volume (vph)	0	474	1034	21	0	0			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900			
Lane Util. Factor	1.00	0.95	0.91	0.91	1.00	1.00			
Ped Bike Factor			1.00						
Frt			0.997						
Flt Protected									
Satd. Flow (prot)	0	3008	4467	0	0	0			
Flt Permitted									
Satd. Flow (perm)	0	3008	4467	0	0	0			
Right Turn on Red				Yes		Yes			
Satd. Flow (RTOR)			6						
Link Speed (mph)		25	25		25				
Link Distance (ft)		287	184		238				
Travel Time (s)		7.8	5.0		6.5				
Confl. Bikes (#/hr)				10					
Peak Hour Factor	0.81	0.81	0.98	0.98	0.92	0.92			
Heavy Vehicles (%)	0%	8%	4%	11%	0%	0%			
Adj. Flow (vph)	0	585	1055	21	0	0			
Shared Lane Traffic (%)									
Lane Group Flow (vph)	0	585	1076	0	0	0			
Turn Type		NA	NA						
Protected Phases		1 5	1 5				1	2	5
Permitted Phases									
Detector Phase		1 5	1 5						
Switch Phase									
Minimum Initial (s)							8.0	8.0	8.0
Minimum Split (s)							23.0	30.0	22.0
Total Split (s)							35.0	30.0	55.0
Total Split (%)							29%	25%	46%
Maximum Green (s)							29.0	26.0	49.0
Yellow Time (s)							3.0	4.0	3.0
All-Red Time (s)							3.0	0.0	3.0
Lost Time Adjust (s)									
Total Lost Time (s)									
Lead/Lag							Lead	Lag	
Lead-Lag Optimize?									
Vehicle Extension (s)							2.0	2.0	2.0
Recall Mode							C-Max	None	Max
Walk Time (s)							7.0	7.0	7.0
Flash Dont Walk (s)							7.0	19.0	8.0
Pedestrian Calls (#/hr)							0	500	0
Act Effct Green (s)		86.0	86.0						
Actuated g/C Ratio		0.72	0.72						
v/c Ratio		0.27	0.34						
Control Delay		3.5	3.0						
Queue Delay		0.7	2.0						
Total Delay		4.1	5.0						
LOS		A	A						
Approach Delay		4.1	5.0						
Approach LOS		A	A						
Queue Length 50th (ft)		62	0						
Queue Length 95th (ft)		69	m0						
Internal Link Dist (ft)		207	104		158				
Turn Bay Length (ft)									
Base Capacity (vph)		2155	3203						
Starvation Cap Reductn		1160	1920						
Spillback Cap Reductn		687	90						
Storage Cap Reductn		0	0						
Reduced v/c Ratio		0.59	0.84						

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 34 (28%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.22
Intersection Signal Delay: 4.7 Intersection LOS: A
Intersection Capacity Utilization 26.1% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: New Chardon Street & Canal Street

Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBU	SBL	SBT	SBR	SBR2
Lane Configurations																	
Traffic Volume (vph)	44	105	36	24	390	80	477	72	147	267	312	255	9	97	207	55	95
Future Volume (vph)	44	105	36	24	390	80	477	72	147	267	312	255	9	97	207	55	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	10	12	12	12	10	10	16	12	11	11	11	16
Storage Length (ft)	0		0			0		0		0		150		0		150	
Storage Lanes	0		0			1		0		1		1		0		1	
Taper Length (ft)	25					25				25				25			
Lane Util. Factor	0.95	0.95	0.95	0.95	0.91	0.91	0.91	0.95	0.95	0.91	0.91	1.00	0.91	0.91	0.91	0.91	1.00
Ped Bike Factor		0.72			0.63		0.86			0.71	0.93				0.83		0.59
Frt		0.957					0.984					0.850			0.978		0.850
Flt Protected		0.990			0.950		0.990			0.950	0.982				0.986		
Satd. Flow (prot)	0	2037	0	0	1302	0	2891	0	0	1344	2682	1569	0	0	3516	0	1647
Flt Permitted		0.990			0.950		0.990			0.950	0.982				0.986		
Satd. Flow (perm)	0	1983	0	0	820	0	2530	0	0	959	2486	1569	0	0	3257	0	967
Right Turn on Red				Yes				Yes				No					Yes
Satd. Flow (RTOR)		10					10										145
Link Speed (mph)		25					25				25				25		
Link Distance (ft)		204					287				468				998		
Travel Time (s)		5.6					7.8				12.8				27.2		
Confl. Peds. (#/hr)	152		432	317	432	317		152	317	265		1136		1136		317	265
Confl. Bikes (#/hr)			1	1				17				10				64	64
Peak Hour Factor	0.84	0.84	0.84	0.84	0.97	0.97	0.97	0.97	0.91	0.91	0.91	0.91	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	14%	14%	10%	0%	6%	0%	3%	4%	0%	7%	6%	5%	11%	9%	14%	0%	0%
Adj. Flow (vph)	52	125	43	29	402	82	492	74	162	293	343	280	10	113	241	64	110
Shared Lane Traffic (%)					14%					66%							
Lane Group Flow (vph)	0	249	0	0	346	0	704	0	0	262	536	280	0	0	428	0	110
Turn Type	Split	NA			Split	Split	NA		Split	Split	NA	pt+ov	Perm	Split	NA		Perm
Protected Phases	3	3			2	2	2		1	1	1	1 2		4	4		
Permitted Phases													4				4
Detector Phase	3	3			2	2	2		1	1	1	1 2	4	4	4		4
Switch Phase																	
Minimum Initial (s)	8.0	8.0			8.0	8.0	8.0		8.0	8.0	8.0		8.0	8.0	8.0		8.0
Minimum Split (s)	19.0	19.0			15.0	15.0	15.0		33.0	33.0	33.0		24.0	24.0	24.0		24.0
Total Split (s)	22.0	22.0			40.0	40.0	40.0		34.0	34.0	34.0		24.0	24.0	24.0		24.0
Total Split (%)	18.3%	18.3%			33.3%	33.3%	33.3%		28.3%	28.3%	28.3%		20.0%	20.0%	20.0%		20.0%
Maximum Green (s)	15.0	15.0			34.0	34.0	34.0		28.0	28.0	28.0		16.0	16.0	16.0		16.0
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0		3.0
All-Red Time (s)	4.0	4.0			3.0	3.0	3.0		3.0	3.0	3.0		5.0	5.0	5.0		5.0
Lost Time Adjust (s)		-2.0			-2.0		-2.0			-2.0	-2.0				-2.0		0.0
Total Lost Time (s)		5.0			4.0		4.0			4.0	4.0				6.0		8.0
Lead/Lag	Lag	Lag			Lead	Lead	Lead										
Lead-Lag Optimize?																	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0		2.0
Recall Mode	Max	Max			Max	Max	Max		C-Max	C-Max	C-Max		Max	Max	Max		Max
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)	4.0	4.0							17.0	17.0	17.0		8.0	8.0	8.0		8.0
Pedestrian Calls (#/hr)	0	0							0		0		0	0	0		0
Act Effct Green (s)		17.0			36.0		36.0			30.0	30.0	70.0			18.0		16.0
Actuated g/C Ratio		0.14			0.30		0.30			0.25	0.25	0.58			0.15		0.13
v/c Ratio		0.84			0.89		0.81			0.78	0.80	0.31			0.81		0.43
Control Delay		44.1			48.2		29.0			33.4	27.9	9.5			62.5		8.7
Queue Delay		0.0			11.0		5.7			0.0	0.0	0.0			0.0		0.0
Total Delay		44.1			59.2		34.7			33.4	27.9	9.5			62.5		8.7
LOS		D			E		C			C	C	A			E		A
Approach Delay		44.1					42.8				24.5				51.5		
Approach LOS		D					D				C				D		
Queue Length 50th (ft)		23			172		171			129	136	71			119		0
Queue Length 95th (ft)		#61			#457		209			m#323	#226	m111			#152		21
Internal Link Dist (ft)		124					207				388				918		
Turn Bay Length (ft)												150					150
Base Capacity (vph)		297			390		874			336	670	915			527		254
Starvation Cap Reductn		0			34		122			0	0	0			0		0
Spillback Cap Reductn		0			0		0			0	0	0			0		0
Storage Cap Reductn		0			0		0			0	0	0			0		0
Reduced v/c Ratio		0.84			0.97		0.94			0.78	0.80	0.31			0.81		0.43

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 37.8 Intersection LOS: D
Intersection Capacity Utilization 79.9% ICU Level of Service D
Analysis Period (min) 15
\# 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: 10: GCG Entrance Driveway & Congress Street/Merrimac Street & New Chardon Street

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø1	Ø2
Lane Configurations								
Traffic Volume (vph)	191	0	0	743	4	18		
Future Volume (vph)	191	0	0	743	4	18		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	12	12	11	11		
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00		
Ped Bike Factor								
Frt					0.890			
Flt Protected					0.991			
Satd. Flow (prot)	2901	0	0	3094	1458	0		
Flt Permitted					0.991			
Satd. Flow (perm)	2901	0	0	3094	1458	0		
Right Turn on Red		Yes				Yes		
Satd. Flow (RTOR)					72			
Link Speed (mph)	25			25	25			
Link Distance (ft)	137			204	136			
Travel Time (s)	3.7			5.6	3.7			
Confl. Bikes (#/hr)		2						
Peak Hour Factor	0.83	0.83	0.93	0.93	0.25	0.25		
Heavy Vehicles (%)	12%	0%	0%	5%	0%	0%		
Adj. Flow (vph)	230	0	0	799	16	72		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	230	0	0	799	88	0		
Turn Type	NA			NA	Prot			
Protected Phases	3			1 2 3	4		1	2
Permitted Phases								
Detector Phase	3			1 2 3	4			
Switch Phase								
Minimum Initial (s)	8.0				8.0		8.0	8.0
Minimum Split (s)	19.0				24.0		33.0	15.0
Total Split (s)	22.0				24.0		34.0	40.0
Total Split (%)	18.3%				20.0%		28%	33%
Maximum Green (s)	15.0				16.0		28.0	34.0
Yellow Time (s)	3.0				3.0		3.0	3.0
All-Red Time (s)	4.0				5.0		3.0	3.0
Lost Time Adjust (s)	-2.0				-2.0			
Total Lost Time (s)	5.0				6.0			
Lead/Lag	Lag							Lead
Lead-Lag Optimize?								
Vehicle Extension (s)	2.0				2.0		2.0	2.0
Recall Mode	Max				Max		C-Max	Max
Walk Time (s)	7.0				7.0		7.0	
Flash Dont Walk (s)	4.0				8.0		17.0	
Pedestrian Calls (#/hr)	0				0		0	
Act Effct Green (s)	17.0			92.0	18.0			
Actuated g/C Ratio	0.14			0.77	0.15			
v/c Ratio	0.56			0.34	0.32			
Control Delay	53.9			0.8	17.5			
Queue Delay	0.3			1.0	0.0			
Total Delay	54.2			1.8	17.5			
LOS	D			A	B			
Approach Delay	54.2			1.8	17.5			
Approach LOS	D			A	B			
Queue Length 50th (ft)	88			8	11			
Queue Length 95th (ft)	121			18	0			
Internal Link Dist (ft)	57			124	56			
Turn Bay Length (ft)								
Base Capacity (vph)	410			2372	279			
Starvation Cap Reductn	0			1238	0			
Spillback Cap Reductn	20			0	0			
Storage Cap Reductn	0			0	0			
Reduced v/c Ratio	0.59			0.70	0.32			

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 0 (0%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 13.8 — Intersection LOS: B
Intersection Capacity Utilization 37.8% — ICU Level of Service A
Analysis Period (min) 15

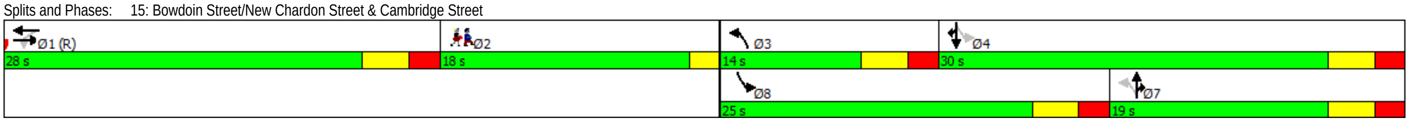
Splits and Phases: 12: GCG Exit Driveway & New Chardon Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations		↑↑↱			↰↑↱		↰	↑	↱	↰	↑	↱	
Traffic Volume (vph)	0	695	93	21	199	31	153	144	110	322	192	287	
Future Volume (vph)	0	695	93	21	199	31	153	144	110	322	192	287	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	0		100	0		100	
Storage Lanes	0		0	0		0	1		1	1		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.91	0.91	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.95			0.95				0.61			0.75	
Frt		0.982			0.981				0.850			0.850	
Flt Protected					0.996		0.950			0.950			
Satd. Flow (prot)	0	4538	0	0	3140	0	1612	1759	1482	1719	1845	1524	
Flt Permitted					0.856		0.632			0.370			
Satd. Flow (perm)	0	4538	0	0	2698	0	1072	1759	909	670	1845	1136	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		26			17				170			299	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		236			438			364			579		
Travel Time (s)		5.4			10.0			8.3			13.2		
Confl. Peds. (#/hr)			530			756			361			229	
Confl. Bikes (#/hr)			105			21			6				
Peak Hour Factor	0.93	0.93	0.93	0.86	0.86	0.86	0.94	0.94	0.94	0.96	0.96	0.96	
Heavy Vehicles (%)	100%	7%	6%	21%	2%	25%	12%	8%	9%	5%	3%	6%	
Adj. Flow (vph)	0	747	100	24	231	36	163	153	117	335	200	299	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	847	0	0	291	0	163	153	117	335	200	299	
Turn Type		NA		Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom	
Protected Phases		1			1		3	7	7	8	4	4	2
Permitted Phases				1			7		7	4		4	
Detector Phase		1		1	1		3	7	7	8	4	4	
Switch Phase													
Minimum Initial (s)		8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	1.0
Minimum Split (s)		28.0		28.0	28.0		13.0	13.0	13.0	13.0	13.0	13.0	18.0
Total Split (s)		28.0		28.0	28.0		14.0	19.0	19.0	25.0	30.0	30.0	18.0
Total Split (%)		31.1%		31.1%	31.1%		15.6%	21.1%	21.1%	27.8%	33.3%	33.3%	20%
Maximum Green (s)		23.0		23.0	23.0		9.0	14.0	14.0	20.0	25.0	25.0	16.0
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)		2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	0.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag		Lead		Lead	Lead		Lead	Lag	Lag	Lead	Lag	Lag	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	2.0
Recall Mode		C-Max		C-Max	C-Max		None	None	None	None	None	None	None
Walk Time (s)		7.0		7.0	7.0								7.0
Flash Dont Walk (s)		16.0		16.0	16.0								9.0
Pedestrian Calls (#/hr)		0		0	0								20
Act Effct Green (s)		38.5			38.5		21.0	11.6	11.6	34.3	19.9	19.9	
Actuated g/C Ratio		0.43			0.43		0.23	0.13	0.13	0.38	0.22	0.22	
v/c Ratio		0.43			0.25		0.53	0.67	0.35	0.73	0.49	0.52	
Control Delay		26.2			9.9		26.5	52.0	4.7	30.5	33.8	6.9	
Queue Delay		0.6			0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		26.8			9.9		26.5	52.0	4.7	30.5	33.8	6.9	
LOS		C			A		C	D	A	C	C	A	
Approach Delay		26.8			9.9			29.7			22.8		
Approach LOS		C			A			C			C		
Queue Length 50th (ft)		26			23		60	84	0	139	100	0	
Queue Length 95th (ft)		221			34		100	144	19	204	154	59	
Internal Link Dist (ft)		156			358			284			499		
Turn Bay Length (ft)									100			100	
Base Capacity (vph)		1956			1163		310	273	374	488	512	639	
Starvation Cap Reductn		687			0		0	0	0	0	0	0	
Spillback Cap Reductn		0			11		0	0	0	0	0	1	
Storage Cap Reductn		0			0		0	0	0	0	0	0	
Reduced v/c Ratio		0.67			0.25		0.53	0.56	0.31	0.69	0.39	0.47	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 23.9 Intersection LOS: C
Intersection Capacity Utilization 66.0% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 15: Bowdoin Street/New Chardon Street & Cambridge Street



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	19	271	559	278	18	108	210	121	21	33	11	0	0	0
Future Volume (vph)	19	271	559	278	18	108	210	121	21	33	11	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0		100		100	0		0	0		0
Storage Lanes		2		0		1		1	0		0	0		0
Taper Length (ft)		25				25			25			25		
Lane Util. Factor	0.95	0.97	0.95	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.88					0.66		0.95				
Frt			0.950					0.850		0.977				
Flt Protected		0.950				0.950				0.984				
Satd. Flow (prot)	0	3346	2845	0	0	1689	3374	1455	0	1660	0	0	0	0
Flt Permitted		0.603				0.328				0.984				
Satd. Flow (perm)	0	2124	2845	0	0	583	3374	966	0	1660	0	0	0	0
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			95					138		11				
Link Speed (mph)			30				30			30			30	
Link Distance (ft)			438				763			259			584	
Travel Time (s)			10.0				17.3			5.9			13.3	
Confl. Peds. (#/hr)				154				377			241			
Confl. Bikes (#/hr)				60				6			2			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.88	0.88	0.88	0.88	0.69	0.69	0.69	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	6%	5%	0%	8%	7%	11%	0%	5%	9%	0%	0%	0%
Adj. Flow (vph)	20	279	576	287	20	123	239	138	30	48	16	0	0	0
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	299	863	0	0	143	239	138	0	94	0	0	0	0
Turn Type	custom	Prot	NA		custom	Prot	NA	Perm	Perm	NA				
Protected Phases		2	1			6	1			5				
Permitted Phases	2				6			1	5					
Detector Phase	2	2	1		6	6	1	1	5	5				
Switch Phase														
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0				
Minimum Split (s)	22.0	22.0	27.0		12.0	12.0	27.0	27.0	22.0	22.0				
Total Split (s)	22.0	22.0	29.0		12.0	12.0	29.0	29.0	27.0	27.0				
Total Split (%)	24.4%	24.4%	32.2%		13.3%	13.3%	32.2%	32.2%	30.0%	30.0%				
Maximum Green (s)	18.0	18.0	25.0		8.0	8.0	25.0	25.0	23.0	23.0				
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		0.0				
Total Lost Time (s)		4.0	4.0			4.0	4.0	4.0		4.0				
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lead	Lead	Lead	Lead				
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	None	None	C-Max		None	None	C-Max	C-Max	None	None				
Walk Time (s)	7.0	7.0	7.0				7.0	7.0	7.0	7.0				
Flash Dont Walk (s)	11.0	11.0	16.0				16.0	16.0	11.0	11.0				
Pedestrian Calls (#/hr)	0	0	0				0	0	0	0				
Act Effct Green (s)		15.8	25.0			25.9	25.0	25.0		9.8				
Actuated g/C Ratio		0.18	0.28			0.29	0.28	0.28		0.11				
v/c Ratio		0.80	1.01			0.86	0.26	0.38		0.50				
Control Delay		45.1	59.4			78.2	26.2	7.9		42.0				
Queue Delay		0.0	0.0			0.0	0.0	0.0		0.0				
Total Delay		45.1	59.4			78.2	26.2	7.9		42.0				
LOS		D	E			E	C	A		D				
Approach Delay			55.8				35.6			42.0				
Approach LOS			E				D			D				
Queue Length 50th (ft)		82	~221			80	55	0		46				
Queue Length 95th (ft)		#140	#346			#212	84	42		66				
Internal Link Dist (ft)			358				683			179			504	
Turn Bay Length (ft)						100		100						
Base Capacity (vph)		424	858			167	937	368		432				
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		0.71	1.01			0.86	0.26	0.38		0.22				

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 105
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 49.1 Intersection LOS: D
Intersection Capacity Utilization 58.7% ICU Level of Service B
Analysis Period (min) 15
~ 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: 16: Somerset Street/Sudbury Street & Cambridge Street

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	424	0	0	187	0
Future Volume (Veh/h)	0	424	0	0	187	0
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)	0	461	0	0	203	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		584				
pX, platoon unblocked					0.95	
vC, conflicting volume	0				230	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				88	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				77	100
cM capacity (veh/h)	1636				864	1091

Direction, Lane #	EB 1	EB 2	SB 1
Volume Total	230	230	203
Volume Left	0	0	203
Volume Right	0	0	0
cSH	1700	1700	864
Volume to Capacity	0.14	0.14	0.23
Queue Length 95th (ft)	0	0	23
Control Delay (s)	0.0	0.0	10.4
Lane LOS			B
Approach Delay (s)	0.0		10.4
Approach LOS			B

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	28.7%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection Sign configuration not allowed in HCM analysis.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations														
Traffic Volume (vph)	152	251	156	0	0	0	14	0	825	159	90	538	0	
Future Volume (vph)	152	251	156	0	0	0	14	0	825	159	90	538	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	11	10	12	12	12	12	11	11	11	10	11	11	
Storage Length (ft)	0		0	0		0		0		0	100		0	
Storage Lanes	1		0	0		0		0		0	1		0	
Taper Length (ft)	25			25				25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	0.91	1.00	0.91	0.91	1.00	0.91	1.00	
Ped Bike Factor	0.46	0.79							0.94		0.88			
Frt		0.943							0.976					
Flt Protected	0.950								0.999		0.950			
Satd. Flow (prot)	1392	2118	0	0	0	0	0	0	3877	0	1458	4178	0	
Flt Permitted	0.950								0.927		0.950			
Satd. Flow (perm)	641	2118	0	0	0	0	0	0	3597	0	1278	4178	0	
Right Turn on Red			Yes			Yes				No			Yes	
Satd. Flow (RTOR)		96												
Link Speed (mph)		25			25				25			25		
Link Distance (ft)		153			161				386			468		
Travel Time (s)		4.2			4.4				10.5			12.8		
Confl. Peds. (#/hr)	430		475							674	674			
Confl. Bikes (#/hr)			11							12			59	
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.94	0.94	0.94	0.94	0.88	0.88	0.88	
Heavy Vehicles (%)	5%	6%	4%	0%	0%	0%	0%	0%	6%	14%	4%	8%	0%	
Parking (#/hr)	0	0												
Adj. Flow (vph)	171	282	175	0	0	0	15	0	878	169	102	611	0	
Shared Lane Traffic (%)														
Lane Group Flow (vph)	171	457	0	0	0	0	0	0	1062	0	102	611	0	
Turn Type	Split	NA					Perm		NA		Prot	NA		
Protected Phases	5	5							1		6	1 6		2
Permitted Phases							1							
Detector Phase	5	5					1		1		6	1 6		
Switch Phase														
Minimum Initial (s)	8.0	8.0					10.0		10.0		7.0			7.0
Minimum Split (s)	15.0	15.0					17.0		17.0		14.0			26.0
Total Split (s)	25.0	25.0					51.0		51.0		18.0			26.0
Total Split (%)	20.8%	20.8%					42.5%		42.5%		15.0%			22%
Maximum Green (s)	19.0	19.0					46.0		46.0		12.0			22.0
Yellow Time (s)	3.0	3.0					3.0		3.0		3.0			4.0
All-Red Time (s)	3.0	3.0					2.0		2.0		3.0			0.0
Lost Time Adjust (s)	-2.0	-2.0							-2.0		-2.0			
Total Lost Time (s)	4.0	4.0							3.0		4.0			
Lead/Lag	Lead	Lead					Lead		Lead		Lag			Lag
Lead-Lag Optimize?														
Vehicle Extension (s)	2.0	2.0					2.0		2.0		2.0			2.0
Recall Mode	Max	Max					C-Max		C-Max		Max			Ped
Walk Time (s)	0.0	0.0												7.0
Flash Dont Walk (s)	8.0	8.0												15.0
Pedestrian Calls (#/hr)	0	0												500
Act Effct Green (s)	21.0	21.0							48.0		14.0	66.0		
Actuated g/C Ratio	0.18	0.18							0.40		0.12	0.55		
v/c Ratio	0.70	1.02							0.74		0.60	0.27		
Control Delay	63.3	85.9							33.1		58.1	15.5		
Queue Delay	0.0	0.0							0.9		0.0	0.0		
Total Delay	63.3	85.9							34.0		58.1	15.5		
LOS	E	F							C		E	B		
Approach Delay		79.8							34.0			21.6		
Approach LOS		E							C			C		
Queue Length 50th (ft)	126	~157							253		82	109		
Queue Length 95th (ft)	#218	#267							317		m97	m129		
Internal Link Dist (ft)		73			81				306			388		
Turn Bay Length (ft)											100			
Base Capacity (vph)	243	449							1438		170	2297		
Starvation Cap Reductn	0	0							155		0	0		
Spillback Cap Reductn	0	0							0		0	0		
Storage Cap Reductn	0	0							0		0	0		
Reduced v/c Ratio	0.70	1.02							0.83		0.60	0.27		

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 102 (85%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 42.3 — Intersection LOS: D
Intersection Capacity Utilization 62.2% — ICU Level of Service B
Analysis Period (min) 15
~ 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: 19: Congress Street & Sudbury Street

Lane Group	EBT	EBR	SBL	SBT	SEL
Lane Configurations					
Traffic Volume (vph)	316	120	31	394	21
Future Volume (vph)	316	120	31	394	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12
Lane Util. Factor	0.95	1.00	0.95	0.95	1.00
Ped Bike Factor		0.66		0.98	
Frt		0.850			
Flt Protected				0.996	0.950
Satd. Flow (prot)	3116	1482	0	3241	926
Flt Permitted				0.996	0.950
Satd. Flow (perm)	3116	971	0	3166	926
Right Turn on Red		Yes	No		
Satd. Flow (RTOR)		129			
Link Speed (mph)	25			25	25
Link Distance (ft)	111			438	138
Travel Time (s)	3.0			11.9	3.8
Confl. Peds. (#/hr)		180	134		
Confl. Bikes (#/hr)		1			
Peak Hour Factor	0.93	0.93	0.86	0.86	0.62
Heavy Vehicles (%)	12%	9%	10%	11%	95%
Adj. Flow (vph)	340	129	36	458	34
Shared Lane Traffic (%)					
Lane Group Flow (vph)	340	129	0	494	34
Turn Type	NA	Perm	Perm	NA	Prot
Protected Phases	1			3	4
Permitted Phases		1	3		
Detector Phase	1	1	3	3	4
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	6.0
Minimum Split (s)	21.0	21.0	18.0	18.0	13.0
Total Split (s)	42.0	42.0	41.0	41.0	27.0
Total Split (%)	38.2%	38.2%	37.3%	37.3%	24.5%
Maximum Green (s)	38.0	38.0	35.0	35.0	21.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0		-2.0	0.0
Total Lost Time (s)	3.0	3.0		4.0	6.0
Lead/Lag			Lead	Lead	Lag
Lead-Lag Optimize?					
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0
Recall Mode	C-Max	C-Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	5.0	5.0	4.0	4.0	
Pedestrian Calls (#/hr)	0	0	25	25	
Act Effct Green (s)	39.0	39.0		37.0	21.0
Actuated g/C Ratio	0.35	0.35		0.34	0.19
v/c Ratio	0.31	0.30		0.46	0.19
Control Delay	26.7	6.3		30.5	40.8
Queue Delay	1.5	0.5		0.0	0.0
Total Delay	28.2	6.8		30.5	40.8
LOS	C	A		C	D
Approach Delay	22.3			30.5	40.8
Approach LOS	C			C	D
Queue Length 50th (ft)	90	0		143	20
Queue Length 95th (ft)	129	41		183	34
Internal Link Dist (ft)	31			358	58
Turn Bay Length (ft)					
Base Capacity (vph)	1104	427		1064	176
Starvation Cap Reductn	565	96		0	0
Spillback Cap Reductn	3	0		0	0
Storage Cap Reductn	0	0		0	0
Reduced v/c Ratio	0.63	0.39		0.46	0.19

Intersection Summary	
Area Type: Other	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 10 (9%), Referenced to phase 1:EBT, Start of Green	
Natural Cycle: 55	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.46	
Intersection Signal Delay: 27.0	Intersection LOS: C
Intersection Capacity Utilization 38.5%	ICU Level of Service A
Analysis Period (min) 15	

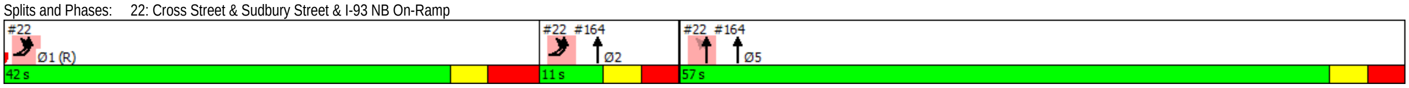
Splits and Phases: 21: Surface Street & Sudbury Street & Haymarket Bus Exit

Lane Group	EBL2	EBL	EBR	NBL	NBT	SBT	SBR	SEL	SER	Ø1	Ø2
Lane Configurations											
Traffic Volume (vph)	250	118	0	164	690	0	0	0	0		
Future Volume (vph)	250	118	0	164	690	0	0	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	13	12	12	11	12	12	12	12		
Lane Util. Factor	0.95	0.97	1.00	0.95	0.95	1.00	1.00	1.00	1.00		
Frt											
Flt Protected		0.950			0.990						
Satd. Flow (prot)	0	3136	0	0	3174	0	0	0	0		
Flt Permitted		0.950			0.990						
Satd. Flow (perm)	0	3136	0	0	3174	0	0	0	0		
Right Turn on Red	Yes		Yes								
Satd. Flow (RTOR)		275									
Link Speed (mph)		25			25	25		25			
Link Distance (ft)		191			203	568		237			
Travel Time (s)		5.2			5.5	15.5		6.5			
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.92	0.92	0.92	0.92		
Heavy Vehicles (%)	8%	31%	0%	4%	10%	0%	0%	0%	0%		
Adj. Flow (vph)	275	130	0	171	719	0	0	0	0		
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	405	0	0	890	0	0	0	0		
Turn Type	Prot	Prot		Perm	NA						
Protected Phases	1 2	1 2			5					1	2
Permitted Phases				5							
Detector Phase	1 2	1 2		5	5						
Switch Phase											
Minimum Initial (s)				10.0	10.0					10.0	4.0
Minimum Split (s)				18.0	18.0					25.0	11.0
Total Split (s)				57.0	57.0					42.0	11.0
Total Split (%)				51.8%	51.8%					38%	10%
Maximum Green (s)				51.0	51.0					35.0	5.0
Yellow Time (s)				3.0	3.0					3.0	3.0
All-Red Time (s)				3.0	3.0					4.0	3.0
Lost Time Adjust (s)					-1.0						
Total Lost Time (s)					5.0						
Lead/Lag										Lead	Lag
Lead-Lag Optimize?											
Vehicle Extension (s)				2.0	2.0					2.0	2.0
Recall Mode				Max	Max					C-Max	Max
Walk Time (s)				7.0	7.0					7.0	
Flash Dont Walk (s)				4.0	4.0					3.0	
Pedestrian Calls (#/hr)				30	30					0	
Act Effct Green (s)		47.0			52.0						
Actuated g/C Ratio		0.43			0.47						
v/c Ratio		0.27			0.59						
Control Delay		1.1			7.1						
Queue Delay		0.4			0.1						
Total Delay		1.5			7.2						
LOS		A			A						
Approach Delay		1.5			7.2						
Approach LOS		A			A						
Queue Length 50th (ft)		0			204						
Queue Length 95th (ft)		2			250						
Internal Link Dist (ft)		111			123	488		157			
Turn Bay Length (ft)											
Base Capacity (vph)		1497			1500						
Starvation Cap Reductn		617			47						
Spillback Cap Reductn		0			0						
Storage Cap Reductn		0			0						
Reduced v/c Ratio		0.46			0.61						

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 16 (15%), Referenced to phase 1:EBL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.59
Intersection Signal Delay: 5.4 Intersection LOS: A
Intersection Capacity Utilization 46.9% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 22: Cross Street & Sudbury Street & I-93 NB On-Ramp



Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations														
Traffic Volume (vph)	0	905	75	19	10	425	0	0	0	0	1106	310	295	
Future Volume (vph)	0	905	75	19	10	425	0	0	0	0	1106	310	295	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	14	12	12	12	12	12	11	13	
Lane Util. Factor	1.00	0.91	0.91	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.91	0.86	0.91	
Ped Bike Factor												0.99		
Frt		0.989										0.995	0.850	
Flt Protected						0.997					0.950	0.970		
Satd. Flow (prot)	0	4547	0	0	0	3353	0	0	0	0	1382	2455	1254	
Flt Permitted						0.748					0.950	0.970		
Satd. Flow (perm)	0	4547	0	0	0	2515	0	0	0	0	1382	2455	1254	
Right Turn on Red			No				Yes			Yes			No	
Satd. Flow (RTOR)														
Link Speed (mph)		25				25			25			25		
Link Distance (ft)		184				394			438			242		
Travel Time (s)		5.0				10.7			11.9			6.6		
Confl. Peds. (#/hr)													148	
Peak Hour Factor	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.94	0.94	0.94	
Heavy Vehicles (%)	0%	1%	8%	0%	11%	3%	0%	0%	0%	0%	7%	17%	9%	
Adj. Flow (vph)	0	995	82	20	11	447	0	0	0	0	1177	330	314	
Shared Lane Traffic (%)											48%		10%	
Lane Group Flow (vph)	0	1077	0	0	0	478	0	0	0	0	612	926	283	
Turn Type		NA		Perm	Perm	NA					Split	NA	Prot	
Protected Phases		1				1					5	5	5	2
Permitted Phases				1	1									
Detector Phase		1		1	1	1					5	5	5	
Switch Phase														
Minimum Initial (s)		8.0		8.0	8.0	8.0					8.0	8.0	8.0	8.0
Minimum Split (s)		23.0		23.0	23.0	23.0					22.0	22.0	22.0	30.0
Total Split (s)		33.0		33.0	33.0	33.0					47.0	47.0	47.0	30.0
Total Split (%)		30.0%		30.0%	30.0%	30.0%					42.7%	42.7%	42.7%	27%
Maximum Green (s)		27.0		27.0	27.0	27.0					41.0	41.0	41.0	26.0
Yellow Time (s)		3.0		3.0	3.0	3.0					3.0	3.0	3.0	4.0
All-Red Time (s)		3.0		3.0	3.0	3.0					3.0	3.0	3.0	0.0
Lost Time Adjust (s)		-2.0				-2.0					-2.0	-2.0	-2.0	
Total Lost Time (s)		4.0				4.0					4.0	4.0	4.0	
Lead/Lag		Lead		Lead	Lead	Lead								Lag
Lead-Lag Optimize?														
Vehicle Extension (s)		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					Max	Max	Max	None
Walk Time (s)		7.0		7.0	7.0	7.0					7.0	7.0	7.0	7.0
Flash Dont Walk (s)		7.0		7.0	7.0	7.0					8.0	8.0	8.0	19.0
Pedestrian Calls (#/hr)		0		0	0	0					0	0	0	50
Act Effct Green (s)		35.0				35.0					43.0	43.0	43.0	
Actuated g/C Ratio		0.32				0.32					0.39	0.39	0.39	
v/c Ratio		0.74				0.60					1.13	1.09dl	0.58	
Control Delay		26.1				37.9					108.7	49.6	26.2	
Queue Delay		3.3				0.0					0.0	20.6	4.0	
Total Delay		29.4				37.9					108.7	70.2	30.1	
LOS		C				D					F	E	C	
Approach Delay		29.4				37.9						76.9		
Approach LOS		C				D						E		
Queue Length 50th (ft)		252				162					~560	383	132	
Queue Length 95th (ft)		#343				223					#807	#530	252	
Internal Link Dist (ft)		104				314			358			162		
Turn Bay Length (ft)														
Base Capacity (vph)		1446				800					540	959	490	
Starvation Cap Reductn		269				0					0	74	133	
Spillback Cap Reductn		0				0					0	0	0	
Storage Cap Reductn		0				0					0	0	0	
Reduced v/c Ratio		0.92				0.60					1.13	1.05	0.79	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 57 (52%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.13
Intersection Signal Delay: 56.2 Intersection LOS: E
Intersection Capacity Utilization 78.1% ICU Level of Service D
Analysis Period (min) 15
~ 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 8: Surface Street & New Chardon Street/I-93 Ramps

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø1	Ø2	Ø5
Lane Configurations		↑↑	↑↑↑→						
Traffic Volume (vph)	0	980	693	28	0	0			
Future Volume (vph)	0	980	693	28	0	0			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900			
Lane Util. Factor	1.00	0.95	0.91	0.91	1.00	1.00			
Ped Bike Factor			1.00						
Frt			0.994						
Flt Protected									
Satd. Flow (prot)	0	3217	4400	0	0	0			
Flt Permitted									
Satd. Flow (perm)	0	3217	4400	0	0	0			
Right Turn on Red				Yes		Yes			
Satd. Flow (RTOR)			13						
Link Speed (mph)		25	25		25				
Link Distance (ft)		287	184		238				
Travel Time (s)		7.8	5.0		6.5				
Confl. Bikes (#/hr)				186					
Peak Hour Factor	0.95	0.95	0.93	0.93	0.92	0.92			
Heavy Vehicles (%)	0%	1%	5%	4%	0%	0%			
Adj. Flow (vph)	0	1032	745	30	0	0			
Shared Lane Traffic (%)									
Lane Group Flow (vph)	0	1032	775	0	0	0			
Turn Type		NA	NA						
Protected Phases		1 5	1 5				1	2	5
Permitted Phases									
Detector Phase		1 5	1 5						
Switch Phase									
Minimum Initial (s)							8.0	8.0	8.0
Minimum Split (s)							23.0	30.0	22.0
Total Split (s)							33.0	30.0	47.0
Total Split (%)							30%	27%	43%
Maximum Green (s)							27.0	26.0	41.0
Yellow Time (s)							3.0	4.0	3.0
All-Red Time (s)							3.0	0.0	3.0
Lost Time Adjust (s)									
Total Lost Time (s)									
Lead/Lag							Lead	Lag	
Lead-Lag Optimize?									
Vehicle Extension (s)							2.0	2.0	2.0
Recall Mode							C-Max	None	Max
Walk Time (s)							7.0	7.0	7.0
Flash Dont Walk (s)							7.0	19.0	8.0
Pedestrian Calls (#/hr)							0	50	0
Act Effct Green (s)		82.8	82.8						
Actuated g/C Ratio		0.75	0.75						
v/c Ratio		0.43	0.23						
Control Delay		6.9	1.3						
Queue Delay		1.5	0.3						
Total Delay		8.5	1.6						
LOS		A	A						
Approach Delay		8.5	1.6						
Approach LOS		A	A						
Queue Length 50th (ft)		148	5						
Queue Length 95th (ft)		m171	m21						
Internal Link Dist (ft)		207	104		158				
Turn Bay Length (ft)									
Base Capacity (vph)		2421	3315						
Starvation Cap Reductn		959	1688						
Spillback Cap Reductn		1135	72						
Storage Cap Reductn		0	0						
Reduced v/c Ratio		0.80	0.48						

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 57 (52%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.13
Intersection Signal Delay: 5.5 Intersection LOS: A
Intersection Capacity Utilization 33.4% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

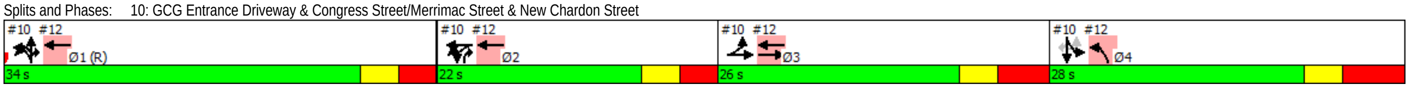
Splits and Phases: 9: New Chardon Street & Canal Street

Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBU	SBL	SBT	SBR	SBR2
Lane Configurations																	
Traffic Volume (vph)	67	301	62	4	311	20	316	41	58	217	253	369	4	304	305	18	55
Future Volume (vph)	67	301	62	4	311	20	316	41	58	217	253	369	4	304	305	18	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	10	12	12	12	10	10	16	12	11	11	11	16
Storage Length (ft)	0		0			0		0		0		150		0		150	
Storage Lanes	0		0			1		0		1		1		0		1	
Taper Length (ft)	25					25				25				25			
Lane Util. Factor	0.95	0.95	0.95	0.95	0.91	0.91	0.91	0.95	0.95	0.91	0.91	1.00	0.91	0.91	0.91	0.91	1.00
Ped Bike Factor		0.85			0.80		0.88			0.85	0.97				0.83		0.71
Frt		0.977					0.987					0.850			0.996		0.850
Flt Protected		0.992			0.950		0.989			0.950	0.986				0.976		
Satd. Flow (prot)	0	2639	0	0	1254	0	2823	0	0	1335	2709	1615	0	0	4050	0	1647
Flt Permitted		0.992			0.950		0.989			0.950	0.986				0.976		
Satd. Flow (perm)	0	2591	0	0	1005	0	2519	0	0	1132	2627	1615	0	0	3406	0	1176
Right Turn on Red				Yes				Yes				No					Yes
Satd. Flow (RTOR)		1					7										159
Link Speed (mph)		25					25				25				25		
Link Distance (ft)		204					287				468				998		
Travel Time (s)		5.6					7.8				12.8				27.2		
Confl. Peds. (#/hr)	76		602	228	228	602		76	228	125		1385		1385		228	125
Confl. Bikes (#/hr)												11				7	7
Peak Hour Factor	0.94	0.94	0.94	0.94	0.97	0.97	0.97	0.97	0.98	0.98	0.98	0.98	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	0%	10%	0%	6%	3%	0%	5%	6%	2%	0%	3%	10%	7%	0%
Adj. Flow (vph)	71	320	66	4	321	21	326	42	59	221	258	377	4	330	332	20	60
Shared Lane Traffic (%)					27%					47%							
Lane Group Flow (vph)	0	461	0	0	234	0	476	0	0	176	362	377	0	0	686	0	60
Turn Type	Split	NA			Split	Split	NA		Split	Split	NA	pt+ov	Perm	Split	NA		Perm
Protected Phases	3	3			2	2	2		1	1	1	1 2		4	4		
Permitted Phases													4				4
Detector Phase	3	3			2	2	2		1	1	1	1 2	4	4	4		4
Switch Phase																	
Minimum Initial (s)	8.0	8.0			8.0	8.0	8.0		8.0	8.0	8.0		8.0	8.0	8.0		8.0
Minimum Split (s)	19.0	19.0			15.0	15.0	15.0		33.0	33.0	33.0		24.0	24.0	24.0		24.0
Total Split (s)	26.0	26.0			22.0	22.0	22.0		34.0	34.0	34.0		28.0	28.0	28.0		28.0
Total Split (%)	23.6%	23.6%			20.0%	20.0%	20.0%		30.9%	30.9%	30.9%		25.5%	25.5%	25.5%		25.5%
Maximum Green (s)	19.0	19.0			16.0	16.0	16.0		28.0	28.0	28.0		20.0	20.0	20.0		20.0
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0		3.0
All-Red Time (s)	4.0	4.0			3.0	3.0	3.0		3.0	3.0	3.0		5.0	5.0	5.0		5.0
Lost Time Adjust (s)		-2.0			-2.0		-2.0			-2.0	-2.0				-2.0		0.0
Total Lost Time (s)		5.0			4.0		4.0			4.0	4.0				6.0		8.0
Lead/Lag	Lag	Lag			Lead	Lead	Lead										
Lead-Lag Optimize?																	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0		2.0
Recall Mode	Max	Max			Max	Max	Max		C-Max	C-Max	C-Max		Max	Max	Max		Max
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)	4.0	4.0							17.0	17.0	17.0		8.0	8.0	8.0		8.0
Pedestrian Calls (#/hr)	0	0							0	0	0		0	0	0		0
Act Effct Green (s)		21.0			18.0		18.0			30.0	30.0	52.0			22.0		20.0
Actuated g/C Ratio		0.19			0.16		0.16			0.27	0.27	0.47			0.20		0.18
v/c Ratio		0.91			1.14		1.02			0.48	0.49	0.49			1.12dl		0.17
Control Delay		39.8			155.7		101.2			26.7	25.0	7.2			53.5		1.1
Queue Delay		0.0			0.0		0.0			0.0	0.0	1.1			0.0		0.0
Total Delay		39.8			155.7		101.2			26.7	25.0	8.4			53.5		1.1
LOS		D			F		F			C	C	A			D		A
Approach Delay		39.8					119.2				18.4				49.3		
Approach LOS		D					F				B				D		
Queue Length 50th (ft)		35			~216		~196			62	64	54			172		0
Queue Length 95th (ft)		#234			#374		#295			m75	m75	m59			#234		0
Internal Link Dist (ft)		124					207				388				918		
Turn Bay Length (ft)												150					150
Base Capacity (vph)		504			205		467			364	738	763			810		343
Starvation Cap Reductn		0			0		0			0	0	192			0		0
Spillback Cap Reductn		0			0		0			0	0	0			0		0
Storage Cap Reductn		0			0		0			0	0	0			0		0
Reduced v/c Ratio		0.91			1.14		1.02			0.48	0.49	0.66			0.85		0.17

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 79 (72%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.14
Intersection Signal Delay: 55.3 — Intersection LOS: E
Intersection Capacity Utilization 85.8% — ICU Level of Service E
Analysis Period (min) 15
~ 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 10: GCG Entrance Driveway & Congress Street/Merrimac Street & New Chardon Street

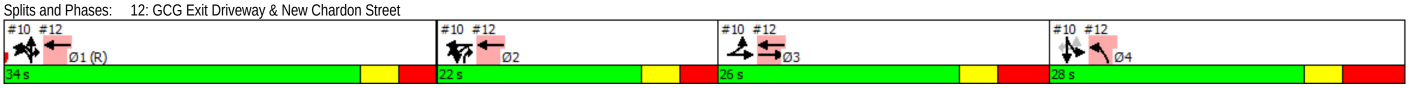


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø1	Ø2
Lane Configurations								
Traffic Volume (vph)	376	0	0	533	41	58		
Future Volume (vph)	376	0	0	533	41	58		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	12	12	11	11		
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00		
Ped Bike Factor					0.99			
Frt					0.921			
Flt Protected					0.980			
Satd. Flow (prot)	3154	0	0	3065	1450	0		
Flt Permitted					0.980			
Satd. Flow (perm)	3154	0	0	3065	1450	0		
Right Turn on Red		Yes				Yes		
Satd. Flow (RTOR)					57			
Link Speed (mph)	25			25	25			
Link Distance (ft)	137			204	136			
Travel Time (s)	3.7			5.6	3.7			
Confl. Bikes (#/hr)		3				1		
Peak Hour Factor	0.98	0.98	0.90	0.90	0.86	0.86		
Heavy Vehicles (%)	3%	0%	0%	6%	5%	0%		
Adj. Flow (vph)	384	0	0	592	48	67		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	384	0	0	592	115	0		
Turn Type	NA			NA	Prot			
Protected Phases	3			1 2 3	4		1	2
Permitted Phases								
Detector Phase	3			1 2 3	4			
Switch Phase								
Minimum Initial (s)	8.0				8.0		8.0	8.0
Minimum Split (s)	19.0				24.0		33.0	15.0
Total Split (s)	26.0				28.0		34.0	22.0
Total Split (%)	23.6%				25.5%		31%	20%
Maximum Green (s)	19.0				20.0		28.0	16.0
Yellow Time (s)	3.0				3.0		3.0	3.0
All-Red Time (s)	4.0				5.0		3.0	3.0
Lost Time Adjust (s)	-2.0				-2.0			
Total Lost Time (s)	5.0				6.0			
Lead/Lag	Lag							Lead
Lead-Lag Optimize?								
Vehicle Extension (s)	2.0				2.0		2.0	2.0
Recall Mode	Max				Max		C-Max	Max
Walk Time (s)	7.0				7.0		7.0	
Flash Dont Walk (s)	4.0				8.0		17.0	
Pedestrian Calls (#/hr)	0				0		0	
Act Effct Green (s)	21.0			78.0	22.0			
Actuated g/C Ratio	0.19			0.71	0.20			
v/c Ratio	0.64			0.27	0.34			
Control Delay	46.5			0.7	23.3			
Queue Delay	0.2			0.8	0.0			
Total Delay	46.7			1.5	23.3			
LOS	D			A	C			
Approach Delay	46.7			1.5	23.3			
Approach LOS	D			A	C			
Queue Length 50th (ft)	132			6	34			
Queue Length 95th (ft)	185			m6	82			
Internal Link Dist (ft)	57			124	56			
Turn Bay Length (ft)								
Base Capacity (vph)	602			2173	335			
Starvation Cap Reductn	0			1210	0			
Spillback Cap Reductn	22			0	0			
Storage Cap Reductn	0			0	0			
Reduced v/c Ratio	0.66			0.61	0.34			

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 79 (72%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.14
Intersection Signal Delay: 19.7 Intersection LOS: B
Intersection Capacity Utilization 31.4% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

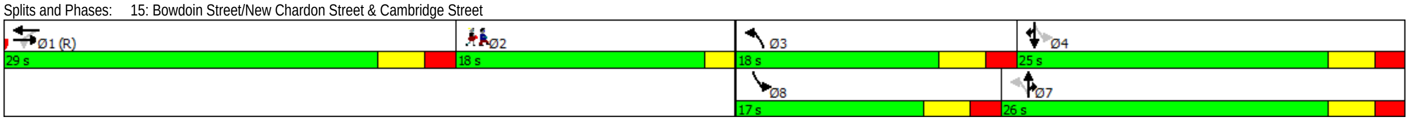
Splits and Phases: 12: GCG Exit Driveway & New Chardon Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	666	73	16	312	47	223	328	137	250	170	197	
Future Volume (vph)	0	666	73	16	312	47	223	328	137	250	170	197	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	0		100	0		100	
Storage Lanes	0		0	0		0	1		1	1		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.91	0.91	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		1.00			0.98								
Frt		0.985			0.981				0.850			0.850	
Flt Protected					0.998		0.950			0.950			
Satd. Flow (prot)	0	4899	0	0	3374	0	1656	1863	1509	1671	1845	1583	
Flt Permitted					0.902		0.540			0.203			
Satd. Flow (perm)	0	4899	0	0	3049	0	941	1863	1509	357	1845	1583	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		20			17				109			216	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		236			438			363			579		
Travel Time (s)		5.4			10.0			8.3			13.2		
Confl. Bikes (#/hr)			30			153			12				
Peak Hour Factor	0.98	0.98	0.98	0.91	0.91	0.91	0.92	0.92	0.92	0.91	0.91	0.91	
Heavy Vehicles (%)	0%	4%	3%	0%	2%	10%	9%	2%	7%	8%	3%	2%	
Adj. Flow (vph)	0	680	74	18	343	52	242	357	149	275	187	216	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	754	0	0	413	0	242	357	149	275	187	216	
Turn Type		NA		Perm	NA		pm+pt	NA	Prot	pm+pt	NA	Prot	
Protected Phases		1			1		3	7	7	8	4	4	2
Permitted Phases				1			7			4			
Detector Phase		1		1	1		3	7	7	8	4	4	
Switch Phase													
Minimum Initial (s)		8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	1.0
Minimum Split (s)		28.0		28.0	28.0		13.0	13.0	13.0	13.0	13.0	13.0	18.0
Total Split (s)		29.0		29.0	29.0		18.0	26.0	26.0	17.0	25.0	25.0	18.0
Total Split (%)		32.2%		32.2%	32.2%		20.0%	28.9%	28.9%	18.9%	27.8%	27.8%	20%
Maximum Green (s)		24.0		24.0	24.0		13.0	21.0	21.0	12.0	20.0	20.0	16.0
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)		2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	0.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag		Lead		Lead	Lead		Lead	Lag	Lag	Lead	Lag	Lag	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	2.0
Recall Mode		C-Max		C-Max	C-Max		None	Min	Min	None	Min	Min	Ped
Walk Time (s)		7.0		7.0	7.0								7.0
Flash Dont Walk (s)		16.0		16.0	16.0								9.0
Pedestrian Calls (#/hr)		0		0	0								20
Act Effct Green (s)		25.5			25.5		31.4	19.5	19.5	31.7	19.7	19.7	
Actuated g/C Ratio		0.28			0.28		0.35	0.22	0.22	0.35	0.22	0.22	
v/c Ratio		0.54			0.47		0.57	0.89	0.36	0.91	0.46	0.42	
Control Delay		21.5			15.3		24.5	58.5	12.4	58.1	34.8	7.1	
Queue Delay		0.8			0.4		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		22.2			15.7		24.5	58.5	12.4	58.1	34.8	7.1	
LOS		C			B		C	E	B	E	C	A	
Approach Delay		22.2			15.7			38.3			35.4		
Approach LOS		C			B			D			D		
Queue Length 50th (ft)		67			41		91	193	18	105	92	0	
Queue Length 95th (ft)		192			m56		149	#337	67	#254	157	56	
Internal Link Dist (ft)		156			358			283			499		
Turn Bay Length (ft)									100			100	
Base Capacity (vph)		1401			875		443	434	435	301	410	519	
Starvation Cap Reductn		333			0		0	0	0	0	0	0	
Spillback Cap Reductn		0			137		0	0	0	0	0	9	
Storage Cap Reductn		0			0		0	0	0	0	0	0	
Reduced v/c Ratio		0.71			0.56		0.55	0.82	0.34	0.91	0.46	0.42	

Intersection Summary
Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 29.3 Intersection LOS: C
Intersection Capacity Utilization 65.7% ICU Level of Service C
Analysis Period (min) 15
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: 15: Bowdoin Street/New Chardon Street & Cambridge Street

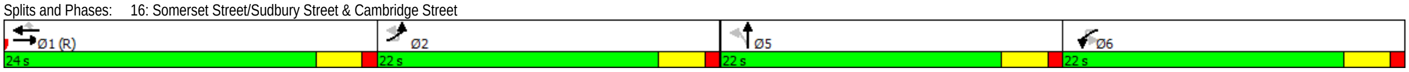


Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↰	↑↑			↰	↑↑	↱		✥				
Traffic Volume (vph)	28	296	613	117	19	53	279	165	69	109	30	0	0	0
Future Volume (vph)	28	296	613	117	19	53	279	165	69	109	30	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0		100		100	0		0	0		0
Storage Lanes		2		0		1		1	0		0	0		0
Taper Length (ft)		25				25			25			25		
Lane Util. Factor	0.95	0.97	0.95	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.90					0.60		0.95				
Frt			0.976					0.850		0.981				
Flt Protected		0.950				0.950				0.984				
Satd. Flow (prot)	0	3408	3103	0	0	1805	3574	1538	0	1736	0	0	0	0
Flt Permitted		0.574				0.369				0.984				
Satd. Flow (perm)	0	2059	3103	0	0	701	3574	921	0	1736	0	0	0	0
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			22					172		8				
Link Speed (mph)			30				30			30			30	
Link Distance (ft)			438				763			259			584	
Travel Time (s)			10.0				17.3			5.9			13.3	
Confl. Peds. (#/hr)				535				533			244			
Confl. Bikes (#/hr)				4				80			3			
Peak Hour Factor	0.98	0.98	0.98	0.98	0.96	0.96	0.96	0.96	0.91	0.91	0.91	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	2%	4%	0%	0%	1%	5%	1%	0%	3%	0%	0%	0%
Adj. Flow (vph)	29	302	626	119	20	55	291	172	76	120	33	0	0	0
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	331	745	0	0	75	291	172	0	229	0	0	0	0
Turn Type	custom	Prot	NA		custom	Prot	NA	Perm	Perm	NA				
Protected Phases		2	1			6	1			5				
Permitted Phases	2				6			1	5					
Detector Phase	2	2	1		6	6	1	1	5	5				
Switch Phase														
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0				
Minimum Split (s)	22.0	22.0	27.0		22.0	22.0	27.0	27.0	22.0	22.0				
Total Split (s)	22.0	22.0	24.0		22.0	22.0	24.0	24.0	22.0	22.0				
Total Split (%)	24.4%	24.4%	26.7%		24.4%	24.4%	26.7%	26.7%	24.4%	24.4%				
Maximum Green (s)	18.0	18.0	20.0		18.0	18.0	20.0	20.0	18.0	18.0				
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		0.0				
Total Lost Time (s)		4.0	4.0			4.0	4.0	4.0		4.0				
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lead	Lead	Lead	Lead				
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	None	None	C-Max		None	None	C-Max	C-Max	None	None				
Walk Time (s)	7.0	7.0	7.0				7.0	7.0						
Flash Dont Walk (s)	11.0	11.0	16.0				16.0	16.0						
Pedestrian Calls (#/hr)	0	0	0				0	0						
Act Effct Green (s)		16.8	31.1			13.6	31.1	31.1		14.9				
Actuated g/C Ratio		0.19	0.35			0.15	0.35	0.35		0.17				
v/c Ratio		0.86	0.69			0.71	0.24	0.40		0.78				
Control Delay		45.4	33.2			69.0	25.4	8.1		52.7				
Queue Delay		0.0	0.0			0.0	0.0	0.0		0.0				
Total Delay		45.4	33.2			69.0	25.4	8.1		52.7				
LOS		D	C			E	C	A		D				
Approach Delay			37.0				26.0			52.7				
Approach LOS			D				C			D				
Queue Length 50th (ft)		97	170			41	66	0		120				
Queue Length 95th (ft)		m#151	m#312			#94	111	57		194				
Internal Link Dist (ft)			358				683			179			504	
Turn Bay Length (ft)						100		100						
Base Capacity (vph)		411	1085			140	1234	430		353				
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		0.81	0.69			0.54	0.24	0.40		0.65				

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 35.7 Intersection LOS: D
Intersection Capacity Utilization 52.1% ICU Level of Service A
Analysis Period (min) 15
\# 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: 16: Somerset Street/Sudbury Street & Cambridge Street



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	570	0	0	194	0
Future Volume (Veh/h)	0	570	0	0	194	0
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)	0	620	0	0	211	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		584				
pX, platoon unblocked					0.94	
vC, conflicting volume	0				310	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				146	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				73	100
cM capacity (veh/h)	1636				789	1091

Direction, Lane #	EB 1	EB 2	SB 1
Volume Total	310	310	211
Volume Left	0	0	211
Volume Right	0	0	0
cSH	1700	1700	789
Volume to Capacity	0.18	0.18	0.27
Queue Length 95th (ft)	0	0	27
Control Delay (s)	0.0	0.0	11.2
Lane LOS			B
Approach Delay (s)	0.0		11.2
Approach LOS			B

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection Sign configuration not allowed in HCM analysis.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations														
Traffic Volume (vph)	153	413	167	0	0	0	10	0	740	367	157	517	0	
Future Volume (vph)	153	413	167	0	0	0	10	0	740	367	157	517	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	11	10	12	12	12	12	11	11	11	10	11	11	
Storage Length (ft)	0		0	0		0		0		0	100		0	
Storage Lanes	1		0	0		0		0		0	1		0	
Taper Length (ft)	25			25				25			25			
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	0.91	1.00	0.91	0.91	1.00	0.91	1.00	
Ped Bike Factor	0.57	0.84							0.88		0.89			
Frt		0.957							0.951					
Flt Protected	0.950										0.950			
Satd. Flow (prot)	1392	2288	0	0	0	0	0	0	3619	0	1486	4029	0	
Flt Permitted	0.950								0.934		0.950			
Satd. Flow (perm)	787	2288	0	0	0	0	0	0	3380	0	1321	4029	0	
Right Turn on Red			Yes			Yes				No			Yes	
Satd. Flow (RTOR)		50												
Link Speed (mph)		25			25				25			25		
Link Distance (ft)		153			161				395			468		
Travel Time (s)		4.2			4.4				10.8			12.8		
Confl. Peds. (#/hr)	236		435							650	650			
Confl. Bikes (#/hr)			5							46			2	
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.98	0.98	0.98	0.98	0.93	0.93	0.93	
Heavy Vehicles (%)	5%	5%	6%	0%	0%	0%	0%	0%	3%	7%	2%	12%	0%	
Parking (#/hr)	0	0												
Adj. Flow (vph)	172	464	188	0	0	0	10	0	755	374	169	556	0	
Shared Lane Traffic (%)														
Lane Group Flow (vph)	172	652	0	0	0	0	0	0	1139	0	169	556	0	
Turn Type	Split	NA					Perm		NA		Prot	NA		
Protected Phases	5	5							1		6	1 6		2
Permitted Phases							1							
Detector Phase	5	5					1		1		6	1 6		
Switch Phase														
Minimum Initial (s)	8.0	8.0					10.0		10.0		7.0			7.0
Minimum Split (s)	15.0	15.0					17.0		17.0		14.0			26.0
Total Split (s)	26.0	26.0					42.0		42.0		16.0			26.0
Total Split (%)	23.6%	23.6%					38.2%		38.2%		14.5%			24%
Maximum Green (s)	20.0	20.0					37.0		37.0		10.0			22.0
Yellow Time (s)	3.0	3.0					3.0		3.0		3.0			4.0
All-Red Time (s)	3.0	3.0					2.0		2.0		3.0			0.0
Lost Time Adjust (s)	-2.0	-2.0							-2.0		-2.0			
Total Lost Time (s)	4.0	4.0							3.0		4.0			
Lead/Lag	Lead	Lead					Lead		Lead		Lag			Lag
Lead-Lag Optimize?														
Vehicle Extension (s)	2.0	2.0					2.0		2.0		2.0			2.0
Recall Mode	Max	Max					C-Max		C-Max		Max			Ped
Walk Time (s)	0.0	0.0												7.0
Flash Dont Walk (s)	8.0	8.0												15.0
Pedestrian Calls (#/hr)	0	0												0
Act Effct Green (s)	22.0	22.0							39.0		12.0	55.0		
Actuated g/C Ratio	0.20	0.20							0.35		0.11	0.50		
v/c Ratio	0.62	1.31							0.95		1.04	0.28		
Control Delay	51.0	188.1							31.7		104.3	16.2		
Queue Delay	0.0	0.1							9.9		30.5	0.0		
Total Delay	51.0	188.2							41.7		134.8	16.2		
LOS	D	F							D		F	B		
Approach Delay		159.6							41.7			43.9		
Approach LOS		F							D			D		
Queue Length 50th (ft)	112	~298							315		~126	81		
Queue Length 95th (ft)	185	#411							#384		m#141	m86		
Internal Link Dist (ft)		73			81				315			388		
Turn Bay Length (ft)											100			
Base Capacity (vph)	278	497							1198		162	2014		
Starvation Cap Reductn	0	0							5		0	0		
Spillback Cap Reductn	0	8							68		70	0		
Storage Cap Reductn	0	0							0		0	0		
Reduced v/c Ratio	0.62	1.33							1.01		1.84	0.28		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 70 (64%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 120
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.31
Intersection Signal Delay: 78.4 — Intersection LOS: E
Intersection Capacity Utilization 71.2% — ICU Level of Service C
Analysis Period (min) 15
~ 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.

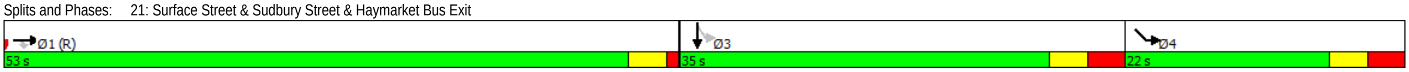
Splits and Phases: 19: Congress Street & Sudbury Street

Lane Group	EBT	EBR	SBL	SBT	SEL	SER
Lane Configurations						
Traffic Volume (vph)	798	145	71	325	29	6
Future Volume (vph)	798	145	71	325	29	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Lane Util. Factor	0.95	1.00	0.95	0.95	1.00	1.00
Ped Bike Factor		0.53		0.94		
Frt		0.850			0.977	
Flt Protected				0.991	0.960	
Satd. Flow (prot)	3323	1553	0	3352	918	0
Flt Permitted				0.991	0.960	
Satd. Flow (perm)	3323	831	0	3141	918	0
Right Turn on Red		Yes	No			
Satd. Flow (RTOR)		158				
Link Speed (mph)	25			25	25	
Link Distance (ft)	111			438	138	
Travel Time (s)	3.0			11.9	3.8	
Confl. Peds. (#/hr)		402	183			
Confl. Bikes (#/hr)		10				
Peak Hour Factor	0.92	0.92	0.88	0.88	0.77	0.77
Heavy Vehicles (%)	5%	4%	1%	8%	93%	100%
Adj. Flow (vph)	867	158	81	369	38	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	867	158	0	450	46	0
Turn Type	NA	Perm	Perm	NA	Prot	
Protected Phases	1			3	4	
Permitted Phases		1	3			
Detector Phase	1	1	3	3	4	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	6.0	
Minimum Split (s)	21.0	21.0	18.0	18.0	13.0	
Total Split (s)	53.0	53.0	35.0	35.0	22.0	
Total Split (%)	48.2%	48.2%	31.8%	31.8%	20.0%	
Maximum Green (s)	49.0	49.0	29.0	29.0	16.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	1.0	1.0	3.0	3.0	3.0	
Lost Time Adjust (s)	-1.0	-1.0		-2.0	0.0	
Total Lost Time (s)	3.0	3.0		4.0	6.0	
Lead/Lag			Lead	Lead	Lag	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	
Recall Mode	C-Max	C-Max	Max	Max	Max	
Walk Time (s)	7.0	7.0	7.0	7.0		
Flash Dont Walk (s)	5.0	5.0	4.0	4.0		
Pedestrian Calls (#/hr)	0	0	25	25		
Act Effct Green (s)	50.0	50.0		31.0	16.0	
Actuated g/C Ratio	0.45	0.45		0.28	0.15	
v/c Ratio	0.57	0.34		0.51	0.35	
Control Delay	17.5	6.1		37.7	50.5	
Queue Delay	51.4	1.2		0.0	0.0	
Total Delay	68.9	7.4		37.7	50.5	
LOS	E	A		D	D	
Approach Delay	59.4			37.7	50.5	
Approach LOS	E			D	D	
Queue Length 50th (ft)	230	22		111	30	
Queue Length 95th (ft)	m207	m21		m124	57	
Internal Link Dist (ft)	31			358	58	
Turn Bay Length (ft)						
Base Capacity (vph)	1510	463		885	133	
Starvation Cap Reductn	759	155		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	1.15	0.51		0.51	0.35	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 69 (63%), Referenced to phase 1:EBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 52.7 Intersection LOS: D
Intersection Capacity Utilization 49.8% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: Surface Street & Sudbury Street & Haymarket Bus Exit

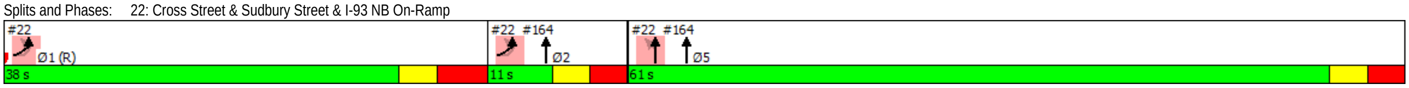


Lane Group	EBL2	EBL	EBR	NBL	NBT	SBT	SBR	SEL	SER	Ø1	Ø2
Lane Configurations											
Traffic Volume (vph)	632	266	0	642	787	0	0	0	0		
Future Volume (vph)	632	266	0	642	787	0	0	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	13	12	12	11	12	12	12	12		
Lane Util. Factor	0.95	0.97	1.00	0.95	0.95	1.00	1.00	1.00	1.00		
Ped Bike Factor											
Frt											
Flt Protected		0.950			0.978						
Satd. Flow (prot)	0	3374	0	0	3272	0	0	0	0		
Flt Permitted		0.950			0.978						
Satd. Flow (perm)	0	3374	0	0	3272	0	0	0	0		
Right Turn on Red	Yes		Yes								
Satd. Flow (RTOR)		192									
Link Speed (mph)		25			25	25		25			
Link Distance (ft)		191			203	568		237			
Travel Time (s)		5.2			5.5	15.5		6.5			
Confl. Bikes (#/hr)			11								
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.92	0.92	0.92	0.92		
Heavy Vehicles (%)	4%	15%	0%	1%	7%	0%	0%	0%	0%		
Adj. Flow (vph)	687	289	0	676	828	0	0	0	0		
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	976	0	0	1504	0	0	0	0		
Turn Type	Perm	Prot		Perm	NA						
Protected Phases		1 2			5					1	2
Permitted Phases	1 2			5							
Detector Phase	1 2	1 2		5	5						
Switch Phase											
Minimum Initial (s)				10.0	10.0					10.0	4.0
Minimum Split (s)				18.0	18.0					25.0	11.0
Total Split (s)				61.0	61.0					38.0	11.0
Total Split (%)				55.5%	55.5%					35%	10%
Maximum Green (s)				55.0	55.0					31.0	5.0
Yellow Time (s)				3.0	3.0					3.0	3.0
All-Red Time (s)				3.0	3.0					4.0	3.0
Lost Time Adjust (s)					-1.0						
Total Lost Time (s)					5.0						
Lead/Lag										Lead	Lag
Lead-Lag Optimize?											
Vehicle Extension (s)				2.0	2.0					2.0	2.0
Recall Mode				Max	Max					C-Max	Max
Walk Time (s)				7.0	7.0					7.0	
Flash Dont Walk (s)				4.0	4.0					3.0	
Pedestrian Calls (#/hr)				30	30					0	
Act Effct Green (s)		43.0			56.0						
Actuated g/C Ratio		0.39			0.51						
v/c Ratio		0.68			0.90						
Control Delay		5.4			15.3						
Queue Delay		0.1			0.0						
Total Delay		5.5			15.3						
LOS		A			B						
Approach Delay		5.5			15.3						
Approach LOS		A			B						
Queue Length 50th (ft)		7			503						
Queue Length 95th (ft)		20			#624						
Internal Link Dist (ft)		111			123	488		157			
Turn Bay Length (ft)											
Base Capacity (vph)		1435			1665						
Starvation Cap Reductn		53			0						
Spillback Cap Reductn		0			0						
Storage Cap Reductn		0			0						
Reduced v/c Ratio		0.71			0.90						

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 74 (67%), Referenced to phase 1:EBL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 11.5 Intersection LOS: B
Intersection Capacity Utilization 84.6% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 22: Cross Street & Sudbury Street & I-93 NB On-Ramp



Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø2
Lane Configurations															
Traffic Volume (vph)	0	436	38	37	21	610	0	0	0	0	875	367	445		
Future Volume (vph)	0	436	38	37	21	610	0	0	0	0	875	367	445		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	12	12	12	14	12	12	12	12	12	11	13		
Lane Util. Factor	1.00	0.91	0.91	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.95	0.95	0.88		
Ped Bike Factor		1.00				1.00					1.00	1.00			
Frt		0.988											0.850		
Flt Protected						0.996					0.950	0.974			
Satd. Flow (prot)	0	4276	0	0	0	3395	0	0	0	0	1403	1356	2470		
Flt Permitted						0.796					0.950	0.974			
Satd. Flow (perm)	0	4276	0	0	0	2713	0	0	0	0	1400	1354	2470		
Right Turn on Red			No				Yes			Yes			No		
Satd. Flow (RTOR)															
Link Speed (mph)		25				25			25			25			
Link Distance (ft)		184				338			438			242			
Travel Time (s)		5.0				9.2			11.9			6.6			
Confl. Peds. (#/hr)			1		1						1		191		
Confl. Bikes (#/hr)													93		
Peak Hour Factor	0.80	0.80	0.80	0.84	0.84	0.84	0.84	0.92	0.92	0.92	0.96	0.96	0.96		
Heavy Vehicles (%)	0%	7%	16%	11%	5%	1%	0%	0%	0%	0%	10%	16%	7%		
Adj. Flow (vph)	0	545	48	44	25	726	0	0	0	0	911	382	464		
Shared Lane Traffic (%)											48%				
Lane Group Flow (vph)	0	593	0	0	0	795	0	0	0	0	474	819	464		
Turn Type		NA		Perm	Perm	NA					Split	NA	custom		
Protected Phases		6				6					1 5	1 5	5	1	2
Permitted Phases				6	6										
Detector Phase		6		6	6	6					1 5	1 5	5		
Switch Phase															
Minimum Initial (s)		8.0		8.0	8.0	8.0							8.0	8.0	8.0
Minimum Split (s)		23.0		23.0	23.0	23.0							22.0	23.0	30.0
Total Split (s)		40.0		40.0	40.0	40.0							30.0	40.0	40.0
Total Split (%)		36.4%		36.4%	36.4%	36.4%							27.3%	36%	36%
Maximum Green (s)		34.0		34.0	34.0	34.0							24.0	34.0	36.0
Yellow Time (s)		3.0		3.0	3.0	3.0							3.0	3.0	4.0
All-Red Time (s)		3.0		3.0	3.0	3.0							3.0	3.0	0.0
Lost Time Adjust (s)		-2.0				-2.0							-2.0		
Total Lost Time (s)		4.0				4.0							4.0		
Lead/Lag		Lag		Lag	Lag	Lag							Lead		
Lead-Lag Optimize?															
Vehicle Extension (s)		2.0		2.0	2.0	2.0							2.0	2.0	2.0
Recall Mode		None		None	None	None							Max	C-Max	None
Walk Time (s)		7.0		7.0	7.0	7.0								7.0	7.0
Flash Dont Walk (s)		7.0		7.0	7.0	7.0								7.0	19.0
Pedestrian Calls (#/hr)		0		0	0	0								0	500
Act Effct Green (s)		36.0				36.0					66.0	66.0	26.0		
Actuated g/C Ratio		0.33				0.33					0.60	0.60	0.24		
v/c Ratio		0.42				0.90					0.56	1.01	0.80		
Control Delay		17.1				49.5					11.1	50.5	44.8		
Queue Delay		1.1				0.0					0.3	0.0	9.9		
Total Delay		18.2				49.5					11.3	50.5	54.6		
LOS		B				D					B	D	D		
Approach Delay		18.2				49.5						41.0			
Approach LOS		B				D						D			
Queue Length 50th (ft)		94				279					108	~611	180		
Queue Length 95th (ft)		115				#331					138	#896	#259		
Internal Link Dist (ft)		104				258			358			162			
Turn Bay Length (ft)															
Base Capacity (vph)		1399				887					841	813	583		
Starvation Cap Reductn		545				0					66	0	95		
Spillback Cap Reductn		0				0					0	0	0		
Storage Cap Reductn		0				0					0	0	0		
Reduced v/c Ratio		0.69				0.90					0.61	1.01	0.95		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 16 (15%), Referenced to phase 1:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 38.9 — Intersection LOS: D
Intersection Capacity Utilization 78.6% — ICU Level of Service D
Analysis Period (min) 15
~ 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: 8: Surface Street & New Chardon Street/I-93 Ramps

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø1	Ø2	Ø5	Ø6
Lane Configurations		↑↑	↑↑↑↱							
Traffic Volume (vph)	0	474	1034	21	0	0				
Future Volume (vph)	0	474	1034	21	0	0				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Lane Util. Factor	1.00	0.95	0.91	0.91	1.00	1.00				
Ped Bike Factor			1.00							
Frt			0.997							
Flt Protected										
Satd. Flow (prot)	0	3008	4467	0	0	0				
Flt Permitted										
Satd. Flow (perm)	0	3008	4467	0	0	0				
Right Turn on Red				Yes		Yes				
Satd. Flow (RTOR)			5							
Link Speed (mph)		25	25		25					
Link Distance (ft)		287	184		238					
Travel Time (s)		7.8	5.0		6.5					
Confl. Bikes (#/hr)				10						
Peak Hour Factor	0.81	0.81	0.98	0.98	0.92	0.92				
Heavy Vehicles (%)	0%	8%	4%	11%	0%	0%				
Adj. Flow (vph)	0	585	1055	21	0	0				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	585	1076	0	0	0				
Turn Type		NA	NA							
Protected Phases		5 6	5 6				1	2	5	6
Permitted Phases										
Detector Phase		5 6	5 6							
Switch Phase										
Minimum Initial (s)							8.0	8.0	8.0	8.0
Minimum Split (s)							23.0	30.0	22.0	23.0
Total Split (s)							40.0	40.0	30.0	40.0
Total Split (%)							36%	36%	27%	36%
Maximum Green (s)							34.0	36.0	24.0	34.0
Yellow Time (s)							3.0	4.0	3.0	3.0
All-Red Time (s)							3.0	0.0	3.0	3.0
Lost Time Adjust (s)										
Total Lost Time (s)										
Lead/Lag									Lead	Lag
Lead-Lag Optimize?										
Vehicle Extension (s)							2.0	2.0	2.0	2.0
Recall Mode							C-Max	None	Max	None
Walk Time (s)							7.0	7.0		7.0
Flash Dont Walk (s)							7.0	19.0		7.0
Pedestrian Calls (#/hr)							0	500		0
Act Effct Green (s)		66.0	66.0							
Actuated g/C Ratio		0.60	0.60							
v/c Ratio		0.32	0.40							
Control Delay		8.3	2.4							
Queue Delay		1.1	1.0							
Total Delay		9.4	3.4							
LOS		A	A							
Approach Delay		9.4	3.4							
Approach LOS		A	A							
Queue Length 50th (ft)		62	0							
Queue Length 95th (ft)		m76	m0							
Internal Link Dist (ft)		207	104		158					
Turn Bay Length (ft)										
Base Capacity (vph)		1804	2682							
Starvation Cap Reductn		935	1243							
Spillback Cap Reductn		165	143							
Storage Cap Reductn		0	0							
Reduced v/c Ratio		0.67	0.75							

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 16 (15%), Referenced to phase 1:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 5.5 Intersection LOS: A
Intersection Capacity Utilization 26.1% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 9: New Chardon Street & Canal Street

Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBU	SBL	SBT	SBR	SBR2
Lane Configurations																	
Traffic Volume (vph)	44	105	36	24	390	80	477	72	147	267	312	255	9	97	207	55	95
Future Volume (vph)	44	105	36	24	390	80	477	72	147	267	312	255	9	97	207	55	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	10	12	12	12	10	10	16	12	11	11	11	16
Storage Length (ft)	0		0			0		0		0		150		0		150	
Storage Lanes	0		0			1		0		1		1		0		1	
Taper Length (ft)	25					25				25				25			
Lane Util. Factor	0.95	0.95	0.95	0.95	0.91	0.91	0.91	0.95	0.95	0.91	0.91	1.00	0.91	0.91	0.91	0.91	1.00
Ped Bike Factor		0.73			0.70		0.85			0.70	0.92				0.82		0.55
Frt		0.957					0.984					0.850			0.978		0.850
Flt Protected		0.990			0.950		0.990			0.950	0.982				0.986		
Satd. Flow (prot)	0	2037	0	0	1302	0	2874	0	0	1344	2682	1569	0	0	3481	0	1647
Flt Permitted		0.990			0.950		0.990			0.950	0.982				0.986		
Satd. Flow (perm)	0	2004	0	0	906	0	2515	0	0	943	2469	1569	0	0	3224	0	911
Right Turn on Red				Yes				Yes				No					Yes
Satd. Flow (RTOR)		11					11										169
Link Speed (mph)		25					25				25				25		
Link Distance (ft)		204					287				468				998		
Travel Time (s)		5.6					7.8				12.8				27.2		
Confl. Peds. (#/hr)	152		432	317	432	317		152	317	265		1136		1136		317	265
Confl. Bikes (#/hr)			1	1				17				10				64	64
Peak Hour Factor	0.84	0.84	0.84	0.84	0.97	0.97	0.97	0.97	0.91	0.91	0.91	0.91	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	14%	14%	10%	0%	6%	0%	3%	4%	0%	7%	6%	5%	11%	9%	14%	0%	0%
Adj. Flow (vph)	52	125	43	29	402	82	492	74	162	293	343	280	10	113	241	64	110
Shared Lane Traffic (%)					14%					66%							
Lane Group Flow (vph)	0	249	0	0	346	0	704	0	0	262	536	280	0	0	428	0	110
Turn Type	Split	NA			Split	Split	NA		Split	Split	NA	pt+ov	Split	Split	NA		Perm
Protected Phases	4	4			1	1	1		2	2	2	1 2	3	3	3		
Permitted Phases																	3
Detector Phase	4	4			1	1	1		2	2	2	1 2	3	3	3		3
Switch Phase																	
Minimum Initial (s)	8.0	8.0			8.0	8.0	8.0		8.0	8.0	8.0		8.0	8.0	8.0		8.0
Minimum Split (s)	24.0	24.0			33.0	33.0	33.0		15.0	15.0	15.0		19.0	19.0	19.0		19.0
Total Split (s)	24.0	24.0			33.0	33.0	33.0		34.0	34.0	34.0		19.0	19.0	19.0		19.0
Total Split (%)	21.8%	21.8%			30.0%	30.0%	30.0%		30.9%	30.9%	30.9%		17.3%	17.3%	17.3%		17.3%
Maximum Green (s)	16.0	16.0			27.0	27.0	27.0		28.0	28.0	28.0		12.0	12.0	12.0		12.0
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0		3.0
All-Red Time (s)	5.0	5.0			3.0	3.0	3.0		3.0	3.0	3.0		4.0	4.0	4.0		4.0
Lost Time Adjust (s)		-2.0			-2.0		-2.0			-2.0	-2.0				-2.0		0.0
Total Lost Time (s)		6.0			4.0		4.0			4.0	4.0				5.0		7.0
Lead/Lag									Lead	Lead	Lead		Lag	Lag	Lag		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	2.0	2.0		2.0
Recall Mode	Max	Max			C-Max	C-Max	C-Max		Max	Max	Max		Max	Max	Max		Max
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)	8.0	8.0			17.0	17.0	17.0						4.0	4.0	4.0		4.0
Pedestrian Calls (#/hr)	0	0			0	0	0						0	0	0		0
Act Effct Green (s)		18.0			29.0		29.0			30.0	30.0	63.0			14.0		12.0
Actuated g/C Ratio		0.16			0.26		0.26			0.27	0.27	0.57			0.13		0.11
v/c Ratio		0.73			1.01		0.92			0.72	0.73	0.31			0.97		0.44
Control Delay		24.3			70.8		35.0			38.0	33.5	3.5			83.5		7.1
Queue Delay		0.0			5.1		6.8			0.0	0.0	0.0			0.0		0.0
Total Delay		24.3			75.9		41.8			38.0	33.5	3.5			83.5		7.1
LOS		C			E		D			D	C	A			F		A
Approach Delay		24.3					53.0				26.8				67.9		
Approach LOS		C					D				C				E		
Queue Length 50th (ft)		20			~226		137			189	193	8			111		0
Queue Length 95th (ft)		37			#473		#342			#302	262	33			#169		7
Internal Link Dist (ft)		124					207				388				918		
Turn Bay Length (ft)												150					150
Base Capacity (vph)		342			343		765			366	731	898			443		249
Starvation Cap Reductn		0			6		44			0	0	0			0		0
Spillback Cap Reductn		0			0		0			0	0	0			0		0
Storage Cap Reductn		0			0		0			0	0	0			0		0
Reduced v/c Ratio		0.73			1.03		0.98			0.72	0.73	0.31			0.97		0.44

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 100 (91%), Referenced to phase 1:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 43.6 — Intersection LOS: D
Intersection Capacity Utilization 75.2% — ICU Level of Service D
Analysis Period (min) 15
~ 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: 10: GCG Entrance Driveway & Congress Street/Merrimac Street & New Chardon Street

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø1	Ø2
Lane Configurations								
Traffic Volume (vph)	191	0	0	743	4	18		
Future Volume (vph)	191	0	0	743	4	18		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	12	12	11	11		
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00		
Ped Bike Factor								
Frt					0.890			
Flt Protected					0.991			
Satd. Flow (prot)	2901	0	0	3094	1458	0		
Flt Permitted					0.991			
Satd. Flow (perm)	2901	0	0	3094	1458	0		
Right Turn on Red		Yes				Yes		
Satd. Flow (RTOR)					72			
Link Speed (mph)	25			25	25			
Link Distance (ft)	137			204	136			
Travel Time (s)	3.7			5.6	3.7			
Confl. Bikes (#/hr)		2						
Peak Hour Factor	0.83	0.83	0.93	0.93	0.25	0.25		
Heavy Vehicles (%)	12%	0%	0%	5%	0%	0%		
Adj. Flow (vph)	230	0	0	799	16	72		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	230	0	0	799	88	0		
Turn Type	NA			NA	Prot			
Protected Phases	4			1 2 4	3		1	2
Permitted Phases								
Detector Phase	4			1 2 4	3			
Switch Phase								
Minimum Initial (s)	8.0				8.0		8.0	8.0
Minimum Split (s)	24.0				19.0		33.0	15.0
Total Split (s)	24.0				19.0		33.0	34.0
Total Split (%)	21.8%				17.3%		30%	31%
Maximum Green (s)	16.0				12.0		27.0	28.0
Yellow Time (s)	3.0				3.0		3.0	3.0
All-Red Time (s)	5.0				4.0		3.0	3.0
Lost Time Adjust (s)	-2.0				-2.0			
Total Lost Time (s)	6.0				5.0			
Lead/Lag					Lag			Lead
Lead-Lag Optimize?								
Vehicle Extension (s)	2.0				2.0		2.0	2.0
Recall Mode	Max				Max		C-Max	Max
Walk Time (s)	7.0				7.0		7.0	
Flash Dont Walk (s)	8.0				4.0		17.0	
Pedestrian Calls (#/hr)	0				0		0	
Act Effct Green (s)	18.0			87.0	14.0			
Actuated g/C Ratio	0.16			0.79	0.13			
v/c Ratio	0.49			0.33	0.35			
Control Delay	45.7			1.0	18.4			
Queue Delay	0.0			1.1	0.0			
Total Delay	45.7			2.1	18.4			
LOS	D			A	B			
Approach Delay	45.7			2.1	18.4			
Approach LOS	D			A	B			
Queue Length 50th (ft)	78			11	10			
Queue Length 95th (ft)	108			m32	0			
Internal Link Dist (ft)	57			124	56			
Turn Bay Length (ft)								
Base Capacity (vph)	474			2447	248			
Starvation Cap Reductn	0			1340	0			
Spillback Cap Reductn	0			0	0			
Storage Cap Reductn	0			0	0			
Reduced v/c Ratio	0.49			0.72	0.35			

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 100 (91%), Referenced to phase 1:WBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 12.4 Intersection LOS: B
Intersection Capacity Utilization 37.0% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

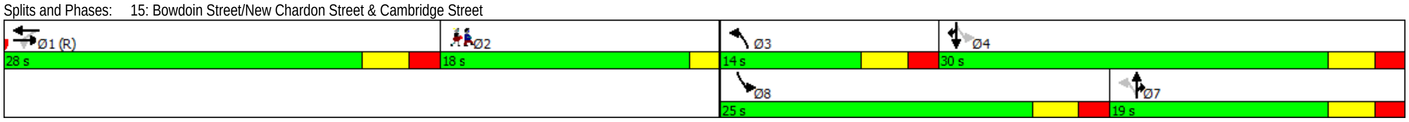
Splits and Phases: 12: GCG Exit Driveway & New Chardon Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations		↑↑↱			↰↑↱		↰	↑	↱	↰	↑	↱	
Traffic Volume (vph)	0	695	93	21	199	31	153	144	110	322	192	287	
Future Volume (vph)	0	695	93	21	199	31	153	144	110	322	192	287	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	0		100	0		100	
Storage Lanes	0		0	0		0	1		1	1		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.91	0.91	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		0.95			0.95				0.61			0.75	
Frt		0.982			0.981				0.850			0.850	
Flt Protected					0.996		0.950			0.950			
Satd. Flow (prot)	0	4538	0	0	3140	0	1612	1759	1482	1719	1845	1524	
Flt Permitted					0.856		0.632			0.370			
Satd. Flow (perm)	0	4538	0	0	2698	0	1072	1759	909	670	1845	1136	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		26			17				170			299	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		236			438			364			579		
Travel Time (s)		5.4			10.0			8.3			13.2		
Confl. Peds. (#/hr)			530			756			361			229	
Confl. Bikes (#/hr)			105			21			6				
Peak Hour Factor	0.93	0.93	0.93	0.86	0.86	0.86	0.94	0.94	0.94	0.96	0.96	0.96	
Heavy Vehicles (%)	100%	7%	6%	21%	2%	25%	12%	8%	9%	5%	3%	6%	
Adj. Flow (vph)	0	747	100	24	231	36	163	153	117	335	200	299	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	847	0	0	291	0	163	153	117	335	200	299	
Turn Type		NA		Perm	NA		pm+pt	NA	custom	pm+pt	NA	custom	
Protected Phases		1			1		3	7	7	8	4	4	2
Permitted Phases				1			7		7	4		4	
Detector Phase		1		1	1		3	7	7	8	4	4	
Switch Phase													
Minimum Initial (s)		8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	1.0
Minimum Split (s)		28.0		28.0	28.0		13.0	13.0	13.0	13.0	13.0	13.0	18.0
Total Split (s)		28.0		28.0	28.0		14.0	19.0	19.0	25.0	30.0	30.0	18.0
Total Split (%)		31.1%		31.1%	31.1%		15.6%	21.1%	21.1%	27.8%	33.3%	33.3%	20%
Maximum Green (s)		23.0		23.0	23.0		9.0	14.0	14.0	20.0	25.0	25.0	16.0
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)		2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	0.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag		Lead		Lead	Lead		Lead	Lag	Lag	Lead	Lag	Lag	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	2.0
Recall Mode		C-Max		C-Max	C-Max		None	None	None	None	None	None	None
Walk Time (s)		7.0		7.0	7.0								7.0
Flash Dont Walk (s)		16.0		16.0	16.0								9.0
Pedestrian Calls (#/hr)		0		0	0								20
Act Effct Green (s)		38.5			38.5		21.0	11.6	11.6	34.3	19.9	19.9	
Actuated g/C Ratio		0.43			0.43		0.23	0.13	0.13	0.38	0.22	0.22	
v/c Ratio		0.43			0.25		0.53	0.67	0.35	0.73	0.49	0.52	
Control Delay		4.9			20.1		26.5	52.0	4.7	30.5	33.8	6.9	
Queue Delay		0.3			0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		5.2			20.1		26.5	52.0	4.7	30.5	33.8	6.9	
LOS		A			C		C	D	A	C	C	A	
Approach Delay		5.2			20.1			29.7			22.8		
Approach LOS		A			C			C			C		
Queue Length 50th (ft)		24			44		60	84	0	139	100	0	
Queue Length 95th (ft)		70			100		100	144	19	204	154	59	
Internal Link Dist (ft)		156			358			284			499		
Turn Bay Length (ft)									100			100	
Base Capacity (vph)		1956			1163		310	273	374	488	512	639	
Starvation Cap Reductn		470			0		0	0	0	0	0	0	
Spillback Cap Reductn		0			0		0	0	0	0	0	0	
Storage Cap Reductn		0			0		0	0	0	0	0	0	
Reduced v/c Ratio		0.57			0.25		0.53	0.56	0.31	0.69	0.39	0.47	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 12 (13%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 17.5 Intersection LOS: B
Intersection Capacity Utilization 66.0% ICU Level of Service C
Analysis Period (min) 15

Splits and Phases: 15: Bowdoin Street/New Chardon Street & Cambridge Street



Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	19	271	559	278	18	108	210	121	21	33	11	0	0	0
Future Volume (vph)	19	271	559	278	18	108	210	121	21	33	11	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0		100		100	0		0	0		0
Storage Lanes		2		0		1		1	0		0	0		0
Taper Length (ft)		25				25			25			25		
Lane Util. Factor	0.95	0.97	0.95	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.86							0.94				
Frt			0.950					0.850		0.977				
Flt Protected		0.950				0.950				0.984				
Satd. Flow (prot)	0	3346	2806	0	0	1689	3374	1455	0	1652	0	0	0	0
Flt Permitted		0.950				0.950				0.984				
Satd. Flow (perm)	0	3346	2806	0	0	1689	3374	1455	0	1652	0	0	0	0
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			121					138		8				
Link Speed (mph)			30				30			30			30	
Link Distance (ft)			438				763			259			584	
Travel Time (s)			10.0				17.3			5.9			13.3	
Confl. Peds. (#/hr)				154				377			241			
Confl. Bikes (#/hr)				60				6			2			
Peak Hour Factor	0.97	0.97	0.97	0.97	0.88	0.88	0.88	0.88	0.69	0.69	0.69	0.92	0.92	0.92
Heavy Vehicles (%)	0%	5%	6%	5%	0%	8%	7%	11%	0%	5%	9%	0%	0%	0%
Adj. Flow (vph)	20	279	576	287	20	123	239	138	30	48	16	0	0	0
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	299	863	0	0	143	239	138	0	94	0	0	0	0
Turn Type	Split	Split	NA		Split	Split	NA	Prot	Perm	NA				
Protected Phases	1	1	1		5	5	5	5		6				
Permitted Phases									6					
Detector Phase	1	1	1		5	5	5	5	6	6				
Switch Phase														
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0				
Minimum Split (s)	27.0	27.0	27.0		12.0	12.0	12.0	12.0	12.0	12.0				
Total Split (s)	63.0	63.0	63.0		27.0	27.0	27.0	27.0	20.0	20.0				
Total Split (%)	57.3%	57.3%	57.3%		24.5%	24.5%	24.5%	24.5%	18.2%	18.2%				
Maximum Green (s)	59.0	59.0	59.0		23.0	23.0	23.0	23.0	16.0	16.0				
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		0.0				
Total Lost Time (s)		4.0	4.0			4.0	4.0	4.0		4.0				
Lead/Lag					Lead	Lead	Lead	Lead	Lag	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		None	None	None	None	None	None				
Walk Time (s)	7.0	7.0	7.0											
Flash Dont Walk (s)	16.0	16.0	16.0											
Pedestrian Calls (#/hr)	0	0	0											
Act Effct Green (s)		75.5	75.5			14.3	14.3	14.3		10.6				
Actuated g/C Ratio		0.69	0.69			0.13	0.13	0.13		0.10				
v/c Ratio		0.13	0.44			0.65	0.55	0.45		0.57				
Control Delay		7.7	8.9			58.7	48.7	11.5		56.1				
Queue Delay		0.0	0.4			0.0	0.0	0.0		0.0				
Total Delay		7.7	9.3			58.7	48.7	11.5		56.1				
LOS		A	A			E	D	B		E				
Approach Delay			8.9				41.6			56.1				
Approach LOS			A				D			E				
Queue Length 50th (ft)		35	113			98	84	0		59				
Queue Length 95th (ft)		71	213			150	114	50		80				
Internal Link Dist (ft)			358				683			179			504	
Turn Bay Length (ft)						100		100						
Base Capacity (vph)		2296	1964			353	705	413		247				
Starvation Cap Reductn		0	589			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		0.13	0.63			0.41	0.34	0.33		0.38				

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 27 (25%), Referenced to phase 1:EBTL, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 21.0 Intersection LOS: C
Intersection Capacity Utilization 50.4% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 16: Somerset Street/Sudbury Street & Cambridge Street

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	424	0	0	187	0
Future Volume (Veh/h)	0	424	0	0	187	0
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)	0	461	0	0	203	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		584				
pX, platoon unblocked						
vC, conflicting volume	0				230	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				230	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				73	100
cM capacity (veh/h)	1636				743	1091

Direction, Lane #	EB 1	EB 2	SB 1
Volume Total	230	230	203
Volume Left	0	0	203
Volume Right	0	0	0
cSH	1700	1700	743
Volume to Capacity	0.14	0.14	0.27
Queue Length 95th (ft)	0	0	28
Control Delay (s)	0.0	0.0	11.7
Lane LOS			B
Approach Delay (s)	0.0		11.7
Approach LOS			B

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	28.7%	ICU Level of Service	A
Analysis Period (min)	15		

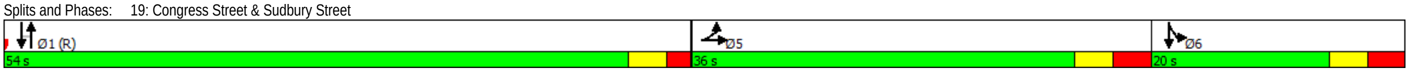
Intersection Sign configuration not allowed in HCM analysis.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↱							↑↑↑↱		↰	↑↑↑	
Traffic Volume (vph)	152	251	156	0	0	0	14	0	825	159	90	538	0
Future Volume (vph)	152	251	156	0	0	0	14	0	825	159	90	538	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	10	12	12	12	12	11	11	11	10	11	11
Storage Length (ft)	50		50	0		0		0		0	100		0
Storage Lanes	1		0	0		0		0		0	1		0
Taper Length (ft)	25			25				25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	0.91	1.00	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor	0.63	0.85							0.93		0.90		
Frt		0.943							0.976				
Flt Protected	0.950								0.999		0.950		
Satd. Flow (prot)	1392	2274	0	0	0	0	0	0	3813	0	1458	4178	0
Flt Permitted	0.950								0.927		0.950		
Satd. Flow (perm)	879	2274	0	0	0	0	0	0	3538	0	1310	4178	0
Right Turn on Red			Yes			Yes				No			Yes
Satd. Flow (RTOR)		122											
Link Speed (mph)		25			25				25			25	
Link Distance (ft)		153			161				386			468	
Travel Time (s)		4.2			4.4				10.5			12.8	
Confl. Peds. (#/hr)	430		475							674	674		
Confl. Bikes (#/hr)			11							12			59
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.94	0.94	0.94	0.94	0.88	0.88	0.88
Heavy Vehicles (%)	5%	6%	4%	0%	0%	0%	0%	0%	6%	14%	4%	8%	0%
Parking (#/hr)	0	0											
Adj. Flow (vph)	171	282	175	0	0	0	15	0	878	169	102	611	0
Shared Lane Traffic (%)													
Lane Group Flow (vph)	171	457	0	0	0	0	0	0	1062	0	102	611	0
Turn Type	Split	NA					Perm		NA		Prot	NA	
Protected Phases	5	5							1		6	1 6	
Permitted Phases							1						
Detector Phase	5	5					1		1		6	1 6	
Switch Phase													
Minimum Initial (s)	8.0	8.0					10.0		10.0		7.0		
Minimum Split (s)	28.0	28.0					27.0		27.0		14.0		
Total Split (s)	36.0	36.0					54.0		54.0		20.0		
Total Split (%)	32.7%	32.7%					49.1%		49.1%		18.2%		
Maximum Green (s)	30.0	30.0					49.0		49.0		14.0		
Yellow Time (s)	3.0	3.0					3.0		3.0		3.0		
All-Red Time (s)	3.0	3.0					2.0		2.0		3.0		
Lost Time Adjust (s)	-2.0	-2.0							-2.0		-2.0		
Total Lost Time (s)	4.0	4.0							3.0		4.0		
Lead/Lag	Lead	Lead									Lag		
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0	2.0					2.0		2.0		2.0		
Recall Mode	Max	Max					C-Max		C-Max		Max		
Walk Time (s)	7.0	7.0					7.0		7.0				
Flash Dont Walk (s)	15.0	15.0					15.0		15.0				
Pedestrian Calls (#/hr)	100	100					100		100				
Act Effct Green (s)	32.0	32.0							51.0		16.0	71.0	
Actuated g/C Ratio	0.29	0.29							0.46		0.15	0.65	
v/c Ratio	0.42	0.61							0.65		0.48	0.23	
Control Delay	31.3	23.9							19.9		49.0	5.3	
Queue Delay	0.0	0.0							1.0		0.0	0.0	
Total Delay	31.3	23.9							20.9		49.0	5.3	
LOS	C	C							C		D	A	
Approach Delay		25.9							20.9			11.6	
Approach LOS		C							C			B	
Queue Length 50th (ft)	85	85							160		61	30	
Queue Length 95th (ft)	130	121							178		m66	m32	
Internal Link Dist (ft)		73			81				306			388	
Turn Bay Length (ft)	50										100		
Base Capacity (vph)	404	748							1640		212	2696	
Starvation Cap Reductn	0	0							316		0	0	
Spillback Cap Reductn	0	0							0		0	0	
Storage Cap Reductn	0	0							0		0	0	
Reduced v/c Ratio	0.42	0.61							0.80		0.48	0.23	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 82 (75%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.65
Intersection Signal Delay: 19.5 Intersection LOS: B
Intersection Capacity Utilization 63.6% ICU Level of Service B
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 19: Congress Street & Sudbury Street



Lane Group	EBT	EBR	SBL	SBT	SEL
Lane Configurations					
Traffic Volume (vph)	316	120	31	394	21
Future Volume (vph)	316	120	31	394	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12
Lane Util. Factor	0.95	1.00	0.95	0.95	1.00
Ped Bike Factor		0.66		0.98	
Frt		0.850			
Flt Protected				0.996	0.950
Satd. Flow (prot)	3116	1482	0	3241	926
Flt Permitted				0.996	0.950
Satd. Flow (perm)	3116	971	0	3166	926
Right Turn on Red		Yes	No		
Satd. Flow (RTOR)		129			
Link Speed (mph)	25			25	25
Link Distance (ft)	111			438	138
Travel Time (s)	3.0			11.9	3.8
Confl. Peds. (#/hr)		180	134		
Confl. Bikes (#/hr)		1			
Peak Hour Factor	0.93	0.93	0.86	0.86	0.62
Heavy Vehicles (%)	12%	9%	10%	11%	95%
Adj. Flow (vph)	340	129	36	458	34
Shared Lane Traffic (%)					
Lane Group Flow (vph)	340	129	0	494	34
Turn Type	NA	Perm	Perm	NA	Prot
Protected Phases	1			3	4
Permitted Phases		1	3		
Detector Phase	1	1	3	3	4
Switch Phase					
Minimum Initial (s)	10.0	10.0	10.0	10.0	6.0
Minimum Split (s)	21.0	21.0	18.0	18.0	13.0
Total Split (s)	42.0	42.0	41.0	41.0	27.0
Total Split (%)	38.2%	38.2%	37.3%	37.3%	24.5%
Maximum Green (s)	38.0	38.0	35.0	35.0	21.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0
All-Red Time (s)	1.0	1.0	3.0	3.0	3.0
Lost Time Adjust (s)	-1.0	-1.0		-2.0	0.0
Total Lost Time (s)	3.0	3.0		4.0	6.0
Lead/Lag			Lead	Lead	Lag
Lead-Lag Optimize?					
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0
Recall Mode	C-Max	C-Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	
Flash Dont Walk (s)	5.0	5.0	4.0	4.0	
Pedestrian Calls (#/hr)	0	0	25	25	
Act Effct Green (s)	39.0	39.0		37.0	21.0
Actuated g/C Ratio	0.35	0.35		0.34	0.19
v/c Ratio	0.31	0.30		0.46	0.19
Control Delay	25.1	7.2		20.9	40.8
Queue Delay	1.0	0.4		0.0	0.0
Total Delay	26.1	7.5		20.9	40.8
LOS	C	A		C	D
Approach Delay	21.0			20.9	40.8
Approach LOS	C			C	D
Queue Length 50th (ft)	83	5		117	20
Queue Length 95th (ft)	128	m39		m124	34
Internal Link Dist (ft)	31			358	58
Turn Bay Length (ft)					
Base Capacity (vph)	1104	427		1064	176
Starvation Cap Reductn	513	82		0	0
Spillback Cap Reductn	0	0		0	0
Storage Cap Reductn	0	0		0	0
Reduced v/c Ratio	0.58	0.37		0.46	0.19

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 9 (8%), Referenced to phase 1:EBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.46
Intersection Signal Delay: 21.6 Intersection LOS: C
Intersection Capacity Utilization 38.5% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

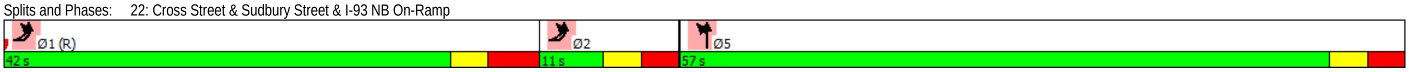
Splits and Phases: 21: Surface Street & Sudbury Street & Haymarket Bus Exit

Lane Group	EBL2	EBL	EBR	NBL	NBT	SBT	SBR	SEL	SER	Ø1	Ø2
Lane Configurations											
Traffic Volume (vph)	250	118	0	164	690	0	0	0	0		
Future Volume (vph)	250	118	0	164	690	0	0	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	13	12	12	11	12	12	12	12		
Lane Util. Factor	0.95	0.97	1.00	0.95	0.95	1.00	1.00	1.00	1.00		
Frt											
Flt Protected		0.950			0.990						
Satd. Flow (prot)	0	3136	0	0	3174	0	0	0	0		
Flt Permitted		0.950			0.990						
Satd. Flow (perm)	0	3136	0	0	3174	0	0	0	0		
Right Turn on Red	Yes		Yes								
Satd. Flow (RTOR)		275									
Link Speed (mph)		25			25	25		25			
Link Distance (ft)		191			203	568		237			
Travel Time (s)		5.2			5.5	15.5		6.5			
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.92	0.92	0.92	0.92		
Heavy Vehicles (%)	8%	31%	0%	4%	10%	0%	0%	0%	0%		
Adj. Flow (vph)	275	130	0	171	719	0	0	0	0		
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	405	0	0	890	0	0	0	0		
Turn Type	Prot	Prot		Split	NA						
Protected Phases	1 2	1 2		5	5					1	2
Permitted Phases											
Detector Phase	1 2	1 2		5	5						
Switch Phase											
Minimum Initial (s)				10.0	10.0					10.0	4.0
Minimum Split (s)				18.0	18.0					25.0	11.0
Total Split (s)				57.0	57.0					42.0	11.0
Total Split (%)				51.8%	51.8%					38%	10%
Maximum Green (s)				51.0	51.0					35.0	5.0
Yellow Time (s)				3.0	3.0					3.0	3.0
All-Red Time (s)				3.0	3.0					4.0	3.0
Lost Time Adjust (s)					-1.0						
Total Lost Time (s)					5.0						
Lead/Lag										Lead	Lag
Lead-Lag Optimize?											
Vehicle Extension (s)				2.0	2.0					2.0	2.0
Recall Mode				Max	Max					C-Max	Max
Walk Time (s)				7.0	7.0					7.0	
Flash Dont Walk (s)				4.0	4.0					3.0	
Pedestrian Calls (#/hr)				30	30					0	
Act Effct Green (s)		47.0			52.0						
Actuated g/C Ratio		0.43			0.47						
v/c Ratio		0.27			0.59						
Control Delay		0.7			2.0						
Queue Delay		0.3			0.3						
Total Delay		1.0			2.2						
LOS		A			A						
Approach Delay		1.0			2.2						
Approach LOS		A			A						
Queue Length 50th (ft)		0			7						
Queue Length 95th (ft)		2			2						
Internal Link Dist (ft)		111			123	488		157			
Turn Bay Length (ft)											
Base Capacity (vph)		1497			1500						
Starvation Cap Reductn		567			161						
Spillback Cap Reductn		0			0						
Storage Cap Reductn		0			0						
Reduced v/c Ratio		0.44			0.66						

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 12 (11%), Referenced to phase 1:EBL, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.59
Intersection Signal Delay: 1.9 Intersection LOS: A
Intersection Capacity Utilization 46.9% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 22: Cross Street & Sudbury Street & I-93 NB On-Ramp

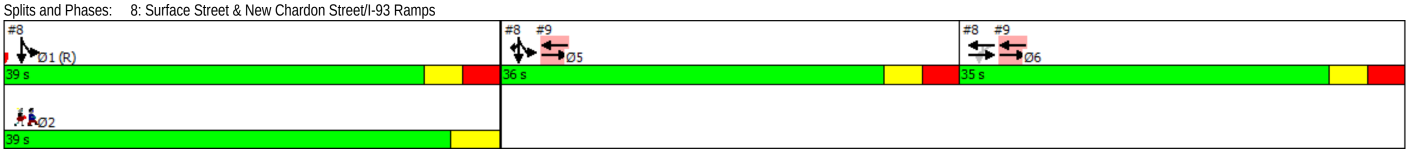


Lane Group	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø1	Ø2
Lane Configurations															
Traffic Volume (vph)	0	905	75	19	10	425	0	0	0	0	1106	310	295		
Future Volume (vph)	0	905	75	19	10	425	0	0	0	0	1106	310	295		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	12	12	12	14	12	12	12	12	12	11	13		
Lane Util. Factor	1.00	0.91	0.91	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.91	0.86	0.91		
Ped Bike Factor												0.99			
Frt		0.989										0.995	0.850		
Flt Protected						0.997					0.950	0.970			
Satd. Flow (prot)	0	4547	0	0	0	3353	0	0	0	0	1382	2454	1254		
Flt Permitted						0.715					0.950	0.970			
Satd. Flow (perm)	0	4547	0	0	0	2404	0	0	0	0	1382	2454	1254		
Right Turn on Red			No				Yes			Yes			No		
Satd. Flow (RTOR)															
Link Speed (mph)		25				25			25			25			
Link Distance (ft)		184				394			438			242			
Travel Time (s)		5.0				10.7			11.9			6.6			
Confl. Peds. (#/hr)													148		
Peak Hour Factor	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.92	0.92	0.92	0.94	0.94	0.94		
Heavy Vehicles (%)	0%	1%	8%	0%	11%	3%	0%	0%	0%	0%	7%	17%	9%		
Adj. Flow (vph)	0	995	82	20	11	447	0	0	0	0	1177	330	314		
Shared Lane Traffic (%)											48%		10%		
Lane Group Flow (vph)	0	1077	0	0	0	478	0	0	0	0	612	926	283		
Turn Type		NA		Perm	Perm	NA					Split	NA	custom		
Protected Phases		6				6					1 5	1 5	5	1	2
Permitted Phases				6	6										
Detector Phase		6		6	6	6					1 5	1 5	5		
Switch Phase															
Minimum Initial (s)		8.0		8.0	8.0	8.0							8.0	8.0	8.0
Minimum Split (s)		23.0		23.0	23.0	23.0							22.0	23.0	30.0
Total Split (s)		35.0		35.0	35.0	35.0							36.0	39.0	39.0
Total Split (%)		31.8%		31.8%	31.8%	31.8%							32.7%	35%	35%
Maximum Green (s)		29.0		29.0	29.0	29.0							30.0	33.0	35.0
Yellow Time (s)		3.0		3.0	3.0	3.0							3.0	3.0	4.0
All-Red Time (s)		3.0		3.0	3.0	3.0							3.0	3.0	0.0
Lost Time Adjust (s)		-2.0				-2.0							-2.0		
Total Lost Time (s)		4.0				4.0							4.0		
Lead/Lag		Lag		Lag	Lag	Lag							Lead		
Lead-Lag Optimize?															
Vehicle Extension (s)		2.0		2.0	2.0	2.0							2.0	2.0	2.0
Recall Mode		None		None	None	None							Max	C-Max	None
Walk Time (s)		7.0		7.0	7.0	7.0								7.0	7.0
Flash Dont Walk (s)		7.0		7.0	7.0	7.0								7.0	19.0
Pedestrian Calls (#/hr)		0		0	0	0								0	50
Act Effct Green (s)		31.0				31.0					71.0	71.0	32.0		
Actuated g/C Ratio		0.28				0.28					0.65	0.65	0.29		
v/c Ratio		0.84				0.71					0.69	0.58	0.78		
Control Delay		29.6				42.1					13.4	9.0	42.3		
Queue Delay		26.9				0.0					1.6	0.7	16.1		
Total Delay		56.5				42.1					15.0	9.7	58.3		
LOS		E				D					B	A	E		
Approach Delay		56.5				42.1						19.0			
Approach LOS		E				D						B			
Queue Length 50th (ft)		239				159					215	123	167		
Queue Length 95th (ft)		313				221					295	165	#349		
Internal Link Dist (ft)		104				314			358			162			
Turn Bay Length (ft)															
Base Capacity (vph)		1281				677					892	1583	364		
Starvation Cap Reductn		251				0					134	324	70		
Spillback Cap Reductn		0				0					0	0	0		
Storage Cap Reductn		0				0					0	0	0		
Reduced v/c Ratio		1.05				0.71					0.81	0.74	0.96		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 85 (77%), Referenced to phase 1:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 34.3 Intersection LOS: C
Intersection Capacity Utilization 78.1% ICU Level of Service D
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Surface Street & New Chardon Street/I-93 Ramps



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø1	Ø2	Ø5	Ø6
Lane Configurations										
Traffic Volume (vph)	0	980	693	28	0	0				
Future Volume (vph)	0	980	693	28	0	0				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900				
Lane Util. Factor	1.00	0.95	0.91	0.91	1.00	1.00				
Ped Bike Factor			0.99							
Frt			0.994							
Flt Protected										
Satd. Flow (prot)	0	3217	4398	0	0	0				
Flt Permitted										
Satd. Flow (perm)	0	3217	4398	0	0	0				
Right Turn on Red				Yes		Yes				
Satd. Flow (RTOR)			10							
Link Speed (mph)		25	25		25					
Link Distance (ft)		287	184		238					
Travel Time (s)		7.8	5.0		6.5					
Confl. Bikes (#/hr)				186						
Peak Hour Factor	0.95	0.95	0.93	0.93	0.92	0.92				
Heavy Vehicles (%)	0%	1%	5%	4%	0%	0%				
Adj. Flow (vph)	0	1032	745	30	0	0				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	1032	775	0	0	0				
Turn Type		NA	NA							
Protected Phases		5 6	5 6				1	2	5	6
Permitted Phases										
Detector Phase		5 6	5 6							
Switch Phase										
Minimum Initial (s)							8.0	8.0	8.0	8.0
Minimum Split (s)							23.0	30.0	22.0	23.0
Total Split (s)							39.0	39.0	36.0	35.0
Total Split (%)							35%	35%	33%	32%
Maximum Green (s)							33.0	35.0	30.0	29.0
Yellow Time (s)							3.0	4.0	3.0	3.0
All-Red Time (s)							3.0	0.0	3.0	3.0
Lost Time Adjust (s)										
Total Lost Time (s)										
Lead/Lag									Lead	Lag
Lead-Lag Optimize?										
Vehicle Extension (s)							2.0	2.0	2.0	2.0
Recall Mode							C-Max	None	Max	None
Walk Time (s)							7.0	7.0		7.0
Flash Dont Walk (s)							7.0	19.0		7.0
Pedestrian Calls (#/hr)							0	50		0
Act Effct Green (s)		67.0	67.0							
Actuated g/C Ratio		0.61	0.61							
v/c Ratio		0.53	0.29							
Control Delay		7.1	2.2							
Queue Delay		6.3	0.6							
Total Delay		13.4	2.8							
LOS		B	A							
Approach Delay		13.4	2.8							
Approach LOS		B	A							
Queue Length 50th (ft)		141	10							
Queue Length 95th (ft)		m207	21							
Internal Link Dist (ft)		207	104		158					
Turn Bay Length (ft)										
Base Capacity (vph)		1959	2682							
Starvation Cap Reductn		760	1438							
Spillback Cap Reductn		866	74							
Storage Cap Reductn		0	0							
Reduced v/c Ratio		0.94	0.62							

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 85 (77%), Referenced to phase 1:SBTL, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.84
Intersection Signal Delay: 8.9 Intersection LOS: A
Intersection Capacity Utilization 33.4% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

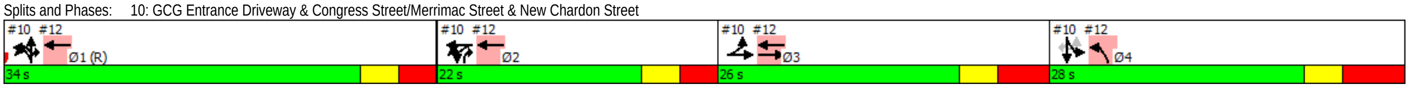
Splits and Phases: 9: New Chardon Street & Canal Street

Lane Group	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL2	NBL	NBT	NBR	SBU	SBL	SBT	SBR	SBR2
Lane Configurations																	
Traffic Volume (vph)	67	301	62	4	311	20	316	41	58	217	253	369	4	304	305	18	55
Future Volume (vph)	67	301	62	4	311	20	316	41	58	217	253	369	4	304	305	18	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	10	10	12	12	12	10	10	16	12	11	11	11	16
Storage Length (ft)	0		0			0		0		0		150		0		150	
Storage Lanes	0		0			1		0		1		1		0		1	
Taper Length (ft)	25					25				25				25			
Lane Util. Factor	0.95	0.95	0.95	0.95	0.91	0.91	0.91	0.95	0.95	0.91	0.91	1.00	0.91	0.91	0.91	0.91	1.00
Ped Bike Factor		0.85			0.80		0.88			0.85	0.97				0.83		0.71
Frt		0.977					0.987					0.850			0.996		0.850
Flt Protected		0.992			0.950		0.989			0.950	0.986				0.976		
Satd. Flow (prot)	0	2639	0	0	1254	0	2823	0	0	1335	2709	1615	0	0	4050	0	1647
Flt Permitted		0.992			0.950		0.989			0.950	0.986				0.976		
Satd. Flow (perm)	0	2591	0	0	1005	0	2519	0	0	1132	2627	1615	0	0	3406	0	1176
Right Turn on Red				Yes				Yes				No					Yes
Satd. Flow (RTOR)		1					7										159
Link Speed (mph)		25					25				25				25		
Link Distance (ft)		204					287				468				998		
Travel Time (s)		5.6					7.8				12.8				27.2		
Confl. Peds. (#/hr)	76		602	228	228	602		76	228	125		1385		1385		228	125
Confl. Bikes (#/hr)												11				7	7
Peak Hour Factor	0.94	0.94	0.94	0.94	0.97	0.97	0.97	0.97	0.98	0.98	0.98	0.98	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	3%	3%	0%	10%	0%	6%	3%	0%	5%	6%	2%	0%	3%	10%	7%	0%
Adj. Flow (vph)	71	320	66	4	321	21	326	42	59	221	258	377	4	330	332	20	60
Shared Lane Traffic (%)					27%					47%							
Lane Group Flow (vph)	0	461	0	0	234	0	476	0	0	176	362	377	0	0	686	0	60
Turn Type	Split	NA			Split	Split	NA		Split	Split	NA	pt+ov	Perm	Split	NA		Perm
Protected Phases	3	3			2	2	2		1	1	1	1 2		4	4		
Permitted Phases													4				4
Detector Phase	3	3			2	2	2		1	1	1	1 2	4	4	4		4
Switch Phase																	
Minimum Initial (s)	8.0	8.0			8.0	8.0	8.0		8.0	8.0	8.0		8.0	8.0	8.0		8.0
Minimum Split (s)	19.0	19.0			15.0	15.0	15.0		33.0	33.0	33.0		24.0	24.0	24.0		24.0
Total Split (s)	26.0	26.0			22.0	22.0	22.0		34.0	34.0	34.0		28.0	28.0	28.0		28.0
Total Split (%)	23.6%	23.6%			20.0%	20.0%	20.0%		30.9%	30.9%	30.9%		25.5%	25.5%	25.5%		25.5%
Maximum Green (s)	19.0	19.0			16.0	16.0	16.0		28.0	28.0	28.0		20.0	20.0	20.0		20.0
Yellow Time (s)	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0	3.0		3.0
All-Red Time (s)	4.0	4.0			3.0	3.0	3.0		3.0	3.0	3.0		5.0	5.0	5.0		5.0
Lost Time Adjust (s)		-2.0			-2.0		-2.0			-2.0	-2.0				-2.0		0.0
Total Lost Time (s)		5.0			4.0		4.0			4.0	4.0				6.0		8.0
Lead/Lag	Lag	Lag			Lead	Lead	Lead										
Lead-Lag Optimize?																	
Vehicle Extension (s)	2.0	2.0			2.0	2.0	2.0		2.0	2.0	2.0		2.0	2.0	2.0		2.0
Recall Mode	Max	Max			Max	Max	Max		C-Max	C-Max	C-Max		Max	Max	Max		Max
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)	4.0	4.0							17.0	17.0	17.0		8.0	8.0	8.0		8.0
Pedestrian Calls (#/hr)	0	0							0	0	0		0	0	0		0
Act Effct Green (s)		21.0			18.0		18.0			30.0	30.0	52.0			22.0		20.0
Actuated g/C Ratio		0.19			0.16		0.16			0.27	0.27	0.47			0.20		0.18
v/c Ratio		0.91			1.14		1.02			0.48	0.49	0.49			1.12dl		0.17
Control Delay		39.8			140.6		82.5			24.7	22.4	7.6			53.5		1.1
Queue Delay		2.6			0.0		0.6			0.0	0.0	1.0			0.3		0.0
Total Delay		42.4			140.6		83.1			24.7	22.4	8.5			53.7		1.1
LOS		D			F		F			C	C	A			D		A
Approach Delay		42.4					102.0				17.1				49.5		
Approach LOS		D					F				B				D		
Queue Length 50th (ft)		35			~220		~200			70	72	80			172		0
Queue Length 95th (ft)		#234			#397		#315			m113	m113	m125			#234		0
Internal Link Dist (ft)		124					207				388				918		
Turn Bay Length (ft)												150					150
Base Capacity (vph)		504			205		467			364	738	763			810		343
Starvation Cap Reductn		0			0		1			0	0	179			0		0
Spillback Cap Reductn		13			0		0			0	0	0			8		0
Storage Cap Reductn		0			0		0			0	0	0			0		0
Reduced v/c Ratio		0.94			1.14		1.02			0.48	0.49	0.65			0.86		0.17

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 50 (45%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.14
Intersection Signal Delay: 51.1 Intersection LOS: D
Intersection Capacity Utilization 85.8% ICU Level of Service E
Analysis Period (min) 15
~ 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 10: GCG Entrance Driveway & Congress Street/Merrimac Street & New Chardon Street

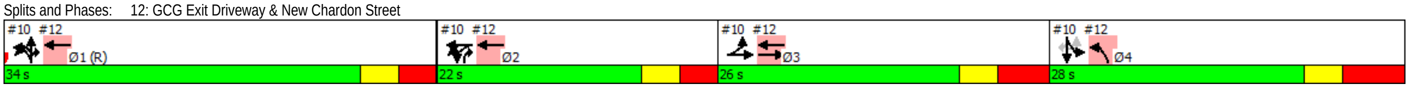


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø1	Ø2
Lane Configurations								
Traffic Volume (vph)	376	0	0	533	41	58		
Future Volume (vph)	376	0	0	533	41	58		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	12	12	12	11	11		
Lane Util. Factor	0.95	1.00	1.00	0.95	1.00	1.00		
Ped Bike Factor					0.99			
Frt					0.921			
Flt Protected					0.980			
Satd. Flow (prot)	3154	0	0	3065	1450	0		
Flt Permitted					0.980			
Satd. Flow (perm)	3154	0	0	3065	1450	0		
Right Turn on Red		Yes				Yes		
Satd. Flow (RTOR)					57			
Link Speed (mph)	25			25	25			
Link Distance (ft)	137			204	136			
Travel Time (s)	3.7			5.6	3.7			
Confl. Bikes (#/hr)		3				1		
Peak Hour Factor	0.98	0.98	0.90	0.90	0.86	0.86		
Heavy Vehicles (%)	3%	0%	0%	6%	5%	0%		
Adj. Flow (vph)	384	0	0	592	48	67		
Shared Lane Traffic (%)								
Lane Group Flow (vph)	384	0	0	592	115	0		
Turn Type	NA			NA	Prot			
Protected Phases	3			1 2 3	4		1	2
Permitted Phases								
Detector Phase	3			1 2 3	4			
Switch Phase								
Minimum Initial (s)	8.0				8.0		8.0	8.0
Minimum Split (s)	19.0				24.0		33.0	15.0
Total Split (s)	26.0				28.0		34.0	22.0
Total Split (%)	23.6%				25.5%		31%	20%
Maximum Green (s)	19.0				20.0		28.0	16.0
Yellow Time (s)	3.0				3.0		3.0	3.0
All-Red Time (s)	4.0				5.0		3.0	3.0
Lost Time Adjust (s)	-2.0				-2.0			
Total Lost Time (s)	5.0				6.0			
Lead/Lag	Lag							Lead
Lead-Lag Optimize?								
Vehicle Extension (s)	2.0				2.0		2.0	2.0
Recall Mode	Max				Max		C-Max	Max
Walk Time (s)	7.0				7.0		7.0	
Flash Dont Walk (s)	4.0				8.0		17.0	
Pedestrian Calls (#/hr)	0				0		0	
Act Effct Green (s)	21.0			78.0	22.0			
Actuated g/C Ratio	0.19			0.71	0.20			
v/c Ratio	0.64			0.27	0.34			
Control Delay	46.5			0.7	23.3			
Queue Delay	0.2			0.8	0.0			
Total Delay	46.7			1.5	23.3			
LOS	D			A	C			
Approach Delay	46.7			1.5	23.3			
Approach LOS	D			A	C			
Queue Length 50th (ft)	132			6	34			
Queue Length 95th (ft)	185			m6	82			
Internal Link Dist (ft)	57			124	56			
Turn Bay Length (ft)								
Base Capacity (vph)	602			2173	335			
Starvation Cap Reductn	0			1210	0			
Spillback Cap Reductn	22			0	0			
Storage Cap Reductn	0			0	0			
Reduced v/c Ratio	0.66			0.61	0.34			

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 50 (45%), Referenced to phase 1:NBTL, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.14
Intersection Signal Delay: 19.7 Intersection LOS: B
Intersection Capacity Utilization 31.4% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 12: GCG Exit Driveway & New Chardon Street

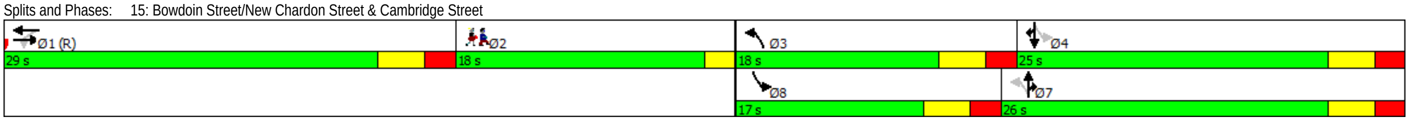


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	0	666	73	16	312	47	223	328	137	250	170	197	
Future Volume (vph)	0	666	73	16	312	47	223	328	137	250	170	197	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Storage Length (ft)	0		0	0		0	0		100	0		100	
Storage Lanes	0		0	0		0	1		1	1		1	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.91	0.91	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor		1.00			0.98								
Frt		0.985			0.981				0.850			0.850	
Flt Protected					0.998		0.950			0.950			
Satd. Flow (prot)	0	4899	0	0	3374	0	1656	1863	1509	1671	1845	1583	
Flt Permitted					0.902		0.540			0.203			
Satd. Flow (perm)	0	4899	0	0	3049	0	941	1863	1509	357	1845	1583	
Right Turn on Red			Yes			Yes			Yes			Yes	
Satd. Flow (RTOR)		20			17				109			216	
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		236			438			363			579		
Travel Time (s)		5.4			10.0			8.3			13.2		
Confl. Bikes (#/hr)			30			153			12				
Peak Hour Factor	0.98	0.98	0.98	0.91	0.91	0.91	0.92	0.92	0.92	0.91	0.91	0.91	
Heavy Vehicles (%)	0%	4%	3%	0%	2%	10%	9%	2%	7%	8%	3%	2%	
Adj. Flow (vph)	0	680	74	18	343	52	242	357	149	275	187	216	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	0	754	0	0	413	0	242	357	149	275	187	216	
Turn Type		NA		Perm	NA		pm+pt	NA	Prot	pm+pt	NA	Prot	
Protected Phases		1			1		3	7	7	8	4	4	2
Permitted Phases				1			7			4			
Detector Phase		1		1	1		3	7	7	8	4	4	
Switch Phase													
Minimum Initial (s)		8.0		8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0	1.0
Minimum Split (s)		28.0		28.0	28.0		13.0	13.0	13.0	13.0	13.0	13.0	18.0
Total Split (s)		29.0		29.0	29.0		18.0	26.0	26.0	17.0	25.0	25.0	18.0
Total Split (%)		32.2%		32.2%	32.2%		20.0%	28.9%	28.9%	18.9%	27.8%	27.8%	20%
Maximum Green (s)		24.0		24.0	24.0		13.0	21.0	21.0	12.0	20.0	20.0	16.0
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)		2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	0.0
Lost Time Adjust (s)		0.0			0.0		0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)		5.0			5.0		5.0	5.0	5.0	5.0	5.0	5.0	
Lead/Lag		Lead		Lead	Lead		Lead	Lag	Lag	Lead	Lag	Lag	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	2.0
Recall Mode		C-Max		C-Max	C-Max		None	Min	Min	None	Min	Min	Ped
Walk Time (s)		7.0		7.0	7.0								7.0
Flash Dont Walk (s)		16.0		16.0	16.0								9.0
Pedestrian Calls (#/hr)		0		0	0								20
Act Effct Green (s)		25.5			25.5		31.4	19.5	19.5	31.7	19.7	19.7	
Actuated g/C Ratio		0.28			0.28		0.35	0.22	0.22	0.35	0.22	0.22	
v/c Ratio		0.54			0.47		0.57	0.89	0.36	0.91	0.46	0.42	
Control Delay		21.5			15.3		24.5	58.5	12.4	58.1	34.8	7.1	
Queue Delay		0.8			0.4		0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay		22.2			15.7		24.5	58.5	12.4	58.1	34.8	7.1	
LOS		C			B		C	E	B	E	C	A	
Approach Delay		22.2			15.7			38.3			35.4		
Approach LOS		C			B			D			D		
Queue Length 50th (ft)		67			41		91	193	18	105	92	0	
Queue Length 95th (ft)		192			m56		149	#337	67	#254	157	56	
Internal Link Dist (ft)		156			358			283			499		
Turn Bay Length (ft)									100			100	
Base Capacity (vph)		1401			875		443	434	435	301	410	519	
Starvation Cap Reductn		333			0		0	0	0	0	0	0	
Spillback Cap Reductn		0			137		0	0	0	0	0	9	
Storage Cap Reductn		0			0		0	0	0	0	0	0	
Reduced v/c Ratio		0.71			0.56		0.55	0.82	0.34	0.91	0.46	0.42	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 29.3 Intersection LOS: C
Intersection Capacity Utilization 65.7% ICU Level of Service C
Analysis Period (min) 15
\# 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: 15: Bowdoin Street/New Chardon Street & Cambridge Street

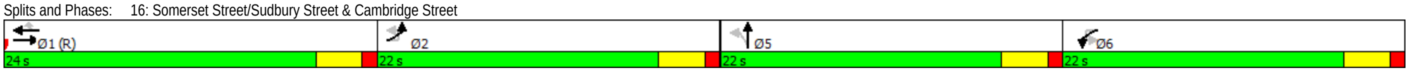


Lane Group	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations														
Traffic Volume (vph)	28	296	613	117	19	53	279	165	69	109	30	0	0	0
Future Volume (vph)	28	296	613	117	19	53	279	165	69	109	30	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)		0		0		100		100	0		0	0		0
Storage Lanes		2		0		1		1	0		0	0		0
Taper Length (ft)		25				25			25			25		
Lane Util. Factor	0.95	0.97	0.95	0.95	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor			0.90					0.60		0.95				
Frt			0.976					0.850		0.981				
Flt Protected		0.950				0.950				0.984				
Satd. Flow (prot)	0	3408	3103	0	0	1805	3574	1538	0	1736	0	0	0	0
Flt Permitted		0.574				0.369				0.984				
Satd. Flow (perm)	0	2059	3103	0	0	701	3574	921	0	1736	0	0	0	0
Right Turn on Red				Yes				Yes			Yes			Yes
Satd. Flow (RTOR)			22					172		8				
Link Speed (mph)			30				30			30			30	
Link Distance (ft)			438				763			259			584	
Travel Time (s)			10.0				17.3			5.9			13.3	
Confl. Peds. (#/hr)				535				533			244			
Confl. Bikes (#/hr)				4				80			3			
Peak Hour Factor	0.98	0.98	0.98	0.98	0.96	0.96	0.96	0.96	0.91	0.91	0.91	0.92	0.92	0.92
Heavy Vehicles (%)	0%	3%	2%	4%	0%	0%	1%	5%	1%	0%	3%	0%	0%	0%
Adj. Flow (vph)	29	302	626	119	20	55	291	172	76	120	33	0	0	0
Shared Lane Traffic (%)														
Lane Group Flow (vph)	0	331	745	0	0	75	291	172	0	229	0	0	0	0
Turn Type	custom	Prot	NA		custom	Prot	NA	Perm	Perm	NA				
Protected Phases		2	1			6	1			5				
Permitted Phases	2				6			1	5					
Detector Phase	2	2	1		6	6	1	1	5	5				
Switch Phase														
Minimum Initial (s)	8.0	8.0	8.0		8.0	8.0	8.0	8.0	8.0	8.0				
Minimum Split (s)	22.0	22.0	27.0		22.0	22.0	27.0	27.0	22.0	22.0				
Total Split (s)	22.0	22.0	24.0		22.0	22.0	24.0	24.0	22.0	22.0				
Total Split (%)	24.4%	24.4%	26.7%		24.4%	24.4%	26.7%	26.7%	24.4%	24.4%				
Maximum Green (s)	18.0	18.0	20.0		18.0	18.0	20.0	20.0	18.0	18.0				
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		0.0				
Total Lost Time (s)		4.0	4.0			4.0	4.0	4.0		4.0				
Lead/Lag	Lag	Lag	Lead		Lag	Lag	Lead	Lead	Lead	Lead				
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	None	None	C-Max		None	None	C-Max	C-Max	None	None				
Walk Time (s)	7.0	7.0	7.0				7.0	7.0						
Flash Dont Walk (s)	11.0	11.0	16.0				16.0	16.0						
Pedestrian Calls (#/hr)	0	0	0				0	0						
Act Effct Green (s)		16.8	31.1			13.6	31.1	31.1		14.9				
Actuated g/C Ratio		0.19	0.35			0.15	0.35	0.35		0.17				
v/c Ratio		0.86	0.69			0.71	0.24	0.40		0.78				
Control Delay		45.4	33.2			69.0	25.4	8.1		52.7				
Queue Delay		0.0	0.0			0.0	0.0	0.0		0.0				
Total Delay		45.4	33.2			69.0	25.4	8.1		52.7				
LOS		D	C			E	C	A		D				
Approach Delay			37.0				26.0			52.7				
Approach LOS			D				C			D				
Queue Length 50th (ft)		97	170			41	66	0		120				
Queue Length 95th (ft)		m#151	m#312			#94	111	57		194				
Internal Link Dist (ft)			358				683			179			504	
Turn Bay Length (ft)						100		100						
Base Capacity (vph)		411	1085			140	1234	430		353				
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		0.81	0.69			0.54	0.24	0.40		0.65				

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 35.7 Intersection LOS: D
Intersection Capacity Utilization 52.1% ICU Level of Service A
Analysis Period (min) 15
\# 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: 16: Somerset Street/Sudbury Street & Cambridge Street



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	570	0	0	194	0
Future Volume (Veh/h)	0	570	0	0	194	0
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)	0	620	0	0	211	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		584				
pX, platoon unblocked					0.94	
vC, conflicting volume	0				310	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	0				146	0
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				73	100
cM capacity (veh/h)	1636				789	1091

Direction, Lane #	EB 1	EB 2	SB 1
Volume Total	310	310	211
Volume Left	0	0	211
Volume Right	0	0	0
cSH	1700	1700	789
Volume to Capacity	0.18	0.18	0.27
Queue Length 95th (ft)	0	0	27
Control Delay (s)	0.0	0.0	11.2
Lane LOS			B
Approach Delay (s)	0.0		11.2
Approach LOS			B

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

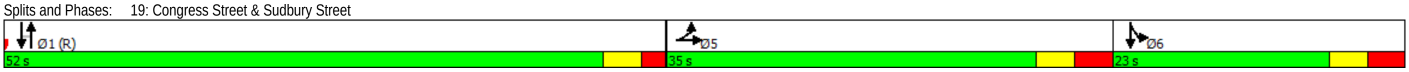
Intersection Sign configuration not allowed in HCM analysis.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations													
Traffic Volume (vph)	153	413	167	0	0	0	10	0	740	367	157	517	0
Future Volume (vph)	153	413	167	0	0	0	10	0	740	367	157	517	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	11	10	12	12	12	12	11	11	11	10	11	11
Storage Length (ft)	0		0	0		0		0		0	100		0
Storage Lanes	1		0	0		0		0		0	1		0
Taper Length (ft)	25			25				25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	0.91	1.00	0.91	0.91	1.00	0.91	1.00
Ped Bike Factor	0.69	0.89							0.85		0.91		
Frt		0.957							0.951				
Flt Protected	0.950										0.950		
Satd. Flow (prot)	1392	2417	0	0	0	0	0	0	3514	0	1486	4029	0
Flt Permitted	0.950								0.934		0.950		
Satd. Flow (perm)	960	2417	0	0	0	0	0	0	3282	0	1354	4029	0
Right Turn on Red			Yes			Yes				No			Yes
Satd. Flow (RTOR)		55											
Link Speed (mph)		25			25				25			25	
Link Distance (ft)		153			161				395			468	
Travel Time (s)		4.2			4.4				10.8			12.8	
Confl. Peds. (#/hr)	236		435							650	650		
Confl. Bikes (#/hr)			5							46			2
Peak Hour Factor	0.89	0.89	0.89	0.92	0.92	0.92	0.98	0.98	0.98	0.98	0.93	0.93	0.93
Heavy Vehicles (%)	5%	5%	6%	0%	0%	0%	0%	0%	3%	7%	2%	12%	0%
Parking (#/hr)	0	0											
Adj. Flow (vph)	172	464	188	0	0	0	10	0	755	374	169	556	0
Shared Lane Traffic (%)													
Lane Group Flow (vph)	172	652	0	0	0	0	0	0	1139	0	169	556	0
Turn Type	Split	NA					Perm		NA		Prot	NA	
Protected Phases	5	5							1		6	1 6	
Permitted Phases							1						
Detector Phase	5	5					1		1		6	1 6	
Switch Phase													
Minimum Initial (s)	8.0	8.0					10.0		10.0		7.0		
Minimum Split (s)	28.0	28.0					27.0		27.0		14.0		
Total Split (s)	35.0	35.0					52.0		52.0		23.0		
Total Split (%)	31.8%	31.8%					47.3%		47.3%		20.9%		
Maximum Green (s)	29.0	29.0					47.0		47.0		17.0		
Yellow Time (s)	3.0	3.0					3.0		3.0		3.0		
All-Red Time (s)	3.0	3.0					2.0		2.0		3.0		
Lost Time Adjust (s)	-2.0	-2.0							-2.0		-2.0		
Total Lost Time (s)	4.0	4.0							3.0		4.0		
Lead/Lag	Lead	Lead									Lag		
Lead-Lag Optimize?													
Vehicle Extension (s)	2.0	2.0					2.0		2.0		2.0		
Recall Mode	Max	Max					C-Max		C-Max		Max		
Walk Time (s)	7.0	7.0					7.0		7.0				
Flash Dont Walk (s)	15.0	15.0					15.0		15.0				
Pedestrian Calls (#/hr)	100	100					100		100				
Act Effct Green (s)	31.0	31.0							49.0		19.0	72.0	
Actuated g/C Ratio	0.28	0.28							0.45		0.17	0.65	
v/c Ratio	0.44	0.91							0.78		0.66	0.21	
Control Delay	36.7	52.6							11.1		49.6	6.1	
Queue Delay	0.0	0.4							1.3		0.0	0.0	
Total Delay	36.7	53.0							12.5		49.6	6.1	
LOS	D	D							B		D	A	
Approach Delay		49.6							12.5			16.2	
Approach LOS		D							B			B	
Queue Length 50th (ft)	100	216							83		122	69	
Queue Length 95th (ft)	164	#321							98		m128	m72	
Internal Link Dist (ft)		73			81				315			388	
Turn Bay Length (ft)											100		
Base Capacity (vph)	392	720							1461		256	2637	
Starvation Cap Reductn	0	0							71		0	0	
Spillback Cap Reductn	0	5							149		0	0	
Storage Cap Reductn	0	0							0		0	0	
Reduced v/c Ratio	0.44	0.91							0.87		0.66	0.21	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 28 (25%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.91
Intersection Signal Delay: 24.9 Intersection LOS: C
Intersection Capacity Utilization 71.2% ICU Level of Service C
Analysis Period (min) 15
\# 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: 19: Congress Street & Sudbury Street

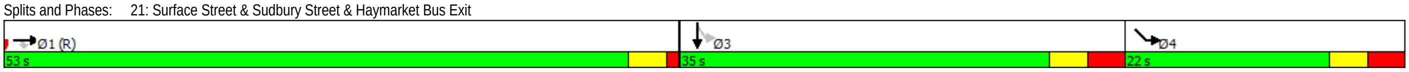


Lane Group	EBT	EBR	SBL	SBT	SEL	SER
Lane Configurations						
Traffic Volume (vph)	798	145	71	325	29	6
Future Volume (vph)	798	145	71	325	29	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	12	12	12	12	12
Lane Util. Factor	0.95	1.00	0.95	0.95	1.00	1.00
Ped Bike Factor		0.53		0.94		
Frt		0.850			0.977	
Flt Protected				0.991	0.960	
Satd. Flow (prot)	3323	1553	0	3352	918	0
Flt Permitted				0.991	0.960	
Satd. Flow (perm)	3323	831	0	3141	918	0
Right Turn on Red		Yes	No			
Satd. Flow (RTOR)		158				
Link Speed (mph)	25			25	25	
Link Distance (ft)	111			438	138	
Travel Time (s)	3.0			11.9	3.8	
Confl. Peds. (#/hr)		402	183			
Confl. Bikes (#/hr)		10				
Peak Hour Factor	0.92	0.92	0.88	0.88	0.77	0.77
Heavy Vehicles (%)	5%	4%	1%	8%	93%	100%
Adj. Flow (vph)	867	158	81	369	38	8
Shared Lane Traffic (%)						
Lane Group Flow (vph)	867	158	0	450	46	0
Turn Type	NA	Perm	Perm	NA	Prot	
Protected Phases	1			3	4	
Permitted Phases		1	3			
Detector Phase	1	1	3	3	4	
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	6.0	
Minimum Split (s)	21.0	21.0	18.0	18.0	13.0	
Total Split (s)	53.0	53.0	35.0	35.0	22.0	
Total Split (%)	48.2%	48.2%	31.8%	31.8%	20.0%	
Maximum Green (s)	49.0	49.0	29.0	29.0	16.0	
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0	
All-Red Time (s)	1.0	1.0	3.0	3.0	3.0	
Lost Time Adjust (s)	-1.0	-1.0		-2.0	0.0	
Total Lost Time (s)	3.0	3.0		4.0	6.0	
Lead/Lag			Lead	Lead	Lag	
Lead-Lag Optimize?						
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	
Recall Mode	C-Max	C-Max	Max	Max	Max	
Walk Time (s)	7.0	7.0	7.0	7.0		
Flash Dont Walk (s)	5.0	5.0	4.0	4.0		
Pedestrian Calls (#/hr)	0	0	25	25		
Act Effct Green (s)	50.0	50.0		31.0	16.0	
Actuated g/C Ratio	0.45	0.45		0.28	0.15	
v/c Ratio	0.57	0.34		0.51	0.35	
Control Delay	20.9	3.3		30.5	50.5	
Queue Delay	17.4	0.6		0.0	0.0	
Total Delay	38.3	4.0		30.5	50.5	
LOS	D	A		C	D	
Approach Delay	33.0			30.5	50.5	
Approach LOS	C			C	D	
Queue Length 50th (ft)	199	4		127	30	
Queue Length 95th (ft)	m230	m5		m170	57	
Internal Link Dist (ft)	31			358	58	
Turn Bay Length (ft)						
Base Capacity (vph)	1510	463		885	133	
Starvation Cap Reductn	647	112		0	0	
Spillback Cap Reductn	0	0		0	0	
Storage Cap Reductn	0	0		0	0	
Reduced v/c Ratio	1.00	0.45		0.51	0.35	

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 72 (65%), Referenced to phase 1:EBT, Start of Green
Natural Cycle: 55
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.57
Intersection Signal Delay: 32.8 Intersection LOS: C
Intersection Capacity Utilization 49.8% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 21: Surface Street & Sudbury Street & Haymarket Bus Exit

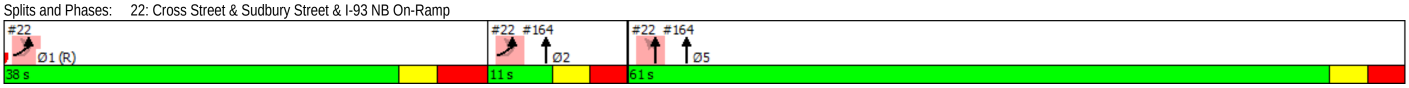


Lane Group	EBL2	EBL	EBR	NBL	NBT	SBT	SBR	SEL	SER	Ø1	Ø2
Lane Configurations											
Traffic Volume (vph)	632	266	0	642	787	0	0	0	0		
Future Volume (vph)	632	266	0	642	787	0	0	0	0		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Lane Width (ft)	12	13	12	12	11	12	12	12	12		
Lane Util. Factor	0.95	0.97	1.00	0.95	0.95	1.00	1.00	1.00	1.00		
Ped Bike Factor											
Frt											
Flt Protected		0.950			0.978						
Satd. Flow (prot)	0	3374	0	0	3272	0	0	0	0		
Flt Permitted		0.950			0.978						
Satd. Flow (perm)	0	3374	0	0	3272	0	0	0	0		
Right Turn on Red	Yes		Yes								
Satd. Flow (RTOR)		192									
Link Speed (mph)		25			25	25		25			
Link Distance (ft)		191			203	568		237			
Travel Time (s)		5.2			5.5	15.5		6.5			
Confl. Bikes (#/hr)			11								
Peak Hour Factor	0.92	0.92	0.92	0.95	0.95	0.92	0.92	0.92	0.92		
Heavy Vehicles (%)	4%	15%	0%	1%	7%	0%	0%	0%	0%		
Adj. Flow (vph)	687	289	0	676	828	0	0	0	0		
Shared Lane Traffic (%)											
Lane Group Flow (vph)	0	976	0	0	1504	0	0	0	0		
Turn Type	Perm	Prot		Perm	NA						
Protected Phases		1 2			5					1	2
Permitted Phases	1 2			5							
Detector Phase	1 2	1 2		5	5						
Switch Phase											
Minimum Initial (s)				10.0	10.0					10.0	4.0
Minimum Split (s)				18.0	18.0					25.0	11.0
Total Split (s)				61.0	61.0					38.0	11.0
Total Split (%)				55.5%	55.5%					35%	10%
Maximum Green (s)				55.0	55.0					31.0	5.0
Yellow Time (s)				3.0	3.0					3.0	3.0
All-Red Time (s)				3.0	3.0					4.0	3.0
Lost Time Adjust (s)					-1.0						
Total Lost Time (s)					5.0						
Lead/Lag										Lead	Lag
Lead-Lag Optimize?											
Vehicle Extension (s)				2.0	2.0					2.0	2.0
Recall Mode				Max	Max					C-Max	Max
Walk Time (s)				7.0	7.0					7.0	
Flash Dont Walk (s)				4.0	4.0					3.0	
Pedestrian Calls (#/hr)				30	30					0	
Act Effct Green (s)		43.0			56.0						
Actuated g/C Ratio		0.39			0.51						
v/c Ratio		0.68			0.90						
Control Delay		8.4			16.1						
Queue Delay		0.1			0.0						
Total Delay		8.5			16.1						
LOS		A			B						
Approach Delay		8.5			16.1						
Approach LOS		A			B						
Queue Length 50th (ft)		29			458						
Queue Length 95th (ft)		65			#607						
Internal Link Dist (ft)		111			123	488		157			
Turn Bay Length (ft)											
Base Capacity (vph)		1435			1665						
Starvation Cap Reductn		43			0						
Spillback Cap Reductn		0			0						
Storage Cap Reductn		0			0						
Reduced v/c Ratio		0.70			0.90						

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 70 (64%), Referenced to phase 1:EBL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 13.1 Intersection LOS: B
Intersection Capacity Utilization 84.6% ICU Level of Service E
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 22: Cross Street & Sudbury Street & I-93 NB On-Ramp



APPENDIX C: Pedestrian Wind Study

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Government Square – Phase 1

Boston, Massachusetts

Final Report

Pedestrian Wind Consultation

RWDI # 1401777
November 11, 2015

SUBMITTED TO

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1. INTRODUCTION

A pedestrian wind study was conducted on the proposed Government Square - Phase 1 located in Boston, Massachusetts. The objective of the study was to assess the effect of the proposed development on local conditions in pedestrian areas around the study site and provide recommendations for minimizing adverse effects.

The study involved wind simulations on a 1:400 scale model of the proposed building and surroundings. These simulations were then conducted in RWDI's boundary-layer wind tunnel in Guelph, Ontario, for the purpose of quantifying local wind speed conditions and comparing to appropriate criteria for gauging wind comfort in pedestrian areas. A list of the drawings used for the construction of the model can be found in Appendix A. The criteria recommended by the Boston Redevelopment Authority (BRA) were used in this study. The present report describes the methods and presents the results of the wind tunnel simulations.

2. OVERVIEW

Major buildings, especially those that protrude above their surroundings, often cause increased local wind speeds at the pedestrian level. Typically, wind speeds increase with elevation above the ground surface, and taller buildings intercept these faster winds and deflect them down to the pedestrian level. The funneling of wind through gaps between buildings and the acceleration of wind around corners of buildings may also cause increases in wind speed. Conversely, if a building is surrounded by others of equivalent height, it may be protected from the prevailing upper-level winds, resulting in no significant changes to the local pedestrian-level wind environment. The most effective way to assess potential pedestrian-level wind impacts around a proposed new building is to conduct scale model tests in a wind tunnel.

The consideration of wind in planning outdoor activity areas is important since high winds in an area tend to deter pedestrian use. For example, winds should be light or relatively light in areas where people would be sitting, such as outdoor cafes or playgrounds. For bus stops and other locations where people would be standing, somewhat higher winds can be tolerated. For frequently used sidewalks, where people are primarily walking, stronger winds are acceptable. For infrequently used areas, the wind comfort criteria can be relaxed even further. The actual effects of wind can range from pedestrian inconvenience, due to the blowing of dust and other loose material in a moderate breeze, to severe difficulty with walking due to the wind forces on the pedestrian.

3. METHODOLOGY

Information concerning the site and surroundings was derived from: information on surrounding buildings and terrain; site plans and elevations of the proposed development provided by the design team. The following configurations were simulated:

No-Build Configuration: includes all existing surrounding buildings;

Phase 1 Configuration: includes the proposed WPB1 Tower and all existing surroundings as well as the proposed landscaping along Sudbury Street and to the west of the WPB1 Tower

As shown in Figures 1a and 1b, the wind tunnel model included the proposed development and all relevant surrounding buildings and topography within a 1500 ft radius of the study site. The mean speed profile and turbulence of the natural wind approaching the modelled area were also simulated in RWDI's boundary layer wind tunnel. The scale model was equipped with 121 specially designed wind speed sensors that were connected to the wind tunnel's data acquisition system to record the mean and fluctuating components of wind speed at a full-scale height of 5 feet above grade in pedestrian areas throughout the study site. Wind speeds were measured for 36 wind directions, in 10 degree increments, starting from true north. The measurements at each sensor location were recorded in the form of ratios of local mean and gust speeds to the reference wind speed in the free stream above the model. The results were then combined with long-term meteorological data, recorded during the years 1981 to 2011 at Boston's Logan International Airport, in order to predict full scale wind conditions. The analysis was performed separately for each of the four seasons and for the entire year.

Figures 2a, 2b and 2c present "wind roses", summarizing the annual and seasonal wind climates in the Boston area, based on the data from Logan Airport. The left-hand wind rose, in Figure 2a, for example, summarizes the spring (March, April, and May) wind data. In general, the prevailing winds at this time of year are from the west-northwest, northwest, west, south-southwest and east-southeast. In addition to these directions, strong winds are also prevalent from the northeast direction as indicated by the red and yellow color bands on the wind rose.

On an annual basis (Figure 2c) the most common wind directions are those between south-southwest and north-northwest. Winds from the east-southeast are also relatively common. In the case of strong winds, northeast and west-northwest are the dominant wind directions.

This study involved state-of-the-art measurement and analysis techniques to predict wind conditions at the study site. Nevertheless, some uncertainty remains in predicting wind comfort, and this must be kept in mind. For example, the sensation of comfort among individuals can be quite variable. Variations in age, individual health, clothing, and other human factors can change a particular response of an individual. The comfort limits used in this report represent an average for the total population. Also, unforeseen changes in the project area, such as the construction or removal of buildings, can affect the conditions experienced at the site. Finally, the prediction of wind speeds is necessarily a statistical procedure. The wind speeds reported are for the frequency of occurrence stated (one percent of the time). Higher wind speeds will occur but on a less frequent basis.

4. PEDESTRIAN WIND COMFORT 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[1]. 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:

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.

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 uncomfortable for more passive activities such as sitting.

5. TEST RESULTS

Table 1 presents the mean and effective gust wind speeds for each season as well as annually. For the two test configurations, Figures 3a and 3b graphically depict the mean wind speeds and Figures 4a and 4b depict the effective gust speeds at each wind measurement location based on the annual winds. Typically the summer and fall winds tend to be more comfortable than the annual winds while the winter and spring winds are less comfortable than the annual winds. The following summary of pedestrian wind comfort and safety is based on the annual winds for each configuration tested, except where noted below in the text.

5.1 Onsite Areas (Locations 1 through 26)

A wind comfort categorization of walking is considered appropriate for sidewalks. Lower wind speeds conducive to standing are preferred at building entrances.

[1] Melbourne, W.H., 1978, "Criteria for Environmental Wind Conditions", Journal of Industrial Aerodynamics, 3 (1978) 241 - 249.

5.1.1 No-Build Configuration

As shown in Figure 3a, most of the locations are suitable for walking or better annually. Uncomfortable wind speeds exist to the southwest corner (Location 5) and northeast corner (Location 24) of the existing garage on an annual basis. In the winter, wind speed at Location 5 is rated as dangerous (Table 1).

The effective gust criterion was not met annually at one location to the southwest corner of the existing garage (Location 5 in Figure 4a).

5.1.2 Phase 1 Configuration

With the addition of the WPB1 tower and proposed landscaping, the wind conditions around the site are expected to be similar to or slightly improved from the No-Build conditions. For instance, the effective gust criterion was met annually at all on site test locations, including Location 5 (Figure 4b). The mean wind speeds at Location 5 remain uncomfortable annually (Figure 3b), but no longer dangerous in the winter (Table 1). In addition, wind speeds at Location 24 are reduced to be comfortable for walking on an annual basis (Figure 3b). Location 16 under the garage is an exception, where uncomfortable wind speeds are predicted for the Phase 1 Configuration (Figure 3b).

If lower wind speeds are desired for uncomfortable locations, additional wind control measures in the form of landscaping or wind screens can be considered.

5.2 Off-site Walkways (Locations 27 through 121)

5.2.1 No-Build Configuration

Wind conditions for off-site areas are generally expected to be comfortable for walking or better on an annual basis (Figure 3a). Local flow accelerations and uncomfortable wind conditions are measured along Sudbury Street (Locations 57, 60, 64, 67 – 69 and 120), along Cambridge Street (Locations 62, 119 and 121), along New Chardon Street (Locations 115 and 116) and along Congress Street (Location 51). The mean wind speeds at Location 62 are rated dangerous in the winter (Table 1).

The effective gust criterion was not met annually at four off-site locations (Locations 60, 62, 68 and 119 in Figure 4a).

5.2.2 Phase 1 Configuration

With the addition of the proposed Phase 1 Development and landscaping along Sudbury Street, overall the off-site wind conditions are expected to be similar to or better than those that currently exist. Uncomfortable winds are detected at a reduced number of locations along Sudbury Street (Locations 57, 60 and 68), along Cambridge Street (Locations 62, 119 and 121), along Congress Street (location 51) and along New Chardon Street to the north of the proposed development (Location 94). The winter wind speeds at Location 62 remain dangerous in the Phase 1 Configuration (Table 1).

The effective gust criterion was not met annually at two off-site locations to the south and southwest of the proposed development (Locations 62 and 119 in Figure 4b), which is a reduction from four for the No-Build configuration.

6. APPLICABILITY OF RESULTS

The results presented in this report pertain to the model of the Government Square development constructed using the architectural design drawings listed in Appendix A. Should there be any design changes that deviate from this list of drawings, the results presented may change. Therefore, if changes in the design are made, it is recommended that RWDI be contacted and requested to review their potential effects on wind conditions.

TABLES

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
1	A	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	16		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	13		Standing	19		Acceptable
		Summer	10	+11%	Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	19		Acceptable
		Annual	12		Sitting	18		Acceptable
2	A	Spring	13		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	12	-14%	Sitting	20		Acceptable
		Annual	12		Sitting	18		Acceptable
3	A	Spring	12		Sitting	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	12		Sitting	20		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	22		Acceptable
		Annual	12		Sitting	20		Acceptable
4	A	Spring	13		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	20		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	9	-31%	Sitting	14	-33%	Acceptable
		Summer	7	-30%	Sitting	11	-31%	Acceptable
		Fall	9	-25%	Sitting	13	-35%	Acceptable
		Winter	10	-29%	Sitting	15	-32%	Acceptable
		Annual	9	-31%	Sitting	14	-30%	Acceptable
5	A	Spring	25		Uncomfortable	32		Unacceptable
		Summer	19		Walking	25		Acceptable
		Fall	24		Uncomfortable	30		Acceptable
		Winter	28		Dangerous	35		Unacceptable
		Annual	25		Uncomfortable	32		Unacceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

<u>Configurations</u>

A – No Build
B – Phase 1

<u>Mean Wind Speed Criteria</u>

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

<u>Effective Gust Criteria</u>

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	22	-12%	Uncomfortable	28	-12%	Acceptable
		Summer	17	-11%	Walking	22	-12%	Acceptable
		Fall	21	-12%	Uncomfortable	27		Acceptable
		Winter	24	-14%	Uncomfortable	31	-11%	Acceptable
		Annual	22	-12%	Uncomfortable	28	-12%	Acceptable
6	A	Spring	15		Standing	23		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	21		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	22		Acceptable
	B	Spring	15		Standing	21		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	15		Standing	21		Acceptable
7	A	Spring	13		Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	9		Sitting	14	-12%	Acceptable
		Fall	11		Sitting	17	-11%	Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	12		Sitting	18		Acceptable
8	A	Spring	11		Sitting	18		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	14	+27%	Standing	21	+17%	Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	13	+18%	Standing	19		Acceptable
		Winter	14	+17%	Standing	21	+11%	Acceptable
		Annual	13	+18%	Standing	19		Acceptable
9	A	Data Not Available						
	B	Spring	7	-59%	Sitting	12	-52%	Acceptable
		Summer	6	-54%	Sitting	9	-55%	Acceptable
		Fall	7	-56%	Sitting	11	-52%	Acceptable
		Winter	8	-53%	Sitting	13	-48%	Acceptable
		Annual	7	-56%	Sitting	12	-50%	Acceptable
10	A	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

<u>Configurations</u>

A – No Build
B – Phase 1

<u>Mean Wind Speed Criteria</u>

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

<u>Effective Gust Criteria</u>

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

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Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	13		Standing	20		Acceptable
		Summer	10	+11%	Sitting	16	+14%	Acceptable
		Fall	12		Sitting	19	+12%	Acceptable
		Winter	14	+17%	Standing	22	+16%	Acceptable
		Annual	13	+18%	Standing	20	+11%	Acceptable
11	A	Spring	14		Standing	22		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	20	+43%	Uncomfortable	28	+27%	Acceptable
		Summer	14	+17%	Standing	20	+11%	Acceptable
		Fall	17	+31%	Walking	24	+20%	Acceptable
		Winter	19	+36%	Walking	27	+23%	Acceptable
		Annual	18	+29%	Walking	25	+19%	Acceptable
12	A	Spring	13		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	20		Acceptable
		Winter	13		Standing	22		Acceptable
		Annual	13		Standing	21		Acceptable
	B	Spring	15	+15%	Standing	25	+14%	Acceptable
		Summer	12		Sitting	19	+12%	Acceptable
		Fall	14	+17%	Standing	23	+15%	Acceptable
		Winter	16	+23%	Walking	27	+23%	Acceptable
		Annual	15	+15%	Standing	24	+14%	Acceptable
13	A	Spring	16		Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	15		Standing	24		Acceptable
	B	Spring	20	+25%	Uncomfortable	26		Acceptable
		Summer	16	+23%	Walking	21	+11%	Acceptable
		Fall	18	+20%	Walking	25		Acceptable
		Winter	20	+18%	Uncomfortable	27		Acceptable
		Annual	19	+27%	Walking	25		Acceptable
14	A	Spring	8		Sitting	13		Acceptable
		Summer	6		Sitting	10		Acceptable
		Fall	7		Sitting	12		Acceptable
		Winter	8		Sitting	13		Acceptable
		Annual	7		Sitting	12		Acceptable
	B	Spring	9	+12%	Sitting	14		Acceptable
		Summer	7	+17%	Sitting	11		Acceptable
		Fall	9	+29%	Sitting	13		Acceptable
		Winter	10	+25%	Sitting	16	+23%	Acceptable
		Annual	9	+29%	Sitting	14	+17%	Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A – No Build				
B – Phase 1	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
15	A	Spring	11		Sitting	17		Acceptable
		Summer	9		Sitting	13		Acceptable
		Fall	10		Sitting	15		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	11		Sitting	16		Acceptable
	B	Spring	12		Sitting	16		Acceptable
		Summer	9		Sitting	12		Acceptable
		Fall	11		Sitting	15		Acceptable
		Winter	12		Sitting	17		Acceptable
		Annual	11		Sitting	16		Acceptable
16	A	Spring	20		Uncomfortable	28		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	20		Uncomfortable	28		Acceptable
		Annual	18		Walking	26		Acceptable
	B	Spring	23	+15%	Uncomfortable	29		Acceptable
		Summer	19	+19%	Walking	23		Acceptable
		Fall	22	+29%	Uncomfortable	27	+12%	Acceptable
		Winter	25	+25%	Uncomfortable	31	+11%	Acceptable
		Annual	23	+28%	Uncomfortable	28		Acceptable
17	A	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	13		Standing	21	+11%	Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	20	+11%	Acceptable
		Winter	15	+15%	Standing	23	+15%	Acceptable
		Annual	13		Standing	21	+11%	Acceptable
18	A	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
19	A	Spring	12		Sitting	18		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	17		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	12		Sitting	17		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

<u>Configurations</u>	<u>Mean Wind Speed Criteria</u>		<u>Effective Gust Criteria</u>	
A – No Build				
B – Phase 1	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	14	+17%	Standing	19		Acceptable
		Summer	12		Sitting	16		Acceptable
		Fall	13		Standing	18		Acceptable
		Winter	12		Sitting	17		Acceptable
		Annual	13		Standing	18		Acceptable
20	A	Spring	16		Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	23		Acceptable
	B	Spring	16		Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	15		Standing	22		Acceptable
21	A	Spring	19		Walking	27		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	25		Acceptable
	B	Spring	19		Walking	27		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	18		Walking	25		Acceptable
		Annual	17		Walking	25		Acceptable
22	A	Spring	17		Walking	25		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	16		Walking	24		Acceptable
	B	Spring	17		Walking	25		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	17		Walking	24		Acceptable
		Annual	16		Walking	24		Acceptable
23	A	Spring	19		Walking	28		Acceptable
		Summer	16		Walking	23		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	26		Acceptable
	B	Spring	19		Walking	27		Acceptable
		Summer	16		Walking	23		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	18		Walking	26		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – No Build
B – Phase 1

Mean Wind Speed Criteria

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
24	A	Spring	21		Uncomfortable	31		Acceptable
		Summer	16		Walking	23		Acceptable
		Fall	19		Walking	28		Acceptable
		Winter	23		Uncomfortable	34		Unacceptable
		Annual	20		Uncomfortable	30		Acceptable
	B	Spring	19		Walking	28		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	17	-11%	Walking	26		Acceptable
		Winter	21		Uncomfortable	31		Acceptable
		Annual	18		Walking	28		Acceptable
25	A	Spring	18		Walking	26		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	19		Walking	28		Acceptable
		Annual	17		Walking	25		Acceptable
	B	Spring	19		Walking	27		Acceptable
		Summer	15		Standing	20		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	19		Walking	28		Acceptable
		Annual	18		Walking	25		Acceptable
26	A	Spring	17		Walking	26		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	19		Walking	28		Acceptable
		Annual	17		Walking	26		Acceptable
	B	Spring	17		Walking	25		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	19		Walking	28		Acceptable
		Annual	17		Walking	25		Acceptable
27	A	Spring	16		Walking	26		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	15		Standing	24		Acceptable
		Winter	16		Walking	26		Acceptable
		Annual	15		Standing	25		Acceptable
	B	Spring	15		Standing	23	-12%	Acceptable
		Summer	11		Sitting	17	-11%	Acceptable
		Fall	13	-13%	Standing	21	-12%	Acceptable
		Winter	14	-12%	Standing	22	-15%	Acceptable
		Annual	13	-13%	Standing	21	-16%	Acceptable
28	A	Spring	16		Walking	24		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	16		Walking	23		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – No Build
B – Phase 1

Mean Wind Speed Criteria

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	12	-25%	Sitting	20	-17%	Acceptable
		Summer	10	-17%	Sitting	16	-16%	Acceptable
		Fall	12	-20%	Sitting	19	-14%	Acceptable
		Winter	14	-18%	Standing	23	-12%	Acceptable
		Annual	12	-25%	Sitting	20	-13%	Acceptable
29	A	Spring	11		Sitting	18		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	11		Sitting	17		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable
30	A	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	11	-15%	Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	11	-15%	Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
31	A	Spring	10		Sitting	15		Acceptable
		Summer	9		Sitting	13		Acceptable
		Fall	9		Sitting	14		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	9		Sitting	14		Acceptable
	B	Spring	10		Sitting	15		Acceptable
		Summer	8	-11%	Sitting	13		Acceptable
		Fall	9		Sitting	14		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	9		Sitting	14		Acceptable
32	A	Spring	11		Sitting	17		Acceptable
		Summer	9		Sitting	13		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	11		Sitting	16		Acceptable
	B	Spring	11		Sitting	17		Acceptable
		Summer	9		Sitting	13		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A – No Build				
B – Phase 1	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
33	A	Spring	14		Standing	21		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	14		Standing	22		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	13		Standing	21		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	14		Standing	21		Acceptable
34	A	Spring	16		Walking	23		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	15		Standing	22		Acceptable
	B	Spring	16		Walking	23		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	15		Standing	22		Acceptable
35	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable
36	A	Spring	13		Standing	19		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	13		Standing	19		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
37	A	Spring	14		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	19		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A – No Build				
B – Phase 1	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	13		Standing	19		Acceptable
		Summer	11		Sitting	15		Acceptable
		Fall	12		Sitting	17	-11%	Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
38	A	Spring	15		Standing	20		Acceptable
		Summer	12		Sitting	16		Acceptable
		Fall	13		Standing	18		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	14		Standing	19		Acceptable
		Summer	12		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	19		Acceptable
39	A	Spring	13		Standing	19		Acceptable
		Summer	11		Sitting	15		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	13		Standing	18		Acceptable
		Summer	11		Sitting	15		Acceptable
		Fall	12		Sitting	17		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	12		Sitting	17		Acceptable
40	A	Spring	13		Standing	19		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	14		Standing	19		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13		Standing	18		Acceptable
41	A	Spring	13		Standing	19		Acceptable
		Summer	11		Sitting	15		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	13		Standing	19		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A – No Build				
B – Phase 1	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
42	A	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	14		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	19		Acceptable
43	A	Spring	18		Walking	27		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable
	B	Spring	16	-11%	Walking	25		Acceptable
		Summer	12	-14%	Sitting	18		Acceptable
		Fall	14	-12%	Standing	22		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	23		Acceptable
44	A	Spring	17		Walking	25		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	19		Walking	28		Acceptable
		Annual	17		Walking	25		Acceptable
	B	Spring	16		Walking	24		Acceptable
		Summer	11	-15%	Sitting	18		Acceptable
		Fall	14	-12%	Standing	22		Acceptable
		Winter	16	-16%	Walking	25	-11%	Acceptable
		Annual	15	-12%	Standing	23		Acceptable
45	A	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	19		Acceptable
	B	Spring	11		Sitting	18		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	11		Sitting	17	-11%	Acceptable
46	A	Spring	19		Walking	29		Acceptable
		Summer	15		Standing	23		Acceptable
		Fall	18		Walking	27		Acceptable
		Winter	20		Uncomfortable	31		Acceptable
		Annual	18		Walking	28		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

<u>Configurations</u>

A – No Build
B – Phase 1

<u>Mean Wind Speed Criteria</u>

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

<u>Effective Gust Criteria</u>

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	16	-16%	Walking	25	-14%	Acceptable
		Summer	14		Standing	22		Acceptable
		Fall	15	-17%	Standing	24	-11%	Acceptable
		Winter	16	-20%	Walking	25	-19%	Acceptable
		Annual	15	-17%	Standing	24	-14%	Acceptable
47	A	Spring	15		Standing	23		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	21		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	22		Acceptable
	B	Spring	13	-13%	Standing	21		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13	-13%	Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
48	A	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	25		Acceptable
		Annual	14		Standing	23		Acceptable
	B	Spring	15		Standing	21		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	22	-12%	Acceptable
		Annual	14		Standing	21		Acceptable
49	A	Spring	14		Standing	23		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	13		Standing	23		Acceptable
		Annual	13		Standing	22		Acceptable
	B	Spring	16	+14%	Walking	23		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	12		Sitting	20	-13%	Acceptable
		Annual	14		Standing	21		Acceptable
50	A	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	21		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	13		Standing	21		Acceptable
	B	Spring	12	-14%	Sitting	20		Acceptable
		Summer	10		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13	-13%	Standing	21		Acceptable
		Annual	12		Sitting	20		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A – No Build				
B – Phase 1	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
51	A	Spring	23		Uncomfortable	33		Unacceptable
		Summer	18		Walking	25		Acceptable
		Fall	21		Uncomfortable	30		Acceptable
		Winter	23		Uncomfortable	32		Unacceptable
		Annual	21		Uncomfortable	30		Acceptable
	B	Spring	22		Uncomfortable	30		Acceptable
		Summer	17		Walking	23		Acceptable
		Fall	19		Walking	28		Acceptable
		Winter	21		Uncomfortable	30		Acceptable
		Annual	20		Uncomfortable	28		Acceptable
52	A	Spring	9		Sitting	15		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	8		Sitting	14		Acceptable
		Winter	9		Sitting	16		Acceptable
		Annual	9		Sitting	14		Acceptable
	B	Spring	9		Sitting	15		Acceptable
		Summer	7		Sitting	12		Acceptable
		Fall	8		Sitting	14		Acceptable
		Winter	9		Sitting	15		Acceptable
		Annual	9		Sitting	14		Acceptable
53	A	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	18		Acceptable
		Fall	13		Standing	21		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	22		Acceptable
	B	Spring	13		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
54	A	Spring	16		Walking	24		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	23		Acceptable
	B	Spring	16		Walking	25		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	23		Acceptable
55	A	Spring	14		Standing	21		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	12		Sitting	19		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A – No Build				
B – Phase 1	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	12	-14%	Sitting	19		Acceptable
		Summer	10	-17%	Sitting	15	-12%	Acceptable
		Fall	10	-17%	Sitting	16	-11%	Acceptable
		Winter	11		Sitting	17	-11%	Acceptable
		Annual	11		Sitting	17	-11%	Acceptable
56	A	Spring	18		Walking	26		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	20		Uncomfortable	29		Acceptable
		Annual	18		Walking	26		Acceptable
	B	Spring	17		Walking	25		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18		Walking	28		Acceptable
		Annual	16	-11%	Walking	25		Acceptable
57	A	Spring	20		Uncomfortable	29		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	22		Uncomfortable	32		Unacceptable
		Annual	20		Uncomfortable	29		Acceptable
	B	Spring	22		Uncomfortable	31		Acceptable
		Summer	17	+13%	Walking	24		Acceptable
		Fall	21	+11%	Uncomfortable	30	+11%	Acceptable
		Winter	25	+14%	Uncomfortable	34		Unacceptable
		Annual	22		Uncomfortable	31		Acceptable
58	A	Spring	16		Walking	24		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	15		Standing	22		Acceptable
	B	Spring	15		Standing	23		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	15		Standing	22		Acceptable
59	A	Spring	21		Uncomfortable	32		Unacceptable
		Summer	14		Standing	22		Acceptable
		Fall	18		Walking	28		Acceptable
		Winter	19		Walking	29		Acceptable
		Annual	18		Walking	28		Acceptable
	B	Spring	19		Walking	30		Acceptable
		Summer	14		Standing	22		Acceptable
		Fall	17		Walking	27		Acceptable
		Winter	19		Walking	30		Acceptable
		Annual	18		Walking	28		Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

<u>Configurations</u>

A – No Build
B – Phase 1

<u>Mean Wind Speed Criteria</u>

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

<u>Effective Gust Criteria</u>

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
60	A	Spring	25		Uncomfortable	35		Unacceptable
		Summer	19		Walking	26		Acceptable
		Fall	23		Uncomfortable	32		Unacceptable
		Winter	27		Uncomfortable	37		Unacceptable
		Annual	24		Uncomfortable	34		Unacceptable
	B	Spring	22	-12%	Uncomfortable	31	-11%	Acceptable
		Summer	17	-11%	Walking	24		Acceptable
		Fall	21		Uncomfortable	29		Acceptable
		Winter	24	-11%	Uncomfortable	34		Unacceptable
		Annual	22		Uncomfortable	31		Acceptable
61	A	Spring	19		Walking	28		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	19		Walking	28		Acceptable
		Annual	18		Walking	26		Acceptable
	B	Spring	19		Walking	27		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	25		Acceptable
62	A	Spring	26		Uncomfortable	36		Unacceptable
		Summer	20		Uncomfortable	28		Acceptable
		Fall	25		Uncomfortable	34		Unacceptable
		Winter	29		Dangerous	39		Unacceptable
		Annual	26		Uncomfortable	36		Unacceptable
	B	Spring	26		Uncomfortable	35		Unacceptable
		Summer	21		Uncomfortable	28		Acceptable
		Fall	25		Uncomfortable	33		Unacceptable
		Winter	29		Dangerous	39		Unacceptable
		Annual	26		Uncomfortable	35		Unacceptable
63	A	Spring	19		Walking	30		Acceptable
		Summer	14		Standing	22		Acceptable
		Fall	17		Walking	28		Acceptable
		Winter	20		Uncomfortable	30		Acceptable
		Annual	18		Walking	29		Acceptable
	B	Spring	17	-11%	Walking	25	-17%	Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	16		Walking	24	-14%	Acceptable
		Winter	16	-20%	Walking	25	-17%	Acceptable
		Annual	16	-11%	Walking	24	-17%	Acceptable
64	A	Spring	20		Uncomfortable	31		Acceptable
		Summer	15		Standing	24		Acceptable
		Fall	19		Walking	30		Acceptable
		Winter	21		Uncomfortable	34		Unacceptable
		Annual	20		Uncomfortable	31		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A – No Build				
B – Phase 1	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	18		Walking	28		Acceptable
		Summer	14		Standing	22		Acceptable
		Fall	17	-11%	Walking	27		Acceptable
		Winter	20		Uncomfortable	31		Acceptable
		Annual	18		Walking	28		Acceptable
65	A	Spring	17		Walking	26		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable
	B	Spring	18		Walking	25		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	20	+18%	Uncomfortable	27		Acceptable
		Annual	18	+12%	Walking	25		Acceptable
66	A	Spring	21		Uncomfortable	29		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	20		Uncomfortable	28		Acceptable
		Annual	19		Walking	26		Acceptable
	B	Spring	19		Walking	25	-14%	Acceptable
		Summer	13		Standing	17	-15%	Acceptable
		Fall	16	-11%	Walking	22	-15%	Acceptable
		Winter	17	-15%	Walking	23	-18%	Acceptable
		Annual	16	-16%	Walking	22	-15%	Acceptable
67	A	Spring	22		Uncomfortable	31		Acceptable
		Summer	17		Walking	24		Acceptable
		Fall	21		Uncomfortable	29		Acceptable
		Winter	24		Uncomfortable	34		Unacceptable
		Annual	22		Uncomfortable	31		Acceptable
	B	Spring	17	-23%	Walking	24	-23%	Acceptable
		Summer	13	-24%	Standing	19	-21%	Acceptable
		Fall	16	-24%	Walking	23	-21%	Acceptable
		Winter	18	-25%	Walking	26	-24%	Acceptable
		Annual	17	-23%	Walking	23	-26%	Acceptable
68	A	Spring	25		Uncomfortable	35		Unacceptable
		Summer	20		Uncomfortable	27		Acceptable
		Fall	24		Uncomfortable	33		Unacceptable
		Winter	27		Uncomfortable	38		Unacceptable
		Annual	25		Uncomfortable	35		Unacceptable
	B	Spring	21	-16%	Uncomfortable	30	-14%	Acceptable
		Summer	16	-20%	Walking	23	-15%	Acceptable
		Fall	20	-17%	Uncomfortable	28	-15%	Acceptable
		Winter	23	-15%	Uncomfortable	33	-13%	Unacceptable
		Annual	21	-16%	Uncomfortable	30	-14%	Acceptable

Notes:
1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A – No Build				
B – Phase 1	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
69	A	Spring	21		Uncomfortable	29		Acceptable
		Summer	16		Walking	23		Acceptable
		Fall	20		Uncomfortable	28		Acceptable
		Winter	23		Uncomfortable	31		Acceptable
		Annual	21		Uncomfortable	28		Acceptable
	B	Spring	18	-14%	Walking	24	-17%	Acceptable
		Summer	14	-12%	Standing	19	-17%	Acceptable
		Fall	17	-15%	Walking	23	-18%	Acceptable
		Winter	19	-17%	Walking	27	-13%	Acceptable
		Annual	18	-14%	Walking	24	-14%	Acceptable
70	A	Spring	20		Uncomfortable	27		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	19		Walking	27		Acceptable
		Annual	18		Walking	25		Acceptable
	B	Spring	13	-35%	Standing	19	-30%	Acceptable
		Summer	10	-38%	Sitting	16	-27%	Acceptable
		Fall	12	-29%	Sitting	18	-25%	Acceptable
		Winter	14	-26%	Standing	21	-22%	Acceptable
		Annual	13	-28%	Standing	19	-24%	Acceptable
71	A	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	15		Standing	23		Acceptable
	B	Spring	16		Walking	23		Acceptable
		Summer	11		Sitting	16	-11%	Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	14	-12%	Standing	21	-16%	Acceptable
		Annual	14		Standing	20	-13%	Acceptable
72	A	Spring	8		Sitting	14		Acceptable
		Summer	6		Sitting	11		Acceptable
		Fall	8		Sitting	13		Acceptable
		Winter	8		Sitting	14		Acceptable
		Annual	8		Sitting	13		Acceptable
	B	Spring	10	+25%	Sitting	16	+14%	Acceptable
		Summer	9	+50%	Sitting	14	+27%	Acceptable
		Fall	10	+25%	Sitting	16	+23%	Acceptable
		Winter	11	+38%	Sitting	17	+21%	Acceptable
		Annual	10	+25%	Sitting	16	+23%	Acceptable
73	A	Spring	17		Walking	25		Acceptable
		Summer	15		Standing	20		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	16		Walking	23		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A – No Build				
B – Phase 1	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	13	-24%	Standing	20	-20%	Acceptable
		Summer	10	-33%	Sitting	16	-20%	Acceptable
		Fall	12	-20%	Sitting	19	-14%	Acceptable
		Winter	13	-19%	Standing	21	-12%	Acceptable
		Annual	12	-25%	Sitting	20	-13%	Acceptable
74	A	Spring	15		Standing	21		Acceptable
		Summer	11		Sitting	15		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	14		Standing	19		Acceptable
	B	Spring	15		Standing	21		Acceptable
		Summer	11		Sitting	15		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	19		Acceptable
75	A	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	13		Standing	19		Acceptable
		Annual	12		Sitting	17		Acceptable
	B	Spring	12		Sitting	19		Acceptable
		Summer	8	-11%	Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	11	-15%	Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable
76	A	Spring	14		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	22		Acceptable
	B	Spring	13		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	21		Acceptable
77	A	Spring	12		Sitting	18		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	19		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	11		Sitting	17		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	10	-17%	Sitting	16	-11%	Acceptable
		Winter	11	-15%	Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A – No Build				
B – Phase 1	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
78	A	Spring	18		Walking	26		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	17		Walking	24		Acceptable
	B	Spring	16	-11%	Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	16	-11%	Walking	24		Acceptable
		Annual	15	-12%	Standing	23		Acceptable
79	A	Spring	12		Sitting	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	16	+33%	Walking	23	+15%	Acceptable
		Summer	13	+30%	Standing	19	+19%	Acceptable
		Fall	14	+27%	Standing	21	+17%	Acceptable
		Winter	15	+15%	Standing	23	+15%	Acceptable
		Annual	15	+25%	Standing	22	+16%	Acceptable
80	A	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	12		Sitting	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	12		Sitting	19		Acceptable
81	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	20		Acceptable
82	A	Spring	14		Standing	21		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A – No Build				
B – Phase 1	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	13		Standing	20		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
83	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	16	+14%	Walking	23		Acceptable
		Summer	13	+18%	Standing	18		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	15	+15%	Standing	21		Acceptable
84	A	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	15	+15%	Standing	23	+15%	Acceptable
		Summer	13	+18%	Standing	19	+12%	Acceptable
		Fall	14	+17%	Standing	22	+16%	Acceptable
		Winter	15	+15%	Standing	24	+14%	Acceptable
		Annual	14	+17%	Standing	22	+16%	Acceptable
85	A	Spring	17		Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	17		Walking	24		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	16		Walking	23		Acceptable
		Summer	13		Standing	18		Acceptable
		Fall	15		Standing	21		Acceptable
		Winter	17		Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable
86	A	Spring	11		Sitting	17		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
	B	Spring	15	+36%	Standing	21	+24%	Acceptable
		Summer	12	+33%	Sitting	18	+29%	Acceptable
		Fall	12	+20%	Sitting	18	+12%	Acceptable
		Winter	13	+18%	Standing	19	+12%	Acceptable
		Annual	13	+30%	Standing	19	+19%	Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – No Build
B – Phase 1

Mean Wind Speed Criteria

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
87	A	Spring	12		Sitting	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	12		Sitting	20		Acceptable
	B	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	12	-14%	Sitting	20		Acceptable
		Annual	12		Sitting	19		Acceptable
88	A	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	12		Sitting	20		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	22		Acceptable
		Annual	12		Sitting	20		Acceptable
89	A	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	13		Acceptable
		Fall	11		Sitting	16	-11%	Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	12		Sitting	17		Acceptable
90	A	Spring	15		Standing	21		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	17		Walking	23		Acceptable
		Annual	15		Standing	21		Acceptable
	B	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	14		Standing	21		Acceptable
91	A	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	13		Standing	19		Acceptable
		Annual	12		Sitting	17		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A – No Build				
B – Phase 1	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	13		Standing	19		Acceptable
		Annual	11		Sitting	18		Acceptable
92	A	Spring	18		Walking	25		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	17		Walking	24		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	19		Walking	27		Acceptable
		Summer	16	+14%	Walking	22		Acceptable
		Fall	17	+13%	Walking	24		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	18	+12%	Walking	25		Acceptable
93	A	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	14		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
94	A	Spring	20		Uncomfortable	27		Acceptable
		Summer	17		Walking	21		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	20		Uncomfortable	27		Acceptable
		Annual	19		Walking	25		Acceptable
	B	Spring	22		Uncomfortable	28		Acceptable
		Summer	18		Walking	22		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	21		Uncomfortable	29		Acceptable
		Annual	20		Uncomfortable	27		Acceptable
95	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	12	-14%	Sitting	19		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	12	-14%	Sitting	19		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A – No Build				
B – Phase 1	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
96	A	Spring	16		Walking	24		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	19		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	15		Standing	23		Acceptable
97	A	Spring	17		Walking	24		Acceptable
		Summer	13		Standing	18		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	18		Walking	25		Acceptable
		Annual	16		Walking	23		Acceptable
	B	Spring	17		Walking	23		Acceptable
		Summer	13		Standing	18		Acceptable
		Fall	16		Walking	22		Acceptable
		Winter	18		Walking	25		Acceptable
		Annual	16		Walking	23		Acceptable
98	A	Spring	9		Sitting	14		Acceptable
		Summer	7		Sitting	11		Acceptable
		Fall	8		Sitting	13		Acceptable
		Winter	9		Sitting	14		Acceptable
		Annual	8		Sitting	13		Acceptable
	B	Spring	20	+122%	Uncomfortable	26	+86%	Acceptable
		Summer	14	+100%	Standing	19	+73%	Acceptable
		Fall	18	+125%	Walking	24	+85%	Acceptable
		Winter	20	+122%	Uncomfortable	26	+86%	Acceptable
		Annual	18	+125%	Walking	24	+85%	Acceptable
99	A	Spring	19		Walking	28		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	16		Walking	25		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	17		Walking	26		Acceptable
	B	Spring	19		Walking	27		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	17		Walking	25		Acceptable
100	A	Spring	19		Walking	28		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	16		Walking	25		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

<u>Configurations</u>

A – No Build
B – Phase 1

<u>Mean Wind Speed Criteria</u>

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

<u>Effective Gust Criteria</u>

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	20		Uncomfortable	29		Acceptable
		Summer	17		Walking	22		Acceptable
		Fall	18		Walking	27		Acceptable
		Winter	18		Walking	27		Acceptable
		Annual	18		Walking	26		Acceptable
101	A	Spring	14		Standing	23		Acceptable
		Summer	11		Sitting	18		Acceptable
		Fall	13		Standing	21		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	19	+36%	Walking	24		Acceptable
		Summer	14	+27%	Standing	18		Acceptable
		Fall	17	+31%	Walking	22		Acceptable
		Winter	19	+27%	Walking	24		Acceptable
		Annual	18	+29%	Walking	22		Acceptable
102	A	Spring	17		Walking	26		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	16		Walking	25		Acceptable
		Winter	18		Walking	28		Acceptable
		Annual	17		Walking	26		Acceptable
	B	Spring	16		Walking	24		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	17		Walking	25	-11%	Acceptable
		Annual	16		Walking	24		Acceptable
103	A	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	16		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	11		Sitting	16		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	11		Sitting	16		Acceptable
104	A	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	14		Standing	22		Acceptable
	B	Spring	16		Walking	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations	Mean Wind Speed Criteria		Effective Gust Criteria	
A – No Build				
B – Phase 1	Comfortable for Sitting:	≤ 12 mph	Acceptable:	≤ 31 mph
	Comfortable for Standing:	> 12 and ≤ 15 mph	Unacceptable:	> 31 mph
	Comfortable for Walking:	> 15 and ≤ 19 mph		
	Uncomfortable for Walking:	> 19 and ≤ 27 mph		
	Dangerous Conditions:	> 27 mph		

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
105	A	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	13		Standing	19		Acceptable
	B	Spring	14		Standing	20		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
106	A	Spring	16		Walking	22		Acceptable
		Summer	14		Standing	18		Acceptable
		Fall	15		Standing	21		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	15		Standing	22		Acceptable
	B	Spring	16		Walking	23		Acceptable
		Summer	13		Standing	18		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	17		Walking	24		Acceptable
		Annual	16		Walking	22		Acceptable
107	A	Spring	16		Walking	21		Acceptable
		Summer	13		Standing	17		Acceptable
		Fall	14		Standing	19		Acceptable
		Winter	15		Standing	21		Acceptable
		Annual	15		Standing	20		Acceptable
	B	Spring	14	-12%	Standing	21		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	13	-13%	Standing	20		Acceptable
108	A	Spring	15		Standing	21		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	20		Acceptable
	B	Spring	15		Standing	21		Acceptable
		Summer	13		Standing	17		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	20		Acceptable
109	A	Spring	15		Standing	20		Acceptable
		Summer	12		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	15		Standing	22		Acceptable
		Annual	14		Standing	20		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

<u>Configurations</u>

A – No Build
B – Phase 1

<u>Mean Wind Speed Criteria</u>

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

<u>Effective Gust Criteria</u>

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	15		Standing	20		Acceptable
		Summer	12		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	14		Standing	19		Acceptable
110	A	Spring	16		Walking	22		Acceptable
		Summer	13		Standing	17		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	15		Standing	21		Acceptable
	B	Spring	15		Standing	20		Acceptable
		Summer	13		Standing	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14	-12%	Standing	21		Acceptable
		Annual	14		Standing	19		Acceptable
111	A	Spring	11		Sitting	18		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	18		Acceptable
	B	Spring	11		Sitting	17		Acceptable
		Summer	8	-11%	Sitting	13	-13%	Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	12		Sitting	18		Acceptable
		Annual	10		Sitting	17		Acceptable
112	A	Spring	17		Walking	25		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18		Walking	27		Acceptable
		Annual	16		Walking	25		Acceptable
	B	Spring	15	-12%	Standing	23		Acceptable
		Summer	12		Sitting	17	-11%	Acceptable
		Fall	14	-12%	Standing	21	-12%	Acceptable
		Winter	16	-11%	Walking	24	-11%	Acceptable
		Annual	15		Standing	22	-12%	Acceptable
113	A	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – No Build
B – Phase 1

Mean Wind Speed Criteria

Comfortable for Sitting: ≤ 12 mph
Comfortable for Standing: > 12 and ≤ 15 mph
Comfortable for Walking: > 15 and ≤ 19 mph
Uncomfortable for Walking: > 19 and ≤ 27 mph
Dangerous Conditions: > 27 mph

Effective Gust Criteria

Acceptable: ≤ 31 mph
Unacceptable: > 31 mph

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			Mean Wind Speed			Effective Gust Wind Speed		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
114	A	Spring	14		Standing	23		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	15		Standing	24		Acceptable
		Annual	14		Standing	23		Acceptable
	B	Spring	14		Standing	23		Acceptable
		Summer	12		Sitting	20		Acceptable
		Fall	13		Standing	22		Acceptable
		Winter	14		Standing	23		Acceptable
		Annual	13		Standing	22		Acceptable
115	A	Spring	20		Uncomfortable	29		Acceptable
		Summer	18		Walking	25		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	21		Uncomfortable	29		Acceptable
		Annual	20		Uncomfortable	27		Acceptable
	B	Spring	19		Walking	27		Acceptable
		Summer	17		Walking	23		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	19		Walking	27		Acceptable
		Annual	18		Walking	26		Acceptable
116	A	Spring	20		Uncomfortable	28		Acceptable
		Summer	18		Walking	25		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	21		Uncomfortable	29		Acceptable
		Annual	20		Uncomfortable	27		Acceptable
	B	Spring	19		Walking	28		Acceptable
		Summer	17		Walking	24		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	20		Uncomfortable	28		Acceptable
		Annual	18		Walking	27		Acceptable
117	A	Spring	13		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	20		Acceptable
	B	Spring	12		Sitting	20		Acceptable
		Summer	10		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	20		Acceptable
118	A	Spring	19		Walking	26		Acceptable
		Summer	17		Walking	24		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	20		Uncomfortable	27		Acceptable
		Annual	18		Walking	26		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – No Build
B – Phase 1

Mean Wind Speed Criteria

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

BRA Criteria			**Mean Wind Speed**			**Effective Gust Wind Speed**		
Loc.	Config.	Season	Speed(mph)	%Change	RATING	Speed(mph)	%Change	RATING
	B	Spring	16	-16%	Walking	24		Acceptable
		Summer	14	-18%	Standing	21	-12%	Acceptable
		Fall	15	-17%	Standing	22	-12%	Acceptable
		Winter	16	-20%	Walking	24	-11%	Acceptable
		Annual	15	-17%	Standing	23	-12%	Acceptable
119	A	Spring	26		Uncomfortable	35		Unacceptable
		Summer	24		Uncomfortable	32		Unacceptable
		Fall	26		Uncomfortable	34		Unacceptable
		Winter	27		Uncomfortable	37		Unacceptable
		Annual	26		Uncomfortable	34		Unacceptable
	B	Spring	24		Uncomfortable	33		Unacceptable
		Summer	22		Uncomfortable	30		Acceptable
		Fall	24		Uncomfortable	32		Unacceptable
		Winter	25		Uncomfortable	34		Unacceptable
		Annual	24		Uncomfortable	32		Unacceptable
120	A	Spring	20		Uncomfortable	30		Acceptable
		Summer	17		Walking	26		Acceptable
		Fall	20		Uncomfortable	29		Acceptable
		Winter	21		Uncomfortable	31		Acceptable
		Annual	20		Uncomfortable	29		Acceptable
	B	Spring	18		Walking	27		Acceptable
		Summer	16		Walking	23	-12%	Acceptable
		Fall	18		Walking	27		Acceptable
		Winter	19		Walking	29		Acceptable
		Annual	18		Walking	27		Acceptable
121	A	Spring	21		Uncomfortable	30		Acceptable
		Summer	19		Walking	27		Acceptable
		Fall	21		Uncomfortable	30		Acceptable
		Winter	24		Uncomfortable	33		Unacceptable
		Annual	21		Uncomfortable	30		Acceptable
	B	Spring	20		Uncomfortable	28		Acceptable
		Summer	17	-11%	Walking	25		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	22		Uncomfortable	30		Acceptable
		Annual	20		Uncomfortable	28		Acceptable

Notes: 1) Wind speeds are for a 1% probability of exceedance; and,
2) % Change is based on comparison with Configuration A and only those that are greater than 10% are listed.

Configurations

A – No Build
B – Phase 1

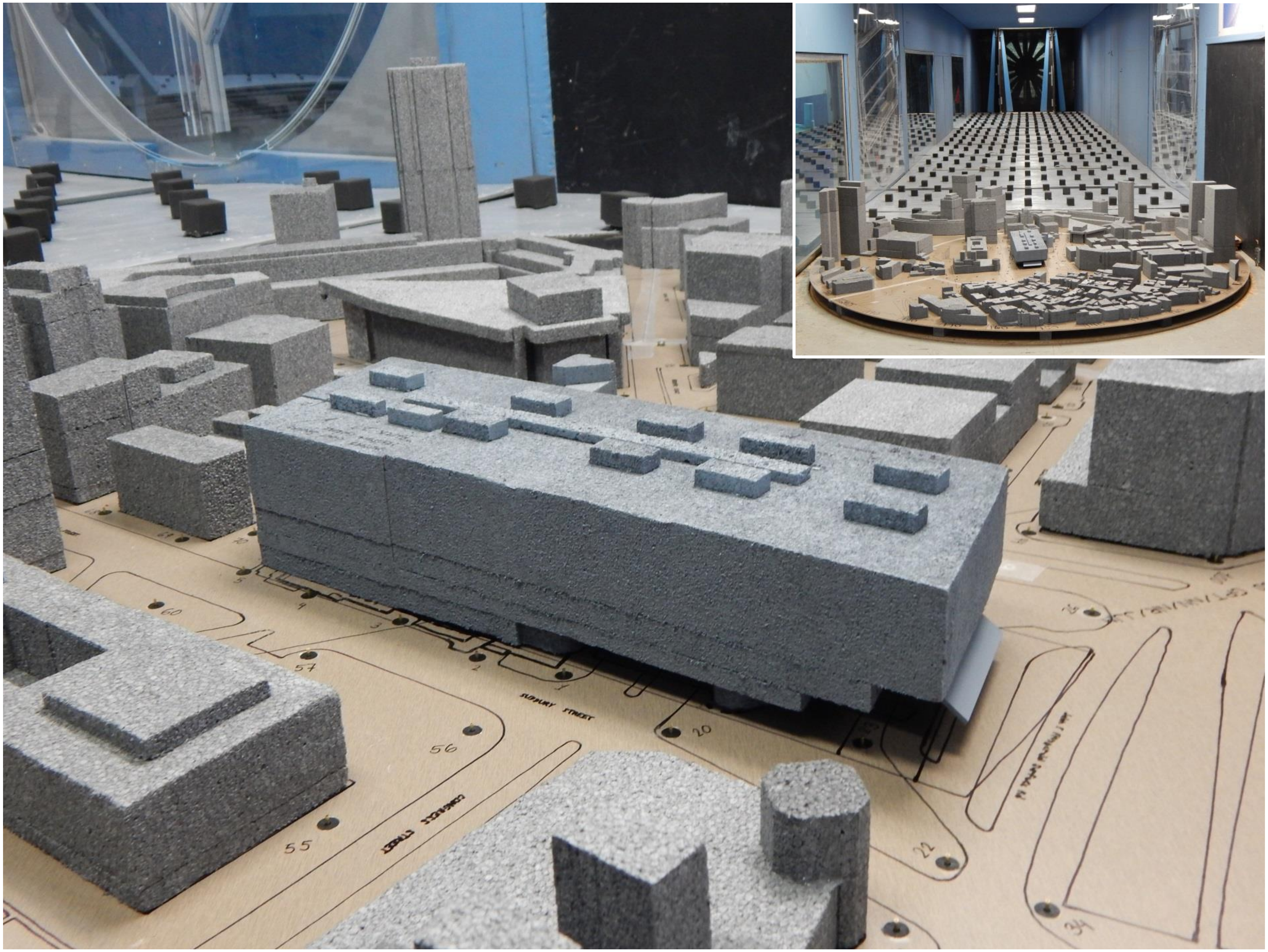
Mean Wind Speed Criteria

Comfortable for Sitting:	≤ 12 mph
Comfortable for Standing:	> 12 and ≤ 15 mph
Comfortable for Walking:	> 15 and ≤ 19 mph
Uncomfortable for Walking:	> 19 and ≤ 27 mph
Dangerous Conditions:	> 27 mph

Effective Gust Criteria

Acceptable:	≤ 31 mph
Unacceptable:	> 31 mph

FIGURES



Wind Tunnel Study Model
No-Build

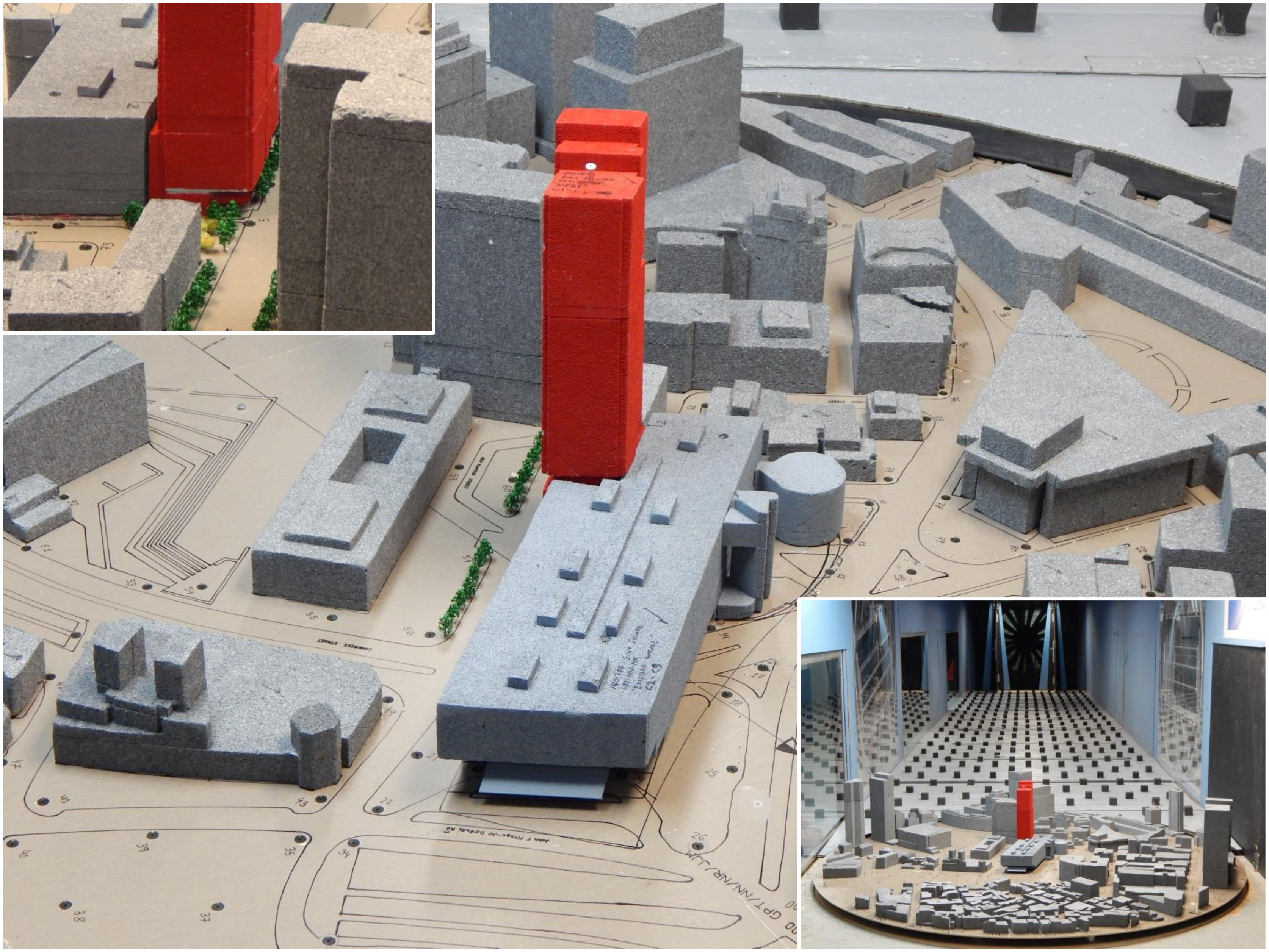
Government Square – Boston, MA

Project #1401777

Figure No. 1a

Date: November 9, 2015

RWDI



Wind Tunnel Study Model
Phase 1

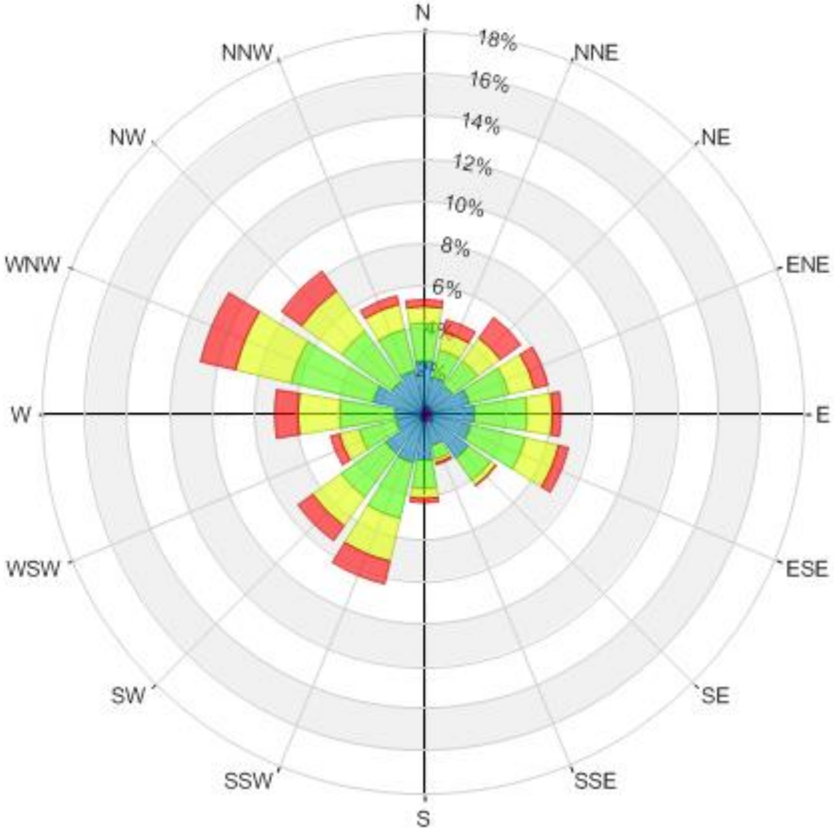
Government Square – Boston, MA

Project #1401777

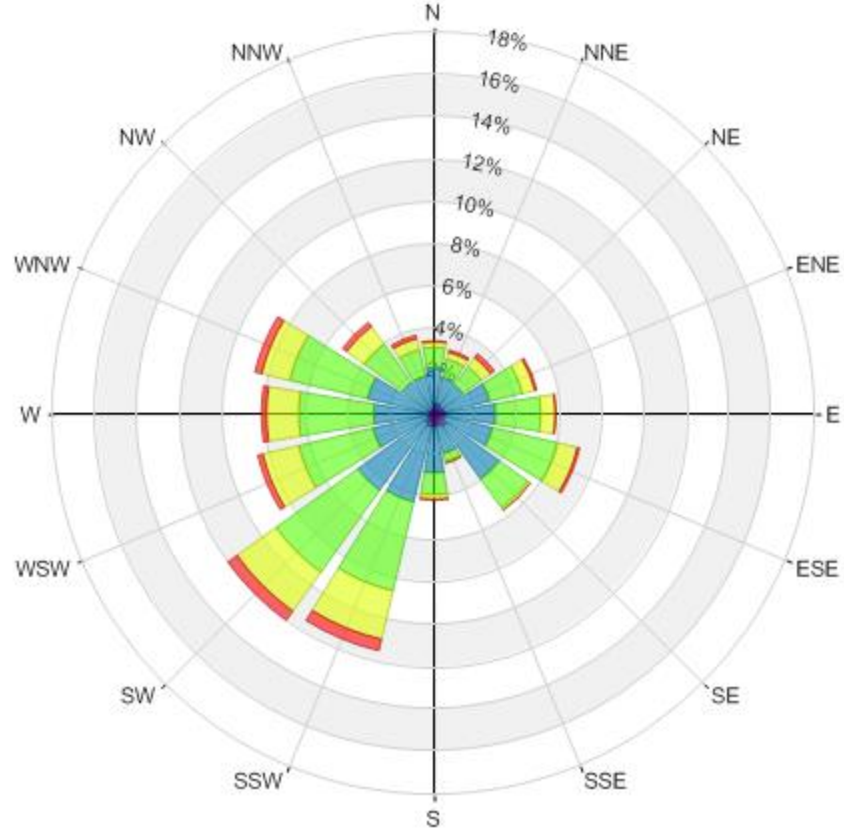
Figure No. 1b

Date: November 9, 2015

RWDI



Spring
(March - May)



Summer
(June - August)

Wind Speed (mph)	Probability (%) Spring	Summer
Calm	2.0	2.1
1-5	5.5	7.4
6-10	27.5	36.6
11-15	33.5	36.4
16-20	20.7	14.6
>20	10.8	3.0

Directional Distribution (%) of Winds (Blowing From)
Boston Logan International Airport (1981 - 2011)

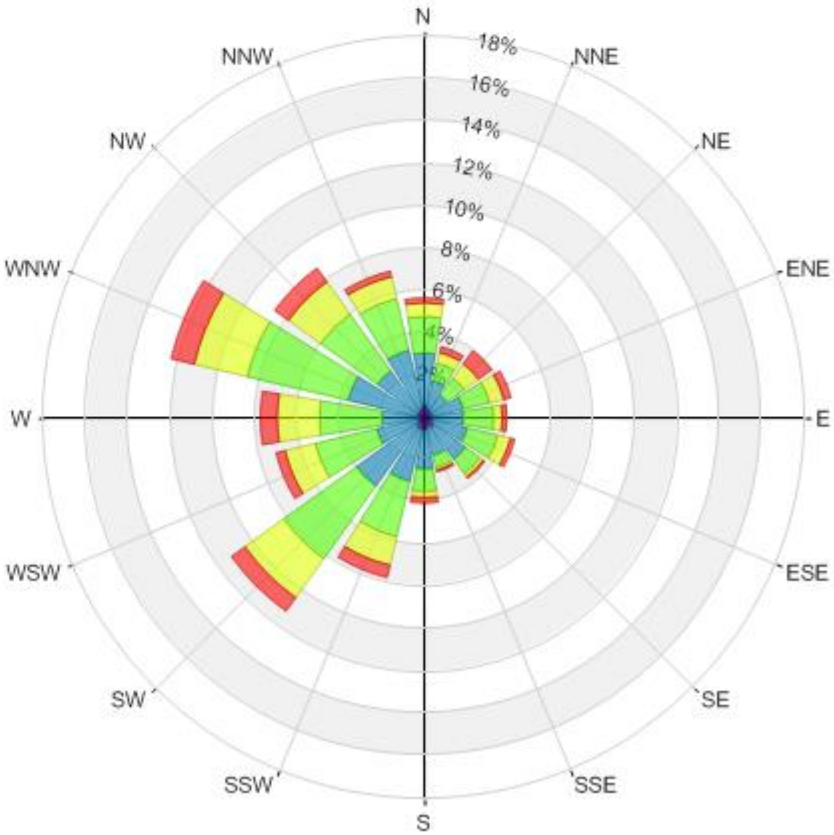
Government Square – Boston, MA

Project #1401777

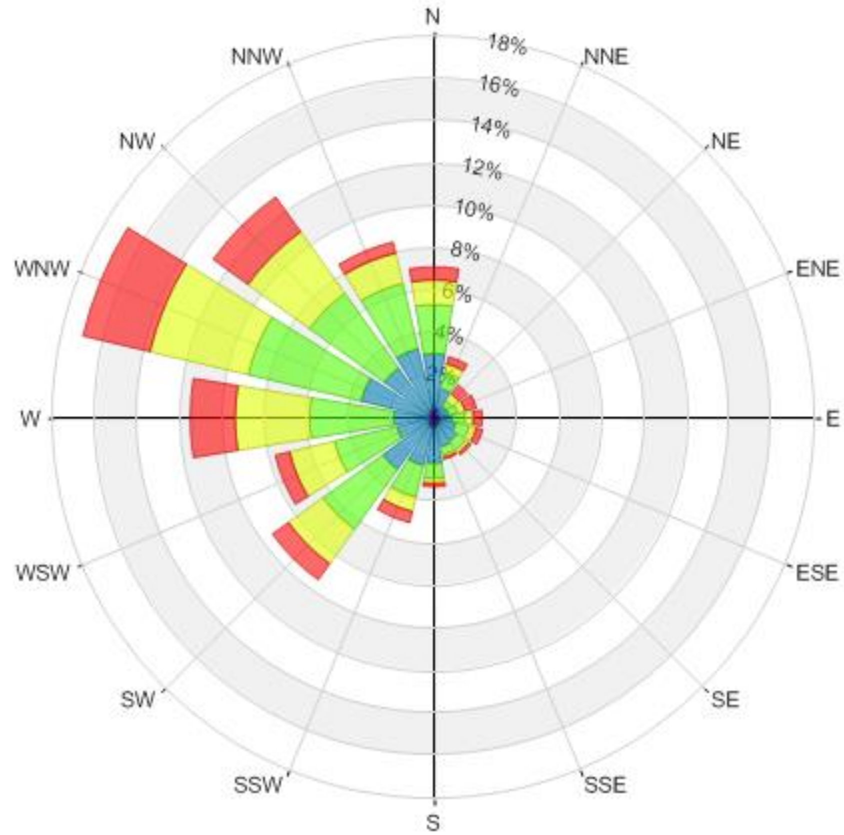
Figure No. 2a

Date: November 10, 2015

RWDI



Fall
(September - November)



Winter
(December - February)

Wind Speed (mph)	Probability (%) Fall	Winter
Calm	2.3	1.8
1-5	6.9	5.3
6-10	32.7	26.1
11-15	33.9	31.8
16-20	16.8	21.8
>20	7.3	13.2

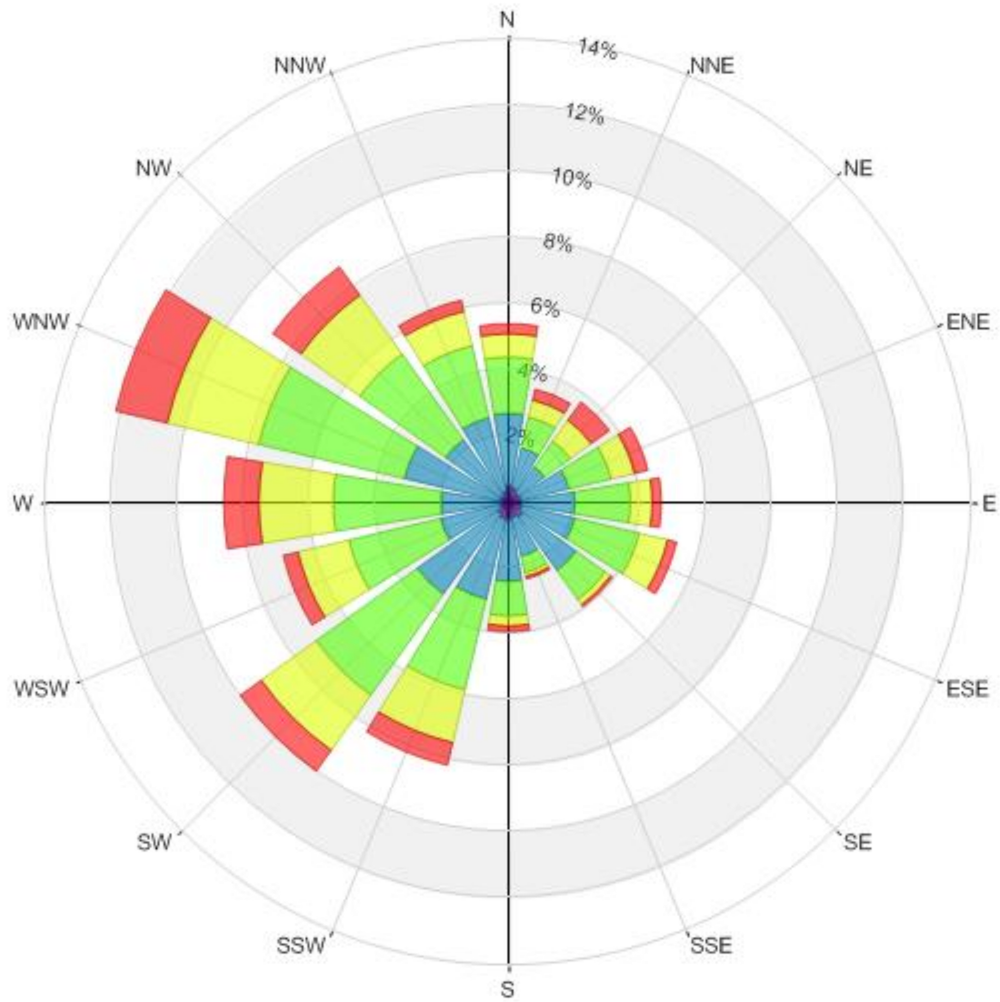
Directional Distribution (%) of Winds (Blowing From)
Boston Logan International Airport (1983 - 2013)

Government Square – Boston, MA

Project #1401777

Figure No. 2b

Date: November 10, 2015



Annual Winds

Wind Speed (mph)	Probability (%)
Calm	2.0
1-5	6.3
6-10	30.8
11-15	33.9
16-20	18.5
>20	8.6

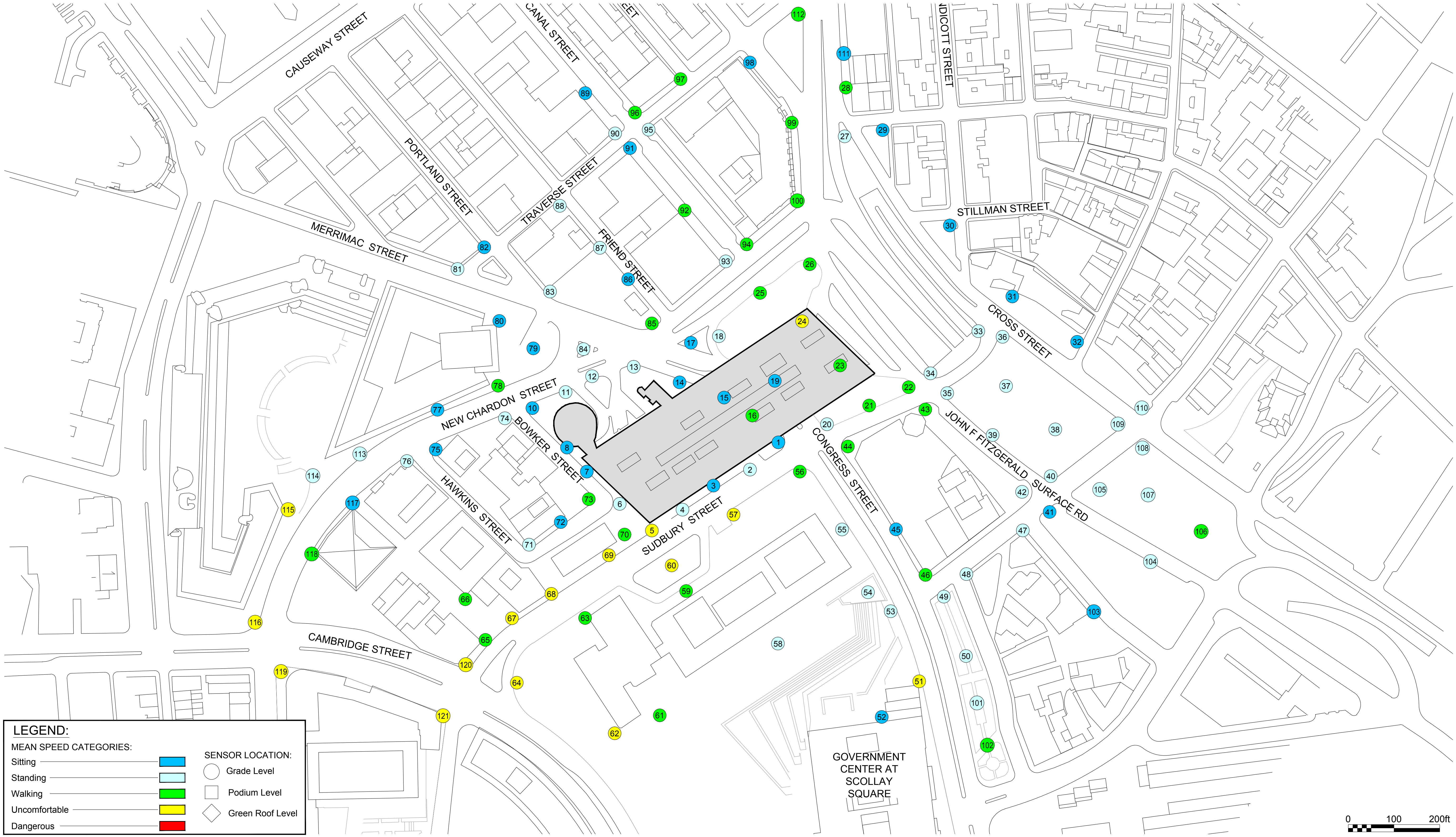
Directional Distribution (%) of Winds (Blowing From)
Boston Logan International Airport (1981 - 2011)

Government Square – Boston, MA

Project #1401777

Figure No. 2c

Date: November 10, 2015



Pedestrian Wind Conditions - Mean Speed - No-Build
Annual (January to December, 0:00 to 23:00)

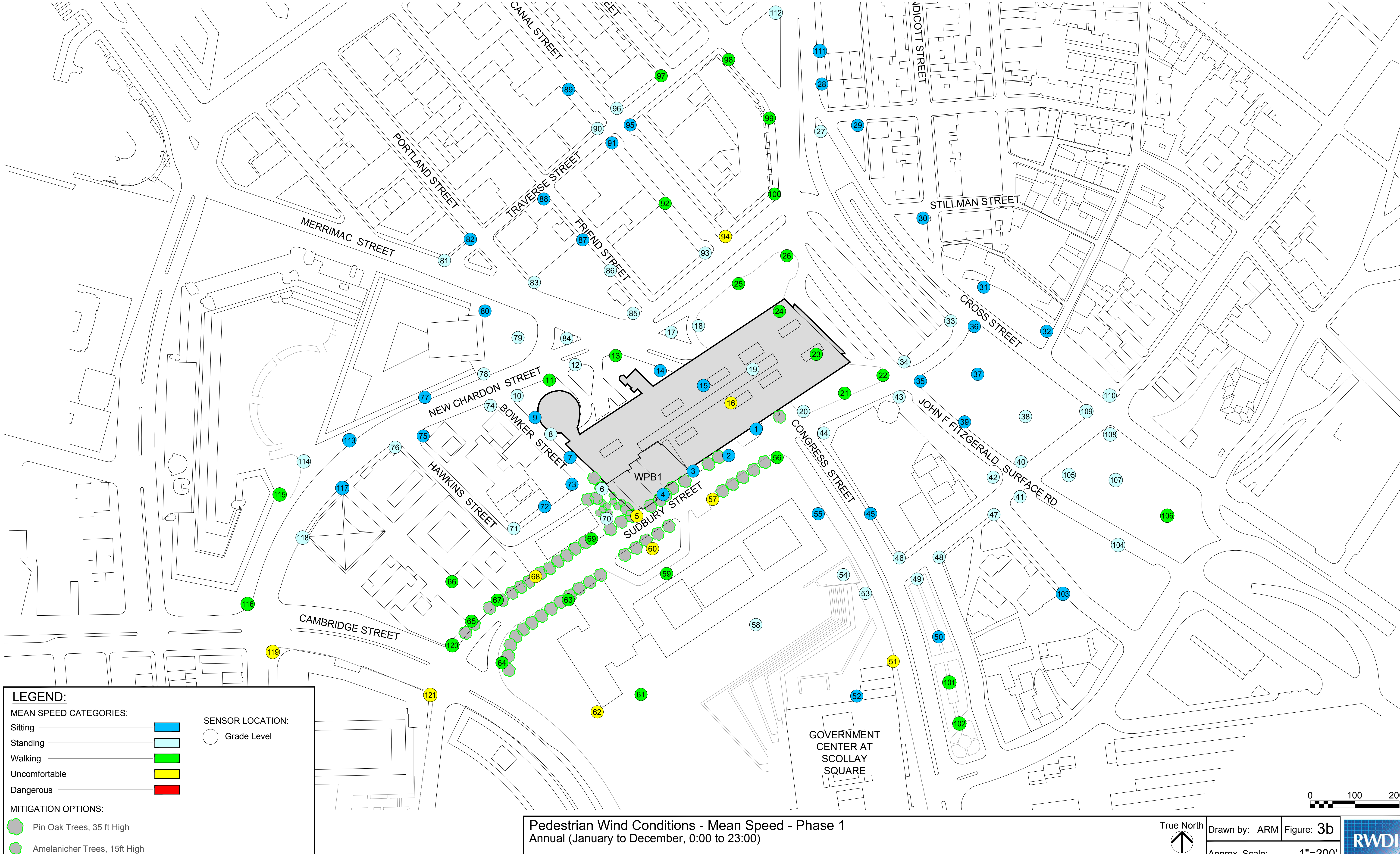
Government Square - Boston, MA

True North

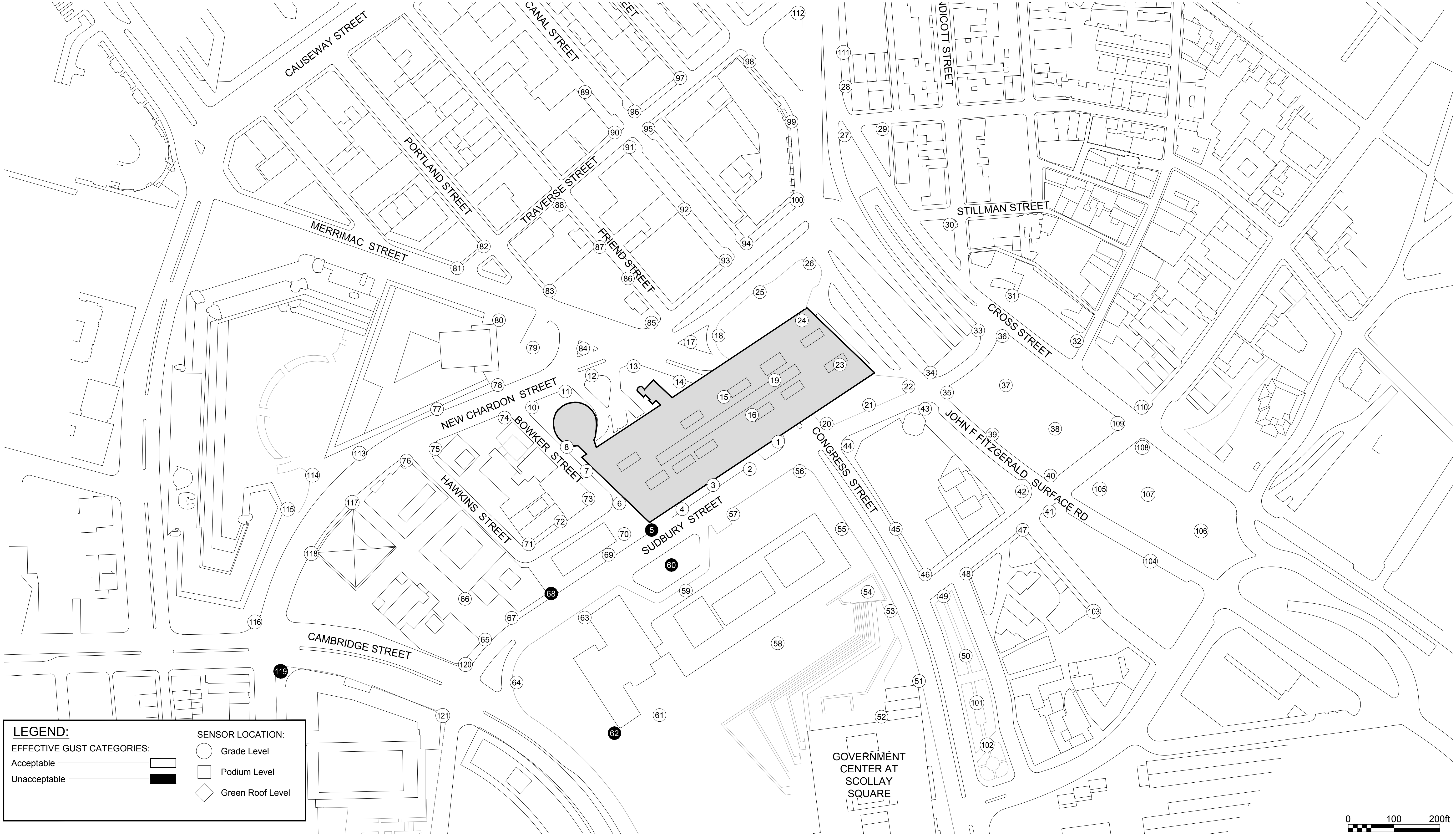
Project #1401777

Drawn by: EM	Figure: 3a
Approx. Scale:	1"=200'
Date Revised:	Oct. 8, 2015

RWDI



Pedestrian Wind Conditions - Mean Speed - Phase 1 Annual (January to December, 0:00 to 23:00)	True North	Drawn by: ARM	Figure: 3b
		Approx. Scale: 1"=200'	RWDI
Government Square - Boston, MA	Project #1401777	Date Revised: Nov. 11, 2015	



Pedestrian Wind Conditions - Effective Gust - No-Build
Annual (January to December, 0:00 to 23:00)

Government Square - Boston, MA

True North

Project #1401777

Drawn by: EM	Figure: 4a
Approx. Scale:	1"=200'
Date Revised:	Oct. 8, 2015

RWDI

LEGEND:

EFFECTIVE GUST CATEGORIES:

Acceptable

Unacceptable

SENSOR LOCATION:

Grade Level

MITIGATION OPTIONS:

Pin Oak Trees, 35 ft High

Amelanicher Trees, 15ft High

Pedestrian Wind Conditions - Effective Gust - Phase 1

Annual (January to December, 0:00 to 23:00)

Government Square - Boston, MA

True North

Project #1401777

Drawn by: ARM	Figure: 4b
Approx. Scale:	1"=200'
Date Revised:	Nov. 9, 2015

RWDI

APPENDIX A

CONSULTING ENGINEERS
& SCIENTISTS

APPENDIX A: DRAWING LIST FOR MODEL CONSTRUCTION

The drawings and information listed below were received from CBT Architects and were used to construct the scale model of the proposed Government Square Development. Should there be any design changes that deviate from this list of drawings, the results may change. Therefore, if changes in the design are made, it is recommended that RWDI be contacted and requested to review their potential effects on wind conditions.

File Name	File Type	Date Received (dd/mm/yyyy)
2015_09_02_Phase-1	Rhinoceros	September 2, 2015
Comprehensive Landscape Plan LSK15.pdf	Adobe Portable Document Format	November 2, 2015

APPENDIX D: Solar Glare Supporting Documentation

Government Square

Boston, MA

Solar Reflection Detailed Analysis
Phase I – Residential Tower

RWDI #1401777P
November 11, 2015

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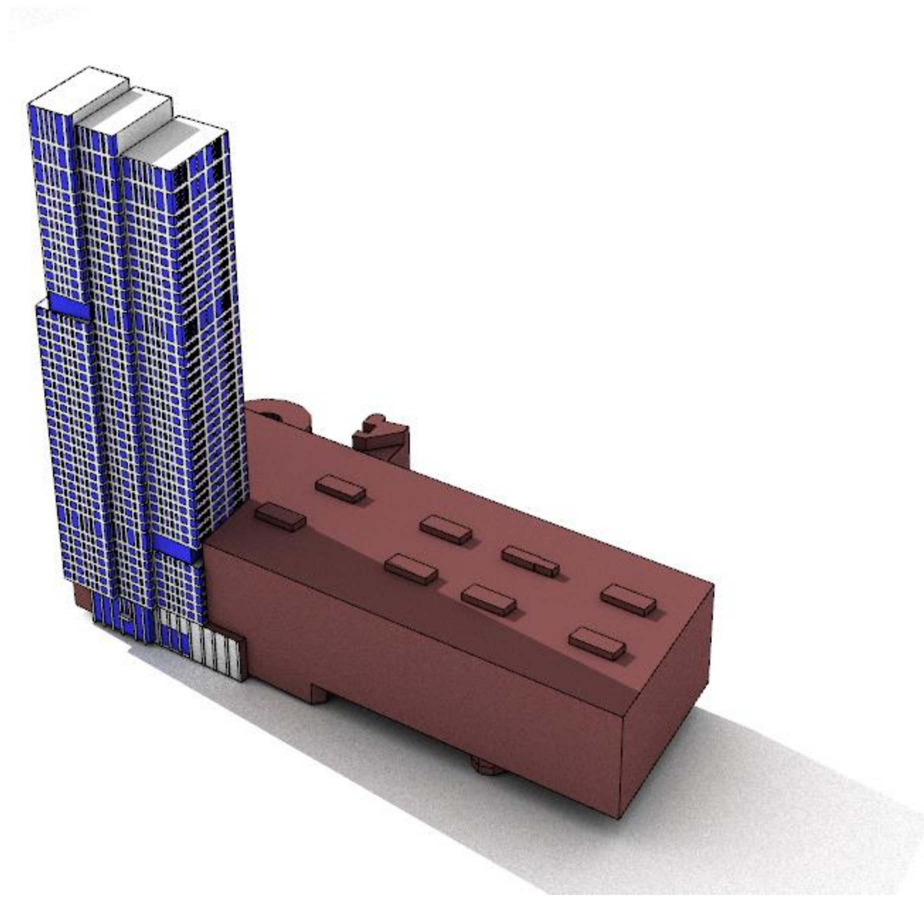

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1.0 INTRODUCTION

This report summarizes the computer modeling results of reflected sunlight from Phase 1 of the proposed Government Square development, which consists of a residential tower (WP-B1), and the existing Government Center Garage. The tower will be constructed adjacent to and over the garage located at 50 Sudbury St, Boston, MA (as shown in Figure 1). It is our understanding that the development will be surrounded by typical urban spaces such as busy roadways, other buildings, and parks.

This report presents the findings of a detailed investigation of the impact that solar reflections emanating from the residential tower development (WP-B1) will have on the surrounding urban terrain using computer modeling based on RWDI's proprietary software called *Eclipse*.

On October 22nd, RWDI presented the preliminary results to the project team. On October 30th, RWDI provided a report of the detailed study of reflected sunlight events at the selected receptor points which represent locations of drivers, pedestrians, and building facades in areas where frequent or relatively intense reflections were predicted with the preliminary analysis.

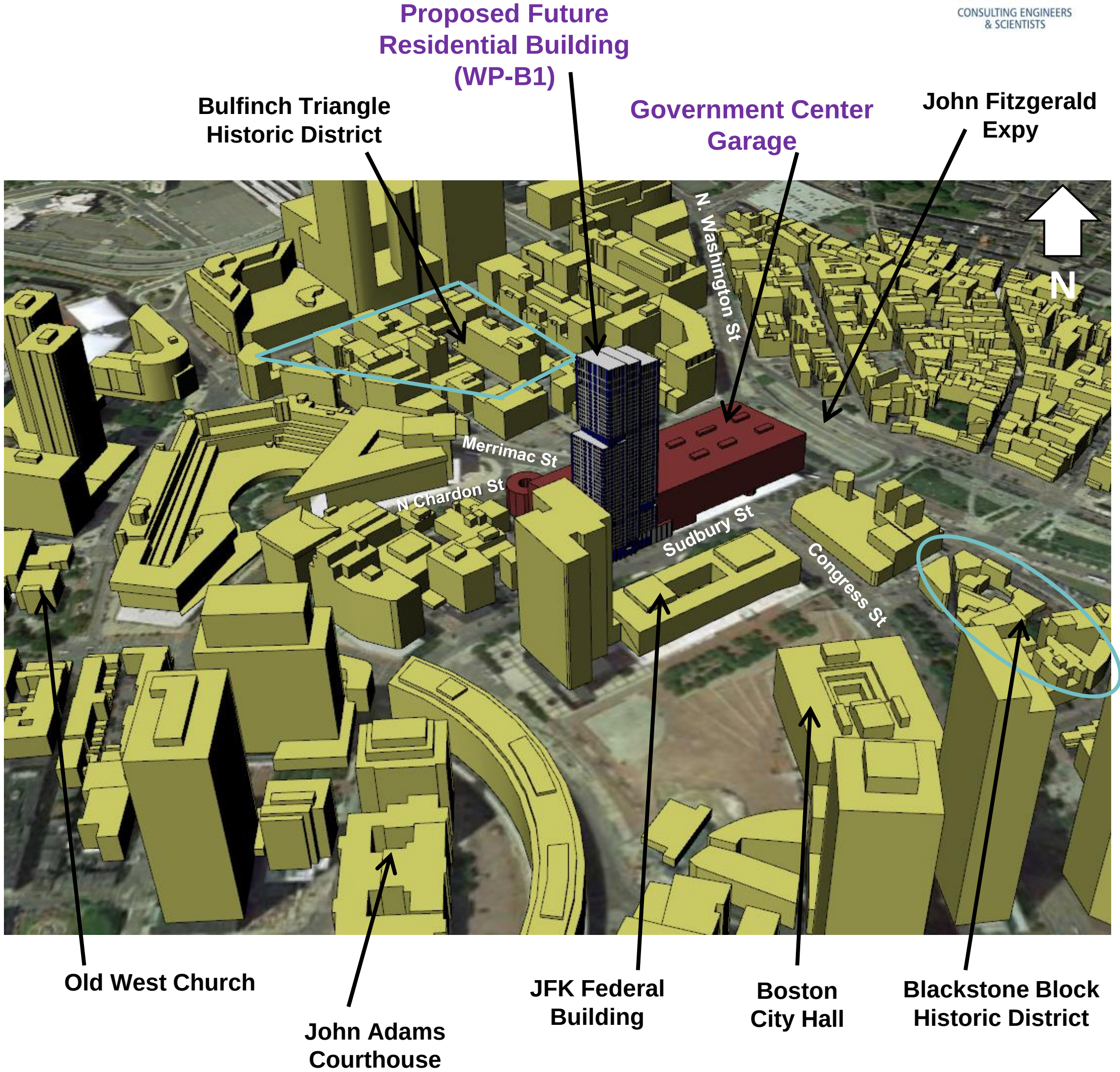


Figure 1: Phase I of proposed Government Square development

2.0 EXECUTIVE SUMMARY

In general, RWDI would consider the reflections caused by this project to be typical of those caused by most buildings with a similar amount of glazing in an urban setting. There are no unique problems or concerns and the results are generally satisfactory.

RWDI does not anticipate significant visual glare impact on the majority of the adjacent building facades or pedestrians off-site of the Government Center Garage (refer to Appendix A). Moderate levels of reflection are predicted to occur on the facade of the JFK Federal building (receptors F11 and F12) as well as on pedestrians at Sudbury St. (e.g., receptor P20). These reflections will likely cause some minor distraction or nuisance to the viewers, which can be easily remedied by pulling the blinds or diverting one's gaze.

RWDI considers the receptors representing drivers to have a low level of visual impact, mainly owing to the low visible reflectance of the proposed glazing on the tower.

CONTENTS

3.0 BACKGROUND – URBAN REFLECTIONS

It is a common experience in urban areas to occasionally experience reflected light from glass and metallic surfaces. The interactions between a building and the sun can lead to numerous visual and thermal issues.

Visual glare can:

- impair the vision of motorists and others who cannot simply look away from the source because of an important activity;
- cause nuisance to pedestrians or occupants of nearby buildings; and,
- create undesirable patterns of light throughout the urban fabric.

Heat gain can*:*

- affect human thermal comfort;
- be a safety concern for people and materials, particularly if insolation levels are high as a result of focusing of multiple reflections to a single point; and,
- alter heating and cooling loads of conditioned spaces affected by the reflections.

The most significant safety concerns with solar reflections occur with concave facades which act to focus the reflected light in a single area. In contrast, convex facades act to scatter reflections in a "pinwheel" pattern. RWDI does not expect issues with solar focusing to be present in the first phase of Government Square development because all the glazing surfaces are planar.

To quantify the impact of solar reflections from the development, it is important to understand four critical characteristics:

1. ***Frequency*** (how often glare events occur);
2. ***Duration*** (how long each instance of glare lasts);
3. ***Intensity*** (how "bright"; the events are based on a combination of solar intensity, surface size and orientation, and the distance from the point of interest); and,
4. ***Location*** (does the reflection fall on a sensitive location).

RWDI's criteria for visual glare and heat gain is included in Appendix C.

4.0 GENERAL METHODOLOGY

RWDI assessed the potential reflection issues using an in-house, computer modeling tool called *Eclipse*, as per the steps outlined below:

- A 3D model of the area of interest (as shown in Figure 2) was developed and subdivided into many smaller triangular patches (see Figure 3). The reflective properties of the various surfaces were defined using the data presented in Appendix A.
- For each hour in a year, the expected solar position was determined, and “virtual rays” were drawn from the sun to each triangular patch of the 3D model. Each ray that was considered to be “unobstructed” was reflected from the building surface onto a horizontal plane called a ‘Receiving Surface’ just above ground level.
- This analysis used “clear sky” solar data at the location of Boston's Logan International Airport. That is to say, a data set where it is assumed that no cloud cover ever occurs, which provides a “worst case” scenario showing the full extent of when and where glare could ever occur (refer to sun path diagram shown in Appendix B of RWDI’s Preliminary Report dated October 22, 2015).
- Finally, a statistical analysis was performed to assess the frequency, intensity and duration of the glare events.

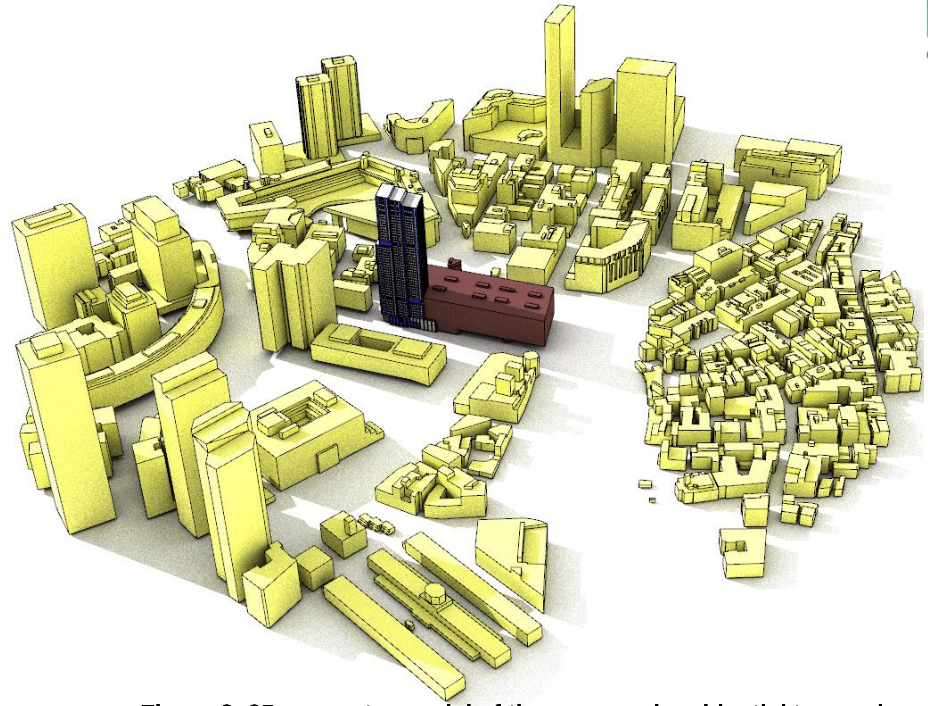
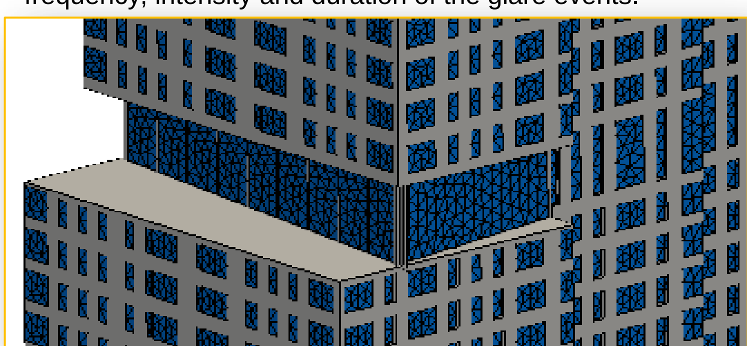


Figure 2: 3D computer model of the proposed residential tower along with the surrounding neighborhood



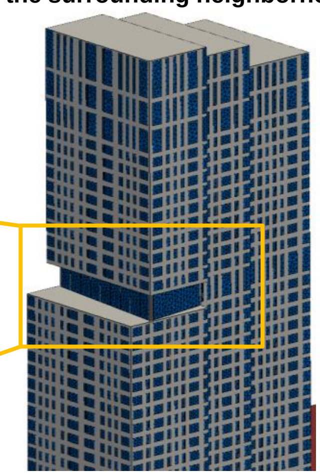


Figure 3: Close-up view of the model, showing surface subdivisions on the residential tower

5.0 ASSUMPTIONS AND LIMITATIONS

Key assumptions and simplifications of the modeling process included:

Model

- The analysis was conducted based on the geometry provided by CBT Architects to RWDI on October 7, 2015. It should be noted that this study is highly dependent on building geometry, and any significant changes to the building's geometry will likely require a new analysis.
- Potential reductions of solar reflections due to the presence of vegetation, or other non-architectural obstructions, were not included.
- Only a single reflection from the development is included in the analysis. That is to say, light that has reflected off several surfaces before reaching the 'Receiving Surface' is assumed to have a negligible impact.
- Only the residential tower (WP-B1) was considered as potentially reflective in the current model. Existing structures (including the garage) were included for shading purposes but were not considered reflective.

Glazing

- Reflectance values were based on information from by CBT Architects provided to RWDI via email on September 20, 2015. Glazed surfaces on the residential tower were modeled as Viracon VE1-2M, which has a visible and full spectrum reflectance of 11% and 30% respectively. Figure 4 shows the location of the glazing types. Further details are available in Appendix B.
- The metal panel portions of the façade are assumed to be non-reflective as they will be painted with a low luster finish with shades of gray. The client has designated no other specular surfaces on the buildings.
- Any light reflections from other buildings and surfaces are not accounted for.

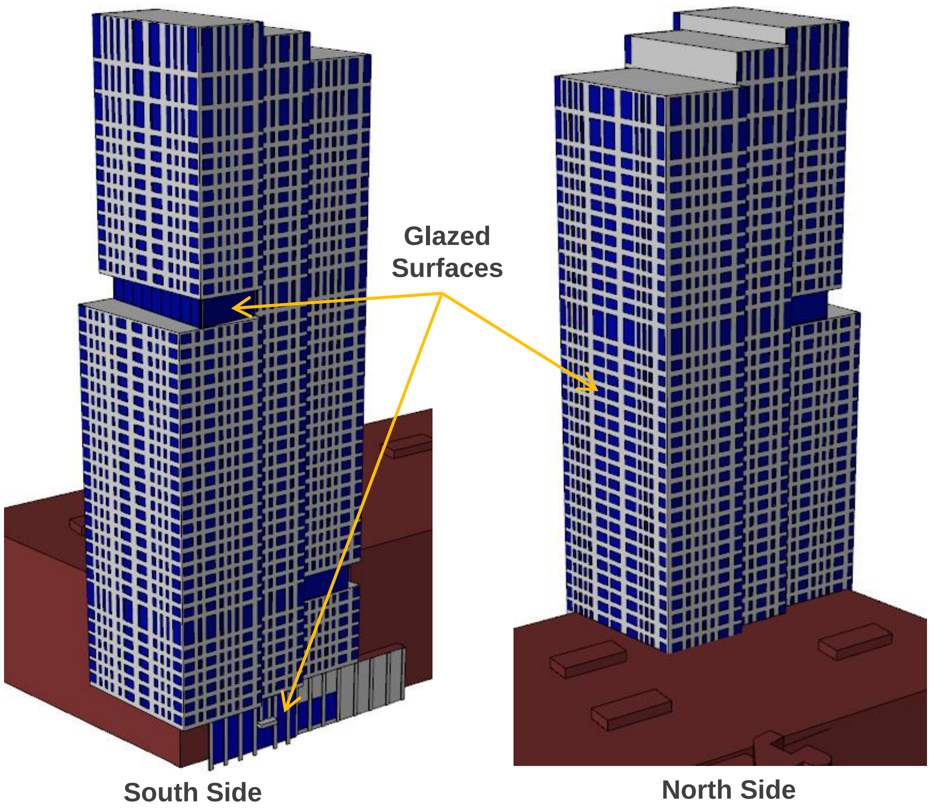


Figure 4: Location of the glazing surfaces (north and south views)

6.0 RECEPTOR LOCATIONS FOR DETAILED STUDY

Receptor Number	Receptor Description	Receptor Number	Receptor Description
D1	Drivers travelling southwest along New Chardon St	F14-F15	Facade of Old West Church, at two different heights of the building
D2	Drivers travelling southeast along Merrimac St	F16	Facade of a building at Cooper St.
D3	Drivers travelling northeast along New Chardon St	P17	Pedestrians at Portland St
D4	Drivers travelling northeast along Sudbury St	P18	Pedestrians at the roof of Government Center Garage
D5	Drivers travelling northwest along Congress St	P19	Pedestrians at intersection of Cross St and Haymarket Square St
D6	Drivers travelling southeast along Lomasney Way	P20	Pedestrians walking on the Sudbury St
F7-F8	Facade of a building at Bulfinch Triangle Historic District, at two different heights of the building	P21	Pedestrians at Boston City Hall
F9-F10	Facade of Edward W Brook Courthouse building, at two different heights of the building	P22	Pedestrians at intersection of John Fitzgerald Surface Rd and Haymarket Square St
F11	Facade of edge section of northwest façade of proposed building	P23	Pedestrians at Blackstone Block Historic District near Holocaust Memorial
F12-F13	Facade of JFK Federal building, at two different heights of the building	P24	Pedestrians in front of Edward W Brook Courthouse building

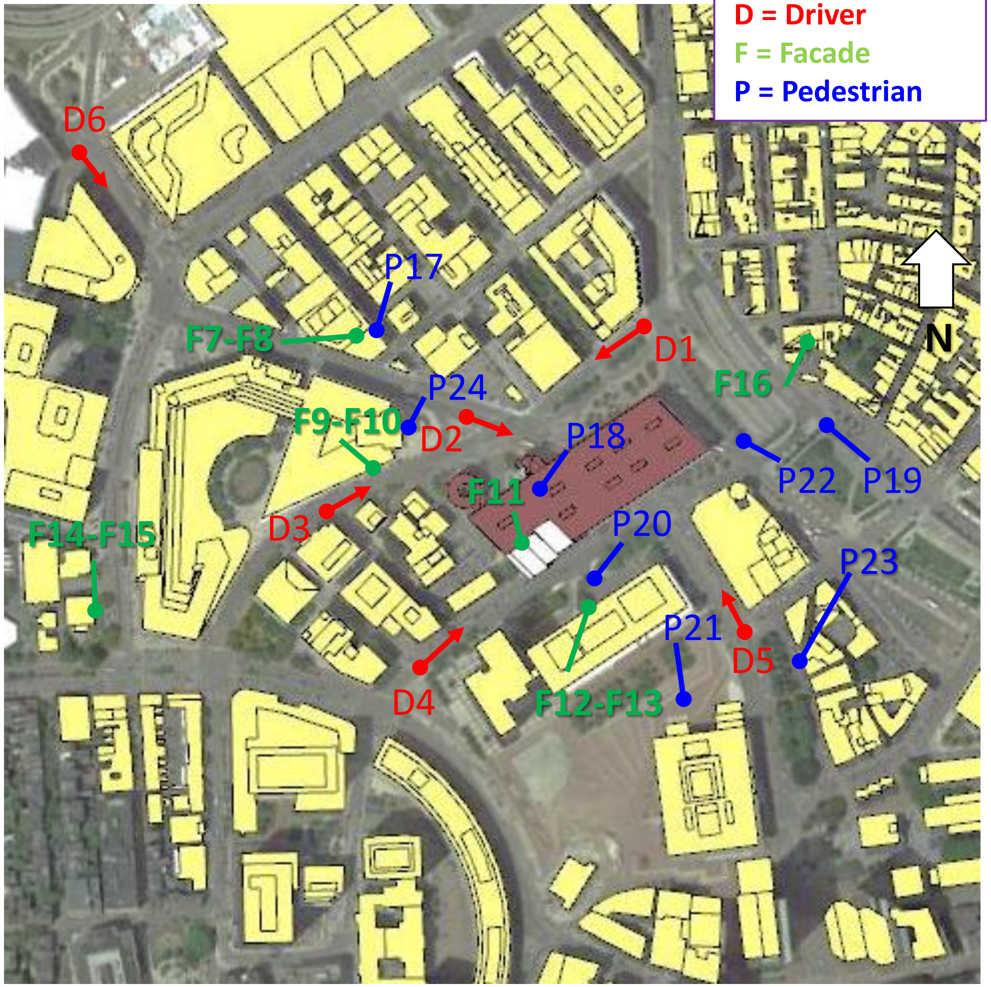


Figure 5: Map of Receptor Locations

7.0 FORMAT AND INTERPRETATION OF RESULTS

a) Visual Glare

Visual glare results are presented graphically using "annual glare impact diagrams" as shown in an example image below in Figure 6. The diagrams illustrate the frequency, duration and intensity of glare events. The horizontal axis of the diagram indicates the day of the year, and the vertical axis indicates the hour. We note that the referenced times are in local standard time, so in jurisdictions where Daylight Savings Time is used, the plot should be shifted by an hour when appropriate. The color of the plot for a given combination of date and time indicates the relative impact of any glare sources found. Additional information on RWDI's criteria for visual glare is included in Appendix C.

Low: Either no significant reflections occur or the reflections will have a minimal effect on a viewer, even when looking directly at the source.

Moderate: The reflections can cause some visual nuisance only to viewers looking **directly** at the source.

High: The reflections can cause safety issues to viewers who are unable to look away from the source (such as drivers).

Damaging: The brightest glare source is bright enough to permanently damage the eye for a viewer looking directly at the source.

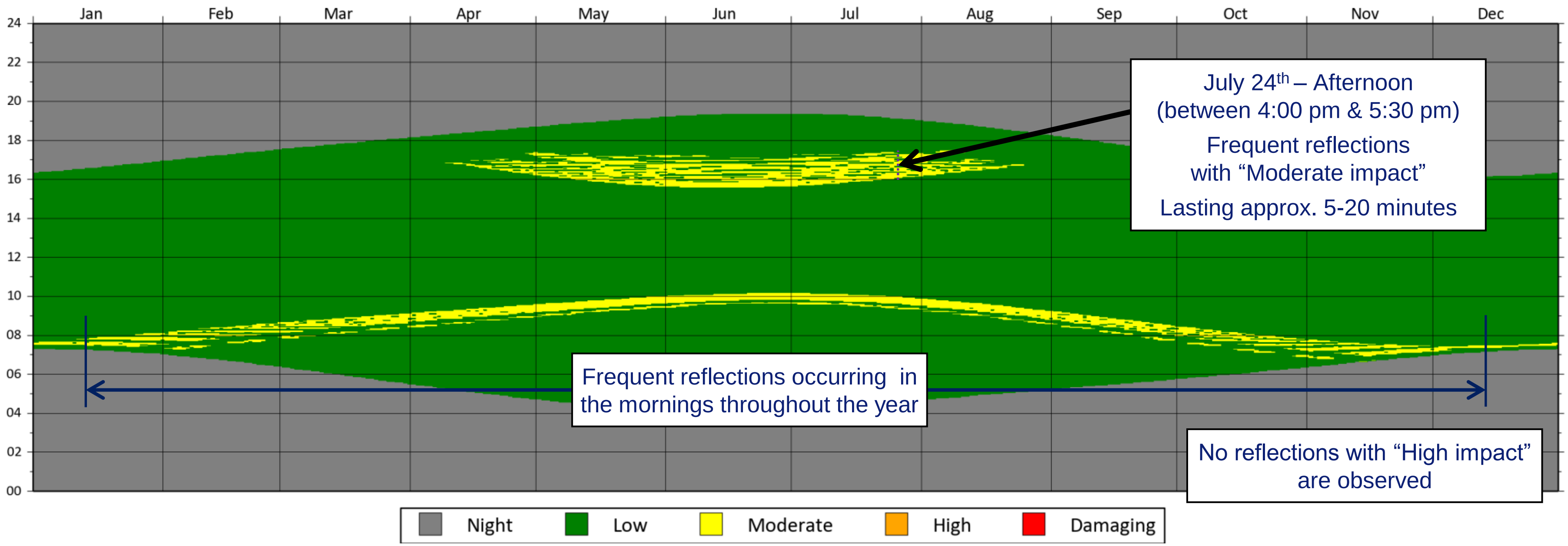


Figure 6: Example of Annual Glare Impact Diagram – Receptor P18

7.0 FORMAT AND INTERPRETATION OF RESULTS

b) Thermal Impact

Thermal impact results are presented graphically using "annual heat impact diagrams" as shown in an example image below in Figure 7. The diagrams illustrate the frequency, duration and intensity of reflection events. The horizontal axis of the diagram indicates the day of the year, and the vertical axis indicates the hour. We note that the referenced times are in local standard time, so in jurisdictions where Daylight Savings Time is used, the plot should be shifted by an hour when appropriate. The color of the plot for a given combination of date and time indicates the intensity of the reflected light at that point in time. Additional information on RWDI's criteria for solar thermal is included in Appendix C.

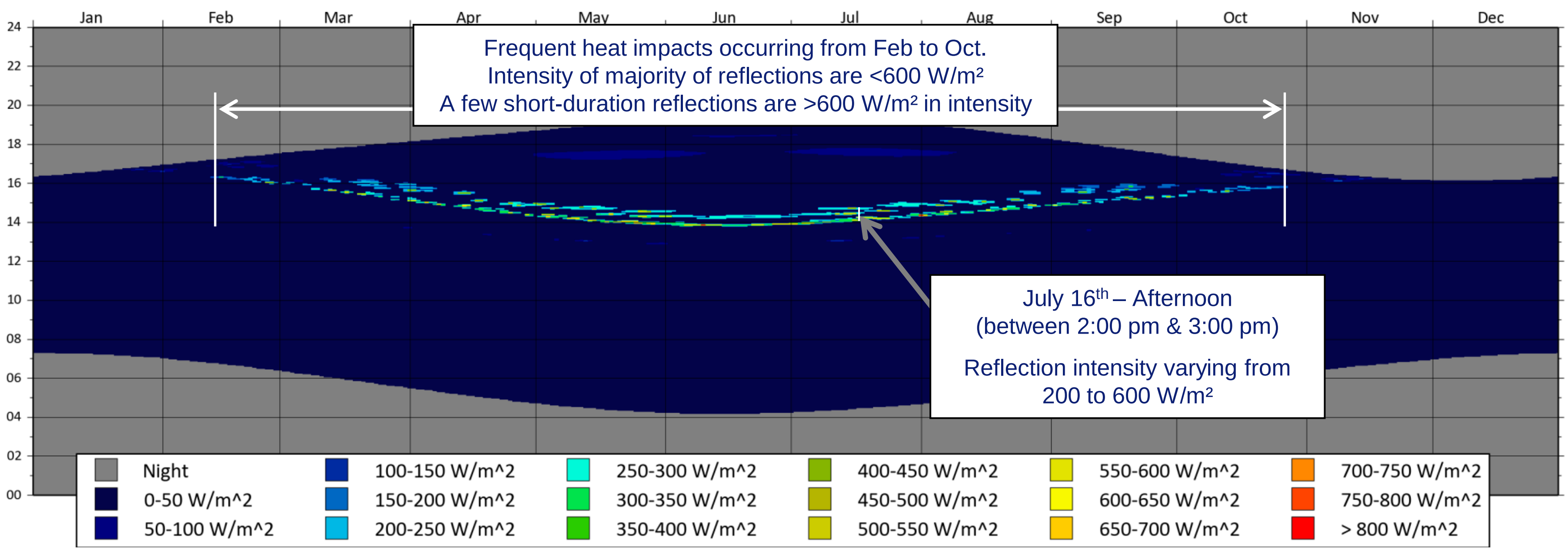


Figure 7: Example of Annual Heat Impact Diagram – Receptor F11

8. RESULTS – ILLUSTRATION OF PREDICTED RAYS OF REFLECTED SUNLIGHT

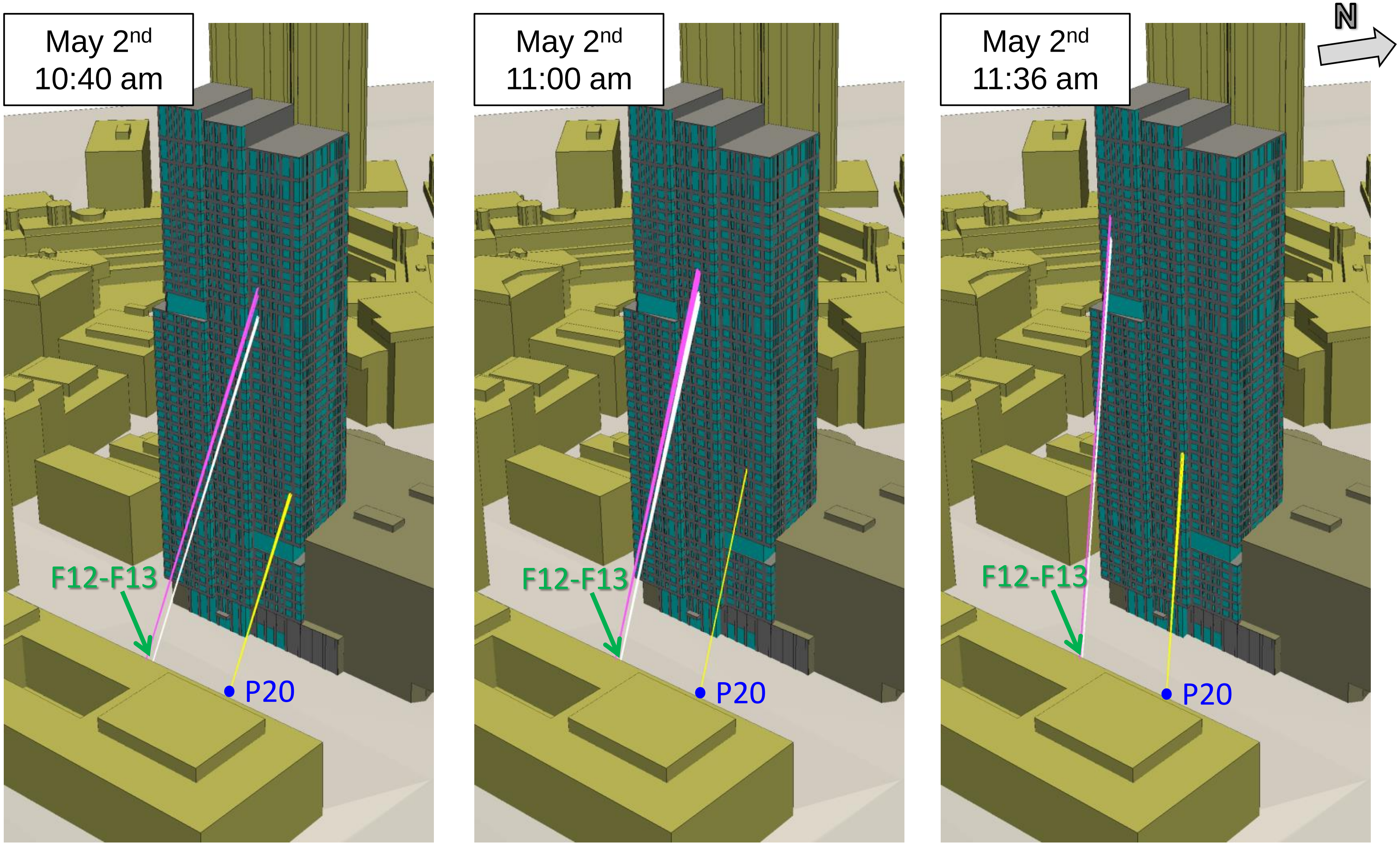


Figure 8: Illustration of reflection traces on receptors F12, F13, P20 in midday of May 2nd

8. RESULTS – SUMMARY OF PREDICTED IMPACTS OF REFLECTED SUNLIGHT

Table 1 below summarizes the results of the detailed receptor analysis with regard to the visual light impact (glare) and the thermal impact on people and on facades. Appendix A provides visual and thermal impact diagrams for a selection of off-site receptor points.

Receptor Number	Receptor Type	Assumed Activity Risk Level	Assumed Ability To Self-Mitigate	Reflected Light Visual Impact	Direct Visual Impact of Sun at Time of Reflection event (Y/N)	Reflected Solar Thermal Impact on People	Reflected Solar Thermal Impact on Facade
D1	Driver	High	Low	***Low***	No	***Low***	–
D2	Driver	High	Low	***Low***	No	***Low***	–
D3	Driver	High	Low	***Low***	No	***Low***	–
D4	Driver	High	Low	***Low***	No	***Low***	–
D5	Driver	High	Low	***Low***	No	***Low***	–
D6	Driver	High	Low	***Low***	No	***Low***	–
F7-F8	Facade	Low	High	***Low***	NA	–	***Low***
F9-F10	Facade	Low	High	***Low***	NA	–	***Low***
F11	Facade	Low	High	***Moderate***	NA	–	***Low***
F12-F13	Facade	Low	High	***Moderate***	NA	–	***Low***
F14-F15	Facade	Low	High	***Low***	NA	–	***Low***
F16	Facade	Low	High	***Low***	NA	–	***Low***
P17	Pedestrian	Low	High	***Low***	NA	***Low***	–
P18	Pedestrian	Low	High	***Moderate***	NA	***Low***	–
P19	Pedestrian	Low	High	***Low***	NA	***Low***	–
P20	Pedestrian	Low	High	***Moderate***	NA	***Low***	–
P21	Pedestrian	Low	High	***Low***	NA	***Low***	–
P22	Pedestrian	Low	High	***Low***	NA	***Low***	–
P23	Pedestrian	Low	High	***Low***	NA	***Low***	–
P24	Pedestrian	Low	High	***Low***	NA	***Low***	–

Table 1: Summary of Overall Predicted Impacts – Driver, Facade, and Pedestrian Receptors

9. CONCLUSIONS

1. It is RWDI's opinion that the level of reflections created by this development are typical of what is found in an urban environment.
2. The planar nature of the building means the reflections emanating from the tower are not focusing (multiplying) in any particular area. Therefore, RWDI does not expect any severe thermal impacts (i.e. risks to human safety or property damage) to occur.
3. RWDI does not anticipate significant visual glare impact on the majority of the adjacent building facades or pedestrians off-site the Government Center Garage. See Appendix A for details.

   Moderate levels of reflection are predicted to occur frequently immediately to the south, and southeast of the building. In particular, the facade of JFK Federal building (receptors F11 and F12) as well as pedestrians at Sudbury St (e.g., receptor P20) are expected to experience frequent reflections throughout the year that are usually 10 to 30 minutes in duration. These reflections are typically occurring at high angles and they may only cause some minor distraction or nuisance to the viewers, remedied by pulling the blinds or diverting one's gaze.

   To illustrate the reflection sources that impact the above-noted receptors, Figure 8 shows a sample set of reflections emanating from the south and southeast areas of the Residential Tower that fall onto the receptors during the midday of May 2nd. Complete elimination of these reflections would require significant alterations to the façade and is likely not practical.

   RWDI considers the receptors which represent drivers to have a **low** visual glare impact mainly owing to the low visible reflectance of the proposed glazing. Only brief visible glare instances are expected to fall onto the drivers travelling southeast along Merrimac St. (receptor D2) in the mornings (between 8:00 am to 10:00 am) during spring and autumn. These reflections are not of a concern since they are not expected to fall within the driver's required 20° cone of vision at that location.

6. On site, on the roof of the Government Center Garage, the computer model predicts frequent reflections to occur in the mornings and afternoons at some locations (e.g., receptor P18). These reflections are usually 5 to 20 minutes in duration per day. If required for the intended use of this space, localized shading structures may be considered to mitigate the impacts.

10. RECOMMENDATIONS

As presented in this summary report and also in the detailed report issued on October 30, 2015 the predicted reflections of sunlight off of the façade of the residential tower are believed to be generally acceptable. However, the detailed report does provide some minor recommendations for potential mitigation of reflections. This could include the addition of external sunshades, for example, but this may not be a practical solution balancing the effectiveness, with cost and other issues with implementing external sunshades, such as wind-induced noise and falling ice & snow, etc. Impacts on site on the roof deck of the garage may be mitigated with local shading systems as part of the landscape plan.

APPENDIX A - DETAILED REFLECTION RESULTS

A. DETAILED REFLECTION RESULTS

Note: Results are only provided for a selection of receptors are included in this report in order to illustrate the nature of the results. The complete set of results are presented in the RWDI report dated October 30, 2015.

Visible Glare Results:

a) D1, D3, D4, D5 and D6 do not have any significant reflection events

b) D2 is also free of any significant reflection events for most of the year, except for about 10 minute events between 8am and 10am in the spring and autumn.

c) F7, F8 do not have any significant reflection events

d) F9, F10 only have 15 minute duration reflection events in the spring and autumn

e) F11 – is shows moderate "self" reflections – the reflection of sunlight from one area of the proposed tower onto itself.

f) F12, F13, F14, F15 do not have any significant reflection events

g) F16 do not have any significant reflection events, except for 10-minute events per day in the spring and fall

h) P17, P19 do not have any significant reflection events, except for 10-minute events per day in the spring and fall

i) P18 is a pedestrian receptor on the roof of the GCG parking garage north of the residential tower. Predicted reflection events are approximately an hour duration per day in the morning all year and about 1.5 hours per day in the late afternoon during the summer months

j) P20 receives reflected sunlight 2 to 3 hours per day all year round

k) P21-P24 do not have any significant reflection events

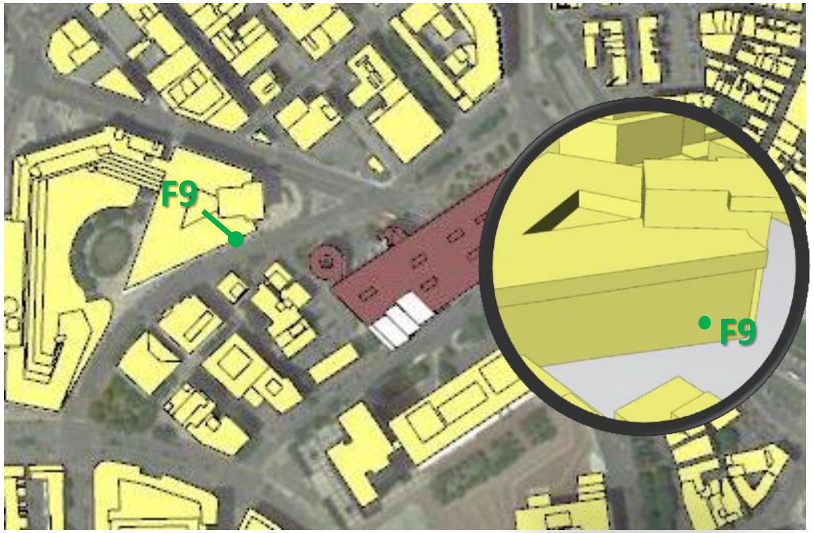
Solar Thermal Impacts:

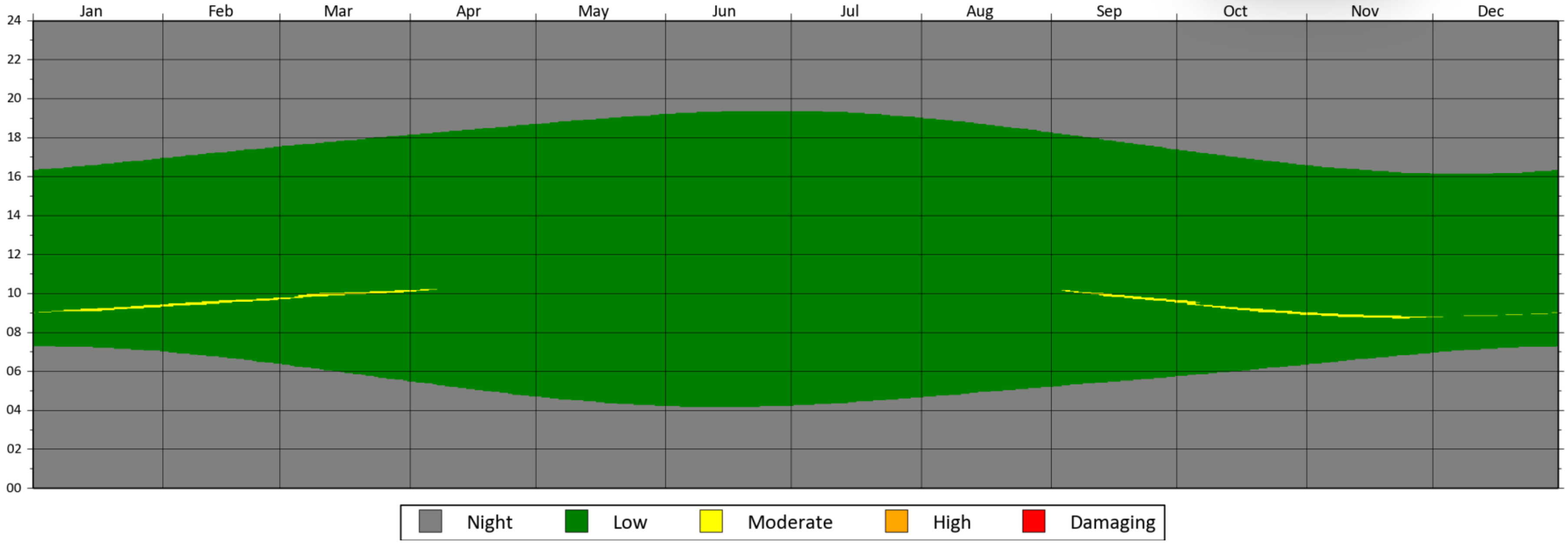
All reflections falling on receptor points off site the Government Center Garage are predicted to be within RWDI's proposed thermal comfort and thermal safety criteria.

RWDI considers all the receptors that are representing drivers and pedestrians off site from the Government Square Garage have a <u>low</u> thermal impact since predicted reflections are relatively infrequent, short duration and mostly low intensity.

Receptor F9 Annual Visual Impact

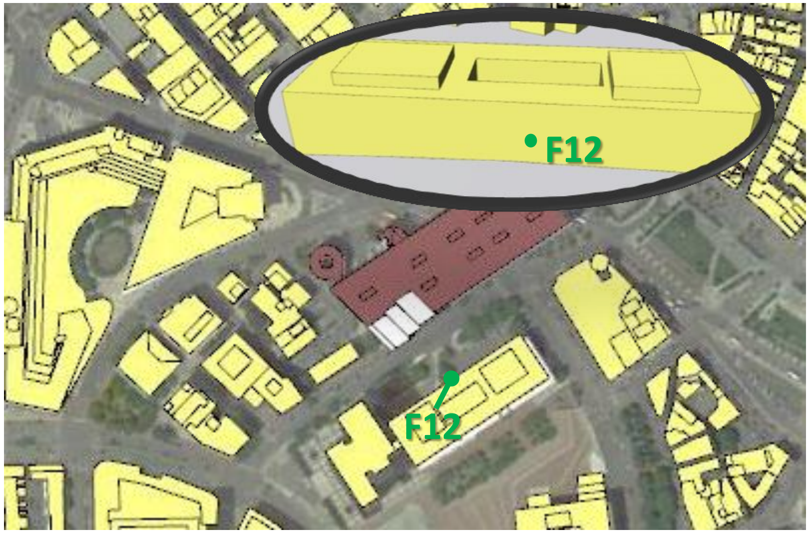
Receptor F9 is a facade receptor placed on Edward W Brook Courthouse building, at lower-half height of the building.

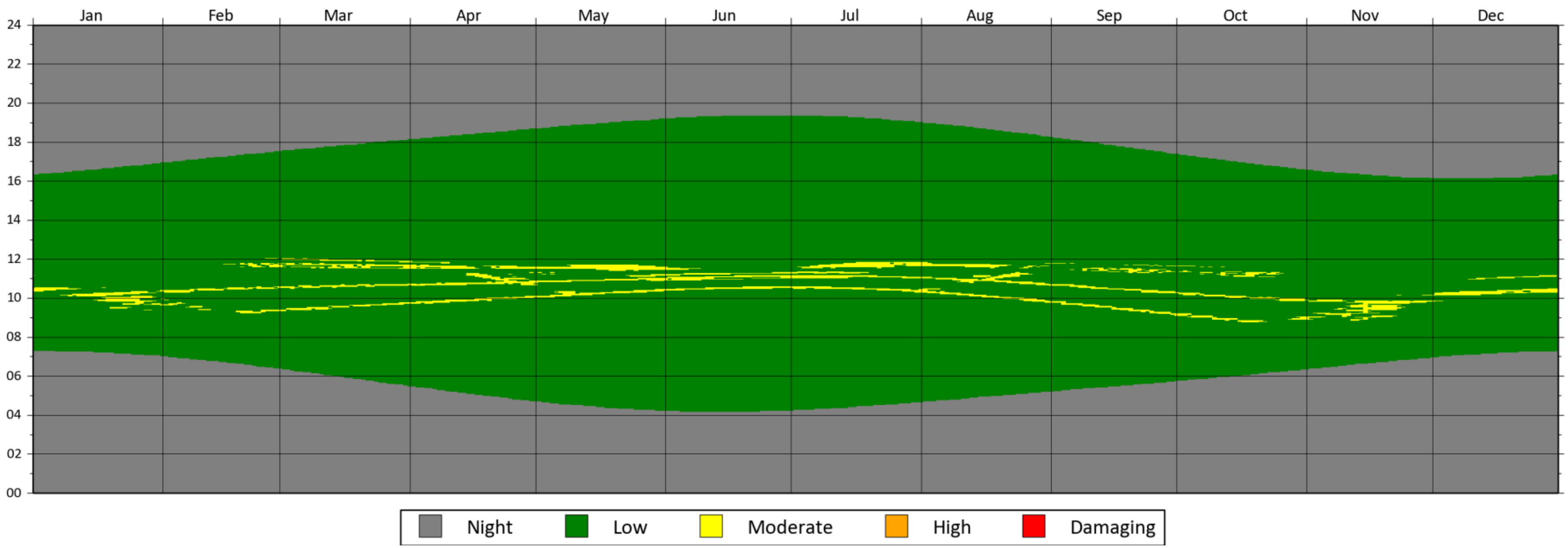




Receptor F12 Annual Visual Impact

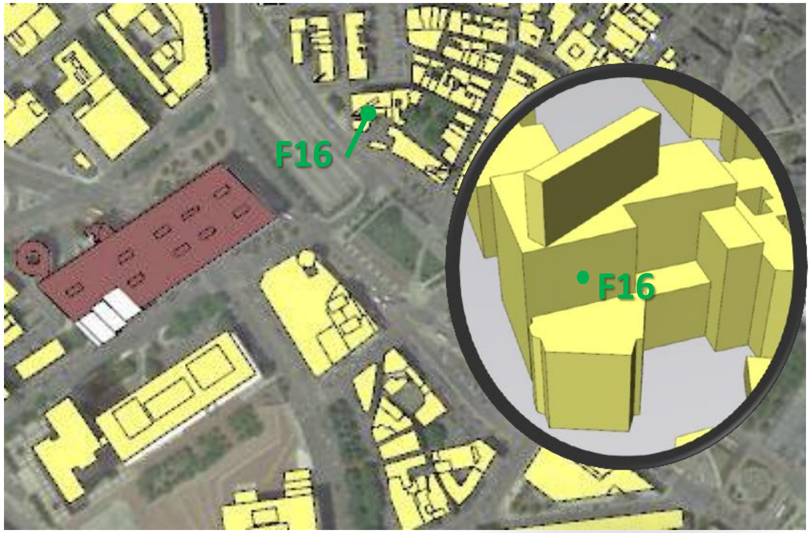
Receptor F12 is a facade receptor placed on the JFK Federal building, at lower-half height of the building

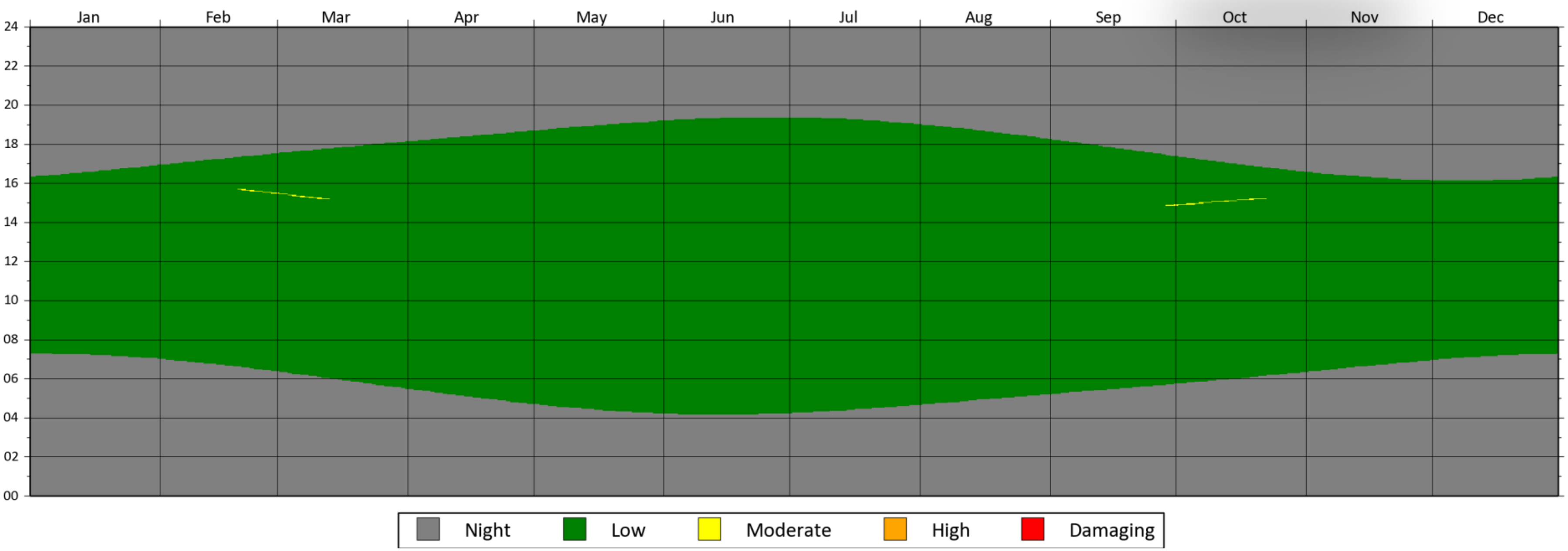




Receptor F16 Annual Visual Impact

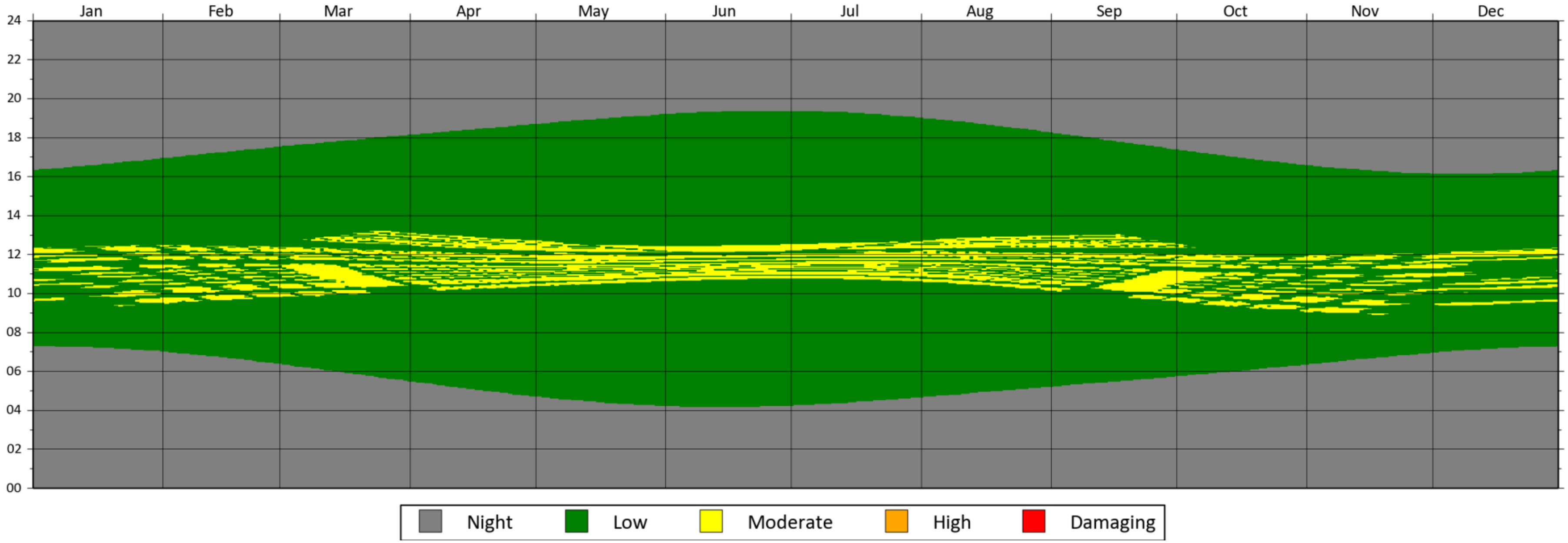
Receptor F16 is a facade receptor placed on a building at Cooper St.



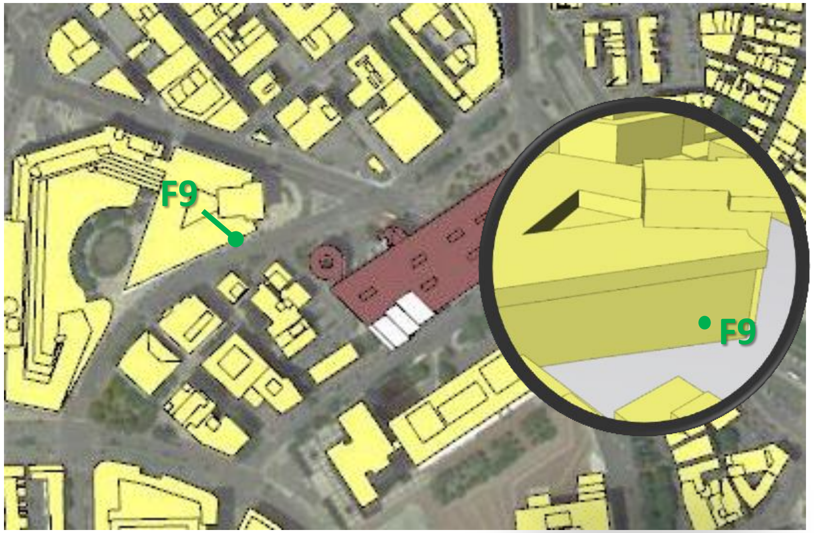


Receptor P20 Annual Visual Impact

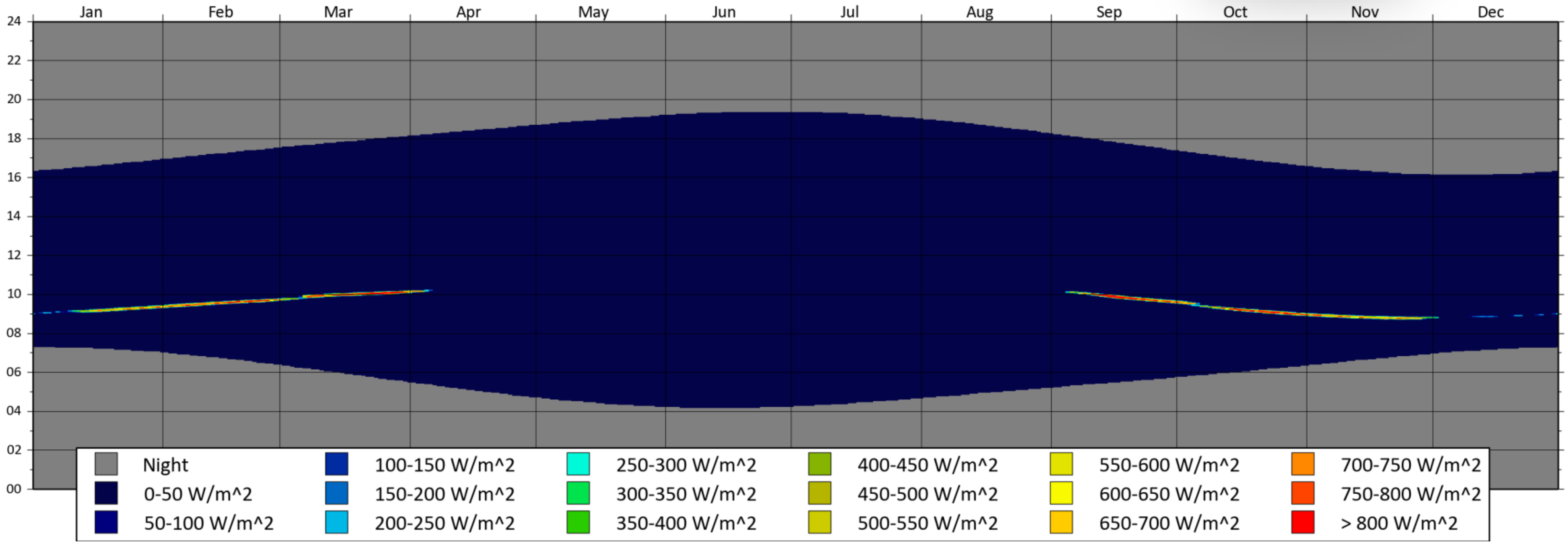
P20 is a pedestrian receptor representing pedestrians walking on the Sudbury St.



Receptor F9 Annual Thermal Impact

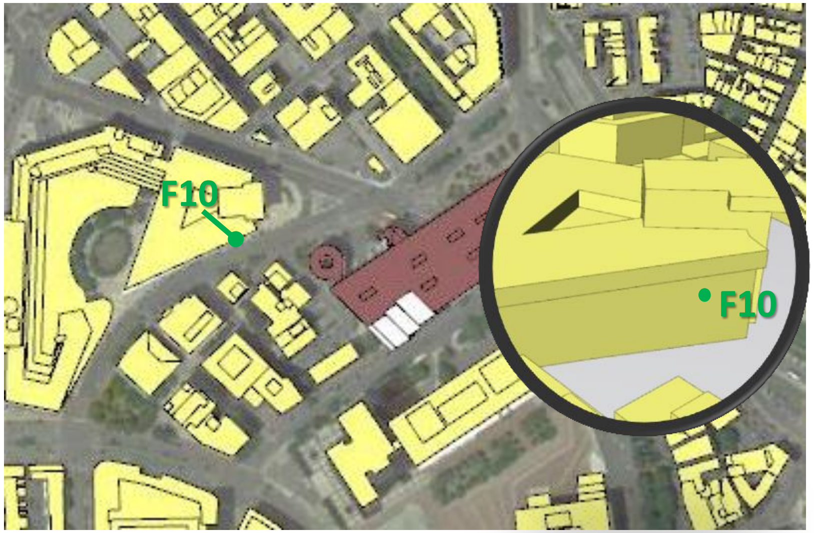


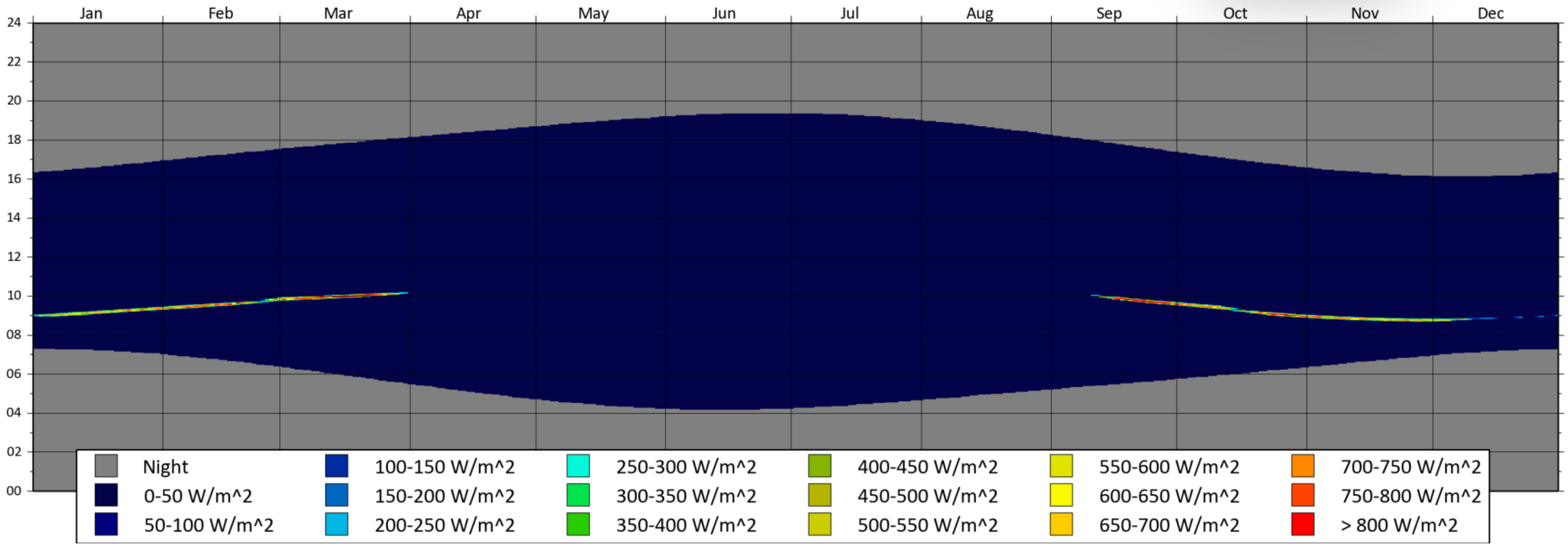
Receptor F9 is a facade receptor placed on Edward W Brook Courthouse building, at lower-half height of the building.



Receptor F10 Annual Thermal Impact

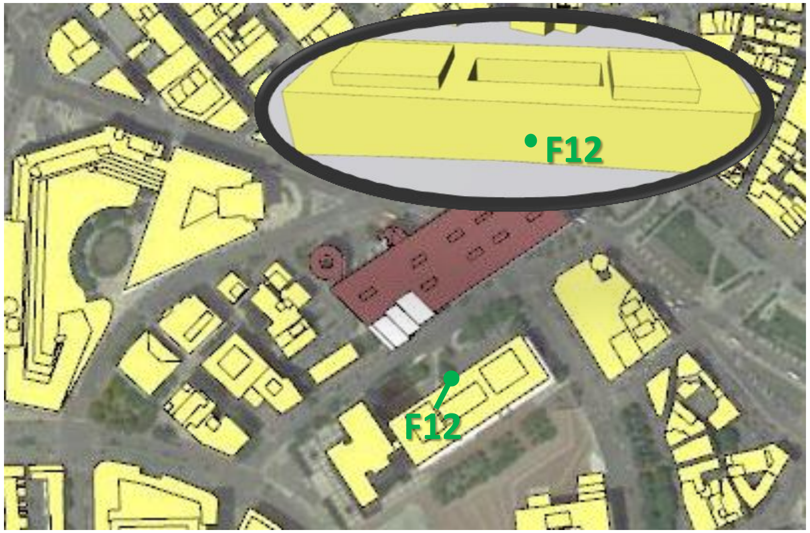
Receptor F10 is a facade receptor placed on Edward W Brook Courthouse building, at upper-half height of the building.

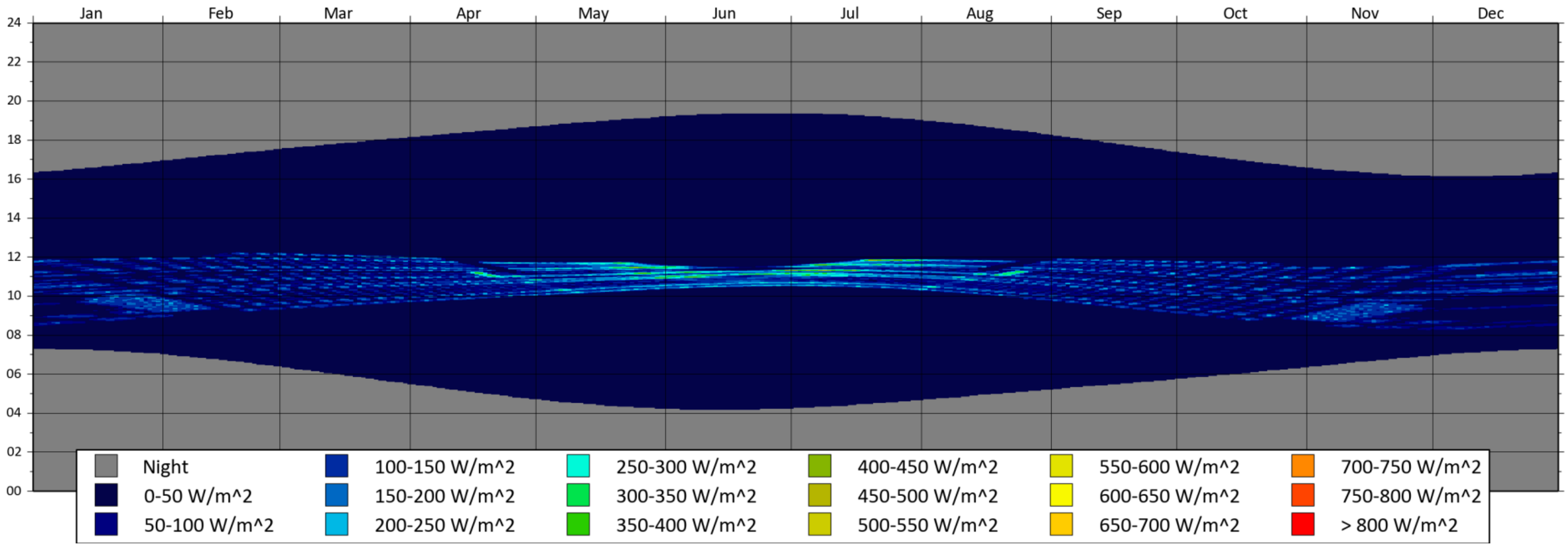




Receptor F12 Annual Thermal Impact

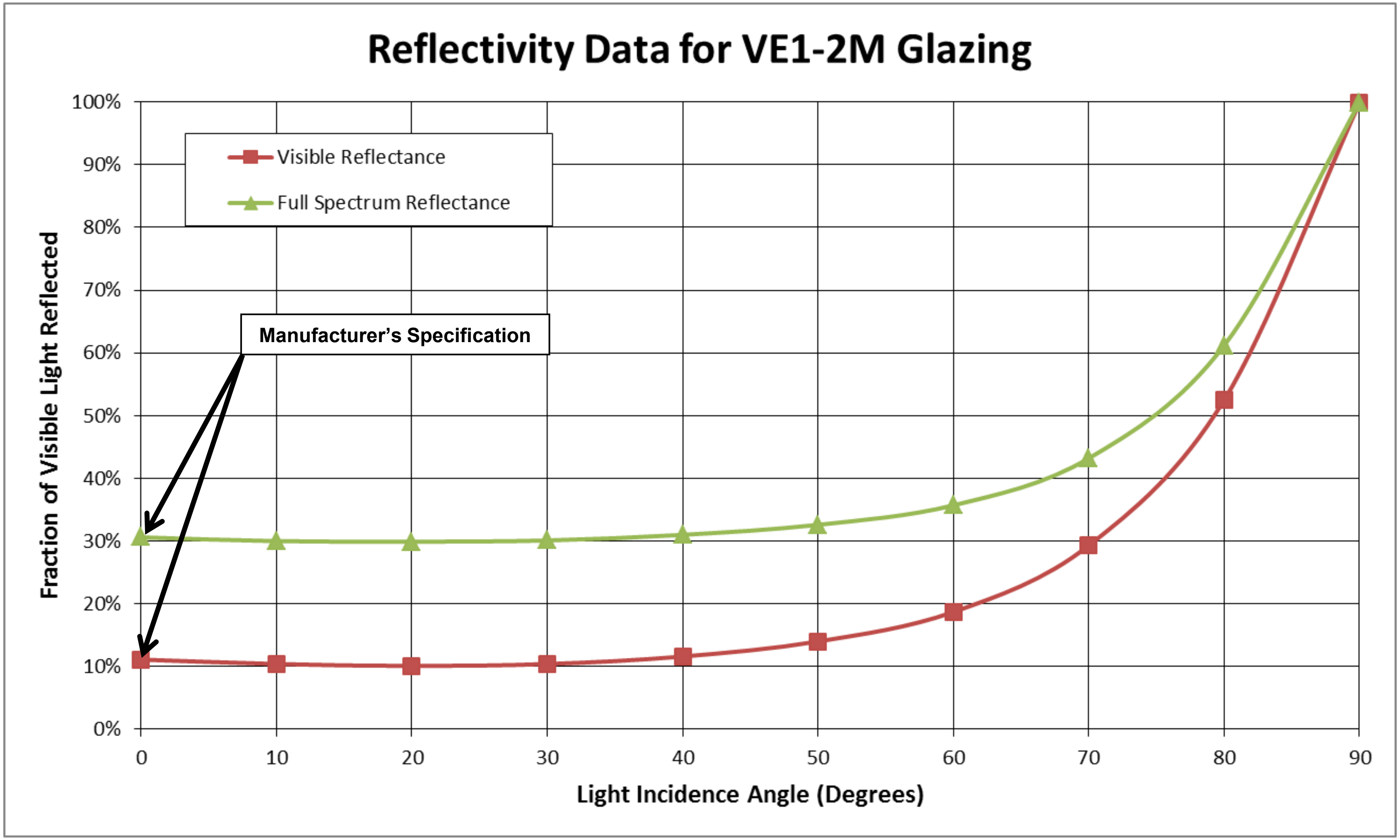
Receptor F12 is a facade receptor placed on the JFK Federal building, at lower-half height of the building





APPENDIX B - BUILDING FACADE GLASS PROPERTIES

B. RESIDENTIAL BUILDING FACADE GLASS PROPERTIES – VE1-2M



APPENDIX C – THERMAL AND VISUAL GLARE CRITERIA

C1. CRITERIA – SOLAR THERMAL

Solar Focusing

Solar focusing is a phenomenon where more than one reflection falls on the same point. This can occur when reflection from multiple flat surfaces converge at a single point, but are more common on inward-curving (concave) facades. Although this feature is not present in this project, it is prudent to understand the potential solar insolation levels that reflections from the buildings may create.

There are currently no existing criteria or standards that define an "acceptable" level of reflected solar radiation from buildings. RWDI has conducted a literature review of available scientific sources to determine levels of solar radiation we would consider acceptable to an individual in the urban realm.

Irradiance Limits – People

The National Fire Protection Association (NFPA) sets thermal radiation criteria which define a tenable environment for people exiting a fire event in building or tunnel (NFPA 130). They set the upper limit for thermal radiation at 2,500 W/m². Irradiance levels at or below this value can be tolerated for at least several minutes without significantly affecting an individual's ability to escape from a fire event. That being said, skin damage (sun burns) and pain can occur at this 2,500 W/m² threshold. According to British fire standards[1], the onset of pain for ***bare*** skin can occur within 30 seconds at an irradiance of 2,500 W/m². This threshold closely matches the irradiance exposure guidelines published by the U.S. Federal Emergency Management Agency (FEMA), summarized in Table C1. This table also includes the length of time required before the onset of a second degree burn due to thermal radiation. It should be noted that these numbers are guideline values only, and that in reality many factors (skin color, age, clothing choice, etc.) influence how a person reacts to thermal radiation. For our work RWDI have established **2,500 W/m² as a human safety threshold**.

Due to the potential exposure of the public, the significant variability in both how individuals will respond to thermal irradiation exposure, and the fact that individuals may not fully appreciate the impact of the reflection until they are exposed, it is RWDI's opinion that a lower threshold value may be more appropriate for human thermal comfort.

Thus, we suggest that for ground level areas where the public will be present, reflected irradiance levels should not exceed 1,500 W/m². This threshold value is a conservative one, which is based around the potential for damage to human skin, requiring several minutes of exposure before damage or discomfort potentially occurs.

For these reasons, we have applied a **short-term thermal comfort threshold of 1,500 W/m²** for our work.

Table C1: Time for Physiological Effects on Bare Skin at Specific Thermal Radiation Levels[2]

Thermal Irradiance [W/m²]	Time To Onset of Pain [sec]	Time To Onset of Second Degree Burn [sec]
1,000	115	663
2,000	45	187
3,000	27	92
4,000	18	57
5,000	13	40
6,000	11	30
8,000	7	20
10,000	5	14
12,000	4	11

[1] The application of fire safety engineering principles to fire safety design of buildings – Part 6: Human Factors' PD 7974-6:2004, British Standards Institution 2004.
[2] Federal Emergency Management Agency, U.S. Department of Transportation, and U.S. Environmental Protection Agency. 1988. Handbook of Chemical Hazard Analysis Procedures. Washington, D.C.: Federal Emergency Management Agency Publications Office.

C2. CRITERIA – VISUAL GLARE

To account for the high variability in how individuals experience bright light, RWDI would classify any reflection as "significant" if it is calculated to be least 50% as intense as one that would cause temporary flash blindness (i.e. the after images visible after one sees a camera flash in a dark room).

This is accomplished through the use of our computer model to determine the following information at each combination of location, date and time:

1. The maximum amount of radiation striking the back of the eye that a person would experience if looking directly at the source.
2. The size of the angle that the reflection subtends in the sky (i.e. how much of a viewer's field of vision that the glare takes up – Figure C1).

Using the above information, the maximum glare impact at a certain location can be identified using the methodology of Ho et al[1] (Figure C2) to determine the potential of the reflection to cause temporary flash-blindness.

As a reference, Figure C2 on the right illustrates where looking directly at the sun falls in terms of irradiance on the retina (on average about 8 W/cm²), and the size of the angle that the sun subtends in the sky (about 9.8 milliradians). This puts it just at the border of causing serious damage. This methodology assumes that the exposure time is equivalent to the length of an average person's blink response.

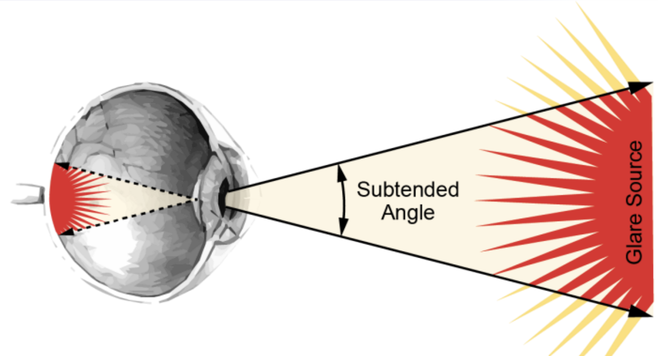
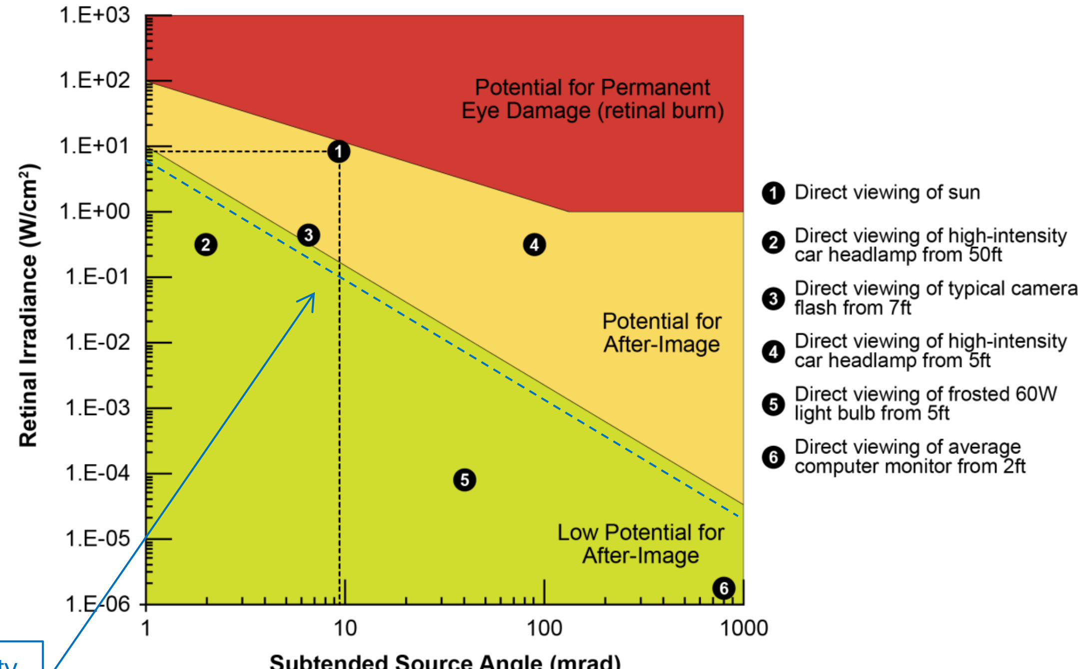


Figure C1: Subtended Angle of Glare



RWDI Criteria – 50% of the intensity of a reflection with the potential of causing after-imaging

Figure C2: After-image potential plot [1]

[1]Ho, C.K., C.M. Ghanbari, and R.B. Diver, 2010, Methodology to Assess Potential Glint and Glare Hazards from concentrating Solar Power Plants: Analytical Models and Experimental Validation, SAND2010-2581C, in proceedings of the 4th International Conference on Energy Sustainability, ES2010-90053, Phoenix, AZ, May 17-22, 2010.

C3. CRITERIA – VISUAL GLARE IMPACT CATEGORIES

In RWDI's detailed modeling, visual glare was assessed at 1 minute intervals, over the course of a year. At each combination of date and time, the maximum glare impact from all surfaces was determined. RWDI combined the maximum glare impact with the assumed task(s) occurring at the location in question to derive an overall impact category:

- **Low** – Either no significant glare sources are found or the intensity of the brightest source is less than what is required to cause flash blindness. There is little impact on viewers or pilots.
- **Moderate** – The brightest glare source is capable of causing flash blindness according to the RWDI criteria explained in Section C2, but is either falling on a point representing a pedestrian (who can easily look away), or emanating from a location that falls outside of the line-of-sight of someone who has limited ability to look away from a given direction (i.e. a vehicle driver). These can be thought of as "nuisance" reflections.
- **High** – The brightest glare source is capable of causing flash blindness according to the RWDI criteria explained in Section C2, and is emanating from a surface within the line-of-sight of a driver or someone else who has limited ability to look away and is performing a "high risk" activity (Figure C3). Such situations pose a significant risk of distraction and can reduce visual acuity for those operating vehicles or performing other high-risk tasks.
- **Damaging** – The brightest glare source is bright enough to permanently damage the eye. Reflections of this magnitude pose a significant threat to the safety of those nearby.

As a further conservatism, RWDI assumed that the "line-of-sight" for vehicle drivers included all surfaces within 20° of the direction of travel (Figure C3), and that no sunglasses or other eye protection equipment are worn.

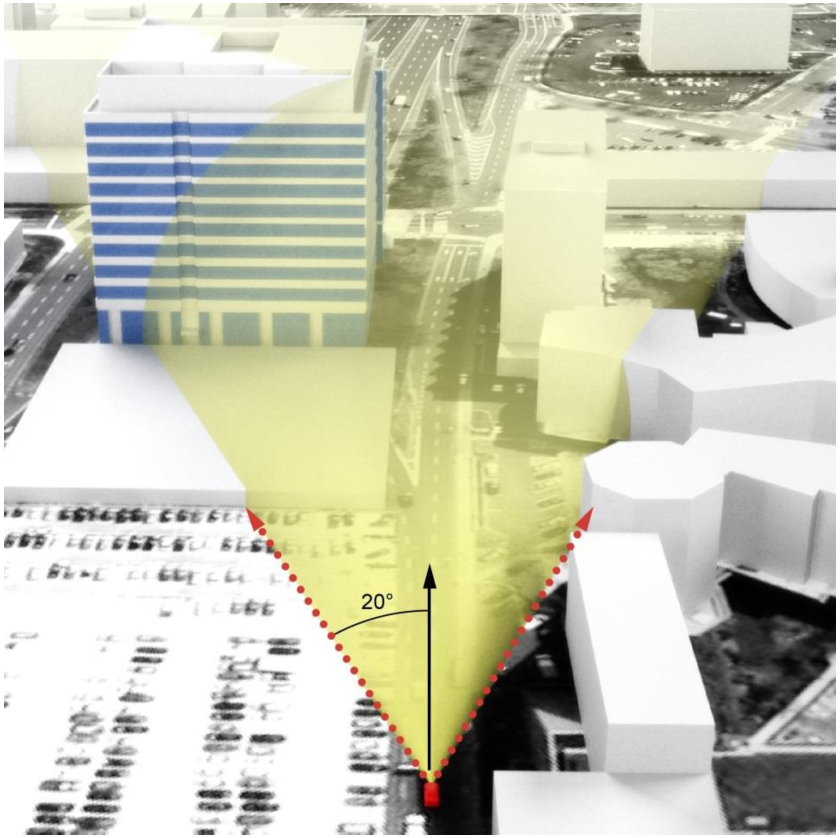


Figure C3: A driver's 20° cone of vision

APPENDIX E: Air Quality Supporting Documentation

APPENDIX E
WP-B1 RESIDENTIAL BUILDING AIR QUALITY

Stationary Source

- Air Quality Ambient Background Concentrations
- AERMOD Modeling Input Parameters
    - CO Parameters
    - PM10 Parameters
    - PM2.5 Parameters
    - NOx Parameters
    - SO_2 Parameters
- AERMOD Modeling Output Results
    - CO Concentrations
    - PM10 Concentrations
    - PM2.5 Concentrations
    - NOx Concentrations
    - SO_2 Concentrations
- Project Concentration Calculations

Stationary Source

Air Quality Ambient Background Concentrations

Summary of Background Concentrations

Carbon Monoxide (CO) Background Concentrations

Kenmore Square, Boston MA

Time Period	Background Concentration* (ppm)	(Micrograms/meter3)	NAAQS Standard ug/m3 (ppm)
1-Hour	1.3	1514.1	40,000 (35)
8-Hour	0.9	1048.3	10,000 (9)
Calculated Persistance Factor	0.69		

* Highest value of 2012, 2013 and 2014

Particulate Matter (PM2.5) Background Concentrations

174 North St, Boston, MA

Time Period	Background Concentration* (ppm)	(Micrograms/meter3)	NAAQS Standard ug/m3
24-Hour	-	18.2	35.0
Annual	-	8.4	15.0

* Average value of 2012, 2013 and 2014

Particulate Matter (PM10) Background Concentrations

One City Square, Boston

Time Period	Background Concentration* (ppm)	(Micrograms/meter3)	NAAQS Standard ug/m3
24-Hour	-	47.7	150.0

* Average value of 2012, 2013 and 2014

Nitrogen Dioxide (NO2) Background Concentrations

Kenmore Square, Boston MA

Time Period	Background Concentration* (ppm)	(Micrograms/meter3)	NAAQS Standard ug/m3 (ppm)
Annual	0.019	36.5	100 (0.053)
1-Hour	0.049	93.1	190 (0.100)

* Highest value of 2012, 2013 and 2014

Sulfur Dioxide (SO2) Background Concentrations

Kenmore Square, Boston MA

Time Period	Background Concentration* (ppm)	(Micrograms/meter3)	NAAQS Standard ug/m3 (ppm)
1-Hour	0.0116	31.0	200 (0.075)

* Highest value of 2011, 2012 and 2013

Adjustment from 1-hour (DEP Standards, not project-specific)

Annual	24-Hour	8-Hour	3-Hour
0.08	**0.40**	**0.70**	**0.90**

AERMOD Modeling Input Parameters

- CO Parameters
- PM10 Parameters
- PM2.5 Parameters
- NOx Parameters
- SO_2 Parameters

CO Parameters

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	CO 2010
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	1,8
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4564659 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	CO
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2010.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2010.PFL
ME	SURFDATA	Surf met data info.	1 2010 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2010 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.27	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.04536	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.27	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.04536	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	CO 2011
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	1,8
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4608848 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	CO
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2011.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2011.PFL
ME	SURFDATA	Surf met data info.	1 2011 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2011 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.27	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.04536	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.27	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.04536	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	CO 2012
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	1,8
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4650668 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	CO
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2012.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2012.PFL
ME	SURFDATA	Surf met data info.	1 2012 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2012 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.27	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.04536	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.27	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.04536	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	CO 2013
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	1,8
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4698049 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	CO
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2013.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2013.PFL
ME	SURFDATA	Surf met data info.	1 2013 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2013 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.27	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.04536	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.27	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.04536	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	CO 2014
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	1,8
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4732161 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	CO
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2014.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2014.PFL
ME	SURFDATA	Surf met data info.	14739 2014 LOGAN
ME	UAIRDATA	U-Air met data info.	54762 2014 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.27	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.04536	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.27	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.04536	156.3898	499.8167	2.117299	1.0668

PM10 Parameters

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	PM10 2010
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	24
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4564659 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	PM10
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2010.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2010.PFL
ME	SURFDATA	Surf met data info.	1 2010 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2010 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.08316	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.08316	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	PM10 2011
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	24
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4608848 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	PM10
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2011.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2011.PFL
ME	SURFDATA	Surf met data info.	1 2011 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2011 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.08316	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.08316	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	PM10 2012
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	24
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4650668 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	PM10
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2012.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2012.PFL
ME	SURFDATA	Surf met data info.	1 2012 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2012 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.08316	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.08316	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	PM10 2013
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	24
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4698049 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	PM10
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2013.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2013.PFL
ME	SURFDATA	Surf met data info.	1 2013 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2013 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.08316	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.08316	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	PM10 2014
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	24
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4732161 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	PM10
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2014.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2014.PFL
ME	SURFDATA	Surf met data info.	14739 2014 LOGAN
ME	UAIRDATA	U-Air met data info.	54762 2014 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.08316	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.08316	156.3898	499.8167	2.117299	1.0668

PM2.5 Parameters

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	PM25 2010
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	24,ANNUAL
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4564659 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	PM25
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2010.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2010.PFL
ME	SURFDATA	Surf met data info.	1 2010 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2010 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.08316	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.08316	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	PM25 2011
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	24,ANNUAL
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4608848 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	PM25
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2011.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2011.PFL
ME	SURFDATA	Surf met data info.	1 2011 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2011 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.	

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.08316	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.08316	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	PM25 2012
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	24,ANNUAL
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4650668 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	PM25
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2012.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2012.PFL
ME	SURFDATA	Surf met data info.	1 2012 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2012 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.08316	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.08316	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	PM25 2013
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	24,ANNUAL
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4698049 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	PM25
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2013.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2013.PFL
ME	SURFDATA	Surf met data info.	1 2013 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2013 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.08316	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.08316	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	PM25 2014
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	24,ANNUAL
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4732161 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	PM25
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2014.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2014.PFL
ME	SURFDATA	Surf met data info.	14739 2014 LOGAN
ME	UAIRDATA	U-Air met data info.	54762 2014 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.	

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.08316	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.0176	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.08316	156.3898	499.8167	2.117299	1.0668

NOx Parameters

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	NOx 2010
CO	MODELOPT	Model options	CONC,PVMRM
CO	AVERTIME	Averaging times	1,ANNUAL
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4564659 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	NO2
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2010.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2010.PFL
ME	SURFDATA	Surf met data info.	1 2010 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2010 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.10548	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.21672	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.10548	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.21672	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	NOx 2011
CO	MODELOPT	Model options	CONC,PVMRM
CO	AVERTIME	Averaging times	1,ANNUAL
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4608848 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	NO2
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2011.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2011.PFL
ME	SURFDATA	Surf met data info.	1 2011 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2011 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.	

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.10548	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.21672	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.10548	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.21672	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	NOx 2012
CO	MODELOPT	Model options	CONC,PVMRM
CO	AVERTIME	Averaging times	1,ANNUAL
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4650668 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	NO2
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2012.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2012.PFL
ME	SURFDATA	Surf met data info.	1 2012 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2012 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.10548	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.21672	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.10548	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.21672	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	NOx 2013
CO	MODELOPT	Model options	CONC,PVMRM
CO	AVERTIME	Averaging times	1,ANNUAL
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4698049 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	NO2
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2013.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2013.PFL
ME	SURFDATA	Surf met data info.	1 2013 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2013 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.	

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.10548	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.21672	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.10548	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.21672	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	NOx 2014
CO	MODELOPT	Model options	CONC,PVMRM
CO	AVERTIME	Averaging times	1,ANNUAL
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4732161 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	NO2
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2014.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2014.PFL
ME	SURFDATA	Surf met data info.	14739 2014 LOGAN
ME	UAIRDATA	U-Air met data info.	54762 2014 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.10548	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.21672	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.10548	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.21672	156.3898	499.8167	2.117299	1.0668

SO2 Parameters

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	SO2 2010
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	1
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4564659 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	SO2
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2010.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2010.PFL
ME	SURFDATA	Surf met data info.	1 2010 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2010 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.002807	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.00372133	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.002807	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.00372133	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	SO2 2011
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	1
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4608848 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	SO2
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2011.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2011.PFL
ME	SURFDATA	Surf met data info.	1 2011 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2011 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.002807	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.00372133	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.002807	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.00372133	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	SO2 2012
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	1
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4650668 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	SO2
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2012.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2012.PFL
ME	SURFDATA	Surf met data info.	1 2012 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2012 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.002807	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.00372133	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.002807	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.00372133	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	SO2 2013
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	1
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4698049 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	SO2
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2013.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2013.PFL
ME	SURFDATA	Surf met data info.	1 2013 LOGAN
ME	UAIRDATA	U-Air met data info.	2 2013 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.002807	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.00372133	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.002807	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.00372133	156.3898	499.8167	2.117299	1.0668

AERMOD Model Options

Model Options

Pathway	Keyword	Description	Value
CO	TITLEONE	Project title 1	Government Center BP1
CO	TITLETWO	Project title 2	SO2 2014
CO	MODELOPT	Model options	DFAULT,CONC
CO	AVERTIME	Averaging times	1
CO	URBANOPT	Urban options	Table (5,2) / /item /ID /URB1 /POPULATION /4732161 /NAME /AREA1 /ROUGHNESS /1
CO	POLLUTID	Pollutant ID	SO2
CO	HALFLIFE	Half life	
CO	DCAYCOEF	Decay coefficient	
CO	FLAGPOLE	Flagpole receptor heights	
CO	RUNORNOT	Run or Not	RUN
CO	EVENTFIL	Event file	F
CO	SAVEFILE	Save file	F
CO	INITFILE	Initialization file	
CO	MULTYEAR	Multiple year option	N/A
CO	DEBUGOPT	Debug options	N/A
CO	ERRORFIL	Error file	F
SO	ELEVUNIT	Elevation units	METERS
SO	EMISUNIT	Emission units	N/A
RE	ELEVUNIT	Elevation units	METERS
ME	SURFFILE	Surface met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2014.SFC
ME	PROFFILE	Profile met file	\\MABOSDATA\PROJECTS\11679.00\tech\AirQuality\ARTICL~1 \AERMOD\MET\BOS_2014.PFL
ME	SURFDATA	Surf met data info.	14739 2014 LOGAN
ME	UAIRDATA	U-Air met data info.	54762 2014 GREY_MAINE
ME	SITEDATA	On-site met data info.	
ME	PROFBASE	Elev. above MSL	9
ME	STARTEND	Start-end met dates	
ME	WDROTATE	Wind dir. rot. adjust.	
ME	WINDCATS	Wind speed cat. max.	
ME	SCIMBYHR	SCIM sample params	
EV	DAYTABLE	Print summary opt.	N/A
OU	EVENTOUT	Output info. level	N/A

OU	DAYTABLE	Print summary opt.	

Source Parameter Tables

All Sources

Source ID / Pollutant ID	Source Type	Description	UTM		Elev.	Emiss. Rate	Emiss. Units	Release Height
			East (m)	North (m)	(m)			(m)
PPCSR00A	POINT	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.002807	(g/s)	161.483
74J60000	POINT	4x Boilers	330386.4	4692040.5	8.770001	0.00372133	(g/s)	156.3898

Point Sources

Source ID / Pollutant ID	Description	UTM		Elev.	Emiss. Rate	Stack Height	Stack Temp	Stack Velocity	Stack Diameter
		East (m)	North (m)	(m)	(g/s)	(m)	(K)	(m/s)	(m)
PPCSR00A	1500 kWEmergency Gen	330376.9	4692032.4	8.770001	0.002807	161.483	677.0389	51.8	0.356616
74J60000	4x Boilers	330386.4	4692040.5	8.770001	0.00372133	156.3898	499.8167	2.117299	1.0668

AERMOD Modeling Output Results

- CO Concentrations
- PM10 Concentrations
- PM2.5 Concentrations
- NOx Concentrations
- SO_2 Concentrations

CO Concentrations

BREEZE AERMOD Model Results

Highest Results of Pollutant: CO

Avg. Per.	Grp ID	High	Type	Val	Units	Date	UTM		Elev.	Hill Ht.	Flag Ht.	Rec. Type	Grid ID
						YYMMDDHH	East (m)	North (m)	(m)	(m)	(m)		
1-HR	ALL	2ND	Avg. Conc.	7.48506	ug/m**3	10012309	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
8-HR	ALL	2ND	Avg. Conc.	5.36940	ug/m**3	10010216	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
3	Warning Message(s)
27	Informational Message(s)
8760	Hours Were Processed
6	Calm Hours Identified
21	Missing Hours Identified (0.24 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Highest Results of Pollutant: CO

Avg. Per.	Grp ID	High	Type	Val	Units	Date	UTM		Elev.	Hill Ht.	Flag Ht.	Rec. Type	Grid ID
						YYMMDDHH	East (m)	North (m)	(m)	(m)	(m)		
1-HR	ALL	2ND	Avg. Conc.	7.49707	ug/m**3	11112407	330398.62	4691980.41	9.30	9.30	0.00	GP	CTMNC000
8-HR	ALL	2ND	Avg. Conc.	5.20260	ug/m**3	11091908	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
3	Warning Message(s)
23	Informational Message(s)
8760	Hours Were Processed
6	Calm Hours Identified
17	Missing Hours Identified (0.19 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Highest Results of Pollutant: CO

Avg. Per.	Grp ID	High	Type	Val	Units	Date	UTM		Elev.	Hill Ht.	Flag Ht.	Rec. Type	Grid ID
						YYMMDDHH	East (m)	North (m)	(m)	(m)	(m)		
1-HR	ALL	2ND	Avg. Conc.	7.69667	ug/m**3	12011909	330403.83	4691950.87	9.60	9.60	0.00	GP	CTMNC000
8-HR	ALL	2ND	Avg. Conc.	5.41514	ug/m**3	12112108	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
3	Warning Message(s)
16	Informational Message(s)
8784	Hours Were Processed
14	Calm Hours Identified
2	Missing Hours Identified (0.02 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Highest Results of Pollutant: CO

Avg. Per.	Grp ID	High	Type	Val	Units	Date	UTM		Elev.	Hill Ht.	Flag Ht.	Rec. Type	Grid ID
						YYMMDDHH	East (m)	North (m)	(m)	(m)	(m)		
1-HR	ALL	2ND	Avg. Conc.	7.63148	ug/m**3	13011510	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
8-HR	ALL	2ND	Avg. Conc.	5.73654	ug/m**3	13061908	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
3	Warning Message(s)
9	Informational Message(s)
8760	Hours Were Processed
6	Calm Hours Identified
3	Missing Hours Identified (0.03 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Highest Results of Pollutant: CO

Avg. Per.	Grp ID	High	Type	Val	Units	Date	UTM		Elev.	Hill Ht.	Flag Ht.	Rec. Type	Grid ID
						YYMMDDHH	East (m)	North (m)	(m)	(m)	(m)		
1-HR	ALL	2ND	Avg. Conc.	7.55458	ug/m**3	14071709	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
8-HR	ALL	2ND	Avg. Conc.	5.28735	ug/m**3	14122124	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
4	Warning Message(s)
28	Informational Message(s)
8760	Hours Were Processed
10	Calm Hours Identified
18	Missing Hours Identified (0.21 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	ME	W186	THRESH_1MIN 1-min ASOS wind speed threshold used 0.50
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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PM10 Concentrations

BREEZE AERMOD Model Results

Highest Results of Pollutant: PM10

Avg. Per.	Grp ID	High	Type	Val	Units	Date	UTM		Elev.	Hill Ht.	Flag Ht.	Rec. Type	Grid ID
						YYMMDDHH	East (m)	North (m)	(m)	(m)	(m)		
24-HR	ALL	2ND	Avg. Conc.	2.13973	ug/m**3	10121924	330403.20	4692013.52	8.60	8.60	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
2	Warning Message(s)
27	Informational Message(s)
8760	Hours Were Processed
6	Calm Hours Identified
21	Missing Hours Identified (0.24 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Highest Results of Pollutant: PM10

Avg. Per.	Grp ID	High	Type	Val	Units	Date	UTM		Elev.	Hill Ht.	Flag Ht.	Rec. Type	Grid ID
						YYMMDDHH	East (m)	North (m)	(m)	(m)	(m)		
24-HR	ALL	2ND	Avg. Conc.	2.33773	ug/m**3	11102424	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
2	Warning Message(s)
23	Informational Message(s)
8760	Hours Were Processed
6	Calm Hours Identified
17	Missing Hours Identified (0.19 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Highest Results of Pollutant: PM10

Avg. Per.	Grp ID	High	Type	Val	Units	Date	UTM		Elev.	Hill Ht.	Flag Ht.	Rec. Type	Grid ID
						YYMMDDHH	East (m)	North (m)	(m)	(m)	(m)		
24-HR	ALL	2ND	Avg. Conc.	2.54078	ug/m**3	12061324	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
2	Warning Message(s)
16	Informational Message(s)
8784	Hours Were Processed
14	Calm Hours Identified
2	Missing Hours Identified (0.02 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Highest Results of Pollutant: PM10

Avg. Per.	Grp ID	High	Type	Val	Units	Date	UTM		Elev.	Hill Ht.	Flag Ht.	Rec. Type	Grid ID
						YYMMDDHH	East (m)	North (m)	(m)	(m)	(m)		
24-HR	ALL	2ND	Avg. Conc.	2.18877	ug/m**3	13063024	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
2	Warning Message(s)
9	Informational Message(s)
8760	Hours Were Processed
6	Calm Hours Identified
3	Missing Hours Identified (0.03 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Highest Results of Pollutant: PM10

Avg. Per.	Grp ID	High	Type	Val	Units	Date	UTM		Elev.	Hill Ht.	Flag Ht.	Rec. Type	Grid ID
						YYMMDDHH	East (m)	North (m)	(m)	(m)	(m)		
24-HR	ALL	2ND	Avg. Conc.	1.76576	ug/m**3	14122424	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
3	Warning Message(s)
28	Informational Message(s)
8760	Hours Were Processed
10	Calm Hours Identified
18	Missing Hours Identified (0.21 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	ME	W186	THRESH_1MIN 1-min ASOS wind speed threshold used 0.50
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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PM2.5 Concentrations

BREEZE AERMOD Model Results

Max. Annual (1 YEARS) Results of Pollutant: PM25 (ug/m**3)

Group ID	High	Avg. Conc.	UTM East (m)	UTM North (m)	Elev. (m)	Hill Ht. (m)	Flag Ht. (m)	Rec. Type	Grid ID
ALL	1ST	0.37009	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
	2ND	0.36812	330403.20	4692013.52	8.60	8.60	0.00	GP	CTMNC000
	3RD	0.35951	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
	4TH	0.35482	330407.48	4692016.52	8.50	8.50	0.00	GP	CTMNC000
	5TH	0.33946	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
	6TH	0.33120	330411.18	4692020.22	8.30	8.30	0.00	GP	CTMNC000
	7TH	0.31278	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000
	8TH	0.30035	330414.18	4692024.50	8.20	8.20	0.00	GP	CTMNC000
	9TH	0.28144	330377.94	4692011.31	9.00	9.00	0.00	GP	CTMNC000
	10TH	0.27335	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000

Maximum Period 24-HR Results Averaged Over (1 YEARS) of Pollutant: PM25 (ug/m**3)

Highest (Conc.)	Group ID	Highest (Receptor)	Avg. Conc.	UTM East (m)	UTM North (m)	Elevation (m)	Hill Ht (m)	Flag HT (m)	Rec.Type	Grid ID
8TH-Highest	ALL	1ST	1.58778	330403.20	4692013.52	8.60	8.60	0.00	GP	CTMNC000
		2ND	1.58552	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
		3RD	1.54974	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
		4TH	1.54617	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
		5TH	1.51224	330407.48	4692016.52	8.50	8.50	0.00	GP	CTMNC000
		6TH	1.48457	330382.99	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		7TH	1.48048	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
		8TH	1.47016	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		9TH	1.44216	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000
		10TH	1.41382	330398.46	4692067.69	7.10	7.10	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
3	Warning Message(s)
27	Informational Message(s)
8760	Hours Were Processed
6	Calm Hours Identified
21	Missing Hours Identified (0.24 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Max. Annual (1 YEARS) Results of Pollutant: PM25 (ug/m**3)

Group ID	High	Avg. Conc.	UTM East (m)	UTM North (m)	Elev. (m)	Hill Ht. (m)	Flag Ht. (m)	Rec. Type	Grid ID
ALL	1ST	0.39899	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
	2ND	0.39265	330403.20	4692013.52	8.60	8.60	0.00	GP	CTMNC000
	3RD	0.39240	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
	4TH	0.37586	330407.48	4692016.52	8.50	8.50	0.00	GP	CTMNC000
	5TH	0.37491	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
	6TH	0.34986	330411.18	4692020.22	8.30	8.30	0.00	GP	CTMNC000
	7TH	0.34881	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000
	8TH	0.34078	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
	9TH	0.33944	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
	10TH	0.33010	330398.46	4692067.69	7.10	7.10	0.00	GP	CTMNC000

Maximum Period 24-HR Results Averaged Over (1 YEARS) of Pollutant: PM25 (ug/m**3)

Highest (Conc.)	Group ID	Highest (Receptor)	Avg. Conc.	UTM East (m)	UTM North (m)	Elevation (m)	Hill Ht (m)	Flag HT (m)	Rec.Type	Grid ID
8TH-Highest	ALL	1ST	1.97018	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
		2ND	1.92036	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		3RD	1.77974	330398.46	4692067.69	7.10	7.10	0.00	GP	CTMNC000
		4TH	1.77080	330382.99	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		5TH	1.67658	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
		6TH	1.67036	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
		7TH	1.66474	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
		8TH	1.64544	330403.20	4692013.52	8.60	8.60	0.00	GP	CTMNC000
		9TH	1.63981	330407.48	4692016.52	8.50	8.50	0.00	GP	CTMNC000
		10TH	1.63562	330377.94	4692067.69	7.10	7.10	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
3	Warning Message(s)
23	Informational Message(s)
8760	Hours Were Processed
6	Calm Hours Identified
17	Missing Hours Identified (0.19 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Max. Annual (1 YEARS) Results of Pollutant: PM25 (ug/m**3)

Group ID	High	Avg. Conc.	UTM East (m)	UTM North (m)	Elev. (m)	Hill Ht. (m)	Flag Ht. (m)	Rec. Type	Grid ID
ALL	1ST	0.40297	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
	2ND	0.39660	330403.20	4692013.52	8.60	8.60	0.00	GP	CTMNC000
	3RD	0.39554	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
	4TH	0.37945	330407.48	4692016.52	8.50	8.50	0.00	GP	CTMNC000
	5TH	0.37658	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
	6TH	0.37389	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
	7TH	0.37364	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
	8TH	0.35939	330398.46	4692067.69	7.10	7.10	0.00	GP	CTMNC000
	9TH	0.35777	330382.99	4692069.04	7.10	7.10	0.00	GP	CTMNC000
	10TH	0.35271	330411.18	4692020.22	8.30	8.30	0.00	GP	CTMNC000

Maximum Period 24-HR Results Averaged Over (1 YEARS) of Pollutant: PM25 (ug/m**3)

Highest (Conc.)	Group ID	Highest (Receptor)	Avg. Conc.	UTM East (m)	UTM North (m)	Elevation (m)	Hill Ht (m)	Flag HT (m)	Rec.Type	Grid ID
8TH-Highest	ALL	1ST	1.88612	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
		2ND	1.86689	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		3RD	1.84728	330398.46	4692067.69	7.10	7.10	0.00	GP	CTMNC000
		4TH	1.83960	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
		5TH	1.76931	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
		6TH	1.75934	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000
		7TH	1.72957	330382.99	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		8TH	1.71565	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
		9TH	1.69620	330403.20	4692065.48	7.20	7.20	0.00	GP	CTMNC000
		10TH	1.65028	330403.20	4692013.52	8.60	8.60	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
3	Warning Message(s)
16	Informational Message(s)
8784	Hours Were Processed
14	Calm Hours Identified
2	Missing Hours Identified (0.02 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Max. Annual (1 YEARS) Results of Pollutant: PM25 (ug/m**3)

Group ID	High	Avg. Conc.	UTM East (m)	UTM North (m)	Elev. (m)	Hill Ht. (m)	Flag Ht. (m)	Rec. Type	Grid ID
ALL	1ST	0.36976	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
	2ND	0.36407	330403.20	4692013.52	8.60	8.60	0.00	GP	CTMNC000
	3RD	0.36225	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
	4TH	0.34792	330407.48	4692016.52	8.50	8.50	0.00	GP	CTMNC000
	5TH	0.34331	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
	6TH	0.33050	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
	7TH	0.32993	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
	8TH	0.32263	330411.18	4692020.22	8.30	8.30	0.00	GP	CTMNC000
	9TH	0.31825	330398.46	4692067.69	7.10	7.10	0.00	GP	CTMNC000
	10TH	0.31572	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000

Maximum Period 24-HR Results Averaged Over (1 YEARS) of Pollutant: PM25 (ug/m**3)

Highest (Conc.)	Group ID	Highest (Receptor)	Avg. Conc.	UTM East (m)	UTM North (m)	Elevation (m)	Hill Ht (m)	Flag HT (m)	Rec.Type	Grid ID
8TH-Highest	ALL	1ST	1.81005	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
		2ND	1.77711	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
		3RD	1.74087	330403.20	4692013.52	8.60	8.60	0.00	GP	CTMNC000
		4TH	1.69224	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		5TH	1.69146	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
		6TH	1.68296	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
		7TH	1.65666	330398.46	4692067.69	7.10	7.10	0.00	GP	CTMNC000
		8TH	1.61017	330407.48	4692016.52	8.50	8.50	0.00	GP	CTMNC000
		9TH	1.57098	330382.99	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		10TH	1.55110	330403.20	4692065.48	7.20	7.20	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
3	Warning Message(s)
9	Informational Message(s)
8760	Hours Were Processed
6	Calm Hours Identified
3	Missing Hours Identified (0.03 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Max. Annual (1 YEARS) Results of Pollutant: PM25 (ug/m**3)

Group ID	High	Avg. Conc.	UTM East (m)	UTM North (m)	Elev. (m)	Hill Ht. (m)	Flag Ht. (m)	Rec. Type	Grid ID
ALL	1ST	0.28916	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
	2ND	0.28719	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
	3RD	0.28108	330403.20	4692013.52	8.60	8.60	0.00	GP	CTMNC000
	4TH	0.27616	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
	5TH	0.26544	330407.48	4692016.52	8.50	8.50	0.00	GP	CTMNC000
	6TH	0.25765	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000
	7TH	0.24963	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
	8TH	0.24941	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
	9TH	0.24412	330411.18	4692020.22	8.30	8.30	0.00	GP	CTMNC000
	10TH	0.23970	330398.46	4692067.69	7.10	7.10	0.00	GP	CTMNC000

Maximum Period 24-HR Results Averaged Over (1 YEARS) of Pollutant: PM25 (ug/m**3)

Highest (Conc.)	Group ID	Highest (Receptor)	Avg. Conc.	UTM East (m)	UTM North (m)	Elevation (m)	Hill Ht (m)	Flag HT (m)	Rec.Type	Grid ID
8TH-Highest	ALL	1ST	1.35232	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
		2ND	1.33133	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
		3RD	1.31465	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
		4TH	1.29079	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000
		5TH	1.28651	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		6TH	1.27153	330403.20	4692013.52	8.60	8.60	0.00	GP	CTMNC000
		7TH	1.26236	330398.46	4692067.69	7.10	7.10	0.00	GP	CTMNC000
		8TH	1.24344	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
		9TH	1.21560	330382.99	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		10TH	1.20398	330377.94	4692011.31	9.00	9.00	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
4	Warning Message(s)
28	Informational Message(s)
8760	Hours Were Processed
10	Calm Hours Identified
18	Missing Hours Identified (0.21 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	ME	W186	THRESH_1MIN 1-min ASOS wind speed threshold used 0.50
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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NOx Concentrations

BREEZE AERMOD Model Results

Max. Annual (1 YEARS) Results of Pollutant: NO2 (ug/m**3)

Group ID	High	Avg. Conc.	UTM East (m)	UTM North (m)	Elev. (m)	Hill Ht. (m)	Flag Ht. (m)	Rec. Type	Grid ID
ALL	1ST	0.80646	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
	2ND	0.79948	330403.20	4692013.52	8.60	8.60	0.00	GP	CTMNC000
	3RD	0.78554	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
	4TH	0.76774	330407.48	4692016.52	8.50	8.50	0.00	GP	CTMNC000
	5TH	0.74282	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
	6TH	0.71397	330411.18	4692020.22	8.30	8.30	0.00	GP	CTMNC000
	7TH	0.68442	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000
	8TH	0.64522	330414.18	4692024.50	8.20	8.20	0.00	GP	CTMNC000
	9TH	0.61507	330377.94	4692011.31	9.00	9.00	0.00	GP	CTMNC000
	10TH	0.57778	330418.20	4691987.54	9.10	9.10	0.00	GP	CTMNC000

Maximum Period 1-HR Results Averaged Over (1 YEARS) of Pollutant: NO2 (ug/m**3)

Highest (Conc.)	Group ID	Highest (Receptor)	Avg.Conc.	UTM East (m)	UTM North (m)	Elevation (m)	Hill Ht (m)	Flag HT (m)	Rec.Type	Grid ID
8TH-Highest	ALL	1ST	12.53788	330377.94	4692011.31	9.00	9.00	0.00	GP	CTMNC000
		2ND	12.48802	330367.68	4691983.12	9.50	9.50	0.00	GP	CTMNC000
		3RD	12.36867	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000
		4TH	12.31938	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
		5TH	12.29827	330377.94	4692067.69	7.10	7.10	0.00	GP	CTMNC000
		6TH	12.28471	330382.99	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		7TH	12.26803	330373.20	4692065.48	7.20	7.20	0.00	GP	CTMNC000
		8TH	12.26657	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
		9TH	12.19794	330357.42	4691954.93	10.00	10.00	0.00	GP	CTMNC000
		10TH	12.15898	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
5	Warning Message(s)
27	Informational Message(s)
8760	Hours Were Processed
6	Calm Hours Identified
21	Missing Hours Identified (0.24 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	CO	W271	O3FILE w/o O3VALs; full conv for hrs with miss O3
WARNING	CO	W361	Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Max. Annual (1 YEARS) Results of Pollutant: NO2 (ug/m**3)

Group ID	High	Avg. Conc.	UTM East (m)	UTM North (m)	Elev. (m)	Hill Ht. (m)	Flag Ht. (m)	Rec. Type	Grid ID
ALL	1ST	0.86066	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
	2ND	0.84832	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
	3RD	0.84462	330403.20	4692013.52	8.60	8.60	0.00	GP	CTMNC000
	4TH	0.81142	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
	5TH	0.80586	330407.48	4692016.52	8.50	8.50	0.00	GP	CTMNC000
	6TH	0.75483	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000
	7TH	0.74762	330411.18	4692020.22	8.30	8.30	0.00	GP	CTMNC000
	8TH	0.70286	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
	9TH	0.69976	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
	10TH	0.68296	330377.94	4692011.31	9.00	9.00	0.00	GP	CTMNC000

Maximum Period 1-HR Results Averaged Over (1 YEARS) of Pollutant: NO2 (ug/m**3)

Highest (Conc.)	Group ID	Highest (Receptor)	Avg.Conc.	UTM East (m)	UTM North (m)	Elevation (m)	Hill Ht (m)	Flag HT (m)	Rec.Type	Grid ID
8TH-Highest	ALL	1ST	12.77020	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		2ND	12.53825	330403.20	4692065.48	7.20	7.20	0.00	GP	CTMNC000
		3RD	12.53552	330398.46	4692067.69	7.10	7.10	0.00	GP	CTMNC000
		4TH	12.49214	330377.94	4692067.69	7.10	7.10	0.00	GP	CTMNC000
		5TH	12.33871	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
		6TH	12.25914	330382.99	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		7TH	12.24333	330398.62	4692098.59	6.10	6.10	0.00	GP	CTMNC000
		8TH	12.23407	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000
		9TH	12.15690	330377.94	4692011.31	9.00	9.00	0.00	GP	CTMNC000
		10TH	12.11293	330408.72	4692095.88	6.30	6.30	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
5	Warning Message(s)
23	Informational Message(s)
8760	Hours Were Processed
6	Calm Hours Identified
17	Missing Hours Identified (0.19 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	CO	W271	O3FILE w/o O3VALs; full conv for hrs with miss O3
WARNING	CO	W361	Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Max. Annual (1 YEARS) Results of Pollutant: NO2 (ug/m**3)

Group ID	High	Avg. Conc.	UTM		Elev.	Hill Ht.	Flag Ht.	Rec. Type	Grid ID
			East (m)	North (m)	(m)	(m)	(m)		
ALL	1ST	0.87658	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
	2ND	0.86194	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
	3RD	0.86062	330403.20	4692013.52	8.60	8.60	0.00	GP	CTMNC000
	4TH	0.82114	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
	5TH	0.82090	330407.48	4692016.52	8.50	8.50	0.00	GP	CTMNC000
	6TH	0.76697	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
	7TH	0.76678	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
	8TH	0.76052	330411.18	4692020.22	8.30	8.30	0.00	GP	CTMNC000
	9TH	0.75991	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000
	10TH	0.73851	330398.46	4692067.69	7.10	7.10	0.00	GP	CTMNC000

Maximum Period 1-HR Results Averaged Over (1 YEARS) of Pollutant: NO2 (ug/m**3)

Highest (Conc.)	Group ID	Highest (Receptor)	Avg.Conc.	UTM		Elevation	Hill Ht	Flag HT	Rec.Type	Grid ID
				East (m)	North (m)	(m)	(m)	(m)		
8TH-Highest	ALL	1ST	12.82476	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
		2ND	12.75586	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		3RD	12.73444	330382.99	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		4TH	12.44132	330377.94	4692011.31	9.00	9.00	0.00	GP	CTMNC000
		5TH	12.43945	330398.46	4692067.69	7.10	7.10	0.00	GP	CTMNC000
		6TH	12.40540	330388.20	4692099.50	6.10	6.10	0.00	GP	CTMNC000
		7TH	12.36981	330377.78	4692098.59	6.00	6.00	0.00	GP	CTMNC000
		8TH	12.23054	330367.68	4691983.12	9.50	9.50	0.00	GP	CTMNC000
		9TH	12.19364	330377.94	4692067.69	7.10	7.10	0.00	GP	CTMNC000
		10TH	12.16996	330373.20	4692013.52	8.90	8.90	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
5	Warning Message(s)
16	Informational Message(s)
8784	Hours Were Processed
14	Calm Hours Identified
2	Missing Hours Identified (0.02 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	CO	W271	O3FILE w/o O3VALs; full conv for hrs with miss O3
WARNING	CO	W361	Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Max. Annual (1 YEARS) Results of Pollutant: NO2 (ug/m**3)

Group ID	High	Avg. Conc.	UTM East (m)	UTM North (m)	Elev. (m)	Hill Ht. (m)	Flag Ht. (m)	Rec. Type	Grid ID
ALL	1ST	0.80650	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
	2ND	0.79189	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
	3RD	0.79177	330403.20	4692013.52	8.60	8.60	0.00	GP	CTMNC000
	4TH	0.75402	330407.48	4692016.52	8.50	8.50	0.00	GP	CTMNC000
	5TH	0.75129	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
	6TH	0.69663	330411.18	4692020.22	8.30	8.30	0.00	GP	CTMNC000
	7TH	0.69076	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000
	8TH	0.68006	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
	9TH	0.67849	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
	10TH	0.65536	330398.46	4692067.69	7.10	7.10	0.00	GP	CTMNC000

Maximum Period 1-HR Results Averaged Over (1 YEARS) of Pollutant: NO2 (ug/m**3)

Highest (Conc.)	Group ID	Highest (Receptor)	Avg.Conc.	UTM East (m)	UTM North (m)	Elevation (m)	Hill Ht (m)	Flag HT (m)	Rec.Type	Grid ID
8TH-Highest	ALL	1ST	12.79766	330382.99	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		2ND	12.72623	330377.94	4692067.69	7.10	7.10	0.00	GP	CTMNC000
		3RD	12.60425	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		4TH	12.57466	330367.68	4692095.88	6.10	6.10	0.00	GP	CTMNC000
		5TH	12.46893	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
		6TH	12.44301	330398.46	4692067.69	7.10	7.10	0.00	GP	CTMNC000
		7TH	12.39657	330373.20	4692065.48	7.20	7.20	0.00	GP	CTMNC000
		8TH	12.31257	330358.20	4692091.46	6.10	6.10	0.00	GP	CTMNC000
		9TH	12.15138	330357.42	4692124.07	5.60	5.60	0.00	GP	CTMNC000
		10TH	12.03810	330398.62	4692098.59	6.10	6.10	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
5	Warning Message(s)
9	Informational Message(s)
8760	Hours Were Processed
6	Calm Hours Identified
3	Missing Hours Identified (0.03 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	CO	W271	O3FILE w/o O3VALs; full conv for hrs with miss O3
WARNING	CO	W361	Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Max. Annual (1 YEARS) Results of Pollutant: NO2 (ug/m**3)

Group ID	High	Avg. Conc.	UTM East (m)	UTM North (m)	Elev. (m)	Hill Ht. (m)	Flag Ht. (m)	Rec. Type	Grid ID
ALL	1ST	0.60294	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
	2ND	0.60043	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
	3RD	0.58428	330403.20	4692013.52	8.60	8.60	0.00	GP	CTMNC000
	4TH	0.57838	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
	5TH	0.54980	330407.48	4692016.52	8.50	8.50	0.00	GP	CTMNC000
	6TH	0.53990	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000
	7TH	0.50384	330411.18	4692020.22	8.30	8.30	0.00	GP	CTMNC000
	8TH	0.49941	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
	9TH	0.49894	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
	10TH	0.48886	330377.94	4692011.31	9.00	9.00	0.00	GP	CTMNC000

Maximum Period 1-HR Results Averaged Over (1 YEARS) of Pollutant: NO2 (ug/m**3)

Highest (Conc.)	Group ID	Highest (Receptor)	Avg.Conc.	UTM East (m)	UTM North (m)	Elevation (m)	Hill Ht (m)	Flag HT (m)	Rec.Type	Grid ID
8TH-Highest	ALL	1ST	10.51533	330377.94	4692067.69	7.10	7.10	0.00	GP	CTMNC000
		2ND	10.09808	330373.20	4692065.48	7.20	7.20	0.00	GP	CTMNC000
		3RD	9.96710	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
		4TH	9.79470	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000
		5TH	9.73955	330382.99	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		6TH	9.60994	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
		7TH	9.33336	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
		8TH	9.26739	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		9TH	9.25981	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
		10TH	9.08968	330377.78	4691980.41	9.50	9.50	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
6	Warning Message(s)
28	Informational Message(s)
8760	Hours Were Processed
10	Calm Hours Identified
18	Missing Hours Identified (0.21 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	CO	W271	O3FILE w/o O3VALs; full conv for hrs with miss O3
WARNING	CO	W361	Multiyear PERIOD/ANNUAL values for NO2/SO2 require MULTYEAR Opt
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	ME	W186	THRESH_1MIN 1-min ASOS wind speed threshold used 0.50
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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SO2 Concentrations

BREEZE AERMOD Model Results

Maximum Period 1-HR Results Averaged Over (1 YEARS) of Pollutant: SO2 (ug/m**3)

Highest (Conc.)	Group ID	Highest (Receptor)	Avg.Conc.	UTM East (m)	UTM North (m)	Elevation (m)	Hill Ht (m)	Flag HT (m)	Rec.Type	Grid ID
4TH-Highest	ALL	1ST	0.30280	330377.94	4692011.31	9.00	9.00	0.00	GP	CTMNC000
		2ND	0.30278	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000
		3RD	0.30181	330367.68	4691983.12	9.50	9.50	0.00	GP	CTMNC000
		4TH	0.29159	330357.42	4691954.93	10.00	10.00	0.00	GP	CTMNC000
		5TH	0.28843	330377.78	4691980.41	9.50	9.50	0.00	GP	CTMNC000
		6TH	0.28627	330373.20	4692013.52	8.90	8.90	0.00	GP	CTMNC000
		7TH	0.28345	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
		8TH	0.27964	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
		9TH	0.27913	330372.57	4691950.87	9.90	9.90	0.00	GP	CTMNC000
		10TH	0.27578	330373.20	4692065.48	7.20	7.20	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
2	Warning Message(s)
27	Informational Message(s)
8760	Hours Were Processed
6	Calm Hours Identified
21	Missing Hours Identified (0.24 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Maximum Period 1-HR Results Averaged Over (1 YEARS) of Pollutant: SO2 (ug/m**3)

Highest (Conc.)	Group ID	Highest (Receptor)	Avg.Conc.	UTM East (m)	UTM North (m)	Elevation (m)	Hill Ht (m)	Flag HT (m)	Rec.Type	Grid ID
4TH-Highest	ALL	1ST	0.30022	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
		2ND	0.29985	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
		3RD	0.29551	330398.46	4692011.31	8.80	8.80	0.00	GP	CTMNC000
		4TH	0.29542	330408.72	4691983.12	9.20	9.20	0.00	GP	CTMNC000
		5TH	0.29424	330377.94	4692067.69	7.10	7.10	0.00	GP	CTMNC000
		6TH	0.29392	330398.62	4691980.41	9.30	9.30	0.00	GP	CTMNC000
		7TH	0.29289	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		8TH	0.29198	330403.20	4692013.52	8.60	8.60	0.00	GP	CTMNC000
		9TH	0.29167	330398.46	4692067.69	7.10	7.10	0.00	GP	CTMNC000
		10TH	0.28917	330408.72	4692095.88	6.30	6.30	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
2	Warning Message(s)
23	Informational Message(s)
8760	Hours Were Processed
6	Calm Hours Identified
17	Missing Hours Identified (0.19 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Maximum Period 1-HR Results Averaged Over (1 YEARS) of Pollutant: SO2 (ug/m**3)

Highest (Conc.)	Group ID	Highest (Receptor)	Avg.Conc.	UTM East (m)	UTM North (m)	Elevation (m)	Hill Ht (m)	Flag HT (m)	Rec.Type	Grid ID
4TH-Highest	ALL	1ST	0.30867	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000
		2ND	0.30388	330382.99	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		3RD	0.30277	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
		4TH	0.30256	330377.94	4692067.69	7.10	7.10	0.00	GP	CTMNC000
		5TH	0.29997	330377.94	4692011.31	9.00	9.00	0.00	GP	CTMNC000
		6TH	0.29818	330367.68	4692095.88	6.10	6.10	0.00	GP	CTMNC000
		7TH	0.29783	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
		8TH	0.29713	330388.20	4692099.50	6.10	6.10	0.00	GP	CTMNC000
		9TH	0.29541	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		10TH	0.29164	330398.46	4692067.69	7.10	7.10	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
2	Warning Message(s)
16	Informational Message(s)
8784	Hours Were Processed
14	Calm Hours Identified
2	Missing Hours Identified (0.02 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Maximum Period 1-HR Results Averaged Over (1 YEARS) of Pollutant: SO2 (ug/m**3)

Highest (Conc.)	Group ID	Highest (Receptor)	Avg.Conc.	UTM East (m)	UTM North (m)	Elevation (m)	Hill Ht (m)	Flag HT (m)	Rec.Type	Grid ID
4TH-Highest	ALL	1ST	0.30644	330398.46	4692067.69	7.10	7.10	0.00	GP	CTMNC000
		2ND	0.30475	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
		3RD	0.30016	330393.41	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		4TH	0.29741	330388.20	4692069.50	7.10	7.10	0.00	GP	CTMNC000
		5TH	0.29669	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000
		6TH	0.29645	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
		7TH	0.29624	330408.72	4692095.88	6.30	6.30	0.00	GP	CTMNC000
		8TH	0.29364	330382.99	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		9TH	0.29138	330388.20	4691979.50	9.40	9.40	0.00	GP	CTMNC000
		10TH	0.29039	330377.78	4692098.59	6.00	6.00	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
2	Warning Message(s)
9	Informational Message(s)
8760	Hours Were Processed
6	Calm Hours Identified
3	Missing Hours Identified (0.03 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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BREEZE AERMOD Model Results

Maximum Period 1-HR Results Averaged Over (1 YEARS) of Pollutant: SO2 (ug/m**3)

Highest (Conc.)	Group ID	Highest (Receptor)	Avg.Conc.	UTM East (m)	UTM North (m)	Elevation (m)	Hill Ht (m)	Flag HT (m)	Rec.Type	Grid ID
4TH-Highest	ALL	1ST	0.27151	330377.94	4692011.31	9.00	9.00	0.00	GP	CTMNC000
		2ND	0.26743	330373.20	4692065.48	7.20	7.20	0.00	GP	CTMNC000
		3RD	0.26730	330388.20	4692009.50	8.90	8.90	0.00	GP	CTMNC000
		4TH	0.26483	330377.94	4692067.69	7.10	7.10	0.00	GP	CTMNC000
		5TH	0.25842	330393.41	4692009.96	8.90	8.90	0.00	GP	CTMNC000
		6TH	0.25322	330382.99	4692009.96	9.00	9.00	0.00	GP	CTMNC000
		7TH	0.25069	330388.20	4691979.50	9.40	9.40	0.00	GP	CTMNC000
		8TH	0.24903	330382.99	4692069.04	7.10	7.10	0.00	GP	CTMNC000
		9TH	0.24899	330368.92	4692062.48	7.40	7.40	0.00	GP	CTMNC000
		10TH	0.24841	330373.20	4692013.52	8.90	8.90	0.00	GP	CTMNC000

Summary of Total Messages

#	Message Type
0	Fatal Error Message(s)
3	Warning Message(s)
28	Informational Message(s)
8760	Hours Were Processed
10	Calm Hours Identified
18	Missing Hours Identified (0.21 Percent)

Error & Warning Messages

Msg. Type	Pathway	Ref. #	Description
WARNING	SO	W320	Input Parameter May Be Out-of-Range for Parameter VS
WARNING	ME	W186	THRESH_1MIN 1-min ASOS wind speed threshold used 0.50
WARNING	OU	W565	Possible Conflict With Dynamically Allocated FUNIT PLOTFILE

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Project Concentration Calculations

11679.00 Government Center Garage BP1- 1500 kW Gen & 4 Boilers
Project Contributions

Year	CO		NO2		PM10	PM25		SO2
	1-Hour	8-Hour	1-Hour	Annual	24-Hour	24-Hour	Annual	1-Hour
	2nd high	2nd high	98th percentile (8th)	max	2nd high	98th percentile (8th)	max	99th percentile (4th)
2010	7.48506	5.36940	12.53788	0.80646	2.13973	1.58778	0.37009	0.30280
2011	7.49707	5.20260	12.77020	0.86066	2.33773	1.97018	0.39899	0.30022
2012	7.69667	5.41514	12.82476	0.87658	2.54078	1.88612	0.40297	0.30867
2013	7.63148	5.73654	12.79766	0.80650	2.18877	1.81005	0.36976	0.30644
2014	7.55458	5.28735	10.51533	0.60294	1.76576	1.35232	0.28916	0.27151
Concentrations	7.6967	5.7365	12.2892	0.8766	2.1946	1.7213	0.3662	0.2979

Job Number: 11679.00
Job Name: Government Center Garage
Results of: BP1- 1500 kW Gen & 4 Boilers

Results Table

Pollutant	Annual	24-Hour	8-Hour	3-Hour	1-Hour
Nitrogen Dioxide (NO2)	**Pass**	N/A	N/A	N/A	**Pass**
Sulfur Dioxide (SO2)	N/A	N/A	N/A	N/A	**Pass**
Carbon Monoxide (CO)	N/A	N/A	**Pass**	N/A	**Pass**
Particulate Matter (PM10)	N/A	**Pass**	N/A	N/A	N/A
Particulate Matter (PM2.5)	**Pass**	**Pass**	N/A	N/A	N/A

Maximum Concentrations

Pollutant	Annual	24-Hour	8-Hour	3-Hour	1-Hour
Nitrogen Dioxide (NO2)	**37.38**	N/A	N/A	N/A	**105.39**
Sulfur Dioxide (SO2)	N/A	N/A	N/A	N/A	**31.30**
Carbon Monoxide (CO)	N/A	N/A	**1,054.04**	N/A	**1,521.80**
Particulate Matter (PM10)	N/A	**49.86**	N/A	N/A	N/A
Particulate Matter (PM2.5)	**8.77**	**19.92**	N/A	N/A	N/A

Background Value

Pollutant	Annual	24-Hour	8-Hour	3-Hour	1-Hour
Nitrogen Dioxide (NO2)	**36.50**	N/A	N/A	N/A	**93.10**
Sulfur Dioxide (SO2)	N/A	N/A	N/A	N/A	**31.00**
Carbon Monoxide (CO)	N/A	N/A	**1,048.30**	N/A	**1,514.10**
Particulate Matter (PM10)	N/A	**47.67**	N/A	N/A	N/A
Particulate Matter (PM2.5)	**8.40**	**18.20**	N/A	N/A	N/A

Project Contribution

Pollutant	Annual	24-Hour	8-Hour	3-Hour	1-Hour
Nitrogen Dioxide (NO2)	**0.88**	N/A	N/A	N/A	**12.29**
Sulfur Dioxide (SO2)	N/A	N/A	N/A	N/A	**0.30**
Carbon Monoxide (CO)	N/A	N/A	**5.74**	N/A	**7.70**
Particulate Matter (PM10)	N/A	**2.19**	N/A	N/A	N/A
Particulate Matter (PM2.5)	**0.37**	**1.72**	N/A	N/A	N/A

NAAQS

Pollutant	Annual	24-Hour	8-Hour	3-Hour	1-Hour
Nitrogen Dioxide (NO2)	**100**	N/A	N/A	N/A	**189**
Sulfur Dioxide (SO2)	N/A	N/A	N/A	N/A	**196**
Carbon Monoxide (CO)	N/A	N/A	**10,000**	N/A	**40,000**
Particulate Matter (PM10)	N/A	**150**	N/A	N/A	N/A
Particulate Matter (PM2.5)	**12**	**35**	N/A	N/A	N/A

APPENDIX F: BRA Checklists

BRA Accessibility Checklist

BRA Climate Change Preparedness and Resilience Checklist

Accessibility Checklist

(to be added to the BRA Development Review Guidelines)

In 2009, a nine-member Advisory Board was appointed to the Commission for Persons with Disabilities in an effort to reduce architectural, procedural, attitudinal, and communication barriers affecting persons with disabilities in the City of Boston. These efforts were instituted to work toward creating universal access in the built environment.

In line with these priorities, the Accessibility Checklist aims to support the inclusion of people with disabilities. In order to complete the Checklist, you must provide specific detail, including descriptions, diagrams and data, of the universal access elements that will ensure all individuals have an equal experience that includes full participation in the built environment throughout the proposed buildings and open space.

In conformance with this directive, all development projects subject to Boston Zoning Article 80 Small and Large Project Review, including all Institutional Master Plan modifications and updates, are to complete the following checklist and provide any necessary responses regarding the following:

- improvements for pedestrian and vehicular circulation and access;
- encourage new buildings and public spaces to be designed to enhance and preserve Boston's system of parks, squares, walkways, and active shopping streets;
- ensure that persons with disabilities have full access to buildings open to the public;
- afford such persons the educational, employment, and recreational opportunities available to all citizens; and
- preserve and increase the supply of living space accessible to persons with disabilities.

We would like to thank you in advance for your time and effort in advancing best practices and progressive approaches to expand accessibility throughout Boston's built environment.

Accessibility Analysis Information Sources:

1. Americans with Disabilities Act – 2010 ADA Standards for Accessible Design
    a. http://www.ada.gov/2010ADAstandards_index.htm
2. Massachusetts Architectural Access Board 521 CMR
    a. http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/aab/aab-rules-and-regulations-pdf.html
3. Boston Complete Street Guidelines
    a. http://bostoncompletestreets.org/
4. City of Boston Mayors Commission for Persons with Disabilities Advisory Board
    a. http://www.cityofboston.gov/Disability
5. City of Boston – Public Works Sidewalk Reconstruction Policy
    a. http://www.cityofboston.gov/images_documents/sidewalk%20policy%200114_tcm3-41668.pdf
6. Massachusetts Office On Disability Accessible Parking Requirements
    a. www.mass.gov/anf/docs/mod/hp-parking-regulations-mod.doc
7. MBTA Fixed Route Accessible Transit Stations
    a. http://www.mbta.com/about_the_mbta/accessibility/

Article 80 | ACCESSIBILTY CHECKLIST
Redevelopment of the Government Center Garage – WP-B1 (Residential Building)

Project Information

Project Name:	Redevelopment of the Government Center Garage – WP-B1 (Residential Building)
Project Address Primary:	One Congress Street
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	Douglas Manz, Director of Development The HYM Investment Group, LLC dmanz@hyminvestments.com 617-248-8905

Team Description

Owner / Developer:	Bulfinch Congress Holdings, LLC/The HYM Investment Group, LLC
Architect:	CBT Architects
Engineer (building systems):	WSP
Sustainability / LEED:	The Green Engineer
Permitting:	VHB, Inc.
Construction Management:	Tishman

Project Permitting and Phase

At what phase is the project – at time of this questionnaire? The BRA previously approved conceptual plans of the Development Plan Project as part of the Planned Development Area (PDA) approval. This EPNF has been filed for subsequent review and approval, and is intended to be focused on the advanced building and public realm design as well as key changes to environmental conditions to confirm the Proposed Project is consistent with the approved PDA.

PNF / Expanded PNF Submitted	Draft / Final Project Impact Report Submitted	BRA Board Approved
BRA Design Approved	Under Construction	Construction just completed:

Building Classification and Description

What are the principal Building Uses - select all appropriate uses?

Residential – One to Three Unit	**Residential - Multi-unit, Four +**	Institutional	Education
Commercial	Office	Retail	Assembly
Laboratory / Medical	Manufacturing / Industrial	Mercantile	Storage, Utility and Other

First Floor Uses (List)	Residential Lobby, Service/Loading, Retail

What is the Construction Type – select most appropriate type?

Wood Frame	Masonry	Steel Frame	**Concrete**

Describe the building?

Site Area:	19,510 SF	Building Area:	547,940 GSF
Building Height (top of last occupiable floor):	480 Ft.	Number of Stories (last occupiable floor):	45 Flrs.
First Floor Elevation:	$\underline{+}$27 feet *Elev.*	Are there below grade spaces:	Yes

Assessment of Existing Infrastructure for Accessibility:

This section explores the proximity to accessible transit lines and proximate institutions such as, but not limited to hospitals, elderly and disabled housing, and general neighborhood information. The proponent should identify how the area surrounding the development is accessible for people with mobility impairments and should analyze the existing condition of the accessible routes through sidewalk and pedestrian ramp reports.

Provide a description of the development neighborhood and identifying characteristics.	The Proposed Project Site is immediately adjacent to Government Center office buildings and the Bulfinch Triangle neighborhood. Nearby are the Rose F Kennedy Greenway, Market District, North End, and Beacon Hill.
List the surrounding ADA compliant MBTA transit lines and the proximity to the development site: Commuter rail, subway, bus, etc.	The Proposed Project Site is located very nearby to (just across Congress Street) the MBTA Haymarket Bus Station, and MBTA Haymarket Green and Orange Line Subway Stations, which are handicap accessible.
List the surrounding institutions: hospitals, public housing and elderly and disabled housing	The Temporary Home for Women is located across Bowker Street from the Proposed Project Site.

developments, educational facilities, etc.	
Is the proposed development on a priority accessible route to a key public use facility? List the surrounding: government buildings, libraries, community centers and recreational facilities and other related facilities.	Government buildings adjacent and accessible to the Proposed Project Site include the District 1 Boston Police Station on New Sudbury St. Surrounding government buildings accessible to the Proposed Project Site include: JFK Federal Office Building on New Sudbury St.; Overseers of the Public Welfare Building and Veterans Affairs Department on Hawkins St; U.S. Post Office and Suffolk County Courthouse on New Chardon St.; and Boston City Hall on Congress Street. Also, the North End Greenway Parks are accessible to the Proposed Project Site across Congress St.

Surrounding Site Conditions – Existing:

This section identifies the current condition of the sidewalks and pedestrian ramps around the development site.

Are there sidewalks and pedestrian ramps existing at the development site?	Yes.
If yes above, list the existing sidewalk and pedestrian ramp materials and physical condition at the development site.	The existing sidewalk along New Sudbury Street is a mix of brick and concrete. A pedestrian walkway/ramp exists off of this sidewalk to the left of the vehicular Garage entrance. The existing Bowker Street and New Sudbury Street connection is currently only a stairway and is not accessible (i.e., no ramp).
Are the sidewalks and pedestrian ramps existing-to-remain? If yes, have the sidewalks and pedestrian ramps been verified as compliant? If yes, please provide surveyors report.	The sidewalks and ramps being reconstructed along the north side of New Sudbury Street from Bowker Street to Congress Street as part of the Proposed Project will be designed and constructed in compliance with CMR 521. The brick sidewalk will be replaced with broom-finished concrete, street trees, and other streetscape enhancements. Many of the other sidewalks in the area shall remain until they are reconstructed as part of future phases of the Development Plan Project.
Is the development site within a historic district? If yes, please identify.	No, the Proposed Project Site is not located within a historic district.

Surrounding Site Conditions – Proposed

This section identifies the proposed condition of the walkways and pedestrian ramps in and around the development site. The width of the sidewalk contributes to the degree of comfort and enjoyment of walking along a street. Narrow sidewalks do not support lively pedestrian activity, and may create dangerous conditions that force people to walk in the street. Typically, a five foot wide Pedestrian Zone supports two people walking side by side or two wheelchairs passing each other. An eight foot wide Pedestrian Zone allows two pairs of people to comfortable pass each other, and a ten foot or wider Pedestrian Zone can support high volumes of pedestrians.

Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? See: www.bostoncompletestreets.org	Yes, the proposed sidewalk improvements abutting the Proposed Project Site will be made consistent with Boston Complete Street Guidelines, where feasible.
If yes above, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, Boulevard.	Downtown Commercial
What is the total width of the proposed sidewalk? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone.	Frontage Zone: 0’-0”min – 19’-3”max Pedestrian Zone: 8’-0”min – 9’-6”max Greenscape/Furnishing Zone: 4’-0” consistent Curb Zone: 6”
List the proposed materials for each Zone. Will the proposed materials be on private property or will the proposed materials be on the City of Boston pedestrian right-of-way?	City-approved pavement materials Frontage Zone: Pavers Pedestrian Zone: Exposed Aggregate Furnishing Zone: Pavers or Pervious Pavement System
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the City of Boston Public Improvement Commission?	As part of the Proposed Project, the Proponent will request that with the cooperation of the BRA the City of Boston discontinue minor areas of existing public rights along New Sudbury Street (as shown in Figure 1.4) to allow the Proponent to wrap the Garage with the new building and enhance accessibility. The corner of Bowker Street and New Sudbury Street is owned by the BRA. The Bowker Street connection to New Sudbury Street will be made accessible by way of ramps and stairs.at a 5% slope, per ADA as part of the Proposed Project.
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way?	No. To clarify, there will be one small retail space where a tenant may be interested in café furnishings outside of the pedestrian right-of-way.

If yes above, what are the proposed dimensions of the sidewalk café or furnishings and what will the right-of-way clearance be?	The sidewalk café will encompass a space approximately 8' x 38'. The remaining sidewalk right-of-way will be approximately 10' wide with an additional 4'-4" buffer zone between the sidewalk and the curb.

Proposed Accessible Parking:

See Massachusetts Architectural Access Board Rules and Regulations 521 CMR Section 23.00 regarding accessible parking requirement counts and the Massachusetts Office of Disability Handicap Parking Regulations.

What is the total number of parking spaces provided at the development site parking lot or garage?	The existing Garage capacity is 2,310 spaces. The parking demand ratio assumed for WP-B1 is 0.50 spaces per unit for parking supply of approximately 245 spaces. Much of the existing Garage will remain after the construction of the Proposed Project, which will provide ample parking for the residential building. Dedicated residential parking spaces are not anticipated for the Proposed Project at this time.
What is the total number of accessible spaces provided at the development site?	Much of the existing Garage will remain after the construction of the WP-B1. Accessible parking spaces are currently provided adjacent to the elevators on all floors of the Garage. Three (3) accessible parking spaces will be provided adjacent to the residential building as part of the Proposed Project on Garage Level 6. Dedicated accessible residential parking spaces are not anticipated at this time.
Will any on street accessible parking spaces be required? If yes, has the proponent contacted the Commission for Persons with Disabilities and City of Boston Transportation Department regarding this need?	No
Where is accessible visitor parking located?	Accessible visitor parking will be provided as it currently exists in the Garage (described above).
Has a drop-off area been identified? If yes, will it be accessible?	There will be curb side drop off near the building entrance along New Sudbury Street. Yes, the drop-off area is intended to be accessible.
Include a diagram of the accessible routes to and from the accessible parking lot/garage and drop-off areas to the development entry locations. Please include route distances.	Refer to the 'Proposed Accessible Parking' Accessibility Diagram for WP-B1 attached.

Circulation and Accessible Routes:

The primary objective in designing smooth and continuous paths of travel is to accommodate persons of all abilities that allow for universal access to entryways, common spaces and the visit-ability* of neighbors.

**Visit-ability – Neighbors ability to access and visit with neighbors without architectural barrier limitations*

Provide a diagram of the accessible route connections through the site.	Sidewalks approaching the building will be accessible. The sloped open space between Sudbury and Bowker Streets will be redesigned as part of the Proposed Project to be accessible by way of ramps and stairs. Refer to the 'Streetscape Concept' Accessibility Diagram for WP-B1 attached.
Describe accessibility at each entryway: Flush Condition, Stairs, Ramp Elevator.	Flush Condition on New Sudbury Street.
Are the accessible entrance and the standard entrance integrated?	Yes
If no above, what is the reason?	
Will there be a roof deck or outdoor courtyard space? If yes, include diagram of the accessible route.	Yes, outdoor rooftop spaces are proposed on Level 11, 32, and 46 as part of the Proposed Project. The space will be accessed via the elevators from the lobby to these upper levels and then by exiting a pair of exit doors with flush thresholds.
Has an accessible routes way-finding and signage package been developed? If yes, please describe.	Not at this time.

Accessible Units: (If applicable)

In order to facilitate access to housing opportunities this section addresses the number of accessible units that are proposed for the development site that remove barriers to housing choice.

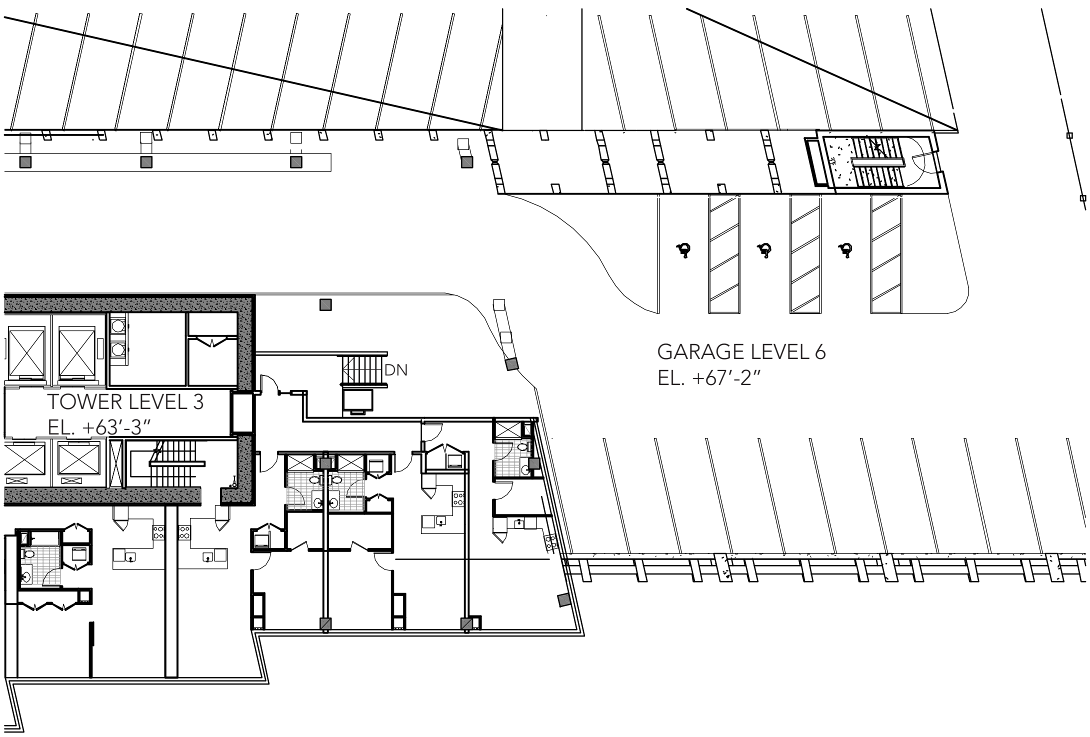
What is the total number of proposed units for the development?	486 units total
How many units are for sale; how many are for rent? What is the market value vs. affordable breakdown?	All units are proposed to be rental units where 64 units (13%) will be designated as affordable.

How many accessible units are being proposed?	25 units (5%) will be accessible. This includes seven (7) studios, eight (8) one-bedroom units, three (3) one- bedroom plus den units, three (3) two-bedroom units, two (2) two-bedroom plus den units and two (2) three-bedroom units.
Please provide plan and diagram of the accessible units.	This level of detail is not available at this time.
How many accessible units will also be affordable? If none, please describe reason.	Approximately 4 units will be affordable and accessible.
Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs at entry or step to balcony. If yes, please provide reason.	No
Has the proponent reviewed or presented the proposed plan to the City of Boston Mayor's Commission for Persons with Disabilities Advisory Board?	No
Did the Advisory Board vote to support this project? If no, what recommendations did the Advisory Board give to make this project more accessible?	No

Thank you for completing the Accessibility Checklist!

For questions or comments about this checklist or accessibility practices, please contact:

kathryn.quigley@boston.gov | Mayors Commission for Persons with Disabilities



Accessible Connection Between Existing Garage and WPB1

Redevelopment of the Government Center Garage
WP-B1 (Residential Building)
Boston, Massachusetts


GARAGE BAY
CENTRAL WEST
RAMP FROM LEVEL TWO UP TO LEVEL THREE
RAMP FROM LEVEL TWO UP TO LEVEL THREE
MAIL ROOM
FIRE COMMAND
COMPACTOR
RECYCLING
TRASH ROOM
ELEVATOR LOBBY
PACKAGE ROOM
LOBBY
RETAIL
TRASH ROOM
LOADING
BAY 1
BAY 2
BAY 3
PEDESTRIAN RAMP
VEHICULAR RAMP
STAIRS
RAMPS
FLUSH
FLUSH
FLUSH
FLUSH
30'
0
60'

Climate Change Preparedness and Resiliency Checklist for New Construction

In November 2013, in conformance with the Mayor's 2011 Climate Action Leadership Committee's recommendations, the Boston Redevelopment Authority adopted policy for all development projects subject to Boston Zoning Article 80 Small and Large Project Review, including all Institutional Master Plan modifications and updates, are to complete the following checklist and provide any necessary responses regarding project resiliency, preparedness, and to mitigate any identified adverse impacts that might arise under future climate conditions.

For more information about the City of Boston's climate policies and practices, and the 2011 update of the climate action plan, *A Climate of Progress*, please see the City's climate action web pages at http://www.cityofboston.gov/climate

In advance we thank you for your time and assistance in advancing best practices in Boston.

Climate Change Analysis and Information Sources:

1. Northeast Climate Impacts Assessment (www.climatechoices.org/ne/)
2. USGCRP 2009 (http://www.globalchange.gov/publications/reports/scientific-assessments/us-impacts/)
3. Army Corps of Engineers guidance on sea level rise (http://planning.usace.army.mil/toolbox/library/ECs/EC11652212Nov2011.pdf)
4. Proceeding of the National Academy of Science, "Global sea level rise linked to global temperature", Vermeer and Rahmstorf, 2009 (http://www.pnas.org/content/early/2009/12/04/0907765106.full.pdf)
5. "Hotspot of accelerated sea-level rise on the Atlantic coast of North America", Asbury H. Sallenger Jr*, Kara S. Doran and Peter A. Howd, 2012 (http://www.bostonredevelopmentauthority.org/planning/Hotspot of Accelerated Sea-level Rise 2012.pdf)
6. "Building Resilience in Boston": Best Practices for Climate Change Adaptation and Resilience for Existing Buildings, Linnean Solutions, The Built Environment Coalition, The Resilient Design Institute, 2103 (http://www.greenribboncommission.org/downloads/Building_Resilience_in_Boston_SML.pdf)

Checklist

Please respond to all of the checklist questions to the fullest extent possible. For projects that respond "Yes" to any of the D.1 – Sea-Level Rise and Storms, Location Description and Classification questions, please respond to all of the remaining Section D questions.

Checklist responses are due at the time of initial project filing or Notice of Project Change and final filings just prior seeking Final BRA Approval. A PDF of your response to the Checklist should be submitted to the Boston Redevelopment Authority via your project manager.

Please Note: When initiating a new project, please visit the BRA web site for the most current Climate Change Preparedness & Resiliency Checklist.

Climate Change Resiliency and Preparedness Checklist

A.1 - Project Information

Project Name:	Redevelopment of the Government Center Garage – WP-B1 (Residential Building)
Project Address Primary:	One Congress Street
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	Douglas Manz, Director of Development The HYM Investment Group, LLC dmanz@hyminvestments.com 617-248-8905

A.2 - Team Description

Owner / Developer:	The HYM Investment Group, LLC
Architect:	CBT Architects
Engineer (building systems):	WSP
Sustainability / LEED:	The Green Engineer
Permitting:	VHB, Inc.
Construction Management:	Tishman
Climate Change Expert:	An integrated design team approach was used.

A.3 - Project Permitting and Phase

At what phase is the project – most recent completed submission at the time of this response? The BRA previously approved conceptual plans of the Development Plan Project as part of the Planned Development Area (PDA) approval. This EPNF has been filed for subsequent review and approval, and is intended to be focused on the advanced building and public realm design as well as key changes to environmental conditions to confirm the Proposed Project is consistent with the approved PDA.

PNF / Expanded PNF Submission	Draft / Final Project Impact Report Submission	BRA Board Approved	Notice of Project Change
Planned Development Area	BRA Final Design Approved	Under Construction	Construction just completed:

A.4 - Building Classification and Description

List the principal Building Uses:	Residential
List the First Floor Uses:	Residential Lobby/Amenity, Service/Loading, Retail

What is the principal Construction Type – select most appropriate type?

Wood Frame	Masonry	Steel Frame	**Concrete**

Describe the building?

Site Area:	19,510 SF	Building Area:	547,940 GSF
Building Height (top of last occupiable floor):	480 Ft.	Number of Stories (last occupiable floor):	45 Flrs.

First Floor Elevation (reference Boston City Base):	±27 feet	Are there below grade spaces/levels, if yes how many:	Yes/ 1 level

A.5 - Green Building

Which LEED Rating System(s) and version has or will your project use (by area for multiple rating systems)?

Select by Primary Use:	New Construction	Core & Shell	Healthcare	Schools
	Retail	Homes Midrise	Homes	Other
Select LEED Outcome:	Certified	Silver	Gold	Platinum

Will the project be USGBC Registered and / or USGBC Certified?

Registered:	*Yes / No*	Certified:	*Yes / No*

A.6 - Building Energy

What are the base and peak operating energy loads for the building?

Electric:	4,000 (kW)	Heating:	12 (MMBtu/hr)
What is the planned building Energy Use Intensity:	48.8 (kbut/SF)	Cooling:	1,275 (Tons/hr)

What are the peak energy demands of your critical systems in the event of a service interruption?

Electric:	1,500 (kW)	Heating:	0.5 (MMBtu/hr)
		Cooling:	10 (Tons/hr)

What is nature and source of your back-up / emergency generators?

Electrical Generation:	1,500 (kW)		Fuel Source:	Diesel Fuel
System Type and Number of Units:	(1) Combustion Engine	Gas Turbine	Combine Heat and Power	*(Units)*

B - Extreme Weather and Heat Events

Climate change will result in more extreme weather events including higher year round average temperatures, higher peak temperatures, and more periods of extended peak temperatures. The section explores how a project responds to higher temperatures and heat waves.

B.1 – Analysis

What is the full expected life of the project?

Select most appropriate:	10 Years	25 Years	50 Years	75 Years

What is the full expected operational life of key building systems (e.g. heating, cooling, ventilation)?

Select most appropriate:	10 Years	25 Years	50 Years	75 Years

What time span of future Climate Conditions was considered?

Select most appropriate:	10 Years	25 Years	50 Years	75 Years

Analysis Conditions - What range of temperatures will be used for project planning – Low/High?

91 / 7 Deg.

What Extreme Heat Event characteristics will be used for project planning – Peak High, Duration, and Frequency?

95 Deg.	1 Days	6 Events / yr.

What Drought characteristics will be used for project planning – Duration and Frequency?

Days	Events / yr.

What Extreme Rain Event characteristics will be used for project planning – Seasonal Rain Fall, Peak Rain Fall, and Frequency of Events per year?

±42 *Inches / yr.*	±2 *Inches*	10 *Events / yr.*

What Extreme Wind Storm Event characteristics will be used for project planning – Peak Wind Speed, Duration of Storm Event, and Frequency of Events per year?

Peak Wind	*Hours*	*Events / yr.*

B.2 - Mitigation Strategies

What will be the overall energy performance, based on use, of the project and how will performance be determined?

Building energy use below code:	25.6%
How is performance determined:	eQUEST model with ASHRAE 90.1-2010 baseline

What specific measures will the project employ to reduce building energy consumption?

Select all appropriate:	High performance building envelop	High performance lighting & controls	Building day lighting	EnergyStar equip. / appliances
	High performance HVAC equipment	Energy recovery ventilation	No active cooling	No active heating
Describe any added measures:	Condensing Domestic Hot water heaters			

What are the insulation (R) values for building envelop elements?

Roof:	R = 20.8	Walls / Curtain Wall Assembly:	R = 21.1
Foundation:	R = N/A	Basement / Slab:	F-0.86 / R-15 for 24”
Windows:	R = 2.2 / U = 0.46	Doors:	R = 1.43 / U = 0.70

What specific measures will the project employ to reduce building energy demands on the utilities and infrastructure?

	On-site clean energy / CHP system(s)	Building-wide power dimming	Thermal energy storage systems	Ground source heat pump
	On-site Solar PV	On-site Solar Thermal	Wind power	None
Describe any added measures:	NA			

Will the project employ Distributed Energy / Smart Grid Infrastructure and /or Systems? Not be considered at this time.

Select all appropriate:	Connected to local distributed electrical	Building will be Smart Grid ready	Connected to distributed steam, hot, chilled water	Distributed thermal energy ready

Will the building remain operable without utility power for an extended period?

	Yes / No	If yes, for how long:	*Days*
If Yes, is building "Islandable?			
If Yes, describe strategies:			

Describe any non-mechanical strategies that will support building functionality and use during an extended interruption(s) of utility services and infrastructure:

Select all appropriate:	Solar oriented – longer south walls	Prevailing winds oriented	External shading devices	Tuned glazing,
	Building cool zones	Operable windows	Natural ventilation	Building shading
	Potable water for drinking / food preparation	Potable water for sinks / sanitary systems	Waste water storage capacity	High Performance Building Envelop
Describe any added measures:	NA			

What measures will the project employ to reduce urban heat-island effect?

Select all appropriate:	High reflective paving materials	Shade trees & shrubs	High reflective roof materials	Vegetated roofs
Describe other strategies:	NA			

What measures will the project employ to accommodate rain events and more rain fall?

Select all appropriate:	On-site retention systems & ponds	Infiltration galleries & areas	vegetated water capture systems	Vegetated roofs
Describe other strategies:	Rainwater harvesting			

What measures will the project employ to accommodate extreme storm events and high winds?

Select all appropriate:	Hardened building structure & elements	Buried utilities & hardened infrastructure	Hazard removal & protective landscapes	Soft & permeable surfaces (water infiltration)
Describe other strategies:	NA			

C - Sea-Level Rise and Storms

Rising Sea-Levels and more frequent Extreme Storms increase the probability of coastal and river flooding and enlarging the extent of the 100 Year Flood Plain. This section explores if a project is or might be subject to Sea-Level Rise and Storm impacts.

C.1 - Location Description and Classification:

Do you believe the building to susceptible to flooding now or during the full expected life of the building?

Yes / No

Describe site conditions?

Site Elevation – Low/High Points:	24/29 *Boston City Base Elev.(Ft.)*
Building Proximity to Water:	±1,700 *Ft.*

Is the site or building located in any of the following?

Coastal Zone:	*Yes* / No	Velocity Zone:	*Yes* / No
Flood Zone:	*Yes* / No	Area Prone to Flooding:	*Yes* / No

Will the 2013 Preliminary FEMA Flood Insurance Rate Maps or future floodplain delineation updates due to Climate Change result in a change of the classification of the site or building location?

2013 FEMA Prelim. FIRMs:	*Yes* / No	Future floodplain delineation updates:	*Yes / No*

What is the project or building proximity to nearest Coastal, Velocity or Flood Zone or Area Prone to Flooding?

230 Ft.*	*Per preliminary maps.

If you answered YES to any of the above Location Description and Classification questions, please complete the following questions. *Otherwise you have completed the questionnaire; thank you!*

C - Sea-Level Rise and Storms

This section explores how a project responds to Sea-Level Rise and / or increase in storm frequency or severity.

C.2 - Analysis

How were impacts from higher sea levels and more frequent and extreme storm events analyzed:

Sea Level Rise:	*Ft.*	Frequency of storms:	*per year*

C.3 - Building Flood Proofing

Describe any strategies to limit storm and flood damage and to maintain functionality during an extended periods of disruption.

What will be the Building Flood Proof Elevation and First Floor Elevation:

Flood Proof Elevation:	*Boston City Base Elev.(Ft.)*	First Floor Elevation:	*Boston City Base Elev. (Ft.)*

Will the project employ temporary measures to prevent building flooding (e.g. barricades, flood gates):

	Yes / No	If Yes, to what elevation	*Boston City Base Elev. (Ft.)*
If Yes, describe:			

What measures will be taken to ensure the integrity of critical building systems during a flood or severe storm event:

Systems located above 1st Floor.	Water tight utility conduits	Waste water back flow prevention	Storm water back flow prevention

Were the differing effects of fresh water and salt water flooding considered:

Yes / No

Will the project site / building(s) be accessible during periods of inundation or limited access to transportation:

	Yes / No	If yes, to what height above 100 Year Floodplain:	*Boston City Base Elev. (Ft.)*

Will the project employ hard and / or soft landscape elements as velocity barriers to reduce wind or wave impacts?

	Yes / No
If Yes, describe:	

Will the building remain occupiable without utility power during an extended period of inundation:

	Yes / No	If Yes, for how long:	*days*

Describe any additional strategies to addressing sea level rise and or sever storm impacts:

C.4 - Building Resilience and Adaptability

Describe any strategies that would support rapid recovery after a weather event and accommodate future building changes that respond to climate change:

Will the building be able to withstand severe storm impacts and endure temporary inundation?

Select appropriate:	*Yes / No*	Hardened / Resilient Ground Floor Construction	Temporary shutters and or barricades	Resilient site design, materials and construction

Can the site and building be reasonably modified to increase Building Flood Proof Elevation?

Select appropriate:	*Yes / No*	Surrounding site elevation can be raised	Building ground floor can be raised	Construction been engineered
Describe additional strategies:				

Has the building been planned and designed to accommodate future resiliency enhancements?

Select appropriate:	*Yes / No*	Solar PV	Solar Thermal	Clean Energy / CHP System(s)
		Potable water storage	Wastewater storage	Back up energy systems & fuel
Describe any specific or additional strategies:				

Thank you for completing the Boston Climate Change Resilience and Preparedness Checklist!

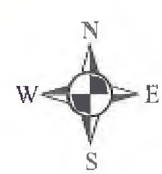
For questions or comments about this checklist or Climate Change Resiliency and Preparedness best practices, please contact: John.Dalzell.BRA@cityofboston.gov

APPENDIX G: Abutter List

MAP TITLE

Department 1

Department 2



0301351000	43 COOPER ST	TARANTINO ANTHONY		28 BURBANK RD	MEDFORD	MA	02155
0301498000	34 THATCHER ST	CASA MARIA APARTMENTS LP	C/O COMMUNITY BUILDERS INC	95 BERKELEY ST	BOSTON	MA	02116
0301500000	LYNN ST	MICHELLE HOLDINGS LLC	C/O MICHELLE HOLDINGS LLC	55 HENSHAW ST	BOSTON	MA	02135
0301501000	51 53 COOPER ST	DECRISTOFORO LUCY		53 COOPER ST	BOSTON	MA	02113
0301502000	55 COOPER ST	MICHELLE HOLDINGS LLC	C/O MICHELLE HOLDINGS LLC	55 HENSHAW ST	BOSTON	MA	02135
0301503000	57 59 COOPER ST	MICHELLE HOLDINGS LLC	C/O MICHELLE HOLDINGS LLC	55 HENSHAW ST	BOSTON	MA	02135
0301504000	45 49 N WASHINGTON ST	MICHELLE HOLDINGS LLC	C/O MICHELLE HOLDINGS LLC	55 HENSHAW ST	BOSTON	MA	02135
0301505000	51 53 N WASHINGTON ST	MICHELLE HOLDINGS LLC	C/O MICHELLE HOLDINGS LLC	55 HENSHAW ST	BOSTON	MA	02135
0301506000	55 57 N WASHINGTON ST	MICHELLE HOLDINGS LLC	C/O MICHELLE HOLDINGS LLC	55 HENSHAW ST	BOSTON	MA	02135
0301507000	59 61 N WASHINGTON ST	MICHELLE HOLDINGS LLC	C/O MICHELLE HOLDINGS LLC	55 HENSHAW ST	BOSTON	MA	02135
0301508000	65 63 N WASHINGTON ST	MICHELLE HOLDINGS LLC	C/O MICHELLE HOLDINGS LLC	55 HENSHAW ST	BOSTON	MA	02135
0301532000	N WASHINGTON ST	COMMONWEALTH OF MASS	STATE TRANSP BLDG	10 PARK PLZ	BOSTON	MA	02116
0301560010	1 CANAL ST	AIMCO ONE CANAL STREET LLC	C/O RYAN LLC	13155 NOWEL RD #100 LB73	DALLAS	TX	75240
0301568000	53 85 CANAL ST	CANAL PLAZA LLC	C/O HUNNEMAN MGMT CO	303 CONGRESS ST	BOSTON	MA	02210
0301591020	104-108 CANAL ST	SOMNATH HOSPITALITY LLC	C/O KISHORKUMAR PATEL	14 HILL ST	WOBURN	MA	01801
0301592000	32 38 ANTHONY R VA LENTI WY	GREATER BOSTON LEGAL SERVICE		197 FRIEND ST &	BOSTON	MA	02114
0301610000	54 48 CANAL ST	FIFTY 4 CNL REALTY LLC	C/O HAMLEN & CO/CHARLES MCKENZIE	54 CANAL ST	BOSTON	MA	02114
0301611000	155 FRIEND ST	ANDREW DUTTON CO INC	C/O EASTERN PROP MGMT GROUP	200 WALNUT ST	SAUGUS	MA	01906
0301612000	157 159 FRIEND ST	BAY COVE HUMAN SERVICES INC	C/O PAUL TONTHAT	66 CANAL ST &	BOSTON	MA	02114
0301613000	165 FRIEND ST	ONE 65 FRIEND ST CONDO ASSN		165 FRIEND	BOSTON	MA	02114
0301613002	165 FRIEND ST #1	IBRAHIM SINOTE ETAL		165 FRIEND	BOSTON	MA	02114
0301613004	165 FRIEND ST #2	GANNETT RICHARD W		165 FRIEND ST #2	BOSTON	MA	02114
0301613006	165 FRIEND ST #3	METCALF JANE E		7110 KITTIWAK RUN	MANLIUS	NY	13104
0301613008	165 FRIEND ST #4	ARCINIEGAS DIEGO A		165 FRIEND ST #4	BOSTON	MA	02114
0301613010	165 FRIEND ST #5	COLLINS WESLEY P					
0301615000	CHAPEL PL	76 CANAL STREET LLC					
0301616000	CHAPEL PL	76 CANAL STREET LLC					
0301617000	CHAPEL PL	BAY COVE HUMAN SERVICES INC	C/O PAUL TONTHAT	66 CANAL ST &	BOSTON	MA	02114
0301618000	FRIEND ST	BAY COVE HUMAN SERVICES INC	C/O PAUL TONTHAT	66 CANAL ST &	BOSTON	MA	02114
0301619000	90 CANAL	CANAL ST LLC 90	C/O VANTAGE REAL ESTATE MGT	90 CANAL ST	BOSTON	MA	02114
0301623000	80 74 CANAL ST	76 CANAL STREET LLC					
0301626000	NEW CHARDON	CITY OF BOSTON		NEW CHARDON	BOSTON	MA	02114
0301628000	158 150 FRIEND ST	ONE MERRIMAC LLC	C/O DAVID WALLACE	226 FIFTH AV. - 3RD FL	NEW YORK	NY	10001
0301632000	MERRIMAC ST	NINETY CANAL ST LLC	C/O MECA SAULS, CONTROLLER	HN GORIN INC, 101 HUNTINGTON AV	5TH FL BOSTON	MA	02199
0301633000	121 127 PORTLAND S T	ONE-21 PORTLAND LLC	C/O STATE FINANCIAL SERV INC	197 PORTLAND ST	BOSTON	MA	02114

0301634000	129 131 PORTLAND S	T	OLYMPIA GROUP LP		PO BOX 374	WESTPORT	MA	02790
0301635000	ANTHONY R VALENTI	WY	M G E HOLDING CO INC	M G E HOLDING CO C/O B D F ADV	24 NEW ENG EXEC PK STE 240	BURLINGTON	MA	01803
0301636000	ANTHONY R VALENTI	WY	M G E HOLDING CO INC	M G E HOLDING CO C/O B D F ADV	24 NEW ENG EXEC PK STE 240	BURLINGTON	MA	01803
0301637000	FRIEND ST		M G E HOLDING CO INC	M G E HOLDING CO C/O B D F ADV	24 NEW ENG EXEC PK STE 240	BURLINGTON	MA	01803
0301639000	FRIEND ST		GORIN ROSALIND E TS	C/O H.N. GORIN INC/M SAULS	101 HUNTINGTON AV, 5TH FL	BOSTON	MA	02199
0301639001	FRIEND ST		GORIN ROSALIND E TS	C/O H.N.GORIN INC/ M SAULS	101 HUNTINGTON AV, 5TH FL	BOSTON	MA	02199
0301640000	FRIEND ST		GORIN ROSALIND E TS	C/O H.N. GORIN INC/M SAULS	101 HUNTINGTON AV, 5TH FL	BOSTON	MA	02199
0301641000	FRIEND ST		GORIN ROSALIND E TS	C/O H.N. GORIN INC/M SAULS	101 HUNTINGTON AV, 5TH FL	BOSTON	MA	02199
0301642000	FRIEND ST		M G E HOLDING CO INC	M G E HOLDING CO C/O B D F ADV	24 NEW ENG EXEC PK STE 240	BURLINGTON	MA	01803
0301643000	ANTHONY R VALENTI	WY	M G E HOLDING CO INC	M G E HOLDING CO C/O B D F ADV	24 NEW ENG EXEC PK STE 240	BURLINGTON	MA	01803
0301644000	14 16 ANTHONY R VA	LENTI WY	PORTLAND STREET HOLDINGS LLC	C/O SYNERGY INVESTMENTS	100 FRANKLIN ST 2ND FLOOR	BOSTON	MA	02110
0301645000	PORTLAND ST		M G E HOLDING CO INC	M G E HOLDING CO C/O B D F ADV	24 NEW ENG EXEC PK STE 240	BURLINGTON	MA	01803
0301660000	222 224 FRIEND ST		PORTLAND ST EQUITY PARTNERS	C/O SALLY MICHAEL, RA	131 DARTMOUTH ST #501	BOSTON	MA	02116
0301661000	FRIEND ST		M G E HOLDING CO INC	M G E HOLDING CO C/O B D F ADV	24 NEW ENG EXEC PK STE 240	BURLINGTON	MA	01803
0301664000	132 130 PORTLAND S	T	COUGHLIN JOHN E TS	JOHN E COUGHLIN/GATEWAY RLTY	239 WESTERN AVE	ESSEX	MA	01929
0301665000	142 138 PORTLAND S	T	CARLSON CLAIR A	C/O M H MASSEY CO LLC	117 SOUTH 14TH ST SUITE 300	RICHMOND	VA	23219
0301675000	101 MERRIMAC ST		ONE-01 MERRIMAC LLC	C/O H.N GORIN INC	101 HUNTINGTON AVE 5TH FLR	BOSTON	MA	02199
0301686000	115 CAMBRIDGE ST		COMMONWEALTH OF MASS		115 CAMBRIDGE	BOSTON	MA	02114
0301687000	MERRIMAC ST		BOSTON REDEVELOPMNT AUTH		MERRIMAC	BOSTON	MA	02114
0301688000	24 NEW CHARDON ST		COMMONWEALTH OF MASS		ONE ASHBURTON PL	BOSTON	MA	02108
0302396000	198 HANOVER ST		CHARTER CROSS STREET LLC	C/O CHARTER CROSS STREET LLC	800 WESTCHESTER AV	RYE BROOK	NY	10573
0302397000	53 55 SALEM ST		CHARTER CROSS STREET LLC	C/O CHARTER CROSS STREET LLC	800 WESTCHESTER AV	RYE BROOK	NY	10573
0302398000	57 61 SALEM ST		FIFTY 7-61 SALEM ST CONDO TR		57 SALEM	BOSTON	MA	02113
0302398002	57 SALEM ST #57F-	1	CAPRICORN 24 SERIES LLC	C/O CHRISTOPHER YOUNG MGR	5 FREMONT ST	WINTHROP	MA	02152
0302398004	57 SALEM ST #57F-	2	OCONNOR KIMBERLY M	C/O KIMBERLY M. O'CONNOR	44 BOW RD	BELMONT	MA	02478
0302398006	57 SALEM ST #57F-	3	KAYNE PATRICIA D	C/O PATRICIA KAYNE SEGEDY	19 DALE ST	SWAMPSCOTT	MA	01907
0302398008	57 SALEM ST #57F-	4	TAYLOR NEIL S	C/O NEIL S TAYLOR	57 SALEM ST #4F	BOSTON	MA	02113
0302398010	57R SALEM ST #57R-	1	KENT AND ASSOCIATES INC		P O BOX 550218	N WALTHAM	MA	02455
0302398012	57 R SALEM ST #57R	-2	BENJAMIN DAVID M ETAL		57R SALEM ST #57R-2	BOSTON	MA	02113
0302398014	57 R SALEM ST #57R	-3	CRAIG PATRICIA M		34 TEELE AV	W SOMERVILLE	MA	02144
0302398016	57 R SALEM ST #57R	-4	CRAIG PATRICIA	C/O PATRICIA CRAIG	32 TEELE AVE	W SOMERVILLE	MA	02144
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0302398020	59 R SALEM ST #59R	-2	PANAGIOTOPOULOS IOANIS	C/O IOANIS PANAGIOTOPOULOS	19 COUNTRY CLUB DR	TEWKSBURY	MA	01876
0302398022	59 R SALEM ST #59R	-3	D&S 59 SALEM STREET LLC	C/O SUSAN PASSACANTILLI	328 POND ST	JAMAICA PLAIN	MA	02130

0302398024	59 R SALEM ST #59R	-4	TROIANI LISA L		59 SALEM ST #4R	BOSTON	MA	02113
0302398026	59 SALEM ST #59F-	1	IACOVONE LISA	C/O VITO L. IACOVONE	15 ROBIN HILL ROAD	CHELMSFORD	MA	01824
0302398028	59 SALEM ST #59F-	2	MCGEE JAMES W		59 SALEM ST #59F-2	BOSTON	MA	02113
0302398030	59 SALEM ST #59F-	3	IACOVONE VITO L	C/O VITO IACOVONE	15 ROBIN HILL RD	CHESTNUT HILL	MA	01824
0302398032	59 SALEM ST #59F-	4	CACACE JOHN A III	C/O JOHN CACACE	394 RIVERWAY #15	BOSTON	MA	02115
0302398034	61 SALEM ST #61-1	CAPRICORN 24 SERIES LLC		C/O CHRISTOPHER YOUNG MGR	5 FREEMONT ST	WINTHROP	MA	02152
0302398036	61 SALEM ST #61-2	MASTROCOLA GLORIA M		C/O GLORIA M GAVRIS	21 MONADNOCK RD	CHESTNUT HILL	MA	02467
0302398038	61 SALEM ST #61-3	SAMIA CARA		C/O CARA SAMIA	61 SALEM ST #61-3	BOSTON	MA	02113
0302398040	61 SALEM ST #61-4	GARDNER AVRIL		C/O AVRIL GARDNER	61 SALEM ST #61-4	BOSTON	MA	02113
0302398042	61 SALEM ST #61-5	ONEIL EDWIN R		C/O EDWIN ONEIL	61 SALEM ST #61-5	BOSTON	MA	02113
0302456000	52 56 SALEM ST	DIPAOLA DAMIEN		C/O DAMIEN DIPAOLA	1 LATHROP PLACE	BOSTON	MA	02113
0302457000	48 50 SALEM ST	LINEAR RETAIL BOSTON #15 LLC		C/O KEYPOINT PARTNERS LLC	1135 TREMONT ST	BOSTON	MA	02120
0302458000	46 50 CROSS ST	LAFAUCI FELIX TRST		C/O STEPHEN LAFAUCI	969 SALEM ST	MALDEN	MA	02148
0302459000	40 42 CROSS ST	PACE JOSEPH A TRSTS		C/O JOSEPH A PACE	190 MAIN ST	SAUGUS	MA	01906
0302460000	28 32 CROSS ST	PACE JOSEPH A		C/O JOSEPH A PACE	190 MAIN ST	SAUGUS	MA	01906
0302460001	CROSS ST	PACE JOSEPH A TS		C/O JOSEPH PACE	190 MAIN ST	SAUGUS	MA	01906
0302461000	55 57 ENDICOTT ST	PACE JOSEPH A TS		C/O JOSEPH PACE	190 MAIN ST	SAUGUS	MA	01906
0302462000	57 R ENDICOTT ST	PACE JOSEPH A TS		C/O JOSEPH PACE	190 MAIN ST	SAUGUS	MA	01906
0302463000	59 61 ENDICOTT ST	DENRAT LLC		C/O PHILIP Y DENORMANDIE	12 MARSHALL STREET	BOSTON	MA	02108
0302463001	MORTON ST	PACE JOSEPH A TRSTS		C/O JOSEPH PACE	190 MAIN ST	SAUGUS	MA	01906
0302464000	MORTON ST	PACE JOSEPH A TS		C/O JOSEPH PACE TS	190 MAIN ST	SAUGUS	MA	01906
0302464001	MORTON ST	PACE JOSEPH A TRSTS		C/O JOSEPH A PACE	190 MAIN ST	SAUGUS	MA	01906
0302464002	MORTON ST	PACE JOSEPH A TRSTS		C/O JOSEPH A PACE	190 MAIN ST	SAUGUS	MA	01906
0302465000	58 60 SALEM ST	OMAR MOHAMED A TS			58 SALEM ST	BOSTON	MA	02113
0302466000	MORTON ST	CITY OF BOSTON			MORTON	BOSTON	MA	02113
0302469010	26 STILLMAN ST	TWENTY6 STILLMAN ST CONDO TR			26 STILLMAN ST	BOSTON	MA	02113
0302469012	26 STILLMAN #1-1	LAGASSE GLENN A			26 STILLMAN ST #1-1	BOSTON	MA	02113
0302469014	26 STILLMAN #1-2	DAVIS DOUGLAS G TS		C/O DOUGLAS G DAVIS	550 MORELAND WY #2815	SANTA CLARA	CA	95054
0302469016	26 STILLMAN #1-3	TANNOURY CHADI		C/I CHADI TANNOURY	26 STILLMAN ST #1-3	BOSTON	MA	02113
0302469018	26 STILLMAN ST #1	-4	AMOS DENNY TRUST					
0302469020	26 STILLMAN ST #2	-1	QUINN STEPHANIE K	C/O STEPHANIE K QUINN	26 STILLMAN ST #2-1	BOSTON	MA	02113
0302469022	26 STILLMAN ST #2	-2	WARREN JEREMY		26 STILLMAN ST #2-2	BOSTON	MA	02113
0302469024	26 STILLMAN ST #2	-3	CONDELLI MICHAEL C	C/O MICHAEL C CONDELLI	31 WASHINGTON STREET UNIT #2	BOSTON	MA	02113
0302469026	26 STILLMAN ST #2	-4	LUKACS SAMANTHA		26 STILLMAN ST #2-4	BOSTON	MA	02113

0302469028	26 STILLMAN ST #2 -5	LAGASSE LISA A		26 STILLMAN ST #2-5	BOSTON	MA	02113
0302469030	26 STILLMAN ST #3 -1	BURKE JORDAN M	C/O JORDAN M BURKE	26 STILLMAN ST # 3-1	BOSTON	MA	02113
0302469032	26 STILLMAN ST #3 -2	ONEIL JANE R	C/O JANE R ONEIL	26 STILLMAN ST # 3-2	BOSTON	MA	02113
0302469034	26 STILLMAN ST #3 -3	REISS GARY P	C/O GARY & BRIDGET REISS	324 REEDY MEADOW RD	GROTON	MA	01450
0302469036	26 STILLMAN ST #3 -4	HALE ROBIN	C/O ROBIN HALE	26 STILLMAN ST #3-4	BOSTON	MA	02113
0302469038	26 STILLMAN ST #3 -5	DURSO STEPHEN F	C/O STEPHEN DURSO	17 SWAN LANE	ANDOVER	MA	01810
0302469040	26 STILLMAN ST #4 -1	GIANATASIO FRANK C	C/O FRANK GIANATASIO	26 STILLMAN ST #4-1	BOSTON	MA	02113
0302469042	26 STILLMAN ST #4 -2	GAVIN JOHN M	C/O JOHN M GAVIN	26 STILLMAN ST #4-2	BOSTON	MA	02113
0302469044	26 STILLMAN ST #4 -3	BALLARIN PETER	C/O PETER BALLARIN	26 STILLMAN ST #4-3	BOSTON	MA	02113
0302469046	26 STILLMAN #4-4	SURAN CAROLINA	C/O CAROLINA SURAN	26 STILLMAN ST #4-4	BOSTON	MA	02113
0302469048	26 STILLMAN ST #4 -5	LEE CHRISTOPHER B	C/O CHRISTOPHER B LEE	26 STILLMAN ST #4-5	BOSTON	MA	02113
0302469050	26 STILLMAN ST #5 -1	SHUR STEVEN E	C/O STEVEN SHUR	26 STILLMAN ST #5-1	BOSTON	MA	02113
0302469052	26 STILLMAN ST #5 -2	GEORGE DEIRDRE	C/O DEIRDRE GEORGE	26 STILLMAN ST # 5-2	BOSTON	MA	02113
0302469054	26 STILLMAN ST #5 -3	CANGIANO PAUL M		26 STILLMAN ST #5-3	BOSTON	MA	02113
0302469056	26 STILLMAN ST #5 -4	YARJAN ROCHELLE	C/O ROCHELLE YARJAN	26 STILLMAN ST #5-4	BOSTON	MA	02113
0302469058	26 STILLMAN ST #5 -5	OHAGAN JOHN G	C/O RYAN O'HAGAN	865 UNITED NATIONS PLAZA, 3B	NEW YORK	NY	10017
0302469060	26 STILLMAN ST #6 -1	NICOLA LEONE DEMAGISTRIS		26 STILLMAN ST #6-1	BOSTON	MA	02113
0302469062	26 STILLMAN ST #6 -2	HOFFMAN KIRSTEN L	C/O KIRSTEN L HOFFMAN	26 STILLMAN ST #6-2	BOSTON	MA	02113
0302469064	26 STILLMAN ST #6 -3	GARCIA ROD R		26 STILLMAN ST # 6-3	BOSTON	MA	02113
0302469066	26 STILLMAN ST #6 -4	OCONNOR CORNELIUS J		26 STILLMAN ST #6-4	BOSTON	MA	02113
0302469500	26 STILLMAN ST	CLEAR CHANNEL OUTDOOR INC	C/O CLEAR CHANNEL OUTDOOR INC	2201 EAST CAMELBACK SUITE-500	PHOENIX	AZ	85016
0302470000	24 22 STILLMAN ST	TWENTY4 STILLMAN STREET LLC		334 NORTH ST	BOSTON	MA	02113
0302471000	20 STILLMAN ST	TWENTY STILLMAN STREET LLC	C/O 20 STILLMAN ST LLC	334 NORTH ST	BOSTON	MA	02113
0302472000	18 STILLMAN ST	EIGHTEEN STILLMAN ST		18 STILLMAN ST	BOSTON	MA	02113
0302472002	18 STILLMAN ST #1	CASTELLUCCI FEDERICO TS		258 W NEWTON ST	BOSTON	MA	02116
0302472004	18 STILLMAN ST #2	CASTELLUCCI FEDERICO TS		258 W NEWTON ST	BOSTON	MA	02116
0302472006	18 STILLMAN ST #3	CASTELLUCCI FEDERICO TS		258 W NEWTON ST	BOSTON	MA	02116
0302472008	18 STILLMAN ST #4	CASTELLUCCI FEDERICO TS		258 W NEWETON ST	BOSTON	MA	02116
0302473000	16 STILLMAN ST	SIXTEEN STILLMAN STREET		16 STILLMAN ST	BOSTON	MA	02113
0302473002	16 STILLMAN ST #1	JENKINS JASON H	C/O JASON H JENKINS	16 STILLMAN ST #1	BOSTON	MA	02113
0302473004	16 STILLMAN ST #2	MITCHEL THOMAS R		16 STILLMAN ST #2	BOSTON	MA	02113
0302473006	16 STILLMAN ST #3	MEZER EDWARD JOSEPH	C/O EDWARD JOSEPH MEZER	16 STILLMAN #3	BOSTON	MA	02113
0302473008	16 STILLMAN ST #4	LYNCH MARCIA T	C/O MARCIA T LYNCH	33 CLINTON AV	S NYACK	NY	10960
0302476000	64 66 SALEM ST	SIXTY 4-66 SALEM ST CONDO TR	C/O RMC DEVELOPMENT CORP	P.O BOX 51182	BOSTON	MA	02205

0302476002	64 66 SALEM ST #C1	CAPRICORN 24 SERIES LLC	C/O CHRISTOPHER YOUNG	5 FREMONT ST	WINTHROP	MA	02152
0302476004	64 66 SALEM ST #2F	SHEEHAN PAMELA A TS	C/O STEPHEN G SHEEHAN	64-66 SALEM ST #2F	BOSTON	MA	02113
0302476006	64 66 SALEM ST #2R	ARRIGG FRED G	C/O FRED G ARRIGG	8 FARNHAM CI	ANDOVER	MA	01810
0302476008	64 66 SALEM ST #3F	ANGOFF MATTHEW	C/O MATTHEW ANGOFF	64-66 SALEM ST #3-F	BOSTON	MA	02113
0302476010	64 66 SALEM ST #3R	SHUMWAY KEVIN A	C/O KEVIN SHUMWAY	346 CONGRESS ST UNIT 502	BOSTON	MA	02210
0302476012	64 66 SALEM ST #4F	MAMARY MARYCATHERINE TS	C/O MARYCATHERINE MAMARY TS	93 MAIN STREET	HINGHAM	MA	02043
0302476014	64 66 SALEM ST #4R	ARRIGG FRED G	C/O FRED G ARRIGG	8 FARNHAM CI	ANDOVER	MA	01810
0302476016	64 66 SALEM ST #5F	GUIGLI MICHAEL P	C/O MICHAEL P GUIGLI	64-66 SALEM ST #5F	BOSTON	MA	02113
0302476018	64 66 SALEM ST #5R	INGALLS ABIGAIL D	C/O ABIGAIL D INGALLS	64-66 SALEM ST #5R	BOSTON	MA	02113
0302476020	64 66 SALEM ST #PH	1 ARRIGG FRED G JR	C/O FRED G ARRIGG JR	64-66 SALEM ST #PH 1	BOSTON	MA	02113
0302476022	64 66 SALEM ST #PH	2 TUCH STEVEN A	C/O STEVEN A TUCH	64-66 SALEM ST #PH 2	BOSTON	MA	02113
0302477000	62 SALEM ST	OMAR MOHAMED A TS	C/O MOHAMED A OMAR	60 SALEM ST	BOSTON	MA	02113
0302485000	19 STILLMAN ST	NINETEEN STILLMAN LLC	C/O 19 STILLMAN LLC	29 COMMONWEALTH AV	BOSTON	MA	02116
0302517000	34 COOPER ST	THIRTY-4 COOPER STREET LLC	C/O 34 COOPER STREET LLC	69 SALEM STREET 1ST FL	BOSTON	MA	02113
0302518000	73 75A ENDICOTT ST	CAPONE EDWARD TS	C/O JEFF CAPONE	73 ENDICOTT ST	BOSTON	MA	02113
0302519000	77 79 ENDICOTT ST	CAPONE EDWARD TS	C/O JEFF CAPONE	73 ENDICOTT ST	BOSTON	MA	02113
0302520000	83 ENDICOTT ST	EIGHTY1-83 ENDICOTT ST CONDO	C/O SALIL K MIDHA TS	83 ENDICOTT ST	BOSTON	MA	02113
0302520002	81 83 ENDICOTT ST	MIDHA SALIL K TS		17 ST THOMAS MORE DR	WINCHESTER	MA	01890
0302520004	81 83 ENDICOTT ST	#2 MIDHA SALIL K TS		17 ST THOMAS MORE DR	WINCHESTER	MA	01890
0302520006	81 83 ENDICOTT ST	#3 MIDHA SALIL K TS		17 ST THOMAS MORE DR	WINCHESTER	MA	01890
0302520008	81 83 ENDICOTT ST	#4 MIDHA SALIL K TS		17 ST THOMAS MORE DR	WINCHESTER	MA	01890
0302521000	87 89 ENDICOTT ST	MUCCIO SALVATORE J TS	C/O MARY COLLEAMENO	15 STILLMAN ST	BOSTON	MA	02113
0302522000	93 91 ENDICOTT ST	FARIA JOSE		93 ENDICOTT ST	BOSTON	MA	02113
0302523000	95 97 ENDICOTT ST	RUSSO JENNIE M	C/O JENNIE M RUSSO	97-95 ENDICOTT ST	BOSTON	MA	02113
0302524000	99 ENDICOTT ST	AGOSTINO GRETCHEN					
0302525000	101 ENDICOTT ST	DIMAURO JOANNE		4 FARNHAM PT RD	E BOOTHBAY	ME	04544
0302527000	74 76 ENDICOTT ST	DELFAVERO NINA TS	C/O DOMINIC TAVILLA	10 VIKING RD	WINCHESTER	MA	01890
0302528000	STILLMAN ST	ROBERTO FRANK TS		77 FOREST ST	MEDFORD	MA	02155
0302528003	STILLMAN ST	CITY OF BOSTON DPW		STILLMAN ST	BOSTON	MA	02113
0302529003	STILLMAN ST	CITY OF BOSTON		STILLMAN ST	BOSTON	MA	02113
0302529005	STILLMAN ST	ROBERTO FRANK TS	C/O FRANK ROBERTO	77 FOREST ST	MEDFORD	MA	02155
0302530000	2 STILLMAN PL	TWO STILLMAN PL CONDO TR		2 STILLMAN PL	BOSTON	MA	02113
0302530002	2 STILLMAN PL #1	GOEDEN BROOKE A	C/O BROOKE A GOEDEN	2 STILLMAN PL #1	BOSTON	MA	02113
0302530004	2 STILLMAN PL #2	MCMAHON DANIEL	C/O DANIEL MCMAHON	2 STILLMAN PL #2	BOSTON	MA	02113

0302530006	2 STILLMAN PL #3	BRENNAN MICHELLE	C/O MICHELLE BRENNAN	185 FORBES RD	WESTWOOD	MA	02090
0302530008	2 STILLMAN PL #4	DAVIS BRIGITTE LINDA	C/O BRIGITTE L DAVIS	2 STILLMAN PL #4	BOSTON	MA	02113
0302531000	3 STILLMAN PL	JEAN ELEANOR M		3 STILLMAN PL	BOSTON	MA	02113
0302532000	4 STILLMAN PL	MENDOZA-ITURRALDE JORGE		4 STILLMAN PL	BOSTON	MA	02113
0302533000	5 STILLMAN PL	FIVE STILLMAN PLACE	C/O FRANCIS MONKIEWICZ TS	5 STILLMAN PLACE	BOSTON	MA	02113
0302533002	5 STILLMAN PL #1	DANGELMAIER RALPH A	C/O RALPH A DANGELMAIER	38 SEARS RD	WESTON	MA	02493
0302533004	5 STILLMAN PL #2	ARDINI ANDREW TS	C/O ANDREW ARDINI TS	5 STILLMAN PL # 2	BOSTON	MA	02113
0302533006	5 STILLMAN PL #3	ONSTOTT AINSLEY C	C/O AINSLEY C ONSTOTT	5 STILLMAN PL # 3	BOSTON	MA	02113
0302533008	5 STILLMAN PL #4	MARCHESE ROBERT	C/O ROBERT MARCHESE	5 STILLMAN PL #4	BOSTON	MA	02113
0302534000	6 STILLMAN PL	CONLON DAVID L	C/O ANNE CONLON	PO BOX 1475	W DENNIS	MA	02670
0302535000	7 STILLMAN PL	SEVEN STILLMAN PL CONDO TR	C/O SEVEN STILLMAN PLACE LLC	87 TERRACE HALL AV	BURLINGTON	MA	01803
0302535002	7 STILLMAN PL #1	YACCARINO DANIEL M	C/O DNAIEL M YACCARINO	52 COOPER ST #1	BOSTON	MA	02113
0302535004	7 STILLMAN PL #2	ONEIL MARIAN		52 COOPER ST #2	BOSTON	MA	02113
0302535006	7 STILLMAN PL #3	MOSCHOS THOMAS W	C/O ATTY DM MOSCHOS	100 FRONT ST	WORCESTER	MA	01608
0302535008	7 STILLMAN PL #4	DRUMMY SEAN T	C/O SEAN T DRUMMY	7 STILLMAN PL #4	BOSTON	MA	02113
0302535010	7 STILLMAN PL #5	HATTON COLMAN	C/O COLMAN HATTON	52 COOPER ST #5	BOSTON	MA	02113
0302535012	7 STILLMAN PL #6	MACDONALD CRAIG E	C/O CRAIG E MACDONALD	52 COOPER ST #6	BOSTON	MA	02113
0302535014	7 STILLMAN PL #7	LAMONT SCOTT		52 COOPER ST #7	BOSTON	MA	02113
0302535016	7 STILLMAN PL #8	SOKOLOV ILYA	C/O ILYA SOKOLOV	52 COOPER ST # 8	BOSTON	MA	02113
0302535018	7 STILLMAN PL #9	LAUZON CECILE T	C/O CECILE LAUZON	52 COOPER ST #9	BOSTON	MA	02113
0302535020	7 STILLMAN PL #10	HENDERSON DAVID		52 COOPER ST #10	BOSTON	MA	02113
0302536000	46 COOPER ST	FORTY-SIX COOPER ST CONDO	C/O ANTHONY RANALDI TS	46 COOPER ST	BOSTON	MA	02113
0302536001	44 42 COOPER ST	LUPO KRISTINA T	C/O KRISTINA T LUPO	44 COOPER ST APT 2	BOSTON	MA	02113
0302536002	102 ENDICOTT ST	BUCCIO NOTARO PHYLLIS	C/O MARIA & PHYLLIS BUCCIO	155 WILLIS AVE	MEDFORD	MA	02155
0302536004	46 COOPER ST #1	CORMIER ROBERT		46 COOPER ST # 1	BOSTON	MA	02113
0302536006	46 COOPER ST #2	RUPP KENNETH S		46 COOPER ST # 2	BOSTON	MA	02113
0302536008	46 COOPER ST #3	TIPLADY NATHANIEL D	C/O NATHANIEL D TIPLADY	46 COOPER ST #3	BOSTON	MA	02113
0302536010	46 COOPER ST #4	NAPPI MICHAEL D		46 COOPER ST # 4	BOSTON	MA	02113
0302537000	98 100 ENDICOTT ST	CARUSO NANCY	C/O NANCY J CARUSO	100 ENDICOTT ST APT 2	BOSTON	MA	02113
0302538000	94 96 ENDICOTT ST	ROBERTO FRANK TS	C/O FRANK ROBERTO	77 FOREST ST	MEDFORD	MA	02155
0302539000	90 92 ENDICOTT ST	LITTLE LION LLC	C/O LITTLE LION LLC	25 BRADY LOOP	ANDOVER	MA	01810
0302540000	86 88 ENDICOTT ST	FRATTAROLI PHILIP A	C/O PHILIP A FRATTAROLI	86-88 ENDICOTT ST	BOSTON	MA	02113
0302541000	84 ENDICOTT ST	EIGHTY-4 ENDICOTT STREET	C/O ALAN L BARNET	28 MONUMENT CT	CHARLESTOWN	MA	02129
0302541002	84 ENDICOTT ST #1	MURPHY ERIN	C/O ERIN MURPHY	84 ENDICOTT ST #1	BOSTON	MA	02113

0302541004	84 ENDICOTT ST #2	PILIERE HOPE		84 ENDICOTT ST # 2	BOSTON	MA	02113
0302541006	84 ENDICOTT ST #3	WELLS CHRISTOPHER J		84 ENDICOTT ST	BOSTON	MA	02113
0302542000	82 82A ENDICOTT ST	FRENI MARIA		82 ENDICOTT	BOSTON	MA	02113
0302545000	N WASHINGTON ST	MICHELLE HOLDINGS LLC	C/O MICHELLE HOLDINGS	55 HENSHAW ST	BOSTON	MA	02135
0302545010	S COOPER ST	CITY OF BOSTON		COOPER ST	BOSTON	MA	02113
0302573000	136 BLACKSTONE	COMMONWEALTH OF MASS	C/O STATE TRANSPORTATION BLDG	10 PARK PLZ #6160	BOSTON	MA	02116
0302573001	136 BLACKSTONE ST	BOSTON PUBLIC MARKET					
0302573002	136 BLACKSTONE ST	BOSTON PUBLIC MARKET					
0302604000	CAMBRIDGE ST	BOSTON REDEVELOPMENT AUTH		CAMBRIDGE ST	BOSTON	MA	02114
0302605000	15 55 NEW SUDBURY	ST UNITED STATES OF AMER		15 NEW SUDBURY	BOSTON	MA	02114
0302617000	CONGRESS ST	BOSTON REDEVELOPMNT AUTH		CONGRESS	BOSTON	MA	02109
0302621000	15 NEW CHARDON	BRICKMAN ONE BOWDOIN LLC	C/O BRICKMAN ONE BOWDOIN LLC	712 FIFTH AVENUE	NEW YORK	NY	10019
0302622000	25 NEW CHARDON	TWENTY 5 NEW CHARDON ST LPS		250 FIRST AV #200	NEEDHAM	MA	02494
0302623000	40 HAWKINS ST	NEW ENGLAND TELEVISION CORP	C/O PAT JASPERR	7 BULFINCH PL	BOSTON	MA	02114
0302624000	30 HAWKINS ST	INTERCONTINENTAL I BULFINCH	C/O INTERNATIONAL I BULFINCH	1270 SOLDIERS FIELD RD	BRIGHTON	MA	02135
0302625000	HAWKINS ST	BOSTON REDVLPMNT AUTH		HAWKINS	BOSTON	MA	02114
0302626000	40 NEW SUDBURY ST	CITY OF BOSTON		40 NEW SUDBURY	BOSTON	MA	02114
0302627000	NEW SUDBURY ST	BOSTON REDVLPMNT AUTH		NEW SUDBURY	BOSTON	MA	02114
0302628000	65 CAMBRIDGE ST	NEW ENGLAND TEL & TEL CO	C/O PROPERTY TAX DEPT	PO BOX 152206	IRVING	TX	75015
0302640000	25 31 HAWKINS ST	BOSTON EDISON CO MASS	NSTAR ELECTRIC CO PROP TAX	PO BOX # 270	HARTFORD	CT	06141
0302641000	33 HAWKINS ST	BOSTON EDISON CO	NSTAR ELECTRIC CO PROP TAX	PO BOX # 270	HARTFORD	CT	06141
0302642000	35 HAWKINS ST	CITY OF BOSTON		35 HAWKINS	BOSTON	MA	02114
0302643000	HAWKINS ST	BOSTON REDEVLPMNT AUTH		HAWKINS	BOSTON	MA	02114
0302644000	41 43 HAWKINS ST	CITY OF BOSTON		41 HAWKINS	BOSTON	MA	02114
0302645000	31 NEW CHARDON	THIRTY ONE NEW CHARDON STREE	C/O SHELLY L MCPHEE	31 NEW CHARDON ST	BOSTON	MA	02114
0302646000	NEW CHARDON	BOSTON REDEVLPMNT AUTH		NEW CHARDON	BOSTON	MA	02114
0302647000	BOWKER ST	CITY OF BOSTON		BOWKER	BOSTON	MA	02114
0302700000	50 NEW SUDBURY ST	BULFINCH CONGRESS HOLDINGS	C/O HYM INVESTMENT GROUP LLC	ONE CONGRESS ST	BOSTON	MA	02104
0303308000	HANOVER ST	COMMONWEALTH OF MASS	STATE TRANSP BLDG	10 PARK PLZ	BOSTON	MA	02116
0303324000	BLACKSTONE ST	COMMONWEALTH OF MASS	STATE TRANSP BLDG	10 PARK PLZ	BOSTON	MA	02116
0303337000	7 9 MARSHALL ST	IBRAHAM ABDO		120 BLACKSTONE ST	BOSTON	MA	02109
0303347000	45 55 UNION ST	FIFTY FIVE UNION LLC		45 UNION ST	BOSTON	MA	02108
0303350000	145 149 HANOVER ST	BEN SHERI TS	C/O VALERIE POST	142 MARLBOROUGH ST	BOSTON	MA	02116

APPENDIX H: Disclosure Form

Note: The amended Disclosure Form will be filed under a separate cover.