SUMMER STREET HOTEL

Notice of Project Change

Submitted to:
Boston Planning & Development Agency
One City Hall Square
Boston, MA 02201

Submitted by:
OH NBH Owner LLC
an affiliate of
The Davis Companies
125 High Street, Suite 2111
Boston, MA 02110

Prepared by:
Epsilon Associates, Inc.
3 Mill & Main Place, Suite 250
Maynard, MA 01754

In Association with:
Elkus Manfredi Architects
Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C.
Howard Stein Hudson
Nitsch Engineering, Inc.
McPhail Associates, LLC
The Green Engineer, Inc.
RWDI

August 29, 2017

Epsilon
ASSOCIATES INC.

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Chapter 1

General Information / Project Description

1.0 GENERAL INFORMATION / PROJECT DESCRIPTION

1.1 Introduction

This Notice of Project Change ("NPC") is being submitted by OH NBH Owner LLC, an affiliate of The Davis Companies and Omni Hotel Management Corp. (the "Proponent") to provide information on the proposed changes to the Waterside Place Project within the Commonwealth Flats Development Area of the South Boston waterfront district. The changes described herein are limited to the proposed development of a portion of the Waterside Place Project site known as Parcel D2, which is bordered by Summer Street to the south, the World Trade Center Avenue viaduct to the west, D Street to the east, and the Track 61 right of way and Massport Haul Road to the north (the "Project Site"). The Project Site also includes a small (738 square foot) adjacent parcel owned by the Massachusetts Port Authority ("Massport") at the northeast corner of the World Trade Center Avenue/Summer Street intersection, which is currently encumbered by a highway easement in favor of the City of Boston. Thus, the entire Project Site is owned by Massport. Massport and the Proponent have entered into a Development Agreement which provides that the Proponent will enter into a long-term ground lease with Massport for the Project Site and develop thereon, the Project, as defined below.

While projects constructed on Massport-owned land are exempt from the provisions of the Boston Zoning Code, as amended (the "Zoning Code"), Massport and the Proponent have agreed that the Project, as further described below, will be reviewed voluntarily under the provisions of Article 80B (Large Project Review) of the Zoning Code with respect to project design, traffic and environmental impacts. The Proponent and Massport have also agreed that the Proponent will voluntarily commit to housing and jobs linkage payments in accordance with Article 80B of the Zoning Code.

Generally consistent with the long-term planning for the Project Site, the proposed project comprises a major new approximately 1,054 key hotel with ballrooms, function rooms and meeting spaces, as well as new retail and restaurant space, together with related public realm improvements, as discussed in this NPC (the "Project" or "Current NPC Project"). The Project will help alleviate the critical shortage of hotel rooms in both the South Boston waterfront district and Boston as a whole, providing a significant number of new rooms and related amenities for business and leisure travelers, and also strengthening the ability of the Boston Convention and Exhibition Center ("BCEC") to compete for future major conventions, meetings and shows. In 2016, Boston placed among the cities with the highest hotel rates in the country, while a report released by the Massachusetts Convention Center Authority ("MCCA") revealed that the BCEC had the fewest hotel rooms available within walking distance when compared to convention centers in other major U.S. cities. The Project will serve a vital role in strengthening the economic position of the BCEC and the South Boston waterfront neighborhood as a whole.

The Project will also provide significant public benefits, including a weather-protected pathway along a portion of World Trade Center Avenue as part of an improved series of pedestrian connections from Congress Street to Summer Street, connecting the Project Site to the SBWTC, MBTA Silver Line Station and other key district destinations, an underground connection to the BCEC through a previously constructed tunnel under Summer Street, and the activation of Summer Street, World Trade Center Avenue and D Street through new ground floor retail and restaurant uses, as well as new construction and permanent jobs and new revenue to the City of Boston, Commonwealth and Massport.

This NPC is being submitted to provide the Boston Redevelopment Authority ("BRA") doing business as Boston Planning & Development Agency (herein, the "BPDA" except when referring to activities prior to 2016), with a review of the permitting history for the Waterside Place Project, a description of proposed changes to the Parcel D2 portion of the Waterside Place Project (i.e., the Project), and a description of the potential environmental impacts and benefits of the Project. This NPC is the sixth in a series of Notice of Project Change filings that have been made for the Waterside Place Project.

1.2 Background

1.2.1 Waterside Place Project History

This section includes Table 1-1 which provides a summary of the Waterside Place Project permitting history, followed by a detailed description of the permitting history.

Table 1-1 Waterside Place Permitting History

Date/Document	Description and Approximate Project Dimensions	Outcome
BPDA and MEPA Joint Documents		
September 2004 EPNF/EENF	♦ 209 residential units ♦ 627,000 sf retail/restaurant ♦ 20,000 sf visitor center ♦ 2,350 parking spaces	BRA Scoping Determination Waiving Further Review on December 3, 2004
February 2007 NPC/SEIR/DPIR	♦ 209 residential units ♦ 300-room hotel ♦ 640,000 sf retail/restaurant ♦ 20,000 sf visitor center ♦ 2,350 parking spaces	BRA Board Approval on June 21, 2007

Table 1-1 Waterside Place Permitting History (Continued)

Date/Document	Description and Approximate Project Dimensions	Outcome
BPDA Only		
June 30, 2010 NPC	Broken into Phases. Phase 1: ♦ 234 apartments ♦ 72,000 sf retail space ♦ 14,000 sf innovation space ♦ 185 parking spaces. Phase 2 remained the same as described in the NPC/SEIR/DPIR.	BRA Board Approval on August 17, 2010
November 4, 2011 NPC	Phase 1 revised, broken into two subphases: Phase 1A and Phase 1B Phase 1A: ♦ 236 apartments ♦ 17,000 sf commercial space ♦ 140 parking spaces, of which 70 would be above-grade spaces in the building, with the remaining approximately 70 spaces consisting of surface spaces adjacent to the building Phase 1B: ♦ 55,000 sf retail space ♦ 7,000 sf innovation space ♦ 115 parking spaces (representing the balance of the Phase 1 parking spaces, i.e., approximately 45 spaces, plus approximately 70 relocated former surface parking spaces) Phase 2 would remain the same as proposed in the NPC/SEIR/DPIR.	BRA Board Approval on November 17, 2011

Table 1-1 Waterside Place Permitting History (Continued)

Date/Document	Description and Approximate Project Dimensions	Outcome
BPDA Only		
December 2015 NPC	Phase 1A revised: ♦ Addressed a change of use of approximately 2,500 sf in Phase 1A initially designated as innovation space, and redesignated as space for a neighborhood health clinic	BRA Board Approval on January 14, 2016
March 24, 2016 NPC	Phase 1B revised: ♦ 23 stories and 325,000 sf ♦ 307 apartments ♦ 3,500 sf retail space ♦ 84 parking spaces Phase 2 was not changed from what was proposed in the NPC/SEIR/DPIR.	BRA Board Approval on July 14, 2016
December 19, 2016 NPC	Phase 1A revised: ♦ 3,593 sf of the original 6,555 sf of innovation space in Phase 1A proposed to be leased to a general contractor for three years to improve the space with the hope that it will be more marketable to a permanent innovation tenant	BRA Board Approval on March 16, 2017

Table 1-1 Waterside Place Permitting History (Continued)

Date/Document	Description and Approximate Project Dimensions	Outcome
MEPA Only		
April 20, 2010 Request for Advisory Opinion	Requested confirmation that an NPC was not required for revisions to the Project. The Project was divided into two phases: Phase 1 and Phase 2. Phase 1 revisions: ♦ Modifying the residential building from ownership to rental ♦ Increasing the number of residential units from 209 to 226 ♦ Increasing the number of parking spaces on Phase 1 to 277 ♦ Decreasing the retail space to approximately 69,500 sf Phase 2 was not changed from what was proposed in the NPC/SEIR/DPIR.	May 7, 2010 Advisory Opinion determined that an NPC was not required
October 24, 2011 Request for Advisory Opinion	Clarified the timing of the proposed mitigation measures, and how the Commonwealth Flats Development Area mitigation elements would be apportioned between Phase 1 and Phase 2.	November 22, 2011 Advisory Opinion confirmed the appointment and timing of the mitigation
April 2016 NPC	Phase 1B revisions: ♦ 23 stories with 345,000 sf ♦ 312 apartments ♦ 2,000 sf retail ♦ 84 parking spaces Phase 2 was not changed from what was proposed in the NPC/SEIR/DPIR.	May 20, 2016 Certificate determined that a Supplemental Environmental Impact Report was not required

Table 1-1 Waterside Place Permitting History (Continued)

Date/Document	Description and Approximate Project Dimensions	Outcome
MEPA Only		
August 2016 NPC	Parking garage revisions (proposed previously as Air Rights Garage [EEA #8505] and as part of the Waterside Place project): ♦ Reduction in parking to 1,620 spaces (with a total parking count for the Waterside Place project of 1,874 spaces) ♦ Incorporation of new multi-modal connections to the district and region, pedestrian amenities, public realm connections ♦ Eliminated the Visitor Center from the Waterside Place project, and eliminated Parcel D-1 from the Waterside Place project site No changes were proposed to the remainder of Phase 2.	September 23, 2016 Certificate determined that no Supplemental Environmental Impact Report was required

In September 2004, The Core Development Group LLC, a partnership between The Drew Company and Vornado Realty Trust, submitted an Expanded Project Notification Form ("PNF") jointly with an Expanded Environmental Notification Form submitted to the Massachusetts Environmental Policy Act ("MEPA") office for the Waterside Place Project (EEA #13367), which was to be located on approximately 10.3 acres of land known as the "Core Block" and adjacent Parcel D1 within the Massport-owned Commonwealth Flats Development Area ("CFDA"), which is located within the South Boston waterfront district. The Waterside Place Project PNF proposed a building program that would include an approximately 209-unit residential development on the northern portion of the site and approximately 627,000 square feet ("sf") of retail space, including retail shops, restaurants, and a multiplex cinema, as well as an approximately 20,000 sf visitor center and a multi-level parking garage with approximately 2,350 spaces. The BRA issued a Scoping Determination on the PNF on December 3, 2004.

In February 2007, The Core Development Group LLC submitted a Draft Project Impact Report ("DPIR") to the BRA, jointly with a Notice of Project Change/Single Environmental Impact Report ("NPC/SEIR") filed with the MEPA office, for a revised version of the Waterside Place Project, which contemplated the construction of approximately 209 residential condominium units on the northern portion of the site as well as an approximately 300-room hotel, and approximately 640,000 sf of retail space, including retail shops, a grocery store, restaurants, an approximately 20,000 sf visitor center, and a multi-level parking garage with approximately 2,350 spaces to be utilized by residents, employees, and visitors. On June 21, 2007, pursuant to Sections 80B-5.4(c) (iv) and 80B-6 of the Boston Zoning Code (the "Zoning Code"), the BRA Board voted to authorize the issuance of a Preliminary Adequacy Determination waiving further review and a Certification of Compliance for the Waterside Place Project. The BRA issued a Preliminary Adequacy Determination waiving further review of the Waterside Place Project on November 2, 2007.

Because of the economic downturn in 2008-2010, construction of the Waterside Place Project as initially contemplated never commenced. Core Development Group LLC then proposed to construct the Waterside Place Project in phases. On June 30, 2010, an NPC was submitted to the BRA concerning changes to the Waterside Place Project, and specifying the components to be constructed in connection with Phase 1 of the project. On August 3, 2010, the Boston Civic Design Commission voted to approve the design for Phase I of the Waterside Place Project. The issuance of a Determination under Section 80A-6.2 of the Zoning Code waiving further review of the NPC (the "First Determination") was approved by vote of the BRA Board on August 17, 2010. The First Determination was issued by the BRA on August 26, 2010.

The uses approved in 2010 for Phase 1 of the Waterside Place Project were consistent with the uses for the northern portion of the Waterside Place Project as approved by the BRA in 2007, with the exception of the addition of the innovation space described below. Phase 1 was approved to include approximately 376,300 sf[1] of gross floor area,[2] featuring approximately 234 rental apartment units, approximately 72,000 sf of retail space, including a grocery store and a pharmacy, approximately 185 parking spaces, and approximately 14,000 sf of innovation space.

On November 4, 2011, a Second NPC was submitted to the BRA by Core Development Group LLC specifying that Phase 1 of the Waterside Place Project was to be completed in two sub-phases, Phase 1A and 1B. The Second NPC stated that Phase 1A would consist of 236 residential rental units to be constructed in a 19-story building of approximately 248 feet in height. The Second NPC also stated that Phase 1A would incorporate approximately

[1] Square footage does not include parking.

[2] All square footage figures concerning Phase 1 and its sub-phases are intended to refer to gross floor area as defined in Article 2A of the Boston Zoning Code.

140 parking spaces, of which 70 would be above-grade spaces in the building (occupying approximately 29,000 sf of area), with the remaining approximately 70 spaces consisting of surface spaces adjacent to the building. The Second NPC indicated that Phase 1A would also include approximately 17,000 sf of ground-floor commercial space, to be dedicated primarily to retail and innovation uses. The issuance of a Determination under Section 80A-6.2 of the Zoning Code waiving further review of the Second NPC was approved by vote of the BRA Board on November 17, 2011 ("Second Determination") and the Second Determination was issued by the BRA on March 8, 2012.

The Second NPC and subsequent 2011 BRA Board approval and March 2012 Cooperation Agreement for the Phase 1 project stated that the balance of Phase 1 (i.e., Phase IB) would consist of the remaining approximately 55,000 sf of retail space, including a grocery store, 7,000 sf of innovation space and approximately 115 parking spaces (representing the balance of the Phase 1 parking spaces, i.e., approximately 45 spaces, plus approximately 70 relocated former surface parking spaces).

A Third NPC was submitted to the BRA in December 2015 and approved by the BRA Board on January 14, 2016. The Third NPC addressed a change of use for part of the innovation space in Phase 1A. As reflected in the Third NPC, approximately 2,500 sf of space which was initially designated as innovation space in Phase 1A, is now slated to be occupied by a neighborhood health clinic.

On March 24, 2016, The Drew Company, as the proponent, submitted a Fourth NPC describing changes to Phase 1B of the Waterside Place Project to the BRA. In April 2016, The Drew Company submitted an NPC to the MEPA Office describing changes to Phase 1B. Phase 1B was proposed to include a 23-story residential apartment building with parking to be located at 501 Congress Street in place of the retail space and parking previously proposed for the Phase 1B site. The approximately 325,000 sf building, which is now under construction, will contain approximately 307 rental apartments, approximately 84 parking spaces on the second level of the building and approximately 3,500 sf of ground level retail space.[3] Phase 2 of the Waterside Place Project was not changed from what was proposed in the NPC/SEIR, which included an approximately 300 room hotel and approximately 561,500 sf of retail space. The Fourth NPC was approved by the BRA Board on July 14, 2016 and a Fourth Determination was issued by the BRA on April 5, 2016. On May 20, 2016, the Secretary issued a Certificate on the NPC determining that a Supplemental Environmental Impact Report was not required.

In August 2016, Massport submitted an NPC to the MEPA office outlining changes to the parking garage proposed on the Waterside Place Project site (previously known as the Air Rights Garage, and currently known as the South Boston Waterfront Transportation Center ["SBWTC"]). Review under MEPA was concluded by the Certificate issued on the NPC by

[3] The program listed includes what was approved by the BRA Board rather than what was proposed in the NPC.

the Secretary of Energy and Environmental Affairs on September 23, 2016 which stated that a Supplemental Environmental Impact Report was not required related to the SBWTC and proposed changes to the Waterside Place Project.

On December 19, 2016, The Drew Company as Proponent, filed the fifth NPC for the Waterside Place Project with the BRA to change the use of the remaining 3,593 sf of the original 6,555 sf of innovation space in Phase 1A of Waterside Place. In the Fifth NPC, the Proponent proposed to lease the space to a general contractor for three years to improve the space with the hope that it will be more marketable to a permanent innovation tenant. The BPDA Board approved the Fifth NPC on March 16, 2017 and a Fifth Determination was issued on March 23, 2017.

1.2.2 Massport RFP Process

In 2014, as part of a larger plan to expand the BCEC and provide additional hotel rooms needed to support the BCEC, Massport joined forces with the MCCA to request proposals for a "Headquarters Hotel Project" that was to comprise an approximately 1,200-key hotel on Parcels D2 and D3 of the CFDA.

In response to this request for proposals (RFP), the Proponent partnered with Omni Hotels & Resorts, Robin Brown of Spot-On Ventures, a number of local minority investors and minority and women-owned businesses ("M/WBEs"). The architectural team of Elkus Manfredi Architects, Moody Nolan (MBE) and Stull and Lee Architects (MBE) worked with the team to prepare a response to the RFP. The Proponent was one of three teams short-listed for final consideration for designation as the developer of the Headquarters Hotel Project. However, in early 2015, plans for the expansion of the BCEC were put on hold and as a result, Massport and the MCCA elected to rescind the RFP.

On February 10, 2016 Massport issued a new RFP for the "Summer Street Hotel" project. This RFP offered an approximately 2.1 acre parcel of land across the street from the BCEC, for long-term ground lease and the development of a mixed-use project that would include a hotel. The Proponent responded to the 2016 RFP and, on September 16, 2016 the Proponent was selected as the developer for Parcel D2. On July 19, 2017, Massport and the Proponent executed a Development Agreement, providing rights to the Proponent to develop the Project Site, subject to the terms and conditions thereof.

Reflective of the strong commitment of the Proponent to diversity and inclusion, the Project team is made up of a diverse group of local individuals and minority and women business enterprise (M/WBEs). By way of example, multiple minority and women-owned businesses are part of the ownership and development team, including a number of local minority individuals and women who are a part of a "Special Member Investment Group" created specifically by the Proponents for this Project. The Project's design team is also led by a joint-venture of Elkus Manfredi Architects and two minority business enterprises (MBE), Moody Nolan and Stull and Lee, and the Proponent is targeting 31% M/WBE participation for the design phase of the Project. The construction management team is similarly a 70/30 joint venture between John Moriarty & Associates and Janey Construction Management (MBE).

1.3 Project Description

1.3.1 Project Site

The Project Site, as shown in Figure 1-1, comprises an approximately 73,659 sf (1.7 acre) parcel of land sometimes known Parcel D2, as well as an adjacent small parcel of land, both of which are owned by Massport (for a total of 74,397 sf). The Project Site comprises the southernmost parcel within the block formerly known as the "Core Block," and is bordered by Summer Street to the south, the World Trade Center Avenue viaduct to the west, D Street to the east, and the Track 61 right of way and Massport Haul Road to the north. The Project Site is vacant and slopes down from Summer Street to the Project Site boundary with the Track 61 right of way, as shown on the survey plan included in this NPC as Appendix A. As a result, on the lower level of the Project Site, the Project Site is bounded by Fargo Street (the former C Street) to the west.

1.3.2 Area Context

The South Boston Waterfront District has been the focus of significant new development over the past decade. New developments such as the Vertex buildings and residential buildings at Fan Pier, the new office building and residential building at Pier 4, the Element Boston Seaport hotel, the Aloft Boston Seaport hotel, the Envoy Hotel, new office buildings at 55 and 101 Seaport Boulevard and new residential developments such as Waterside Place, the Watermark and the Flats on D have added significant new office, retail, hotel and residential space to this growing mixed-use area. Within the next two years, significant additional development will also open on Blocks B and C of the Seaport Square project, containing a mix of residential, office, retail and entertainment uses. In addition, the construction has also started on a mixed-use project on Block M of Seaport Square and the 121 Seaport Boulevard is currently in construction.

Located directly across Summer Street from the Project Site is the BCEC, Boston's largest convention facility, which holds more than 100 events a year with hundreds of thousands of attendees. In addition, the D Street corridor between Summer Street and West Broadway has become an important hub of development and related activity, including new condominiums, the repositioning of the 451 D Street hotel, the opening of two new hotels, a variety of residential developments near West Broadway, and the increasingly popular "Lawn on D" social space operated by the MCCA, two blocks from the Project Site.

The South Boston waterfront area is also important for Boston's maritime and industrial industries, with truck traffic using the Massport Haul Road that runs north of the Project Site, and a number of industrial properties to the east towards Raymond L. Flynn Marine

Park (the former Boston Marine and Industrial Park), including Conley Terminal and Massport Marine Terminal.

1.3.3 Development Description

The Project will serve business travelers, tourists, as well as BCEC users, with approximately 1,054 keys, approximately 120,000 sf of meeting room, convention and banquet/special events/pre-function space, approximately 40,000 sf of retail and restaurant space, approximately 8,500 sf of spa and fitness space, and myriad guest amenities such as a rooftop pool. The Project will contain approximately 788,500 sf of Gross Floor Area, and comprise two 21-story towers flanking the World Trade Center Avenue viaduct and D Street, with a front entrance on Summer Street. Reflective of the wide-ranging population that the Project is anticipated to serve, the hotel will include standard upper-upscale rooms, suites, and "innovation" rooms (approximately 250 sf rooms, without distinction regarding access to the hotel's amenities). The Project may include a large LED sign on one of the two towers, as well as hotel identification signage on both hotel towers, subject to design review and the receipt of applicable governmental approvals. Figures 1-2 and 1-3 show a perspective of the Project from Summer Street and an aerial view showing the Project in its context. Figures 1-4 to 1-20 at the end of this section include floor plans, sections and elevations.

The Project's location across the street from the BCEC and proximate to the Massachusetts Bay Transportation Authority ("MBTA") World Trade Center Silver Line station will make it convenient for visitors and guests to connect to both Logan International Airport and downtown Boston. Table 1-2 provides the Project program.

Table 1-2 Project Program

Project Element	Approximate Dimension
Total Square Footage	**788,500± sf**
Hotel Rooms	1,054± keys
Convention/Banquet/Pre-function	120,000± sf
Restaurant	35,000± sf
Retail	5,000± sf
Spa/Fitness	8,500± sf
Maximum Building Height	218 feet[4,5]

4 All undefined capitalized terms are as defined in the Boston Zoning Code.

5 Elevation of the top of the structure is approximately 269 feet NAVD88 (approximately 275 feet BCB).

G:\Projects2\MA\Boston\4719\MXD\aerial.mxd

Data Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division

Summer Street Hotel **Boston, Massachusetts**

Epsilon ASSOCIATES INC.

Figure 1-1
Aerial Locus Map

Summer Street Hotel **Boston, Massachusetts**

ELKUS | MANFREDI
ARCHITECTS

Figure 1-2

Perspective from Summer Street

Summer Street Hotel **Boston, Massachusetts**

ELKUS | MANFREDI ARCHITECTS

Figure 1-3
Aerial View

The Project will improve access along the Project Site between the BCEC, the Lawn on D social space managed by the MCCA, and developments on D Street south of Summer Street to the South Boston waterfront. Two aspects of the Project will facilitate these connections:

> (1) the Project will connect to an existing pedestrian tunnel under Summer Street, whose construction was funded by Massport and constructed as part of the Central Artery/Third Tunnel project, that will provide covered passage between the Project Site and the BCEC, and
>
> (2) the Proponent will construct streetscape improvements along World Trade Center Avenue to the South Boston Waterfront Transportation Center ("SBWTC") now being constructed by Massport, including a covered pedestrian walkway that will provide weather-protected passage for pedestrians along a portion of World Trade Center Avenue toward the covered walkway being constructed as part of the SBWTC, towards the MBTA Silver Line Station and other key district destinations (see Figure 1-4 at the end of this section).

For vehicles and guest/visitor pick-up and drop-off, a porte cochere will be located off Summer Street and extend under the building footprint located above. No parking will be constructed as part of the Project. Both valet parking and self-parking for the Project will be located within the SBWTC, which will have approximately 400 parking spaces dedicated to the Project, with additional spaces shared amongst the other users of the SBWTC and available for events occurring at the Project throughout the year. An overhead pedestrian bridge constructed in air rights spanning the Massport Haul Road and Track 61 right of way will connect the Project to the SBWTC and allow easy access to the hotel for guests and visitors.

Primary loading and service access operations at the Project will take place off of a service drive that will be constructed by the Proponent within the Project Site just south of the Track 61 right-of-way and Massport Haul Road, at the lower level of the Project. There is an existing gravel service road within the northern portion of the Project Site at the lower level, and as part of the Project, construction of that service road on the Project Site to a finished condition will be undertaken by the Proponent. It is expected that Massport will construct the component of the service road that will run from the Project Site easterly to Pumphouse Road (which is owned by Massport) and/or the Massport Haul Road, subject to terms and conditions agreed to by Massport and the Proponent.

1.3.4 Changes From Waterside Place Project

The portion of the Waterside Place Project that was to be located on Parcel D2 was proposed to include an approximately 300-room hotel and approximately 230,000 sf of retail space, including an approximately 300-seat restaurant (the "Previously Approved Project"), as originally outlined in the DPIR. The Project Site is now proposed to include the Project as described above, which includes an increase in the number of hotel rooms, meeting space and restaurant seats, and a decrease in the amount of retail space. No parking will be provided at the Project Site, but instead, parking will be located in the SBWTC, with a pedestrian bridge connecting the SBWTC to the Project.

1.4 Project Benefits and Mitigation Measures

The Project will generate many public benefits for the surrounding neighborhood, the City of Boston and the Commonwealth, both during construction and on an ongoing basis upon its completion.

Economic Benefits

The Project will provide a number of significant economic benefits to the neighborhood, the City of Boston, and the Commonwealth. The significant addition to the existing supply of full-service hotel rooms within walking distance of the BCEC as well as the Project's 25,000 sf grand ballroom, will improve the BCEC's marketability and allow the BCEC to access much of its currently unrealized capacity. This increased utilization of the BCEC, will help realize the benefit of what is currently a projected $163 million in lost economic impact over five years as estimated by the MCCA. The Project will also add full-service hotel rooms to the growing and dynamic South Boston waterfront district, serving the increasing mix of corporate and leisure travelers within the vibrant, high-density residential, office, and retail neighborhood, and reducing the need to seek hotel accommodations either elsewhere in the city or in nearby suburbs. These additional patrons now staying in the South Boston waterfront district are more likely to support the nearby restaurants, shops, and attractions.

Additionally, the Project will generate substantial ad valorem property taxes, hotel occupancy tax revenues, and meals tax revenues to the City of Boston. The Commonwealth of Massachusetts will similarly receive hotel occupancy and meals tax revenues, as well as Convention Center Fund tax revenues. Massport, as a quasi-public agency in the Commonwealth of Massachusetts, will also receive substantial ground rent payments and District Service Fee payments under its Ground Lease with the Proponent to support activities such as maintenance of public ways, open space areas and infrastructure improvements within the Commonwealth Flats Development Area.

Lastly, the Project is projected to provide approximately 1,110 construction jobs and more than 700 new permanent jobs, most of which will be union jobs, including members of Local 26 and Local 3.

In addition to high W/MBE inclusion and capacity building goals, the Proponent has also identified the following six Boston-area non-profit organizations that will receive financial contributions as part of the Project: Building Pathways, The Boy's and Girl's Club of South Boston, Citizen's for Safety/LIPSTICK, The South Boston Community Health Center, Julie's Family Learning Program, and The Boy's and Girl's Club of Dorchester.

Connectivity

The Project Site is proximate to the MBTA Silver Line, allowing for patrons to arrive by public transportation, and enabling patrons to have convenient access to Logan International Airport, downtown Boston, South Station and beyond. Bus stops for MBTA bus routes #4 and #9 are adjacent to the Project Site, and MBTA express bus routes #448, #449, and #459 are located a short distance away. The Project Site is conveniently located proximate to entry and exit ramps for I-90, which connects to East Boston and Logan International Airport, as well as to the greater Boston highway network. Water taxi stops are available at Pier 4 and World Trade Center, both just a short walk from the Project Site. In addition, the Project is located adjacent to Track 61, which is an unused railroad right-of-way owned by Massport and the Massachusetts Department of Transportation. Track 61 may be used in the future to re-establish public rail service to the South Boston waterfront district. The Project is being designed and constructed so as not to preclude this possibility, including connections from a platform at Track 61 near the Project to the D Street viaduct.

Improved Street and Pedestrian Environment

The Project will activate a long vacant site with street-level retail and restaurants, and an improved pedestrian realm, including a weather-protected walkway for pedestrians travelling southerly along World Trade Center Avenue towards the SBWTC, MBTA Silver Line Station and other key district destinations. The Project will also include a connection to the tunnel below Summer Street that will connect the Project Site to the BCEC. The Project will also enliven a current gap in the pedestrian experience along D Street between the South Boston waterfront and the South Boston residential area to the southwest of the Project Site and the Fort Point Channel neighborhood to the west. The streetscape design will be unified with awnings at the hotel entrances and at retail/restaurant entrances, and street lights along D Street.

Sustainable Design/Green Building

The Proponent is committed to building a LEED Silver Certified project at a minimum, incorporating sustainable design features to minimize energy use, reduce the Project's impact on greenhouse gas emissions, and provide a high-quality environment for guests and visitors.

Transportation Demand Management

A comprehensive transportation demand management program to discourage vehicle use and encourage alternative modes of transportation will be operated at the Project. Valet service will be offered at the front entrance, and parking will be shared with other users of the SBWTC. It is also anticipated that many patrons will be attending conferences at the BCEC, minimizing the need for conventioneers to travel to the BCEC by vehicle or shuttle buses to and from Back Bay, Cambridge and nearby suburbs.

Linkage

The Project will result in the payments of significant voluntary jobs and housing linkage payments to the City, estimated at $5,884,404 and $1,178,292, respectively.

1.5 Legal Information

The Project Site is owned by Massport and the Proponent will enter into a long-term ground lease of the Project Site with Massport, subject to the conditions set forth in the Development Agreement between such parties.

1.5.1 Legal Judgments or Actions

To the Proponent's knowledge based upon information provided by Massport, there are no legal judgments or actions pending concerning the Project Site. To the Proponent's knowledge, there are no legal judgments or actions pending concerning the Project.

1.5.2 History of Tax Arrears

As a single purpose entity established solely to construct and operate the Project, the Proponent does not own any property in the City of Boston. Omni operates the Omni Parker House hotel in downtown Boston, and The Davis Companies owns multiple properties in the City of Boston. The Davis Companies previously redeveloped the Charles River Plaza mixed-use project in the Beacon Hill neighborhood, and the Telford 180 Residences in Allston-Brighton are currently nearing construction completion. The Davis Companies is pursuing entitlements for a residential development at 112 Shawmut Street in the South End neighborhood, as well as the former Hodge Boiler Works site in East Boston. None of these properties are in tax arrears.

1.5.3 Evidence of Site Control/Nature of Public Easements at the Project Site

The Proponent has entered into a legally binding Development Agreement with the owner of the Project Site, Massport. Upon the satisfaction of the conditions set forth in the Development Agreement, the Proponent or an affiliate thereof will enter into a long-term ground lease of the Project Site with Massport and construct, maintain, and operate the Project.

There are no easements for the benefit of the public running through or within any portion of the Project Site. However, there is a MassDOT sanitary sewer line within the service road at the Project Site for which Massport intends to arrange for the grant of easement rights to the Boston Water and Sewer Commission.

1.6 Zoning

Although projects on Massport land are not subject to local regulation, the Proponent intends to work cooperatively with the City of Boston by voluntarily undergoing Article 80

Large Project Review with respect to the Project. The following information is provided for informational purposes only.

The Project Site is shown on Map 4A of the Boston Zoning Maps, is located within the General Area of the Fort Point Waterfront District within the Harborpark Zoning District, and the provisions of Article 42E of the Zoning Code are also applicable to the Project Site.

1.7 Anticipated Permits and Approvals

Although projects on Massport land are not subject to local regulation, the Proponent intends to voluntarily seek various local permits and approvals. Table 1-3 includes a preliminary list of local, state and federal permits and approvals that may be required for the Project. This list is based upon current information about the Project, and is subject to change as the design and program of the Project evolves. Some of the permits and approvals listed may not be required, while there may be others not listed that will be needed.

Table 1-3 Anticipated Permits and Approvals

Agency Name	Permit / Approval
Federal	
Federal Aviation Administration	Determination of No Hazard to Air Navigation (building and cranes)
U.S. Environmental Protection Agency	National Pollution Elimination Discharge System Notice of Intent
Federal Highway Administration	Approval of proposed work within highway right-of-way
State	
Executive Office of Energy and Environmental Affairs	Massachusetts Environmental Policy Act - Notice of Project Change
Department of Environmental Protection	Sewer Connection Permit; Construction Commencement Notice Environmental Results Program (if required)
Massachusetts Department of Transportation, Outdoor Advertising Board	Approval of LED sign (if required)
Massachusetts Department of Transportation	Highway Access Permit; Work Permit
Office of Public Safety and Inspections	Building Permit; Certificate of Occupancy
Massachusetts Water Resources Authority	Sewer Use Discharge Permit; Temporary Construction Site Dewatering Permit

Table 1-2 Anticipated Permits and Approvals (Continued)

Agency Name	Permit / Approval
Local	
Boston Planning & Development Agency	Voluntary Article 80B Large Project Review
Boston Civic Design Commission	Voluntary Design Review
Public Improvement Commission	Specific Repairs and subsurface construction (Summer Street); Canopy License (Summer Street); Discontinuance of City easement rights in former C Street
Boston Water & Sewer Commission	Site Plan Approval and related approvals
Boston Transportation Department	Transportation Access Plan Agreement; Construction Management Plan
Inspectional Services Department	Electrical and health permits

1.8 Development Schedule

It is anticipated that construction will commence in the third quarter of 2018 and be completed within approximately 30 months.

1.9 Public Participation

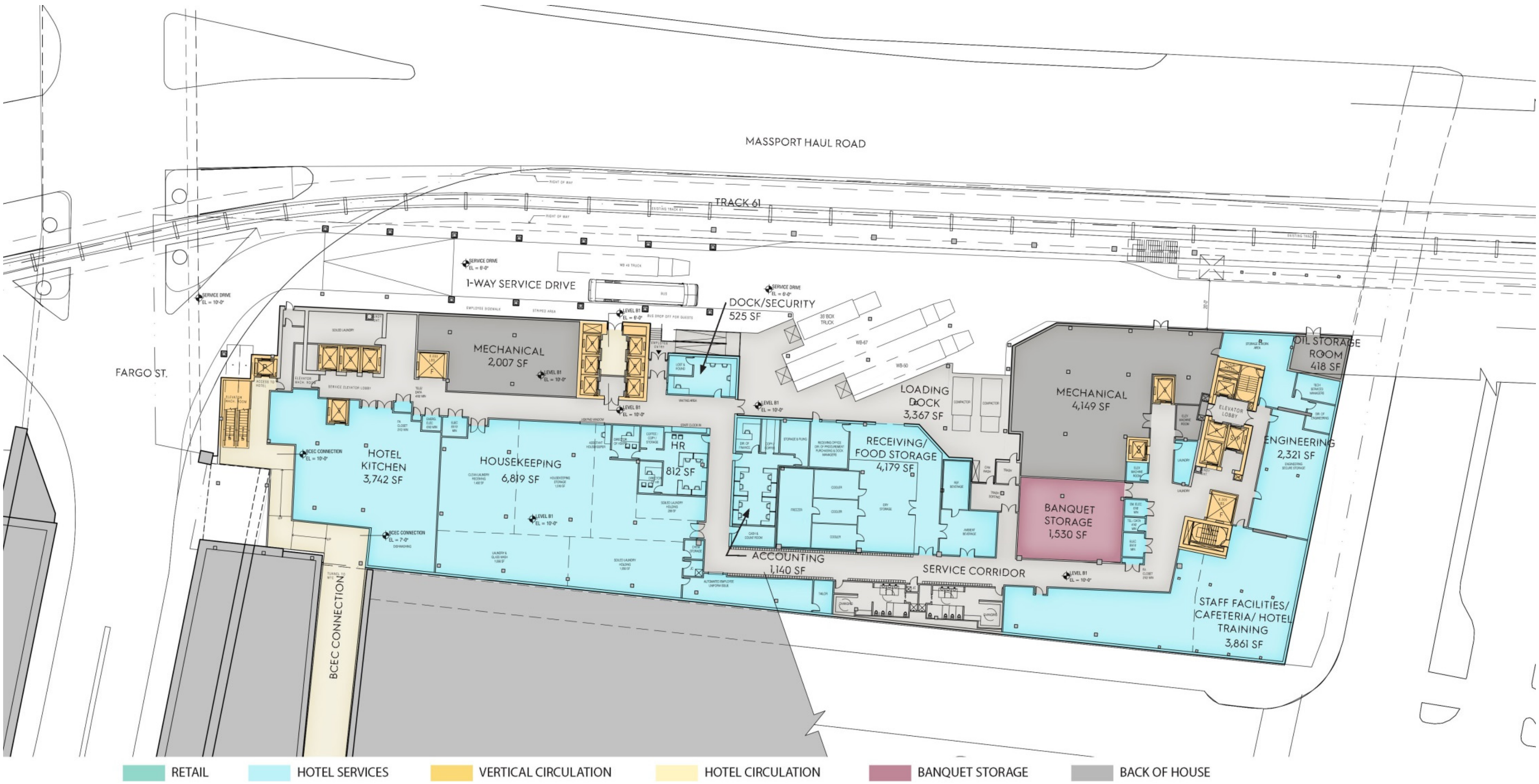
The Proponent and its Project team have met with elected officials, the City of Boston, abutters, neighborhood groups and other interested parties to discuss the Project. The Project team will continue to meet with the community as the Project moves forward.

1.10 Project Team

Proponent:	OH NBH Owner, LLC c/o The Davis Companies 125 High Street, Suite 2111 Boston, MA 02210 (617) 451-1300 Brian Fallon Dante Angelucci Jason Tilley

Architect:	Elkus Manfredi Architects 25 Drydock Avenue Boston, MA 02210 (617) 426-1300 David Manfredi Sam Norod Ross Cameron
Legal Counsel:	Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C. One Financial Center Boston, MA 02111 (617) 348-3009 Rebecca A. Lee, Esq.
Permitting Consultants:	Epsilon Associates, Inc. 3 Mill & Main Place, Suite 250 Maynard, MA 01754 (978) 897-7100 Peggy Briggs Geoff Starsiak
Transportation Consultant:	Howard Stein Hudson 11 Beacon Street, Suite 1010 Boston, MA 02108 (617) 482-7080 Guy Busa Elizabeth Peart
Civil Engineer:	Nitsch Engineering Two Center Plaza, Suite 430 Boston, MA 02108 (617) 338-0063 John Schmid
LEED Consultant:	The Green Engineer 54 Junction Square Drive Concord, MA 01742 (978) 369-8978 Sarah Michelman

MEP Engineer:	Cosentini Associates - A Tetra Tech Company 101 Federal Street, Suite 600 Boston, MA 02110 (617) 748-7800 Robert M. Leber

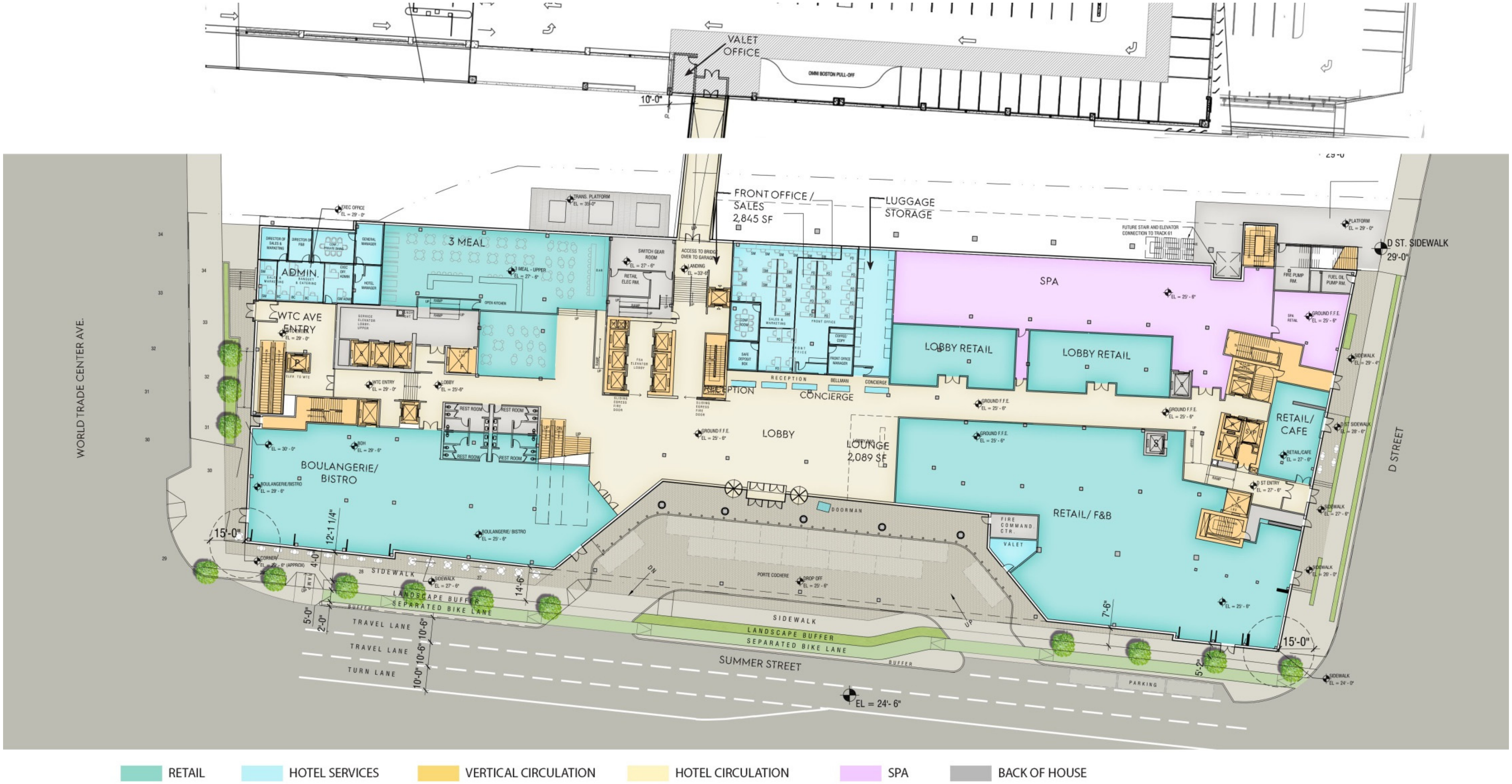


Summer Street Hotel Boston, Massachusetts

ELKUS | MANFREDI ARCHITECTS

Figure 1-4

Level B1

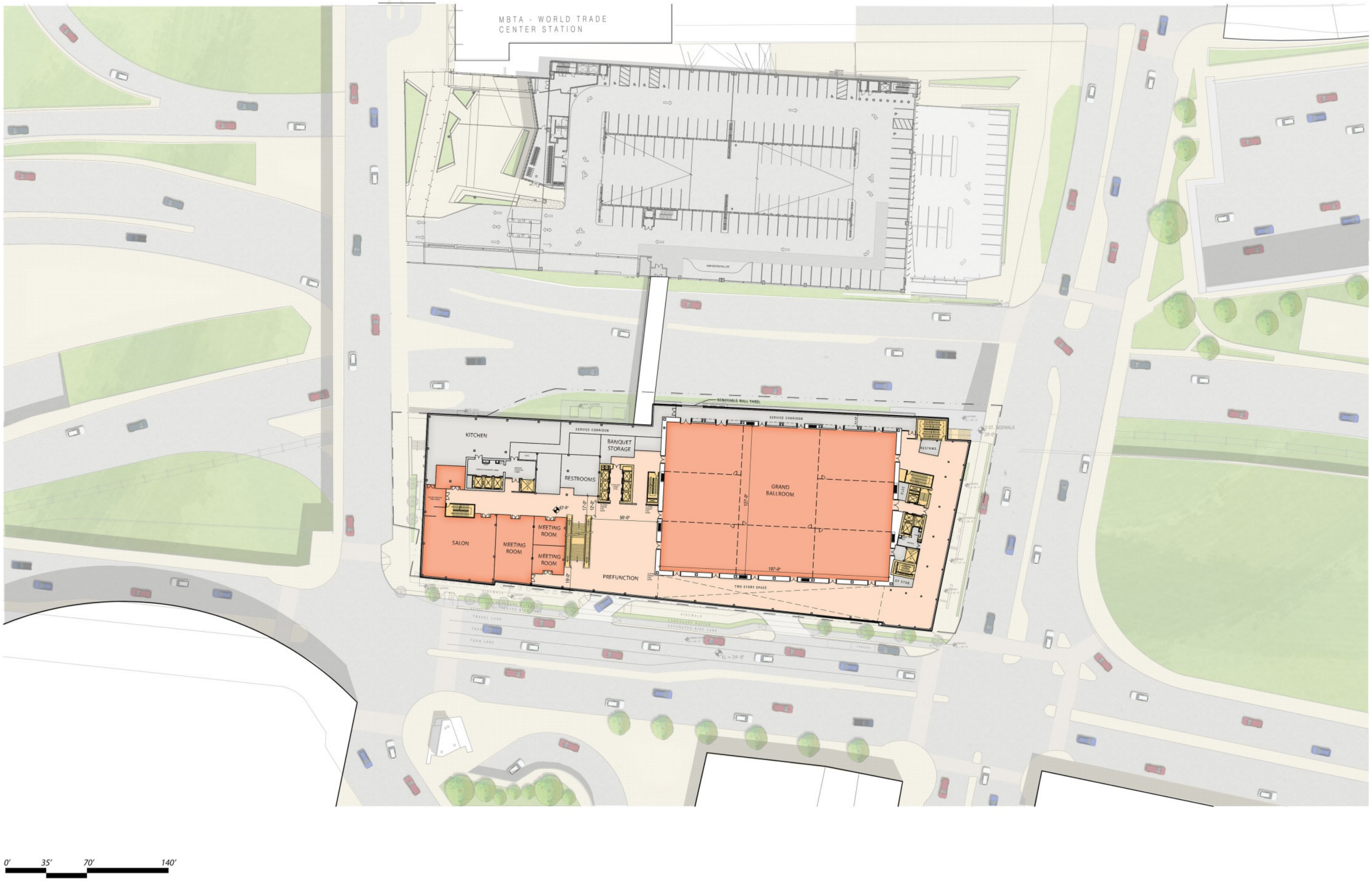


Summer Street Hotel   Boston, Massachusetts

ELKUS | MANFREDI ARCHITECTS

Figure 1-5

Level 1



Summer Street Hotel **Boston, Massachusetts**

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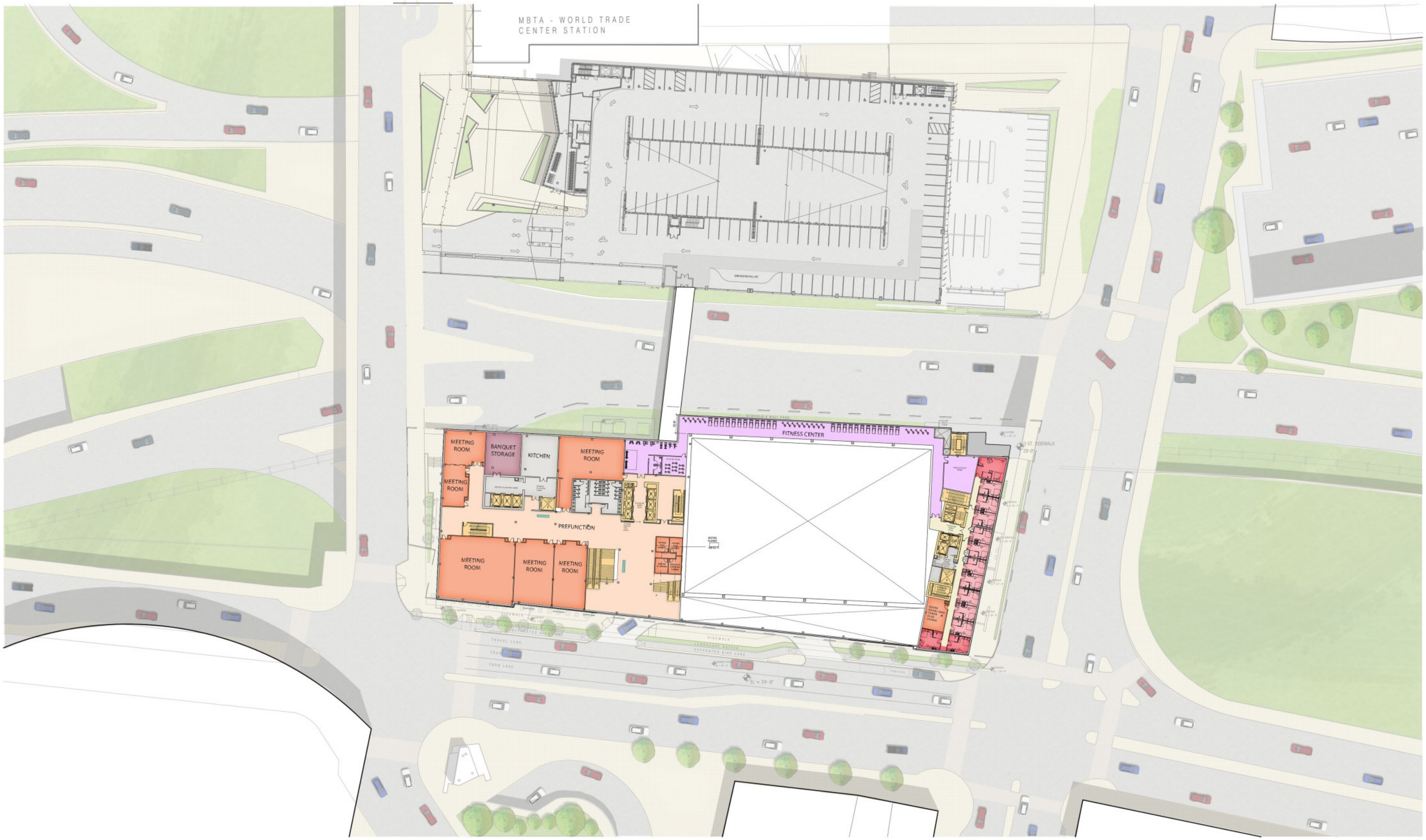
Figure 1-6
Level 2



Summer Street Hotel **Boston, Massachusetts**

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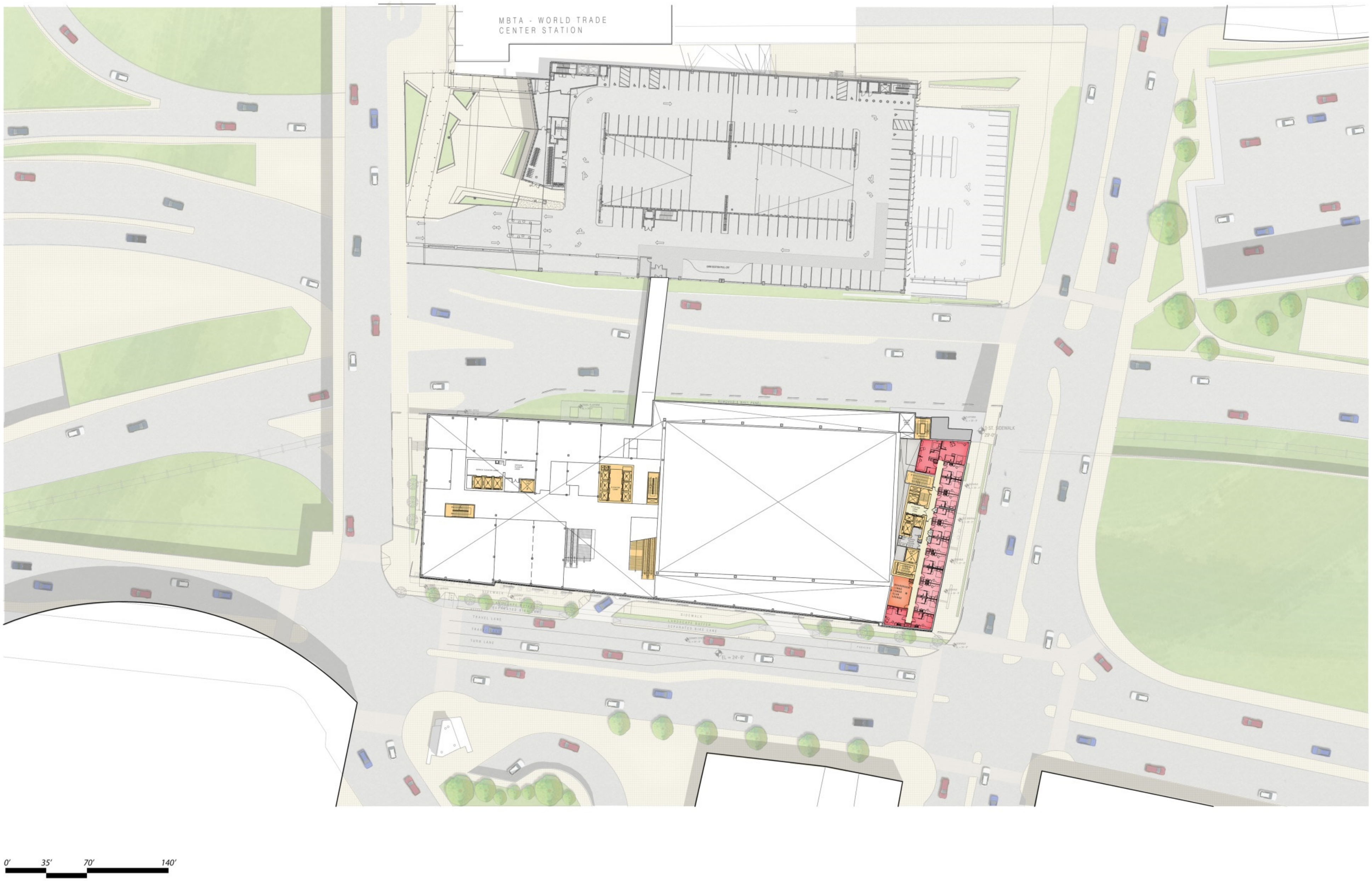
Figure 1-7

Level 3



Summer Street Hotel Boston, Massachusetts

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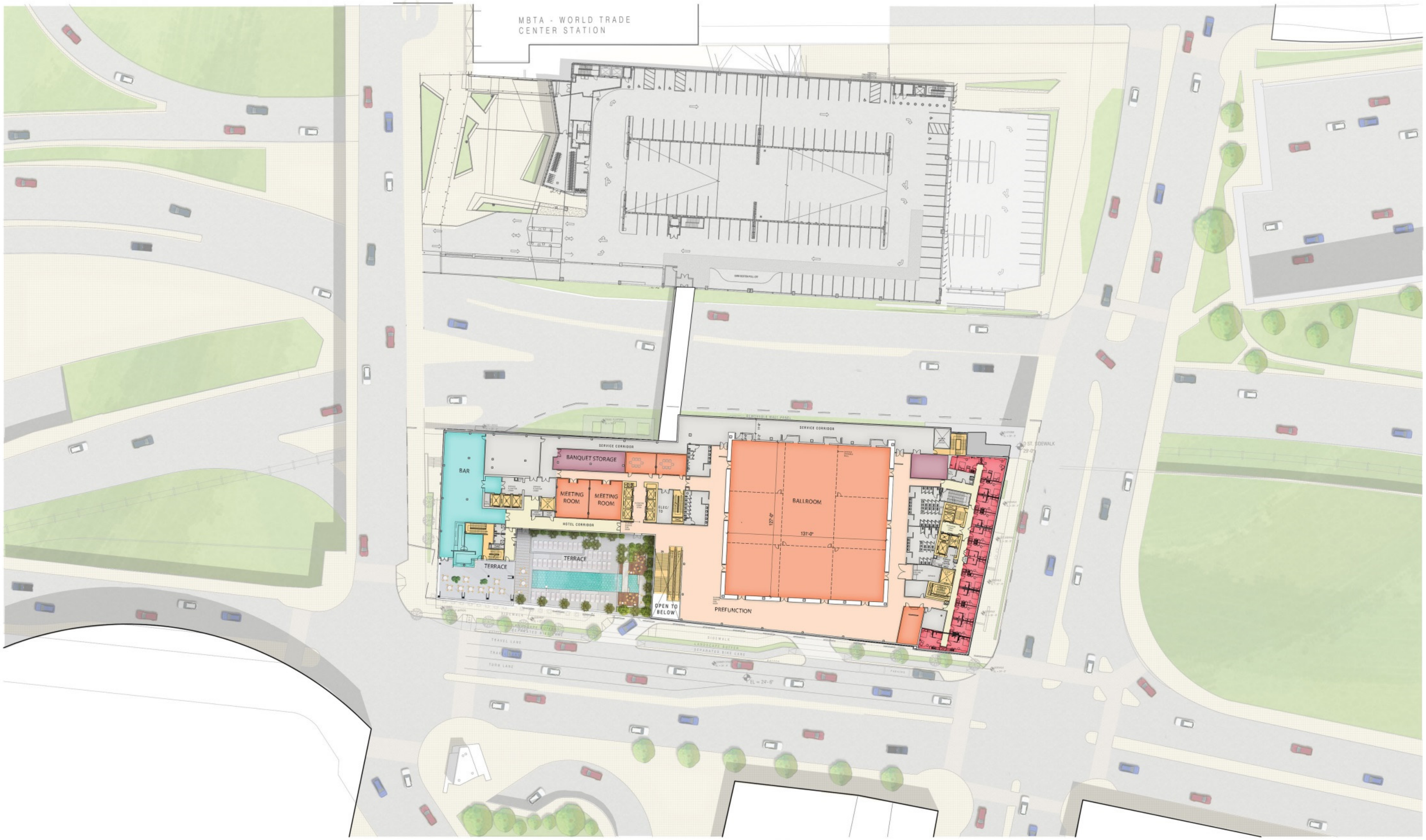
Figure 1-8
Level 3 Mezzanine

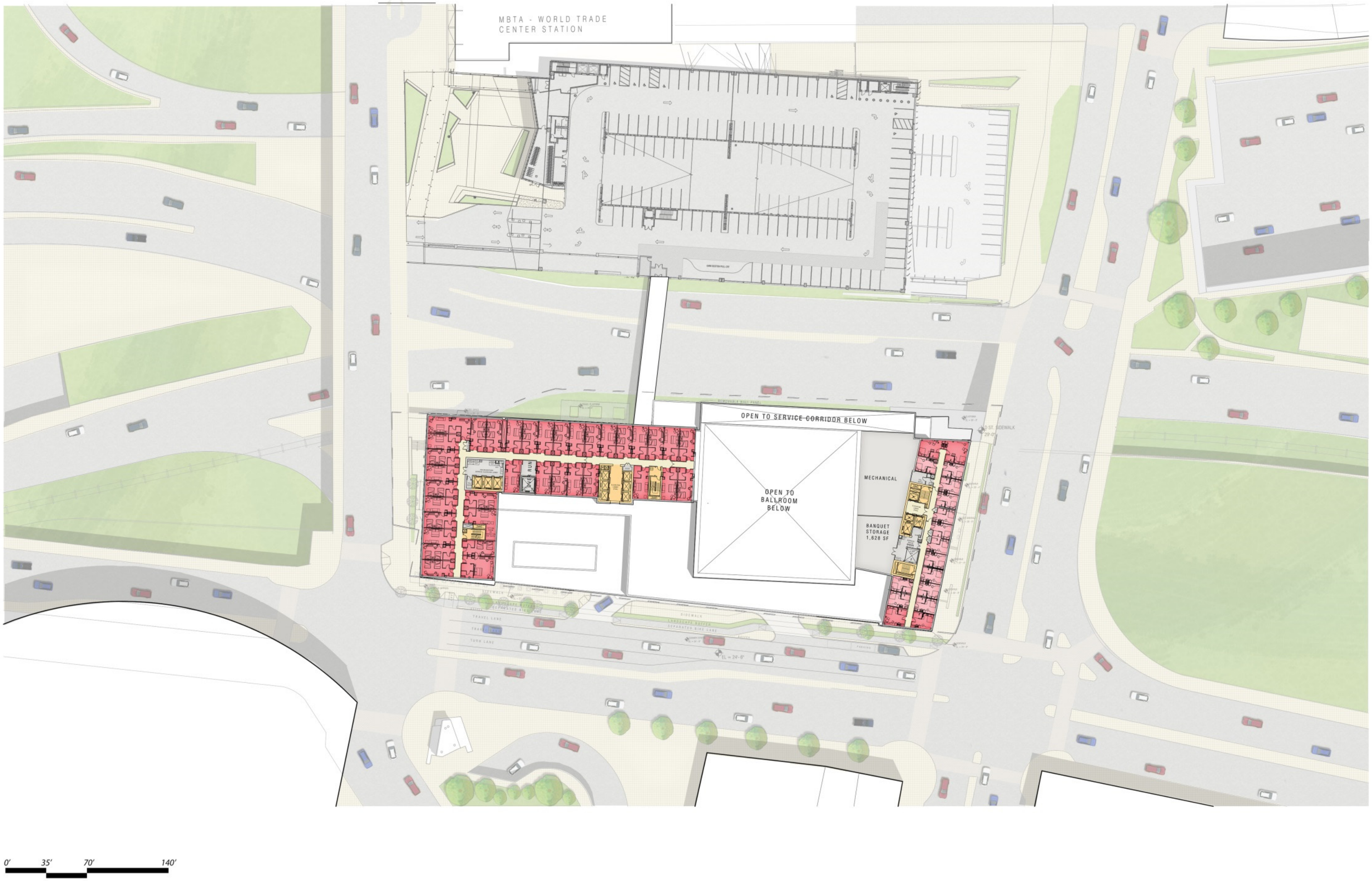


0' 35' 70' 140'

Summer Street Hotel Boston, Massachusetts

ELKUS | MANFREDI ARCHITECTS

Figure 1-9
Level 4



Summer Street Hotel **Boston, Massachusetts**

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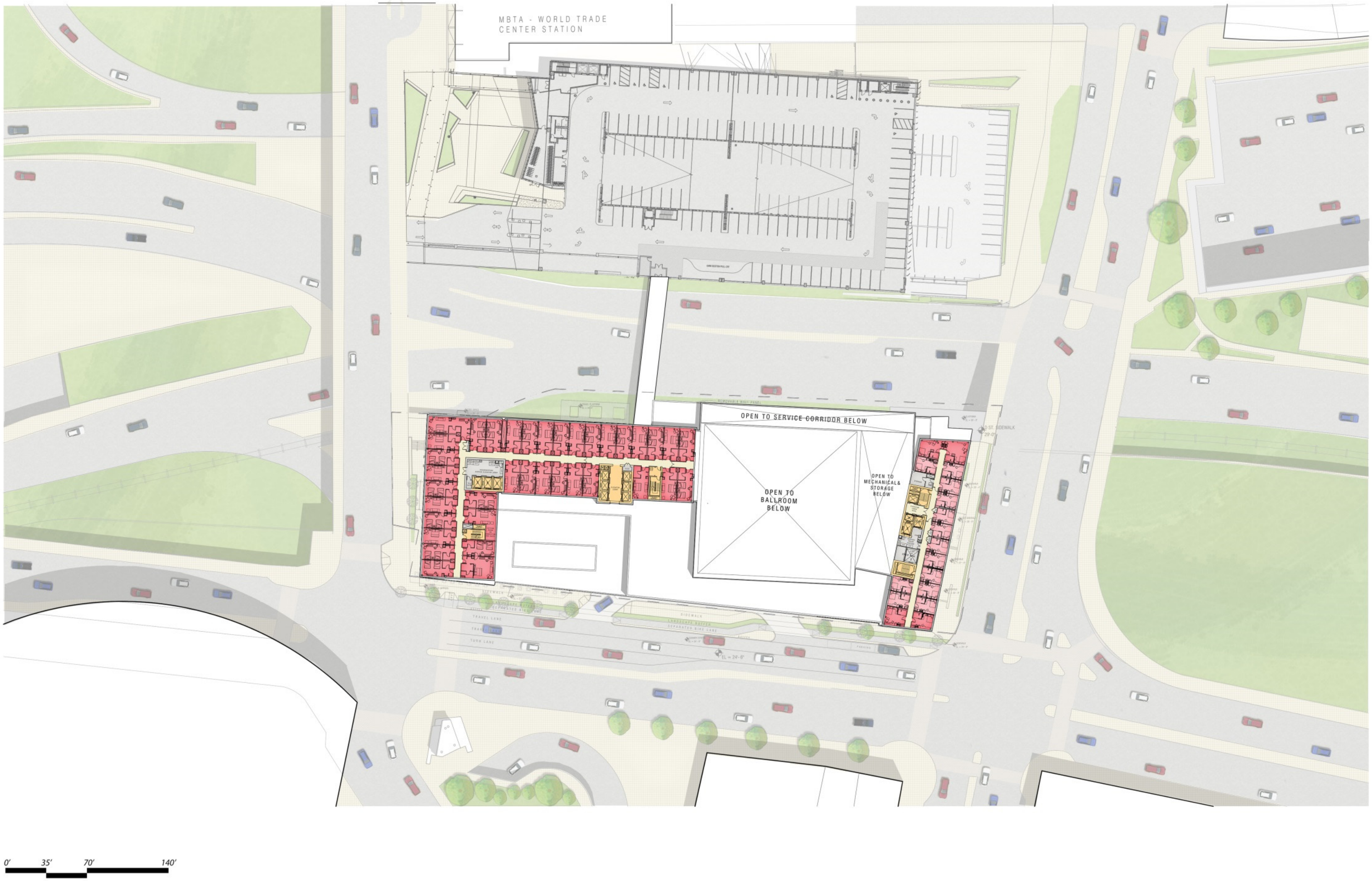
Figure 1-10
Level 5



Summer Street Hotel Boston, Massachusetts

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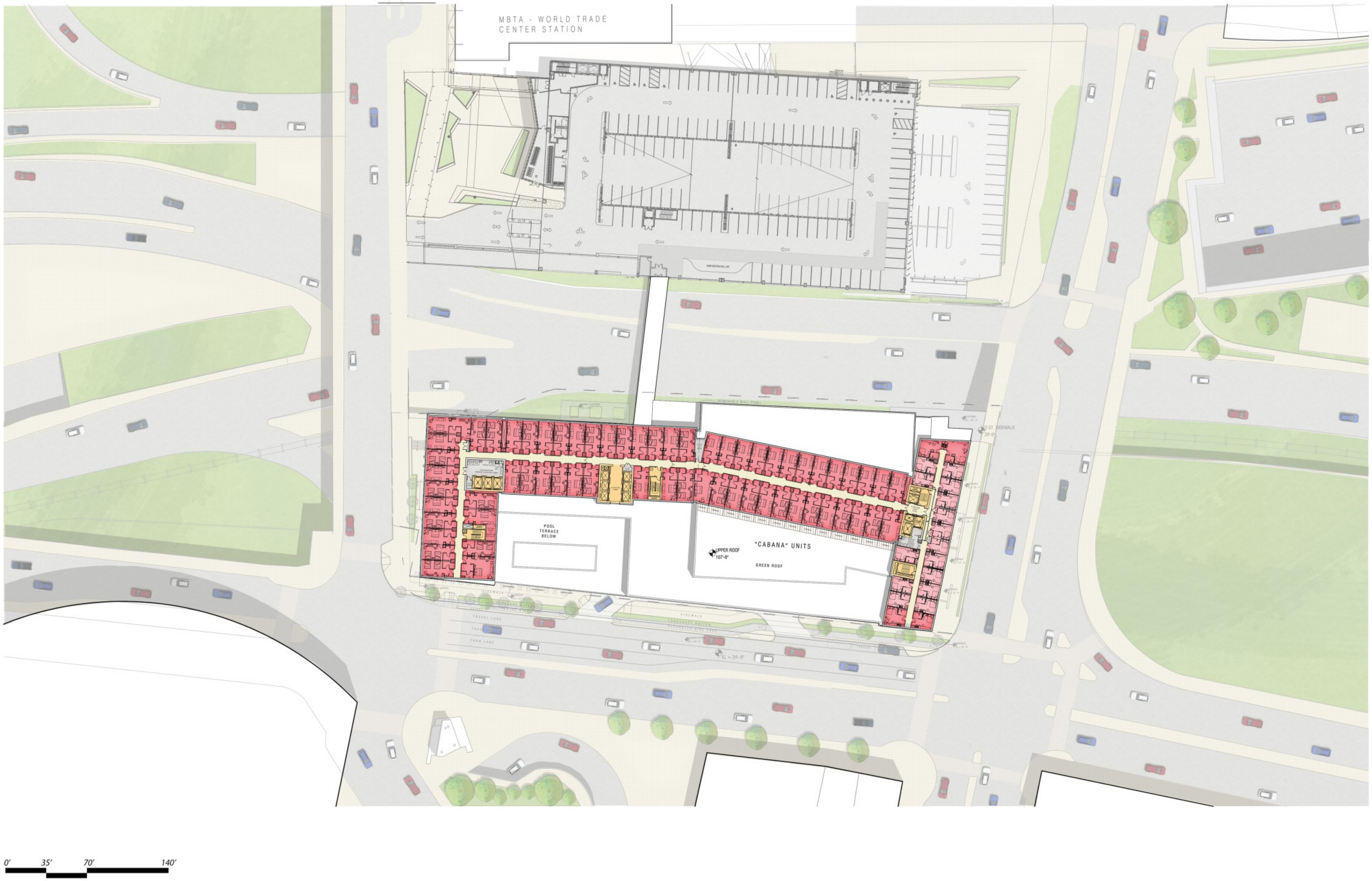
Figure 1-11
Level 6



Summer Street Hotel **Boston, Massachusetts**

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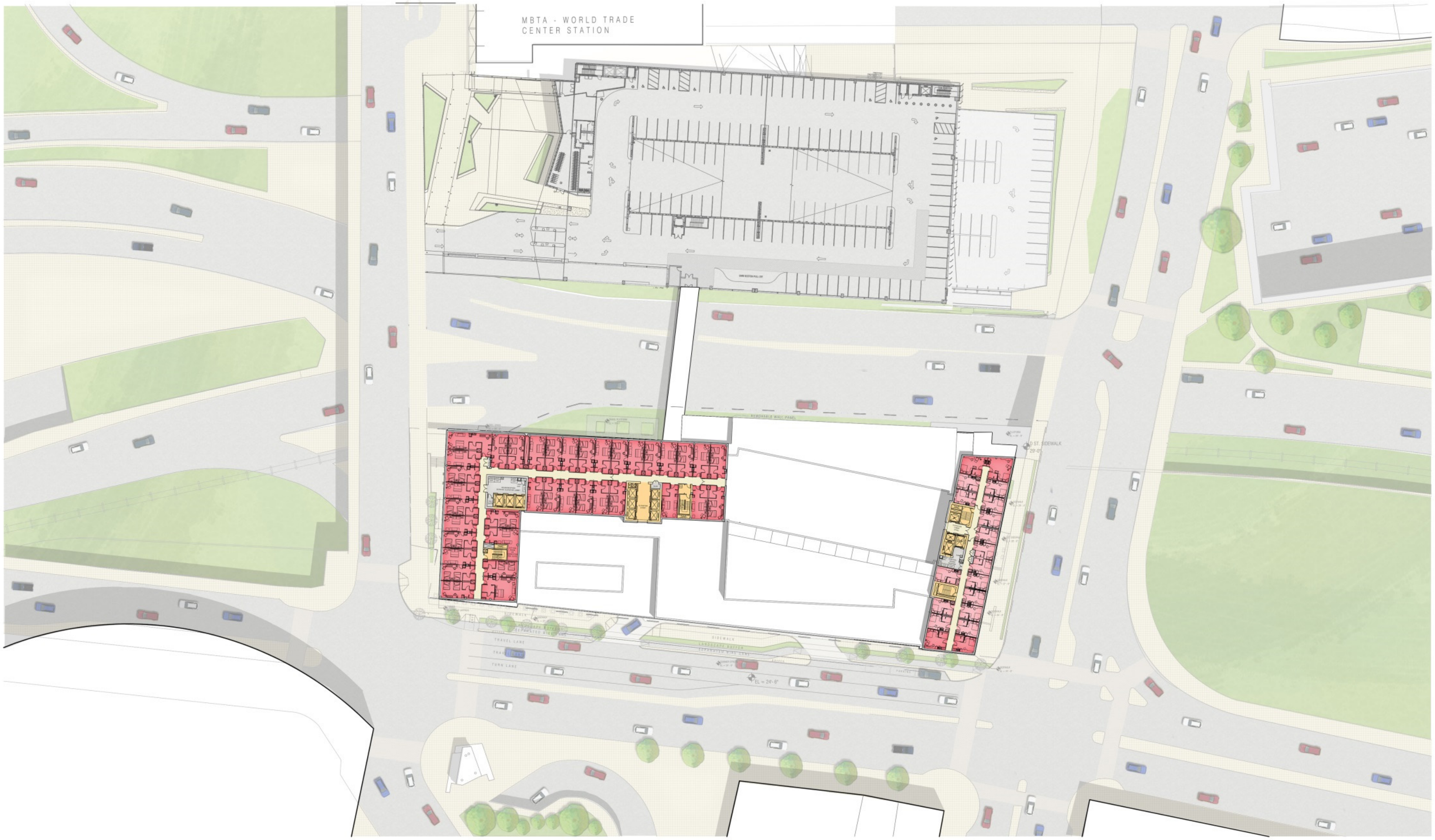
Figure 1-12
Levels 7 to 10



0' 35' 70' 140'

Summer Street Hotel **Boston, Massachusetts**

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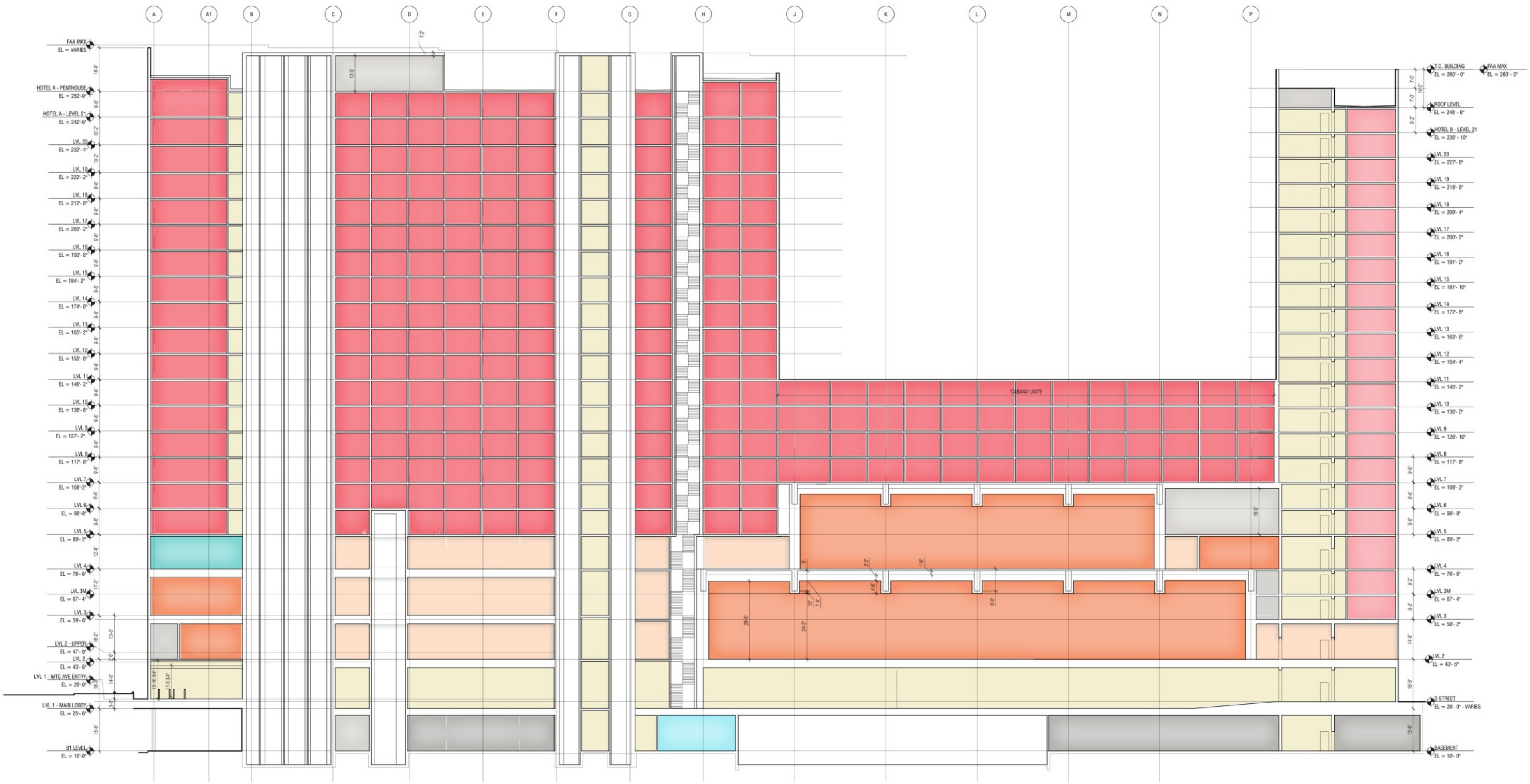
ARCHITECTS

Figure 1-13
Levels 11 to 21



Summer Street Hotel **Boston, Massachusetts**

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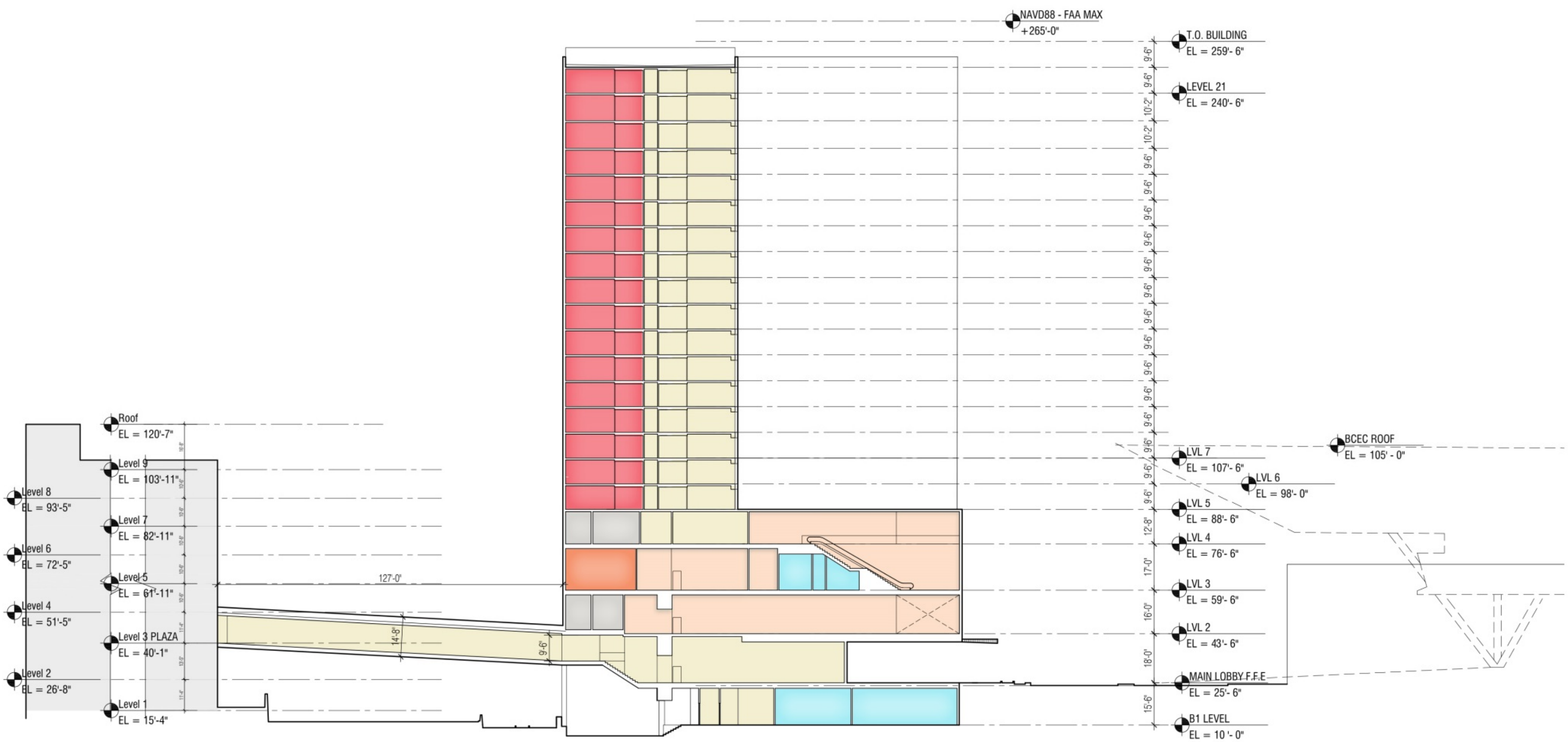
Figure 1-14

Section: East-West



Summer Street Hotel Boston, Massachusetts

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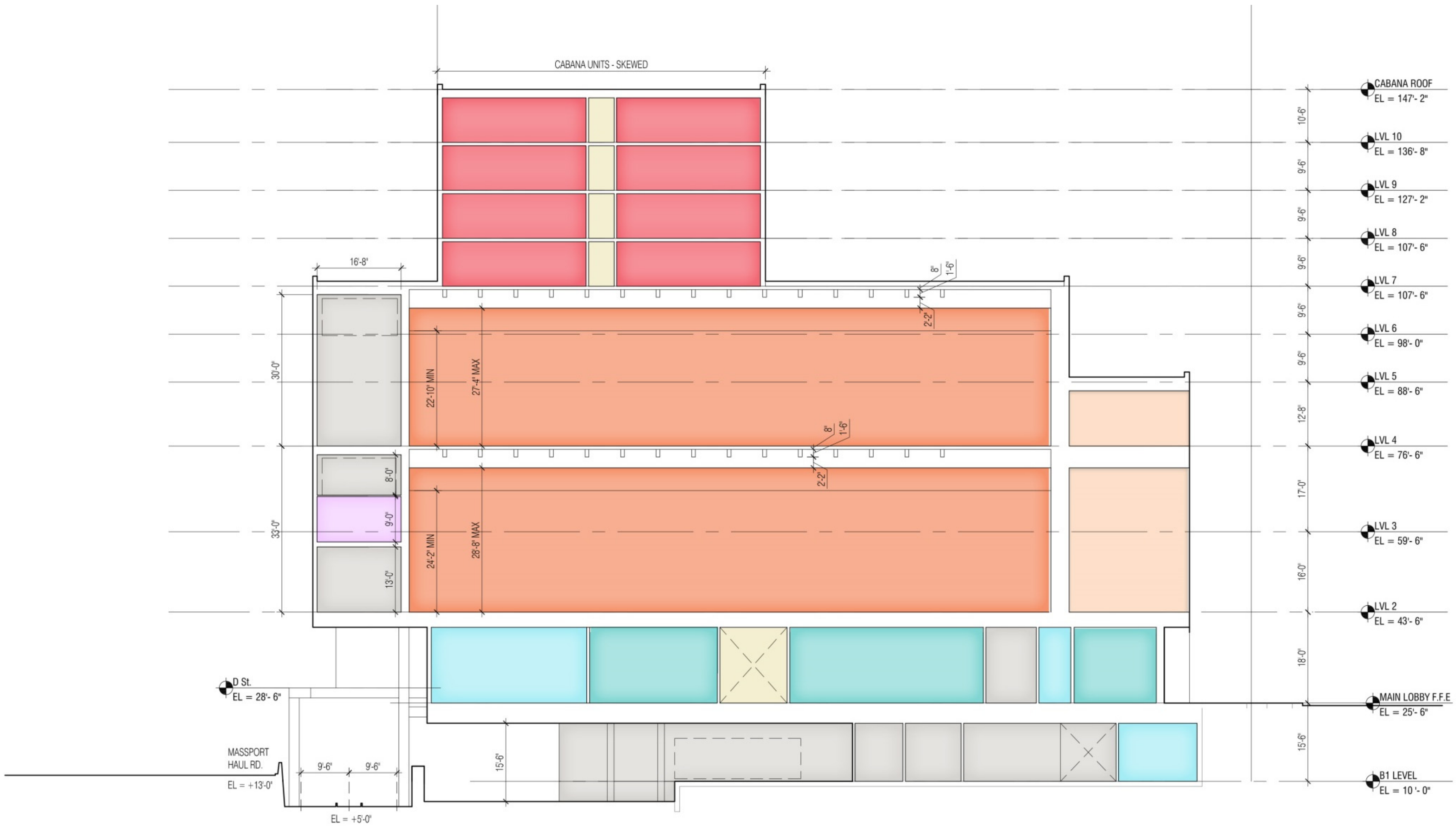
Figure 1-15

Section: North-South



Summer Street Hotel **Boston, Massachusetts**

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Figure 1-16

Section: North-South (Podium Enlarged)

Summer Street Hotel **Boston, Massachusetts**

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Figure 1-17
South Elevation

Summer Street Hotel **Boston, Massachusetts**

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Figure 1-18
West Elevation

Summer Street Hotel **Boston, Massachusetts**

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Figure 1-19
East Elevation

Summer Street Hotel **Boston, Massachusetts**

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Figure 1-20
North Elevation

Chapter 2

Transportation

2.0 TRANSPORTATION

2.1 Overview

Howard Stein Hudson (HSH) has conducted an evaluation of the transportation impacts of the proposed changes to the Project Site. This NPC transportation study focuses on the traffic impacts associated with the net change in the proposed Project program, and includes an assessment of existing conditions and future conditions.

2.1.1 Project Description

Table 2-1 compares the Previously Approved Project with the Project, as described in detail in Chapter 1.

Table 2-1 Summer Street Program

Land Use	Previously Approved Project	Project	Difference
Hotel	300 keys (rooms)	1,054 keys (rooms)	+ 754 keys (rooms)
Retail/Restaurant	Restaurant[1]: 10,500 sf Retail[1]: 279,500	Restaurant: 35,000 sf Retail: 5,000 sf	-250,000 sf

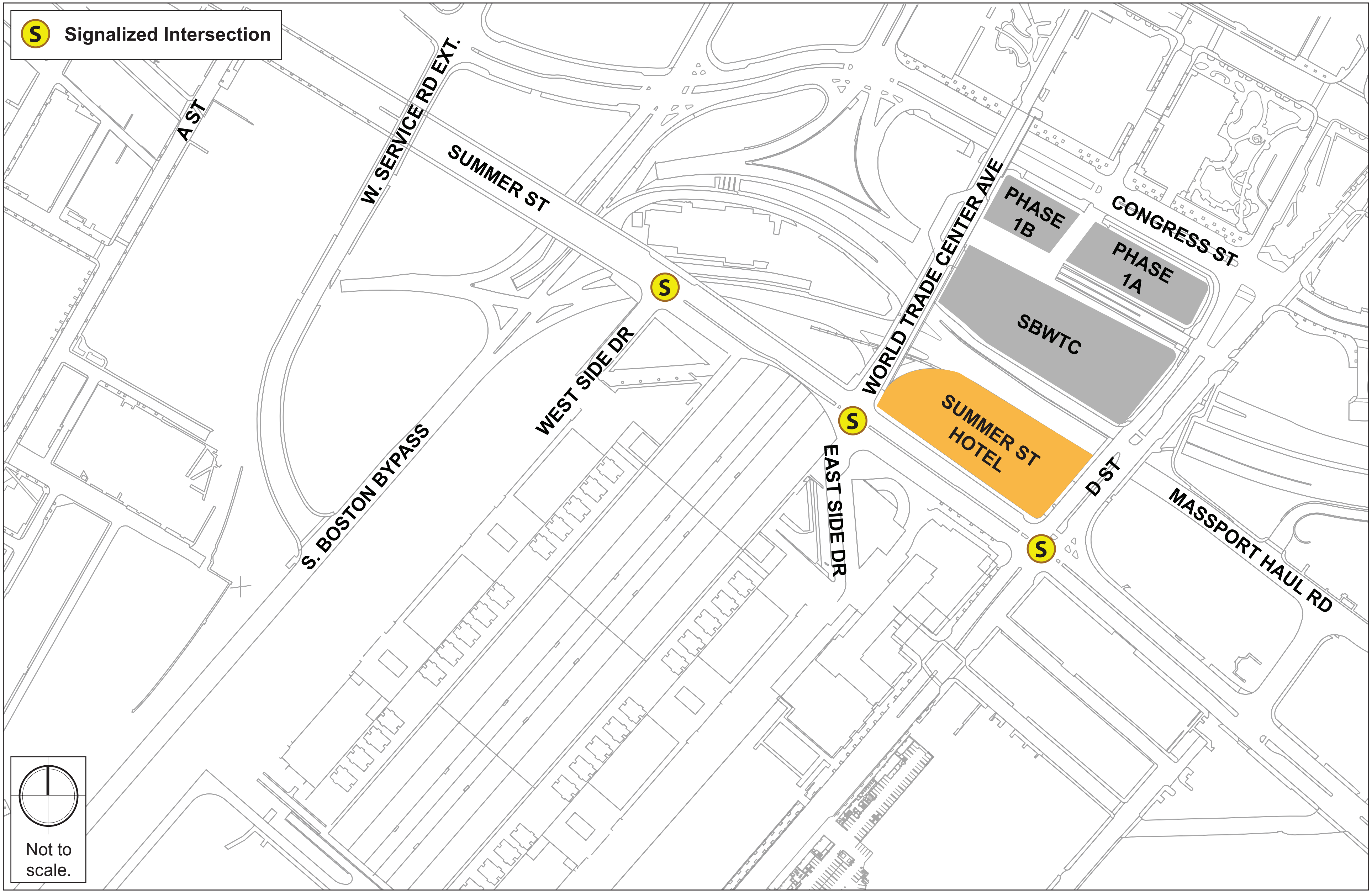
[1] The detail of the retail program specifically for Parcel D2 relative to the whole of the Waterside Place Project was not specified within the DPIR. The 290,000 sf of restaurant/retail was estimated based on available information.

The key differences in the Project are an increase in hotel rooms and a decrease in retail/restaurant space. Approximately 61,500 sf of conference/banquet space in the hotel will accommodate events that will occur primarily during evenings and on weekends. Parking for the Project will be provided in the adjacent SBWTC. A covered pedestrian walkway will span over the Massport Haul Road, connecting the SBWTC directly to the Project Site. Additionally, a previously constructed, but unused, pedestrian tunnel under Summer Street will be activated to allow a direct, internal connection between the Project Site and the BCEC, subject to the negotiation and legal agreement with the MCCA, the owner of the BCEC.

2.1.2 Study Area

The Project Site and other component parcels of the Waterside Place Project (Phase 1A, Phase 1B, and the SBWTC) are shown in Figure 2-1. The study area for the traffic impact analysis includes the three signalized intersections adjacent to the Project Site:

- Summer Street/D Street
- Summer Street/World Trade Center Avenue/East Side Drive
- Summer Street/West Side Drive



Summer Street Hotel **Boston, Massachusetts**

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Figure 2-1
Study Area Intersections

2.1.3 Study Methodology

Key components of the transportation study are identified below:

- The Existing (2017) Conditions presented in Section 2.2 includes an inventory of the existing roadway and intersection conditions, traffic volumes, and available transit services.

- The future transportation impacts are evaluated for Year 2024, based on a seven-year horizon from the year of the filing of this traffic study, and include two conditions:

    - The No-Build (2024) Condition, presented in Section 2.3, incorporates general background traffic growth and growth associated with specific developments. This condition incorporates the hotel program as reflected in the Waterside Place DPIR dated February 26, 2007 and is referred to in this study as the Previously Approved Project (2024) Condition.

    - The Build (2024) Condition, presented in Section 2.4, includes the change in Project Site generated volumes as compared to the Previously Approved Project (2024) Condition. Vehicle and pedestrian circulation at the site, delivery activity and loading dock facilities, and parking are presented. This Build Condition is referred to in this study as the Current NPC Project (2024) Condition.

- Intersection capacity analysis for all conditions is provided in Section 2.5. Travel demand management strategies to reduce automobile travel are presented in Section 2.6.

The traffic analysis in this study adheres to the Boston Transportation Department (BTD) Transportation Access Plan Guidelines and BPDA Article 80 development review process, as well as the guidelines of the EEA/Massachusetts Department of Transportation (MassDOT) Guidelines for Environmental Impact Report/Environmental Impact Statement Traffic Impact Assessments (TIAs) for MEPA review.

2.2 Existing Conditions

This section includes descriptions of existing study area roadway geometries, intersection traffic control, peak hour traffic volumes, and public transportation availability.

2.2.1 Existing Roadway Conditions

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

Summer Street, under jurisdiction of the City of Boston, is an urban principal arterial that runs generally east–west between Washington Street in Downtown Crossing to the west and East Second Street in South Boston to the east, where it then becomes L Street within the study area. Summer Street has two lanes in each direction. On-street parking is allowed on various sections of Summer Street throughout the study area. Sidewalks are provided on both sides of the street. Pavement markings on Summer Street are in good condition in the study area and vary from 9 to 40 feet wide.

D Street is an urban minor arterial south of Summer Street and an urban extension of a minor arterial north of Summer Street. South of Summer Street, D Street is under the jurisdiction of the City of Boston, while north of Summer Street, it is under Massport jurisdiction. D Street runs generally north–south between Seaport Boulevard to the north and Dorchester Avenue to the south. D Street generally consists of two lanes in each direction separated by a raised median north of Summer Street. North of Congress Street, the D Street north- and southbound approaches diverge into two one-way sections in what is known as the "D Street Couplet." At Northern Avenue, the north- and southbound roadways are separated by the South Boston Maritime Park. Parking is allowed only between Ramp DB and Congress Street on the east side, and is unrestricted on the east side of D Street, south of Summer Street. Sidewalks are located on both sides of D Street throughout the study area, and are generally in good condition and vary from 7 to 15 feet wide.

World Trade Center Avenue, a local street under the jurisdiction of Massport, is an elevated north-south roadway, which connects the World Trade Center with Summer Street. The roadway is 30 feet wide and has one travel lane in each direction. While the roadway extends through to the World Trade Center, general traffic is prohibited from travelling beyond the turnaround driveway at the Seaport Hotel. Parking (and stopping) is prohibited along the roadway. Sidewalks are provided on both side of the roadway. A headhouse for the MBTA's WTC Silver Line Station is located on World Trade Center Avenue, providing a pedestrian connection between the elevated World Trade Center Avenue and the lower Congress Street level.

2.2.2 Existing Intersection Conditions

Existing conditions at the study area intersections are described below.

Summer Street/D Street is a four-leg, signalized intersection at the southeasterly corner of the Project Site. The Summer Street eastbound approach consists of an exclusive left-turn lane, an exclusive through lane, and a shared through/right-turn lane. Summer Street westbound consists of a shared left-turn/through lane, a through lane, and a channelized exclusive right-turn lane. D Street northbound is a three-lane approach with an exclusive left-turn lane, a through lane, and a shared through/right-turn lane with an eight-foot adjacent parking lane. Southbound D Street is a three-lane approach with an exclusive left-turn lane, a shared left-turn/through lane, and a shared through/right-turn lane. Parking is allowed along the north side of Summer Street west of the intersection, and along both sides of D Street south of the intersection. All approaches have crosswalks and ADA compliant pedestrian ramps. Pedestrian pushbuttons activate concurrent pedestrian phases at the intersection.

Summer Street/World Trade Center Avenue/East Side Drive is a four-leg, signalized intersection at the southwesterly corner of the Project Site. The Summer Street eastbound approach consists of an exclusive left-turn lane, an exclusive through lane, and a shared through/right-turn lane. Summer Street westbound consists of an exclusive left-turn lane, an exclusive through lane, and a shared through/right-turn lane. The East Side Drive northbound approach consists of an exclusive left-turn lane and a shared through/right-turn lane. World Trade Center Avenue southbound consists of an exclusive left-turn lane and a shared through/right-turn lane. Parking is allowed along the north side of Summer Street only. All approaches have crosswalks and ADA compliant pedestrian ramps. Pedestrian pushbuttons activate an all pedestrian phase at the intersection.

Summer Street/West Side Drive is a three-leg, signalized intersection located southwest of the Project Site. The Summer Street eastbound approach consists of an exclusive through lane and a shared through/right-turn lane. Summer Street westbound consists of an exclusive left-turn lane and two exclusive through lanes. The West Side Drive northbound approach consists of an exclusive left-turn lane and an exclusive right-turn lane. Metered parking is allowed along the north side of Summer Street only, and visitor parking (10 minute limit) is allowed along the west side of West Side Drive only. All approaches have crosswalks and ADA-compliant pedestrian ramps. Pedestrian pushbuttons activate an all-pedestrian phase at the intersection.

2.2.3 Existing Traffic Data

Traffic volume data were collected at Summer Street/D Street and Summer Street/World Trade Center Avenue/East Side Drive on Tuesday, November 1, 2016. The weather was fair with no precipitation and a temperature high of 51 degrees Fahrenheit. On this date, the Citizens Housing and Planning Association (CHAPA), a non-profit umbrella organization for affordable housing and community development activities in Massachusetts, held its 49th annual dinner at the BCEC. The event started at 5:30 p.m. and was attended by over 1,000 members. Also, the New England Council (NEC), the nation's oldest regional business organization, held its annual "New Englander of the Year" awards dinner at the Seaport Hotel/World Trade Center. This gala event started at 4:30 p.m. and was attended by about 1,800 guests. Peak hour counts at the intersection of Summer Street/West Side Drive were collected on May 31, 2017. The weather was fair with no precipitation and a temperature high of 68 degrees Fahrenheit. The only major event in the area was the "Lawyers Have Heart" 5K road race and celebration, which was based at the Blue Hills Bank Pavilion. Registration started at 5:00 p.m. and about 1,800 runners participated.

The count data reflects activity representative of typical conditions in the South Boston waterfront district.

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 Existing (2017) weekday a.m. peak hour and weekday p.m. peak hour traffic volumes are shown in Figures 2-2 and 2-3, respectively. Detailed traffic count data are provided in Appendix B.

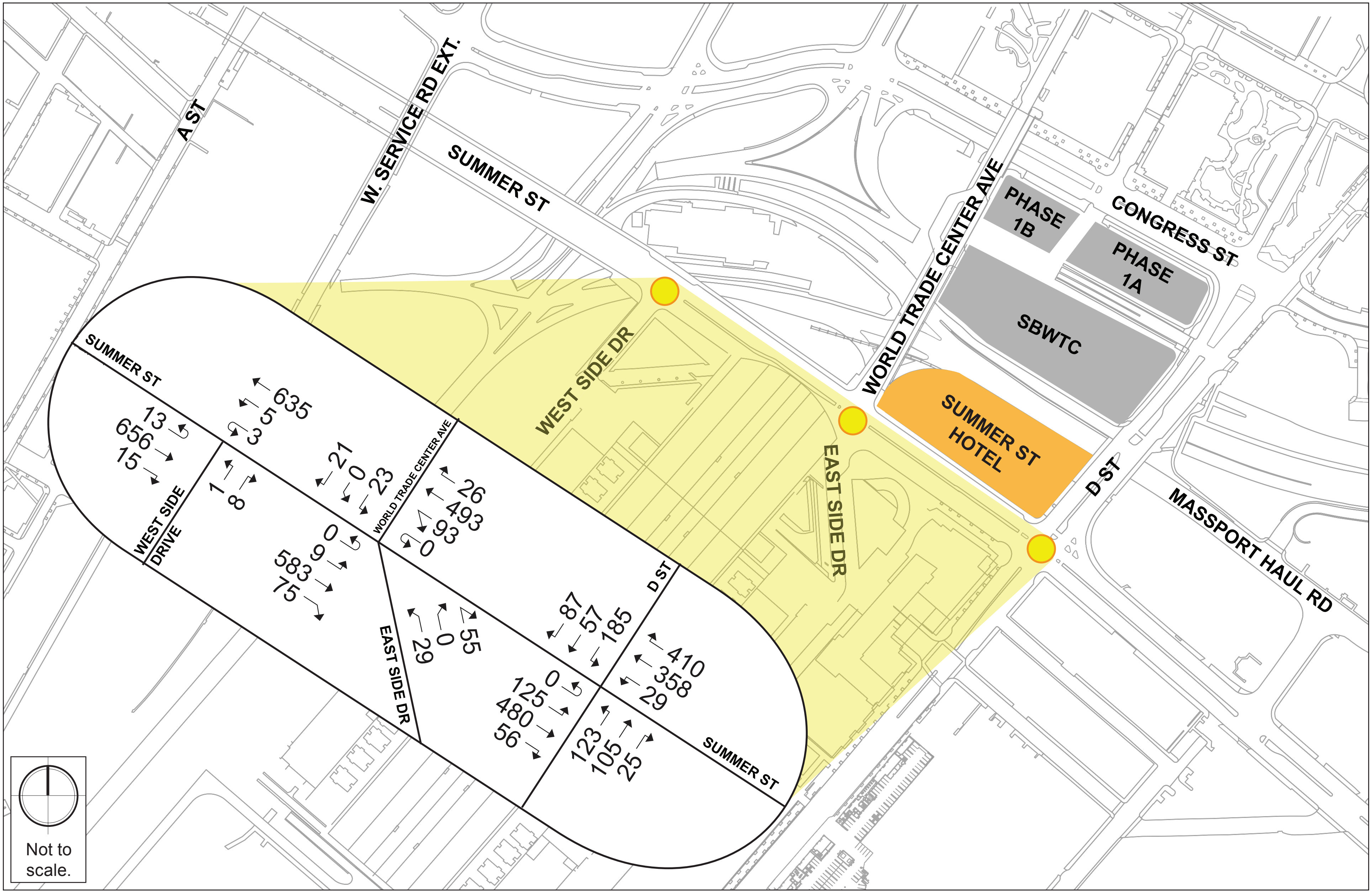
2.2.4 Existing Public Transportation

The Project Site is within 7/10 mile (15 minute walk) of South Station, a transportation hub that provides access to the MBTA Red Line, Silver Line, and eight commuter rail branches. In addition, the MBTA Silver Line Courthouse and World Trade Center stations are located near the Project Site. The MBTA operates six bus routes, as well as two Silver Line routes, near the Project Site as well. South Station is also the terminus for Amtrak train service along the Northeast Corridor. Greyhound and Peter Pan provide regional and commuter bus service from South Station. Boston Harbor Cruise's City Water Taxi provides year-round water shuttle service in Boston's Inner Harbor. Several water taxi pick-up and drop-off locations operate in the South Boston waterfront area and provide connecting service to North Station, downtown, Charlestown, and East Boston, including Logan International Airport. Nearby public transportation services are mapped in Figure 2-4 and listed in Table 2-2.

Table 2-2 Existing Public Transportation Services

Service	Description	Rush-hour Headway (minutes)*
Subway Routes		
Red Line	Alewife – Braintree/Ashmont	9
Bus Routes		
SL1 SL2	South Station – Logan Airport/South Boston Design Center/South Boston – South Station	8 – 10 minutes 5 min (or less)
4	North Station – World Trade Center	15
7	City Point – Otis & Summer Streets	4-7
11	City Point – Downtown Crossing	6
448	Marblehead – Downtown Crossing	60
449	Marblehead – Downtown Crossing	60
459	Salem Depot – Downtown Crossing	75

*Headway is the time between trains/buses.



Summer Street Hotel Boston, Massachusetts

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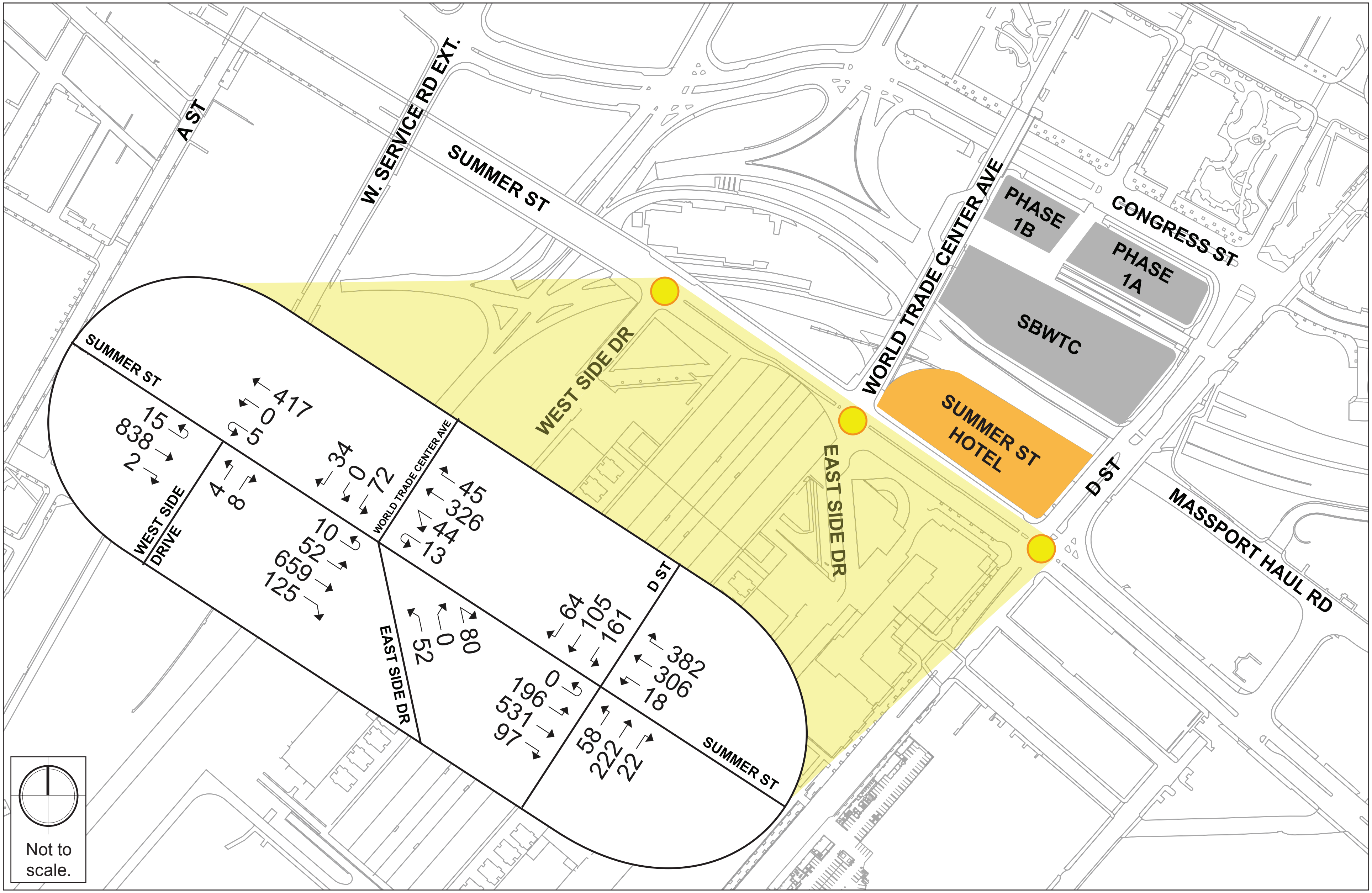
Figure 2-2
Existing (2017) Condition Traffic Volumes, a.m. Peak Hour



Summer Street Hotel   Boston, Massachusetts

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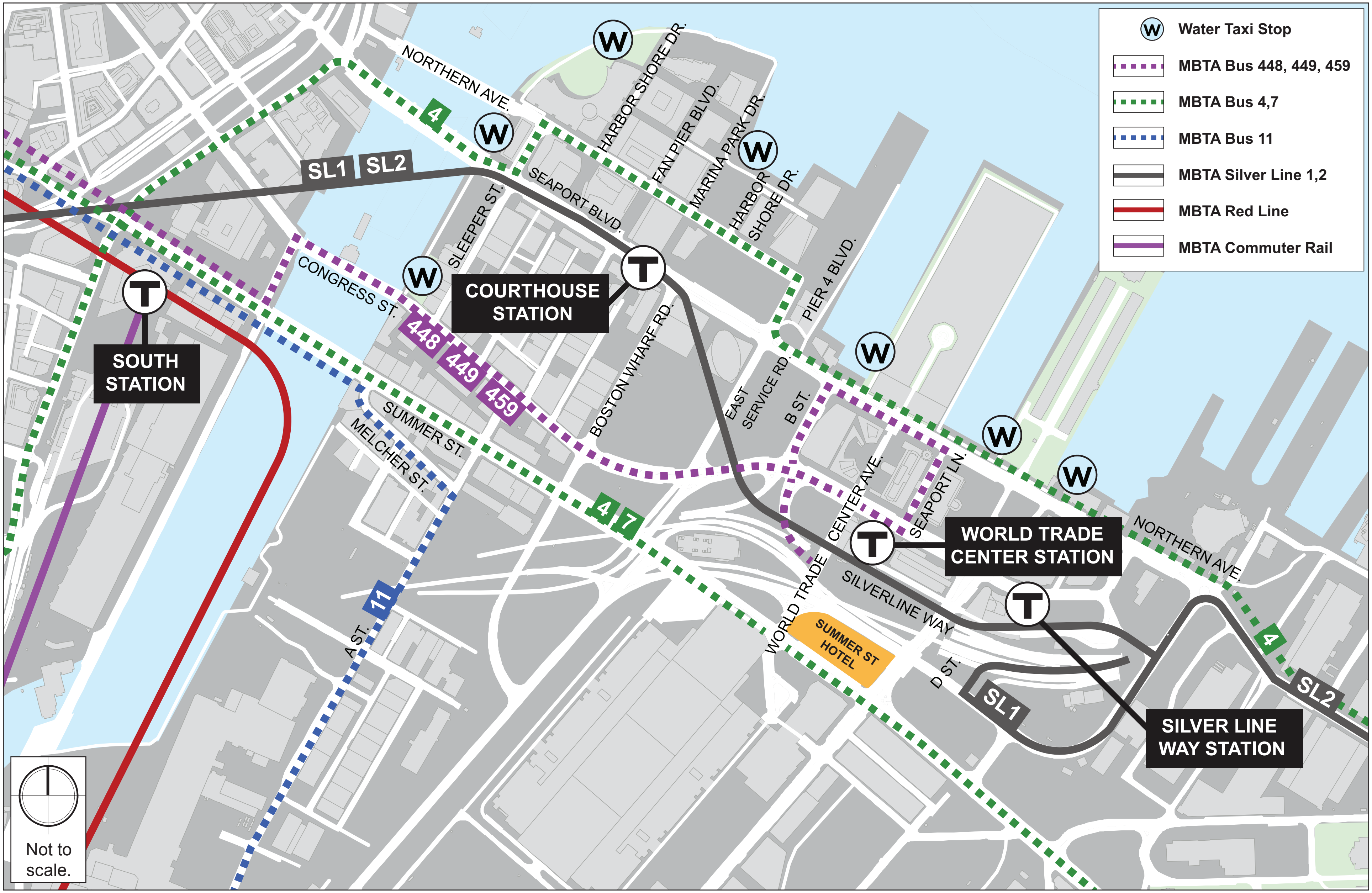
Figure 2-3
Existing (2017) Condition Traffic Volumes, p.m. Peak Hour



Summer Street Hotel **Boston, Massachusetts**

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Figure 2-4
Public Transportation

2.3 Previously Approved Project (2024) Condition

The Previously Approved Project (2024) Condition reflects a future scenario that incorporates anticipated traffic volume changes associated with traffic associated with other specific planned developments, and background traffic growth independent of any specific project. The background projects are mapped in Figure 2-5.

As discussed in Section 1.2.1, the DPIR included a mixed-use hotel/retail development on Parcel D2. The proposed development, which was approved by the BPDA and completed review under MEPA, included a 300-room hotel and approximately 230,000 square feet of retail/restaurant space with meeting rooms and a fitness center/pool. Because such a development could proceed on the Project Site without the requirement of additional transportation analysis, it has been included in the Previously Approved Project Condition.

2.3.1 Specific Development Traffic Growth

Traffic volumes associated with known development projects can affect traffic patterns throughout the study area within the future analysis time horizon. Fourteen such projects, described below, were specifically accounted for in the traffic volumes for the future condition.

General Electric Headquarters - This project calls for the construction of two buildings with a total of 388,700 sf to serve as the new headquarters campus for the General Electric Company. This project has been approved by the BPDA Board and is now under construction.

Block J/Yotel **–** This project, part of the Seaport Square development, includes 99,000 sf of hotel with 12,000 sf of ground floor retail. This hotel opened in June 2017. Although this background project is complete, the associated traffic volumes were not captured in the Project's traffic counts, which were conducted prior to the opening.

Blocks B/C - Benjamin and Via **–** This project, part of the Seaport Square development, includes 230,000 sf of retail and 832 residential units. Construction is complete and retail and residential tenants started occupying the building in June 2017. Although this background project is complete, the associated traffic volumes were not captured in the Project's traffic counts, which were conducted prior to the opening.

Fan Pier (Parcels D, E, & H) **–** These projects include 125,000 sf of office space, 29,000 sf of retail space, 150 hotel rooms, and 160 condominium units. This project is under construction. Parcel D (50 Liberty Residences) is under construction and is expected to open in fall 2017. Construction has yet to start on the other two parcels.

399 Congress Street - This project calls for the construction of a 414 unit apartment building with parking for 144 vehicles. This project has been approved by the BPDA Board.

Summer Street Hotel **Boston, Massachusetts**

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Figure 2-5
Background Projects

Block L2 - 121 Seaport – This project, part of the Seaport Square development, includes approximately 372,400 sf of office space and 59,638 sf of retail space. This project is under construction and is scheduled to open in 2018.

Block M – This project, part of the Seaport Square development, includes 750 residential units and 125,000 sf of retail. The project has been approved by the BPDA Board and is scheduled to open in 2019.

Pier 4 (Lots 2 & 3) – This project includes 353,000 sf of office space, 36,800 sf of retail space, and 106 condominium units. This project is under construction.

150 Seaport Boulevard – This project includes 124 residential units, 10,700 sf of commercial and retail space, and 179 parking spaces. This project has been approved by the BPDA Board.

Waterside Place Phase 1B (Massport)– This project includes a 23-story, 345,000 sf building containing 307 residential units, 3,700 sf of retail space, and 84 parking spaces. This project is under construction.

Marine Wharf Hotel – This project includes a 320,000 sf hotel with 411 rooms, 3,500 sf of retail space, and a 75 space parking garage. This project has been approved by the BPDA Board.

Parcel Q1 – This project includes a 298,700 sf of office building, ground floor retail, and approximately 150 parking spaces. This project was recently approved by the BPDA Board.

Parcel K – This project calls for the construction of two buildings consisting of 304 residential units, 293 hotel units, 17,928 sf of retail space, and 14,400 sf of office space with parking for 440 vehicles. This project was recently approved by the BPDA Board.

25 Fid Kennedy Avenue – This project includes rehabilitation of an approximately 157,000 sf building for use as a plumbing, HVAC, fire-protection, and related construction product assembly plant. This project has been approved by the BPDA Board.

105 West 1st Street – This project calls for the development of a seven-story, approximately 250,000 sf office/research and development building. This project has been approved by the BPDA Board.

2.3.2 Background Traffic Growth

The methodology to account for generic future background traffic growth, independent of the 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 additional unforeseen traffic growth, a traffic growth rate of one percent per year, compounded annually, was used.

The South Station Air Rights project is a 1.9 million square feet mixed-use development to be built in phases above South Station and will ultimately include an office/residential tower, a hotel and/or residential building, a mid-rise office building, and about 900 parking spaces. As part of the project, the existing bus terminal will be expanded and pedestrian connections and circulation will be improved. This project has been approved by the BPDA Board. This project will generate few new vehicle trips in the study area, and is accounted for in the background growth rate.

The SBWTC includes the construction of a new multi-modal transportation center consisting of up to 1,620 parking spaces with connections to the MBTA Silver Line and bike and car-sharing services. The facility is being developed by Massport to support development within Massport's CFDA. Because land use, and not parking capacity, generates vehicle trips, the trip activity associated with the SBWTC is reflected in specific projects.

2.3.3 Previously Approved Project (2024) Condition Traffic Volumes

The Previously Approved Project (2024) Condition traffic volumes were developed by applying a one percent annual growth rate to the Existing (2017) Condition traffic volumes, and adding volumes from the background development projects described above.

The Previously Approved Project (2024) traffic volumes for the a.m. peak hour and p.m. peak hour are shown in Figures 2-6 and 2-7, respectively.

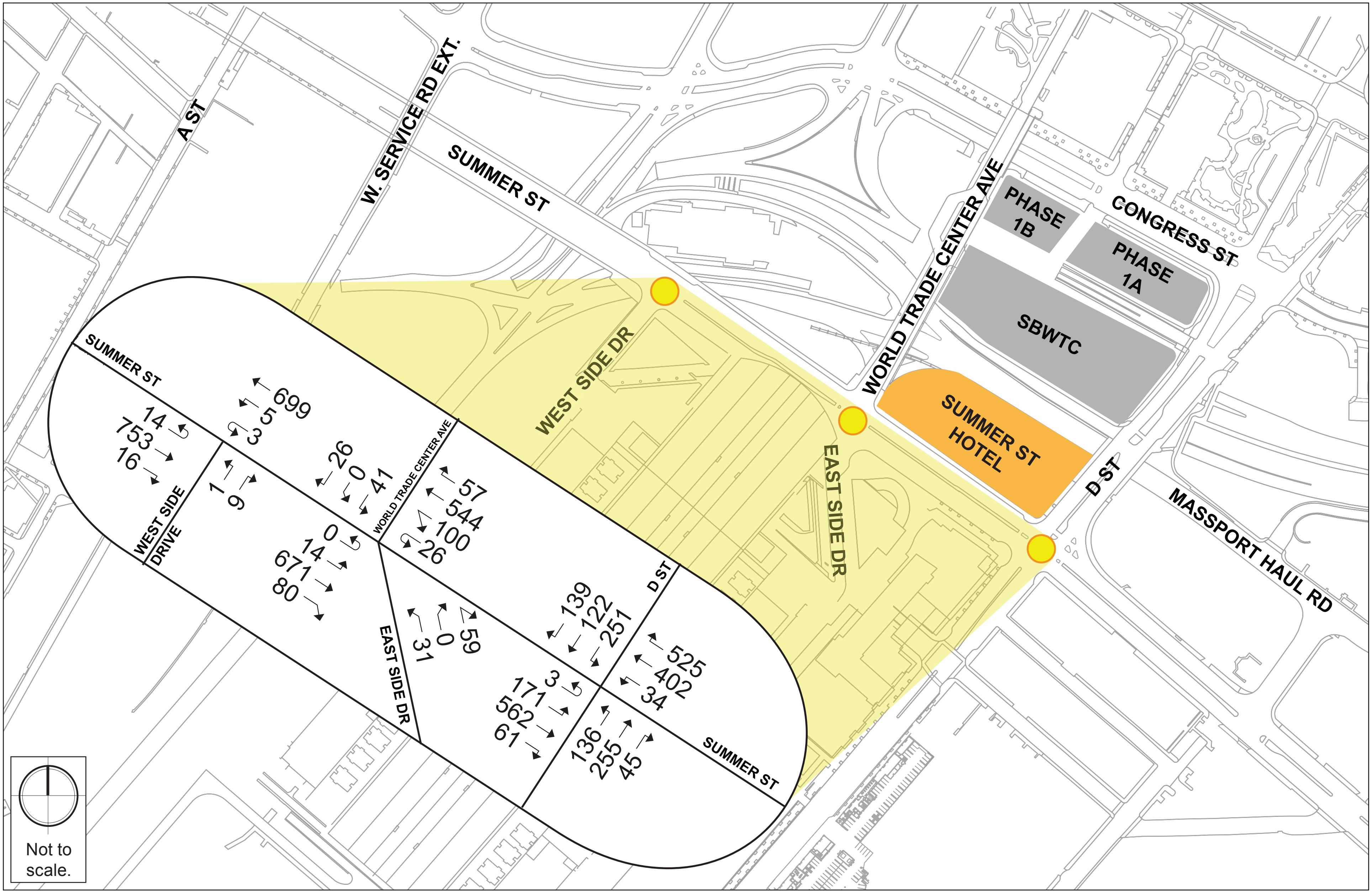
2.4 Current NPC Project (2024) Condition

As previously presented, the Project consists of an approximately 1,054-key hotel, approximately 120,000 sf of convention/banquet/pre-function space, and approximately 40,000 sf of retail/restaurant space.

2.4.1 Site Access and Vehicle Circulation

The site plan and associated pedestrian circulation is shown in Figure 2-8. The primary pedestrian entrance to the Project Site will be located in the porte-cochere on Summer Street. A second pedestrian entrance to the hotel, ground floor retail and restaurants will be provided along World Trade Center Avenue. This secondary entrance will also serve as the primary entrance to the BCEC tunnel. The Project will also feature a pedestrian bridge directly linking the SBWTC to the hotel lobby.

Figures 2-9 and 2-10 show the circulation paths for arriving and departing Project vehicles, respectively. Project parking will be accommodated at the adjacent SBWTC. As shown in Figure 2-9, hotel guests arriving by auto may use valet service available at the Summer Street porte-cochere, the primary hotel entrance, or may self-park by driving directly to the SBWTC driveway on World Trade Center Avenue. A baggage drop area for self-parking hotel guests and second valet drop-off area will be located inside the SBWTC.



Summer Street Hotel **Boston, Massachusetts**

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Figure 2-6
Previously Approved Project (2024) Condition Traffic Volumes, a.m. Peak Hour

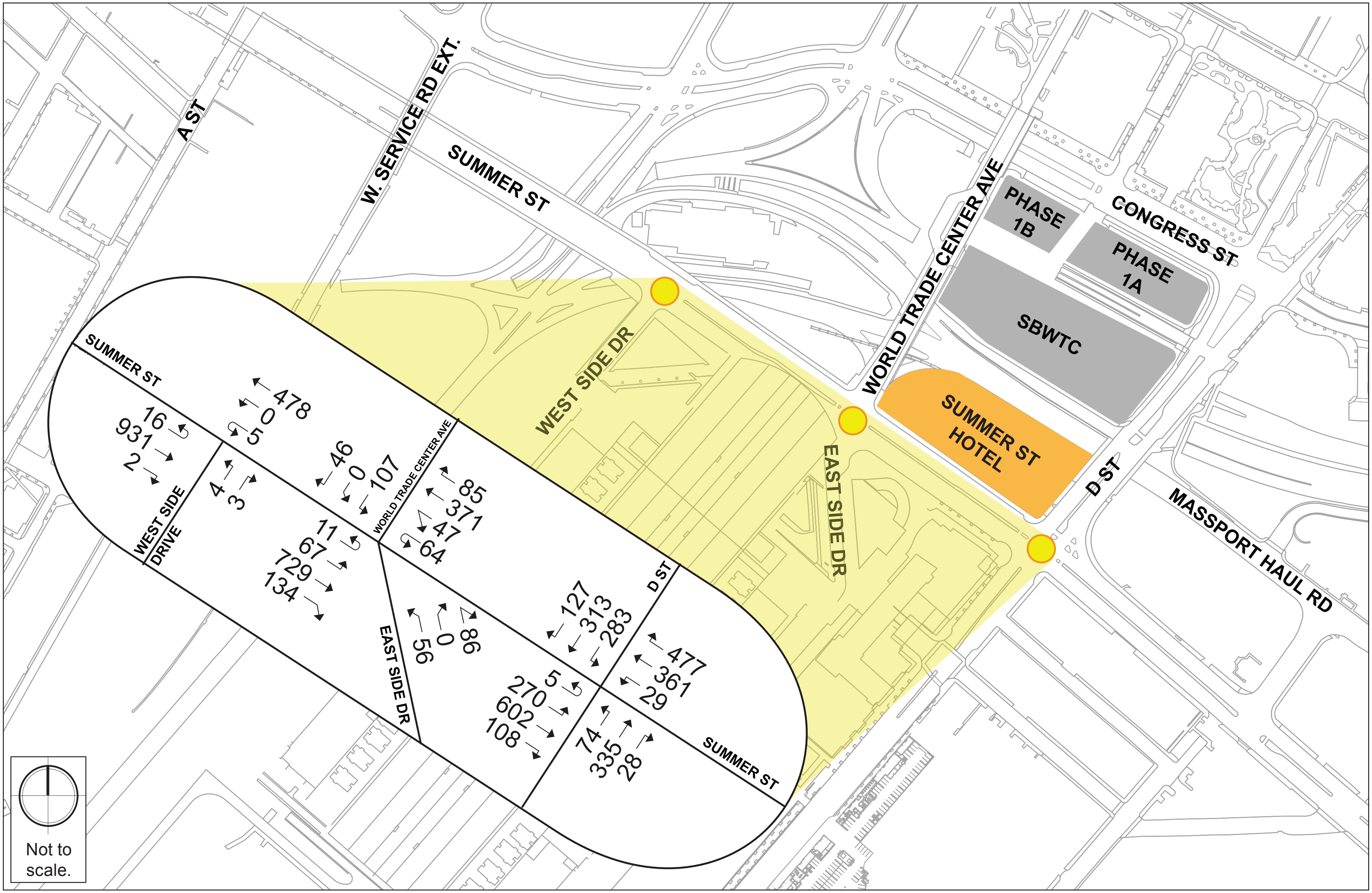

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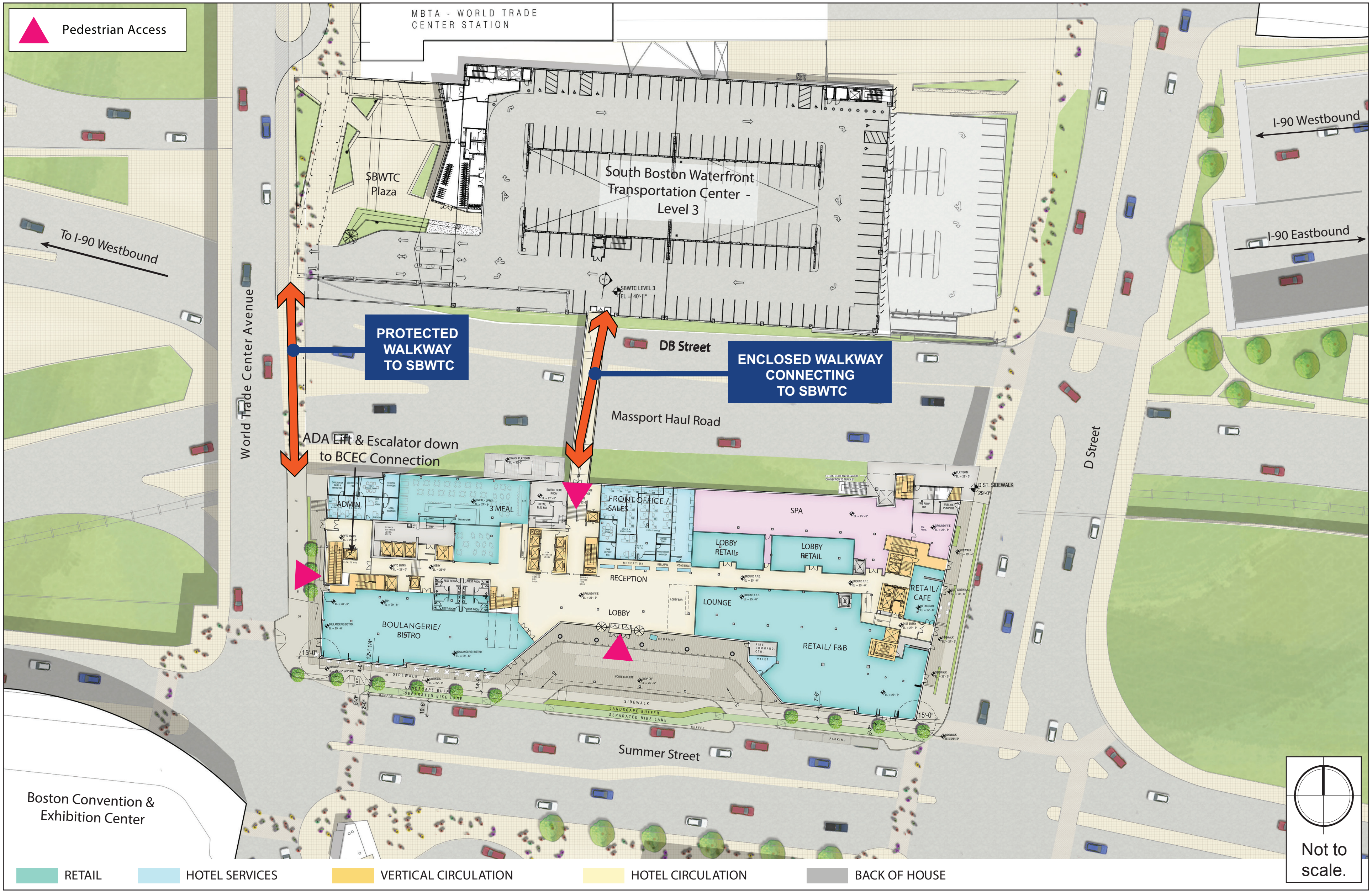
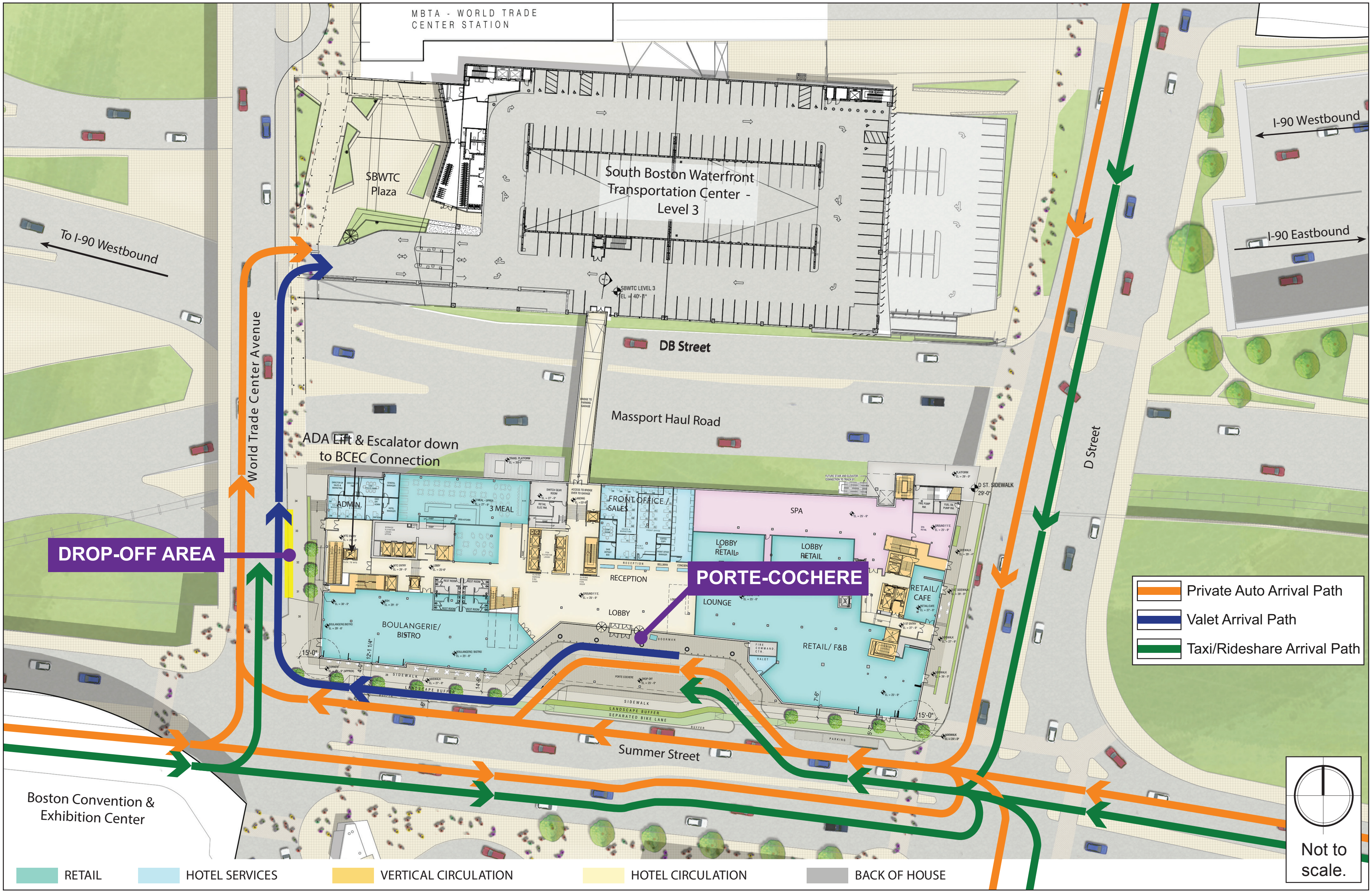
Figure 2-7
Previously Approved Project (2024) Condition Traffic Volumes, p.m. Peak Hour



Summer Street Hotel   Boston, Massachusetts

Figure 2-8

Site Plan - Pedestrian Circulation



Summer Street Hotel **Boston, Massachusetts**

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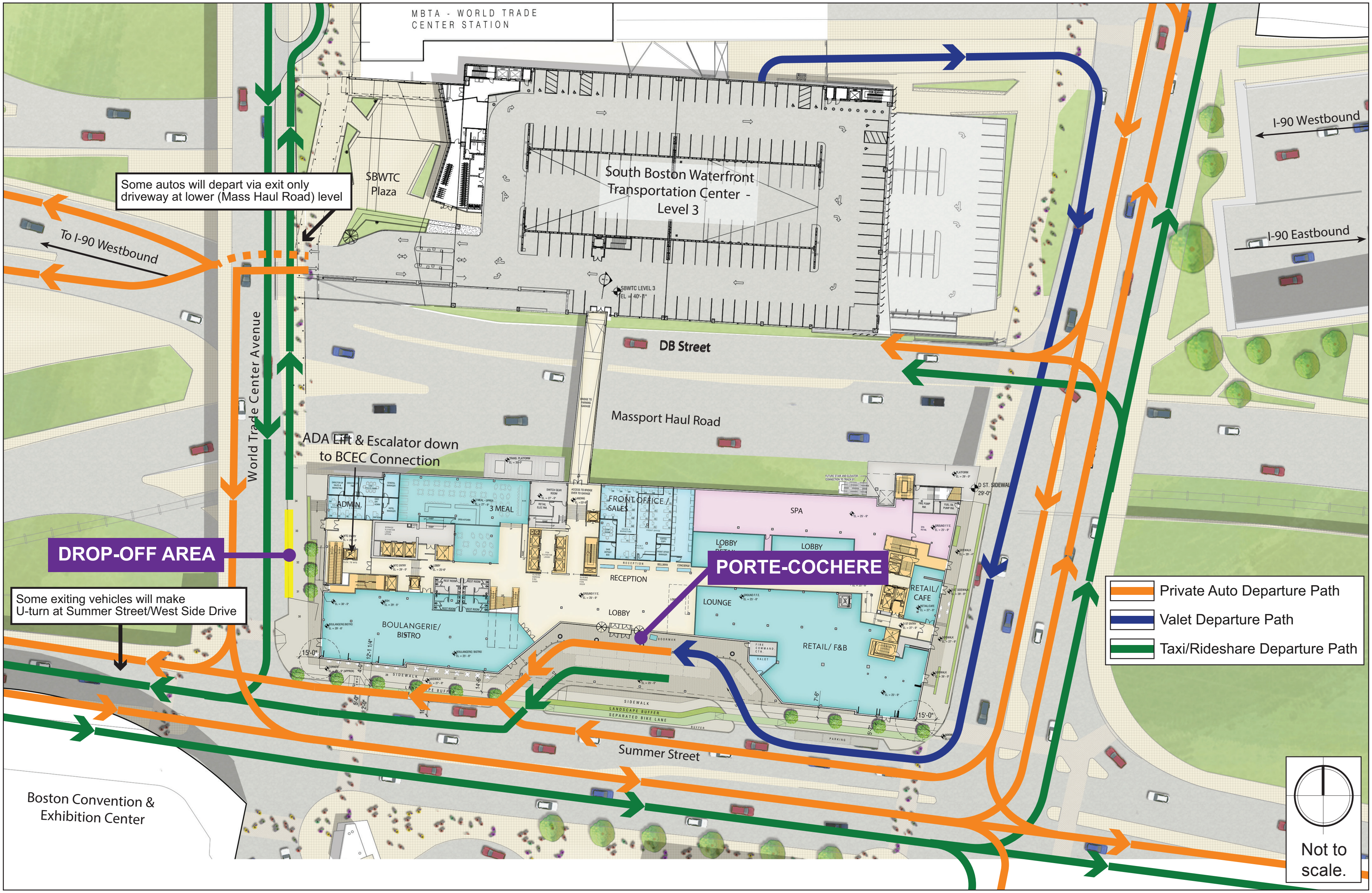
Figure 2-9
Site Plan - Vehicular Circulation - Arrival Paths



Summer Street Hotel **Boston, Massachusetts**

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Figure 2-10
Site Plan - Vehicular Circulation - Departure Paths

Taxicab/rideshare (such as Uber and Lyft) pick-up and drop-off activity will occur primarily within the Summer Street porte-cochere, although an ancillary curbside drop-off area on World Trade Center Avenue, serving pick-up and drop-off activity from taxicabs/rideshares and other vehicles, will be provided. The curbside area on World Trade Center Avenue will not be staffed by valets.

As shown in Figure 2-10, self-parkers may exit SBWTC via the World Trade Center Avenue driveway, Congress Street driveway, or Massport Haul Road exit driveway. Valet-driven vehicles will exit the SBWTC via an exclusive valet-only exit driveway to be located on D Street and arrive at the Summer Street porte-cochere.

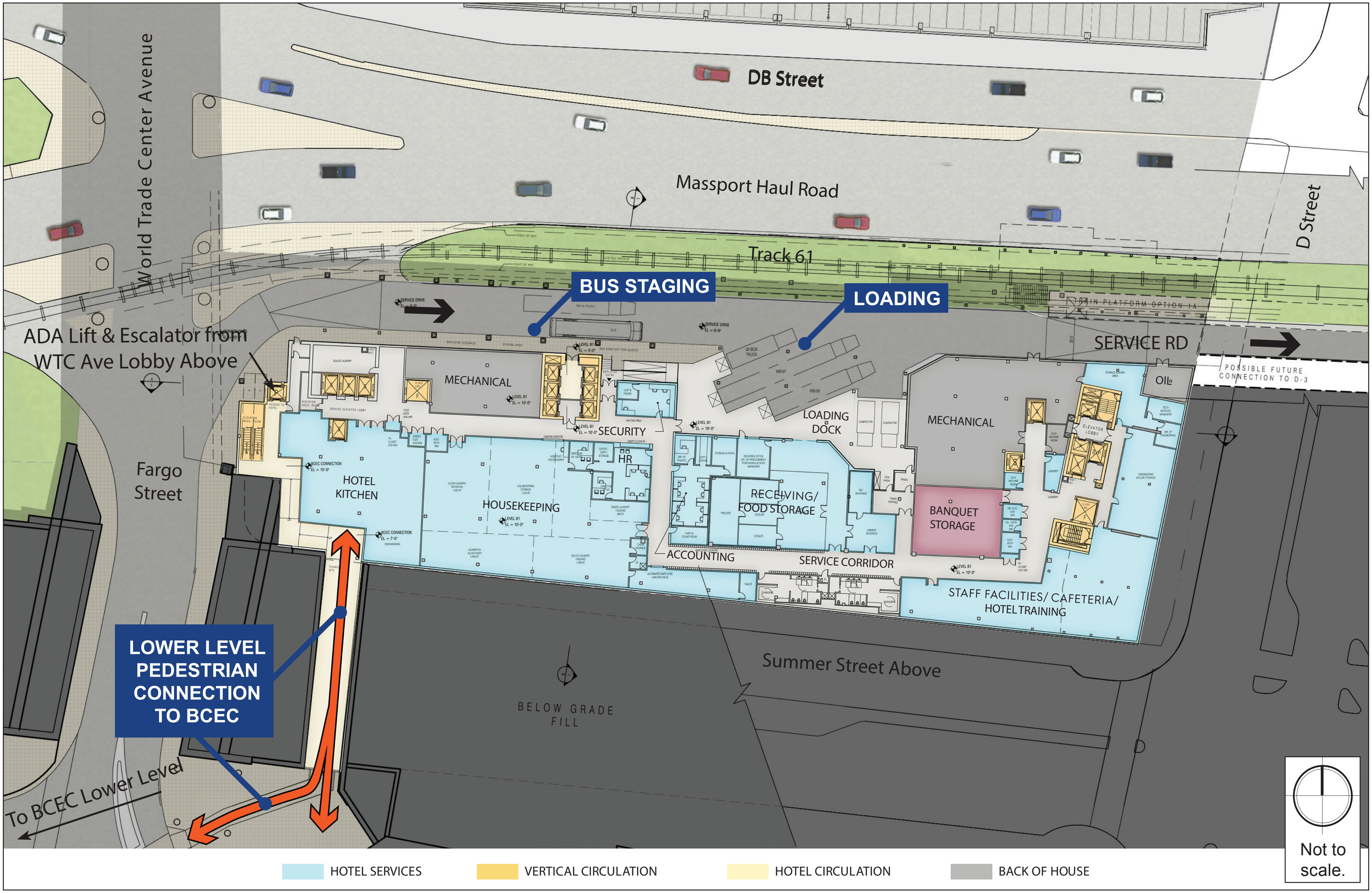
While a U-turn is currently allowed for westbound Summer Street traffic at the World Trade Center/East Side Drive intersection, vehicles exiting the Project's Summer Street porte-cochere would have only a short street segment for merging over to the left lane prior to completing a U-turn and heading east on Summer Street. As discussed under Section 2.5.4, Mitigation Condition, the Proponent is proposing to prohibit the westbound Summer Street U-turn at the World Trade Center Avenue/East Side Drive intersection, forcing westbound Summer Street U-turns to occur at the Summer Street/West Side Drive intersection, about 400 feet to the west (subject to applicable City of Boston approvals). The U-turns will use the existing Summer Street eastbound left turn lane. Adequate turning width on Summer Street is available for vehicles to complete the U-turn maneuver.

2.4.2 Loading and Service Accommodations

All building service and loading will take place off-street on Level B1 of the Project, off a new service driveway ("Service Road") constructed by the Proponent as part of the Project. In addition, Level B1 will also accommodate unloading and loading for private buses serving the Project. The Project's loading and service facility will be designed to accommodate future loading and service access to Massport's Parcel D3 site east of the Project and D Street.

2.4.2.1 Service Road

As shown in Figure 2-11, service and deliveries for the Project will be along the Service Road, which will run parallel to the Massport Haul Road and Track 61 right-of-way extending from C Street to Pumphouse Road. Service Road is intended to provide service/delivery access to both the Project and the future development on Massport Parcel D3. Traffic flow along Service Road will be one-way eastbound. Modifications to traffic islands, pavement marking, and signage improvements will be required at the entrance to Service Road at C Street. Minor improvements to the traffic signal at the Massport Haul Road/C Street intersection will also be required but signal timing and phasing should not be impacted. At Pumphouse Road, a curb cut will be provided mid-block between Summer Street and Massport Haul Road to allow for adequate large vehicle turning maneuvers.



Summer Street Hotel Boston, Massachusetts

Figure 2-11
Loading Facilities

The Service Road will be designed to accommodate WB-67 tractor trailer size vehicles and will be a minimum of 20 feet in width with a minimum 14 foot clear height at all locations. Since pedestrian activity is prohibited along this section of the Massport Haul Road and Pumphouse Road, conflicts between delivery vehicles and pedestrians will be negligible, if any. The portion of the Service Road between the Project Site and Pumphouse Road will be constructed by Massport, subject to conditions agreed to by Massport and the Proponent.

2.4.2.2 Loading and Trash Pick-up

As presented in Figure 2-11, the Project will include three loading bays and two trash/compactor bays. All loading bays will be able to accommodate SU-36 size trucks with Loading Bay #2 and Loading Bay #3 being able to accommodate WB-50 tractor trailers. Loading Bay #2 will also be large enough to provide access to a WB-67 tractor trailer which is expected to service the Project's meeting spaces. While some deliveries will be via truck, delivery data collected by HSH in downtown Boston over the years indicate many will occur via cars/vans.

The truck travel paths circulating into and out of the loading bays and Service Road have been analyzed using AUTOTURN, software that allows modelling vehicular maneuvers to ensure that all movements can be completed safely. The design presented in this NPC will be further refined and detailed as the Project proceeds through design development.

Daily delivery trip estimates for the Project were developed based on data available from another Omni hotel property located in an urban area and close to major tourist destinations. That hotel is similar to the proposed Project, with 800 hotel rooms, a similar amount of meeting and banquet space, and several restaurants. Observed deliveries were increased by a factor of 1.32 to reflect the larger size of the Project (1,054 keys). The factored observations were compared to estimates based on Central Transportation Planning Staff data for the identified land uses in the Boston area. Each method of estimating the average daily loading/service activity, as summarized in Table 2-3, yielded similar results.

Table 2-3 Estimated Project Delivery Activity

Land Use	Average Daily Deliveries: Based on observations at similar Omni property	Average Daily Deliveries: Based on CTPS data
Hotel	13	16
Retail/Restaurant	16	15
Total	29	31

Overall, the Project is expected to generate between 29 and 31 deliveries on a typical weekday. It is anticipated that 90% of these deliveries will occur between 7:00 a.m. and 5:00 p.m. However, whenever possible, loading and service activities will be requested to occur during off-peak hours. On average, one of the daily food delivery vehicles at the observed Omni property remains on-site for about an hour, with other vehicles typically remaining 15 minutes or less. This is similar to HSH's observations of deliveries at other Boston mixed-use developments, where the average duration of a delivery is about 15 minutes. Based on an average duration of 15 minutes per delivery, each dock could accommodate up to four deliveries per hour.

Trash trips are not included in the number of daily deliveries. Trash trips generally occur between 5:00 a.m. and 7:00 a.m., and do not coincide with the regular delivery activity at the loading docks.

Event delivery activity at the Project will vary depending on the size, type, and duration of the event. Event deliveries are scheduled and given the number of available delivery bays and the projected number of deliveries, sufficient loading capacity is provided in the Project to accommodate typical and event delivery activity. Should an event require a number of deliveries the loading facilities cannot handle, they can be managed to occur overnight or be marshaled to the hotel from an off-site location at a staging area to be determined.

2.4.2.3 Bus Accommodations

The Project's Level B1 service area will also provide for bus passenger loading and unloading. As also shown on Figure 2-11, the bus area will provide for up to three buses to stage at any one time, while still allowing through-traffic to pass by along the Service Road. Should an event require more than three buses, their arrival can be managed or be marshaled to the hotel from an off-site, as of yet to be determined, staging area. Access to/from the hotel lobby will be provided directly from the Level B1 sidewalk via a well-appointed elevator lobby and waiting area.

2.4.3 Project Parking

Parking for the Project will be provided in the adjacent SBWTC, a new multi-modal transportation center with connections to the MBTA Silver Line and bike and car-sharing services. The facility, which is scheduled for construction completion in 2018, well before the Project opens, is being developed by Massport to serve the parking demands associated with Massport's CFDA projects, as listed below:

- Waterside Place: Phase 1A, Phase 1B, Parcel D2 (this Project), and Parcel D3.
- Parcel F-1/John Hancock;
- Parcel A-2;
- Parcel H; and
- the existing surface spaces displaced by the construction of SBWTC.

At the SBWTC, vehicular access and egress driveways will be located on Congress Street and on World Trade Center Avenue, with a valet-only exit driveway on D Street. The Project will be connected to the SBWTC via a pedestrian bridge constructed by the Proponent over the Massport Haul Road.

Approximately 400 parking spaces will be allocated to the Project within the SBWTC. BTD has set parking space goals and guidelines throughout the City to establish the parking supply to be provided with new developments. The BTD maximum guideline ratios for downtown hotels is 0.40 spaces per room (or key). The resulting ratio for the Project adheres to this guideline and is slightly below the maximum at 0.38 spaces per room (400 spaces divided by 1,054 hotel keys). On evenings and on weekends, when overall area parking demands are lower, additional spaces will be available for the Project's event activity (e.g., weddings and other social functions).

The planned future parking supply within the entire Waterside Place Project site has decreased since the filing of the 2007 Waterside Place DPIR. At that time, the total proposed parking supply within the entire Waterside Place Project site was 2,350 spaces, and in the 2016 SBWTC NPC, the corresponding number of planned parking spaces had decreased by 476 to 1,874 spaces, with 100 spaces assumed to be located on Parcel D2 which are not proposed as part of the Project, reducing the number of parking spaces on the Waterside Place Project site to 1,774.

Table 2-4 shows the disaggregation of the Waterside Place Project site planned parking supply over time. Of the 1,620 parking spaces to be provided within the SBWTC, approximately 400 spaces will be allocated to the Project.

Table 2-4 Waterside Place Parking Supply

	2008 Waterside Place DPIR			2016 SBWTC NPC		
	Air Rights Garage	Other[1]	Total	SBWTC	Other[1]	Total
Parking Spaces	1,760	590	2,350	1,620	154	1,774

1 Other refers to the parking supply associates with the Phase 1A and Phase 1B parcels located along Congress Street.

2.4.4 Summer Street Bicycle Accommodation

In 2013, the City of Boston/Boston Bikes published the "Boston Bike Network Plan" which, among other proposed initiatives throughout the City, recommended establishing protected bicycle lanes along Summer Street in South Boston. As part of the Project, the Proponent has developed conceptual design plans to create such a bicycle lane adjacent to the Project Site, along the north side of Summer Street on the segment between D Street and World Trade Center Avenue. The separated bicycle lane will provide for westbound bicycle travel and will safely interface with the Project's porte-cochere driveway and elements of the Summer Street pedestrian and vehicle environment. The Proponent will continue to work with the City to finalize these plans and is committed to constructing this segment of the bicycle facility as part of the Project, subject to applicable City of Boston approvals. The design will conform to City and MassDOT design guidelines for bicycle facilities.

2.4.5 Trip Generation Methodology

Determining the future trip generation of a 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 Project, data published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual*[6] were used. ITE provides data to estimate the total number of unadjusted vehicular trips associated with a project. In an urban setting well served by transit, adjustments are necessary to account for other travel mode shares such as walking, bicycling, and transit.

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

Land Use Code 310 – Hotel. Hotels are places of lodging that provide sleeping accommodations and supporting facilities such as restaurants, cocktail lounges, meeting and banquet rooms or convention facilities, limited recreational facilities (e.g., pool, fitness room), and/or other retail and service shops.

Land Use Code 820 – Shopping Center. The Shopping Center land use code is defined as an integrated group of commercial establishments that is planned, developed, owned, and managed as a unit. Shopping center trip generation estimates are based on average vehicle rates per square footage of retail space. Of the ITE retail categories, this one best suits the retail component proposed within the Project

Land Use Code 921 – Quality Restaurant. This land use consists of high quality, full-service eating establishments.

A summary of daily unadjusted vehicle trips, which do not reflect urban travel mode shares and are not used for traffic analysis, is required by MEPA to assess the relative traffic generation of a proposed project. As shown in Table 2-5, the unadjusted vehicle trips forecasted for the Project are significantly (22%) lower than the Previously Approved Project.

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

Table 2-5 Unadjusted Daily Vehicle Trip Comparison

Land Use	Previously Approved Project	Current NPC Project
Hotel	2,452	8,612
Retail/Restaurant	12,878	3,362
Total	15,330	11,974

2.4.6 Travel Mode Shares

BTD provides vehicle, transit, and walking mode split rates for different areas of Boston. The Project is located within designated Area 13 – South Boston. The available BTD mode shares for this area, however, do not specifically reflect the 2004 opening of Phase II of the Silver Line. The future mode shares in the South Boston waterfront have been discussed in the City's 1999 South Boston Transportation Study, the State's 2000 South Boston Transportation Summit, the BRA's (now known as BPDA) February 1999 Seaport Public Realm Plan and the City's August 2006 Fort Point District 100 Acres Master Plan. During the last fifteen years, major proposed developments on the South Boston waterfront district have incorporated updated mode shares that reflect both the Silver Line service and the changing travel characteristics in the district. The updated mode shares have been adopted for the Project.

The unadjusted vehicular trips were converted to person trips by using vehicle occupancy rates published by the Federal Highway Administration (FHWA)[7]. The person trips were then distributed to different modes according to the mode shares shown in Table 2-6.

[7] Summary of Travel Trends: 2009 National Household Travel Survey; FHWA; Washington, D.C.; June 2011.

Table 2-6 Travel Mode Shares

Land Use		Walk/Bicycle Share	Transit Share	Automobile Share[1]	Vehicle Occupancy Rate[2] Private Vehicle	Vehicle Occupancy Rate[2] Taxi/Rideshare
Daily						
Hotel	In	41%	22%	37%	1.84	1.20
	Out	41%	22%	37%	1.84	1.20
Retail	In	27%	34%	39%	1.78	1.20
	Out	27%	34%	39%	1.78	1.20
Restaurant	In	27%	34%	39%	2.20	1.20
	Out	27%	34%	39%	2.20	1.20
a.m. Peak Hour						
Hotel	In	43%	20%	37%	1.84	1.20
	Out	48%	15%	37%	1.84	1.20
Retail	In	0%	62%	38%	1.78	1.20
	Out	15%	46%	39%	1.78	1.20
Restaurant	In	0%	62%	38%	2.20	1.20
	Out	15%	46%	39%	2.20	1.20
p.m. Peak Hour						
Hotel	In	48%	15%	37%	1.84	1.20
	Out	44%	19%	37%	1.84	1.20
Retail	In	23%	38%	39%	1.78	1.20
	Out	23%	38%	39%	1.78	1.20
Restaurant	In	23%	38%	39%	2.20	1.20
	Out	23%	38%	39%	2.20	1.20

1) Includes automobiles and taxicabs/rideshare

2) Average persons per vehicle

2.4.7 Project Trip Generation

The mode share percentages shown in Table 2-6 were applied to the number of person trips to develop walk/bicycle, transit, and vehicle trip generation estimates. The trip generation for the Project by travel mode is shown in Table 2-7. The detailed trip generation information is provided in Appendix B.

Table 2-7 Project Trip Generation

Land Use		Walk/Bicycle Trips	Transit Trips	Vehicle Trips: Private Vehicle	Vehicle Trips: Taxicab/ Rideshare	Vehicle Trips: Total Vehicles
Daily						
Hotel[1]	In	3,248	1,743	1,115	733	1,848
	Out	3,248	1,743	1,115	733	1,848
Retail[2]	In	39	48	26	7	33
	Out	39	48	26	7	33
Restaurant[3]	In	935	1,177	528	158	686
	Out	935	1,177	528	158	686
Total Project Generated	In	4,222	2,968	1,669	898	2,567
	Out	4,222	2,968	1,669	898	2,567
a.m. Peak Hour						
Hotel[1]	In	261	121	85	56	141
	Out	201	63	59	56	115
Retail[2]	In	0	2	1	0	1
	Out	0	1	1	0	1
Restaurant[3]	In	0	20	5	2	7
	Out	4	13	4	2	6
Total Project Generated	In	261	143	91	58	149
	Out	205	77	64	58	122
p.m. Peak Hour						
Hotel[1]	In	278	87	82	54	136
	Out	242	105	78	54	132
Retail[2]	In	2	2	1	1	2
	Out	2	4	2	1	3
Restaurant[3]	In	83	138	55	17	72
	Out	39	65	26	17	43
Total Project Generated	In	363	227	138	72	210
	Out	283	174	106	72	178

1. Based on 1,054 keys.
2. Based on 5,000 sf of retail space.
3. Based on 35,000 sf of restaurant space.

Because the Previously Approved Project on this site (300-room hotel, 290,000 sf of retail/restaurant) was approved by the BPDA and completed review under MEPA, the trips associated with that project are considered part of the "No-Build" condition, reflecting trip activity that would exist without the Current NPC Project. Table 2-8 presents the estimated trips generated with the Previously Approved Project. Because earlier Waterside Place Project filings did not present trip generation disaggregated by sub-parcel, the trip volumes shown in Table 2-8 were estimated by the study team and reflect the same assumptions for trip generation rates, travel mode shares, and taxi use as adopted for the Current NPC Project.

Table 2-8 Previously Approved Project Trip Generation

Land Use		Walk/Bicycle Trips	Transit Trips	Vehicle Trips: Private Vehicle	Vehicle Trips: Taxicab/ Rideshare	Vehicle Trips: Total Vehicles
Daily						
Hotel[1]	In	925	496	318	209	527
	Out	925	496	318	209	527
Retail[2]	In	2,152	2,708	1,501	363	1,864
	Out	2,152	2,708	1,501	363	1,864
Restaurant[3]	In	280	353	158	48	206
	Out	280	353	158	48	206
Total Project Generated	In	3,357	3,557	1,977	620	2,597
	Out	3,357	3,557	1,977	620	2,597
a.m. Peak Hour						
Hotel[1]	In	74	35	24	16	40
	Out	51	16	15	16	31
Retail[2]	In	0	148	43	11	54
	Out	20	61	25	11	36
Restaurant[3]	In	0	3	1	0	1
	Out	1	4	1	0	1
Total Project Generated	In	74	186	68	27	95
	Out	22	81	41	27	38
p.m. Peak Hour						
Hotel[1]	In	66	21	19	13	32
	Out	62	26	20	13	33
Retail[2]	In	147	242	120	32	152
	Out	159	263	130	32	162
Restaurant[3]	In	20	32	13	4	17
	Out	8	13	5	4	9
Total Project Generated	In	233	295	152	49	201
	Out	229	302	155	49	204

1. Based on 300 keys.
2. Based on 279,500 sf of retail space.
3. Based on 10,500 sf of restaurant space.

A comparison of vehicle trips is shown in Table 2-9 for each land use and time period. Under the Current NPC Project, the daily and a.m. peak hour vehicle trips are projected to decrease, while the p.m. peak hour trips are projected to increase. These net new trips were added to the Previously Approved Project condition to estimate the Current NPC Project condition.

Table 2-9 Net New Vehicle Trip Generation

Land Use		Vehicle Trips Private Vehicle	Taxicabs/ Rideshare	Total
Daily				
Hotel[1]	In	797	524	+1,321
	Out	797	524	+1,321
Retail[2]	In	-1,475	-356	-1,831
	Out	-1,475	-356	-1,831
Restaurant[3]	In	370	110	+480
	Out	370	110	+480
Total Net New Project Generated	In	-308	278	-30
	Out	-308	278	-30
a.m. Peak Hour				
Hotel[1]	In	61	40	+101
	Out	44	40	+84
Retail[2]	In	-42	-11	-53
	Out	-24	-11	-35
Restaurant[3]	In	4	2	+6
	Out	3	2	+5
Total Net New Project Generated	In	23	31	+54
	Out	23	31	+54
p.m. Peak Hour				
Hotel[1]	In	63	41	104
	Out	58	41	99
Retail[2]	In	-119	-31	-150
	Out	-128	-31	-159
Restaurant[3]	In	42	13	55
	Out	21	13	34
Total Net New Project Generated	In	-14	23	9
	Out	-49	23	-26

1. Based on an increase of 754 keys.
2. Based on a decrease of 274,500 sf of retail space.
3. Based on an increase of 24,500 sf of restaurant space.

As shown in Table 2-9, the Project is expected to generate 60 fewer vehicle trips (private vehicles and taxicabs/rideshare) throughout the day as compared to the Previously Approved Project. The Project is expected to generate 108 more (54 in and 54 out) vehicle trips during the a.m. peak hour and 17 fewer (9 in and -26 out) vehicle trips during the p.m. peak hour.

The differences in forecasted transit trips between the Previously Approved Project and the Current NPC Project are shown in Table 2-10. During each time period, the transit trip activity will be lower under the Current NPC Project.

Table 2-10 Net New Transit Trips

		Previously Approved Project	Current NPC Project	Difference
Daily				
Total	In	3,557	2,968	-589
	Out	3,557	2,968	-589
a.m. Peak Hour				
Total	In	186	143	-43
	Out	81	77	-4
p.m. Peak Hour				
Total	In	295	227	-68
	Out	302	174	-128

2.4.8 Trip Distribution

The trip distribution identifies the various travel paths for vehicles associated with the Project. The study team developed a detailed set of trip distribution patterns for both the Previously Approved Project and the Current NPC Project to reflect vehicle type (self-park, valet, or taxi/rideshare) and access/egress points related to the Project Site (SBWTC driveways, porte-cochere, drop-off area). Distributions were developed for both conditions so that trip assignments would accurately reflect the volumes differences in the traffic capacity analysis.

Under the Previously Approved Project, it was assumed that all valet activity occurred within the SBWTC and a pick-up/drop-off curb for the hotel was located on Summer Street. As shown in Figure 2-9, the Current NPC Project will include a porte-cochere on Summer Street and a drop-off/pick-up area on World Trade Center Avenue. The distributions accounted for two-stage trips (such as a vehicle that arrives at the porte-cochere and is then taken by valet to the SBWTC) and the "deadhead" segment of a taxi/rideshare trip, when the vehicle is not serving a passenger.

A new drop-off driveway on World Trade Center Avenue, to be located immediately south of the MBTA's World Trade Center Station headhouse, is to be built by Massport. This driveway will serve drop-offs at the MBTA World Trade Center Silver Line Station and provide a convenient location for vehicles travelling northbound on World Trade Center Avenue to turn around and proceed south toward the Summer Street intersection. This driveway was incorporated into the Current NPC Project trip distribution patterns.

Figure 2-12 and Figure 2-13 show the general vehicle trip distribution patterns adopted for hotel trips and retail/restaurant trips, respectively.

2.4.9 Build Traffic Volumes

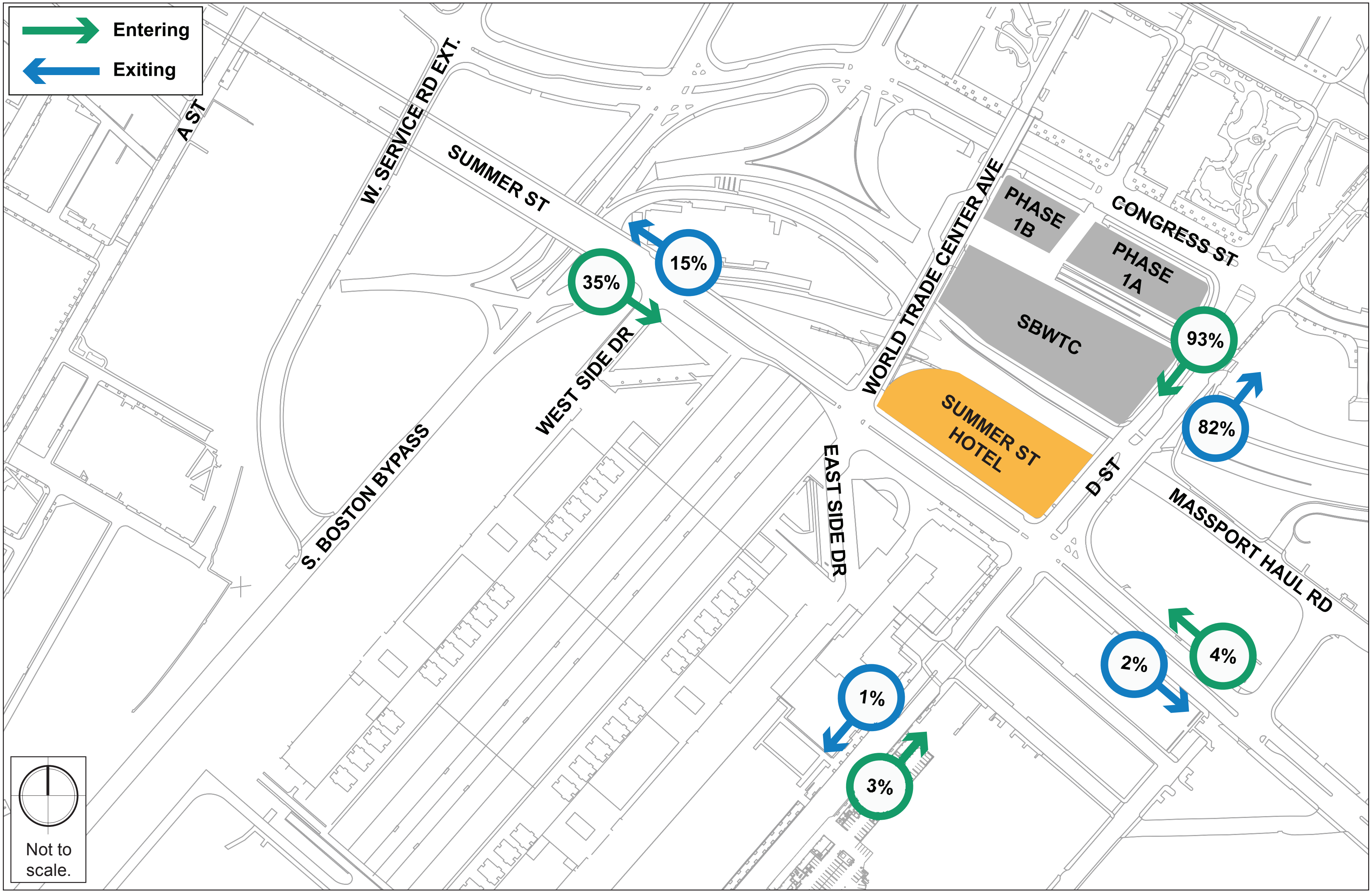
The new vehicle trips were distributed through the study area. The Project-generated trips for the a.m. and p.m. peak hours are shown in Figures 2-14 and 2-15, respectively, and the net new trips (difference from the Previously Approved Project) are shown in Figures 2-16 and 2-17.

The peak hour trip assignments were added to the Previously Approved Project (2024) Condition traffic volumes to develop the Current NPC Project (2024) Condition traffic volumes, as shown in Figures 2-18 and 2-19 for the a.m. and p.m. peak hours, respectively.

2.4.10 Event Management

The Project will have approximately 61,500 sf of banquet and meeting space, including two large ballrooms of approximately 25,000 sf and 15,500 sf, respectively. The Project will also host a variety of events, some of which may be linked to conventions and exhibitions at the BCEC, and others that will be independent (such as gala dinners, weddings, etc.). These events will typically not overlap with peak hours of traffic in the Seaport District.

Based upon Omni Hotels' experience at convention center hotels in Nashville and Dallas, it is expected that the Project could host between 50 and 100 events per year. Therefore, the Proponent will develop a management plan for large events that will maximize efficiency in servicing vehicle arrivals/departures at the Summer Street porte-cochere, within the SBWTC, and on World Trade Center Avenue, as well as related service and loading activities (see Section 2.4.2 for more detail on service and loading operations). The elements of each event management plan, which will vary in specifics depending upon the plan, may include additional valet staffing, road signage (as permitted by Massport on Massport roads and the City of Boston on City streets), police details, and hotel website event and public transportation information. As needed, a strategy for off-site truck/bus marshaling will be incorporated into the event management plan. At least three months prior to the Project opening, the Proponent will ensure that the template for the events management plan is in place with Massport, the City of Boston and the BCEC. All specific event management efforts will be coordinated with these parties, as well as the MBTA, as applicable.



Summer Street Hotel **Boston, Massachusetts**

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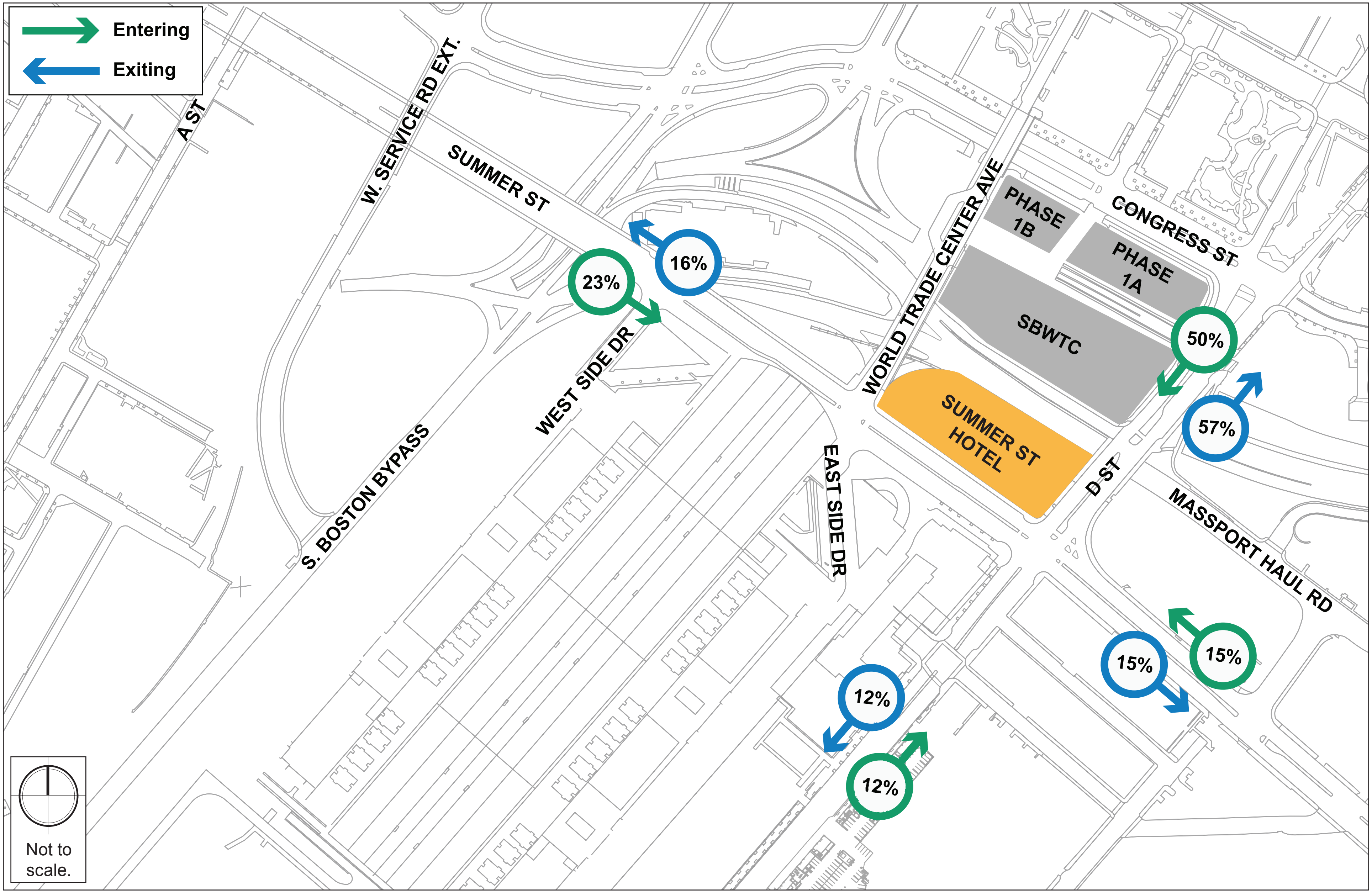
Figure 2-12
Trip Distribution - Hotel



Summer Street Hotel   Boston, Massachusetts

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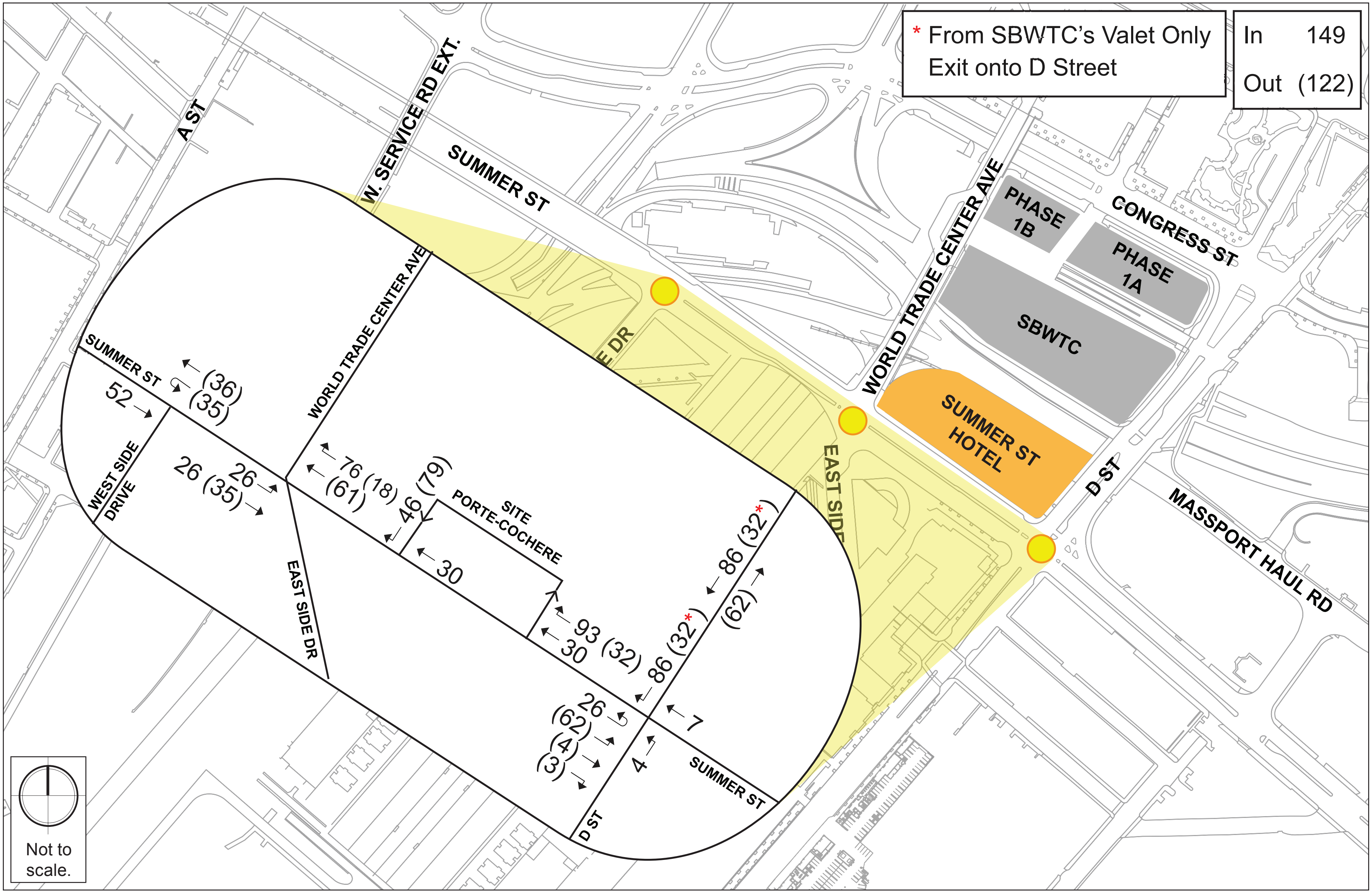
Figure 2-13
Trip Distribution - Retail/Restaurant



Summer Street Hotel **Boston, Massachusetts**

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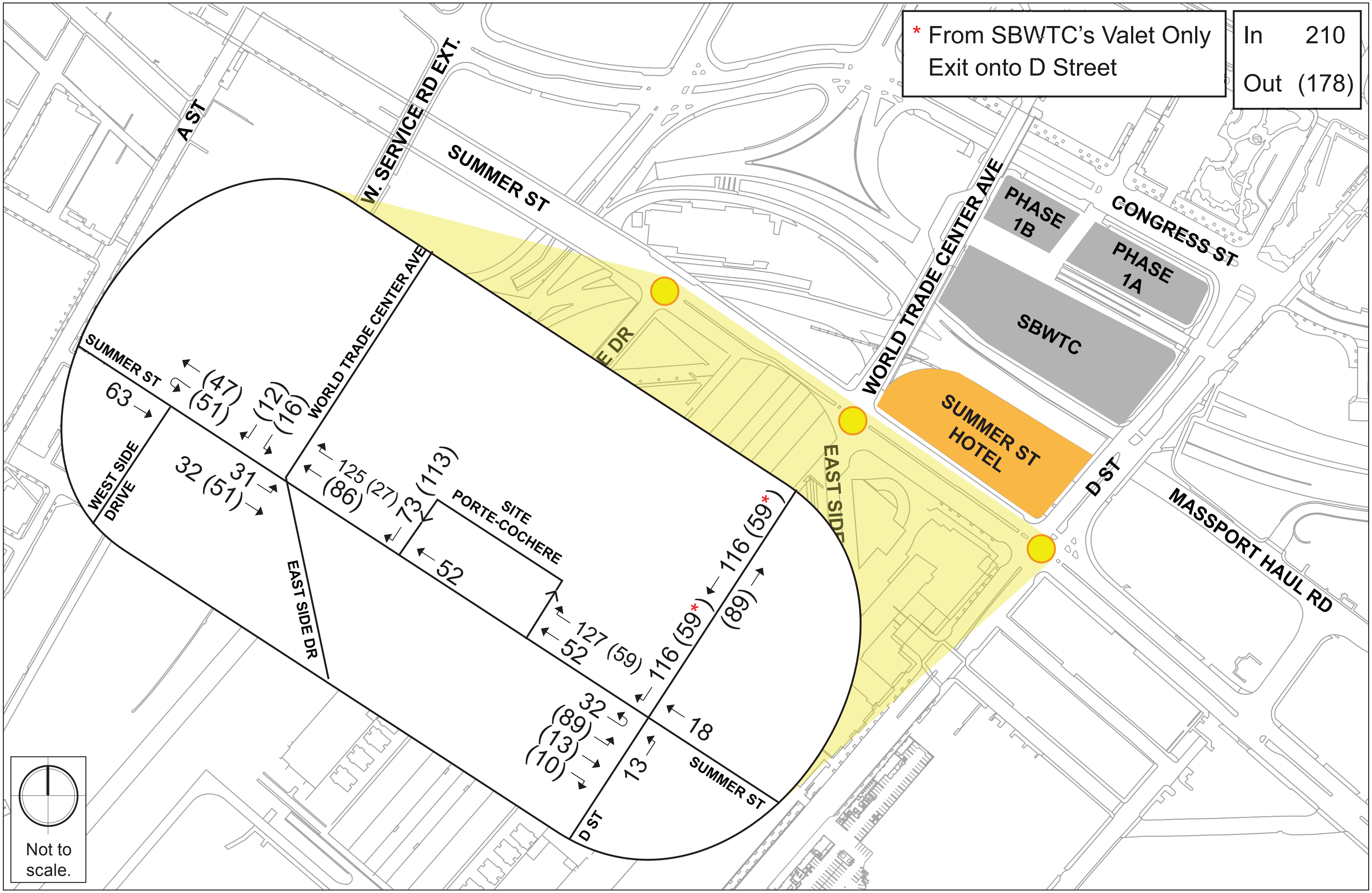
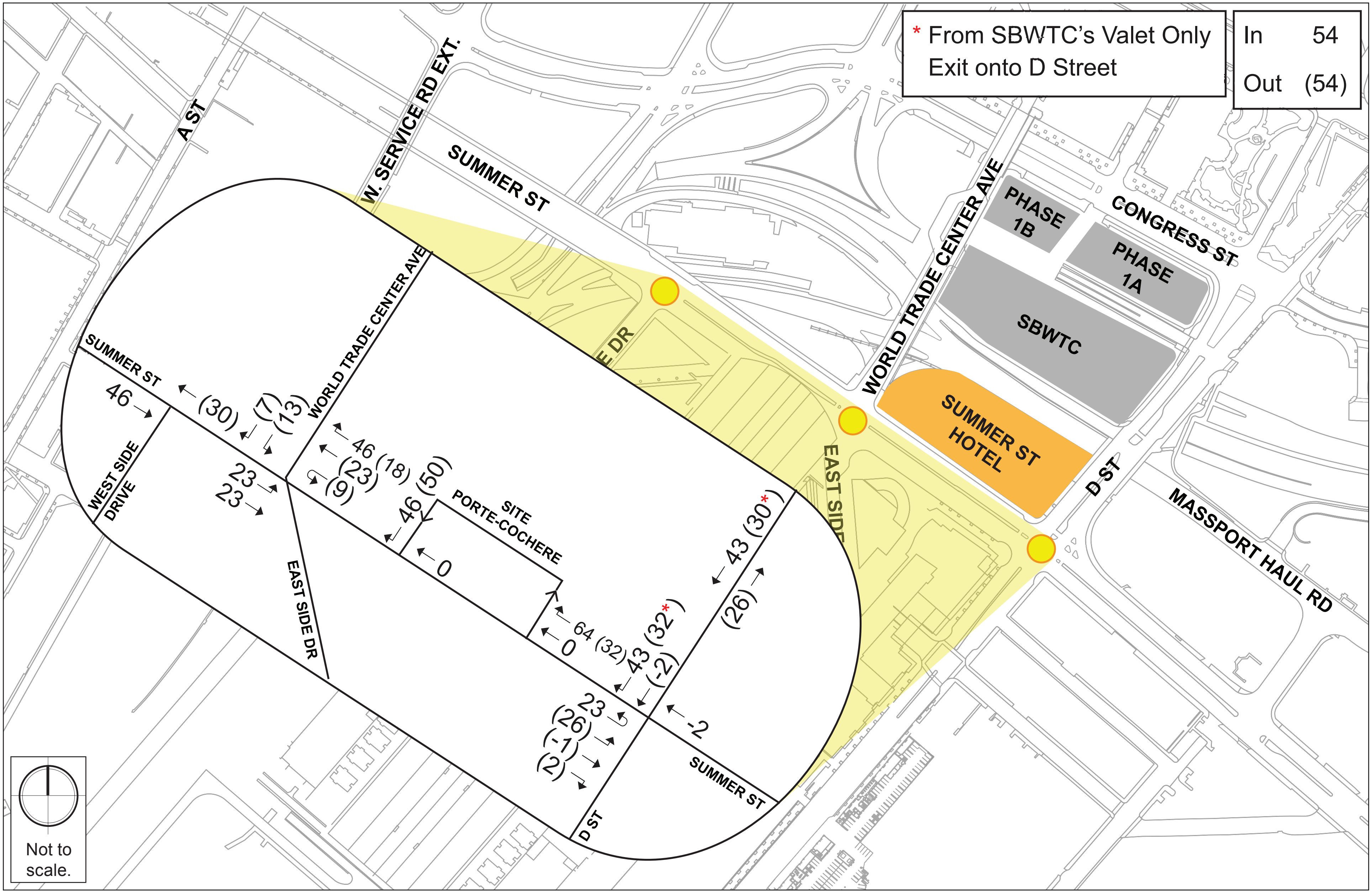
Figure 2-14
Project-generated Trips, a.m. Peak Hour



Summer Street Hotel **Boston, Massachusetts**

Figure 2-15

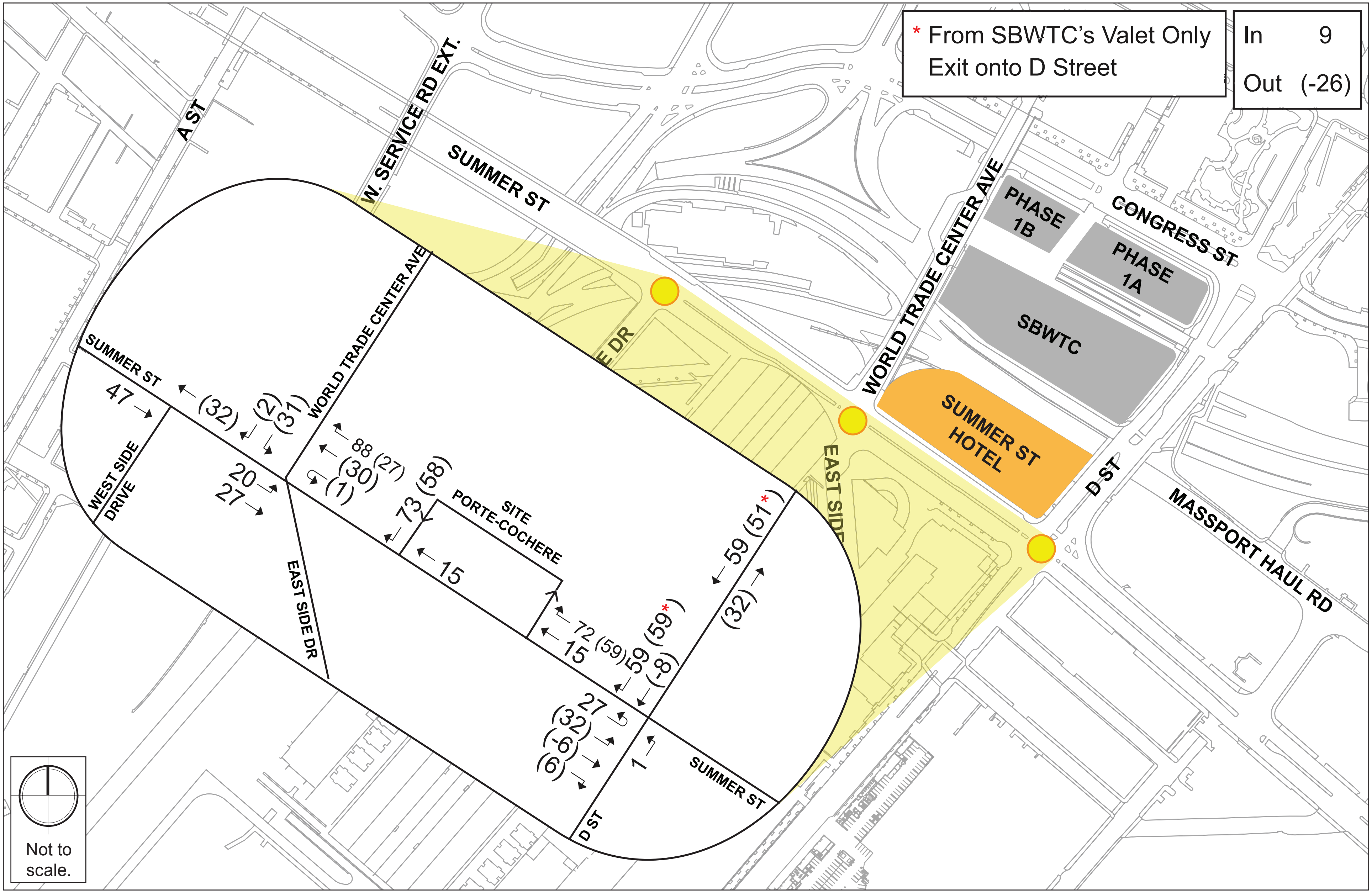
Project-generated Trips, p.m. Peak Hour



Summer Street Hotel **Boston, Massachusetts**

Figure 2-16

Net New Project Trips, a.m. Peak Hour



Summer Street Hotel Boston, Massachusetts

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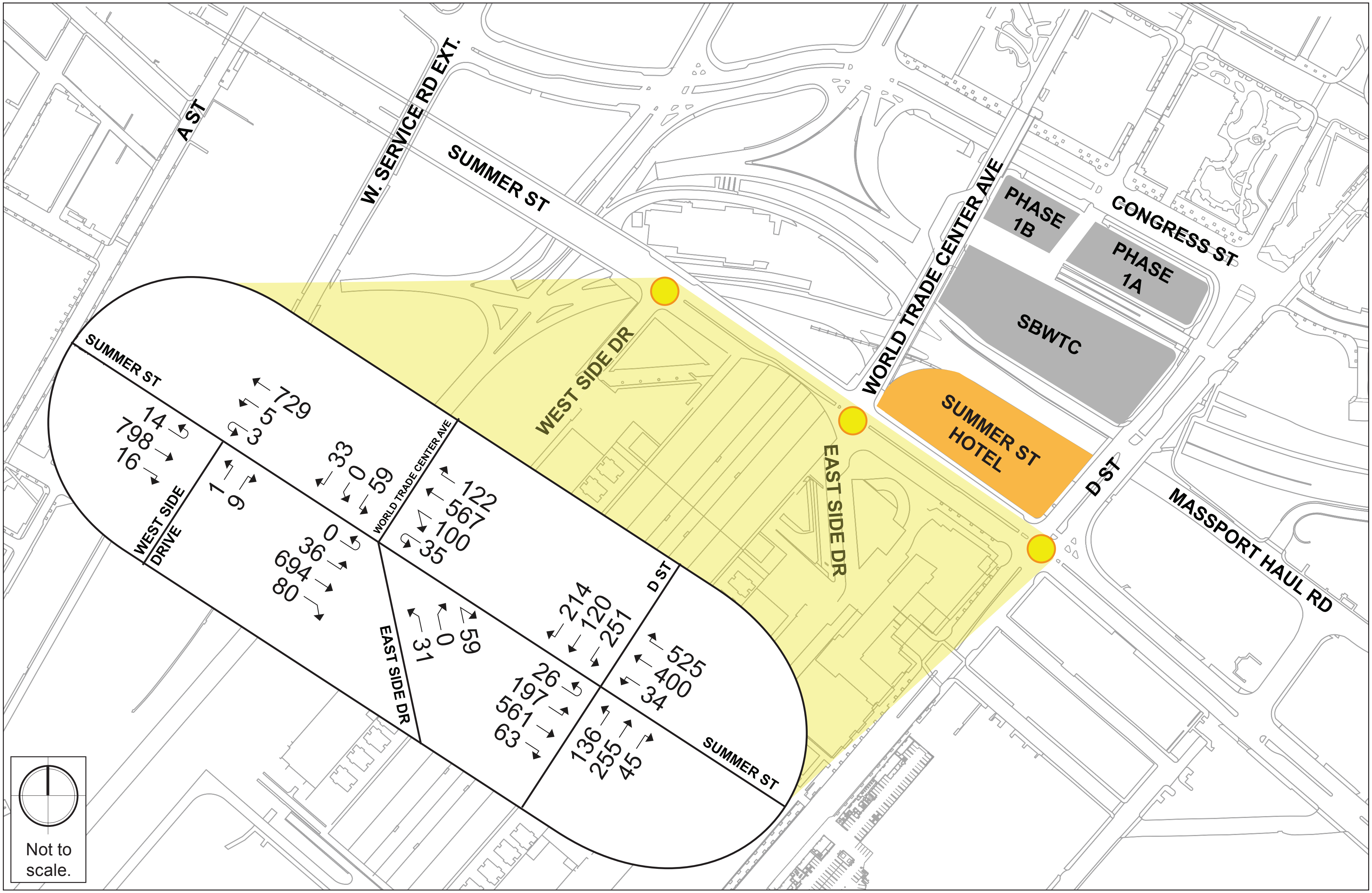
Figure 2-17
Net New Project Trips, p.m. Peak Hour



Summer Street Hotel **Boston, Massachusetts**

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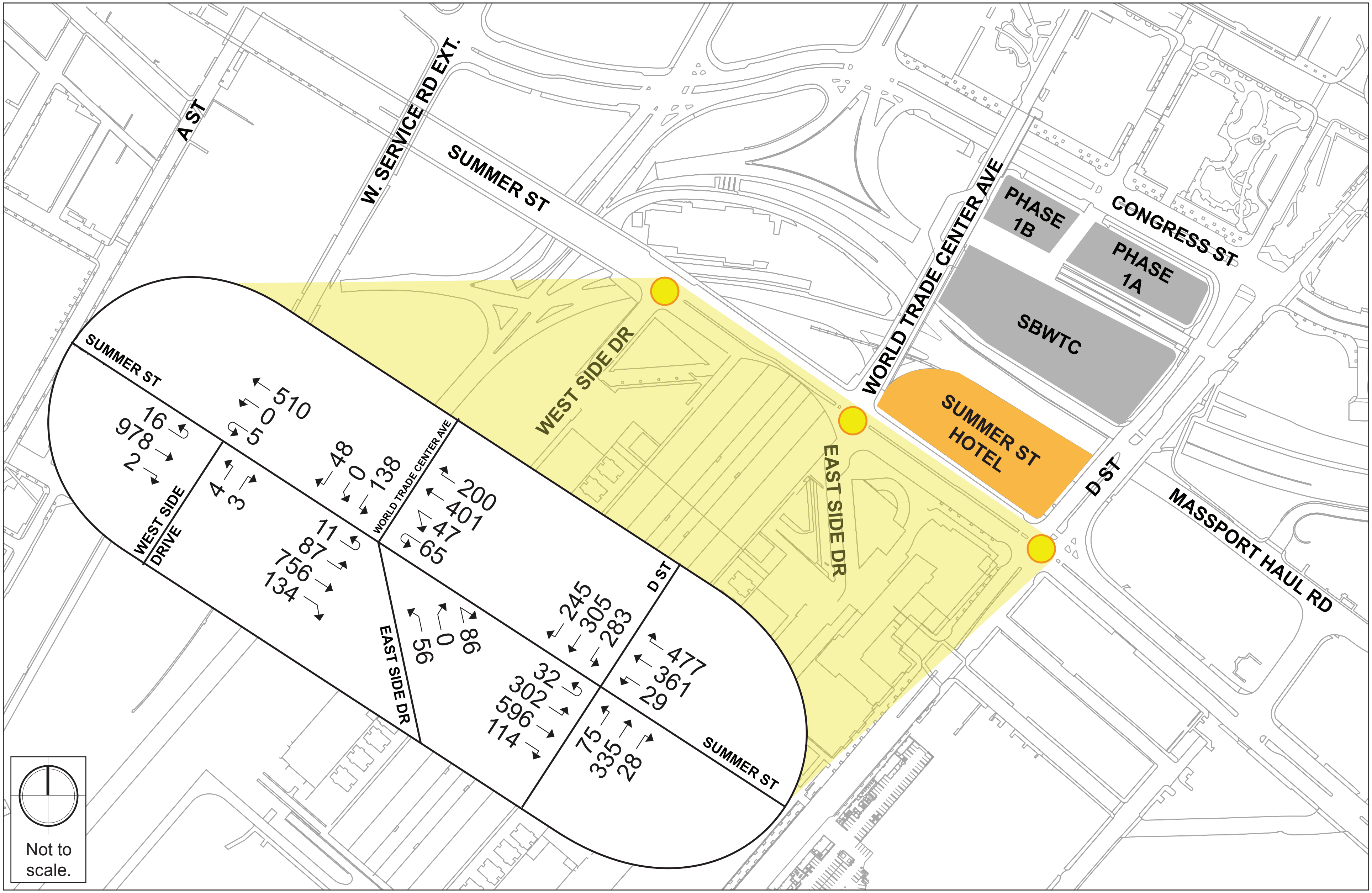
Figure 2-18
Current NPC Project (2024) Condition Traffic Volumes, a.m. Peak Hour



Summer Street Hotel **Boston, Massachusetts**

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Figure 2-19
Current NPC Project (2024) Condition Traffic Volumes, p.m. Peak Hour

2.5 Traffic Capacity 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 2-11 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 2-11 Vehicle Level of Service Criteria

Level of Service	Average Stopped Delay (sec/veh) Signalized Intersections	Average Stopped Delay (sec/veh) 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 ratio (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 2-12 and 2-13 present, respectively, the a.m. and p.m. peak hour capacity analysis for the study area intersections under each analysis condition: Existing (2017) Condition, Previously Approved Condition (2024), and the Current NPC Project (2024) Condition. Also included in these tables are analysis results for a Mitigation (2024) Condition, which is presented in the following section. The detailed analysis sheets are provided in Appendix B. The sections below present results for each condition.

2.5.1 Existing (2017) Condition Traffic Capacity Analysis

Under Existing (2017) Conditions, each intersection operates at an acceptable level of service (LOS), with the exception of the following movements:

- The East Side Drive northbound shared through/right lane, at the **Summer Street/World Trade Center Avenue/East Side Drive** intersection, operates at a LOS E during the p.m. peak hours. Additionally, the World Trade Center Avenue southbound left-turn lane operates at LOS E during the p.m. peak hour.

2.5.2 Previously Approved Project (2024) Condition Traffic Capacity Analysis

All intersections continue to operate at the same overall LOS under the Previously Approved Project (2024) Condition as the Existing (2017) Condition, except for the following movements:

- The Summer Street westbound shared left/through and through lanes at the intersection of **Summer Street/D Street** decrease from LOS D to E during the p.m. peak hour.

- At the intersection of **Summer Street /World Trade Center Avenue/East Side Drive**, the World Trade Center Avenue southbound left-turn lane and the East Side Drive northbound through/right lane decrease from LOS D to E during the a.m. peak hour. During the p.m. peak hour, the World Trade Center Avenue southbound left-turn lane decreases from LOS E to F.

2.5.3 Current NPC Project (2024) Condition Traffic Capacity Analysis

All intersections continue to operate at the same overall LOS as under the Previously Approved Project (2024) Condition, with the exception of the following movements:

- At the intersection of **Summer Street/D Street**, the Summer Street eastbound left-turn lane decrease from LOS D to E during the a.m. peak hour only. All other movements continue to operate at the same LOS during both the a.m. and p.m. peak hours.

2.5.4 Mitigation (2024) Condition

While the analysis results indicate that intersection operations would not be affected with the Project, additional mitigation analysis was completed incorporating recommendations to improve traffic conditions.

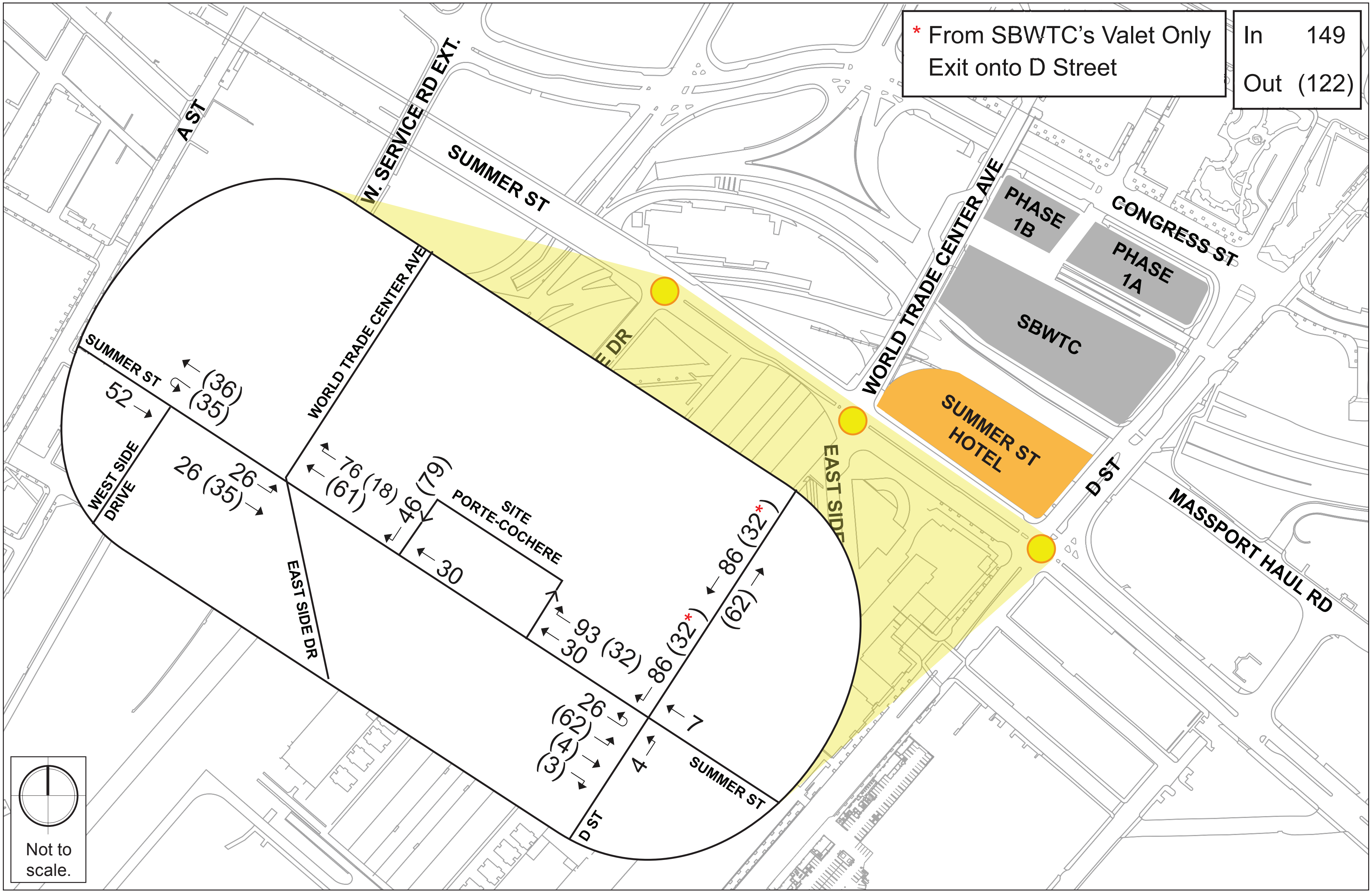
Though a U-turn is currently allowed for westbound Summer Street traffic at the World Trade Center/East Side Drive intersection, vehicles exiting the Project's Summer Street porte-cochere would have only a short street segment to merge left before completing a U-turn and travelling east on Summer Street. To prevent conflicts caused by these U-turning vehicles, the Proponent proposes to prohibit the westbound Summer Street U-turn at the World Trade Center/East Side Drive intersection. Instead, westbound Summer Street U-turns would occur at the Summer Street/West Side Drive intersection, about 400 feet to the west, subject to applicable City of Boston approvals. The U-turns will use the existing Summer Street eastbound left turn lane. Adequate turning width on Summer Street is available for vehicles to complete the U-turn maneuver. The Proponent will work with the City of Boston to formalize this change in the Project's Transportation Access Plan Agreement (TAPA).

The revised Project trips under the Mitigation (2024) Condition are shown in Figures 2-20 and 2-21 for the a.m. and p.m. peak hour, respectively. Intersection volumes under the Mitigation (2024) Condition are shown in Figures 2-22 and 2-23, for the a.m. and p.m. peak hours, respectively.

While the traffic impacts associated with the Current NPC Project are minimal and will not affect overall intersection operations, the study team also assessed minor changes to signal phase timings to improve the two individual approaches that would operate at LOS F.

During the peak hour, the recommended change at the Summer Street/D Street intersection is to allocate a few more seconds of green time to the eastbound Summer Street approach to reduce delays for the left turning vehicles onto D Street, while maintaining overall intersection operations at LOS D. At the Summer Street/World Trade Center Avenue/East Side Drive intersection, the recommended change is to allocate a few more seconds of green time to the southbound World Trade Center Avenue approach to reduce delays on this approach while maintaining acceptable level of service for other movements.

The prohibition of westbound Summer Street U-turns at the Summer Street/World Trade Center/East Side Drive intersection, and reassignment to the Summer Street/West Side Drive intersection is not expected to adversely impact intersection operations.



Summer Street Hotel **Boston, Massachusetts**

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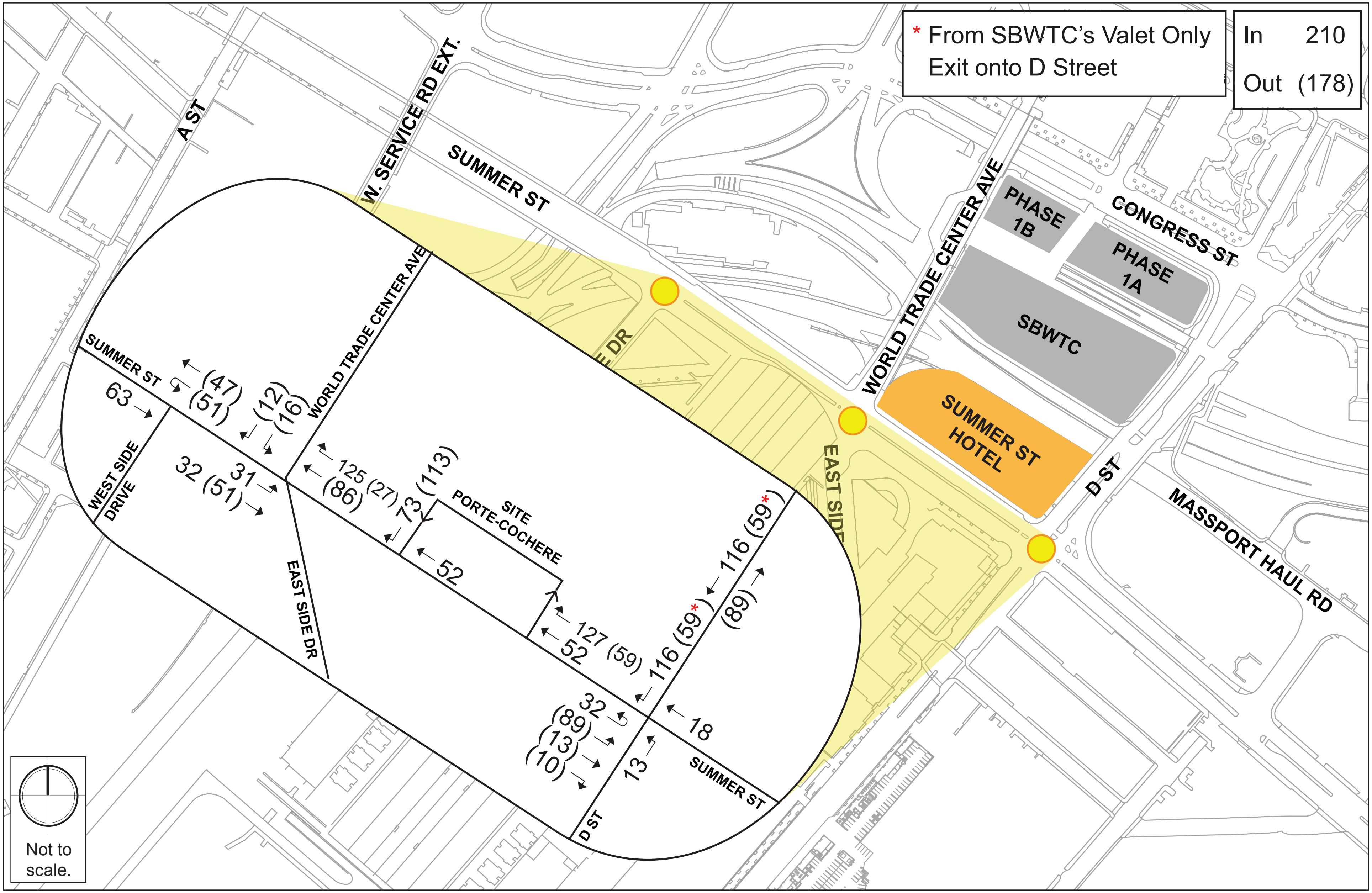
Figure 2-20
Project Generated Trips with Mitigation, a.m. Peak Hour



Summer Street Hotel Boston, Massachusetts

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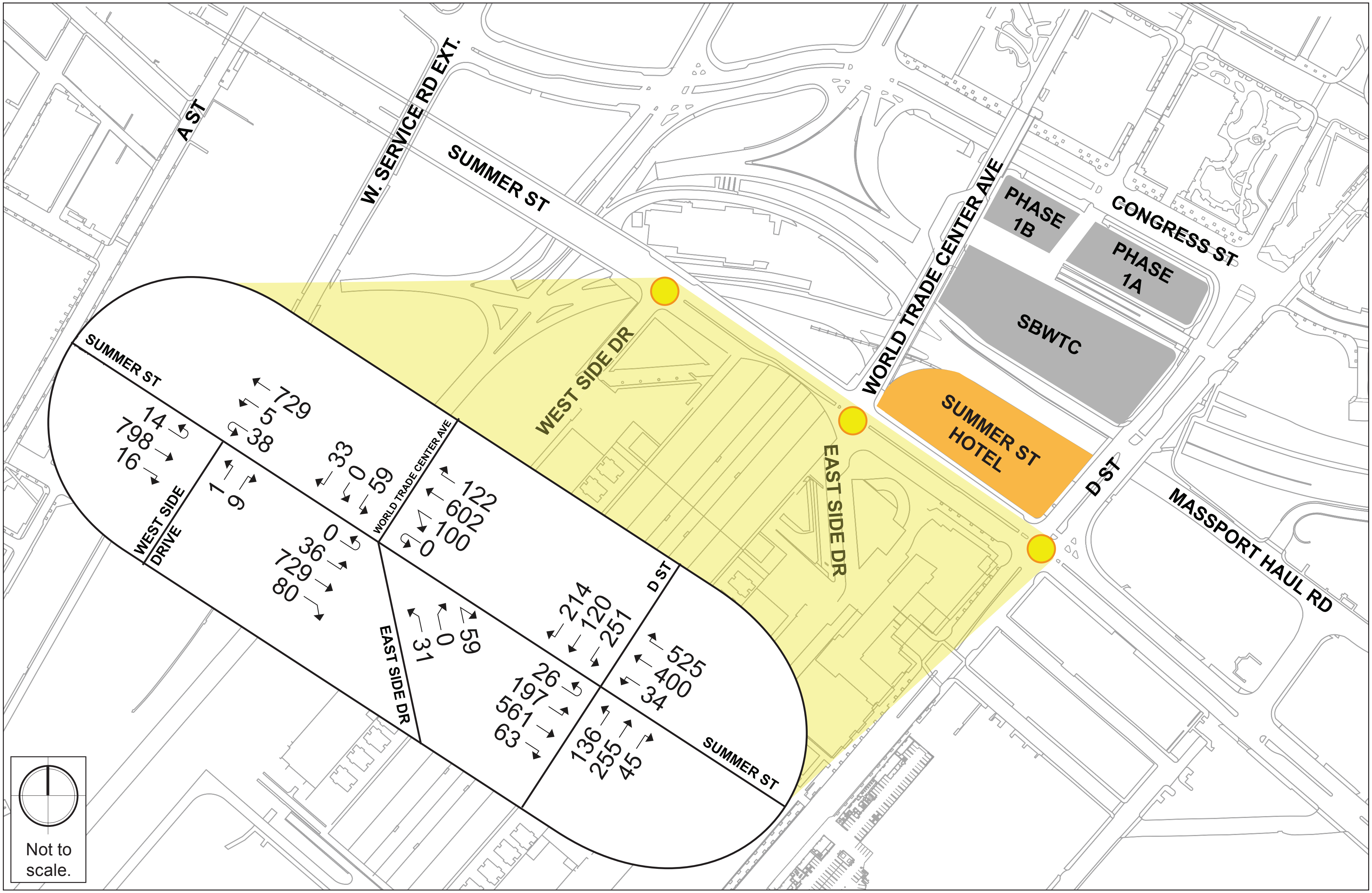
Figure 2-21

Project Generated Trips with Mitigation, p.m. Peak Hour



Summer Street Hotel **Boston, Massachusetts**

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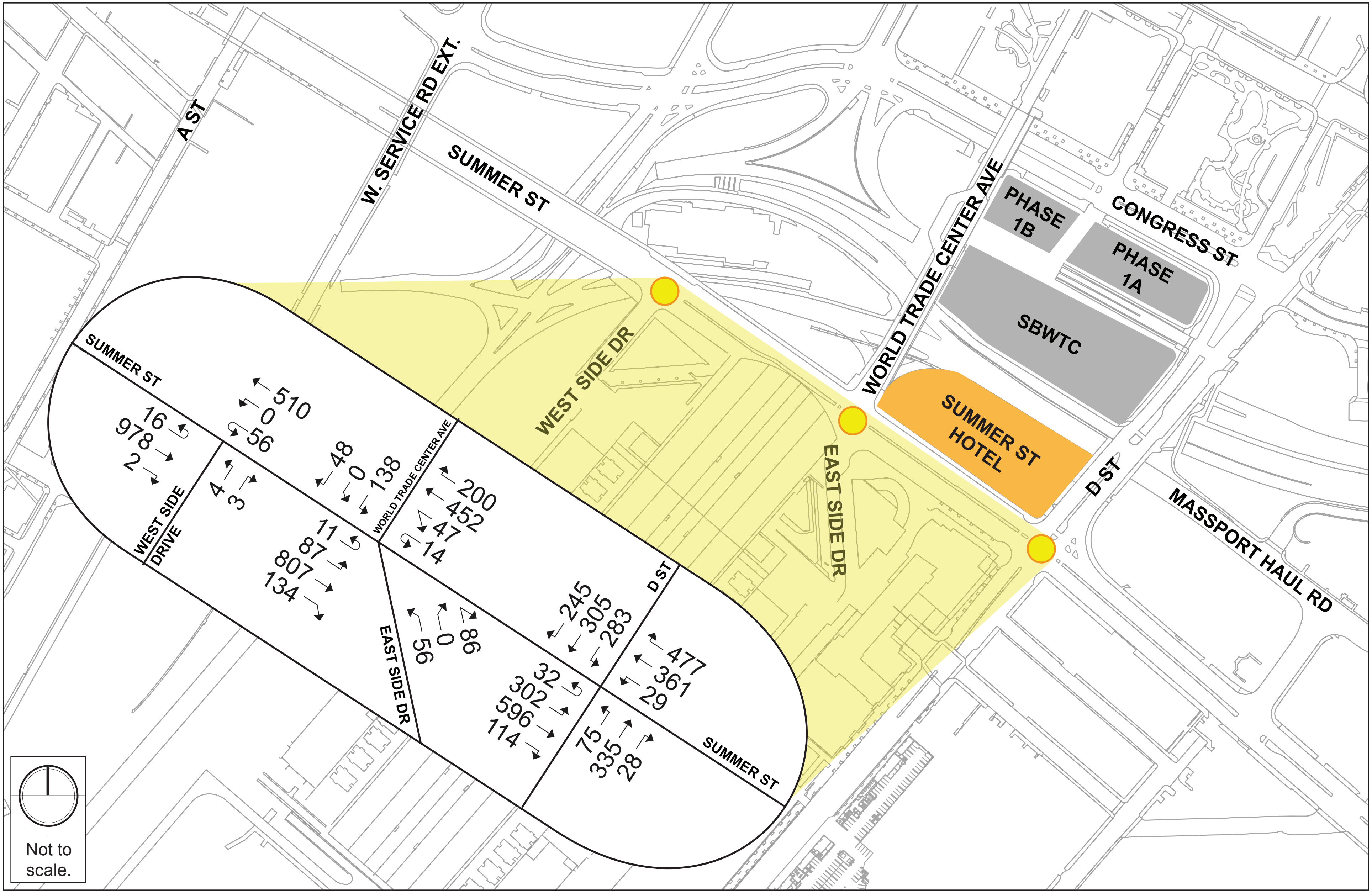
Figure 2-22
Current NPC Project (2024) Condition with Mitigation, a.m. Peak Hour



Summer Street Hotel **Boston, Massachusetts**

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Figure 2-23
Current NPC Project (2024) Condition with Mitigation, p.m. Peak Hour

Table 2-12 Intersection Capacity Analysis Summary, a.m. Peak

Intersection/Approach	Existing (2017) Condition					Previously Approved Project (2024) Condition					Current NPC Project (2024) Condition					Mitigation (2024) Condition				
	LOS	Delay (sec.)	V/C Ratio	50th Queue (ft)	95th Queue (ft)	LOS	Delay (sec.)	V/C Ratio	50th Queue (ft)	95th Queue (ft)	LOS	Delay (sec.)	V/C Ratio	50th Queue (ft)	95th Queue (ft)	LOS	Delay (sec.)	V/C Ratio	50th Queue (ft)	95th Queue (ft)
Summer Street/D Street	**C**	**25.7**	-	-	-	**C**	**32.3**	-	-	-	**C**	**32.7**	-	-	-	**C**	**33.0**	-	-	-
Summer Street EB left	B	19.6	0.41	19	68	C	34.1	0.62	48	137	D	49.2	0.79	100	#178	D	49.6	0.79	103	#183
Summer Street EB thru | thru/right	B	16.6	0.42	36	126	C	20.4	0.48	103	172	C	20.7	0.48	112	179	C	21.8	0.48	116	184
Summer Street WB left/thru | thru	D	43.4	0.73	142	207	D	52.5	0.85	168	#264	D	52.2	0.85	168	#263	D	52.2	0.85	168	#263
Summer Street WB right	C	20.5	0.62	300	302	C	28.7	0.79	293	440	C	28.7	0.79	293	440	C	28.7	0.79	293	440
D Street NB left	D	48.0	0.54	103	144	D	50.2	0.60	115	158	D	50.2	0.60	115	158	D	50.2	0.60	115	158
D Street NB thru | thru/right	C	33.7	0.26	45	64	D	43.1	0.59	127	148	D	43.1	0.59	127	148	D	43.1	0.59	127	148
D Street SB left	C	23.0	0.52	114	93	C	32.9	0.71	107	#239	C	33.1	0.71	91	#241	C	33.1	0.71	91	#241
D Street SB left/thru | thru/right	A	8.6	0.32	12	9	B	11.0	0.52	13	8	A	9.8	0.58	8	29	A	9.8	0.58	8	29
Summer Street /World Trade Center Avenue/ /East Side Drive	**B**	**13.7**	-	-	-	**B**	**14.7**	-	-	-	**B**	**16.1**	-	-	-	**B**	**16.3**	-	-	-
Summer Street EB left	A	4.0	0.02	2	m1	A	4.1	0.04	4	m1	A	4.7	0.11	10	m3	A	4.8	0.12	10	m3
Summer Street EB thru | thru	A	7.5	0.41	176	13	A	7.8	0.47	210	14	A	7.8	0.49	220	14	A	8.2	0.51	234	15
Summer Street EB right	A	0.3	0.11	0	0	A	0.3	0.12	0	0	A	0.3	0.12	0	0	A	0.3	0.12	0	0
Summer Street WB left	B	10.1	0.25	30	m49	B	11.9	0.38	44	m62	B	13.4	0.41	50	m74	B	12.6	0.32	37	m55
Summer Street WB thru | thru/right	B	14.9	0.38	94	135	B	16.0	0.44	115	m154	B	17.7	0.51	141	m190	B	18.0	0.54	149	m202
East Side Drive NB left	D	50.6	0.24	23	52	D	51.0	0.26	24	53	D	51.1	0.26	24	53	D	51.1	0.26	24	53
East Side Drive NB thru/right	D	54.8	0.41	44	84	E	55.7	0.43	47	88	E	55.7	0.43	47	88	E	55.7	0.43	47	88
World Trade Center SB left	D	51.3	0.24	18	44	E	58.6	0.42	32	68	E	70.4	0.61	47	#100	E	70.4	0.61	47	#100
World Trade Center SB thru/right	A	0.1	0.04	0	0	A	0.1	0.05	0	0	A	0.2	0.06	0	0	A	0.2	0.06	0	
Summer Street/West Side Drive	**B**	**12.1**	-	-	-	**B**	**12.6**	-	-	-	**B**	**13.0**	-	-	-	**B**	**13.1**	-	-	-
Summer Street EB thru | thru/right	B	15.8	0.39	91	263	B	16.6	0.44	109	312	B	17.0	0.47	117	335	B	17.0	0.47	117	335
Summer Street WB left	B	11.9	0.02	0	m7	B	11.2	0.02	0	m6	B	11.8	0.02	0	m6	B	10.7	0.13	1	m26
Summer Street WB thru | thru	A	7.8	0.29	5	120	A	7.8	0.32	6	128	A	8.2	0.34	7	145	A	8.6	0.34	6	156
West Side Drive NB left	D	47.0	0.01	1	6	D	47.0	0.01	1	6	D	47.0	0.01	1	6	D	47.0	0.01	1	6
West Side Drive NB right	C	26.2	0.07	0	16	C	25.1	0.08	0	18	C	25.1	0.08	0	18	C	25.1	0.08	0	18

95th percentile queues do not clear after two cycles. Actual queues may be longer.
Grey shading indicates LOS E or F under the Existing Condition, or a deterioration into LOS E or F from the previous condition.
Under the Mitigation Condition, black shading indicates an improvement in level of service out of LOS E or F.

Table 2-13 Intersection Capacity Analysis Summary, p.m. Peak

Intersection/Approach	Existing (2017) Condition					Previously Approved Project (2024) Condition					Current NPC Project (2024) Condition					Mitigation (2024) Condition				
	LOS	Delay (sec.)	V/C Ratio	50th Queue (ft)	95th Queue (ft)	LOS	Delay (sec.)	V/C Ratio	50th Queue (ft)	95th Queue (ft)	LOS	Delay (sec.)	V/C Ratio	50th Queue (ft)	95th Queue (ft)	LOS	Delay (sec.)	V/C Ratio	50th Queue (ft)	95th Queue (ft)
Summer Street/D Street	**C**	**25.9**	**-**	**-**	**-**	**D**	**37.9**	**-**	**-**	**-**	**D**	**46.4**	**-**	**-**	**-**	**D**	**42.5**	-	-	-
Summer Street EB left	B	15.3	0.55	33	49	D	38.5	0.87	55	m#217	F	85.5	1.06	~138	m#426	E	70.4	1.02	~91	m#300
Summer Street EB thru | thru/right	A	9.3	0.48	53	66	B	12.3	0.56	82	m124	B	12.8	0.56	95	m123	B	12.2	0.55	70	85
Summer Street WB left/thru | thru	D	41.3	0.63	117	174	E	61.4	0.88	156	#254	E	64.1	0.90	156	#255	E	64.1	0.90	156	#255
Summer Street WB right	C	23.5	0.62	198	300	D	39.0	0.77	274	412	D	48.2	0.77	274	412	D	47.7	0.77	274	412
D Street NB left	D	40.6	0.25	46	75	D	42.0	0.33	59	92	D	42.1	0.33	60	93	D	43.3	0.35	60	94
D Street NB thru | thru/right	D	41.7	0.48	102	123	D	49.9	0.71	163	183	D	49.9	0.71	163	183	D	53.8	0.74	164	185
D Street SB left	D	42.5	0.47	87	174	D	43.2	0.78	164	m232	D	39.9	0.76	165	m216	D	39.9	0.76	165	m216
D Street SB left/thru | thru/right	C	28.8	0.38	61	121	D	40.5	0.88	191	m#293	D	51.4	0.99	213	m#330	D	51.4	0.99	213	m#330
Summer Street/East Side Drive/ World Trade Center Avenue	**C**	**26.9**	**-**	**-**	**-**	**C**	**30.0**	**-**	**-**	**-**	**D**	**36.3**	**-**	**-**	**-**	**C**	**28.3**	-	-	-
Summer Street EB left	A	3.7	0.14	10	3	A	4.0	0.19	13	4	A	5.7	0.29	17	4	A	9.6	0.38	28	22
Summer Street EB thru | thru	B	17.8	0.48	212	341	B	18.1	0.53	242	372	B	18.1	0.56	254	384	C	21.9	0.67	303	#440
Summer Street EB right	A	6.8	0.20	19	88	A	6.3	0.21	23	81	A	5.8	0.21	24	73	A	5.9	0.23	24	72
Summer Street WB left	C	27.7	0.17	38	m68	C	24.8	0.37	74	m90	C	22.5	0.38	68	m82	C	23.5	0.29	37	m46
Summer Street WB thru | thru/right	D	35.8	0.28	157	211	C	32.8	0.35	184	m213	C	31.0	0.47	236	m264	C	34.0	0.57	268	m298
East Side Drive NB left	D	52.2	0.38	40	79	D	53.5	0.41	44	84	D	53.6	0.41	44	84	D	41.0	0.26	40	77
East Side Drive NB thru/right	E	55.4	0.50	63	110	E	57.0	0.54	68	118	E	57.0	0.54	68	118	D	42.0	0.33	62	107
World Trade Center SB left	E	69.4	0.64	58	#118	F	118.8	0.96	90	#194	F	197.1	1.24	~142	#257	E	66.2	0.76	109	#197
World Trade Center SB thru/right	A	0.1	0.05	0	0	A	0.2	0.07	0	0	A	0.2	0.08	0	0	A	0.2	0.07	0	0
Summer Street/West Side Drive	**B**	**18.2**	**-**	**-**	**-**	**B**	**18.6**	**-**	**-**	**-**	**B**	**18.4**	**-**	**-**	**-**	B	18.6	-	-	-
Summer Street EB thru | thru/right	B	17.3	0.48	123	349	B	18.3	0.54	143	403	B	18.8	0.56	154	432	B	18.8	0.56	154	432
Summer Street WB left	C	29.6	0.01	0	m11	C	27.2	0.02	0	m9	C	25.8	0.02	0	m6	C	21.4	0.19	1	m68
Summer Street WB thru | thru	B	19.6	0.19	2	189	B	18.7	0.22	3	213	B	17.3	0.24	4	223	B	17.6	0.24	4	230
West Side Drive NB left	D	47.2	0.03	3	14	D	47.2	0.03	3	14	D	47.2	0.03	3	14	D	47.2	0.03	3	14
West Side Drive NB right	C	31.7	0.03	0	9	C	31.7	0.03	0	9	C	31.7	0.03	0	9	C	31.7	0.03	0	9

95th percentile queues do not clear after two cycles. Actual queues may be longer.
Grey shading indicates LOS E or F under the Existing Condition, or a deterioration into LOS E or F from the previous condition.
Under the Mitigation Condition, black shading indicates an improvement in level of service from LOS E or F.

2.6 Transportation Demand Management

The Proponent is committed to implementing Transportation Demand Management (TDM) measures to minimize automobile usage by Project guests, visitors, and employees. The Proponent will consider the following measures:

- Offering transit subsidies to hotel employees and requiring that retail tenants offer transit subsidies to employees.
- Providing bicycle parking spaces, of which approximately half will be weather protected, to encourage bicycle use as an alternative to automobile use.
- Implementing a separated bicycle lane along the north side of Summer Street between D Street and World Trade Center Avenue for westbound bicycle travel (see Section 2.4.2).
- Providing car sharing options in the SBWTC, to which the Project will have access.
- The Project will provide dedicated valet parking service on-site with valet curbs to improve customer convenience and reduce unnecessary traffic generated by lost motorists.
- Proponent will join the Seaport TMA to provide TDM programs and to coordinate with neighboring buildings and area tenants.
- Specific TDM measures for the Project employees include:
    - designating an on-site employee transportation coordinator;
    - aggressively marketing TDM plans through marketing and education materials;
    - implementing carpool/vanpool ride-matching for hotel employees;
    - accommodating bikers and pedestrians through design measures and providing secure, weather-protected bicycle storage;
    - providing on-site employee changing rooms/showers,
    - providing on-site sale of transit passes;
    - offering financial incentives (financial awards programs, “commuter choice” program, transit and vanpool subsidies, pre-tax transit and vanpool benefits, combination of subsidy and pre-tax benefits, or transit and vanpool plus parking benefits); and
    - offering guaranteed ride home programs.

- The Proponent will evaluate the need for employer shuttles to transit, including consideration of joining in a shared service with other shuttles operating in the area;
- An overhead pedestrian bridge constructed in the air rights spanning the Massport Haul Road and Track 61 right-of-way will connect the Project to the SBWTC and allow easy access to the hotel for guests and visitors;
- The Project will improve access along the Project Site between the BCEC, the Lawn on D social space managed by the MCCA, and developments on D Street south of Summer Street to the South Boston waterfront. Two aspects of the Project will facilitate these connections: (1) the Project will connect to an existing tunnel underneath Summer Street that will provide covered passage between the Project Site and the BCEC, and (2) the Proponent will construct streetscape improvements along World Trade Center Avenue to the SBWTC, including a protected pedestrian walkway along World Trade Center Avenue toward the SBWTC and the MBTA World Trade Center Silver Line station beyond. See Figure 2-8;
- Transportation service vehicle delivery schedules will be actively managed to ensure that service vehicles do not unduly burden local roadways;
- A Transportation Access Plan Agreement (TAPA) for the Project will be developed and will include an assessment of overall traffic impacts and mitigation adequacy, assessment of construction traffic impacts and mitigation, monitoring and mitigation of traffic impacts, and management of loading and deliveries; and
- Proponent will prepare and submit a Construction Management Plan (CMP) for the Project to minimize construction impacts.

Chapter 3

Environmental Review Component

3.0 ENVIRONMENTAL REVIEW COMPONENT

3.1 Wind

3.1.1 Introduction

The objective of the pedestrian wind study for the Project 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. RWDI completed an initial wind tunnel test on the Project without any street trees or other measures typically used to mitigate pedestrian level wind conditions. While the results of the initial test indicated a general improvement in pedestrian wind conditions, several locations around the Project Site worsened and were projected to be categorized as Uncomfortable, with one location predicted to be categorized as Dangerous. Additionally, several new locations were projected to exceed the Effective Gust Criteria. The Proponent worked with RWDI to understand potential measures that could be incorporated into the design to mitigate these modeled pedestrian level wind conditions which were determined to be unfavorable by the Proponent, including wind screening elements and canopies. Ultimately, RWDI added several potential wind screening elements into the model and tested the impact on wind conditions. The results of the second study are presented in this section, and show that the Project will generally improve pedestrian level wind conditions in the area, including a predicted decrease in the number of locations categorized as Uncomfortable by seven, and no new locations categorized as Dangerous. In addition, the number of locations that exceed the gust criteria is predicted to decrease from 11 to five in the study area. As the design of the Project moves forward, the Project team will continue to analyze what measures will be incorporated into the design, potentially including the measures included in this wind analysis, that will provide suitable wind conditions around the site.

The study involved wind simulations on a 1:300 scale model of the proposed building and surroundings. These simulations were then conducted in RWDI's boundary-layer wind tunnel at Guelph, Ontario, for the purpose of quantifying local wind speed conditions and comparing to appropriate criteria for gauging wind comfort in pedestrian areas. The criteria recommended by the BPDA were used in this study. This section describes the methods and presents the results of the wind tunnel simulations.

3.1.2 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.

3.1.3 Methodology

3.1.3.1 Test Configurations

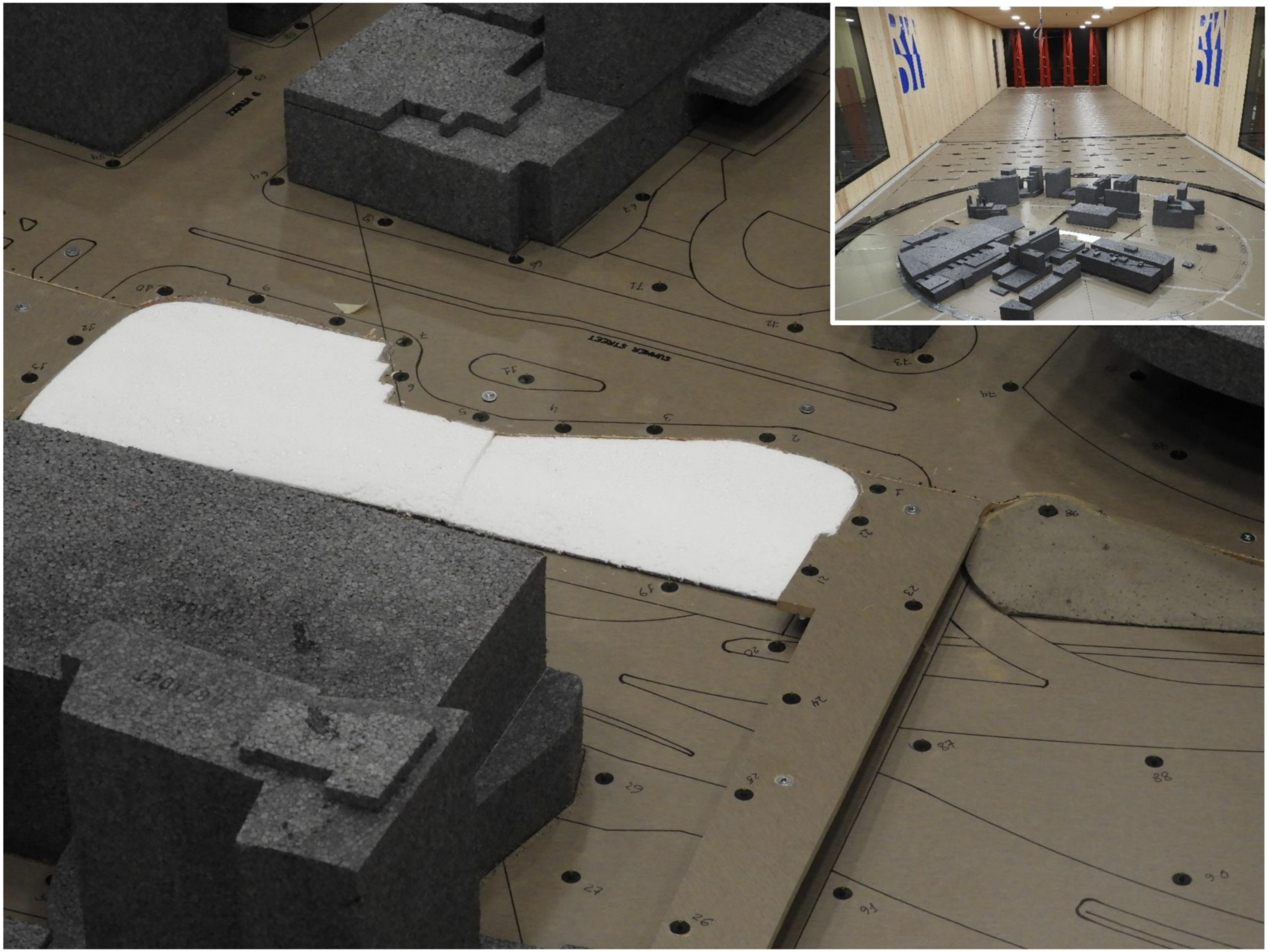
Information concerning the Project Site and surroundings was derived from: information on surrounding buildings and terrain and site plans and elevations of the proposed development provided by the Project team. The following configurations were simulated:

- No Build: includes the existing site and all existing surrounding buildings, as well as buildings under construction or approved by the BPDA; and
- Build: includes the proposed Summer Street Hotel and all existing surroundings.

As shown in Figures 3.1-1 and 3.1-2, the wind tunnel model included the proposed development and all relevant surrounding buildings and topography within a 1,200 foot radius of the Project 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 120 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 five 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.

3.1.3.2 Meteorological Data

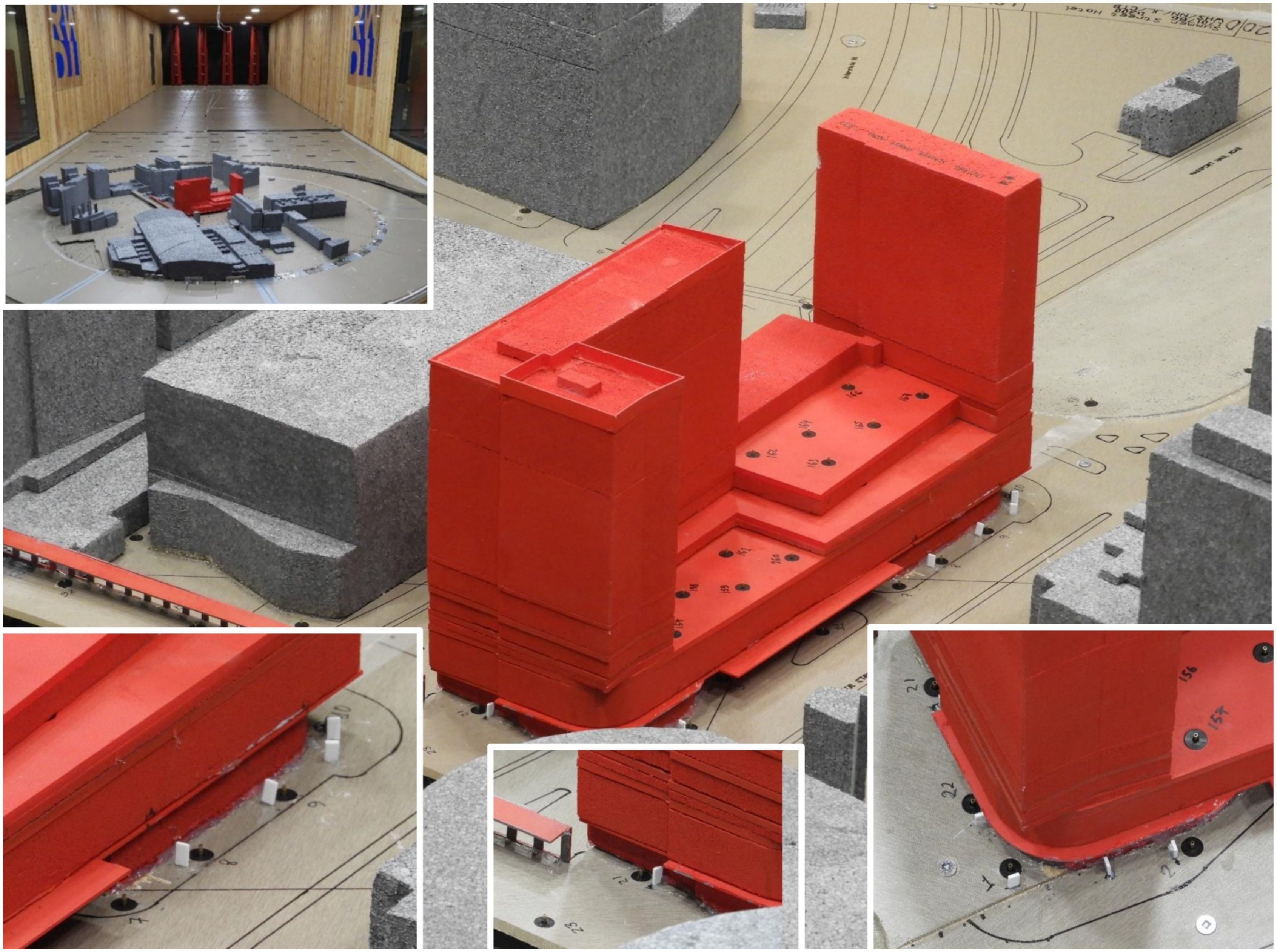
The results obtained from the wind tunnel test were combined with long-term meteorological data, recorded during the years 1991 to 2015 at Boston's Logan International Airport, in order to predict full scale wind conditions. The analysis was performed separately for each of the four seasons and for the entire year.



Summer Street Hotel **Boston, Massachusetts**

Figure 3.1-1

Wind Tunnel Study Model – No-Build



Summer Street Hotel Boston, Massachusetts

Figure 3.1-2

Wind Tunnel Study Model – Build

Figures 3.1-3 to 3.1-5 present "wind roses", summarizing the seasonal and annual wind climates in the Boston area, based on the data from Logan International Airport. The first wind rose in Figure 3.1-3, for example, summarizes the spring (March, April, and May) wind data. In general, the predominant winds at this time of the 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 (the last wind rose, Figure 3.1-5) the most common wind directions are from between the southwest and northwest directions. Winds from east-southeast are also relatively common. In the case of strong winds, northeast and west through northwest are the dominant wind directions.

This study involved state-of-the-art measurement and analysis techniques to predict wind conditions in the study area. 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 in the study area. 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.

3.1.4 BPDA Wind Criteria

The BPDA has adopted two standards for assessing the relative wind comfort of pedestrians. First, the BPDA 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 BPDA to determine the acceptability of specific locations is based on the work of Melbourne[8]. 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 one-hour mean wind speed exceeded one percent of the time (i.e., the 99-percentile mean wind speed). The wind criteria are provided in Table 3.1-1.

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[8] Melbourne, W.H., 1978, "Criteria for Environmental Wind Conditions", Journal of Industrial Aerodynamics, 3 (1978) 241 - 249.

Table 3.1-1 BPDA Mean Wind Criteria*

Level of Comfort	Wind Speed
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.

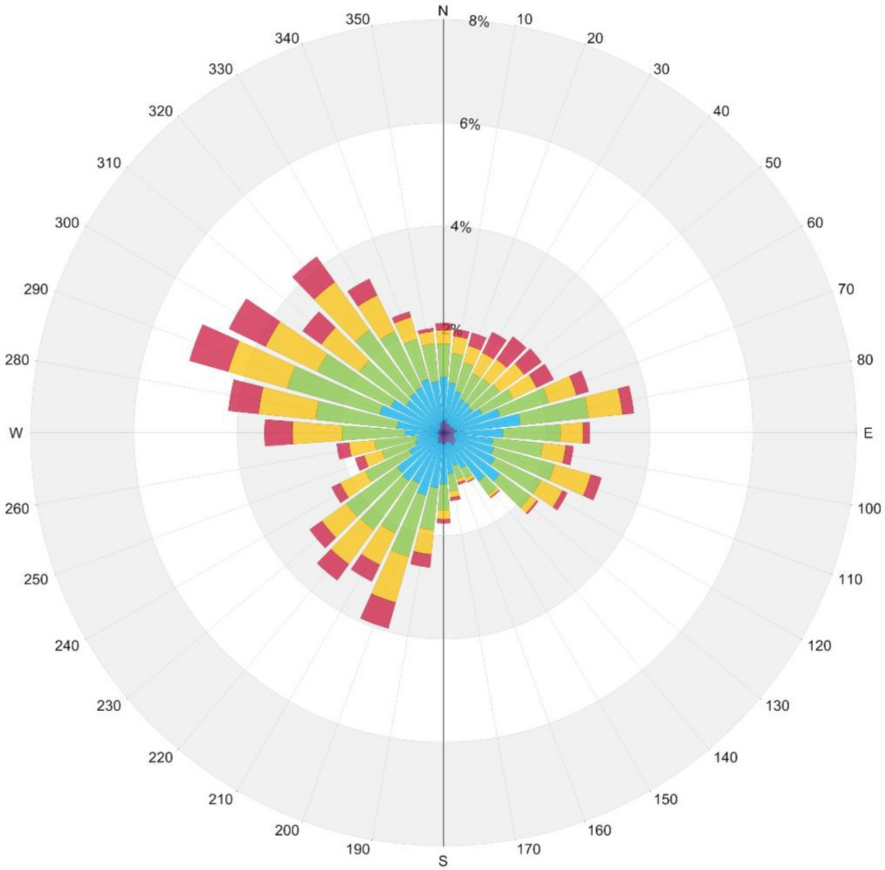
The wind climate found in a typical downtown location in Boston is generally comfortable for the pedestrian use of sidewalks and thoroughfares, and meets the BPDA effective gust velocity criterion of 31 mph. However, without any mitigation measures, this wind climate is likely to be frequently uncomfortable for more passive activities such as sitting.

3.1.5 Predicted Wind Conditions

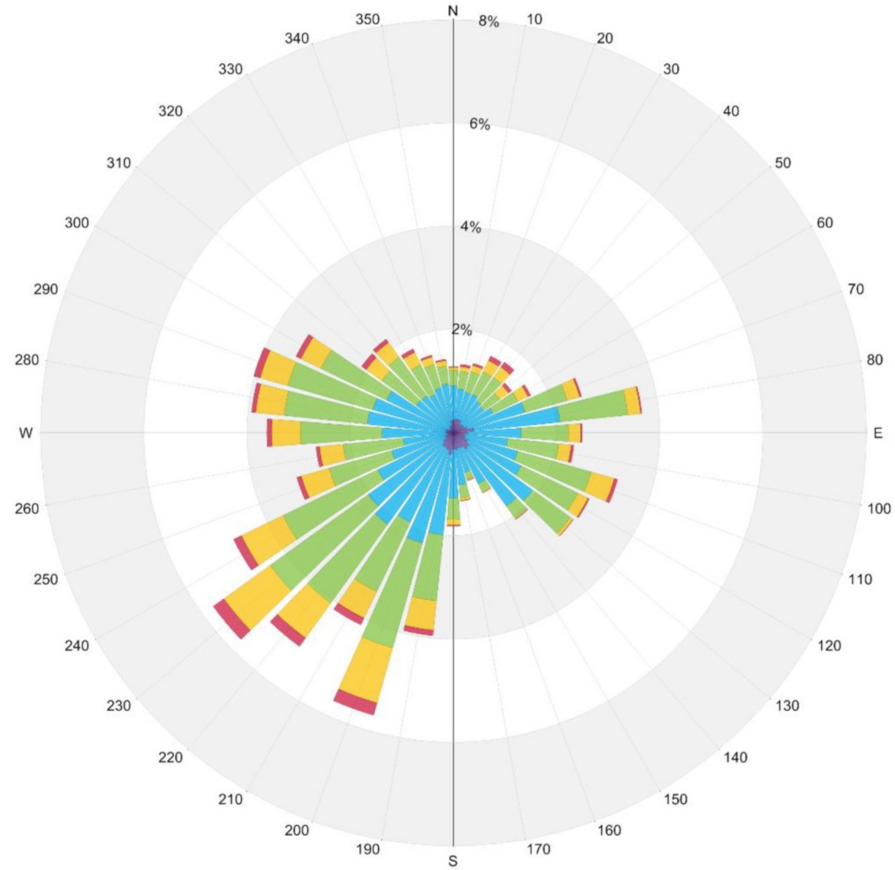
In the following discussion of anticipated wind conditions, reference is made to the following generalized wind flows. Tall buildings tend to intercept the stronger winds at higher elevations and redirect them to the ground level (see Figure 3.1-6). Such a Downwashing Flow is often the main cause for wind accelerations around large buildings at the pedestrian level. When winds approach at an oblique angle to the tall façade and are deflected down, a localized increase in the wind activity can be expected around the exposed building corner at pedestrian level (see Figure 3.1-7). If these building/wind combinations occur for prevailing winds, there is a greater potential for increased wind activity.

Figures 3.1-8 to 3.1-11 graphically depict the wind comfort conditions at each wind measurement location based on the annual winds, while the table in Appendix C presents the mean and effective gust wind speeds for each season as well as annually. 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 is based on the annual winds for each configuration tested, except where noted below in the text.

The following is a detailed discussion of the suitability of the predicted wind comfort conditions for the anticipated pedestrian use of each area of interest including: main entrances along Summer Street, World Trade Center Avenue and D Street, surrounding sidewalks, and terraces at Levels 4 and 5.



Spring
(March - May)



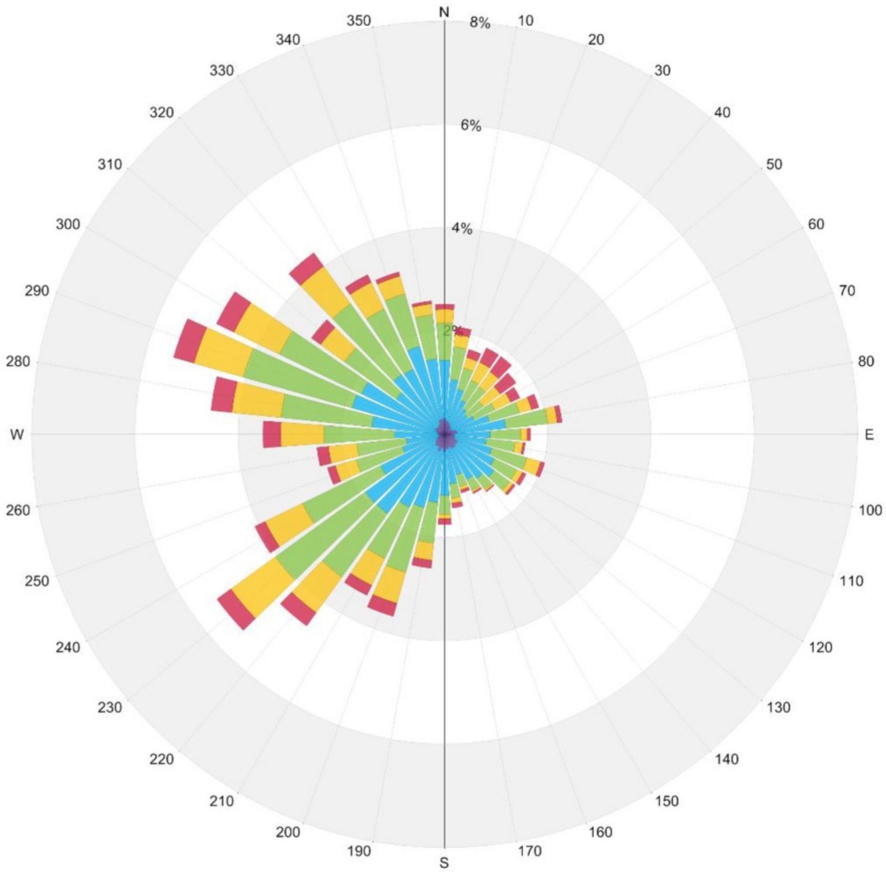
Summer
(June - August)

Wind Speed (mph)	Probability (%) Spring	Probability (%) Summer
Calm	2.4	2.7
1-5	6.4	8.9
6-10	28.5	38.1
11-15	32.9	35.1
16-20	19.7	12.6
>20	10.2	2.7

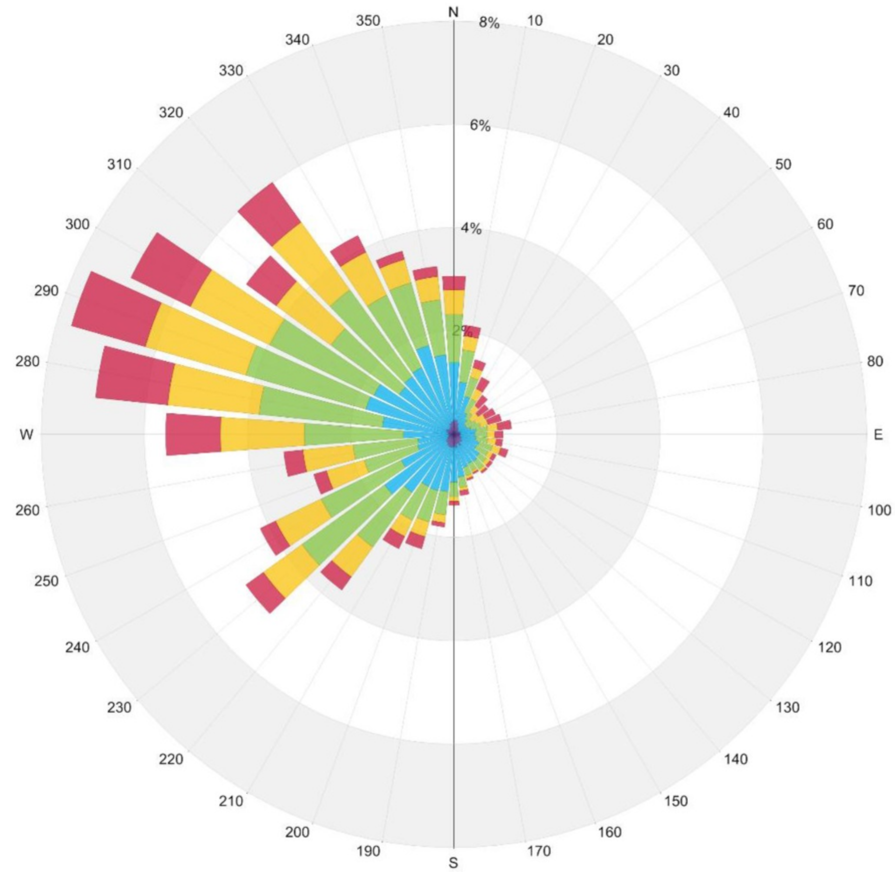
Figure 3.1-3

Directional Distribution (%) of Winds (Blowing From)

Logan International Airport (1991-2015) – Spring and Summer



Fall
(September - November)



Winter
(December - February)

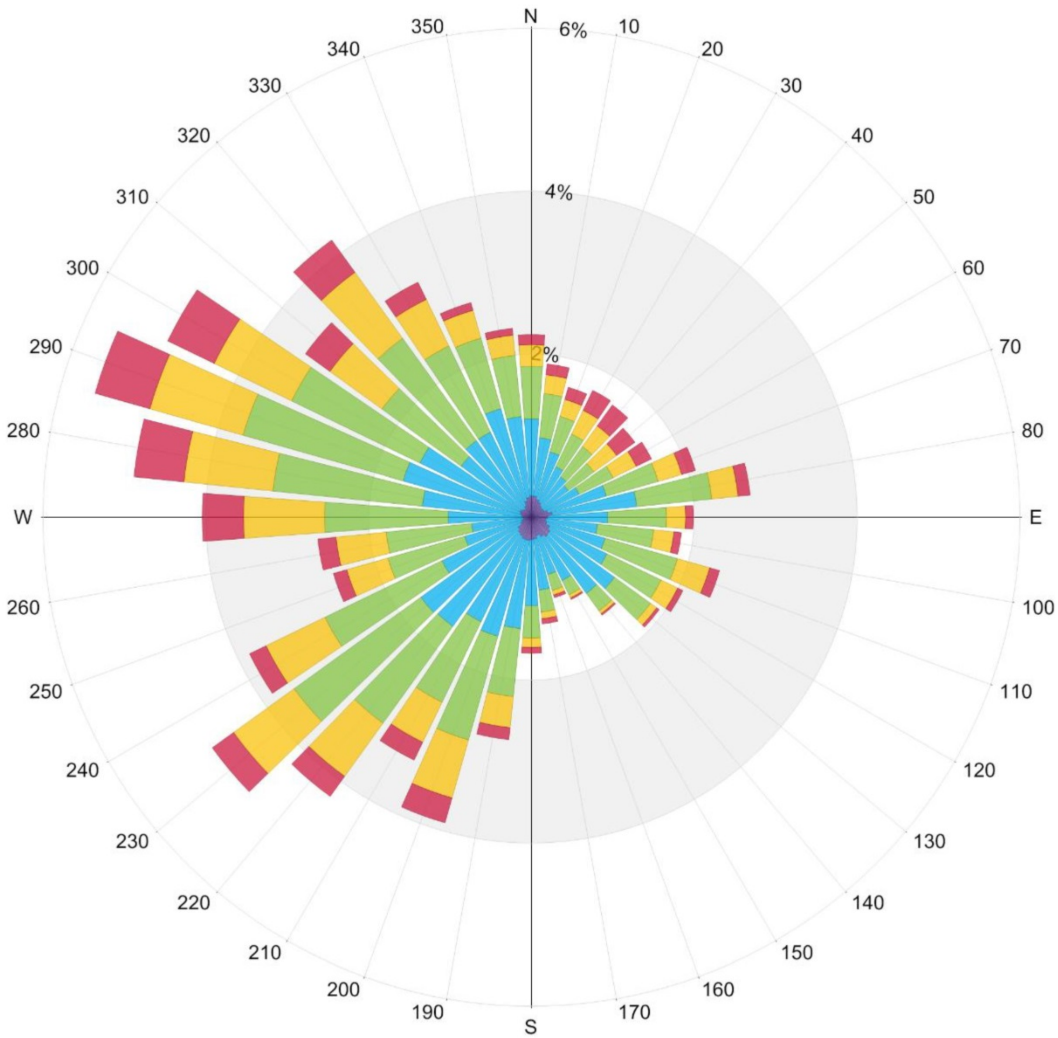
Wind Speed (mph)	Probability (%) Fall	Winter
Calm	2.9	2.3
1-5	8.0	6.2
6-10	34.3	27.6
11-15	32.8	31.0
16-20	15.3	20.1
>20	6.7	12.8

RWDI

Figure 3.1-4

Directional Distribution (%) of Winds (Blowing From)

Logan International Airport (1991-2015) – Fall and Winter



Annual Winds

Wind Speed (mph)	Probability (%)
Calm	2.6
1-5	7.4
6-10	32.1
11-15	33.0
16-20	16.9
>20	8.1

Figure 3.1-5

Directional Distribution (%) of Winds (Blowing From)

Logan International Airport (1991-2015) – Annual

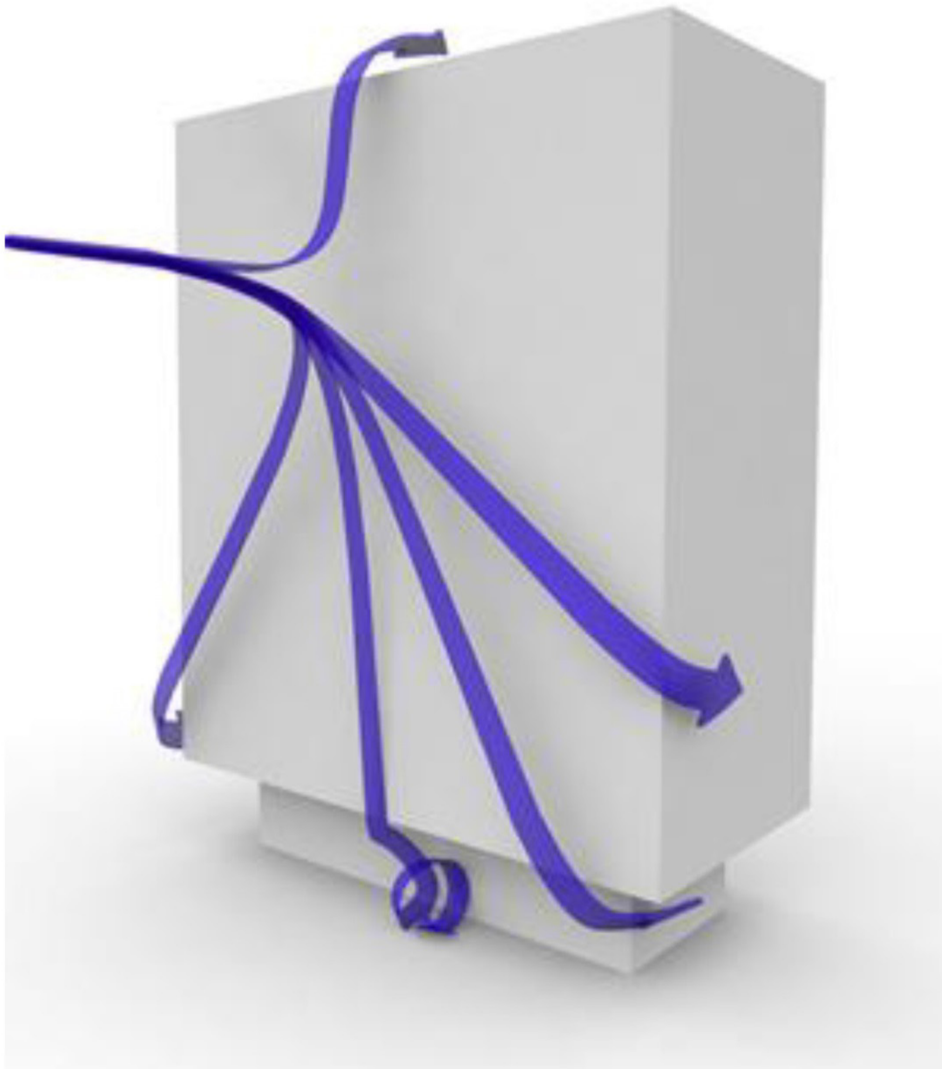


Figure 3.1-6
Downwashing Flow

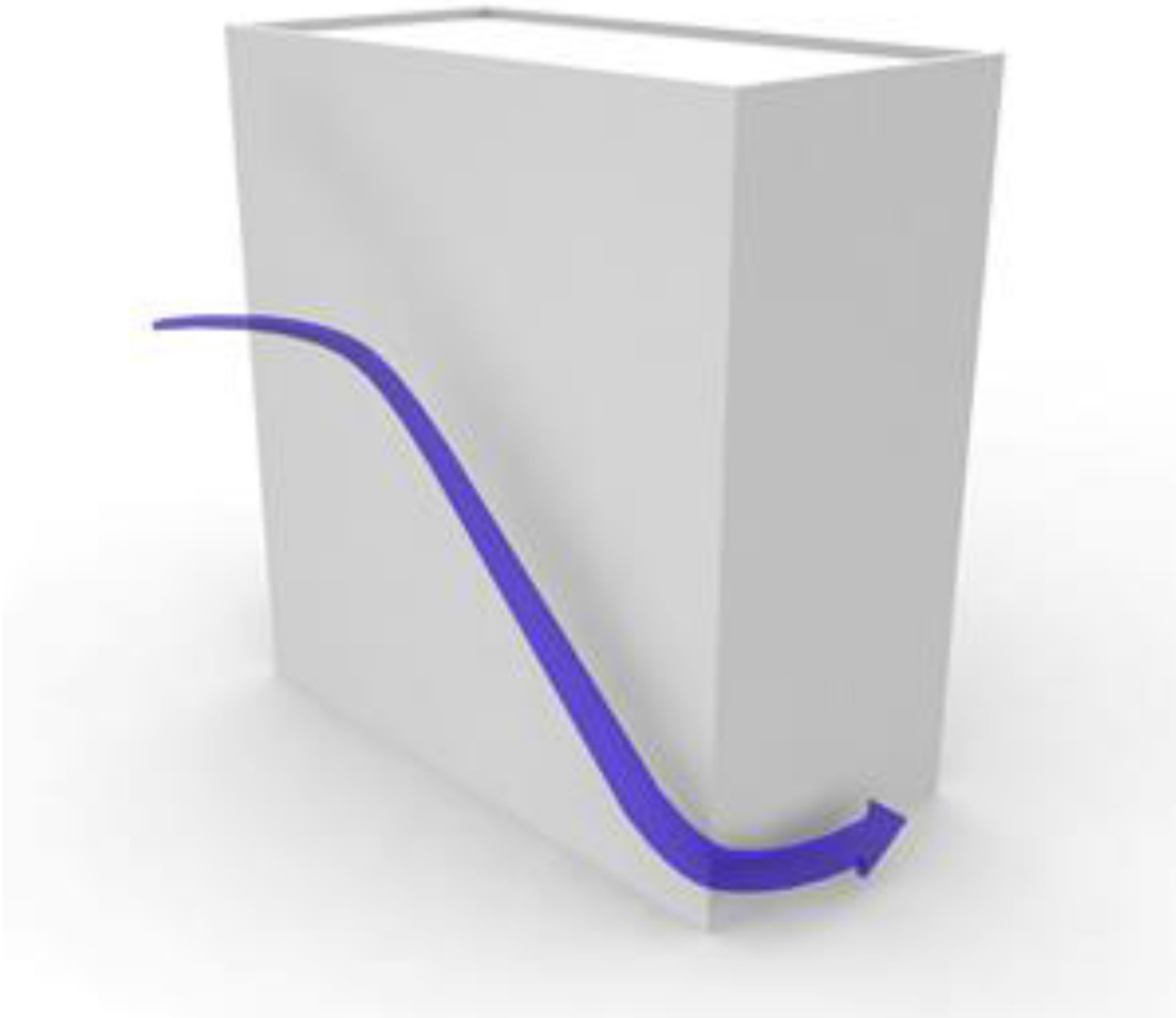
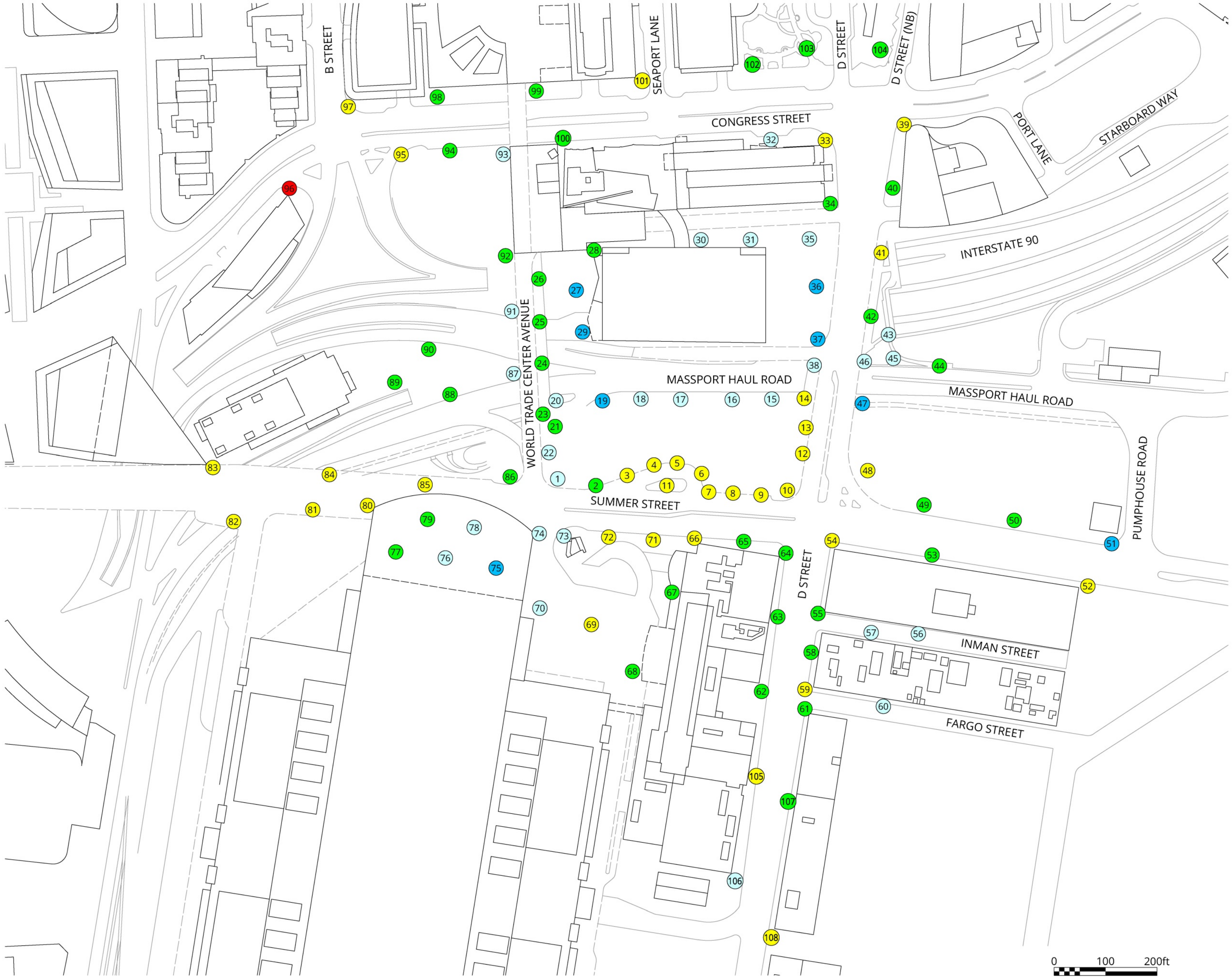


Figure 3.1-7
Corner Acceleration



LEGEND:

MEAN SPEED CATEGORIES:

- Sitting
- Standing
- Walking
- Uncomfortable
- Dangerous

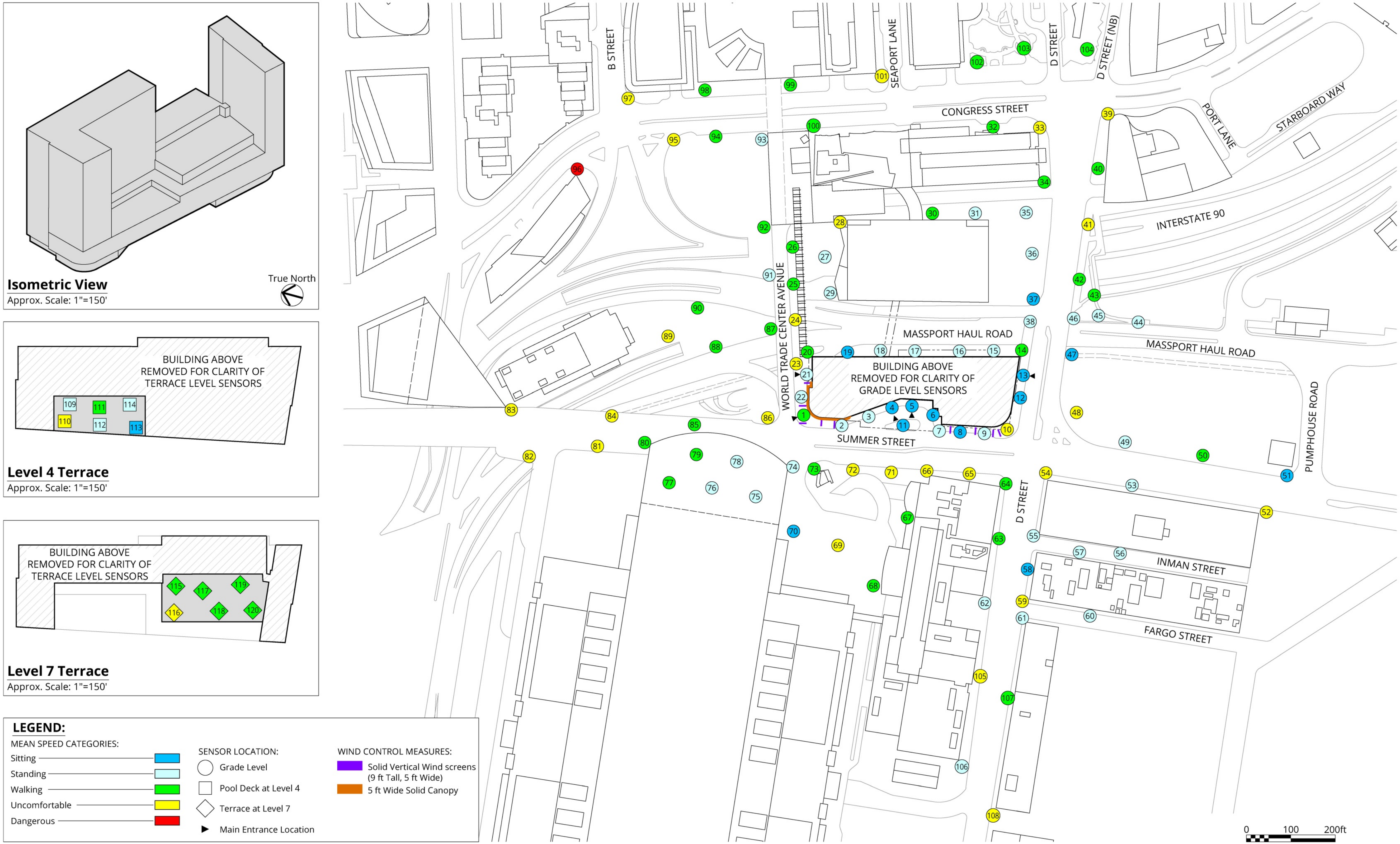
SENSOR LOCATION:

Grade Level

Summer Street Hotel   Boston, Massachusetts

Figure 3.1-8

Annual Pedestrian Wind Conditions – Mean Speed, No-Build



Summer Street Hotel **Boston, Massachusetts**

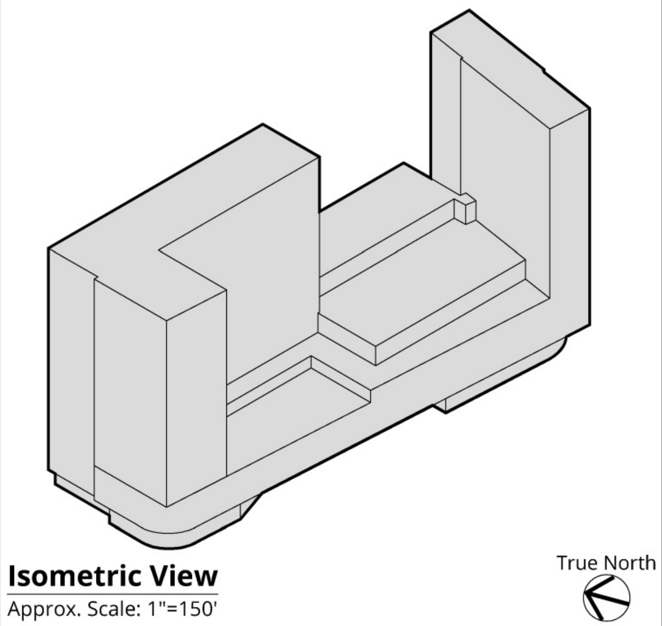
Figure 3.1-9

Annual Pedestrian Wind Conditions – Mean Speed, Build

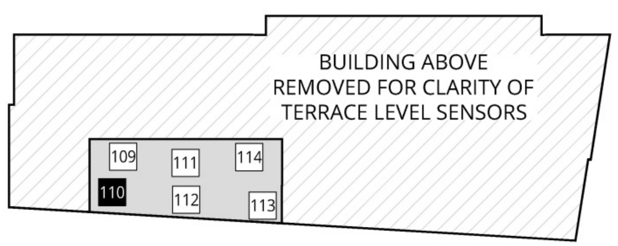
Summer Street Hotel **Boston, Massachusetts**

Figure 3.1-10

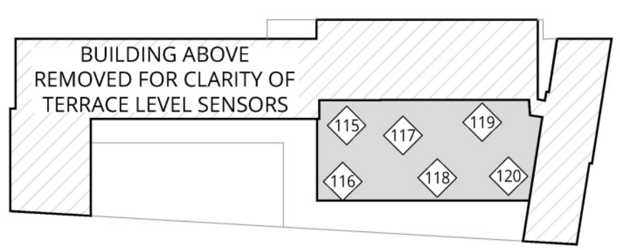
Annual Pedestrian Wind Conditions – Effective Gust, No-Build



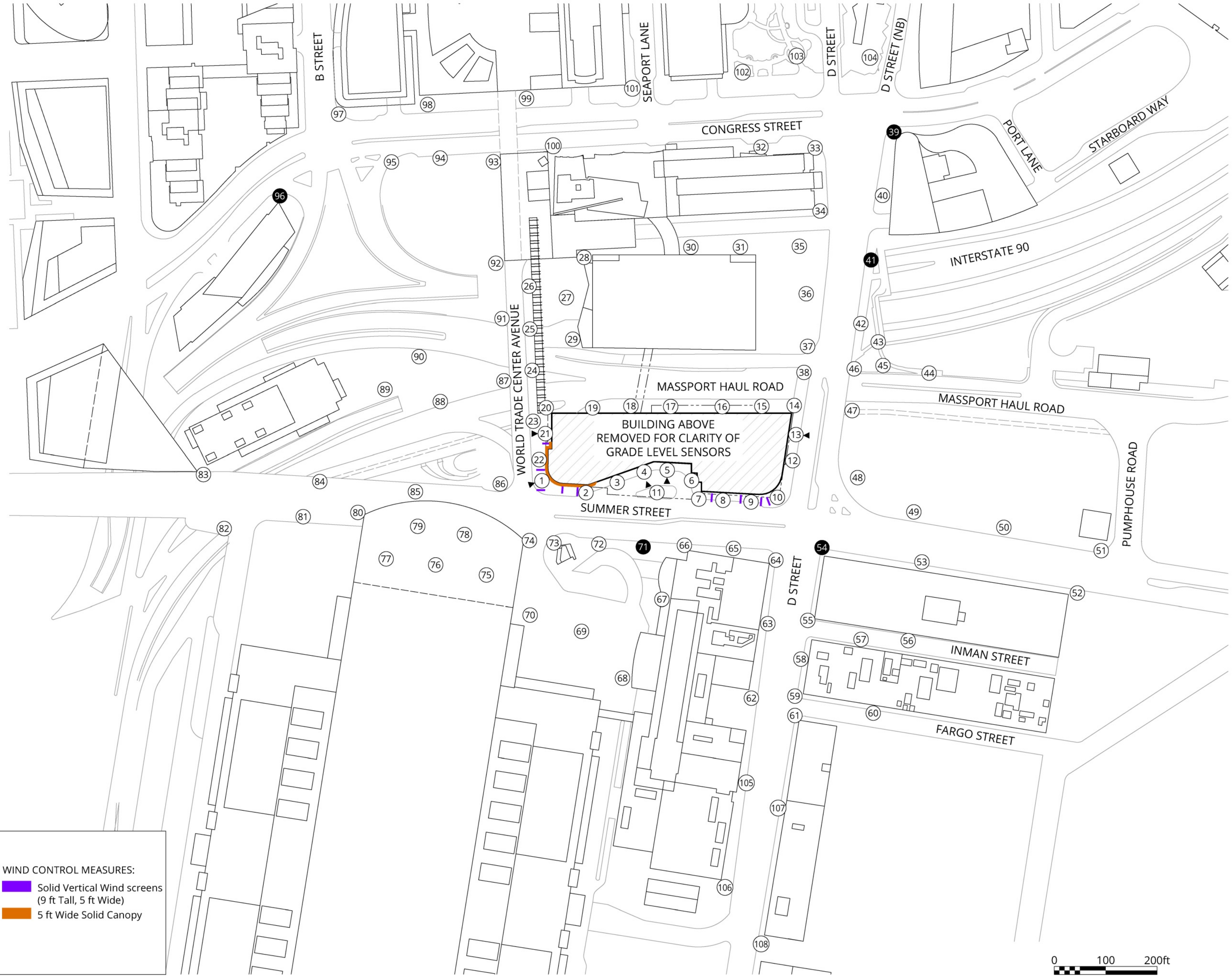
Isometric View
Approx. Scale: 1"=150'



Level 4 Terrace
Approx. Scale: 1"=150'



Level 7 Terrace
Approx. Scale: 1"=150'



LEGEND:

EFFECTIVE GUST CATEGORIES:
- Acceptable
- Unacceptable

SENSOR LOCATION:
- Grade Level
- Pool Deck at Level 4
- Terrace at Level 7
- Main Entrance Location

WIND CONTROL MEASURES:
- Solid Vertical Wind screens (9 ft Tall, 5 ft Wide)
- 5 ft Wide Solid Canopy

Summer Street Hotel **Boston, Massachusetts**

Figure 3.1-11
Annual Pedestrian Wind Conditions – Effective Gust, Build

3.1.5.1 No Build

As shown in Figure 3.1-8, in the No Build configuration winds at on-site locations along the north and west of the Project Site are currently expected to be categorized as comfortable for walking or standing, and those at most locations along the east and south are categorized as Uncomfortable (Locations 3 through 14 in Figure 3.1-8). Wind conditions categorized as comfortable for walking, standing or sitting are predicted at most off-site areas around the Project Site. Uncomfortable wind conditions in the No Build configuration are located along the sidewalks of Summer Street, D Street and Congress Street (Locations 3 through 14, 33, 39, 41, 48, 52, 54, 59, 66, 69, 71, 72, 80 through 85, 95, 97, 101, 105 and 108, as shown on Figure 3.1-8). Winds at one location along the sidewalk of Congress Street to the northwest of the site is expected to be categorized as Dangerous on an annual basis (Location 96, as shown on Figure 3.1-8). High wind speeds categorized as Dangerous are expected at the intersection of D Street and Congress Street, to the northeast of the project site during the winter as well (Location 39, as shown in the table in Appendix C).

Winds at five on-site locations to the south and east of the Project Site and six off-site locations along Summer Street, D Street and Congress Street are predicted to exceed the effective gust speed criterion for the No Build configuration on an annual basis (Locations 6, 7, 9, 11, 14, 39, 41, 69, 71, 72 and 96, as shown on Figure 3.1-10).

3.1.5.2 Build

Grade Level (Locations 1 through 108)

With the addition of the Project, winds at most locations are expected to improve upon or remain similar to the No Build conditions on an annual basis (Figure 3.1-9). Wind speeds comfortable for sitting or standing are predicted at most of the Project's entrances (Locations 4, 5, 13 and 21, as shown on Figure 3.1-9), and at most locations around the perimeter of the Project Site. These conditions are considered appropriate for the intended use. Wind speeds comfortable for walking are predicted along the sidewalk near the southwest corner entrance (Location 1 a shown on Figure 3.1-10), a condition that will continue to be studied to determine if even lower wind speeds are preferred at this location as the design progresses.

The wind condition at the southeast corner of the Project Site, categorized as Uncomfortable, is predicted to remain unchanged (Location 10 as shown on Figure 3.1-9). Many of the locations predicted to be categorized as Uncomfortable in the No Build configuration are improved along Summer Street (Locations 3 through 9, 11 through 14, 80 and 85, as shown on Figure 3.1-9). The addition of the Project is expected to yield slightly higher wind speeds in some areas to the north, south and west of the Project Site along Summer Street and World Trade Center Avenue, resulting in five additional locations with wind conditions categorized as Uncomfortable (Locations 23, 24, 28, 65, 86 and 89, as shown on Figure 3.1-9). The wind speeds categorized as Dangerous along Congress Street is expected to remain unchanged for the Build configuration on an annual basis (Location 96 as shown on Figure 3.1-9). Higher wind speeds categorized as Dangerous are also expected at Locations 39 and 54 during the winter (see the table in Appendix C).

With the addition of the Project, the effective gust exceedance at four locations remain similar to the No Build conditions (Locations 39, 41, 71 and 96, as shown on Figure 3.1-11). The exceedance of the effective gust criterion at seven locations along Summer Street and to the south of the Project are projected to be eliminated (Locations 6, 7, 9, 14, 69 and 72, as shown on Figure 3.1-11). However, one additional location is predicted to exceed the effective gust criterion for the Build configuration annually (Location 54 as shown on Figure 3.1-11).

Terraces (Locations 109 through 120)

Wind speeds comfortable for sitting or standing are desirable for terraces that are intended for passive activities of building users. During fall and winter, the area would not be used frequently, and increased wind activity would be considered appropriate.

As shown in Figure 3.1-9, the wind conditions on the Level 4 terrace are generally predicted to be comfortable for sitting or standing annually, with higher wind speeds comfortable for walking at an isolated location (Location 111 as shown on Figure 3.1-9). The southwest corner of this terrace is expected to be uncomfortable for passive activities (Location 110 as shown on Figure 3.1-9). It can be noted that this corner is predicted to be comfortable for walking during the summer, when the terrace is most frequently expected to be used (see the table in Appendix C). Slightly higher wind speeds comfortable for walking are expected on the Level 5 terrace on an annual basis, with the exception of the southwest corner of this terrace, where wind conditions categorized as Uncomfortable are predicted annually (Location 116 as shown on Figure 3.1-9). Similar to the Level 4 terrace, this terrace is also expected to be comfortable for sitting or standing during the summer, with the exception of the southwest corner, where higher wind speeds comfortable for walking are predicted during the summer (see the table in Appendix C).

The southwest corner of the Level 4 terrace is predicted to exceed the effective gust criterion on an annual basis (Location 110 as shown on Figure 3.1-11).

Higher-than-desired wind speeds on the Level 4 terrace are mainly caused by westerly winds that are accelerated at the southwest corner. These winds are also expected to downwash off (see Figure 3.1-6) the building façade and accelerate at terrace level. High wind activity at the Level 5 terrace is primarily due to the easterly winds.

It should be noted that parapets, trellises, or other features were not included in the analysis, but would be expected to be incorporated into the terrace designs. The Proponent will continue to evaluate measures to ensure that the wind conditions on the terraces are acceptable for the proposed activities.

3.1.6 Conclusion

The wind study shows that the Project is anticipated to generally improve pedestrian level winds in the area. As the design of the Project moves forward, the Proponent will continue to evaluate measures, if necessary, to improve wind conditions around the site.

3.2 Shadow

3.2.1 Introduction and Methodology

As typically required by the BPDA, a shadow impact analysis was conducted to investigate shadow impacts from the Project during three time periods (9:00 a.m., 12:00 noon, and 3:00 p.m.) during the vernal equinox (March 21), summer solstice (June 21), autumnal equinox (September 21), and winter solstice (December 21). In addition, shadow studies were conducted for the 6:00 p.m. time period during the summer solstice and autumnal equinox.

The shadow analysis presents the existing shadow and new shadow that would be created by the Project, illustrating the incremental impact of the Project. The analysis focuses on nearby open spaces, sidewalks and bus stops adjacent to and in the vicinity of the Project Site. Shadows have been determined using the applicable Altitude and Azimuth data for Boston. Figures showing the net new shadow from the Project are provided in Figures 3.2-1 to 3.2-14 at the end of this section. Note that the shadow graphics do not show the shadow that would have been created by the Previously Approved Project.

The results of the analysis show that new shadow from the Project will generally be limited to nearby streets and sidewalks. No new shadow is cast onto existing open spaces during 12 of the 14 time periods studied, or on proposed open spaces during ten of the 14 time periods studied. No new shadow is cast onto nearby transit stops during the time periods studied.

3.2.2 Vernal Equinox (March 21)

At 9:00 a.m. during the vernal equinox, new shadow from the Project will be cast to the northwest. New shadow will be cast onto a portion of World Trade Center Avenue and its sidewalks, as well as Massport Haul Road. No new shadow will be cast onto nearby transit stops or existing public open spaces.

At 12:00 p.m., new shadow from the Project will be cast to the north. New shadow will be cast onto World Trade Center Avenue and its sidewalks, Massport Haul Road, and a portion of the proposed plaza on the west side of the SBWTC. No new shadow will be cast onto nearby transit stops or existing public open spaces.

At 3:00 p.m., new shadow from the Project will be cast to the northeast. New shadow will be cast onto D Street and its sidewalks and Massport Haul Road. No new shadow will be cast onto nearby transit stops or existing public open spaces.

3.2.3 Summer Solstice (June 21)

At 9:00 a.m. during the summer solstice, new shadow from the Project will be cast to the west across minor portions of the Summer Street and its northern sidewalk, and a portion of World Trade Center Avenue and its sidewalks. No new shadow will be cast onto nearby transit stops or existing public open spaces.

At 12:00 p.m., new shadow will be cast to the northwest onto the Massport Haul Road and a minor portion of World Trade Center Avenue and its eastern sidewalk. No new shadow will be cast onto nearby transit stops or existing public open spaces.

At 3:00 p.m., new shadow will be cast to the northeast over the Massport Haul Road and a portion of D Street and its sidewalks. No new shadow will be cast onto nearby transit stops or existing public open spaces.

At 6:00 p.m., new shadow will be cast to the east across D Street and its sidewalks and Massport Haul Road. No new shadow will be cast onto nearby transit stops or existing public open spaces.

3.2.4 Autumnal Equinox (September 21)

At 9:00 a.m. during the vernal equinox, new shadow from the Project will be cast to the northwest. New shadow will be cast onto a portion of World Trade Center Avenue and its sidewalks, as well as Massport Haul Road. No new shadow will be cast onto nearby transit stops or existing public open spaces.

At 12:00 p.m., new shadow from the Project will be cast to the north. New shadow will be cast onto World Trade Center Avenue and its sidewalks, Massport Haul Road, and a portion of the proposed plaza on the west side of the SBWTC. No new shadow will be cast onto nearby transit stops or existing public open spaces.

At 3:00 p.m., new shadow from the Project will be cast to the northeast. New shadow will be cast onto D Street and its sidewalks and Massport Haul Road. No new shadow will be cast onto nearby transit stops or existing public open spaces.

At 6:00 p.m., new shadow will be cast to the east across the Massachusetts Turnpike, portions of Massport Haul Road, D Street and its sidewalks, and Silver Line Way, as well as Williams Tunnel Portal Park. No new shadow will be cast onto nearby transit stops.

3.2.5 Winter Solstice (December 21)

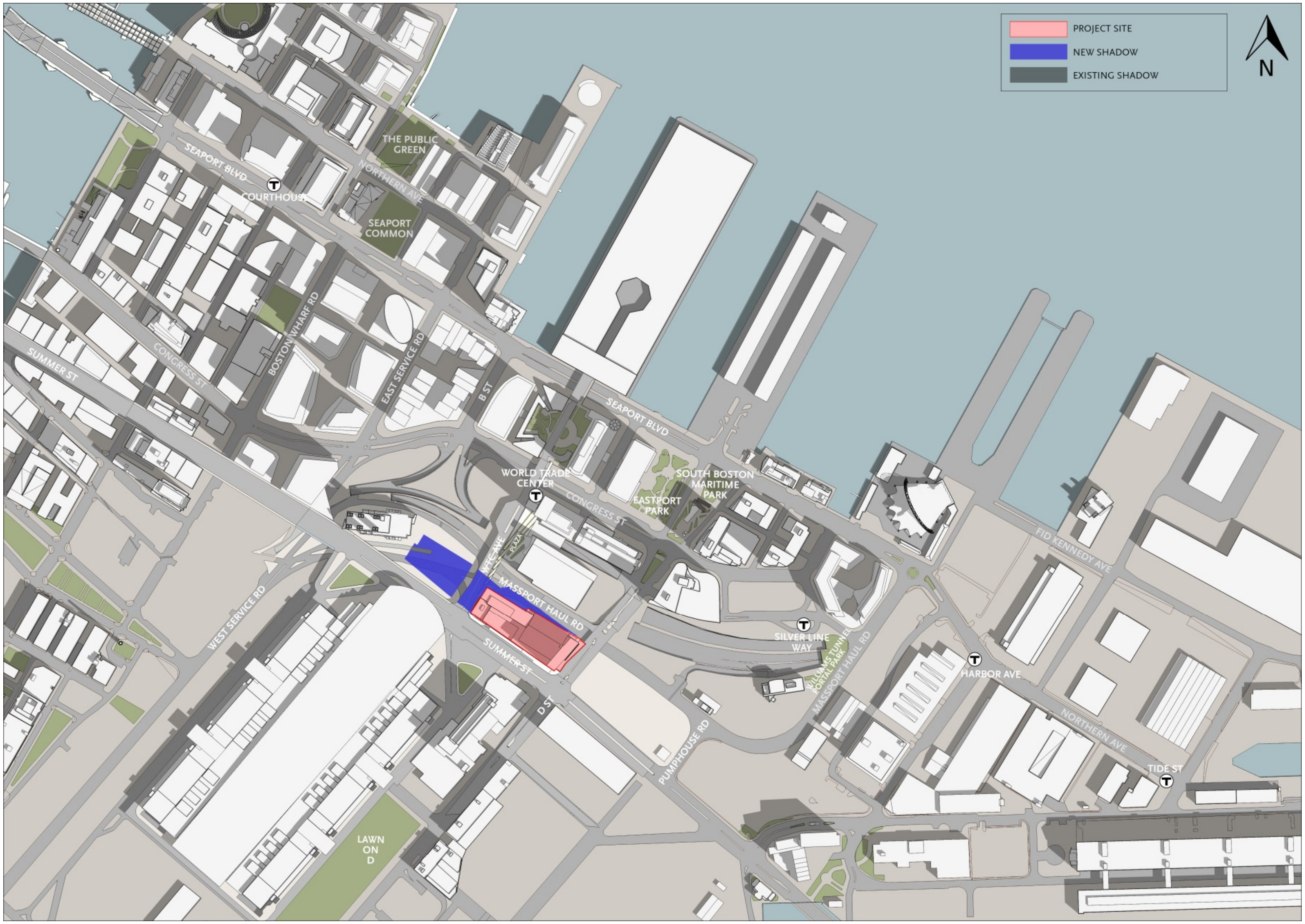
At 9:00 a.m. during the winter solstice, new shadow from the Project will be cast to the northwest across World Trade Center Avenue and its sidewalks, the ramps to the Massachusetts Turnpike, Congress Street and its sidewalks, and B Street and its sidewalks, as well as a minor portion of the proposed plaza on the west side of the SBWTC. No new shadow will be cast onto nearby transit stops or existing public open spaces.

At 12:00 p.m., new shadow will be cast to the north across World Trade Center Avenue and its sidewalks, Massport Haul Road, and a minor portion of Congress Street and its southern sidewalk. No new shadow will be cast onto nearby transit stops or existing public open spaces.

At 3:00 p.m., new shadow will be cast to the northwest across Massport Haul Road, D Street and its sidewalks, Northern Avenue and its sidewalks, a minor portion of the proposed plaza on the west side of the SBWTC, a small portion of South Boston Maritime Park, and a portion of Boston Inner Harbor. No new shadow will be cast onto nearby transit stops.

3.2.6 Conclusions

The shadow analysis examines the impact of new shadow from the Project on the surrounding area during 14 time periods. Of the 12 of the 14 time periods studied, no new shadow will be cast onto existing public open space or transit stops in the vicinity of the Project—new shadow will be cast onto a small portion of South Boston Maritime Park on December at 3:00 p.m. and onto Williams Tunnel Portal Park on September 21 at 6:00 p.m. During four of the 14 time periods, new shadow will be cast onto the proposed plaza on the west side of the SBWTC. No new shadow will be cast onto nearby transit stops during the 14 time periods studied.



Summer Street Hotel **Boston, Massachusetts**

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Figure 3.2-1

Shadow Study, March 21 9:00 a.m.

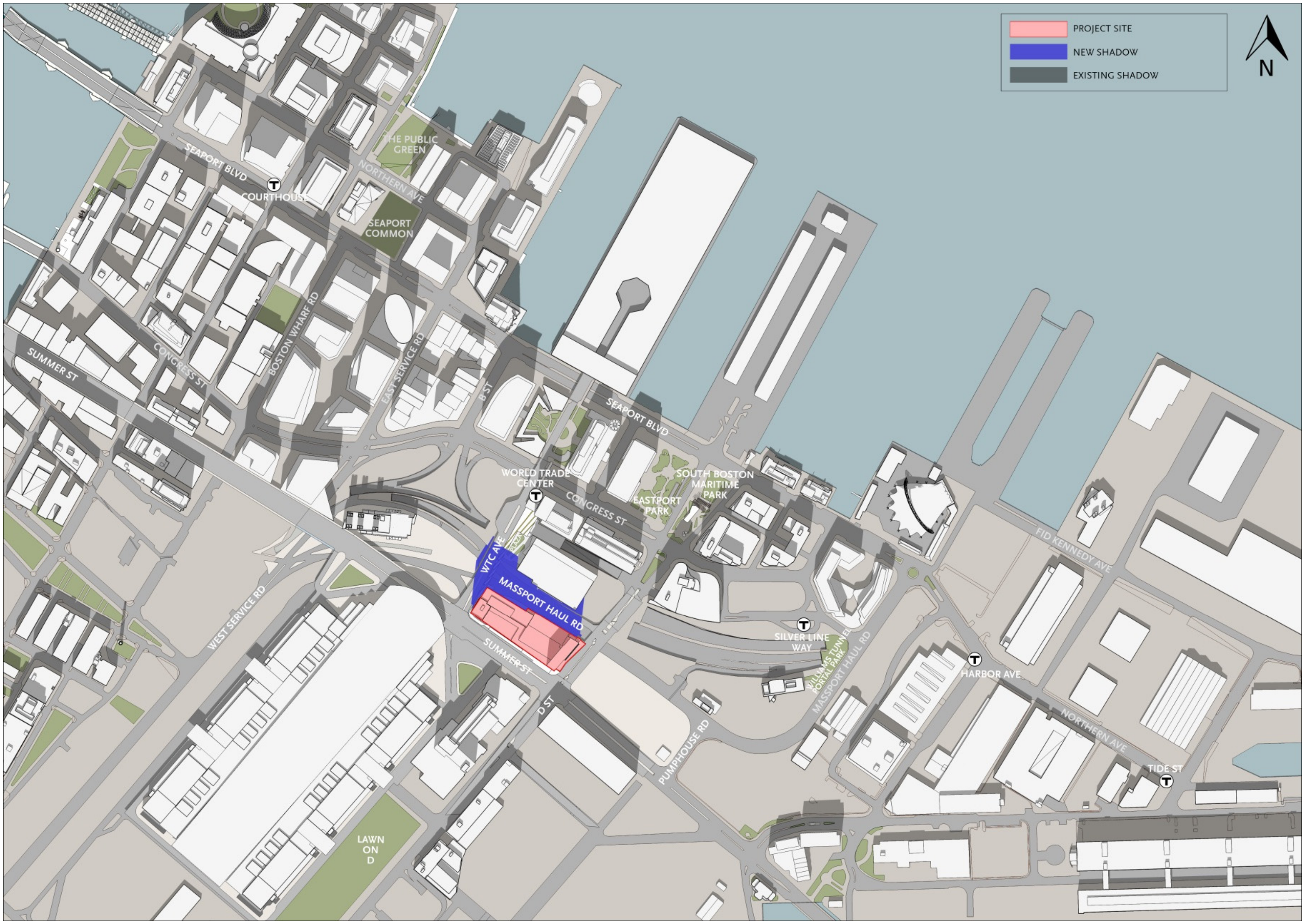

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Figure 3.2-2

Shadow Study, March 21 12:00 p.m.

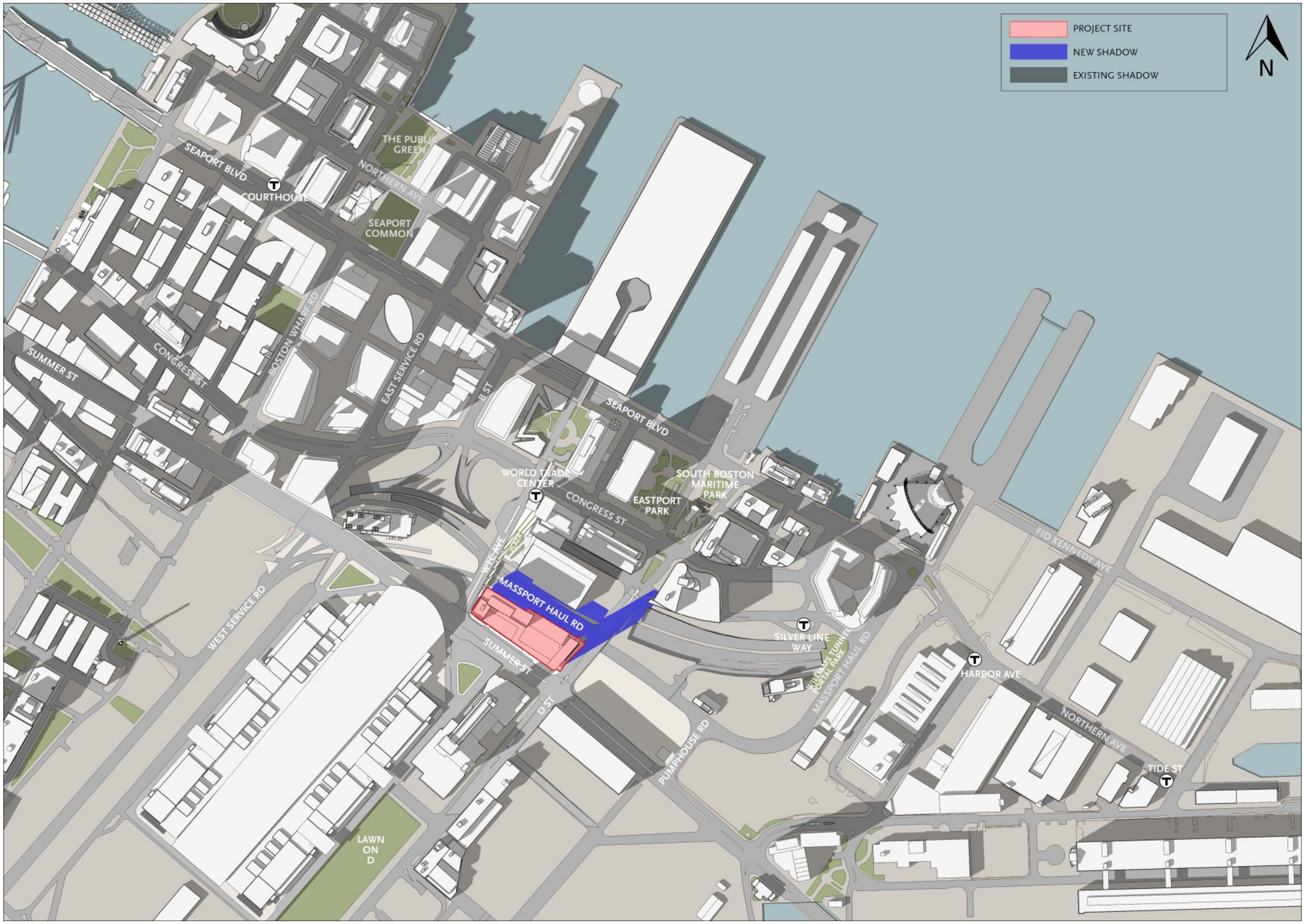

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Figure 3.2-3

Shadow Study, March 21 3:00 p.m.

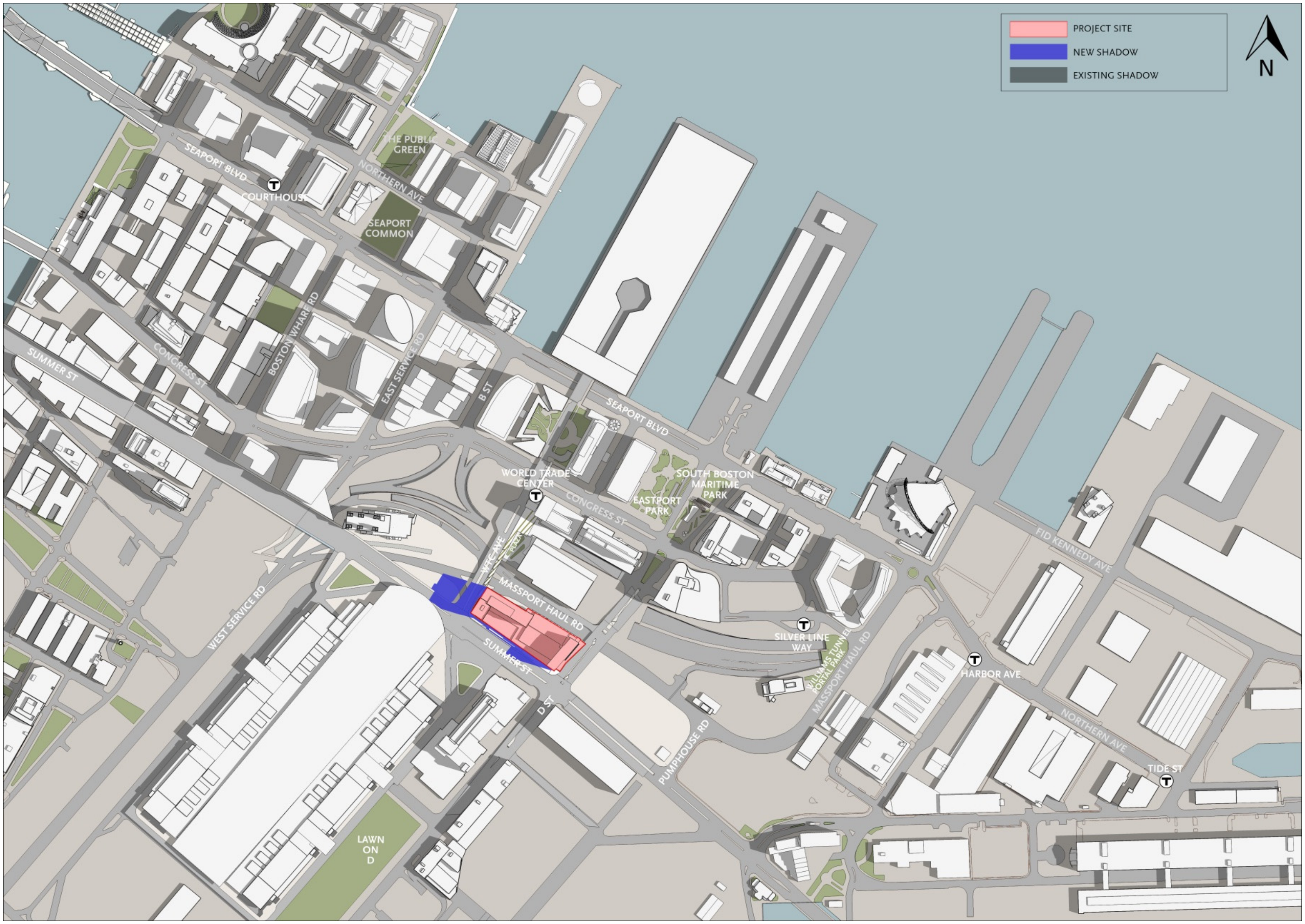

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Figure 3.2-4

Shadow Study, June 21 9:00 a.m.

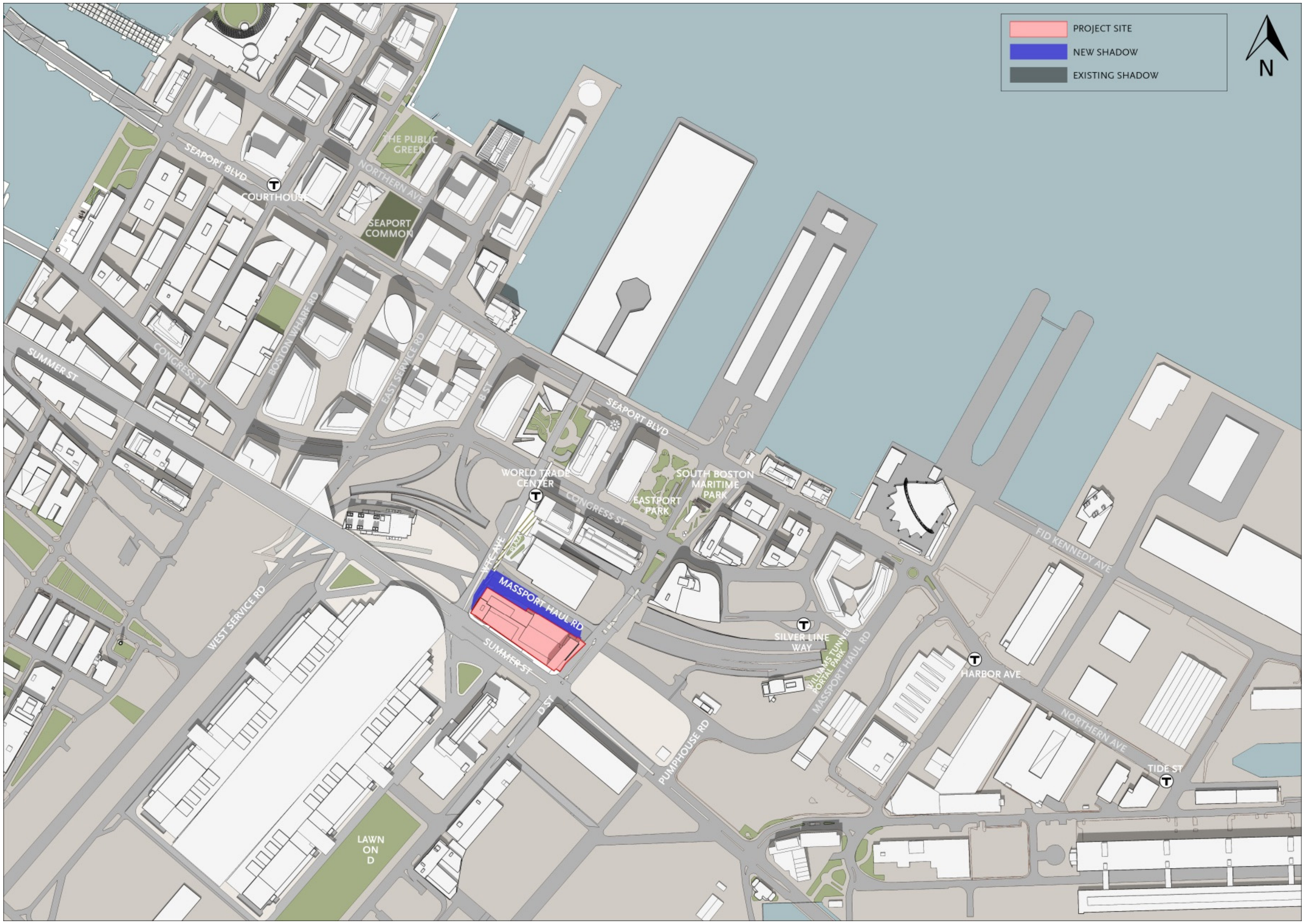

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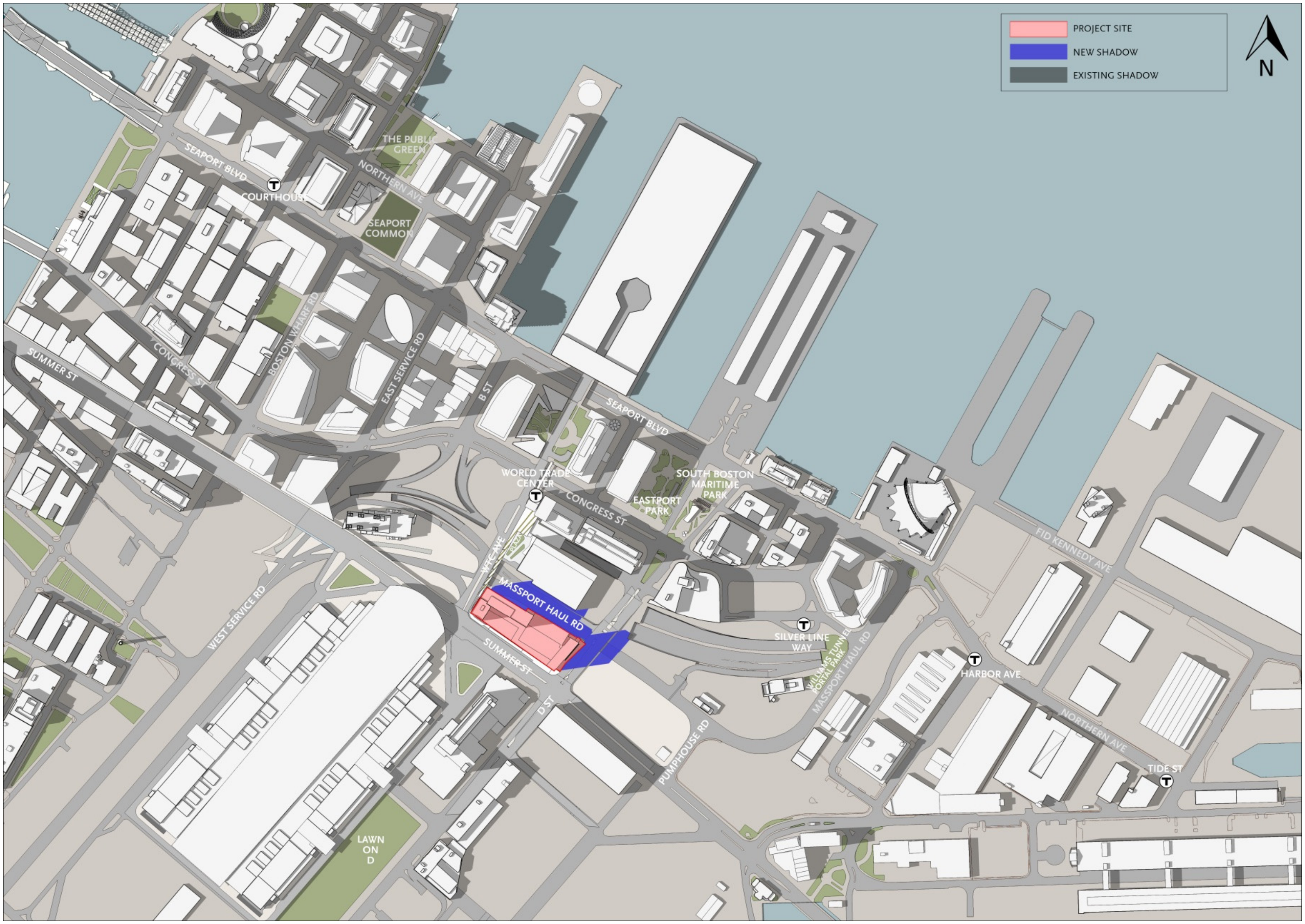
Figure 3.2-5

Shadow Study, June 21 12:00 p.m.



Summer Street Hotel **Boston, Massachusetts**

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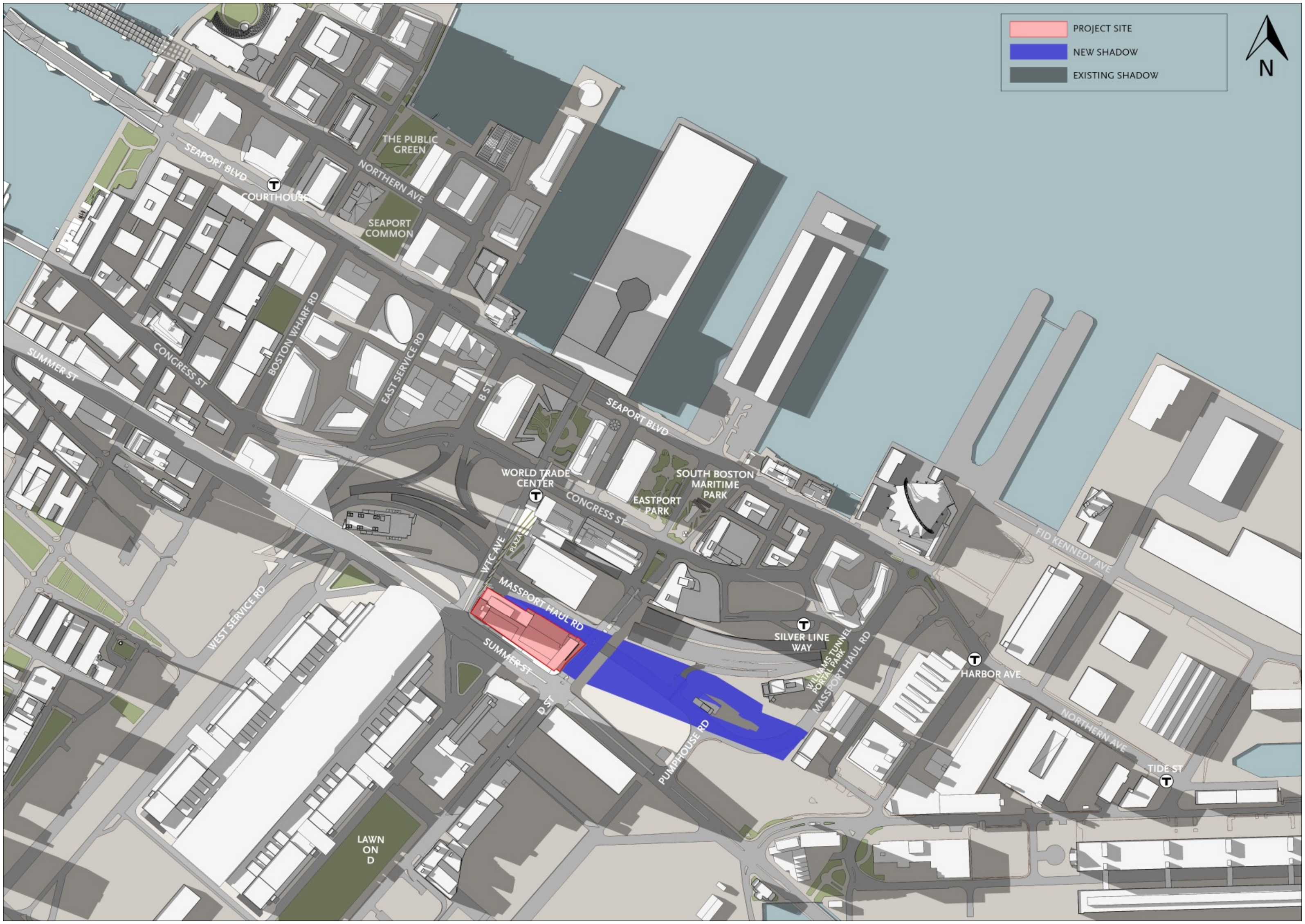
Figure 3.2-6

Shadow Study, June 21 3:00 p.m.



Summer Street Hotel **Boston, Massachusetts**

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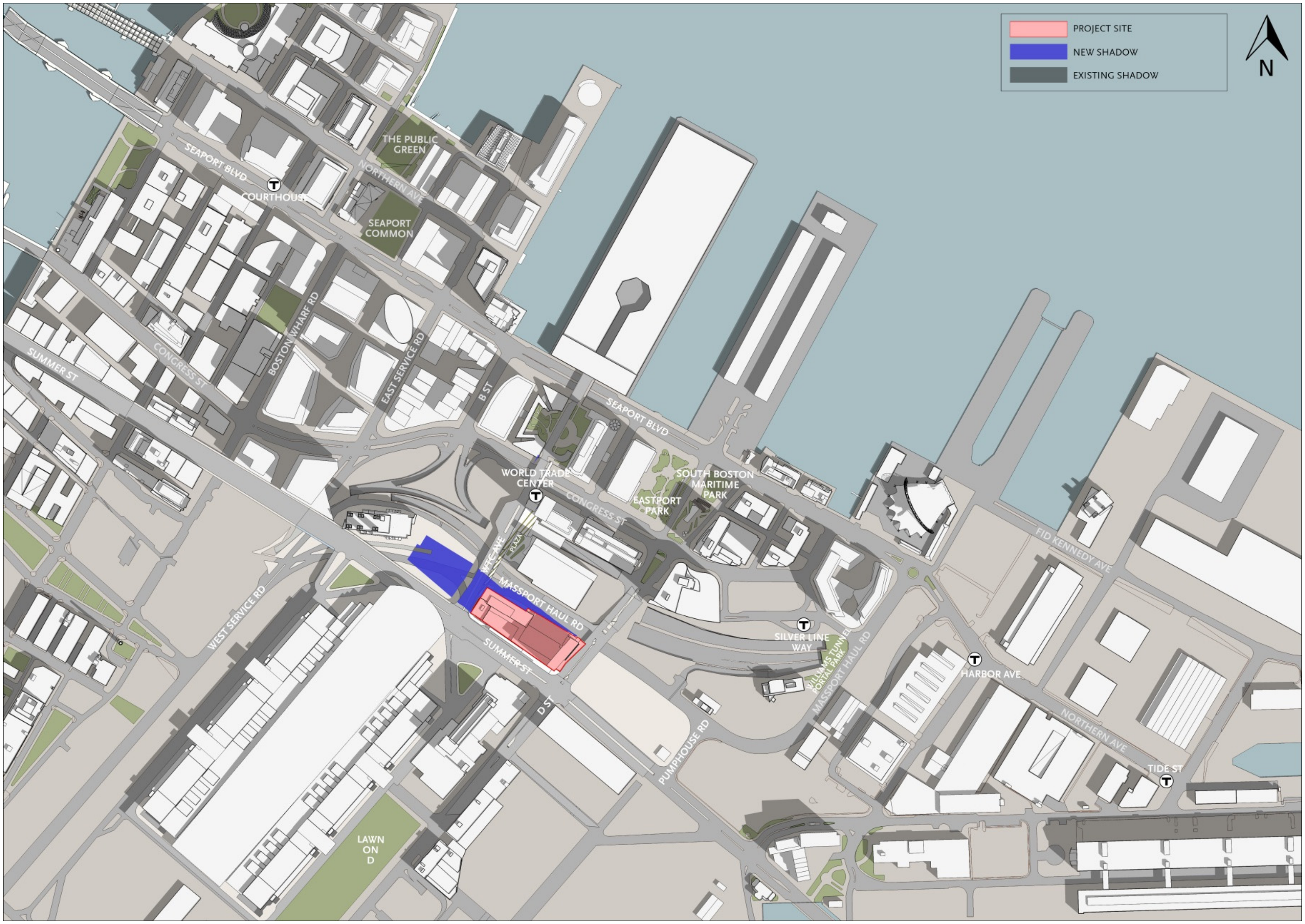
Figure 3.2-7

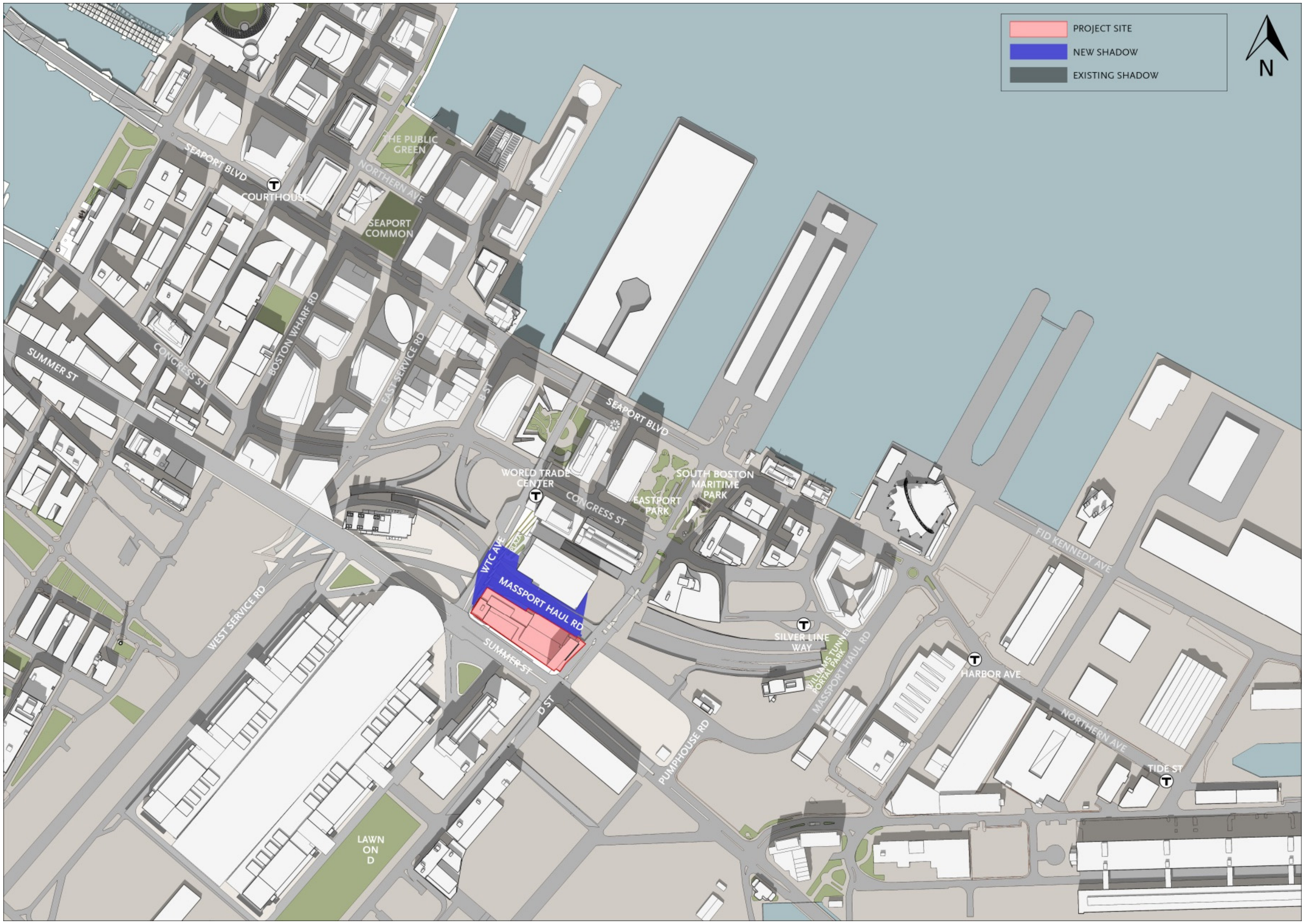
Shadow Study, June 21 6:00 p.m.



Summer Street Hotel **Boston, Massachusetts**

Figure 3.2-8

Shadow Study, September 21 9:00 a.m.



Summer Street Hotel **Boston, Massachusetts**

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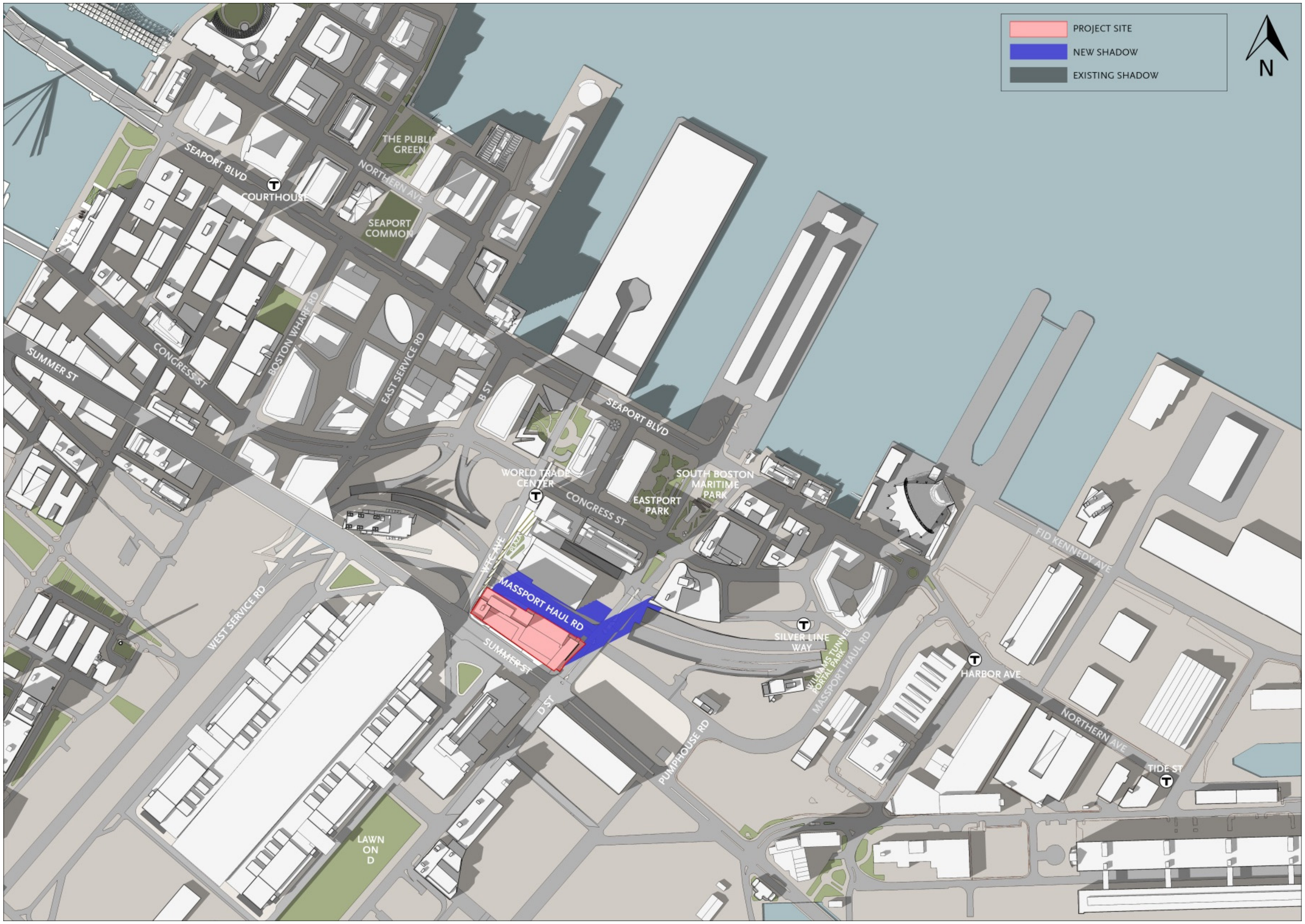
Figure 3.2-9

Shadow Study, September 21 12:00 p.m.



Summer Street Hotel **Boston, Massachusetts**

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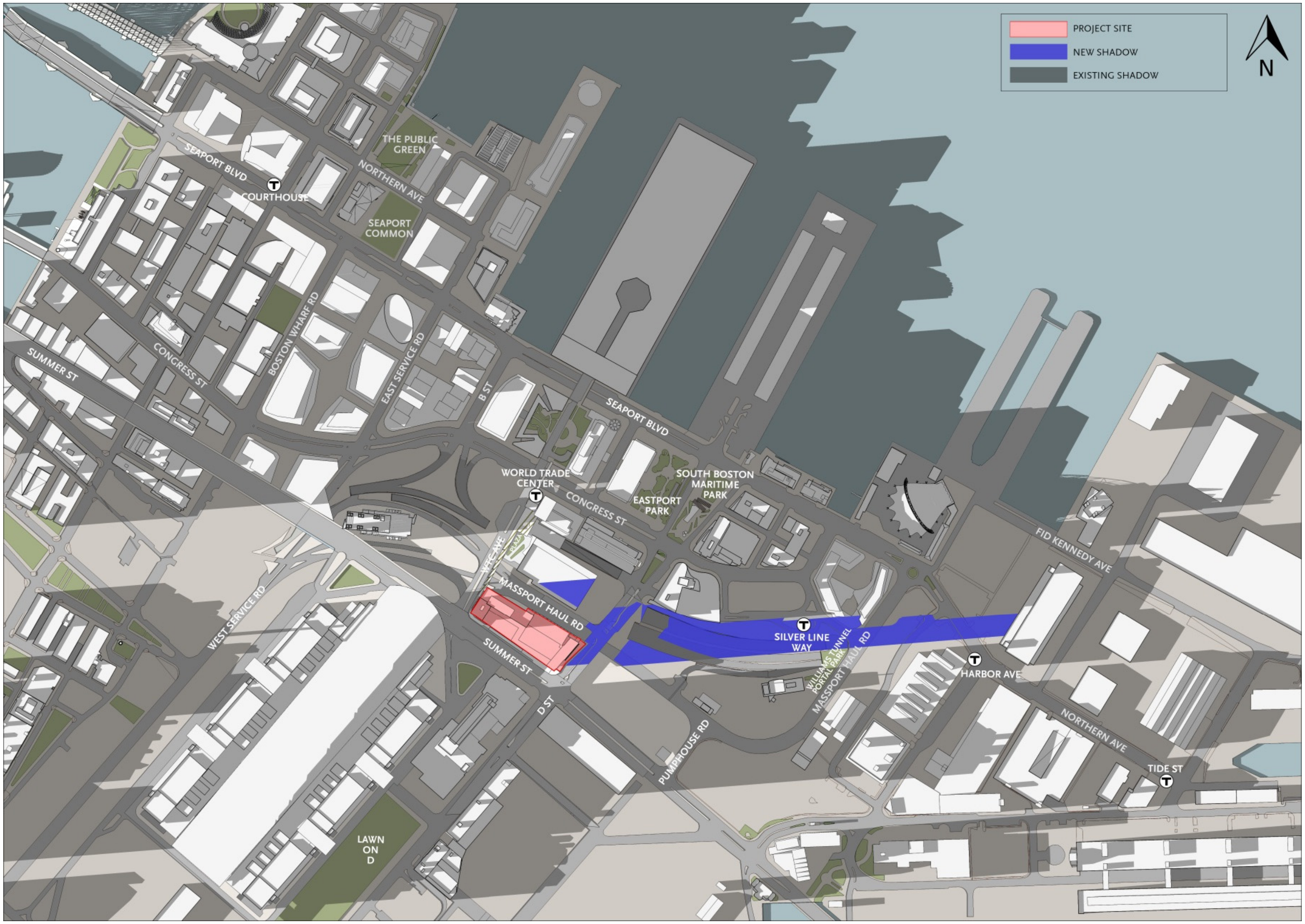
Figure 3.2-10

Shadow Study, September 21 3:00 p.m.



Summer Street Hotel **Boston, Massachusetts**

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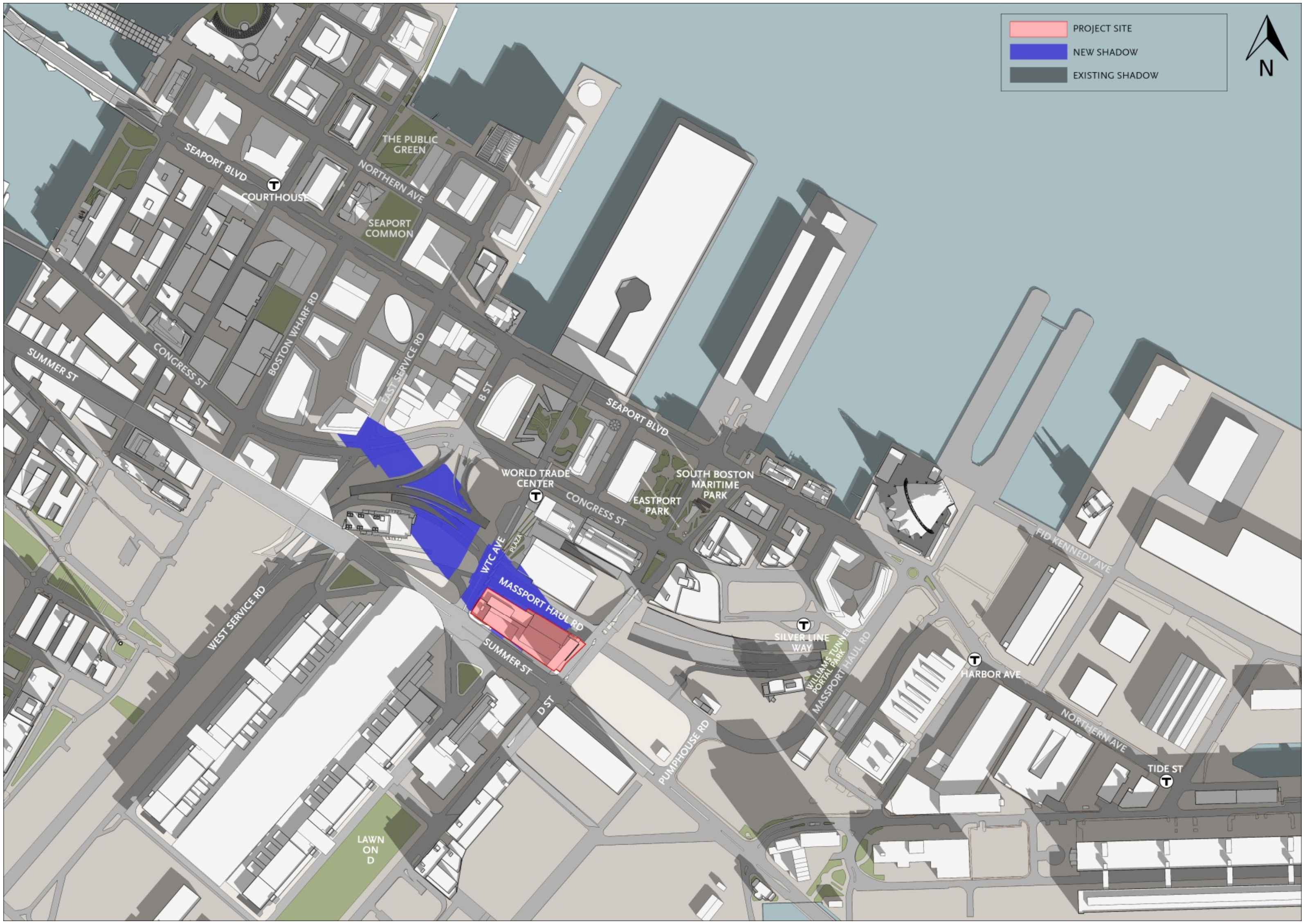
Figure 3.2-11

Shadow Study, September 21 6:00 p.m.



Summer Street Hotel **Boston, Massachusetts**

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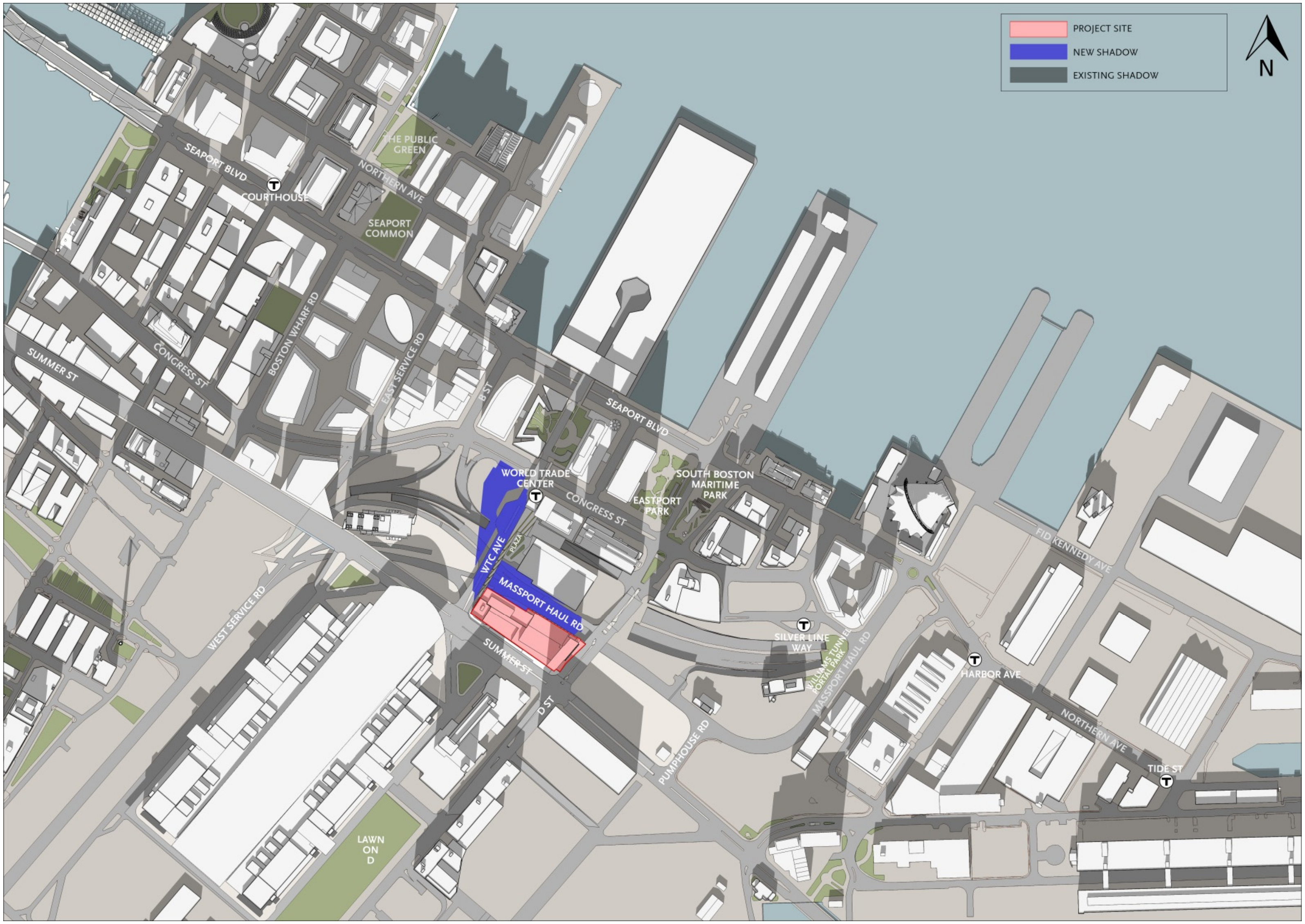
Figure 3.2-12

Shadow Study, December 21 9:00 a.m.



Summer Street Hotel **Boston, Massachusetts**

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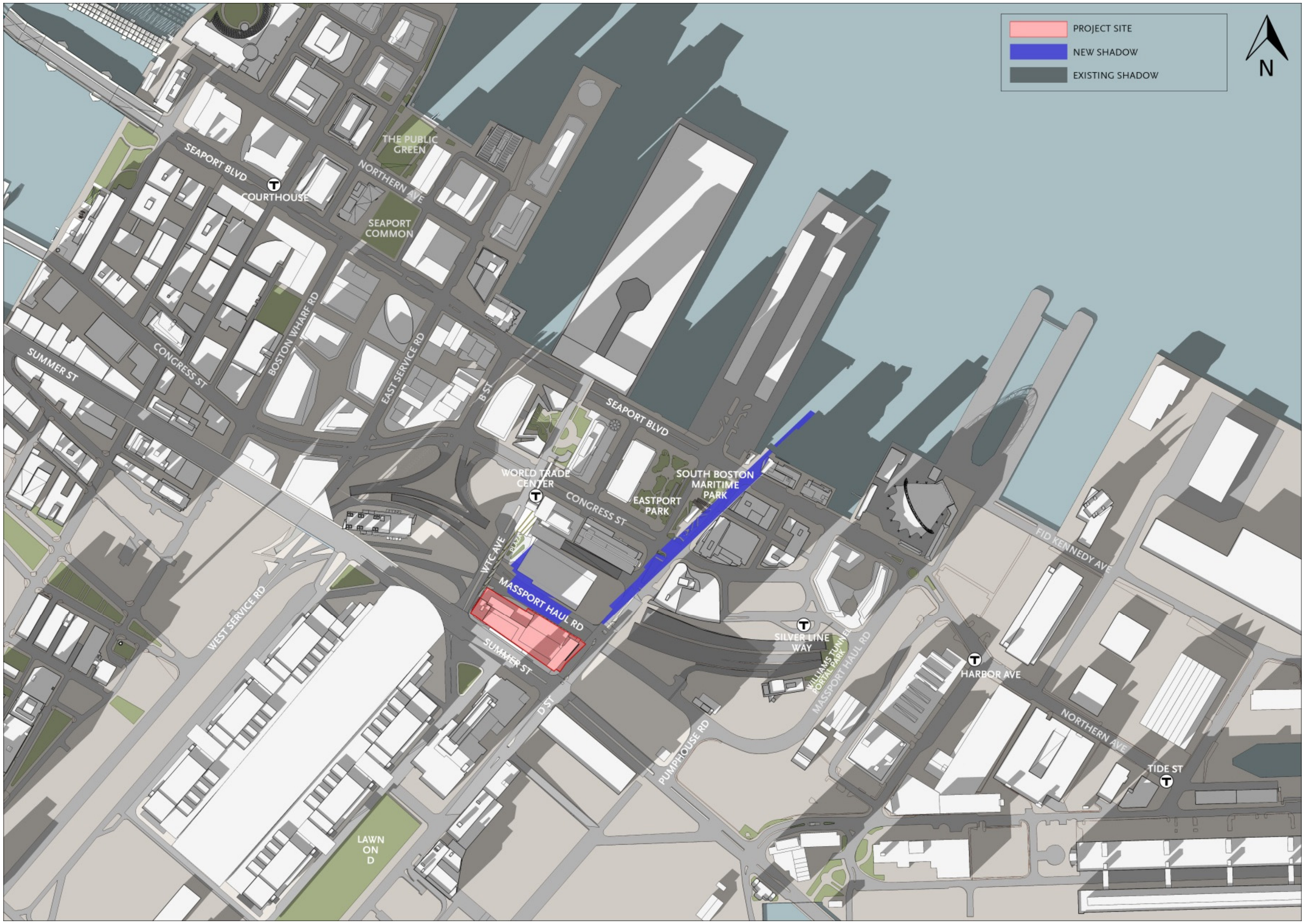
Figure 3.2-13

Shadow Study, December 21 12:00 p.m.



Summer Street Hotel **Boston, Massachusetts**

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Figure 3.2-14

Shadow Study December 21 3:00 p.m.

3.3 Daylight

3.3.1 Introduction

The purpose of the daylight analysis is to estimate the extent to which a proposed project will affect the amount of daylight reaching the streets and the sidewalks in the immediate vicinity of a project site.

Because the Project Site is currently a vacant lot, the Project will increase daylight obstruction; however, the resulting conditions will be typical of the surrounding area and similar to the Previously Approved Project.

3.3.2 Methodology

The daylight analysis was performed using the Boston Redevelopment Authority Daylight Analysis ("BRADA") computer program.[9] This program measures the percentage of "sky-dome" that is obstructed by a project, and is a useful tool in evaluating the net change in obstruction from existing to build conditions at a specific site.

Using BRADA, a silhouette view of the building is taken at ground level from the middle of the adjacent city streets or pedestrian ways centered on the proposed building. The façade of the building facing the viewpoint, including heights, setbacks, corners and other features, is plotted onto a base map using lateral and elevation angles. The two-dimensional base map generated by BRADA represents a figure of the building in the "sky-dome" from the viewpoint chosen. The BRADA program calculates the percentage of daylight that will be obstructed on a scale of 0 to 100 percent based on the width of the view, the distance between the viewpoint and the building, and the massing and setbacks incorporated into the design of the building; the lower the number, the lower the percentage of obstruction of daylight from any given viewpoint.

The analysis compares three conditions for the Project: Existing Condition; Proposed Condition; and the context of the area.

Three viewpoints were chosen to evaluate daylight obstruction for the Proposed Condition. Two area context points were considered to provide a basis of comparison to existing conditions in the surrounding area. The viewpoints and area context viewpoints were taken from the following locations and are shown on Figure 3.3-1.

Viewpoint 1: View from Summer Street facing northeast toward the Project Site.

Viewpoint 2: View from D Street facing northwest toward the Project Site.

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9 Method developed by Harvey Bryan and Susan Stuebig, computer program developed by Ronald Fergle, Massachusetts Institute of Technology, Cambridge, MA, September 1984.

Viewpoint 3: View from World Trade Center Avenue facing southeast toward the Project Site.

Area Context Viewpoint (AC1): View from Congress Street facing northeast toward Seaport West.

Area Context Viewpoint (AC2): View from Summer Street facing southwest toward 495 Summer Street.

3.3.3 Daylight Analysis Results

The results for each viewpoint under each alternative condition are described in Table 3.3-1. Figures 3.3-2 and 3.3-3 illustrate the BRADA results for each analysis and are located at the end of this section.

Table 3.3-1 Daylight Obstruction Values

Viewpoint Locations		Existing Conditions	Previously Approved Project[1]	Proposed Conditions
Viewpoint 1	View from Summer Street facing northeast toward the Project Site	0%	72.7%, 73.6%	66.2%
Viewpoint 2	View from D Street facing northwest toward the Project Site	0%	81.5%	83.8%
Viewpoint 3	View from World Trade Center Avenue facing southeast toward the Project Site	0%	79.3%	89.5%
Area Context Points				
AC1	View from Congress Street facing northeast toward Seaport West	85.4%[2]	N/A	N/A
AC2	View from Summer Street facing southwest toward 495 Summer Street	73.3%	N/A	N/A

1 Waterside Place DPIR. Prepared by Epsilon Associates, Inc. Submitted February 26, 2007.
2 Waterside Place Notice of Project Change. Prepared by Epsilon Associates, Inc. Submitted March 24, 2016.

Summer Street – Viewpoint 1

Summer Street runs along the southern edge of the Project Site. Viewpoint 1 was taken from the center of Summer Street facing north toward the Project Site. Since the Project Site is currently a vacant lot, the development of the Project would result in an increased daylight obstruction of 66.2%. However, the daylight obstruction value is lower than the daylight obstruction value of the Area Context viewpoints, and is lower than the daylight obstruction of the Previously Approved Project which was taken from two locations on Summer Street looking northeast at the site (72.7% and 73.6%).

G:\Projects2\MA\Boston\4719\MXD\viewpoints.mxd

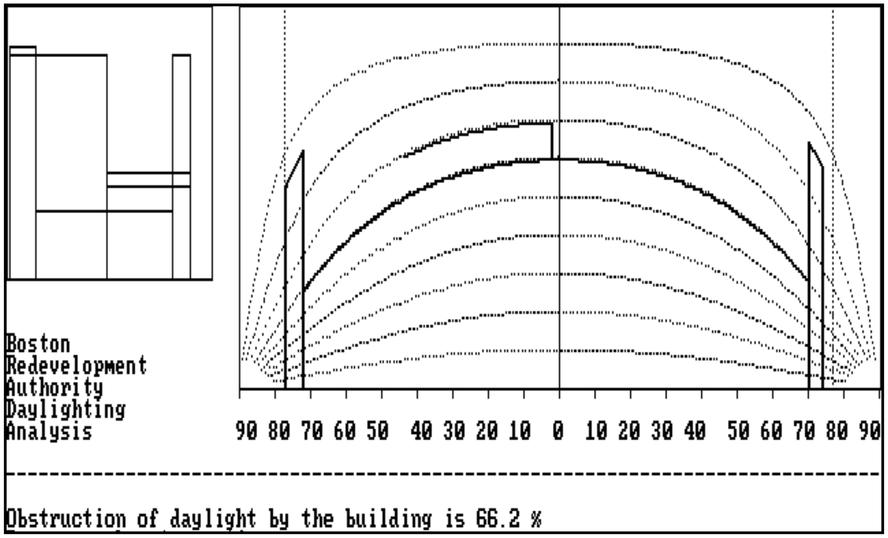
Data Source: Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division

Summer Street Hotel **Boston, Massachusetts**

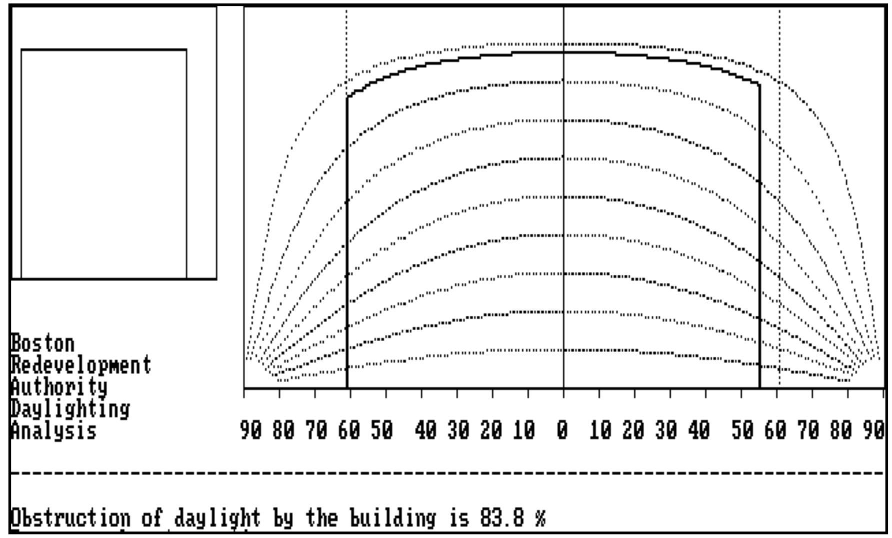
Epsilon ASSOCIATES INC.

Figure 3.3-1

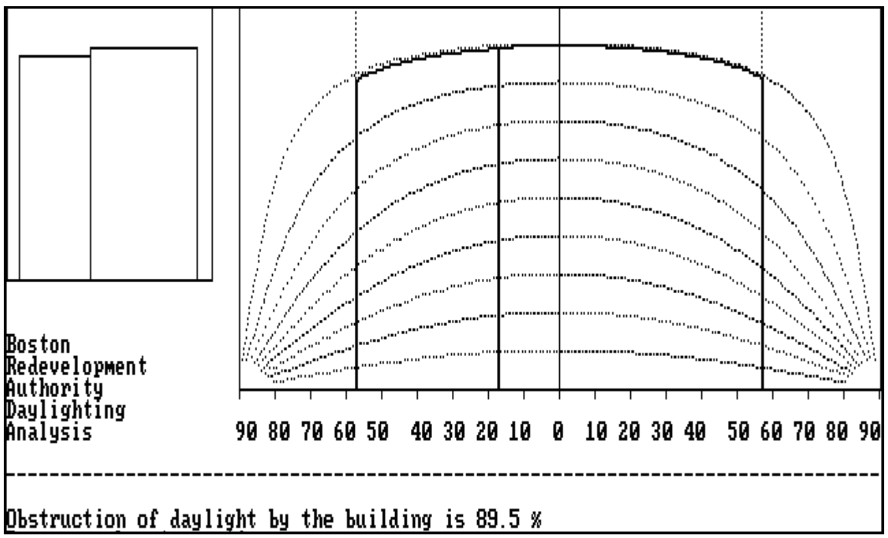
Viewpoint and Area Context Locations



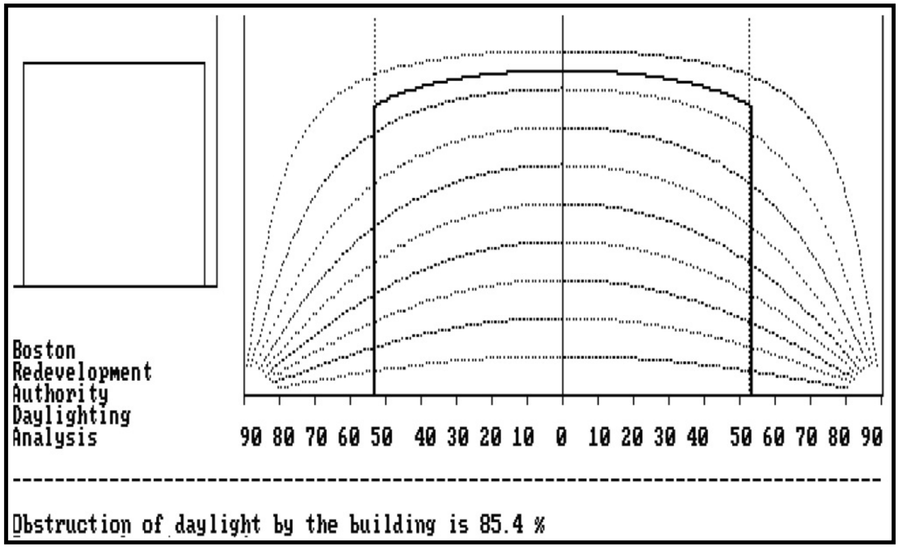
Viewpoint 1 (Proposed): View from Summer Street facing north toward the Project Site



Viewpoint 2 (Proposed): View from D Street facing west toward the Project Site

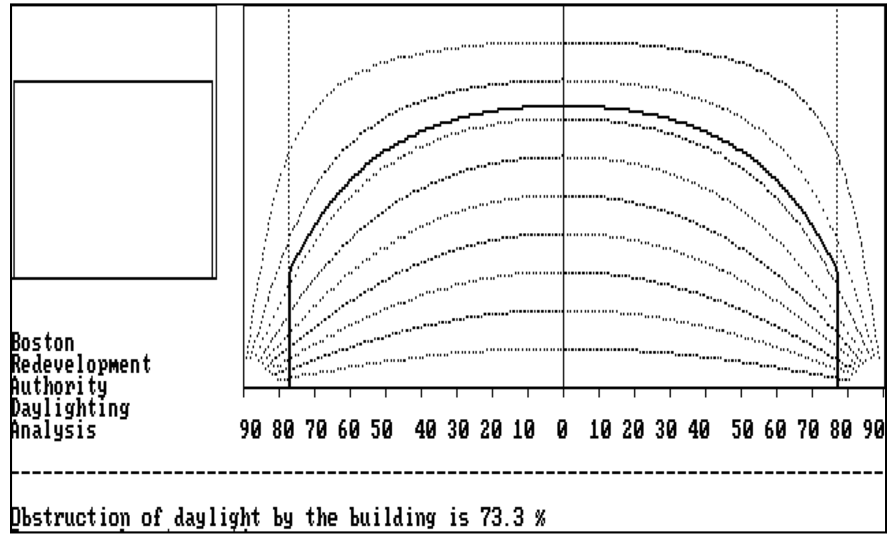


Viewpoint 3 (Proposed): View from World Trade Center Avenue facing east toward the Project Site



AC1: View from Congress Street facing north toward Seaport West

Source: Waterside Place Notice of Public Change. Prepared by Epsilon Associates. Submitted March 24, 2016.



AC2: View from Summer Street facing southwest toward 495 Summer Street .

D Street – Viewpoint 2

D Street runs along the eastern edge of the Project Site. Viewpoint 2 was taken from the center of D Street facing west toward the Project Site. The development of the Project will result in a daylight obstruction value of 83.8%. Since the Project Site is currently a vacant lot, this is an increase over existing conditions; however, the daylight obstruction value is similar to the surrounding area, including the Area Context viewpoints. In addition, the daylight obstruction from this viewpoint is similar to the daylight obstruction of the Previously Approved Project (81.5%).

World Trade Center Avenue – Viewpoint 3

World Trade Center Avenue is an elevated street on a viaduct which runs along the western edge of the Project Site. Viewpoint 3 was taken from the center of World Trade Center Avenue looking east toward the Project Site. The development of the Project will result in a daylight obstruction value of 89.5%. While this is an increase over existing conditions (0% because it is a vacant site) and the Previously Approved Project daylight obstruction value (79.3%), the daylight obstruction value is similar to the surrounding area, including the Area Context viewpoints.

Area Context Viewpoints

The area around the Project Site includes transportation infrastructure (roadways, ramps and a vent building) and existing and proposed high-rise buildings with a mix of uses. To provide a larger context for comparison of daylight conditions, obstruction values were calculated for two Area Context Viewpoints described above and shown in Figure 3.3-3. The daylight obstruction values ranged from 73.3% for AC2 to 85.4% for AC1.

3.3.4 Conclusion

The daylight analysis conducted for the Project describes proposed daylight obstruction conditions at the Project Site, and compares them to the daylight obstruction in the surrounding area and the Previously Approved Project. The results of the BRADA analysis indicate that the Project will have similar daylight obstruction values as the surrounding area and the Previously Approved Project.

3.4 Solar Glare

The DPIR noted the potential for solar glare impacts on the immediately surrounding streets. As noted in the DPIR, the solar glare analysis assumes the exterior skin of the building façades are smooth specular and 100 percent reflective glass. In reality, building facades are not all smooth specular and will contain glass with a reflectivity substantially below 100 percent. The potential impacts will be mitigated through the use of glass having significantly lower reflectivity than that assumed in the analysis. In addition, the Proponent will continue to evaluate the façade design and materials to reduce potential solar glare impacts.

3.5 Solid and Hazardous Waste

3.5.1 Hazardous Waste

Abatement and disposal of hazardous materials (or hazardous waste), if encountered, will be performed under the provisions of MGL c21/2C, OSHA, and the Massachusetts Contingency Plan ("MCP") by specialty contractors experienced and licensed in handling materials of this nature.

It is currently anticipated that construction of the proposed building and site improvements will require excavation and off-site disposal of an unknown quantity of excess soil. The Proponent will retain a Licensed Site Professional ("LSP") to manage the environmental aspects of the Project, including proper management and/or disposal of soil encountered during construction. Disposal of excess excavated soil will be conducted in accordance with the current policies of the Massachusetts Department of Environmental Protection ("MassDEP"). Chemical testing of soil samples will be performed as needed to reuse/dispose of the soils off-site based on the acceptance criteria of specific facilities. The soils transported off site will be legally reused/disposed in accordance with the MCP and other regulatory requirements. Disposal of materials will be tracked via Material Shipping Records, Bills of Lading and/or other methods, as required to ensure their proper and legal disposal.

In addition, procurement of temporary groundwater dewatering discharge permits from the Environmental Protection Agency ("EPA"), MassDEP, Boston Water and Sewer Commission, and/or Massachusetts Water Resources Authority will be required for pumping and discharge of site groundwater from within the temporary excavation support system to be installed prior to excavation.

Massachusetts Contingency Plan

A Phase 1 Environmental Site Assessment has been undertaken as part of the Project. This assessment included a visual inspection of the subject site and surrounding properties for the presence of oil or hazardous materials ("OHM"), a review of historical information regarding the Project Site, a review of federal and state databases and municipal files regarding the use, storage or release of OHM on or near the Project Site.

In the event that during future testing of the Project Site compounds are detected in soil during the above referenced testing at concentrations above applicable MassDEP standards, the release condition will be reported to MassDEP. Further, remedial activities, if necessary, will be conducted in accordance with the MCP and applicable MassDEP Policies.

3.5.2 Operation Solid Waste and Recycling

The Project will generate solid waste typical of hotel, restaurant, and retail uses. The solid waste is expected to include wastepaper, cardboard, glass bottles and food. Recyclable materials will be recycled through a program implemented by the hotel operator. With the exception of cleaning and maintenance material, hazardous wastes typical of hotel, restaurant and retail developments (e.g., cleaning fluids and paint), the Project will not involve the generation, use, transportation, storage, release, or disposal of potentially hazardous materials. Food waste will be separated on site and collected separately for offsite composting.

3.6 Flood Hazard Zones

The Federal Emergency Management Agency ("FEMA") Flood Insurance Rate Maps (FIRMs) for the Project Site - Community Panel Number 25025C0081J – effective March 16, 2016 indicate the northeastern portion of the Project Site is located within the 500-year flood zone. No portion of the site is within the 100-year flood zone. The Project will comply with the Massport Flood-proofing Design Guidelines and performance standards for new buildings, as described in detail in Section 4.2, including placing mechanical equipment to be above the Design Flood Elevation ("DFE") of 23.46 feet BCB (17 feet NAVD88), or waterproofing as necessary if the equipment is below the DFE.

The Project Site is developed and does not contain wetlands.

3.7 Geotechnical/Groundwater

The Geotechnical section includes a description of subsurface soil and groundwater conditions at the Project Site, planned below-grade construction activities, and mitigation measures for protecting adjacent structures and maintaining groundwater levels in the Project's vicinity during foundation and below-grade construction.

3.7.1 Subsurface Soil and Bedrock Conditions

Based on available subsurface data, including recent borings performed at the Project Site, the general Project Site subsurface profile is listed below in general order of increasing depth below ground surface.

Table 3.7-1 Subsurface Soil and Bedrock Conditions

Generalized Subsurface Strata	Range of Strata Thickness (feet)	Depth Range to Top of Strata (feet)
Miscellaneous Fill	19 to 48.5	0
Organic Deposits	0 to 4.5	17
Marine Clay and Sand	50 to 107.5	19 to 48.5
Glacial	6.8 to 35	78 to 136.5
Bedrock	---	88 to 153

3.7.2 Groundwater

Groundwater level measurements obtained in observation wells installed at the Project Site since January 2017 have ranged from about El. -0.1 feet to El. +7.5 feet NAVD88, or about +6.5 feet to +14.0 feet NAVD88 (depth below existing ground surface of about 10 to 16 feet). Groundwater levels in the area could be influenced by leakage into and out of sewers, storm drains and other below grade structures, as well as environmental factors such as precipitation, season, and temperature.

3.7.3 Proposed Conditions

The foundation construction will include the installation of deep end-bearing piles to support the proposed building. The foundation piles will be driven into the glacial deposit and/or bedrock at a depth of about 80 to 150 feet below the existing ground surface. Vibrations associated with pile driving will be monitored continuously.

It is anticipated that one partially below-grade level will be benched into the Project Site, with the lowest level floor slab approximately coincident with the existing grade along the Massport Haul Road side of the Project Site. Construction of the foundations and the below-grade level will require excavation depths anticipated to be up to approximately 20 feet below the Summer Street ground surface. The excavation will be conducted within an engineered lateral earth support system, such as a soldier pile and lagging wall or steel sheet pile wall system, which will be designed to provide excavation support, and limit ground movements outside the excavation to protect adjacent facilities. Due to the depth of excavation, the lateral earth support system will be supported, as required, by an internal bracing system or external bracing system such as tiebacks. Installation of the temporary excavation support wall in a public way, and the installation of tiebacks below adjacent roadways, will require approval from Massport and/or the City of Boston Public Improvements Commission as to Summer Street. Pre-excavation will be performed along the building perimeter to remove obstructions prior to installing the excavation support system.

Temporary dewatering will be required inside the excavation during excavation and foundation. A temporary construction dewatering permit will be obtained from applicable public agencies prior to the discharge of dewatering effluent from the Project Site. Testing of the effluent will be conducted prior to and during discharge to confirm compliance with all permit requirements.

The Project will include coordination with the Boston Groundwater Trust to protect groundwater levels in the area, and it will include the monitoring of existing groundwater observation wells in the vicinity of the Project Site to facilitate monitoring of the groundwater levels before, during, and following construction.

3.8 Air Quality

Stationary Sources

Stationary sources of air pollution are typically units that combust fuel. In this case, these sources will consist of heating and hot water units and emergency electrical generators. Cooling towers, although not a combustion source, are a source of particulate emissions.

It is expected that the majority of stationary sources (boilers, engines, etc.) may be subject to MassDEP's Environmental Results Program. The Proponent will complete the required applications and submittals for this equipment, as necessary.

Mobile Sources

A microscale analysis involves modeling of carbon monoxide ("CO") emissions from vehicles idling at and traveling through signaled intersections. CO is used in microscale studies to indicate roadway pollutant levels since it is the most abundant pollutant emitted by motor vehicles and can result in so-called "hot spot" (high concentration) locations around congested intersections. The NAAQS standards do not allow ambient CO concentrations to exceed 35 parts per million ("ppm") for a one-hour averaging period, and 9 ppm for an eight-hour averaging period, more than once per year at any location. The widespread use of CO catalysts on current vehicles has reduced the occurrences of CO hotspots.

The microscale analysis included in the DPIR for Waterside Place (see Section 1.3.1 for more information) concluded that CO concentrations at the nearest sensitive receptors for impacts from four studied intersections with the entire Waterside Place Project in operation, plus monitored background conditions, were predicted to be well below federal CO National Ambient Air Quality Standards ("NAAQS") thresholds. Since 2007 when the microscale analysis was completed, vehicle emission rates have gone down due to both the improvement in gasoline vehicle efficiency, as well as the influx of electric and hybrid vehicles, and ambient background concentrations have gone down due to various reasons, including more efficient vehicles. With these factors, combined with the fact that there is a reduction in the number of vehicle trips, it is anticipated that air quality impacts from the Project will be similar or less than the Previously Approved Project.

3.9 Noise

The DPIR (see Section 1.3.1 for more information) included an analysis of the Previously Approved Project's mechanical equipment in regard to noise impacts, and concluded that the Previously Approved Project, with appropriate mitigation, will not introduce significant outdoor mechanical equipment noise into the surrounding community.

The City of Boston has both a noise ordinance and noise regulations. Chapter 16 §26 of the Boston Municipal Code sets the general standard for noise that is unreasonable or excessive: louder than 50 decibels between the hours of 11:00 p.m. and 7:00 a.m., or louder than 70 decibels at all other hours. The Boston Air Pollution Control Commission ("APCC") has adopted regulations based on the City's ordinance - "Regulations for the Control of Noise in the City of Boston", which distinguish among residential, business, and industrial districts in the city. In particular, APCC Regulation 2 applies to noise produced by the use or occupancy of any structure, and is applicable to the sounds from the Project.

Table 3.9-1 below presents the "Zoning District Noise Standards" contained in Regulation 2.5 of the APCC "Regulations for the Control of Noise in the City of Boston," adopted December 17, 1976. These maximum allowable sound pressure levels apply at the property line of the receiving property. Zoning District Standards are presented below in Table 3.9-1.

In addition, MassDEP has the authority to regulate noise under 310 CMR 7.10, which is part of the Commonwealth's air pollution control regulations. Per MassDEP regulations, "unnecessary" noise is considered an air contaminant and thus prohibited by 310 CMR 7.10. The MassDEP administers this regulation through Noise Policy DAQC 90-001 which limits a source to a 10-dBA increase above the L_{90} ambient sound level measured at the Project property line and at the nearest residences. The MassDEP policy further prohibits "pure tone" conditions where the sound pressure level in one octave-band is 3 dB or more than the sound levels in each of two adjacent bands.

While the details of the mechanical equipment associated with the Project have not yet been precisely determined, steady operational noise from stationary sources will primarily involve heating, cooling, and ventilation equipment for the office and retail spaces, including: cooling towers, fans, gas-fired condensing boilers, energy recovery unit, chillers, variable air handling units and an emergency generator.

Table 3.9-1 City of Boston Zoning District Noise Standards, Maximum Allowable Sound Pressure Levels

Octave-band Center Frequency (Hz)	Residential Zoning District Daytime (dB)	Residential Zoning District All Other Times (dB)	Residential-Industrial Zoning District Daytime (dB)	Residential-Industrial Zoning District All Other Times (dB)	Business Zoning District Anytime (dB)	Industrial Zoning District Anytime (dB)
32	76	68	79	72	79	83
63	75	67	78	71	78	82
125	69	61	73	65	73	77
250	62	52	68	57	68	73
500	56	46	62	51	62	67
1000	50	40	56	45	56	61
2000	45	33	51	39	51	57
4000	40	28	47	34	47	53
8000	38	26	44	32	44	50
A-Weighted (dBA)	**60**	**50**	**65**	**55**	**65**	**70**

Notes:
- Noise standards are extracted from Regulation 2.5, City of Boston Air Pollution Control Commission, "Regulations for the Control of Noise in the City of Boston", adopted December 17, 1976.
- All standards apply at the property line of the receiving property.
- dB and dBA based on a reference sound pressure of 20 micropascals.
- 'Daytime' refers to the period between 7:00 a.m. and 6:00 p.m. daily, excluding Sunday.

The building is anticipated to be provided with a single central chilled water plant providing cooling for the entire building. The chilled water plant with electric chillers is anticipated to be located in an enclosed mechanical room at the B-1 level. Heat rejection is anticipated to be provided by eight low profile centrifugal type cooling towers mounted in a screen enclosure at the top of the east tower. The building is anticipated to be provided with heat from a gas fired hot water boiler plant using condensing boilers. The boiler plant is anticipated to be located in an enclosed mechanical room at the B-1 level. Air handling systems for the public areas are anticipated to be located in multiple enclosed fan rooms in the podium levels from B-1 to 5. Intake and exhaust air is anticipated to be provided through louvers in the sidewall of the building mostly along the Massport Haul Road side or at the retail storefronts along Summer Street and/or the Summer Street entry canopy. The hotel towers are anticipated to be conditioned with vertically stacked 4 pipe fan coil units fed with hot and chilled water from the boiler and chiller plants. Mechanical ventilation and exhaust for the guest towers are anticipated to be provided by multiple outdoor energy recovery units located at the roof level of each tower.

Domestic hot water for the building are anticipated to be provided by gas fired domestic hot water plants using condensing domestic water heaters and storage tanks located in enclosed mechanical rooms at the top of the two towers.

The electrical system will be provided by three Eversource transformers anticipated to be located in an enclosed ventilated vault at first level. A diesel standby generator is will provide standby power for life safety loads, legally required standby loads and discretionary loads. The generator is anticipated to be located in a screened area at the top of the west tower and will be mounted in an acoustically attenuated walk in type enclosure.

At this time, the mechanical equipment and noise controls are conceptual in nature and, during the final design phase of the Project, will be specified to meet the applicable City of Boston and MassDEP noise limits. Reasonable efforts will be made, if necessary, to minimize noise impacts from the Project using routinely employed methods of noise control, including:

- Selection of "low-noise" equipment models;
- Fitting of inlet and discharge vents with duct silencers;
- Installation of screening barriers to provide shielding where appropriate;
- Use of sound-attenuating enclosures, acoustical blankets, or both on continuously operating equipment with outdoor exposure; and
- Siting of noisy equipment at locations that protect sensitive receptors by shielding or with increased distance.

In summary, the Project, with appropriate noise control, is not expected to result in any adverse noise impacts at nearby sensitive receptors. Short-term, intermittent increases in noise levels will occur during the Project construction. However, every reasonable effort will be made to minimize the noise impacts and ensure that the Project complies with the requirements of the City of Boston noise ordinance.

3.10 Construction

The proximity of city streets and abutting commercial properties to the site will require careful scheduling of material removal and delivery. Planning with the City and neighborhood will be essential to the successful development of the Project.

A Construction Management Plan (CMP) will be submitted to the BTD and Massport for review and approval prior to issuance of a building permit. The CMP will define truck routes which will help in minimizing the impact of trucks on local streets.

Construction methodologies that ensure public safety and protect nearby businesses will be employed. Techniques such as barricades, walkways, painted lines, and signage will be used as necessary. Construction management and scheduling—including plans for construction worker commuting and parking, routing plans and scheduling for trucking and deliveries, protection of existing utilities, maintenance of fire access, and control of noise and dust—will minimize impacts on the surrounding environment.

Throughout the Project construction, a secure perimeter will be maintained to protect the public from construction activities.

Construction Air Quality

Short-term air quality impacts from fugitive dust may be expected during demolition, excavation and the early phases of construction. Plans for controlling fugitive dust during demolition, excavation and construction include mechanical street sweeping, wetting portions of the site during periods of high wind, and careful removal of debris by covered trucks. The construction contract will provide for a number of strictly enforced measures to be used by contractors to reduce potential emissions and minimize impacts. These measures are expected to include:

- Using wetting agents on areas of exposed soil on a scheduled basis;
- Using covered trucks;
- Minimizing spoils on the construction site;
- Monitoring of actual construction practices to ensure that unnecessary transfers and mechanical disturbances of loose materials are minimized;
- Minimizing storage of debris on the site; and
- Periodic street and sidewalk cleaning with water to minimize dust accumulations.

Construction Noise

The Proponent is committed to mitigating noise impacts from the construction of the Project. Periodic increased community sound levels, however, are an inherent consequence of construction activities. Construction work will comply with the requirements of the City of Boston Noise Ordinance. Every reasonable effort will be made to minimize the noise impact of construction activities, including:

- Instituting a proactive program to ensure compliance with the City of Boston noise limitation policy;

- Using appropriate mufflers on all equipment and ongoing maintenance of intake and exhaust mufflers;

- Muffling enclosures on continuously running equipment, such as air compressors and welding generators;

- Replacing specific construction operations and techniques by less noisy ones where feasible;

- Selecting the quietest of alternative items of equipment where feasible;

- Scheduling equipment operations to keep average noise levels low, to synchronize the noisiest operations with times of highest ambient levels, and to maintain relatively uniform noise levels;

- Turning off idling equipment; and

- Locating noisy equipment at locations that protect sensitive locations by shielding or distance.

Construction Waste Management

The Proponent will reuse or recycle demolition and construction materials to the greatest extent feasible. Construction procedures will allow for the segregation, reuse, and recycling of materials. Materials that cannot be reused or recycled will be transported in covered trucks by a contract hauler to a licensed facility.

3.11 Historic Resources

The PNF included a discussion of historic and archeological resources in the vicinity of the Project Site. The Project Site does not contain, nor is it adjacent to, any historical resources.

Chapter 4

Sustainable Design and Climate Change Resilience

4.0 SUSTAINABLE DESIGN AND CLIMATE CHANGE RESILIENCE

4.1 Sustainable Design

4.1.1 Introduction

The Project team will strive to develop the most environmentally friendly building possible. As required by Massport, the Project will be Leadership in Energy and Environmental Design ("LEED") certified at a minimum of the Silver level. To achieve LEED certification, the Project team has identified LEED v4 BD+C as the most appropriate rating system.

Additionally, because the Project Site is owned by Massport, the Project will comply with the following requirements of the MA LEED Plus:

- Energy performance – exceed current code baseline by 20%;
- Engage a third party Building Commissioning Agent;
- Smart Growth Criteria applicable to the Project Site include: the location of the Project is on a previously developed site and has access to public transportation; and
- Water efficiency strategies include:
    - Reducing interior potable water use by a minimum of 20%; and
    - Reducing exterior potable water use for irrigation by a minimum of 50%.

The LEED rating system tracks the sustainable features of a project by achieving points in the following categories: Location and Transportation, Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources, Indoor Environmental Quality, Innovation and Design Process and Regional Priority Credits.

A LEED checklist is included at the end of Section 4.1, and the narrative below outlines how the Project intends to achieve the prerequisites and credits for each credit category. This checklist is preliminary, and will be updated regularly as the design develops and engineering assumptions are substantiated. At present, 51 points have been targeted. Additional credits, identified as "Maybe" on the checklist, will be evaluated as the design progresses.

4.1.2 LEED Approach

Integrative Process (IP)

The Project will meet the intent of this credit through identification of cross discipline opportunities to design a sustainable building project. Sustainable design focused meetings will be ongoing throughout the design process to assist the team in establishing shared sustainable design and energy efficiency goals for the Project. Early design phase energy modeling will be been conducted to review systems synergies and assess areas where energy loads may be significantly reduced. A water use analysis will be conducted to aid in establishing water use reduction targets.

Location and Transportation (LT)

LT Credit 2: Sensitive Land Protection. The Project will meet the credit requirements by locating the building on land that has been previously developed.

LT Credit 3: High Priority Site. The Project will meet the requirements of Option 2 Priority Designation; the site is located within a designated Federal Empowerment Zone site.

LT Credit 4: Surrounding Density and Diverse Uses. The Project will meet Option 1 for Surrounding Density by being located in an area with an average density greater than 35,000 sf/acre. Additionally, the Project will meet Option 2 for Diverse Uses by being located within one-half mile walking distance of at least eight publically available diverse uses in at least three separate use categories.

LT Credit 5: Access to Quality Transit. South Station, with access to commuter rail, bus and MBTA Red Line services may be accessed via a short ride on the MBTA Silver Line or bus routes 4 and 7, all with stops located within one-quarter mile walking distance of the Project entrance.

LT Credit 6: Bicycle Facilities. The Project will provide a minimum of 18 long term (covered) bike storage locations for the full time employees of the hotel and associated retail/restaurant spaces, and 26 short term bike storage locations for visitors (retail and restaurant – excludes hotel guests). There are also available bicycle storage facilities located within the SBWTC parking structure that will be connected to the Project site by a pedestrian bridge. The Project is researching whether such bike storage may be used to help satisfy the requirements of this credit.

LT Credit 7: Reduced Parking Footprint. Approximately 400 parking spaces will be allocated to the Project within the SBWTC multimodal hub located north of the site, and connected to the site by a pedestrian bridge. The Project is researching if the quantity of parking spaces allocated to the Project will enable demonstration of credit compliance.

LT Credit 8: Green Vehicles. There will be designated parking spaces for the exclusive use of hotel guests within the SBWTC. A portion of these spaces will be for LEFE vehicles. Electric vehicle charging stations will be included within the SBWTC available to all garage users, including hotel guests. The Proponent intends to explore this approach further as an alternative compliance path.

Sustainable Sites (SS)

SS Prerequisite 1: Construction Activity Pollution Prevention. The construction manager will be required to submit and implement an appropriate SWPPP/Erosion and Sedimentation Control ("ESC") Plan for construction activities related to the construction of the Project. The ESC Plan will conform to the erosion and sedimentation requirements of the applicable NPDES regulations and specific municipal requirements for the City of Boston. Additionally, the ESC Plan will address management and containment of dust and particulate matter generated by on-site excavation and construction activities. Civil design drawings will include measures for the implementation of the ESC plan.

SS Credit 1: Site Assessment. A comprehensive site assessment was completed as part of the initial MEPA filing. The design team will continue to study topography, hydrology, climate, vegetation, soils, human use, and human health effects specific to the Project to inform the design.

SS Credit 3: Open Space. Landscaped spaces and pedestrian-friendly streetscape improvements are proposed as part of the Project. Additionally, a landscaped roof top terrace space is proposed on the seventh floor. The extent of the plantings and landscaping is under development and will be refined as the design progresses. The Project team is evaluating whether this credit can be achieved.

SS Credit 4: Rainwater Management. The Project will implement a stormwater management plan that anticipates decreasing the volume of stormwater runoff and that captures and treats runoff using acceptable best management practices ("BMPs"). The Project may be considered a 'zero' lot line project and will target managing runoff to meet the 85th percentile of local rainfall events at a minimum. See Section 6.4.2 for more information about stormwater management.

Rainwater control measures will be investigated, engineered and refined as the Project undergoes the design development process. Measures that will be considered include, but are not limited to, the following:

- Subsurface infiltration systems/recharge wells
- Landscaped areas on the seventh floor roof
- Rainwater harvesting

The Project will comply with the MassDEP Stormwater Management Policy, as well as reduce the peak rate and total volume of runoff for the 25-year design storm in the post-development condition to meet the two-year predevelopment condition.

SS Credit 5: Heat Island Reduction. The roof and non-roof hardscape materials will include light-colored surfaces to reduce the overall heat island effect impact from the Project Site.

The roof membrane will be a high albedo roof product with an initial SRI value of 82 minimum. The extent of landscaped roof areas will be further studied as the design progresses. Trees and plantings along Summer Street will provide shade. On-grade hardscape paving materials and roof terrace pedestrian walkway materials will target an initial SRI value of at least 33.

SS Credit 6: Light Pollution Reduction. The Project plans to meet uplight and light trespass requirements by complying with the LEED v4 Backlight, Uplight and Glare, ("BUG"), Rating method. The Project site is classified under Lighting Zone 3 as per the Illuminating Engineering Society and International Dark-Sky Association ("IES/IDA") Model Lighting Ordinance User Guide. To meet credit requirements, the site lighting will not exceed the LEED v4 allowable luminaire backlight, uplight and glare ratings for this lighting zone.

Water Efficiency (WE)

WE Prerequisite 1: Outdoor Water Use Reduction, 30%. Through the use of native/adaptive plant species and an efficient irrigation system, the Project will use 30% less potable water for irrigation (as calculated using the EPA WaterSense Water Budget Tool) when compared to the calculated baseline for the site's peak watering month.

WE Prerequisite 1: Water Use Reduction, 20% Reduction. Through the specification of low flush and flow and high efficiency plumbing fixtures, the Project will reduce potable water consumption by a minimum of 20% over the baseline calculated for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements. Preliminary water use calculations were run; the Project is currently targeting a 32% water use reduction over the baseline.

WE Prerequisite 3: Building Level Water Metering. The Project will meet the requirements of this prerequisite by installing permanent water meters that measure the total potable water use for the building and associated grounds. In addition to installing the meters, the Project will commit to sharing water usage data with the USGBC for a five-year period beginning on the date the Project accepts LEED certification or typical occupancy, whichever comes first.

WE Credit 1: Outdoor Water Use Reduction 50%. The landscape design will incorporate native and adaptive plantings, and the design of the irrigation system will target a 50% reduction, minimum, in potable water use when compared to a mid-summer baseline. The systems will incorporate high controller efficiency and moisture sensors. The Project team is evaluating options for capturing and reusing rainwater to achieve a 100% reduction in potable water use for irrigation.

WE Credit 2 Indoor Water Use Reduction. Through the specification of low flow and high efficiency plumbing fixtures, the Project will implement water use reduction strategies that target 30% less potable water use annually when compared to EPA baseline fixtures for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements. Preliminary water use calculations were run; the Project is currently targeting a 32% water use reduction over the baseline. As the design progresses, the team will continue to identify ways to further reduce potable water use.t

WE Credit 3: Cooling Tower Water Use. The Project will conduct a one-time potable water analysis for the cooling tower water and calculate the cycles of concentration. Through increasing the level of treatment in the make-up and/or condenser water, the Project will achieve a minimum of 10 cycles of concentration before any of the parameters analyzed exceed their maximum allowable levels of concentration.

WE Credit 4: Water Metering. The Project is planning to install permanent water meters for at least two of the following water subsystems: irrigation, indoor plumbing fixtures and fittings, domestic hot water boilers with a projected annual use of 100,000 gallons or more than 500,000 BtuH, reclaimed water, or other process water.

Energy and Atmosphere (EA)

EA Prerequisite 1: Fundamental Commissioning and Verification. A third party Commissioning Agent ("CxA") will be engaged by the owner for the purpose of providing fundamental commissioning services for the building's energy-related systems, including HVAC, lighting, domestic hot water systems and potentially, the building envelope. The CxA will be required to perform the scope of work required to comply with the prerequisite in accordance with ASHRAE Guideline 0-2005 and ASHRAE Guideline 1.1-2007 for HVAC & R systems. Owner's Project Requirements ("OPR") and Basis of Design ("BOD") documents will be developed.

EA Prerequisite 2: Minimum Energy Performance. To meet the prerequisite, the building performance rating will demonstrate at a minimum, a 5% improvement in energy use by cost when compared to a baseline building performance as calculated using the rating method in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2010. A whole building energy model will estimate the expected performance rating of the designed building systems. The Project will also meet the 9th Edition of the MA Energy Code and stretch code requirements.

The energy savings requirements will be met through the selection of efficient building mechanical systems and a high performance envelope. The proposed design incorporates a large number of energy efficiency measures including high efficiency condensing boilers, high efficiency chillers, efficient terminal units, a low lighting power density through the use of LED fixtures, low flow water fixtures, Energy Star rated appliances and commercial kitchen equipment and an improved building envelope.

Other energy conservation measures ("ECMs") that are being considered and evaluated as the design progresses include (but are not limited to) the following:

- Greater interior lighting power density reductions
- Energy efficient exterior lighting
- CO_2 based demand control ventilation for applicable spaces

EA Prerequisite 3: Building Level Energy Metering. To meet the requirements of this prerequisite, the Project will include whole building energy meters to track annual gas, electricity and water use at the Project.

EA Prerequisite 4: Fundamental Refrigerant Management. CFC based refrigerants will not be used in the building HVAC & R systems. Additionally, depending on the uses within the retail/restaurant spaces, equipment such as walk in freezers and coolers installed by future tenants will be required to meet the prerequisite requirements.

EA Credit 1: Enhanced Commissioning. In addition to EAp Fundamental Commissioning and Verification requirements, the Proponent is considering pursing building envelope commissioning. The building owner will engage a CxA during the design phase to review the proposed design and ultimately confirm the building systems are installed and function as intended and desired.

The enhanced commissioning scope will include reviewing the Proponent's project requirements, and the basis of design, creating, distributing and implementing a commissioning plan, performing a design review of the Project documents, witnessing on-site installations and testing and performing commissioning of installed HVAC, lighting, lighting controls and domestic hot water systems.

In addition to the mechanical and electrical systems, the fundamental commissioning requirements will address the building's thermal envelope. The enhanced commissioning scope of work may include further building envelope commissioning.

EA Credit 2: Optimize Energy Performance. The Project will have a high performance building envelope and energy efficient systems. It will be designed to meet IECC 2015/ASHRAE 90.1-2013 energy efficiency requirements. It is assumed that the Project will achieve at least a 16% annual energy cost savings when compared to an ASHARE 90.1-2010 baseline.

EA Credit 3: Advanced Energy Metering. Advanced energy meters are being evaluated for the base building design. Advanced energy metering includes a sub-meter for any energy end use that represents 10% or more of the total annual energy use of the building, and electricity consumption and demand and all data recorded at a minimum of one hour or less with a remotely accessible building automation system. Lease space tenants (i.e., retail, restaurant) would be capable of independently measuring energy consumption for systems dedicated to their space (electricity, chilled and or condenser water for cooling, hot water for heating).

EA Credit 5: Renewable Energy Production. The Project team is evaluating on-site renewable/clean energy opportunities including the use of rooftop photovoltaic panels.

EA Credit 6: Enhanced Refrigerant Management. The HVAC equipment installed in the base building will use refrigerants that have low global warming and ozone depletion potential. Additionally, equipment installed by future tenants will be required to meet the credit requirements. Once the systems design has advanced and the equipment has been identified, calculations will be run to confirm if the credit requirements will be met.

EA Credit 7: Green Power and Carbon Offsets. The Proponent will investigate the purchase of carbon offsets through a five-year contract to offset a minimum of 50% of the building's energy use with renewable sources.

Materials and Resources (MR)

MR Prerequisite 1: Storage and Collection of Recyclables. Storage of collected recyclables will be accommodated on the lower level of the Project in a designated recycling area. Recyclable materials collected will include mixed paper, corrugated cardboard, glass, plastics, and metals, and disposal of two of the following: batteries, mercury-containing lamps, and electronic waste. The hotel maintenance staff and the lease tenants will bring recyclables to the central storage room. A contracted waste management company will collect the recyclables on a regular basis.

MR Prerequisite 2: Construction and Demolition Waste Management Planning. The Project will meet the requirements of this prerequisite by including a Construction Waste Management section in Division 1 of the Project manual. The specification will include direction for the construction manager to submit and implement a compliant waste management plan for the duration of construction. Waste diversion goals for the Project will include at least five materials (both structural and nonstructural) targeted for diversion.

MR Credit 1: Building Life Cycle Impact Reduction. The Project team is considering pursing a whole-building life-cycle assessment. To meet LEED requirements, the life-cycle assessment of the Project's structure and enclosure must demonstrate a minimum of 10% reduction, compared with a baseline building, in at least three of the six impact categories, one of which must be global warming potential. The six impact categories are: global warming potential, depletion of the stratospheric ozone layer, acidification, eutrophication, formation of tropospheric ozone and depletion of nonrenewable energy resources.

MR Credit 2: Building Product Disclosure and Optimization: Environmental Product Declaration. The Project will attempt this credit via Option 1. The technical specifications will include direction for the construction manager and their sub-contractors to provide and submit materials and products Environmental Product Declarations that conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930, and have at least a cradle to gate scope. The Project team will work to provide documentation for 20 different permanently installed products sourced from at least five different manufacturers.

MR Credit 4: Building Product Disclosure and Optimization: Material Ingredients. The Project will attempt this credit via Option 2. The Project manual will include the information and direction for the construction manager and their sub-contractors to provide and submit materials and products documentation identifying the chemical make-up. The documentation may be the manufacturer's inventory, Health Product Declarations or Cradle-to-Cradle certification.

MR Credit 5: Construction and Demolition Waste Management. The Project will meet the requirements of this credit by including a Construction Waste Management section in Division 1 of the Project manual. The specification will include direction for the construction manager to divert a minimum of 75% of the demolition and construction waste generated on site from area landfills. Diverted material must include and separately track at least four different material streams.

Indoor Environmental Quality (IEQ)

IEQ Prerequisite 1: Minimum IAQ Performance. The building mechanical systems will be designed to meet or exceed the requirements of ASHRAE Standard 62.1-2010 sections 4 through 7 and/or applicable building codes. The mechanical engineer will complete a ventilation rate procedure ("VRP") calculator to verify compliance. Outdoor airflow monitors will be included in the Project.

IEQ Prerequisite 2: Environmental Tobacco Smoke (ETS) Control. Smoking will be prohibited in the building and within 25 feet of the building. Signage will be posted to indicate the interior and exterior no-smoking policy.

IEQ Credit 1: Enhanced Indoor Air Quality Strategies. The Proponent is planning to incorporate permanent entryway systems, properly enclosed and ventilated chemical use/storage areas and compliant filtration media. In addition, the Project will include C02 monitoring in all densely occupied spaces.

IEQ Credit 2: Low Emitting Materials. The Project will attempt this credit through meeting the compliance criteria for a minimum of two of the possible six compliant categories: interior paints and coatings; interior adhesives and sealants; flooring; composite wood; ceilings, walls, thermal and acoustic insulation; furniture.

IEQ Credit 3: Construction Indoor Air Quality Management Plan. The Project manual will include direction for the construction manager to develop and implement an Indoor Air Quality Management plan in compliance with applicable control measures as stated in the SMACNA IAQ Guidelines for Occupied Buildings under construction 2nd Edition, 2007

ANSI/SMACNA 008-2008 Chapter 3. Additional measures will be implemented to ensure absorptive materials will be protected from moisture damage.

IEQ Credit 5: Quality Views. A direct line of sight to the outdoors will be provided for 75% of the regularly occupied floor area. 75% of the regularly occupied floor area will also have quality views to the outdoors which may include multiple lines of sight; unobstructed views; views to landscaped areas, sky, pedestrian walkways, and streetscapes. The building will use a test fit tenant layout plan to demonstrate compliance.

Innovation (IN)

IN Credit 1 Innovation: Green Housekeeping/Operations. The Proponent will explore the use of green cleaning products and equipment in the common areas, and provide a package for residents explaining the 'green living' components of the Project.

IN Credit 3 Innovation - Integrated Pest Management. The Proponent may explore the implementation of an indoor integrated pest management ("IPM") program. The program will require routine inspection and monitoring, along with the incorporation of integrated methods, specification of emergency application measures for pesticides, and communication strategies to building occupants. All cleaning products included in the IPM program will adhere to the requirements listed in the Green Housekeeping plan for the Project.

IN Credit 3: Innovation. The Project will identify and attempt an applicable Pilot credit such as Walkable Streets.

IN Credit 4 Innovation. The team is exploring options to achieve at least one additional Innovation credit. Strategies being considered include low mercury lighting and energy reduction during construction.

IN Credit 6: LEED Accredited Professional. Many members of the Project team are LEED Accredited Professionals (APs).

Regional Priority (RP)

Regional Priority Credits ("RPCs") are established by the USGBC to have priority for a particular area of the country. When a project team achieves one of the designated RPCs, an additional credit is awarded to the project. LEEDv4 RPCs applicable to the South Boston Waterfront area include: RPc1 EAc5 Renewable Energy Production (3%/2 points); RPc1 EAc2 Optimize Energy Performance (17%/8 points); RPc2 SSc3 High Priority Site (2 points); RPc3 SSc4 Rainwater Management (2 points); and RPc4 WEc3 Indoor Water Use Reduction (40% threshold).

LEED v4 for BD+C: New Construction and Major Renovation
Project Checklist

Project Name: Summer St. Hotel
Date: April 24, 2017

Y	?	N			
1			Credit	Integrative Process	1

11	2	4	**Location and Transportation**		**16**
		x	Credit	LEED for Neighborhood Development Location	16
1			Credit	Sensitive Land Protection	1
1		1	Credit	High Priority Site	2
5			Credit	Surrounding Density and Diverse Uses	5
3		3	Credit	Access to Quality Transit	5
	1		Credit	Bicycle Facilities	1
	1		Credit	Reduced Parking Footprint	1
1			Credit	Green Vehicles	1

4	4	2	**Sustainable Sites**		**10**
Y			Prereq	Construction Activity Pollution Prevention	Required
1			Credit	Site Assessment	1
		2	Credit	Site Development - Protect or Restore Habitat	2
	1		Credit	Open Space	1
	3		Credit	Rainwater Management	3
2			Credit	Heat Island Reduction	2
1			Credit	Light Pollution Reduction	1

5	0	5	**Water Efficiency**		**11**
Y			Prereq	Outdoor Water Use Reduction	Required
Y			Prereq	Indoor Water Use Reduction	Required
Y			Prereq	Building-Level Water Metering	Required
1		1	Credit	Outdoor Water Use Reduction	2
2		3	Credit	Indoor Water Use Reduction	6
1		1	Credit	Cooling Tower Water Use	2
1			Credit	Water Metering	1

10	8	15	**Energy and Atmosphere**		**33**
Y			Prereq	Fundamental Commissioning and Verification	Required
Y			Prereq	Minimum Energy Performance	Required
Y			Prereq	Building-Level Energy Metering	Required
Y			Prereq	Fundamental Refrigerant Management	Required
4	2		Credit	Enhanced Commissioning	6
6	2	10	Credit	Optimize Energy Performance	18
	1		Credit	Advanced Energy Metering	1
		2	Credit	Demand Response	2
		3	Credit	Renewable Energy Production	3
	1		Credit	Enhanced Refrigerant Management	1
	2		Credit	Green Power and Carbon Offsets	2

7	0	4	**Materials and Resources**		**13**
Y			Prereq	Storage and Collection of Recyclables	Required
Y			Prereq	Construction and Demolition Waste Manageme	Required
3			Credit	Building Life-Cycle Impact Reduction	5
1		1	Credit	Building Product Disclosure and Optimization -	2
		2	Credit	Building Product Disclosure and Optimization -	2
1		1	Credit	Building Product Disclosure and Optimization -	2
2			Credit	Construction and Demolition Waste Manageme	2

6	2	8	**Indoor Environmental Quality**		**16**
Y			Prereq	Minimum Indoor Air Quality Performance	Required
Y			Prereq	Environmental Tobacco Smoke Control	Required
1	1		Credit	Enhanced Indoor Air Quality Strategies	2
1		2	Credit	Low-Emitting Materials	3
1			Credit	Construction Indoor Air Quality Management P	1
		2	Credit	Indoor Air Quality Assessment	2
1			Credit	Thermal Comfort	1
1		1	Credit	Interior Lighting	2
		3	Credit	Daylight	3
1			Credit	Quality Views	1
	1		Credit	Acoustic Performance	1

5	1	0	**Innovation**		**6**
4	1		Credit	Innovation	5
1			Credit	LEED Accredited Professional	1

1	2	1	**Regional Priority**		**4**
1			Credit	Regional Priority: High Priority Site	1
	1		Credit	Regional Priority: Rainwater management (2 pt	1
	1		Credit	Regional Priority: Optimize Energy (8 pt thresh	1
		1	Credit	Regional Priority: Renewable Energy (2 pt thre	1

50	19	39	**TOTALS**	Possible Points:	**110**

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

4.2 Climate Change Resilience

The Proponent has analyzed the potential climate conditions approximately 50 years into the future in order to evaluate the potential impacts on the Project of climate change. Climate change conditions considered include sea level rise, higher maximum and mean temperatures, more frequent and longer extreme heat events, more frequent and longer droughts, more severe rainfall events, and increased wind events. A copy of the completed checklist is included in Appendix D. Given the preliminary level of design, the responses are also preliminary and may be updated as the Project design progresses. It should also be noted that the Project must comply with Massport Flood-proofing Design Guidelines and performance standards for new buildings, as described in detail below.

Increased Temperature

According to "Climate Ready Boston,", a report released by the City of Boston in December 2016 to help Boston plan for the future impacts of climate change, the City of Boston can expect that the number of days with temperatures greater than 90°F will increase from the current 11 days annually experienced between 1971 and 2000, to between 25 and 90 days annually by 2070, depending on the extent of greenhouse gas emissions over the next several decades.[10] Extreme heat can have serious negative impacts on human health and infrastructure, both of which will affect quality of life. The Project design will incorporate a number of measures to minimize the impact of high temperature events, including:

- New street trees;
- Landscaping on the rooftop terraces; and
- High-albedo roofing and paving materials to minimize the heat island effect.

Sea Level Rise

According to Climate Ready Boston, the sea level by 2030 may be as much as eight inches higher than it was in 2000, and could be as high as seven feet higher by 2100 under the high emissions scenario. As described in "Climate Change and Extreme Weather Vulnerability Assessments and Adaptation Options for the Central Artery" published by MassDOT in November 2015 (the "MassDOT Report"), "one of the challenges presented by the wide range of sea level rise ("SLR") projections is the inability to assign likelihood to any particular [SLR] scenario."[11] To be conservative, in the year 2070, SLR could be as high as approximately four feet.

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10 Climate Ready Boston, December 7, 2016.

11 Massachusetts Department of Transportation, et al. "MassDOT-FHWA Pilot Project Report: Climate Change and Extreme Weather Vulnerability Assessments and Adaptation Options for the Central Artery." November 2015.

Alone, sea level rise of approximately four feet would have no impact on the Project Site; however, as shown in the MassDOT Report, combined with storm surge at the right tide, flooding would be anticipated to occur on the northern edge of the Project Site. The storms in the Boston area that could create these flood conditions would be Nor'easters and tropical storms. Currently, hurricanes occur less frequently than Nor'easters; however, in the future according to the MassDOT Report, it is anticipated that there will be roughly the same number of tropical storms impacting the Boston area as Nor'easters. In addition, the intensity of storms is anticipated to increase. The risks of each type of storm differ: hurricanes are typically shorter in duration, but are more intense and create a larger storm surge; Nor'easters are longer in duration, but create a smaller storm surge. For this reason, a hurricane would need to impact Boston within a short window to create flooding as shown in the MassDOT Report, while Nor'easters are more likely to create flooding given that they have a higher probability of impacting the area during the rising tide and high tide.

The MassDOT Report shows that by 2070, the Project Site is anticipated to have between a 0.1% and 1% annual chance of flooding by at least 2 inches. By 2070, the 100-year flood is anticipated to have a flood level of approximately one-half foot to one foot across the Project Site.

As part of the Project's resiliency strategy and in order to comply with Massport Flood-proofing Design Guidelines and performance standards for new buildings, the Project has included a number of flood-proofing measures into the design of the Project. Massport's Flood-proofing Design Guidelines specify the extent of flood-proofing required for critical building systems and spaces. To comply, the Project will be locating the transformers, switchgear, emergency generator, meter centers, fire pump room, fire command room, and main electric room above Massport's designated DFE of 23.46 feet BCB (17 feet NAVD88). Equipment and spaces that will be located below the DFE that will be protected with Dry Flood-proofing will be the domestic hot water heaters, chilled water systems, and Tel/Com incoming service room. The louvers, intake, and exhaust vents for the spaces located below the DFE will utilize Wet Flood-proofing. Additionally the below grade level will utilize water-tight utility conduits and resilient construction materials.

Rain Events

As a result of climate change, the Northeast is expected to experience more frequent and intense storms. To mitigate, the Proponent will take measures to minimize stormwater runoff and protect the Project's mechanical equipment. These measures include:

- The stormwater management system will decrease or maintain the peak flow rate and volume of stormwater runoff from the site;;
- Water tight utility conduits;

- Locating critical mechanical and electrical equipment at the highest elevation possible or flood-proofing it to prevent exposure to flood waters; and

- Wastewater and stormwater back flow prevention.

Drought Conditions

Under the high emissions scenario, the occurrence of droughts lasting one to three months could go up by as much as 75% over existing conditions by the end of the century. To minimize the Project's susceptibility to drought conditions, the landscape design is anticipated to incorporate native and adaptive plant materials and a reduction in potable water use for irrigation when compared to a mid-summer baseline. Aeration fixtures and appliances will be chosen for water conservation qualities, conserving potable water supplies.

Chapter 5

Urban Design

5.0 URBAN DESIGN

5.1 Program

To be located in the South Boston Waterfront District near the Boston Convention and Exhibition Center (BCEC), the Project will inhabit a vital position in the economic and urban evolution of the neighborhood. The South Boston Waterfront District has experienced a tremendous transformation in the almost fifteen years since the construction of the BCEC, experiencing an explosion of development to become one of Boston's most rapidly-emergent, active, and vibrant areas.

Despite this outburst of growth, the Project will serve to alleviate the critical shortage of hotel rooms present in both the South Boston Waterfront District and the Boston area as a whole, thereby strengthening the ability of the BCEC to compete on the world stage for future events. In 2016, Boston placed among the cities with the highest hotel rates in the country, while a report released by the MCCA in 2016 also revealed that the BCEC had the fewest hotel rooms available within walking distance when compared to other convention centers. The Project will serve a vital role in strengthening the economic position of the BCEC, and the city as a whole by providing new hotel rooms, meeting space, and what will be the largest hotel ballroom in Boston.

Beyond serving as the home of the BCEC, the South Boston waterfront is home to a diverse array of activities and uses, including a vibrant arts community, a plethora of waterfront dining options, open-air concerts at Fan Pier Park and the Blue Hills Bank Pavilion, and sunset cruises in Boston Harbor. Major attractions such as the Lawn on D, located just a stone's throw from the Project Site, Harpoon Brewery, and the Institute of Contemporary Art all contribute to the continuing emergence of a dynamic and energetic neighborhood. With approximately 40,000 sf of ground floor retail and restaurant space, the Project will actively contribute to the available local dining and entertainment options, while allowing a greater number of visitors to enjoy the attractions of the area and the city as a whole.

The Proponent is committed to developing a sustainable project with a goal of attaining a building rating of LEED Silver at the minimum, with the possibility of achieving a LEED Gold rating. The Project team has worked with dedication to achieve a design that is efficient and healthy both for its occupants and for the environment. To achieve this, the design team has used a series of guiding principles for the Project. These principles call for a building that is resource efficient, both in its construction and operation, a building that is safe and healthy for all occupants, a building that must be flexible and adaptable to ensure a longer lifespan, and finally, a building that is durable and maintainable in its systems and materiality. To ensure a longer building lifespan along the South Boston waterfront, the Project will prioritize climate change preparedness and resilience by locating all critical operational equipment and spaces within areas of the building that will be protected from projected storm surge and floodplain impacts. This will allow the Project to maintain operability and activity even during an extreme weather event.

In addition to its location near the waterfront, the Project also sits in an area of FAA height restrictions under the flight paths serving Logan International Airport. The Project respects the FAA imposed height limitations across the Project Site, and to guarantee a comfortable and healthy environment for the guests in this environment, all guest rooms will be designed to a maximum interior noise level not in excess of 45 dBA.

5.2 Public Realm

Occupying a site diagonally across Summer Street from the BCEC at the intersections of Summer Street and World Trade Center Avenue and D Street, the Project will bring activity and energy to a Project Site that is currently an empty lot at a vital location in the neighborhood. The Project, in both its massing and its street level activation, serves to fill a void in the urban fabric of the South Boston Waterfront District. The Project will create pedestrian level connectivity in the neighborhood by revitalizing an unoccupied and inactive site and providing much-needed connections between the South Boston Waterfront District and the D Street/West Broadway area of South Boston (see Figure 5-1). The Project will feature the hotel lobby fronting on Summer Street with retail outlets and restaurant uses along World Trade Center Avenue and D Street (see Figures 5-2 and 5-3). Currently, the west side of the D Street viaduct is devoid of public realm activation between the Westin Waterfront Hotel and the Waterside Place residential development. By creating active restaurant and retail storefronts complete with an outdoor seating terrace along D Street, the Project will add an essential link to the chain of activity that runs along D Street from Liberty Wharf on the waterfront, through the Lawn on D open space area at the BCEC, to the Aloft and Element Seaport hotels, and to the West Broadway residential neighborhood (see Figures 5-4 and 5-5).

Recognizing the importance of the pedestrian route that runs from the World Trade Center MBTA Silver Line transit stop to the BCEC, the Project will include a protected pedestrian walkway from the SBWTC parcel to the Project along World Trade Center Avenue (see Figures 5-1 and 5-6). This weather-protected walkway will lead to a publicly accessible lobby in the Project that will allow access into a pedestrian tunnel below Summer Street to the BCEC, thereby providing a weather protected pedestrian pathway from the SBWTC to the BCEC. For those pedestrians continuing above grade along World Trade Center Avenue, the Project will feature a large canopy along the façade that wraps the corner onto Summer Street, further extending the path of pedestrian weather-protection to the intersection of World Trade Center Avenue and Summer Street.

The footprint of the Project is offset from the property line on the three sides bounded by publicly accessible pedestrian sidewalks: World Trade Center Avenue, Summer Street, and D Street. These offsets serve multiple purposes, including the creation of wider, more comfortable pedestrian pathways. Along D Street, pulling the face of the building back from the property line creates ample width to create a planting strip along the edge of the sidewalk, thereby allowing a safer distance between pedestrian and vehicular traffic (see Figure 5-5). In addition, the added width allows the creation of a terrace for outdoor dining, further enhancing the activation of the D Street corridor. Along Summer Street, the Proponent recommends narrowing the central traffic island by two feet. The combination of narrowing the island and offsetting the ground floor façade will allow the Proponent to implement a version of Boston Complete Streets featuring space for a five foot bike lane protected from vehicular traffic by a two foot buffer, with an eight foot wide sidewalk separated from the bike lane by a four foot landscape zone, and enough remaining width for an outdoor dining area.

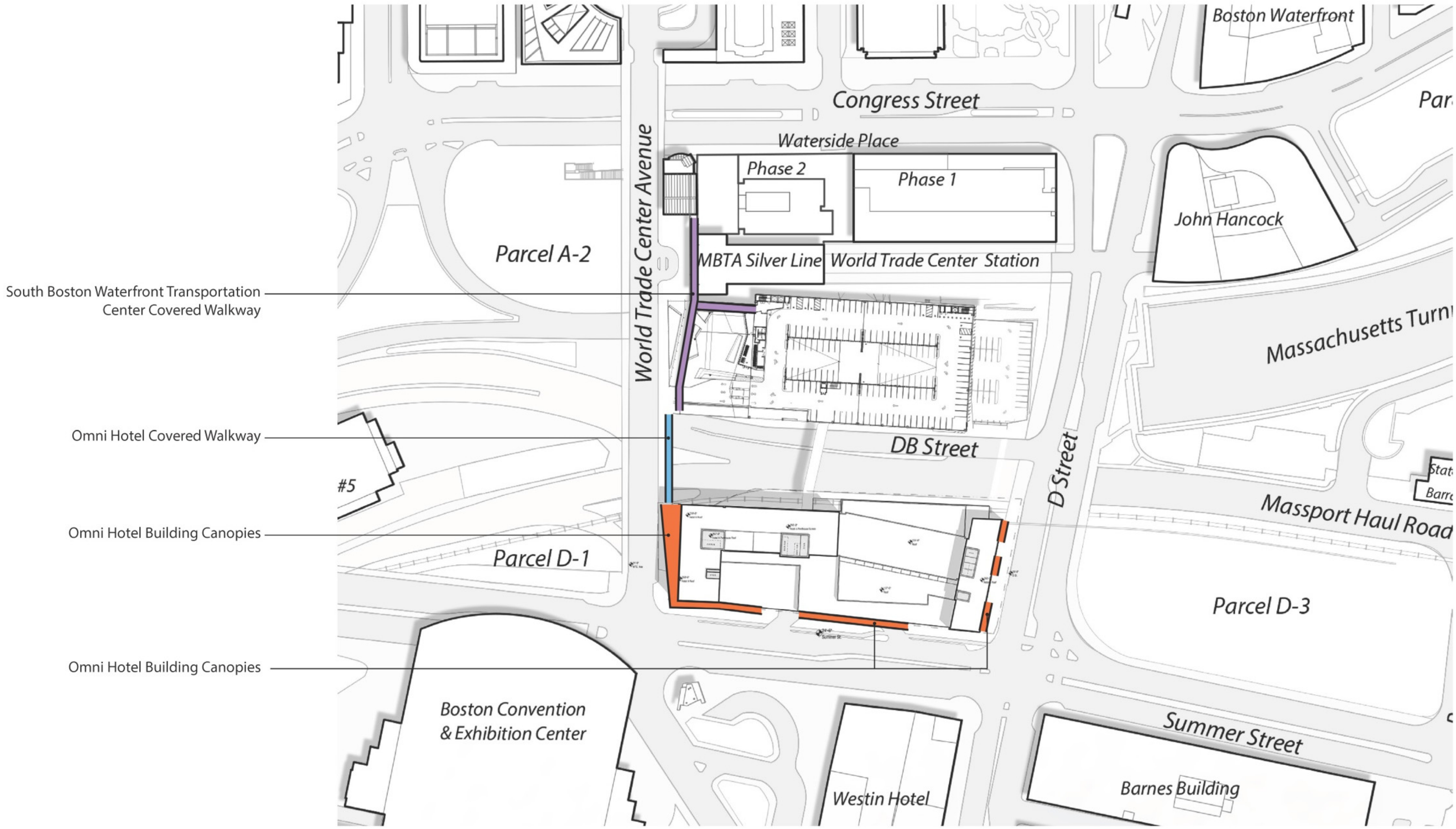
The Project Site's proximity to Fargo Street and the Massport Haul Road at the lower level will allow trucks servicing the Project to avoid local city streets for daily deliveries and larger, less frequent deliveries. As there are no sidewalks nor general public pedestrian access along the Massport Haul Road, hotel service and loading will be concentrated away from the activated sidewalks bordering the Project on Summer Street, D Street, and World Trade Center Avenue, allowing a greater continuity of the streetscape and a more attractive pedestrian realm.

5.3 Massing

The Project's massing approach is centered on creating a unique and dramatic, yet appropriate, urban form for the neighborhood, while allowing for the best possible guest and user experiences. Occupying an entire city block in the South Boston waterfront district, the underlying concept driving the massing approach is to create a collection of buildings on the block, rather than a series of volumes atop a large podium (see Figure 5-7). The Project has been divided into five distinct volumes as opposed to one monolithic building structure. Each of the five volumes will exhibit its own program driven architectural aesthetic, while contributing to a harmonious collection. Volume 1 (West Tower) sits at the corner of World Trade Center Avenue and Summer Street. The tallest in the assembly, it anchors the Project. Volume 3 (East Tower) sits at the opposite end of the Project Site at the corner of Summer Street and D Street. Both Towers visually come to the ground, book-ending the Project and effectively reducing the length of the main podium element (Volume 4). The perceived length of Volume 2 has been reduced by allowing the West Tower to extend north to the Massport Haul Road. The final component in the assembly is Volume 5. Canted at an angle perpendicular to the East Tower, this block reinforces the separation between the facade of Volume 2 and the West façade of the East Tower, further breaking down the appearance of a long monotonous 'wall' along the northern boundary of the Project Site.

The porte-cochere is shaped in a manner to create a dynamic and dramatic experience for those first arriving at the hotel, while minimizing the points of interaction between pedestrians and vehicles. The top of the podium features one large outdoor south-facing pool deck that will provide visual interest and activity from the street. The pool deck is nestled between the two towers to take advantage of their mass and position to shield itself from the northwestern prevailing winds. Further visual interest is created at the corner of the building on World Trade Center Avenue and Summer Street with the creation of an event space at level 4 of the West Tower. Appended to the pool deck but with the ability to operate year round by utilizing retractable glass walls, this element will be open air during the warmer months. This space will be lively and exciting, positioned diagonally across from the BCEC.

Elegant yet powerful in its massing and form, the Project will be an ideal formal partner to the BCEC, while adding variation and visual interest to the skyline of the South Boston Waterfront District.



Summer Street Hotel **Boston, Massachusetts**

ELKUS | MANFREDI ARCHITECTS

Figure 5-1
Canopy Diagram

Summer Street Hotel **Boston, Massachusetts**

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ARCHITECTS

Figure 5-2
View of D Street Corner

Summer Street Hotel   Boston, Massachusetts

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ARCHITECTS

Figure 5-3

View of World Trade Center Avenue Corner

Summer Street Hotel **Boston, Massachusetts**

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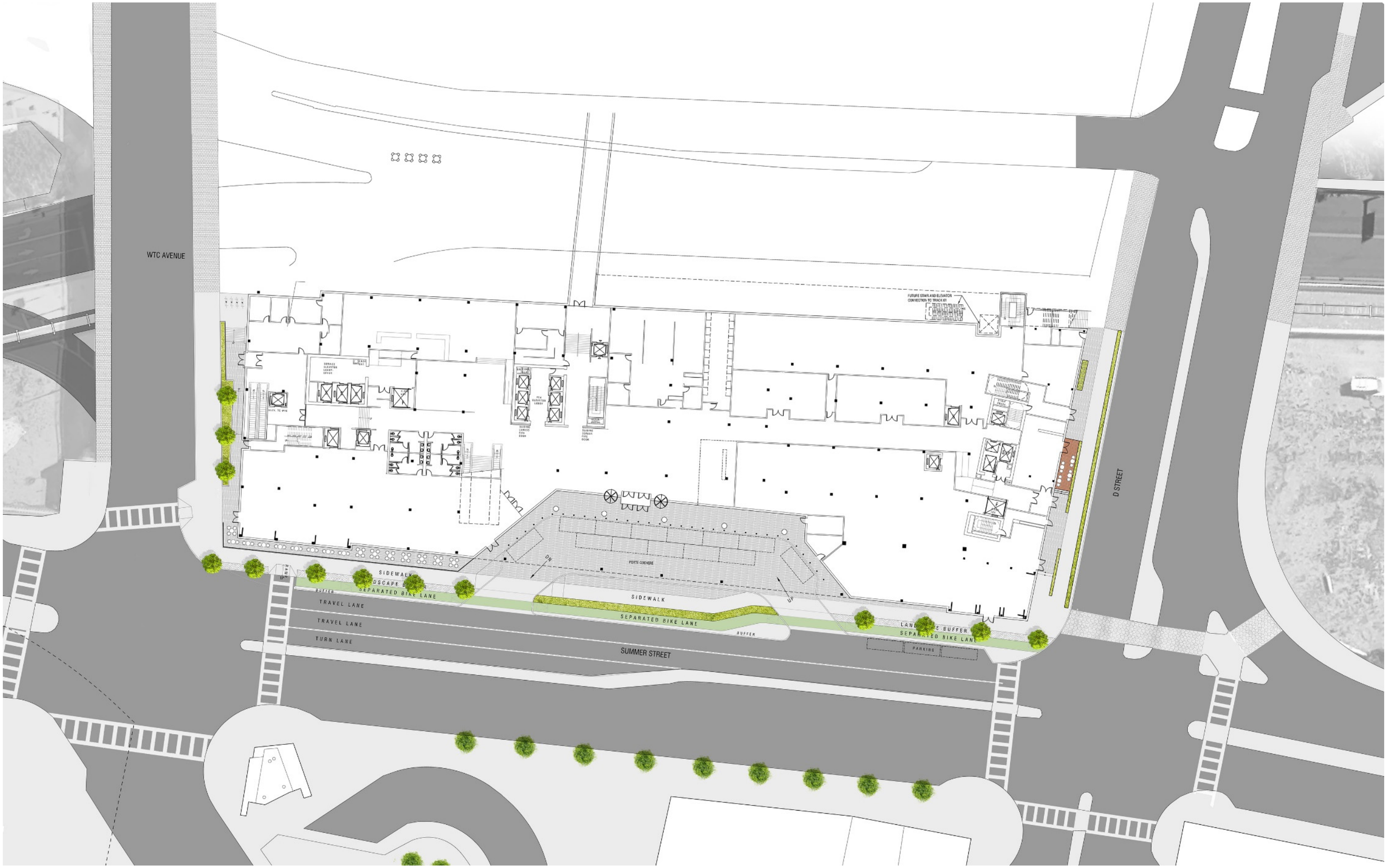
Figure 5-4
View Along D Street



Summer Street Hotel   Boston, Massachusetts

ELKUS | MANFREDI ARCHITECTS

Figure 5-5
Landscape Plan

Summer Street Hotel   Boston, Massachusetts

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ARCHITECTS

Figure 5-6
View Along World Trade Center Avenue

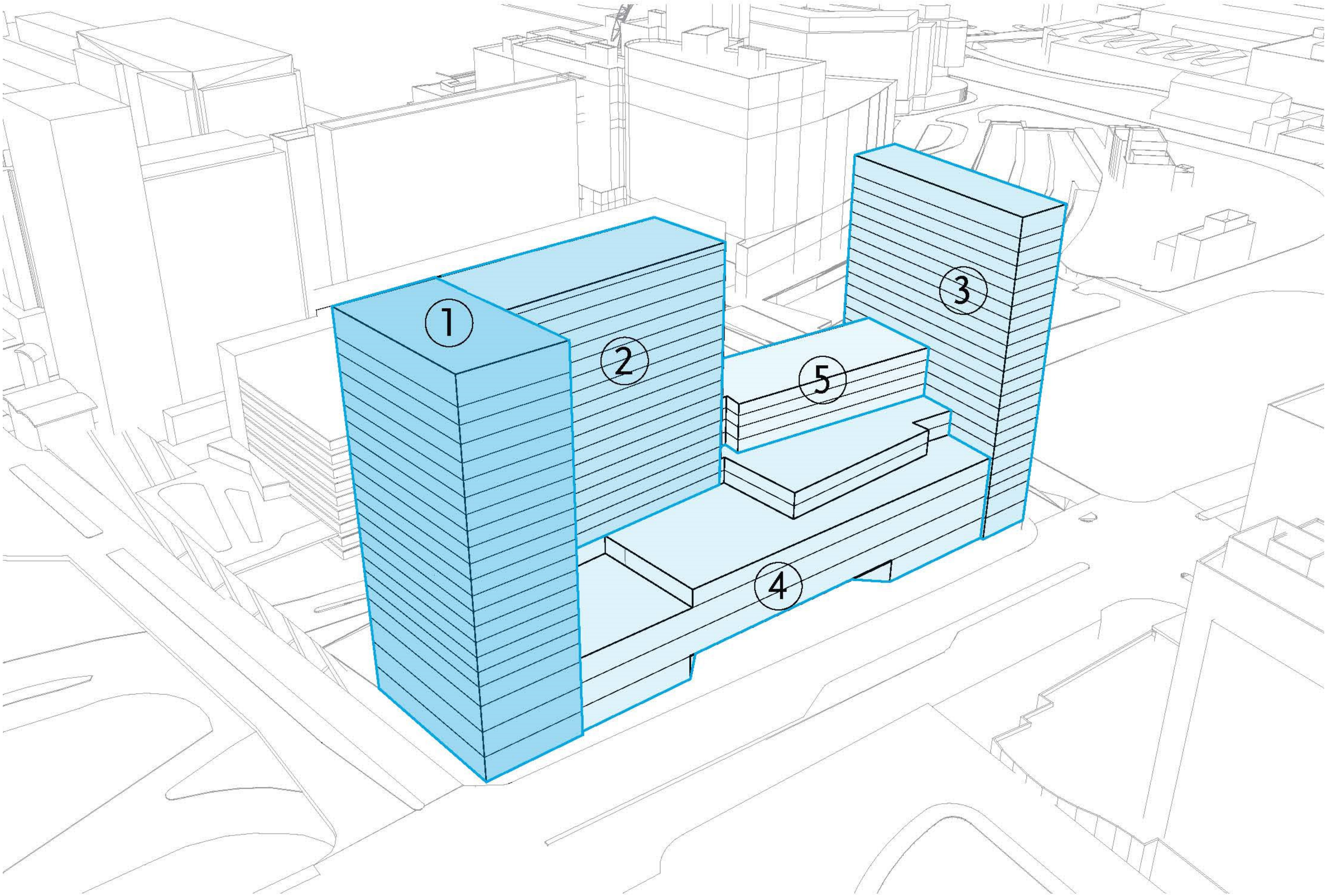


Figure 5-7

Massing Components

Chapter 6

Infrastructure

6.0 INFRASTRUCTURE

6.1 Introduction

The DPIR included a description and availability of existing utility infrastructure systems adjacent to the Project Site, as well as the development's projected utility loads. This section provides a detailed description and capacity analysis of the existing area utilities in conjunction with the proposed development utility loads, including updates to information provided in the DPIR. Information provided addresses the impacts of the Project on the capacity and adequacy of the following utilities:

- Sanitary Sewer System
- Water Supply System
- Storm Drainage System and Water Quality Impacts
- Electric System
- Natural Gas
- Voice/Data Communications

6.2 Sanitary Sewer System

6.2.1 Existing Conditions

There are existing sewer mains in Summer Street, the service drive at the lower level, D Street and World Trade Center Avenue. There is a 12-inch Boston Water and Sewer Commission (BWSC) sewer main in Summer Street, which flows east below Summer Street. There is an existing 12-inch sewer main in the lower level service drive south of the existing Track 61 tracks, which flows easterly below the D Street Bridge. There is an existing MassDOT 10-inch sewer main in World Trade Center Avenue which discharges into the 12-inch sewer main in the service drive. The sewer mains ultimately flow to the MWRA Deer Island Waste Water Treatment Plant for treatment and disposal. See Figure 6-1 for the sanitary sewer system map.

6.2.1.1 On-Site Service Drive Sewer

This 12-inch service is currently owned by MassDOT. Massport has committed to arranging for the grant of easement rights in this line to the BWSC. As discussed in the DPIR, the 12-inch sanitary sewer beneath the on-site service drive is believed to be supported by timber piles. This line was constructed in two phases under the Massachusetts Convention Center Authority Bid Package No. 3, and contract C01A7 of the Central Artery/Tunnel project. It begins at the intersection of New Fargo Street/C Street and

Service Road where it receives flows from Vent building No. 5 and pump discharge volumes from the low point pump station No. 3 (LPO 03), via a series of 10-inch lines. Sanitary flows are carried easterly beneath Service Road to the 36-inch trunk line in Pump House Road where flows are conveyed as described above.

6.2.1.2 Summer Street Sewer

As discussed in the DPIR, the 12-inch sewer main beneath Summer Street was installed under Phase 1 of the Massachusetts Convention Center Authority Bid Package No. 2 in 2000. This line currently receives partial flows from the BCEC as well as partial flows from the Westin Waterfront Hotel. Flows are carried easterly beneath Summer Street to the 30x45-inch trunk line owned by BWSC in E Street, where flows are conveyed as described above.

6.2.2 Project-Generated Sanitary Sewer Flow

The Project's sewage generation rates were estimated using the MassDEP Environmental Code (Title V) Section 310 CMR 15.00 and the proposed building program. Typical generation values are conservative values for estimating the sewage flows from new construction and are used to evaluate new sewage flows or an increase in flows to existing connections. A peaking factor of 3.0 (times the total daily rate) was used to estimate peak flows, consistent with the peaking factor used in the DPIR.

The Project Site is currently empty, therefore there is no sewer generation from the existing site. A breakdown of the previously approved sewer generation values for Parcel D2 and the current building program sewer generation values for the Project are presented in Table 6-1.

Table 6-1 Project Wastewater Generation

Use Category	Size/Units	Rate	Total Flow (GPD)	Peak Flow (GPD)
Hotel				
Previously Approved	300 units	110 gpd/br	33,000	99,000
Project	1054 units	110 gpd/br	115,940	347,820
Retail				
Previously Approved	279,500 sf	0.05 gpd/sf	13,975	41,925
Project	5,000 sf	0.05 gpd/sf	250	750
Restaurant				
Previously Approved	300 seats	35 gpd/seat	10,500	31,500
Project	900 seats	35 gpd/seat	31,500	94,500
Meeting Room/Office Space/Ballroom				
Previously Approved	—	0.075 gpd/sf	—	—
Project	67,827 sf	0.075 gpd/sf	5,087	15,261

Table 6-1 Project Wastewater Generation (continued)

Use Category	Size/Units	Rate	Total Flow (GPD)	Peak Flow (GPD)
SUB-TOTAL				
Previously Approved			57,475	172,425
Project			152,777	458,331
Increase from Previously Approved			*95,302*	*285,906*
Increase from Existing			*152,777*	*458,331*

6.2.3 Proposed Sanitary Sewer Connections

The sewer services for the Project are expected to connect to either the existing BWSC-owned sanitary sewer main located in Summer Street or the Massport owned sewer system in the lower level service drive. The proposed improvements and connections to BWSC infrastructure will be reviewed as part of the BWSC's Site Plan Review process for the Project, and will be coordinated with and reviewed by Massport as part of its design review of the Project. The BWSC's review process will include a comprehensive design review of the proposed service connections, an assessment of Project demands and system capacity, and the establishment of service accounts.

6.2.4 Capacity of Existing Sewers

6.2.4.1 Service Drive Sewer

As discussed in the DPIR, the existing 12-inch sewer in the lower level service drive currently receives sanitary flows from the existing Vent Building No. 5, monthly tunnel washing operations in the vicinity during summer months, and groundwater discharge that is pumped from Low Point Pump Station No. 3 (LPO 3). Tunnel wash and groundwater flows are pumped from LPO 3 via force mains embedded in the tunnel structure to a sediment settling tank within the Vent building which overflows into the existing 10-inch sewer which, in turn carries flows to the 12-inch line. The amount of sewage generated by the existing Vent Building No. 5 and the pump discharge volumes were determined from average daily use records provided by the BWSC. Equating the Vent Building water use values to the amount of sewer generated offers a conservative analysis as sewage volumes are typically 10 percent less than water consumption. A peaking factor of 3.0 (times the average daily rate) was applied to calculate peak flows. The approximate existing discharge volumes to the service drive sewer system are presented in Table 6-2.

Table 6-2 Average Daily Water Consumption/Sewage Generation – Existing Vent Building No. 5 and LPO 03 Pump Discharge Volume

Building/Facility	Average Daily Use	Average Flow	Peak Flow
Vent Building No. 5 300 Massport Haul Road	2,5 cfd	19 gpd	57 gpd
LPO 03 Pump Discharge Volume	1,173 cfd	2,833 gpd	8,500 gpd
TOTAL	**1,176 cfd**	**2,852 gpd**	**8,557 gpd**

To determine the adequacy of this sewer line to accommodate proposed flows from the Project, an evaluation of its capacity was performed. For the purpose of this analysis, it is assumed that the entirety of the building's sewer flows will discharge to this sewer line. The results are presented in Table 6-3. This capacity analysis was presented in the DPIR. No further changes to this capacity analysis were made as part of this NPC.

Table 6-3 Existing Sewer Capacity Evaluation –Sewer Beneath On-Site Service Drive

Segment: MH to MH	Street Name	Segment Size (inches)	Length (feet)	Slope (ft/ft)	Capacity (MGD)
Vent bldg/ LP0w 03-1	MHR WB	10	11.6	0.0086	1.30
1-2	MHR WB	10	42	0.0048	0.97
2-3	MHR WB	10	138.5	0.0058	1.07
3-4	MHR WB	10	268.9	0.0145	1.69
4-5	MHR WB	10	159.1	Unk	Unk
5-6	World Trade Center Ave	10	133.3	0.0020	0.66
6-7	Service Road	12	67	0.0040	1.46
7-8	Service Road	12	153	0.0040	1.46
8-9	Service Road	12	275	0.0040	1.46
9-10	Service Road	12	20	0.0040	1.46
10-11	Service Road	12	149	0.0040	1.46
11-12	Service Road	12	16	0.0040	1.46
12-13	Service Road	12	152	0.0040	1.46
13-14	Service Road	12	265	0.0040	1.46
14-16	Service Road	12	118	0.0040	1.46
16-17	Service Road/ Pumphouse Connector Road	12	100	0.0060	1.79

Note: The Manning's equation was used to calculate tabulated values. The roughness coefficient of 0.013, fair condition PVC or DIP, was used in the equation. Pipe sizes, slopes, and segment lengths were obtained from design and as-built utility drawings from the Central Artery/Tunnel Project – Contracts No. C01A3, C01A7.

As discussed in the DPIR, the critical segment occurs between manholes 5-6 which is upstream from the anticipated Project connection points. As shown in Table 6-2, the 12-inch sewer currently receives average daily flows of 2,852 gpd with peak flows of 8,557 gpd. From Table 6-1, the estimated sewage discharge for the Project is 152,777 gpd with peak discharge of 458,331 gpd. Combining both peak flows yields 466,888 gpd, which is less than the 1,460,000 gpd full flow capacity of the pipe. On this basis, it is concluded that there is sufficient capacity in the 12-inch sanitary sewer to accommodate the sewer flows that will be generated by the Project.

6.2.4.2 Summer Street Sewer

To determine the adequacy of the Summer Street 12-inch sewer line to accommodate proposed flows (assuming the entire building) from the Project, an evaluation of its capacity was performed. The results are presented in Table 6-4. This capacity analysis was presented in the DPIR. No further changes to this capacity analysis were made as part of this NPC.

Table 6-4 Existing Sewer Capacity Evaluation – Sewer Beneath Summer Street

Segment: MH to MH	Street Name	Segment Size (inches)	Length (feet)	Slope (ft/ft)	Capacity (MGD)
1-2	Summer	12	153.5	0.015	2.83
2-3	Summer	12	145.5	0.015	2.83
3-4	Summer	12	183.9	0.015	2.83
4-5	Summer	12	245.6	0.015	2.83
5-6	Summer	12	174.9	0.015	2.83
6-7	Summer	12	34.8	0.015	2.83
7-8	Summer	12	77.6	0.015	2.83
8-9	E Street	12	22.5	.05560	5.44

Note: The Manning's equation was used to calculate tabulated values. The roughness coefficient of 0.013, fair condition PVC or DIP, was used in the equation. Pipe sizes, slopes, and segment lengths were obtained from design and as-built utility drawings from the Central Artery/Tunnel Project – Contracts No. C01A3, C01A7.

From Table 6-1, the estimated sewage discharge for the Project is 152,777 gpd with peak discharge of 458,331 gpd, which is less than the 2,830,000 gpd full flow capacity of the pipe. On this basis, it is concluded that there is sufficient capacity in the 12-inch sanitary sewer to accommodate the flows generated by the Project.

6.2.5 Sewer System Conservation and Mitigation Measures

As discussed in the DPIR, to reduce impacts of the Project's sewage generation and help conserve water, the Project will meet all applicable code requirements including installation of low-flow toilets, flow-restricting shower heads and faucets, and BWSC-approved grease traps in the restaurants. As part of the Proponent's goal to achieve LEED Silver Certification, the Project will incorporate water conservation measures in accordance with LEED credits. New sanitary sewer service(s) for the Project will be designed and constructed to both Massport and BWSC construction standards to minimize infiltration and inflow into the sanitary sewer collection system.

The Project team will work with BWSC to remove infiltration and inflow (I/I) from the sewer distribution system at a ratio of four gallons removed for each new gallon added, as per the MassDEP I/I reduction policy. The Project will either perform equivalent sewer separation work elsewhere in the City with the assistance of the BWSC, or contribute appropriate funds to be determined in conjunction with the BWSC towards its support and implementation of this policy.

6.3 Water Supply System

6.3.1 Existing Conditions

Water for the Project Site will be provided by the BWSC or MassDOT. There are five water systems within the City which provide service to portions of the City based on ground surface elevation. The five systems are southern low (commonly known as low service), southern high (commonly known as high service), southern extra high, northern low, and northern high.

There is an existing 12-inch southern low water main owned by MassDOT which feeds a fire hydrant and dead ends in the Service Road. There is also an existing 16-inch southern low water main operated by BWSC along the northern side of Summer Street, which jogs into the Project Site. There is an existing 16-inch southern high water main and an existing 30-inch southern low water main assumed to be owned by BWSC which are both assumed to cross along the northern side of the parcel within the property; as-built plans prepared in August 2002 indicate that these two active water mains are located in the parcel running through service drive; however BWSC plans indicate that the two water mains are located below D Street, outside of the parcel. The Project team will continue to coordinate with the agencies to determine if the active water mains are located within the Project Site and will need to be relocated.

A water distribution map is shown in Figure 6-2. A capacity analysis will be performed by conducting hydrant flow tests on the existing water systems to confirm the availability of water supply for both the domestic and fire protection needs of the Project.

6.3.2 Water Demand

The Project's estimated water demand was estimated assuming 110% of the Project's sewer generation; typical engineering practice assumes a 10% loss between the Project's water demand and sewer generation through typical building uses. The existing site is currently vacant, therefore there is no water demand for the existing site. A breakdown of the previously permitted water demand values and the current building program water demand values is presented in Table 6-5. The proposed water demand for the Project is estimated to be 168,055 gpd, with a peak demand of 504,164 gpd. The Proponent does not anticipate capacity issues for the Project. The Proponent will coordinate with BWSC throughout the design process to ensure capacity is not an issue.

Table 6-5 Project Water Demand

110% Sewer Generation	Average Daily Use (GPD)	Peak Daily Use (GPD)
Previously Approved	59,923	179,768
Project	168,055	504,164
Increase from Previously Approved	***108,132***	***324,396***
Increase from Existing	***168,055***	***504,164***

6.3.3 Proposed Water Connections

The Project's domestic and fire protection services are expected to tie into the BWSC owned water main located in Summer Street via new domestic and fire protection service laterals. Alternative connections to the MassDOT water main in the service drive or to the BWSC owned water main under the D Street Bridge may be explored during the design process.

The domestic and fire protection water service connections required for the Project will meet the applicable BWSC, City, State, and Federal codes and standards, including cross-connection backflow prevention. Compliance with the standards for the water system service connection will be reviewed as part of BWSC's Site Plan Review process. This review will include sizing of domestic water and fire protection services, calculation of meter sizing, backflow prevention design, and location of hydrants and siamese connections that conform to BWSC and Boston Fire Department requirements.

6.3.4 Conservation Measures

The State Building Code requires the use of water-conserving fixtures. Water conservation measures such as low-flow toilets and restricted flow faucets will help reduce the domestic water demand on the existing distribution system. The installation of sensor-operated sinks with water conserving aerators and sensor-operated toilets in common area restrooms is anticipated to be incorporated into the design plans for the Project.

Backflow preventers will be installed at both domestic and fire protection service connections. New meters will be installed with Meter Transmitter Units (MTU's) as part of the BWSC's Automatic Meter Reading (AMR) system.

The Project will incorporate water conservation measures in accordance with LEED credits. The following water conservation techniques will be used: low flow 1.6 gallons per flush water closets; low flow 1.0 gallon per flush urinals; 0.5 gpm flow aerators on lavatory faucets; and sensor activated common-area faucets and toilets.

6.4 Stormwater Management

6.4.1 Existing Conditions

There is an existing 18-inch to 24-inch MassDOT owned storm drain which flows north in C Street Under Road, located below World Trade Center Avenue and discharges into the 48-inch MassDOT owned drain line which runs along the northern side of the existing railroad tracks in C Street under the World Trade Center viaduct. There is an existing 42-inch BWSC storm drain in Summer Street. The existing storm drain facilities in the site area are shown on Figure 6-3.

The existing site is mostly undeveloped. The majority of the site is covered in grass/dirt or gravel, and a portion of the site is paved.

The Project's potential impact on the existing storm drain mains in Summer Street and World Trade Center Avenue were analyzed. The existing storm drain system capacity calculations are presented in Table 6-6 and Table 6-7.

Table 6-6 Existing Storm Drain Summary - Primary Storm Drain Beneath Summer Street

Segment: MH to MH	Street Name	Segment Size (inches)	Length (feet)	Slope (ft/ft)	Capacity (MGD)
1-2	Summer	42	208	0.009	53.6
2-3	Summer	42	300	0.009	53.6
3-4	Summer	42	235	0.009	53.6
4-5	Summer	42	221	0.009	91.0
5-6	Summer	42	190	0.026	59.2
6-7	Summer	54	94	0.011	115.7
7-8	Summer	60	205	0.002	65.4
8-9	Summer	60	249	0.002	65.4
9-10	Summer	72	100	0.002	106.3
10-11	Summer	72	153	0.002	106.3

Note: 1. Flow Calculations based on Manning Equation.

2. Elevations refer to Boston City Base.

3. Invert information was taken from BWSC Sewer System Map and the as-built utility drawings from the Central Artery/Tunnel Project – Contracts No. C01A3, C01A7.

This capacity analysis was presented in the DPIR. No further changes to this capacity analysis were made as part of this NPC. Table 6-6 indicates the hydraulic capacity of the storm drain system in Summer Street has a minimum hydraulic capacity of 53.6 MGD.

Table 6-7 Existing Storm Drain Summary - Primary Storm Drain Beneath World Trade Center Avenue

Segment: MH to MH	Street Name	Segment Size (inches)	Length (feet)	Slope (ft/ft)	Capacity (MGD)
352 to 351	World Trade Center Avenue	18	71	0.007	5.70
351 to 345	World Trade Center Avenue	24	41	0.010	14.44
345 to 356	Service Drive	48	123	0.008	83.71
356 to 192	Service Drive	48	115	0.007	75.47

Note: 1. Flow Calculations based on Manning Equation.
2. Manhole numbers were taken from BWSC Sewer System Map.
3. Elevations refer to Boston City Base.
4. Invert information was taken from BWSC Sewer System Map and the Existing Conditions Plan prepared by VHB.

Table 6-7 indicates the hydraulic capacity of the storm drain system in World Trade Center Avenue has a minimum hydraulic capacity of 5.70 MGD.

The Proponent does not anticipate capacity issues for the Project. The Proponent will coordinate with BWSC throughout the design process to ensure capacity is not an issue.

6.4.2 Proposed Storm Drainage System

Stormwater improvements will be reviewed as part of the BWSC Site Plan Review process. This process includes a comprehensive design review of the proposed service connections, assessment of Project demands and system capacity, and establishment of service accounts. The proposed stormwater management system will collect site runoff and recharge one-inch over the Project's impervious area to the maximum extent practicable, per the BWSC stormwater management standards. The Project's storm drainage system will discharge to the BWSC-owned storm drain system in Summer Street. Alternative connections into the MassDOT owned storm drain system may be explored during the design process.

Site runoff will be collected by a closed drainage system and treated before overflowing to the BWSC storm drainage system. Stormwater runoff will flow to a proposed recharge system on the Project Site. The proposed stormwater recharge systems are proposed to be located below the service drive; the Project team will confirm if the stormwater recharge systems are feasible based on site soil conditions and groundwater conditions. If is it determined subsurface recharge systems are not feasible to meet BWSC's recharge requirement's, the Project team will explore alternate methods, such as injection wells or water re-use tanks, for meeting the City and the State's stormwater management requirements to the maximum extent practicable.

The stormwater management system will decrease or maintain the peak flow rate and volume of stormwater runoff from the Project Site. New stormwater runoff will not be directed towards abutters. As a result, no capacity issues in the existing storm drain pipe systems are anticipated as a result of the Project.

Catch basins installed will be standard BWSC catch basins with deep sediment sumps and traps. BWSC "Don't Dump – Drains to Boston Harbor" plaques will be installed at new catch basins or at existing catch basins if not already present.

All work on the drainage systems will be performed in accordance with Massport and/or BWSC standards, and will be submitted to the necessary agencies for review and approval prior to implementation.

6.4.3 Water Quality Impact

The Project will not adversely affect the water quality of nearby water bodies. Erosion and sediment control measures will be implemented during construction to minimize the transport of site soils to off-site areas and BWSC storm drain systems. During construction, existing catch basins will be protected with filter fabric, straw bales and/or crushed stone, to provide for sediment removal from runoff. These controls will be inspected and maintained throughout the construction phase until the areas of disturbance have been stabilized through the placement of pavement, structure, or vegetative cover.

If required, site dewatering will be conducted in accordance with applicable MWRA and BWSC discharge permits. Once construction is complete, the Project will be in compliance with local and state stormwater management policies, as described below.

6.4.4 Stormwater Policy Management Standards

In March 1997, MassDEP adopted a new Stormwater Management Policy to address non-point source pollution. In 1997, MassDEP published the Massachusetts Stormwater Handbook as guidance on the Stormwater Policy, which was revised in February 2008. The Policy prescribes specific stormwater management standards for development projects, including urban pollutant removal criteria for projects that may impact environmental resource areas. Compliance is achieved through the implementation of Best Management Practices (BMPs) in the stormwater management design. The Policy is administered locally pursuant to MGL Ch. 131, s. 40.

A brief explanation of each Policy Standard and the system compliance is provided below.

Standard #1: No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.

Compliance: The proposed design will comply with this Standard. No new untreated stormwater will be directly discharged to, nor will erosion be caused to wetlands or waters of the Commonwealth as a result of stormwater discharges related to the Project.

Standard #2: Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates. This Standard may be waived for discharges to land subject to coastal storm flowage as defined in 310 CMR.

Compliance: The proposed design will comply with this Standard to the maximum extent practicable. The post-development peak discharge rates will not exceed the pre-development peak discharge rates through methods involving stormwater recharge on site to the maximum extent practicable, and will be coordinated with BWSC throughout the design process.

Standard #3: Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices, and good operation and maintenance. At a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

Compliance: The Project will comply with this standard. The Project will recharge a volume of one inch over the impervious area.

Standard #4: Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when:

a. Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan, and thereafter are implemented and maintained;

b. Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with the Massachusetts Stormwater Handbook; and

c. Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

Compliance: The proposed design will comply with this standard. The Project will not have an impact on stormwater runoff quality. The Project storm drain service will not discharge to a combined sewer.

Standard #5: For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If through source control and/or pollution prevention all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53 and the regulations promulgated thereunder at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.

Compliance: The proposed design will comply with this standard. The Project is not associated with Higher Potential Pollutant Loads (per the Policy, Volume I, page 1-6).

Standard #6: Stormwater discharges within the Zone II or Interim Wellhead Protection Area of a public water supply, and stormwater discharges near or to any other critical area, require the use of the specific source control and pollution prevention measures and the specific structural stormwater best management practices determined by the Department to be suitable for managing discharges to such areas, as provided in the Massachusetts Stormwater Handbook. A discharge is near a critical area if there is a strong likelihood of a significant impact occurring to said area, taking into account site-specific factors. Stormwater discharges to Outstanding Resource Waters and Special Resource Waters shall be removed and set back from the receiving water or wetland and receive the highest and best practical method of treatment. A "storm water discharge" as defined in 314 CMR 3.04(2)(a)1 or (b) to an Outstanding Resource Water or Special Resource Water shall comply with 314 CMR 3.00 and 314 CMR 4.00. Stormwater discharges to a Zone I or Zone A are prohibited unless essential to the operation of a public water supply.

Compliance: The proposed design will comply with this Standard. The Project will not discharge untreated stormwater to a sensitive area or any other area.

Standard #7: A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

Compliance: The Project is considered a new development per the MassDEP Standards.

Standard #8: A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

Compliance: The Project will comply with this standard. Sedimentation and erosion controls will be incorporated as part of the design of the Project and employed during construction.

Standard 9: A Long-Term Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that stormwater management systems function as designed.

Compliance: The Project will comply with this standard. An O&M Plan including long-term BMP operation requirements will be prepared for the Project, and will assure proper maintenance and functioning of the stormwater management system.

Standard 10: All illicit discharges to the stormwater management system are prohibited.

Compliance: The Project will comply with this standard. There will be no illicit connections associated with the Project.

6.4.5 Stormwater Quality During Construction

Stormwater Management Best Management Practices relative to stormwater pollution prevention, erosion and sediment control will be implemented during construction. These will include:

- Protection of adjacent catch basins by installation of either hay bales or filter fabrics to prevent sedimentation from entering stormwater conveyance system.
- Installation of wheel wash stations at construction site egress points to prevent tracking of mud and dirt onto public roads by construction vehicles.
- Utilization of sedimentation tanks or pits where appropriate to control and contain runoff during construction, including that derived from dewatering activities. Dewatering discharge will pass through a MassDEP approved sedimentation basin prior to discharge into the BWSC drainage system.
- Implementation of dust/emission controls. Examples of measures for dust control include use of wet suppression (alone or with approved binding agents) on a routine basis using a water truck and use of wet spray power vacuum street sweepers on paved roadways.

6.5 Utilities

6.5.1 Steam Service

As discussed in the DPIR, the Proponent explored the use of steam heating; however, there are no active steam facilities proximate to the Project Site. Therefore, the Project does not plan to use steam for space heating.

6.5.2 Natural Gas Service

As discussed in the DPIR, natural gas is provided to the site area by a system of gas lines located in Congress Street, Seaport Boulevard, and Summer Street east of D Street. Natural gas is owned and operated by National Grid. The system in Congress Street consists of 8-inch intermediate pressure line with three laterals to the Project Site installed in anticipation of this development. The Project anticipates using natural gas as the main source of space heating, hot water, and for the restaurants.

As discussed in the DPIR, it appears that the existing 6-inch line on-site north of D Street overpass should be extended westerly beneath Service Road to provide natural gas to the elements south of the I-90 tunnel. National Grid representatives have stated that they have adequate system capacity to meet the Project's load requirements.

6.5.3 Electrical Service

As discussed in the DPIR, electric service in the site area is supplied by the Eversource. Electric power is supplied through the Eversource distribution network located in Congress, D, and Summer Streets and adjoining public ways.

The Project will be serviced from Eversource primary switches and transformers that will either be mounted in an appropriate outdoor location or within an interior room dedicated Eversource space.

It is anticipated that adequate capacity is available to supply the Project's electricity needs from the existing system.

6.5.4 Voice/Data Telecommunications

As discussed in the DPIR, this system includes telephone, both voice and data, cable TV and fire alarm systems.

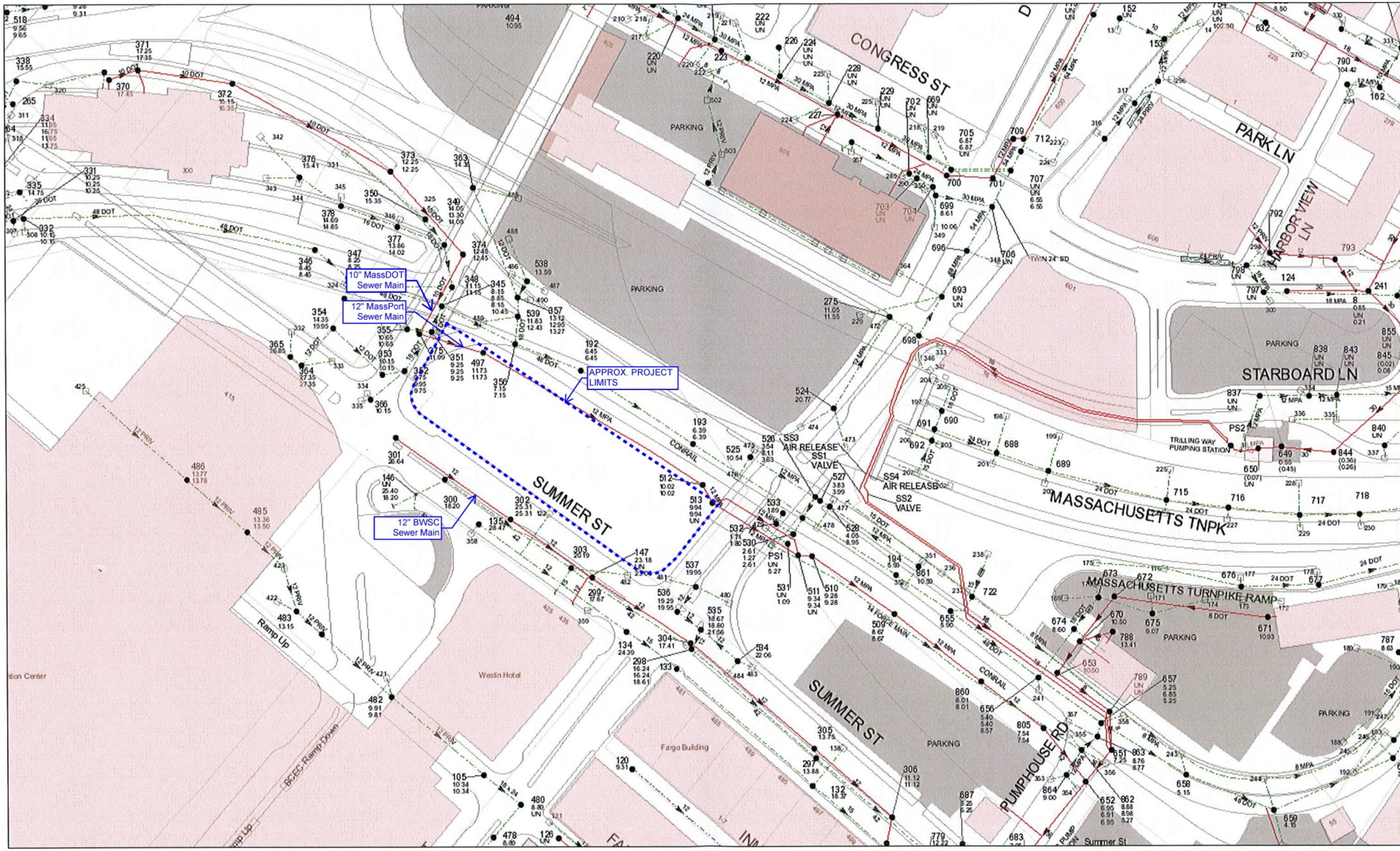
The Project will be serviced via new service connections extending from the existing distribution system(s) in D Street east and west along

Summer Street to the service points of each element.

6.5.5 General Utility Program - Protection of Utilities

Existing public and private infrastructure located within nearby public rights-of-way will be protected during the Project construction. The installation of proposed utility connections within public ways will be undertaken in accordance with the BWSC, Boston Public Works Department, the Dig Safe Program, and applicable utility company requirements. Specific methods for constructing proposed utilities where they are near to, or connect with, existing water, sewer, and drain facilities will be reviewed by the BWSC as part of its Site Plan Review process. All necessary permits will be obtained before the commencement of work.

The Proponent will continue to work and coordinate with the BWSC and the utility companies to ensure safe and coordinated utility operations in connection with the Project.

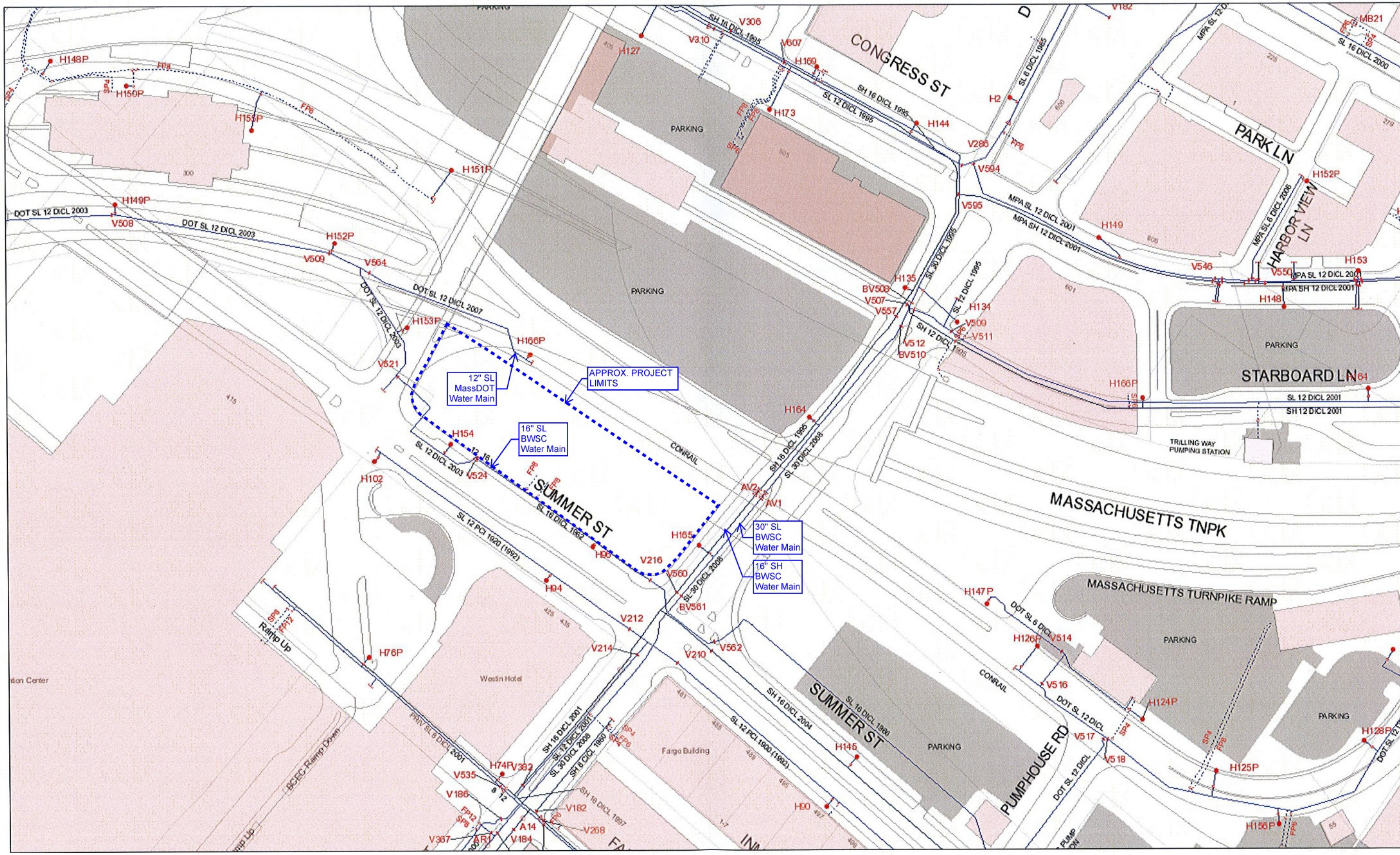


Summer Street Hotel Boston, Massachusetts

Nitsch Engineering

Figure 6-1

Existing Sanitary Sewer System



N
W E
S

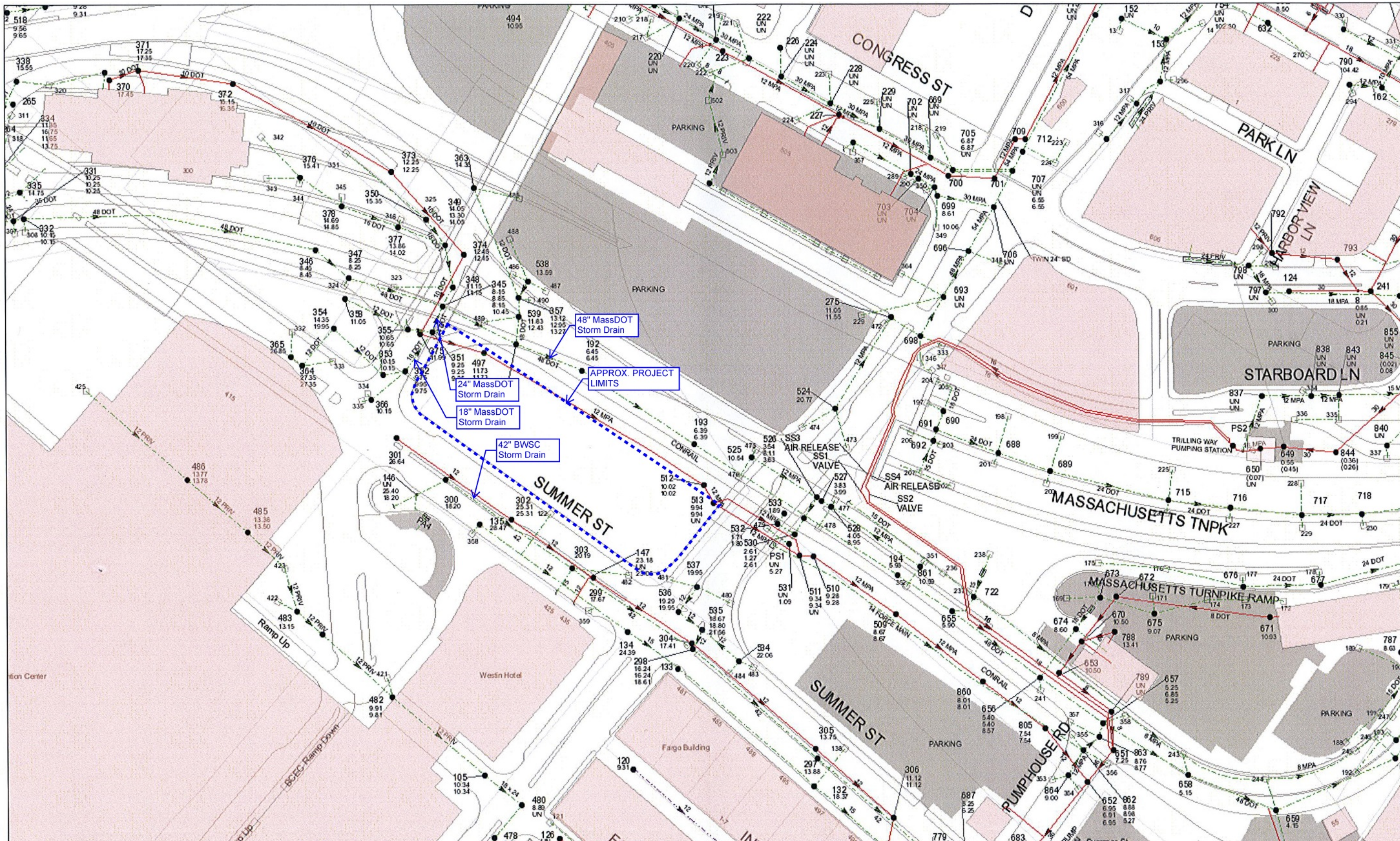
0 45 90 180 270 360 Feet

Summer Street Hotel **Boston, Massachusetts**

Nitsch Engineering

Figure 6-2

Existing Water System



N W E S

0 45 90 180 270 360 Feet

Summer Street Hotel **Boston, Massachusetts**

Nitsch Engineering

Figure 6-3

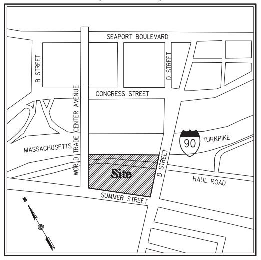
Existing Drainage System

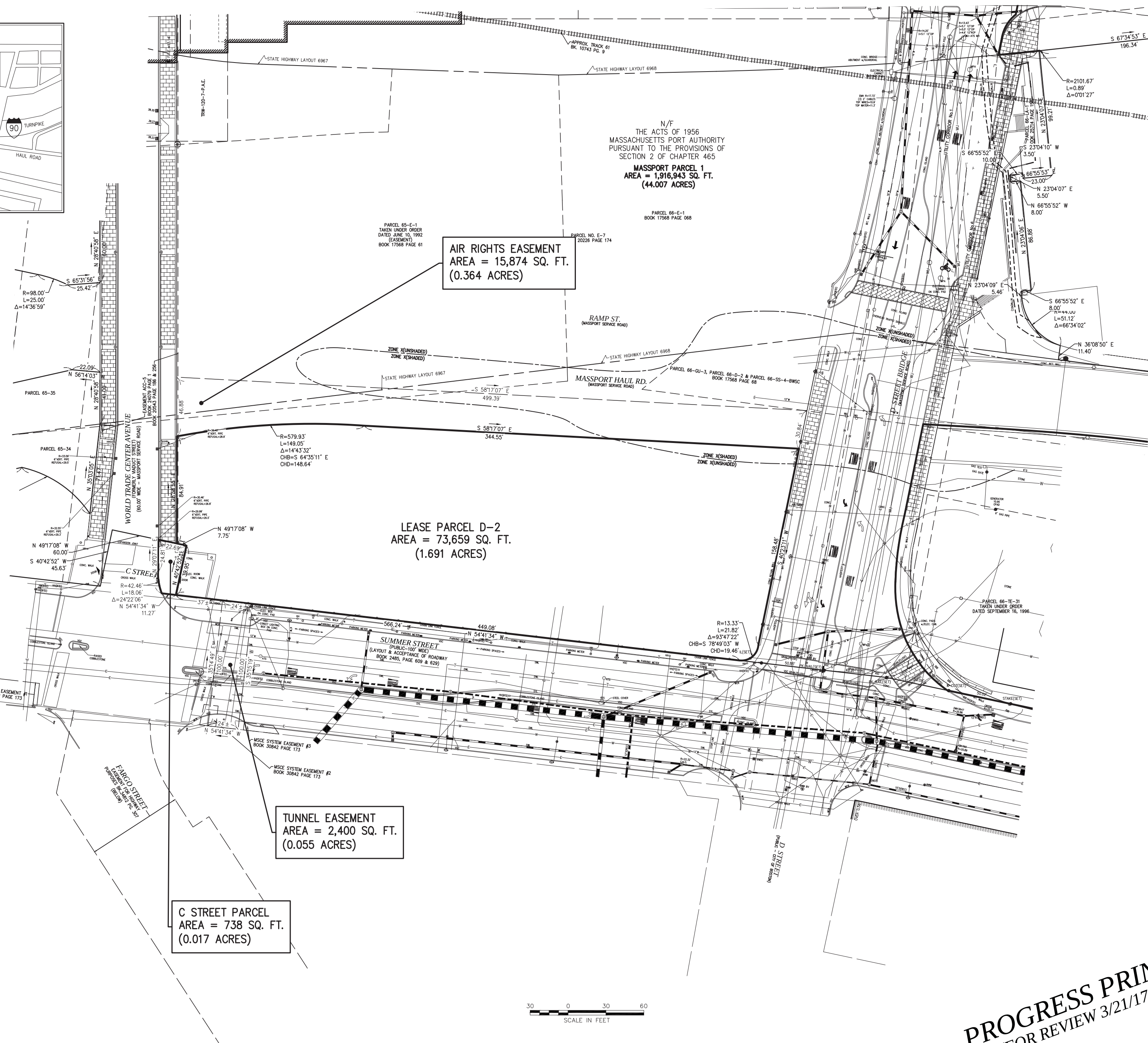
Appendix A

Survey

\\vhb\proj\Wat-LD\13786.00 Davis Co Boston Hotel\cad\sr\planset\13786.00-ALTA.dwg

Locus Map
(NOT TO SCALE)





PROGRESS PRINT
(FOR REVIEW 3/21/17)

Current Owner

LEASE PARCEL D-2
MASSACHUSETTS PORT AUTHORITY
WARD 6 PARCELS 2678 & 2675-2
CHAPTER 465 OF THE ACTS OF 1956

General Notes

1) SEE SHEET SV-1 FOR EXISTING CONDITIONS, NOTES, LEGAL DESCRIPTIONS AND EXCEPTIONS.

Saved Tuesday, March 21, 2017 5:55:00 PM CDROBERTSON Plotted Tuesday, March 21, 2017 6:17:08 PM Robertson, Craig

vhb.com
vhb
101 Walnut Street
PO Box 9151
Watertown, MA 02471
617.924.1770

N.A.D. 1983 (2011)

Lease Parcel D-2
Summer Street, D Street, Haul Road & World Trade Center Ave

S. Boston, Massachusetts

No.	Revision	Date	Appvd.

Designed by | Checked by

Issued for | Date
January 20, 2017

Drawing Title
ALTA/NSPS Land Title Survey Summer Street, D Street & WTC Avenue Level

Drawing Number
Sv-3

Sheet 3 of 4

Project Number
13786.00

Appendix B

Transportation

Appendix A – Transportation

Vehicle Counts

Synchro Intersection Level of Service Reports

- Existing (2017) Condition
- No-Build (2024) Condition
- Build (2024) Condition
- Build (2024) Condition with Mitgation

Trip Generation

Vehicle Counts

Client: Mr. Andrew Fabiszewski
Project #: 0010_HSH_Seaport_Boston
BTD #: Location 24
Location: Seaport, Boston, MA
Street 1: Summer Street
Street 2: World Trade Center Avenue
Count Date: 11/1/2016
Day of Week: Tuesday
Weather: Partly Cloudy, 55° F

BOSTON TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
DataRequest@BostonTrafficData.com
www.BostonTrafficData.com

TOTAL (CARS & TRUCKS)

	World Trade Center Avenue Northbound				World Trade Center Avenue Southbound				Summer Street Eastbound				Summer Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	3	4	4	0	3	0	0	0	2	82	6	0	9	94	2
7:15 AM	0	3	2	6	0	4	0	3	0	4	102	10	0	13	102	3
7:30 AM	0	2	0	7	0	4	0	5	0	5	113	13	0	16	100	4
7:45 AM	0	4	0	8	0	5	0	5	0	4	135	11	0	16	115	7
8:00 AM	0	6	0	8	0	6	0	4	0	2	145	8	0	15	119	9
8:15 AM	0	7	0	13	0	5	0	5	0	3	149	17	0	21	126	7
8:30 AM	0	8	0	16	0	6	0	6	0	2	138	24	0	25	118	4
8:45 AM	0	8	0	17	0	6	0	6	0	2	145	25	0	26	110	4

	World Trade Center Avenue Northbound				World Trade Center Avenue Southbound				Summer Street Eastbound				Summer Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	10	1	16	0	5	1	3	1	4	134	13	1	14	69	2
4:15 PM	0	10	1	16	0	7	0	3	2	6	141	12	2	15	76	5
4:30 PM	0	9	0	15	0	8	0	2	2	7	134	10	2	14	75	7
4:45 PM	0	11	0	18	0	13	0	6	1	12	150	15	1	13	67	12
5:00 PM	0	11	0	20	0	16	0	9	2	16	151	19	2	10	53	16
5:15 PM	0	13	0	20	0	18	0	9	3	14	165	29	3	11	77	13
5:30 PM	0	13	0	19	0	18	0	8	3	10	164	37	4	11	94	8
5:45 PM	0	14	0	20	0	19	0	8	2	11	172	39	4	12	99	8

AM PEAK HOUR 8:00 AM to 9:00 AM	World Trade Center Avenue Northbound				World Trade Center Avenue Southbound				Summer Street Eastbound				Summer Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**29**	**0**	**54**	**0**	**23**	**0**	**21**	**0**	**9**	**577**	**74**	**0**	**87**	**473**	**24**
PHF	**0.83**				**0.92**				**0.96**				**0.95**			
HV %	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**4.7%**	**0.0%**	**0.0%**	**0.0%**	**8.2%**	**0.0%**

PM PEAK HOUR 5:00 PM to 6:00 PM	World Trade Center Avenue Northbound				World Trade Center Avenue Southbound				Summer Street Eastbound				Summer Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**51**	**0**	**79**	**0**	**71**	**0**	**34**	**10**	**51**	**652**	**124**	**13**	**44**	**323**	**45**
PHF	**0.96**				**0.97**				**0.93**				**0.86**			
HV %	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**4.0%**	**0.0%**	**0.0%**	**0.0%**	**5.9%**	**0.0%**

Client:	Mr. Andrew Fabiszewski
Project #:	0010_HSH_Seaport_Boston
BTD #:	Location 25
Location:	Seaport, Boston, MA
Street 1:	Summer Street
Street 2:	D Street
Count Date:	11/1/2016
Day of Week:	Tuesday
Weather:	Partly Cloudy, 55° F

BOSTON
TRAFFIC DATA
PO BOX 1723, Framingham, MA 01701
Office: 978-746-1259
DataRequest@BostonTrafficData.com
www.BostonTrafficData.com

TOTAL (CARS & TRUCKS)

	D Street Northbound				D Street Southbound				Summer Street Eastbound				Summer Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	34	49	3	0	38	13	20	0	9	72	8	0	3	43	56
7:15 AM	0	33	39	4	0	44	18	19	0	12	90	10	0	4	56	77
7:30 AM	0	29	25	3	0	46	22	17	0	14	99	11	0	4	61	91
7:45 AM	0	30	26	4	0	47	20	19	0	19	117	12	0	5	78	97
8:00 AM	0	29	25	5	0	44	17	19	0	22	125	12	0	6	87	94
8:15 AM	0	31	26	6	0	47	15	22	0	30	123	14	0	7	90	103
8:30 AM	0	30	26	7	0	45	11	22	0	35	111	14	0	8	87	102
8:45 AM	0	32	27	7	0	47	13	23	0	37	116	15	0	8	90	107

	D Street Northbound				D Street Southbound				Summer Street Eastbound				Summer Street Westbound			
Start Time	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	16	47	9	0	35	20	14	0	61	69	25	0	12	52	61
4:15 PM	0	16	50	8	0	43	19	16	0	61	77	26	0	11	57	74
4:30 PM	0	15	47	7	0	46	18	17	0	56	77	24	0	9	54	79
4:45 PM	0	15	51	7	0	45	20	17	0	55	101	25	0	7	52	71
5:00 PM	0	14	56	6	0	40	23	16	0	48	115	24	0	5	43	96
5:15 PM	0	14	68	6	0	41	22	16	0	49	130	24	0	5	69	90
5:30 PM	0	12	49	5	0	38	23	15	0	46	133	22	0	4	88	98
5:45 PM	0	13	47	5	0	40	36	16	0	48	140	23	0	4	92	94

AM PEAK HOUR 8:00 AM to 9:00 AM	D Street Northbound				D Street Southbound				Summer Street Eastbound				Summer Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**122**	**104**	**25**	**0**	**183**	**56**	**86**	**0**	**124**	**475**	**55**	**0**	**29**	**354**	**406**
PHF	**0.95**				**0.97**				**0.97**				**0.96**			
HV %	**0.0%**	**0.8%**	**26.9%**	**28.0%**	**0.0%**	**4.4%**	**30.4%**	**3.5%**	**0.0%**	**0.8%**	**11.6%**	**9.1%**	**0.0%**	**3.4%**	**16.9%**	**3.7%**

PM PEAK HOUR 5:00 PM to 6:00 PM	D Street Northbound				D Street Southbound				Summer Street Eastbound				Summer Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	**53**	**220**	**22**	**0**	**159**	**104**	**63**	**0**	**191**	**518**	**93**	**0**	**18**	**292**	**378**
PHF	**0.84**				**0.89**				**0.95**				**0.91**			
HV %	**0.0%**	**1.9%**	**6.8%**	**18.2%**	**0.0%**	**1.9%**	**11.5%**	**0.0%**	**0.0%**	**1.0%**	**6.6%**	**1.1%**	**0.0%**	**11.1%**	**12.0%**	**2.6%**

Synchro Intersection Level of Service Reports

- Existing (2017) Condition

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	125	480	56	29	358	410	123	105	25	185	57	87
Future Volume (vph)	125	480	56	29	358	410	123	105	25	185	57	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	13	12	12	16	16	12	16	12	11	13	12
Storage Length (ft)	155		0	0		0	150		0	200		0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.91	0.91	1.00	0.95	0.95	0.91	0.91	0.95
Ped Bike Factor		1.00				0.94	0.96	0.98		0.92	0.95	
Frt		0.984				0.850		0.971			0.932	
Flt Protected	0.950				0.996		0.950			0.950	0.988	
Satd. Flow (prot)	1525	3135	0	0	3366	1441	1547	3342	0	1415	2811	0
Flt Permitted	0.440				0.557		0.950			0.950	0.988	
Satd. Flow (perm)	706	3135	0	0	1882	1352	1492	3342	0	1304	2756	0
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		14						23			94	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		593			602			347			313	
Travel Time (s)		13.5			13.7			7.9			7.1	
Confl. Peds. (#/hr)				26		32	30		60	60		30
Confl. Bikes (#/hr)			7			2						1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.77	0.77	0.77	0.93	0.93	0.93
Heavy Vehicles (%)	3%	5%	7%	9%	4%	4%	5%	4%	8%	1%	3%	3%
Parking (#/hr)			0						0			
Adj. Flow (vph)	133	511	60	31	381	436	160	136	32	199	61	94
Shared Lane Traffic (%)						0%				26%		
Lane Group Flow (vph)	133	571	0	0	412	436	160	168	0	147	207	0
Turn Type	D.P+P	NA		Perm	NA	pm+ov	Split	NA		Split	NA	
Protected Phases	4	1 4			1	2	3	3		2	2	
Permitted Phases	1			1		1						
Detector Phase	4	1 4		1	1	2	3	3		2	2	
Switch Phase												
Minimum Initial (s)	6.0			8.0	8.0	8.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	14.0			40.0	40.0	28.0	27.0	27.0		28.0	28.0	
Total Split (s)	15.0			40.0	40.0	28.0	27.0	27.0		28.0	28.0	
Total Split (%)	13.6%			36.4%	36.4%	25.5%	24.5%	24.5%		25.5%	25.5%	
Maximum Green (s)	7.0			32.0	32.0	21.0	20.0	20.0		21.0	21.0	
Yellow Time (s)	4.0			4.0	4.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	4.0			4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-1.0				-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	7.0				7.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag						Lead	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Recall Mode	Max			C-Max	C-Max	Ped	Max	Max		Ped	Ped	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)				25.0	25.0	14.0	13.0	13.0		14.0	14.0	
Pedestrian Calls (#/hr)				0	0	0	0	0		0	0	
Act Effct Green (s)	41.0	48.0			33.0	56.0	21.0	21.0		22.0	22.0	
Actuated g/C Ratio	0.37	0.44			0.30	0.51	0.19	0.19		0.20	0.20	
v/c Ratio	0.41	0.42			0.73	0.62	0.54	0.26		0.52	0.32	
Control Delay	19.6	16.6			43.4	20.5	48.0	33.7		23.0	8.6	
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	19.6	16.6			43.4	20.5	48.0	33.7		23.0	8.6	
LOS	B	B			D	C	D	C		C	A	
Approach Delay		17.2			31.6			40.7			14.6	
Approach LOS		B			C			D			B	
Queue Length 50th (ft)	19	36			142	200	103	45		114	12	
Queue Length 95th (ft)	68	126			207	302	144	64		93	9	
Internal Link Dist (ft)		513			522			267			233	
Turn Bay Length (ft)	155						150			200		
Base Capacity (vph)	322	1375			564	706	295	656		283	637	
Starvation Cap Reductn	0	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	0.41	0.42			0.73	0.62	0.54	0.26		0.52	0.32	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 30 (27%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.73
Intersection Signal Delay: 25.7 Intersection LOS: C
Intersection Capacity Utilization 99.2% ICU Level of Service F
Analysis Period (min) 15

Splits and Phases: 1: D Street & Summer Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	9	583	75	93	493	26	29	0	55	23	0	21	
Future Volume (vph)	9	583	75	93	493	26	29	0	55	23	0	21	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	11	11	13	12	15	16	12	11	13	12	
Storage Length (ft)	200		75	175		0	0		0	0		0	
Storage Lanes	1		1	1		0	1		0	1		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor			0.99		1.00								
Frt			0.850		0.992			0.850			0.850		
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1516	3094	1301	1570	3165	0	1787	1599	0	1525	1502	0	
Flt Permitted	0.384			0.363			0.741			0.715			
Satd. Flow (perm)	613	3094	1283	600	3165	0	1394	1599	0	1147	1502	0	
Right Turn on Red			Yes			Yes			No			Yes	
Satd. Flow (RTOR)			149		6						593		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		502			593			362			348		
Travel Time (s)		11.4			13.5			8.2			7.9		
Confl. Bikes (#/hr)			3			14							
Peak Hour Factor	0.95	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.85	0.85	0.85	0.85	
Heavy Vehicles (%)	0%	5%	8%	0%	5%	6%	0%	0%	3%	3%	0%	0%	
Parking (#/hr)						0							
Adj. Flow (vph)	9	614	79	103	548	29	34	0	65	27	0	25	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	9	614	79	103	577	0	34	65	0	27	25	0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA		
Protected Phases	4	1		4	1			3			3		2
Permitted Phases	1		1	1			3			3			
Detector Phase	4	1	1	4	1		3	3		3	3		
Switch Phase													
Minimum Initial (s)	8.0	10.0	10.0	8.0	10.0		8.0	8.0		8.0	8.0		8.0
Minimum Split (s)	16.0	19.0	19.0	16.0	19.0		16.0	16.0		16.0	16.0		30.0
Total Split (s)	16.0	47.0	47.0	16.0	47.0		17.0	17.0		17.0	17.0		30.0
Total Split (%)	14.5%	42.7%	42.7%	14.5%	42.7%		15.5%	15.5%		15.5%	15.5%		27%
Maximum Green (s)	9.0	40.0	40.0	9.0	40.0		10.0	10.0		10.0	10.0		26.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0		4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		0.0
Lost Time Adjust (s)	0.0	-1.0	-1.0	0.0	-1.0		-1.0	-1.0		-1.0	-1.0		
Total Lost Time (s)	7.0	6.0	6.0	7.0	6.0		6.0	6.0		6.0	6.0		
Lead/Lag	Lag	Lead	Lead	Lag	Lead		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	2.0		2.0
Recall Mode	Max	C-Max	C-Max	Max	C-Max		Max	Max		Max	Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													19.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)	61.0	53.0	53.0	61.0	53.0		11.0	11.0		11.0	11.0		
Actuated g/C Ratio	0.55	0.48	0.48	0.55	0.48		0.10	0.10		0.10	0.10		
v/c Ratio	0.02	0.41	0.11	0.25	0.38		0.24	0.41		0.24	0.04		
Control Delay	4.0	7.5	0.3	10.1	14.9		50.6	54.8		51.3	0.1		
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	4.0	7.5	0.3	10.1	14.9		50.6	54.8		51.3	0.1		
LOS	A	A	A	B	B		D	D		D	A		
Approach Delay		6.6			14.1			53.4			26.7		
Approach LOS		A			B			D			C		
Queue Length 50th (ft)	2	176	0	30	94		23	44		18	0		
Queue Length 95th (ft)	m1	13	0	m49	135		52	84		44	0		
Internal Link Dist (ft)		422			513			282			268		
Turn Bay Length (ft)	200		75	175									
Base Capacity (vph)	413	1491	695	412	1527		139	159		114	683		
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0		
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0		
Storage Cap Reductn	0	0	0	0	0		0	0		0	0		
Reduced v/c Ratio	0.02	0.41	0.11	0.25	0.38		0.24	0.41		0.24	0.04		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 32 (29%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.41
Intersection Signal Delay: 13.7 Intersection LOS: B
Intersection Capacity Utilization 48.9% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: East Side Drive/World Trade Center Avenue & Summer Street

Ø1 (R)	Ø2	Ø3	Ø4
47 s	30 s	17 s	16 s

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø2
Lane Configurations							
Traffic Volume (vph)	669	15	8	635	1	8	
Future Volume (vph)	669	15	8	635	1	8	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	10	12	11	11	
Storage Length (ft)		0	200		0	0	
Storage Lanes		0	1		1	1	
Taper Length (ft)			25		25		
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00	
Frt	0.997					0.850	
Flt Protected			0.950		0.950		
Satd. Flow (prot)	3239	0	1516	3249	1570	1405	
Flt Permitted			0.316		0.950		
Satd. Flow (perm)	3239	0	504	3249	1570	1405	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	2					9	
Link Speed (mph)	30			30	30		
Link Distance (ft)	228			502	291		
Travel Time (s)	5.2			11.4	6.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	727	16	9	690	1	9	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	743	0	9	690	1	9	
Turn Type	NA		D.P+P	NA	Prot	Prot	
Protected Phases	1		4	1 4	3	3	2
Permitted Phases			1				
Detector Phase	1		4	1 4	3	3	
Switch Phase							
Minimum Initial (s)	10.0		8.0		8.0	8.0	8.0
Minimum Split (s)	17.0		14.0		15.0	15.0	32.0
Total Split (s)	48.0		14.0		16.0	16.0	32.0
Total Split (%)	43.6%		12.7%		14.5%	14.5%	29%
Maximum Green (s)	43.0		9.0		10.0	10.0	28.0
Yellow Time (s)	3.0		3.0		3.0	3.0	4.0
All-Red Time (s)	2.0		2.0		3.0	3.0	0.0
Lost Time Adjust (s)	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0		4.0		5.0	5.0	
Lead/Lag	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		Max		Min	Min	None
Walk Time (s)							7.0
Flash Dont Walk (s)							21.0
Pedestrian Calls (#/hr)							11
Act Effct Green (s)	65.2		75.2	79.2	9.0	9.0	
Actuated g/C Ratio	0.59		0.68	0.72	0.08	0.08	
v/c Ratio	0.39		0.02	0.29	0.01	0.07	
Control Delay	15.8		11.9	7.8	47.0	26.2	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	15.8		11.9	7.8	47.0	26.2	
LOS	B		B	A	D	C	
Approach Delay	15.8			7.9	28.3		
Approach LOS	B			A	C		
Queue Length 50th (ft)	91		0	5	1	0	
Queue Length 95th (ft)	263		m7	120	6	16	
Internal Link Dist (ft)	148			422	211		
Turn Bay Length (ft)			200				
Base Capacity (vph)	1920		436	2339	157	148	
Starvation Cap Reductn	0		0	0	0	0	
Spillback Cap Reductn	0		0	0	0	0	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	0.39		0.02	0.29	0.01	0.06	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 21 (19%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.39
Intersection Signal Delay: 12.1 Intersection LOS: B
Intersection Capacity Utilization 35.2% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: West Side Drive & Summer Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	196	531	97	18	306	382	58	222	22	161	105	64
Future Volume (vph)	196	531	97	18	306	382	58	222	22	161	105	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	13	12	12	16	16	12	16	12	11	13	12
Storage Length (ft)	155		0	0		0	150		0	200		0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.91	0.91	1.00	0.95	0.95	0.91	0.91	0.95
Ped Bike Factor		1.00				0.94	0.96	0.99		0.93	0.97	
Frt		0.977				0.850		0.986			0.954	
Flt Protected	0.950				0.997		0.950			0.950	0.990	
Satd. Flow (prot)	1525	3107	0	0	3372	1441	1547	3442	0	1415	2905	0
Flt Permitted	0.492				0.603		0.950			0.950	0.990	
Satd. Flow (perm)	790	3107	0	0	2040	1348	1491	3442	0	1320	2866	0
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		24						9			51	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			602			311			316	
Travel Time (s)		12.8			13.7			7.1			7.2	
Confl. Peds. (#/hr)				26		32	30		60	60		30
Confl. Bikes (#/hr)			7			2						1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.77	0.77	0.77	0.93	0.93	0.93
Heavy Vehicles (%)	3%	5%	7%	9%	4%	4%	5%	4%	8%	1%	3%	3%
Parking (#/hr)			0						0			
Adj. Flow (vph)	209	565	103	19	326	406	75	288	29	173	113	69
Shared Lane Traffic (%)						0%				26%		
Lane Group Flow (vph)	209	668	0	0	345	406	75	317	0	128	227	0
Turn Type	D.P+P	NA		Perm	NA	pm+ov	Split	NA		Split	NA	
Protected Phases	4	1 4			1	2	3	3		2	2	
Permitted Phases	1			1		1						
Detector Phase	4	1 4		1	1	2	3	3		2	2	
Switch Phase												
Minimum Initial (s)	6.0			8.0	8.0	8.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	15.0			30.0	30.0	28.0	27.0	27.0		28.0	28.0	
Total Split (s)	19.0			35.0	35.0	29.0	27.0	27.0		29.0	29.0	
Total Split (%)	17.3%			31.8%	31.8%	26.4%	24.5%	24.5%		26.4%	26.4%	
Maximum Green (s)	11.0			27.0	27.0	22.0	20.0	20.0		22.0	22.0	
Yellow Time (s)	4.0			4.0	4.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	4.0			4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-1.0				-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	7.0				7.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag						Lead	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Recall Mode	Max			C-Max	C-Max	Ped	Max	Max		Ped	Ped	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)				12.0	12.0	13.0	12.0	12.0		13.0	13.0	
Pedestrian Calls (#/hr)				0	0	0	0	0		0	0	
Act Effct Green (s)	41.7	48.7			29.7	52.0	21.0	21.0		21.3	21.3	
Actuated g/C Ratio	0.38	0.44			0.27	0.47	0.19	0.19		0.19	0.19	
v/c Ratio	0.55	0.48			0.63	0.62	0.25	0.48		0.47	0.38	
Control Delay	15.3	9.3			41.3	23.1	40.6	41.2		42.5	28.8	
Queue Delay	0.0	0.0			0.0	0.4	0.0	0.5		0.0	0.0	
Total Delay	15.3	9.3			41.3	23.5	40.6	41.7		42.5	28.8	
LOS	B	A			D	C	D	D		D	C	
Approach Delay		10.8			31.7			41.5			33.7	
Approach LOS		B			C			D			C	
Queue Length 50th (ft)	33	53			117	198	46	102		87	61	
Queue Length 95th (ft)	49	66			174	300	75	123		174	121	
Internal Link Dist (ft)		483			522			231			236	
Turn Bay Length (ft)	155						150			200		
Base Capacity (vph)	379	1389			551	678	295	664		295	647	
Starvation Cap Reductn	0	0			0	0	0	0		0	0	
Spillback Cap Reductn	0	0			0	49	0	103		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	0.55	0.48			0.63	0.65	0.25	0.57		0.43	0.35	

Intersection Summary	
Area Type: CBD	
Cycle Length: 110	
Actuated Cycle Length: 110	
Offset: 109 (99%), Referenced to phase 1:EBWB, Start of Green	
Natural Cycle: 100	
Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.63	
Intersection Signal Delay: 25.9	Intersection LOS: C
Intersection Capacity Utilization 89.7%	ICU Level of Service E
Analysis Period (min) 15	

Splits and Phases: 1: D Street & Summer Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	62	659	125	57	326	45	52	0	80	72	0	34	
Future Volume (vph)	62	659	125	57	326	45	52	0	80	72	0	34	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	11	11	13	12	15	16	12	11	13	12	
Storage Length (ft)	200		75	175		0	0		0	0		0	
Storage Lanes	1		1	1		0	1		0	1		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor			0.99		1.00								
Frt			0.850		0.982			0.850			0.850		
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1516	3094	1301	1570	3123	0	1787	1599	0	1525	1502	0	
Flt Permitted	0.486			0.312			0.731			0.696			
Satd. Flow (perm)	776	3094	1283	516	3123	0	1375	1599	0	1117	1502	0	
Right Turn on Red			Yes			Yes			No			Yes	
Satd. Flow (RTOR)			149		15						674		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		508			563			362			321		
Travel Time (s)		11.5			12.8			8.2			7.3		
Confl. Bikes (#/hr)			3			14							
Peak Hour Factor	0.95	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.85	0.85	0.85	0.85	
Heavy Vehicles (%)	0%	5%	8%	0%	5%	6%	0%	0%	3%	3%	0%	0%	
Parking (#/hr)						0							
Adj. Flow (vph)	65	694	132	63	362	50	61	0	94	85	0	40	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	65	694	132	63	412	0	61	94	0	85	40	0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA		
Protected Phases	4	1		4	1			3			3		2
Permitted Phases	1		1	1			3			3			
Detector Phase	4	1	1	4	1		3	3		3	3		
Switch Phase													
Minimum Initial (s)	8.0	10.0	10.0	8.0	10.0		8.0	8.0		8.0	8.0		8.0
Minimum Split (s)	16.0	19.0	19.0	16.0	19.0		16.0	16.0		16.0	16.0		30.0
Total Split (s)	16.0	45.0	45.0	16.0	45.0		19.0	19.0		19.0	19.0		30.0
Total Split (%)	14.5%	40.9%	40.9%	14.5%	40.9%		17.3%	17.3%		17.3%	17.3%		27%
Maximum Green (s)	9.0	38.0	38.0	9.0	38.0		12.0	12.0		12.0	12.0		26.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0		4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		0.0
Lost Time Adjust (s)	0.0	-1.0	-1.0	0.0	-1.0		-1.0	-1.0		-1.0	-1.0		
Total Lost Time (s)	7.0	6.0	6.0	7.0	6.0		6.0	6.0		6.0	6.0		
Lead/Lag	Lag	Lead	Lead	Lag	Lead		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	2.0		2.0
Recall Mode	Max	C-Max	C-Max	Max	C-Max		Max	Max		Max	Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													19.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)	59.0	51.0	51.0	59.0	51.0		13.0	13.0		13.0	13.0		
Actuated g/C Ratio	0.54	0.46	0.46	0.54	0.46		0.12	0.12		0.12	0.12		
v/c Ratio	0.14	0.48	0.20	0.17	0.28		0.38	0.50		0.64	0.05		
Control Delay	3.7	17.8	6.8	27.7	35.8		52.2	55.4		69.4	0.1		
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	3.7	17.8	6.8	27.7	35.8		52.2	55.4		69.4	0.1		
LOS	A	B	A	C	D		D	E		E	A		
Approach Delay		15.1			34.7			54.1			47.2		
Approach LOS		B			C			D			D		
Queue Length 50th (ft)	10	212	19	38	157		40	63		58	0		
Queue Length 95th (ft)	3	341	88	m68	211		79	110		#118	0		
Internal Link Dist (ft)		428			483			282			241		
Turn Bay Length (ft)	200		75	175									
Base Capacity (vph)	476	1434	675	362	1455		162	188		132	771		
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0		
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0		
Storage Cap Reductn	0	0	0	0	0		0	0		0	0		
Reduced v/c Ratio	0.14	0.48	0.20	0.17	0.28		0.38	0.50		0.64	0.05		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 77 (70%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.64
Intersection Signal Delay: 26.9 — Intersection LOS: C
Intersection Capacity Utilization 53.8% — 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.

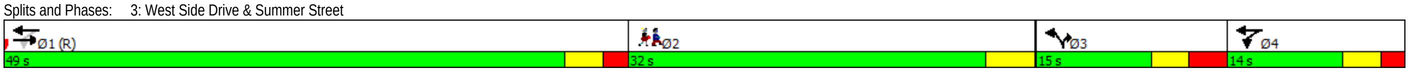
Splits and Phases: 2: East Side Drive/World Trade Center Avenue & Summer Street

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø2
Lane Configurations							
Traffic Volume (vph)	840	15	5	417	4	3	
Future Volume (vph)	840	15	5	417	4	3	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	10	12	11	11	
Storage Length (ft)		0	200		0	0	
Storage Lanes		0	1		1	1	
Taper Length (ft)			25		25		
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00	
Frt	0.997					0.850	
Flt Protected			0.950		0.950		
Satd. Flow (prot)	3239	0	1516	3249	1570	1405	
Flt Permitted			0.241		0.950		
Satd. Flow (perm)	3239	0	385	3249	1570	1405	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	2					3	
Link Speed (mph)	30			30	30		
Link Distance (ft)	358			508	345		
Travel Time (s)	8.1			11.5	7.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	913	16	5	453	4	3	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	929	0	5	453	4	3	
Turn Type	NA		D.P+P	NA	Prot	Prot	
Protected Phases	1		4	1 4	3	3	2
Permitted Phases			1				
Detector Phase	1		4	1 4	3	3	
Switch Phase							
Minimum Initial (s)	10.0		8.0		8.0	8.0	8.0
Minimum Split (s)	17.0		14.0		15.0	15.0	32.0
Total Split (s)	49.0		14.0		15.0	15.0	32.0
Total Split (%)	44.5%		12.7%		13.6%	13.6%	29%
Maximum Green (s)	44.0		9.0		9.0	9.0	28.0
Yellow Time (s)	3.0		3.0		3.0	3.0	4.0
All-Red Time (s)	2.0		2.0		3.0	3.0	0.0
Lost Time Adjust (s)	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0		4.0		5.0	5.0	
Lead/Lag	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		Max		Min	Min	None
Walk Time (s)							7.0
Flash Dont Walk (s)							21.0
Pedestrian Calls (#/hr)							20
Act Effct Green (s)	65.2		75.2	79.2	9.0	9.0	
Actuated g/C Ratio	0.59		0.68	0.72	0.08	0.08	
v/c Ratio	0.48		0.01	0.19	0.03	0.03	
Control Delay	17.3		29.6	19.6	47.2	31.7	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	17.3		29.6	19.6	47.2	31.7	
LOS	B		C	B	D	C	
Approach Delay	17.3			19.7	40.6		
Approach LOS	B			B	D		
Queue Length 50th (ft)	123		0	2	3	0	
Queue Length 95th (ft)	349		m11	189	14	9	
Internal Link Dist (ft)	278			428	265		
Turn Bay Length (ft)			200				
Base Capacity (vph)	1920		365	2339	142	130	
Starvation Cap Reductn	0		0	0	0	0	
Spillback Cap Reductn	0		0	0	0	0	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	0.48		0.01	0.19	0.03	0.02	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 44 (40%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.48
Intersection Signal Delay: 18.2 Intersection LOS: B
Intersection Capacity Utilization 40.5% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: West Side Drive & Summer Street



- No-Build (2024) Condition

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	174	562	61	34	402	525	136	255	45	251	122	139
Future Volume (vph)	174	562	61	34	402	525	136	255	45	251	122	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	13	12	12	16	16	12	16	12	11	13	12
Storage Length (ft)	155		0	0		0	150		0	200		0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.91	0.91	1.00	0.95	0.95	0.91	0.91	0.95
Ped Bike Factor		1.00				0.94	0.97	0.98		0.94	0.96	
Frt		0.985				0.850		0.978			0.936	
Flt Protected	0.950				0.996		0.950			0.950	0.990	
Satd. Flow (prot)	1525	3139	0	0	3365	1441	1547	3387	0	1415	2831	0
Flt Permitted	0.394				0.538		0.950			0.950	0.990	
Satd. Flow (perm)	632	3139	0	0	1818	1352	1502	3387	0	1333	2799	0
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		13						16			142	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		593			602			347			313	
Travel Time (s)		13.5			13.7			7.9			7.1	
Confl. Peds. (#/hr)				26		32	30		60	60		30
Confl. Bikes (#/hr)			7			2						1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.77	0.77	0.77	0.93	0.93	0.93
Heavy Vehicles (%)	3%	5%	7%	9%	4%	4%	5%	4%	8%	1%	3%	3%
Parking (#/hr)			0						0			
Adj. Flow (vph)	185	598	65	36	428	559	177	331	58	270	131	149
Shared Lane Traffic (%)						0%				26%		
Lane Group Flow (vph)	185	663	0	0	464	559	177	389	0	200	350	0
Turn Type	D.P+P	NA		Perm	NA	pm+ov	Split	NA		Split	NA	
Protected Phases	4	1 4			1	2	3	3		2	2	
Permitted Phases	1			1		1						
Detector Phase	4	1 4		1	1	2	3	3		2	2	
Switch Phase												
Minimum Initial (s)	6.0			8.0	8.0	8.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	14.0			40.0	40.0	28.0	27.0	27.0		28.0	28.0	
Total Split (s)	15.0			40.0	40.0	28.0	27.0	27.0		28.0	28.0	
Total Split (%)	13.6%			36.4%	36.4%	25.5%	24.5%	24.5%		25.5%	25.5%	
Maximum Green (s)	7.0			32.0	32.0	21.0	20.0	20.0		21.0	21.0	
Yellow Time (s)	4.0			4.0	4.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	4.0			4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-1.0				-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	7.0				7.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag						Lead	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Recall Mode	Max			C-Max	C-Max	Ped	Max	Max		Ped	Ped	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)				25.0	25.0	14.0	13.0	13.0		14.0	14.0	
Pedestrian Calls (#/hr)				0	0	0	0	0		0	0	
Act Effct Green (s)	41.0	48.0			33.0	56.0	21.0	21.0		22.0	22.0	
Actuated g/C Ratio	0.37	0.44			0.30	0.51	0.19	0.19		0.20	0.20	
v/c Ratio	0.62	0.48			0.85	0.79	0.60	0.59		0.71	0.52	
Control Delay	33.3	20.4			52.5	28.7	50.2	43.0		32.9	11.0	
Queue Delay	0.8	0.0			0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	34.1	20.4			52.5	28.7	50.2	43.1		32.9	11.0	
LOS	C	C			D	C	D	D		C	B	
Approach Delay		23.4			39.5			45.3			19.0	
Approach LOS		C			D			D			B	
Queue Length 50th (ft)	48	103			168	293	115	127		107	13	
Queue Length 95th (ft)	137	172			#264	440	158	148		#239	8	
Internal Link Dist (ft)		513			522			267			233	
Turn Bay Length (ft)	155						150			200		
Base Capacity (vph)	300	1377			545	706	295	659		283	679	
Starvation Cap Reductn	0	0			0	0	0	0		0	0	
Spillback Cap Reductn	19	0			0	2	0	4		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	0.66	0.48			0.85	0.79	0.60	0.59		0.71	0.52	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 30 (27%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 32.3 Intersection LOS: C
Intersection Capacity Utilization 101.9% ICU Level of Service G
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: D Street & Summer Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰	↱		↰	↱		
Traffic Volume (vph)	14	671	80	126	544	57	31	0	59	41	0	26	
Future Volume (vph)	14	671	80	126	544	57	31	0	59	41	0	26	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	11	11	13	12	15	16	12	11	13	12	
Storage Length (ft)	200		75	175		0	0		0	0		0	
Storage Lanes	1		1	1		0	1		0	1		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor			0.99		1.00								
Frt			0.850		0.986			0.850			0.850		
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1516	3094	1301	1570	3140	0	1787	1599	0	1525	1502	0	
Flt Permitted	0.333			0.313			0.737			0.712			
Satd. Flow (perm)	531	3094	1283	517	3140	0	1386	1599	0	1143	1502	0	
Right Turn on Red			Yes			Yes			No			Yes	
Satd. Flow (RTOR)			149		11						578		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		502			593			362			348		
Travel Time (s)		11.4			13.5			8.2			7.9		
Confl. Bikes (#/hr)			3			14							
Peak Hour Factor	0.95	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.85	0.85	0.85	0.85	
Heavy Vehicles (%)	0%	5%	8%	0%	5%	6%	0%	0%	3%	3%	0%	0%	
Parking (#/hr)						0							
Adj. Flow (vph)	15	706	84	140	604	63	36	0	69	48	0	31	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	15	706	84	140	667	0	36	69	0	48	31	0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA		
Protected Phases	4	1		4	1			3			3		2
Permitted Phases	1		1	1			3			3			
Detector Phase	4	1	1	4	1		3	3		3	3		
Switch Phase													
Minimum Initial (s)	8.0	10.0	10.0	8.0	10.0		8.0	8.0		8.0	8.0		8.0
Minimum Split (s)	16.0	19.0	19.0	16.0	19.0		16.0	16.0		16.0	16.0		30.0
Total Split (s)	16.0	47.0	47.0	16.0	47.0		17.0	17.0		17.0	17.0		30.0
Total Split (%)	14.5%	42.7%	42.7%	14.5%	42.7%		15.5%	15.5%		15.5%	15.5%		27%
Maximum Green (s)	9.0	40.0	40.0	9.0	40.0		10.0	10.0		10.0	10.0		26.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0		4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		0.0
Lost Time Adjust (s)	0.0	-1.0	-1.0	0.0	-1.0		-1.0	-1.0		-1.0	-1.0		
Total Lost Time (s)	7.0	6.0	6.0	7.0	6.0		6.0	6.0		6.0	6.0		
Lead/Lag	Lag	Lead	Lead	Lag	Lead		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	2.0		2.0
Recall Mode	Max	C-Max	C-Max	Max	C-Max		Max	Max		Max	Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													19.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)	61.0	53.0	53.0	61.0	53.0		11.0	11.0		11.0	11.0		
Actuated g/C Ratio	0.55	0.48	0.48	0.55	0.48		0.10	0.10		0.10	0.10		
v/c Ratio	0.04	0.47	0.12	0.38	0.44		0.26	0.43		0.42	0.05		
Control Delay	4.1	7.8	0.3	11.9	16.0		51.0	55.7		58.6	0.1		
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	4.1	7.8	0.3	11.9	16.0		51.0	55.7		58.6	0.1		
LOS	A	A	A	B	B		D	E		E	A		
Approach Delay		7.0			15.3			54.1			35.6		
Approach LOS		A			B			D			D		
Queue Length 50th (ft)	4	210	0	44	115		24	47		32	0		
Queue Length 95th (ft)	m1	14	0	m62	m154		53	88		68	0		
Internal Link Dist (ft)		422			513			282			268		
Turn Bay Length (ft)	200		75	175									
Base Capacity (vph)	375	1491	695	372	1518		138	159		114	670		
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0		
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0		
Storage Cap Reductn	0	0	0	0	0		0	0		0	0		
Reduced v/c Ratio	0.04	0.47	0.12	0.38	0.44		0.26	0.43		0.42	0.05		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 32 (29%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.47
Intersection Signal Delay: 14.7 Intersection LOS: B
Intersection Capacity Utilization 53.4% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: East Side Drive/World Trade Center Avenue & Summer Street

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø2
Lane Configurations							
Traffic Volume (vph)	767	16	8	699	1	9	
Future Volume (vph)	767	16	8	699	1	9	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	10	12	11	11	
Storage Length (ft)		0	200		0	0	
Storage Lanes		0	1		1	1	
Taper Length (ft)			25		25		
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00	
Frt	0.997					0.850	
Flt Protected			0.950		0.950		
Satd. Flow (prot)	3239	0	1516	3249	1570	1405	
Flt Permitted			0.271		0.950		
Satd. Flow (perm)	3239	0	433	3249	1570	1405	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	2					10	
Link Speed (mph)	30			30	30		
Link Distance (ft)	228			502	291		
Travel Time (s)	5.2			11.4	6.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	834	17	9	760	1	10	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	851	0	9	760	1	10	
Turn Type	NA		D.P+P	NA	Prot	Prot	
Protected Phases	1		4	1 4	3	3	2
Permitted Phases			1				
Detector Phase	1		4	1 4	3	3	
Switch Phase							
Minimum Initial (s)	10.0		8.0		8.0	8.0	8.0
Minimum Split (s)	17.0		14.0		15.0	15.0	32.0
Total Split (s)	48.0		14.0		16.0	16.0	32.0
Total Split (%)	43.6%		12.7%		14.5%	14.5%	29%
Maximum Green (s)	43.0		9.0		10.0	10.0	28.0
Yellow Time (s)	3.0		3.0		3.0	3.0	4.0
All-Red Time (s)	2.0		2.0		3.0	3.0	0.0
Lost Time Adjust (s)	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0		4.0		5.0	5.0	
Lead/Lag	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		Max		Min	Min	None
Walk Time (s)							7.0
Flash Dont Walk (s)							21.0
Pedestrian Calls (#/hr)							11
Act Effct Green (s)	65.2		75.2	79.2	9.0	9.0	
Actuated g/C Ratio	0.59		0.68	0.72	0.08	0.08	
v/c Ratio	0.44		0.02	0.32	0.01	0.08	
Control Delay	16.6		11.2	7.8	47.0	25.1	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	16.6		11.2	7.8	47.0	25.1	
LOS	B		B	A	D	C	
Approach Delay	16.6			7.8	27.1		
Approach LOS	B			A	C		
Queue Length 50th (ft)	109		0	6	1	0	
Queue Length 95th (ft)	312		m6	128	6	18	
Internal Link Dist (ft)	148			422	211		
Turn Bay Length (ft)			200				
Base Capacity (vph)	1920		394	2339	157	149	
Starvation Cap Reductn	0		0	0	0	0	
Spillback Cap Reductn	0		0	0	0	0	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	0.44		0.02	0.32	0.01	0.07	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 21 (19%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.44
Intersection Signal Delay: 12.6 Intersection LOS: B
Intersection Capacity Utilization 38.3% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: West Side Drive & Summer Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	275	602	108	29	361	477	74	335	28	283	313	127
Future Volume (vph)	275	602	108	29	361	477	74	335	28	283	313	127
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	13	12	12	16	16	12	16	12	11	13	12
Storage Length (ft)	155		0	0		0	150		0	200		0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.91	0.91	1.00	0.95	0.95	0.91	0.91	0.95
Ped Bike Factor		1.00				0.94	0.98	0.99		0.95	0.98	
Frt		0.977				0.850		0.989			0.963	
Flt Protected	0.950				0.996		0.950			0.950	0.993	
Satd. Flow (prot)	1525	3107	0	0	3366	1441	1547	3461	0	1415	2948	0
Flt Permitted	0.415				0.538		0.950			0.950	0.993	
Satd. Flow (perm)	666	3107	0	0	1818	1348	1512	3461	0	1338	2926	0
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		23						7			34	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			602			311			316	
Travel Time (s)		12.8			13.7			7.1			7.2	
Confl. Peds. (#/hr)				26		32	30		60	60		30
Confl. Bikes (#/hr)			7			2						1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.77	0.77	0.77	0.93	0.93	0.93
Heavy Vehicles (%)	3%	5%	7%	9%	4%	4%	5%	4%	8%	1%	3%	3%
Parking (#/hr)			0						0			
Adj. Flow (vph)	293	640	115	31	384	507	96	435	36	304	337	137
Shared Lane Traffic (%)						0%				26%		
Lane Group Flow (vph)	293	755	0	0	415	507	96	471	0	225	553	0
Turn Type	D.P+P	NA		Perm	NA	pm+ov	Split	NA		Split	NA	
Protected Phases	4	1 4			1	2	3	3		2	2	
Permitted Phases	1			1		1						
Detector Phase	4	1 4		1	1	2	3	3		2	2	
Switch Phase												
Minimum Initial (s)	6.0			8.0	8.0	8.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	15.0			30.0	30.0	28.0	27.0	27.0		28.0	28.0	
Total Split (s)	19.0			35.0	35.0	29.0	27.0	27.0		29.0	29.0	
Total Split (%)	17.3%			31.8%	31.8%	26.4%	24.5%	24.5%		26.4%	26.4%	
Maximum Green (s)	11.0			27.0	27.0	22.0	20.0	20.0		22.0	22.0	
Yellow Time (s)	4.0			4.0	4.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	4.0			4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-1.0				-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	7.0				7.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag						Lead	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Recall Mode	Max			C-Max	C-Max	Ped	Max	Max		Ped	Ped	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)				12.0	12.0	13.0	12.0	12.0		13.0	13.0	
Pedestrian Calls (#/hr)				0	0	0	0	0		0	0	
Act Effct Green (s)	40.4	47.4			28.4	52.0	21.0	21.0		22.6	22.6	
Actuated g/C Ratio	0.37	0.43			0.26	0.47	0.19	0.19		0.21	0.21	
v/c Ratio	0.87	0.56			0.88	0.77	0.33	0.71		0.78	0.88	
Control Delay	38.3	12.3			61.4	30.5	42.0	47.6		43.1	39.3	
Queue Delay	0.2	0.0			0.0	8.6	0.0	2.3		0.1	1.2	
Total Delay	38.5	12.3			61.4	39.0	42.0	49.9		43.2	40.5	
LOS	D	B			E	D	D	D		D	D	
Approach Delay		19.7			49.1			48.6			41.3	
Approach LOS		B			D			D			D	
Queue Length 50th (ft)	55	82			156	274	59	163		164	191	
Queue Length 95th (ft)	m#217	m124			#254	412	92	183		m232	m#293	
Internal Link Dist (ft)		483			522			231			236	
Turn Bay Length (ft)	155						150			200		
Base Capacity (vph)	338	1351			469	661	295	666		295	643	
Starvation Cap Reductn	0	0			0	0	0	0		1	19	
Spillback Cap Reductn	1	0			0	122	0	96		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	0.87	0.56			0.88	0.94	0.33	0.83		0.77	0.89	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 109 (99%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.88
Intersection Signal Delay: 37.9 — Intersection LOS: D
Intersection Capacity Utilization 95.0% — ICU Level of Service F
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: 1: D Street & Summer Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	78	729	134	111	371	85	56	0	86	107	0	46	
Future Volume (vph)	78	729	134	111	371	85	56	0	86	107	0	46	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	11	11	13	12	15	16	12	11	13	12	
Storage Length (ft)	200		75	175		0	0		0	0		0	
Storage Lanes	1		1	1		0	1		0	1		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor			0.99		0.99								
Frt			0.850		0.972			0.850			0.850		
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1516	3094	1301	1570	3082	0	1787	1599	0	1525	1502	0	
Flt Permitted	0.422			0.275			0.722			0.692			
Satd. Flow (perm)	674	3094	1283	455	3082	0	1358	1599	0	1111	1502	0	
Right Turn on Red			Yes			Yes			No			Yes	
Satd. Flow (RTOR)			149		28						648		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		508			563			362			321		
Travel Time (s)		11.5			12.8			8.2			7.3		
Confl. Bikes (#/hr)			3			14							
Peak Hour Factor	0.95	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.85	0.85	0.85	0.85	
Heavy Vehicles (%)	0%	5%	8%	0%	5%	6%	0%	0%	3%	3%	0%	0%	
Parking (#/hr)						0							
Adj. Flow (vph)	82	767	141	123	412	94	66	0	101	126	0	54	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	82	767	141	123	506	0	66	101	0	126	54	0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA		
Protected Phases	4	1		4	1			3			3		2
Permitted Phases	1		1	1			3			3			
Detector Phase	4	1	1	4	1		3	3		3	3		
Switch Phase													
Minimum Initial (s)	8.0	10.0	10.0	8.0	10.0		8.0	8.0		8.0	8.0		8.0
Minimum Split (s)	16.0	19.0	19.0	16.0	19.0		16.0	16.0		16.0	16.0		30.0
Total Split (s)	16.0	45.0	45.0	16.0	45.0		19.0	19.0		19.0	19.0		30.0
Total Split (%)	14.5%	40.9%	40.9%	14.5%	40.9%		17.3%	17.3%		17.3%	17.3%		27%
Maximum Green (s)	9.0	38.0	38.0	9.0	38.0		12.0	12.0		12.0	12.0		26.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0		4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		0.0
Lost Time Adjust (s)	0.0	-1.0	-1.0	0.0	-1.0		-1.0	-1.0		-1.0	-1.0		
Total Lost Time (s)	7.0	6.0	6.0	7.0	6.0		6.0	6.0		6.0	6.0		
Lead/Lag	Lag	Lead	Lead	Lag	Lead		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	2.0		2.0
Recall Mode	Max	C-Max	C-Max	Max	C-Max		Max	Max		Max	Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													19.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)	59.0	51.0	51.0	59.0	51.0		13.0	13.0		13.0	13.0		
Actuated g/C Ratio	0.54	0.46	0.46	0.54	0.46		0.12	0.12		0.12	0.12		
v/c Ratio	0.19	0.53	0.21	0.37	0.35		0.41	0.54		0.96	0.07		
Control Delay	4.0	18.1	6.3	24.8	32.8		53.5	57.0		118.8	0.2		
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	4.0	18.1	6.3	24.8	32.8		53.5	57.0		118.8	0.2		
LOS	A	B	A	C	C		D	E		F	A		
Approach Delay		15.2			31.3			55.7			83.2		
Approach LOS		B			C			E			F		
Queue Length 50th (ft)	13	242	23	74	184		44	68		90	0		
Queue Length 95th (ft)	4	372	81	m90	m213		84	118		#194	0		
Internal Link Dist (ft)		428			483			282			241		
Turn Bay Length (ft)	200		75	175									
Base Capacity (vph)	430	1434	675	335	1443		160	188		131	748		
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0		
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0		
Storage Cap Reductn	0	0	0	0	0		0	0		0	0		
Reduced v/c Ratio	0.19	0.53	0.21	0.37	0.35		0.41	0.54		0.96	0.07		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 77 (70%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 30.0 Intersection LOS: C
Intersection Capacity Utilization 58.3% 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.
m Volume for 95th percentile queue is metered by upstream signal.

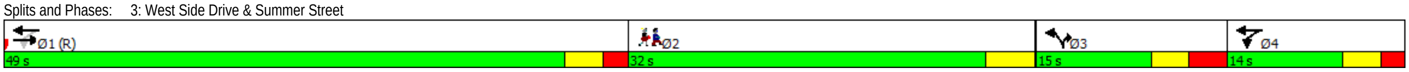
Splits and Phases: 2: East Side Drive/World Trade Center Avenue & Summer Street

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø2
Lane Configurations							
Traffic Volume (vph)	947	2	5	478	4	3	
Future Volume (vph)	947	2	5	478	4	3	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	10	12	11	11	
Storage Length (ft)		0	200		0	0	
Storage Lanes		0	1		1	1	
Taper Length (ft)			25		25		
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00	
Frt						0.850	
Flt Protected			0.950		0.950		
Satd. Flow (prot)	3249	0	1516	3249	1570	1405	
Flt Permitted			0.205		0.950		
Satd. Flow (perm)	3249	0	327	3249	1570	1405	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)						3	
Link Speed (mph)	30			30	30		
Link Distance (ft)	358			508	345		
Travel Time (s)	8.1			11.5	7.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	1029	2	5	520	4	3	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1031	0	5	520	4	3	
Turn Type	NA		D.P+P	NA	Prot	Prot	
Protected Phases	1		4	1 4	3	3	2
Permitted Phases			1				
Detector Phase	1		4	1 4	3	3	
Switch Phase							
Minimum Initial (s)	10.0		8.0		8.0	8.0	8.0
Minimum Split (s)	17.0		14.0		15.0	15.0	32.0
Total Split (s)	49.0		14.0		15.0	15.0	32.0
Total Split (%)	44.5%		12.7%		13.6%	13.6%	29%
Maximum Green (s)	44.0		9.0		9.0	9.0	28.0
Yellow Time (s)	3.0		3.0		3.0	3.0	4.0
All-Red Time (s)	2.0		2.0		3.0	3.0	0.0
Lost Time Adjust (s)	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0		4.0		5.0	5.0	
Lead/Lag	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		Max		Min	Min	None
Walk Time (s)							7.0
Flash Dont Walk (s)							21.0
Pedestrian Calls (#/hr)							20
Act Effct Green (s)	65.2		75.2	79.2	9.0	9.0	
Actuated g/C Ratio	0.59		0.68	0.72	0.08	0.08	
v/c Ratio	0.54		0.02	0.22	0.03	0.03	
Control Delay	18.3		27.2	18.7	47.2	31.7	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	18.3		27.2	18.7	47.2	31.7	
LOS	B		C	B	D	C	
Approach Delay	18.3			18.8	40.6		
Approach LOS	B			B	D		
Queue Length 50th (ft)	143		0	3	3	0	
Queue Length 95th (ft)	403		m9	213	14	9	
Internal Link Dist (ft)	278			428	265		
Turn Bay Length (ft)			200				
Base Capacity (vph)	1925		331	2339	142	130	
Starvation Cap Reductn	0		0	0	0	0	
Spillback Cap Reductn	0		0	0	0	0	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	0.54		0.02	0.22	0.03	0.02	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 44 (40%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.54
Intersection Signal Delay: 18.6 — Intersection LOS: B
Intersection Capacity Utilization 43.3% — ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: West Side Drive & Summer Street



- Build (2024) Condition

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	561	63	34	400	525	136	255	45	251	120	214
Future Volume (vph)	223	561	63	34	400	525	136	255	45	251	120	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	13	12	12	16	16	12	16	12	11	13	12
Storage Length (ft)	155		0	0		0	150		0	200		0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.91	0.91	1.00	0.95	0.95	0.91	0.91	0.95
Ped Bike Factor		1.00				0.94	0.97	0.98		0.94	0.96	
Frt		0.985				0.850		0.978			0.920	
Flt Protected	0.950				0.996		0.950			0.950	0.992	
Satd. Flow (prot)	1525	3138	0	0	3365	1441	1547	3387	0	1415	2768	0
Flt Permitted	0.395				0.538		0.950			0.950	0.992	
Satd. Flow (perm)	634	3138	0	0	1818	1352	1507	3387	0	1333	2742	0
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		14						16			230	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		593			602			347			313	
Travel Time (s)		13.5			13.7			7.9			7.1	
Confl. Peds. (#/hr)				26		32	30		60	60		30
Confl. Bikes (#/hr)			7			2						1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.77	0.77	0.77	0.93	0.93	0.93
Heavy Vehicles (%)	3%	5%	7%	9%	4%	4%	5%	4%	8%	1%	3%	3%
Parking (#/hr)			0						0			
Adj. Flow (vph)	237	597	67	36	426	559	177	331	58	270	129	230
Shared Lane Traffic (%)						0%				26%		
Lane Group Flow (vph)	237	664	0	0	462	559	177	389	0	200	429	0
Turn Type	D.P+P	NA		Perm	NA	pm+ov	Split	NA		Split	NA	
Protected Phases	4	1 4			1	2	3	3		2	2	
Permitted Phases	1			1		1						
Detector Phase	4	1 4		1	1	2	3	3		2	2	
Switch Phase												
Minimum Initial (s)	6.0			8.0	8.0	8.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	14.0			40.0	40.0	28.0	27.0	27.0		28.0	28.0	
Total Split (s)	15.0			40.0	40.0	28.0	27.0	27.0		28.0	28.0	
Total Split (%)	13.6%			36.4%	36.4%	25.5%	24.5%	24.5%		25.5%	25.5%	
Maximum Green (s)	7.0			32.0	32.0	21.0	20.0	20.0		21.0	21.0	
Yellow Time (s)	4.0			4.0	4.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	4.0			4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-1.0				-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	7.0				7.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag						Lead	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Recall Mode	Max			C-Max	C-Max	Ped	Max	Max		Ped	Ped	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)				25.0	25.0	14.0	13.0	13.0		14.0	14.0	
Pedestrian Calls (#/hr)				0	0	0	0	0		0	0	
Act Effct Green (s)	41.0	48.0			33.0	56.0	21.0	21.0		22.0	22.0	
Actuated g/C Ratio	0.37	0.44			0.30	0.51	0.19	0.19		0.20	0.20	
v/c Ratio	0.79	0.48			0.85	0.79	0.60	0.59		0.71	0.58	
Control Delay	46.5	20.7			52.2	28.7	50.2	43.0		33.1	9.2	
Queue Delay	2.7	0.0			0.0	0.0	0.0	0.1		0.0	0.6	
Total Delay	49.2	20.7			52.2	28.7	50.2	43.1		33.1	9.8	
LOS	D	C			D	C	D	D		C	A	
Approach Delay		28.2			39.3			45.3			17.2	
Approach LOS		C			D			D			B	
Queue Length 50th (ft)	100	112			168	293	115	127		91	8	
Queue Length 95th (ft)	#178	179			#263	440	158	148		#241	29	
Internal Link Dist (ft)		513			522			267			233	
Turn Bay Length (ft)	155						150			200		
Base Capacity (vph)	301	1377			545	706	295	659		283	737	
Starvation Cap Reductn	0	0			0	0	0	0		0	91	
Spillback Cap Reductn	19	0			0	2	0	13		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	0.84	0.48			0.85	0.79	0.60	0.60		0.71	0.66	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 30 (27%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 32.7 Intersection LOS: C
Intersection Capacity Utilization 102.0% ICU Level of Service G
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: D Street & Summer Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	36	694	80	135	567	122	31	0	59	59	0	33	
Future Volume (vph)	36	694	80	135	567	122	31	0	59	59	0	33	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	11	11	13	12	15	16	12	11	13	12	
Storage Length (ft)	200		75	175		0	0		0	0		0	
Storage Lanes	1		1	1		0	1		0	1		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor			0.99		0.99								
Frt			0.850		0.973			0.850			0.850		
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1516	3094	1301	1570	3087	0	1787	1599	0	1525	1502	0	
Flt Permitted	0.283			0.300			0.732			0.712			
Satd. Flow (perm)	452	3094	1283	496	3087	0	1377	1599	0	1143	1502	0	
Right Turn on Red			Yes			Yes			No			Yes	
Satd. Flow (RTOR)			149		27						571		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		502			593			362			348		
Travel Time (s)		11.4			13.5			8.2			7.9		
Confl. Bikes (#/hr)			3			14							
Peak Hour Factor	0.95	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.85	0.85	0.85	0.85	
Heavy Vehicles (%)	0%	5%	8%	0%	5%	6%	0%	0%	3%	3%	0%	0%	
Parking (#/hr)						0							
Adj. Flow (vph)	38	731	84	150	630	136	36	0	69	69	0	39	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	38	731	84	150	766	0	36	69	0	69	39	0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA		
Protected Phases	4	1		4	1			3			3		2
Permitted Phases	1		1	1			3			3			
Detector Phase	4	1	1	4	1		3	3		3	3		
Switch Phase													
Minimum Initial (s)	8.0	10.0	10.0	8.0	10.0		8.0	8.0		8.0	8.0		8.0
Minimum Split (s)	16.0	19.0	19.0	16.0	19.0		16.0	16.0		16.0	16.0		30.0
Total Split (s)	16.0	47.0	47.0	16.0	47.0		17.0	17.0		17.0	17.0		30.0
Total Split (%)	14.5%	42.7%	42.7%	14.5%	42.7%		15.5%	15.5%		15.5%	15.5%		27%
Maximum Green (s)	9.0	40.0	40.0	9.0	40.0		10.0	10.0		10.0	10.0		26.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0		4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		0.0
Lost Time Adjust (s)	0.0	-1.0	-1.0	0.0	-1.0		-1.0	-1.0		-1.0	-1.0		
Total Lost Time (s)	7.0	6.0	6.0	7.0	6.0		6.0	6.0		6.0	6.0		
Lead/Lag	Lag	Lead	Lead	Lag	Lead		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	2.0		2.0
Recall Mode	Max	C-Max	C-Max	Max	C-Max		Max	Max		Max	Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													19.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)	61.0	53.0	53.0	61.0	53.0		11.0	11.0		11.0	11.0		
Actuated g/C Ratio	0.55	0.48	0.48	0.55	0.48		0.10	0.10		0.10	0.10		
v/c Ratio	0.11	0.49	0.12	0.41	0.51		0.26	0.43		0.61	0.06		
Control Delay	4.7	7.8	0.3	13.4	17.7		51.1	55.7		70.4	0.2		
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	4.7	7.8	0.3	13.4	17.7		51.1	55.7		70.4	0.2		
LOS	A	A	A	B	B		D	E		E	A		
Approach Delay		6.9			17.0			54.2			45.0		
Approach LOS		A			B			D			D		
Queue Length 50th (ft)	10	220	0	50	141		24	47		47	0		
Queue Length 95th (ft)	m3	14	0	m74	m190		53	88		#100	0		
Internal Link Dist (ft)		422			513			282			268		
Turn Bay Length (ft)	200		75	175									
Base Capacity (vph)	337	1491	695	362	1501		137	159		114	664		
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0		
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0		
Storage Cap Reductn	0	0	0	0	0		0	0		0	0		
Reduced v/c Ratio	0.11	0.49	0.12	0.41	0.51		0.26	0.43		0.61	0.06		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 32 (29%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 16.1 Intersection LOS: B
Intersection Capacity Utilization 55.8% 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: East Side Drive/World Trade Center Avenue & Summer Street

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø2
Lane Configurations							
Traffic Volume (vph)	812	16	8	729	1	9	
Future Volume (vph)	812	16	8	729	1	9	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	10	12	11	11	
Storage Length (ft)		0	200		0	0	
Storage Lanes		0	1		1	1	
Taper Length (ft)			25		25		
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00	
Frt	0.997					0.850	
Flt Protected			0.950		0.950		
Satd. Flow (prot)	3239	0	1516	3249	1570	1405	
Flt Permitted			0.252		0.950		
Satd. Flow (perm)	3239	0	402	3249	1570	1405	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	2					10	
Link Speed (mph)	30			30	30		
Link Distance (ft)	228			502	291		
Travel Time (s)	5.2			11.4	6.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	883	17	9	792	1	10	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	900	0	9	792	1	10	
Turn Type	NA		D.P+P	NA	Prot	Prot	
Protected Phases	1		4	1 4	3	3	2
Permitted Phases			1				
Detector Phase	1		4	1 4	3	3	
Switch Phase							
Minimum Initial (s)	10.0		8.0		8.0	8.0	8.0
Minimum Split (s)	17.0		14.0		15.0	15.0	32.0
Total Split (s)	48.0		14.0		16.0	16.0	32.0
Total Split (%)	43.6%		12.7%		14.5%	14.5%	29%
Maximum Green (s)	43.0		9.0		10.0	10.0	28.0
Yellow Time (s)	3.0		3.0		3.0	3.0	4.0
All-Red Time (s)	2.0		2.0		3.0	3.0	0.0
Lost Time Adjust (s)	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0		4.0		5.0	5.0	
Lead/Lag	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		Max		Min	Min	None
Walk Time (s)							7.0
Flash Dont Walk (s)							21.0
Pedestrian Calls (#/hr)							11
Act Effct Green (s)	65.2		75.2	79.2	9.0	9.0	
Actuated g/C Ratio	0.59		0.68	0.72	0.08	0.08	
v/c Ratio	0.47		0.02	0.34	0.01	0.08	
Control Delay	17.0		11.8	8.1	47.0	25.1	
Queue Delay	0.0		0.0	0.1	0.0	0.0	
Total Delay	17.0		11.8	8.2	47.0	25.1	
LOS	B		B	A	D	C	
Approach Delay	17.0			8.3	27.1		
Approach LOS	B			A	C		
Queue Length 50th (ft)	117		0	7	1	0	
Queue Length 95th (ft)	335		m6	145	6	18	
Internal Link Dist (ft)	148			422	211		
Turn Bay Length (ft)			200				
Base Capacity (vph)	1920		375	2339	157	149	
Starvation Cap Reductn	0		0	497	0	0	
Spillback Cap Reductn	0		0	0	0	0	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	0.47		0.02	0.43	0.01	0.07	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 21 (19%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.47
Intersection Signal Delay: 13.0 Intersection LOS: B
Intersection Capacity Utilization 39.7% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: West Side Drive & Summer Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	334	596	114	29	361	477	75	335	28	283	305	245
Future Volume (vph)	334	596	114	29	361	477	75	335	28	283	305	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	13	12	12	16	16	12	16	12	11	13	12
Storage Length (ft)	155		0	0		0	150		0	200		0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.91	0.91	1.00	0.95	0.95	0.91	0.91	0.95
Ped Bike Factor		1.00				0.94	0.98	0.99		0.95	0.97	
Frt		0.976				0.850		0.989			0.941	
Flt Protected	0.950				0.996		0.950			0.950	0.994	
Satd. Flow (prot)	1525	3103	0	0	3366	1441	1547	3461	0	1415	2856	0
Flt Permitted	0.413				0.536		0.950			0.950	0.994	
Satd. Flow (perm)	663	3103	0	0	1811	1348	1517	3461	0	1338	2838	0
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		25						7			104	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			602			311			316	
Travel Time (s)		12.8			13.7			7.1			7.2	
Confl. Peds. (#/hr)				26		32	30		60	60		30
Confl. Bikes (#/hr)			7			2						1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.77	0.77	0.77	0.93	0.93	0.93
Heavy Vehicles (%)	3%	5%	7%	9%	4%	4%	5%	4%	8%	1%	3%	3%
Parking (#/hr)			0						0			
Adj. Flow (vph)	355	634	121	31	384	507	97	435	36	304	328	263
Shared Lane Traffic (%)						0%				26%		
Lane Group Flow (vph)	355	755	0	0	415	507	97	471	0	225	670	0
Turn Type	D.P+P	NA		Perm	NA	pm+ov	Split	NA		Split	NA	
Protected Phases	4	1 4			1	2	3	3		2	2	
Permitted Phases	1			1		1						
Detector Phase	4	1 4		1	1	2	3	3		2	2	
Switch Phase												
Minimum Initial (s)	6.0			8.0	8.0	8.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	15.0			30.0	30.0	28.0	27.0	27.0		28.0	28.0	
Total Split (s)	19.0			35.0	35.0	29.0	27.0	27.0		29.0	29.0	
Total Split (%)	17.3%			31.8%	31.8%	26.4%	24.5%	24.5%		26.4%	26.4%	
Maximum Green (s)	11.0			27.0	27.0	22.0	20.0	20.0		22.0	22.0	
Yellow Time (s)	4.0			4.0	4.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	4.0			4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-1.0				-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	7.0				7.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag						Lead	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Recall Mode	Max			C-Max	C-Max	Ped	Max	Max		Ped	Ped	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)				12.0	12.0	13.0	12.0	12.0		13.0	13.0	
Pedestrian Calls (#/hr)				0	0	0	0	0		0	0	
Act Effct Green (s)	40.0	47.0			28.0	52.0	21.0	21.0		23.0	23.0	
Actuated g/C Ratio	0.36	0.43			0.25	0.47	0.19	0.19		0.21	0.21	
v/c Ratio	1.06	0.56			0.90	0.77	0.33	0.71		0.76	0.99	
Control Delay	80.9	12.8			64.1	30.4	42.1	47.6		39.8	47.3	
Queue Delay	4.5	0.0			0.0	17.8	0.0	2.3		0.1	4.1	
Total Delay	85.5	12.8			64.1	48.2	42.1	49.9		39.9	51.4	
LOS	F	B			E	D	D	D		D	D	
Approach Delay		36.1			55.4			48.6			48.5	
Approach LOS		D			E			D			D	
Queue Length 50th (ft)	~138	95			156	274	60	163		165	213	
Queue Length 95th (ft)	m#426	m123			#255	412	93	183		m216	m#330	
Internal Link Dist (ft)		483			522			231			236	
Turn Bay Length (ft)	155						150			200		
Base Capacity (vph)	335	1340			460	656	295	666		295	679	
Starvation Cap Reductn	0	0			0	0	0	0		1	12	
Spillback Cap Reductn	4	0			0	146	0	96		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	1.07	0.56			0.90	0.99	0.33	0.83		0.77	1.00	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 109 (99%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.06
Intersection Signal Delay: 46.4 Intersection LOS: D
Intersection Capacity Utilization 97.3% ICU Level of Service F
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: 1: D Street & Summer Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations	↰	↑↑	↱	↰	↑↱		↰	↱		↰	↱		
Traffic Volume (vph)	98	756	134	112	401	200	56	0	86	138	0	48	
Future Volume (vph)	98	756	134	112	401	200	56	0	86	138	0	48	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	11	11	13	12	15	16	12	11	13	12	
Storage Length (ft)	200		75	175		0	0		0	0		0	
Storage Lanes	1		1	1		0	1		0	1		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor			0.99		0.99								
Frt			0.850		0.950			0.850			0.850		
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1516	3094	1301	1570	2993	0	1787	1599	0	1525	1502	0	
Flt Permitted	0.326			0.261			0.720			0.692			
Satd. Flow (perm)	520	3094	1283	431	2993	0	1354	1599	0	1111	1502	0	
Right Turn on Red			Yes			Yes			No			Yes	
Satd. Flow (RTOR)			149		87						633		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		508			563			362			321		
Travel Time (s)		11.5			12.8			8.2			7.3		
Confl. Bikes (#/hr)			3			14							
Peak Hour Factor	0.95	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.85	0.85	0.85	0.85	
Heavy Vehicles (%)	0%	5%	8%	0%	5%	6%	0%	0%	3%	3%	0%	0%	
Parking (#/hr)						0							
Adj. Flow (vph)	103	796	141	124	446	222	66	0	101	162	0	56	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	103	796	141	124	668	0	66	101	0	162	56	0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA		
Protected Phases	4	1		4	1			3			3		2
Permitted Phases	1		1	1			3			3			
Detector Phase	4	1	1	4	1		3	3		3	3		
Switch Phase													
Minimum Initial (s)	8.0	10.0	10.0	8.0	10.0		8.0	8.0		8.0	8.0		8.0
Minimum Split (s)	16.0	19.0	19.0	16.0	19.0		16.0	16.0		16.0	16.0		30.0
Total Split (s)	16.0	45.0	45.0	16.0	45.0		19.0	19.0		19.0	19.0		30.0
Total Split (%)	14.5%	40.9%	40.9%	14.5%	40.9%		17.3%	17.3%		17.3%	17.3%		27%
Maximum Green (s)	9.0	38.0	38.0	9.0	38.0		12.0	12.0		12.0	12.0		26.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0		4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		0.0
Lost Time Adjust (s)	0.0	-1.0	-1.0	0.0	-1.0		-1.0	-1.0		-1.0	-1.0		
Total Lost Time (s)	7.0	6.0	6.0	7.0	6.0		6.0	6.0		6.0	6.0		
Lead/Lag	Lag	Lead	Lead	Lag	Lead		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	2.0		2.0
Recall Mode	Max	C-Max	C-Max	Max	C-Max		Max	Max		Max	Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													19.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)	59.0	51.0	51.0	59.0	51.0		13.0	13.0		13.0	13.0		
Actuated g/C Ratio	0.54	0.46	0.46	0.54	0.46		0.12	0.12		0.12	0.12		
v/c Ratio	0.29	0.56	0.21	0.38	0.47		0.41	0.54		1.24	0.08		
Control Delay	5.7	18.1	5.8	22.5	31.0		53.6	57.0		197.1	0.2		
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	5.7	18.1	5.8	22.5	31.0		53.6	57.0		197.1	0.2		
LOS	A	B	A	C	C		D	E		F	A		
Approach Delay		15.2			29.7			55.7			146.6		
Approach LOS		B			C			E			F		
Queue Length 50th (ft)	17	254	24	68	236		44	68		~142	0		
Queue Length 95th (ft)	4	384	73	m82	m264		84	118		#257	0		
Internal Link Dist (ft)		428			483			282			241		
Turn Bay Length (ft)	200		75	175									
Base Capacity (vph)	360	1434	675	324	1434		160	188		131	735		
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0		
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0		
Storage Cap Reductn	0	0	0	0	0		0	0		0	0		
Reduced v/c Ratio	0.29	0.56	0.21	0.38	0.47		0.41	0.54		1.24	0.08		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 77 (70%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 95
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.24
Intersection Signal Delay: 36.3 Intersection LOS: D
Intersection Capacity Utilization 61.1% 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: 2: East Side Drive/World Trade Center Avenue & Summer Street

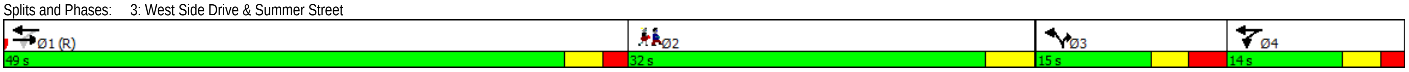
Ø1 (R)	Ø2	Ø3	Ø4
45 s	30 s	19 s	16 s

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø2
Lane Configurations							
Traffic Volume (vph)	994	2	5	510	4	3	
Future Volume (vph)	994	2	5	510	4	3	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	10	12	11	11	
Storage Length (ft)		0	200		0	0	
Storage Lanes		0	1		1	1	
Taper Length (ft)			25		25		
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00	
Frt						0.850	
Flt Protected			0.950		0.950		
Satd. Flow (prot)	3249	0	1516	3249	1570	1405	
Flt Permitted			0.189		0.950		
Satd. Flow (perm)	3249	0	302	3249	1570	1405	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)						3	
Link Speed (mph)	30			30	30		
Link Distance (ft)	358			508	345		
Travel Time (s)	8.1			11.5	7.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	1080	2	5	554	4	3	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1082	0	5	554	4	3	
Turn Type	NA		D.P+P	NA	Prot	Prot	
Protected Phases	1		4	1 4	3	3	2
Permitted Phases			1				
Detector Phase	1		4	1 4	3	3	
Switch Phase							
Minimum Initial (s)	10.0		8.0		8.0	8.0	8.0
Minimum Split (s)	17.0		14.0		15.0	15.0	32.0
Total Split (s)	49.0		14.0		15.0	15.0	32.0
Total Split (%)	44.5%		12.7%		13.6%	13.6%	29%
Maximum Green (s)	44.0		9.0		9.0	9.0	28.0
Yellow Time (s)	3.0		3.0		3.0	3.0	4.0
All-Red Time (s)	2.0		2.0		3.0	3.0	0.0
Lost Time Adjust (s)	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0		4.0		5.0	5.0	
Lead/Lag	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		Max		Min	Min	None
Walk Time (s)							7.0
Flash Dont Walk (s)							21.0
Pedestrian Calls (#/hr)							20
Act Effct Green (s)	65.2		75.2	79.2	9.0	9.0	
Actuated g/C Ratio	0.59		0.68	0.72	0.08	0.08	
v/c Ratio	0.56		0.02	0.24	0.03	0.03	
Control Delay	18.8		25.8	17.3	47.2	31.7	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	18.8		25.8	17.3	47.2	31.7	
LOS	B		C	B	D	C	
Approach Delay	18.8			17.4	40.6		
Approach LOS	B			B	D		
Queue Length 50th (ft)	154		0	4	3	0	
Queue Length 95th (ft)	432		m6	223	14	9	
Internal Link Dist (ft)	278			428	265		
Turn Bay Length (ft)			200				
Base Capacity (vph)	1925		316	2339	142	130	
Starvation Cap Reductn	0		0	0	0	0	
Spillback Cap Reductn	0		0	0	0	0	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	0.56		0.02	0.24	0.03	0.02	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 44 (40%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.56
Intersection Signal Delay: 18.4 Intersection LOS: B
Intersection Capacity Utilization 44.8% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: West Side Drive & Summer Street



- Build (2024) Condition with Mitigation

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	561	63	34	400	525	136	255	45	251	120	214
Future Volume (vph)	223	561	63	34	400	525	136	255	45	251	120	214
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	13	12	12	16	16	12	16	12	11	13	12
Storage Length (ft)	155		0	0		0	150		0	200		0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.91	0.91	1.00	0.95	0.95	0.91	0.91	0.95
Ped Bike Factor		1.00				0.94	0.97	0.98		0.94	0.96	
Frt		0.985				0.850		0.978			0.920	
Flt Protected	0.950				0.996		0.950			0.950	0.992	
Satd. Flow (prot)	1525	3138	0	0	3365	1441	1547	3387	0	1415	2768	0
Flt Permitted	0.395				0.538		0.950			0.950	0.992	
Satd. Flow (perm)	634	3138	0	0	1818	1352	1507	3387	0	1333	2742	0
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		14						16			230	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		593			602			347			313	
Travel Time (s)		13.5			13.7			7.9			7.1	
Confl. Peds. (#/hr)				26		32	30		60	60		30
Confl. Bikes (#/hr)			7			2						1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.77	0.77	0.77	0.93	0.93	0.93
Heavy Vehicles (%)	3%	5%	7%	9%	4%	4%	5%	4%	8%	1%	3%	3%
Parking (#/hr)			0						0			
Adj. Flow (vph)	237	597	67	36	426	559	177	331	58	270	129	230
Shared Lane Traffic (%)						0%				26%		
Lane Group Flow (vph)	237	664	0	0	462	559	177	389	0	200	429	0
Turn Type	D.P+P	NA		Perm	NA	pm+ov	Split	NA		Split	NA	
Protected Phases	4	1 4			1	2	3	3		2	2	
Permitted Phases	1			1		1						
Detector Phase	4	1 4		1	1	2	3	3		2	2	
Switch Phase												
Minimum Initial (s)	6.0			8.0	8.0	8.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	14.0			40.0	40.0	28.0	27.0	27.0		28.0	28.0	
Total Split (s)	15.0			40.0	40.0	28.0	27.0	27.0		28.0	28.0	
Total Split (%)	13.6%			36.4%	36.4%	25.5%	24.5%	24.5%		25.5%	25.5%	
Maximum Green (s)	7.0			32.0	32.0	21.0	20.0	20.0		21.0	21.0	
Yellow Time (s)	4.0			4.0	4.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	4.0			4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-1.0				-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	7.0				7.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag						Lead	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Recall Mode	Max			C-Max	C-Max	Ped	Max	Max		Ped	Ped	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)				25.0	25.0	14.0	13.0	13.0		14.0	14.0	
Pedestrian Calls (#/hr)				0	0	0	0	0		0	0	
Act Effct Green (s)	41.0	48.0			33.0	56.0	21.0	21.0		22.0	22.0	
Actuated g/C Ratio	0.37	0.44			0.30	0.51	0.19	0.19		0.20	0.20	
v/c Ratio	0.79	0.48			0.85	0.79	0.60	0.59		0.71	0.58	
Control Delay	46.8	21.8			52.2	28.7	50.2	43.0		33.1	9.2	
Queue Delay	2.7	0.0			0.0	0.0	0.0	0.1		0.0	0.6	
Total Delay	49.6	21.8			52.2	28.7	50.2	43.1		33.1	9.8	
LOS	D	C			D	C	D	D		C	A	
Approach Delay		29.1			39.3			45.3			17.2	
Approach LOS		C			D			D			B	
Queue Length 50th (ft)	103	116			168	293	115	127		91	8	
Queue Length 95th (ft)	#183	184			#263	440	158	148		#241	29	
Internal Link Dist (ft)		513			522			267			233	
Turn Bay Length (ft)	155						150			200		
Base Capacity (vph)	301	1377			545	706	295	659		283	737	
Starvation Cap Reductn	0	0			0	0	0	0		0	91	
Spillback Cap Reductn	19	0			0	2	0	13		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	0.84	0.48			0.85	0.79	0.60	0.60		0.71	0.66	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 30 (27%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 33.0 — Intersection LOS: C
Intersection Capacity Utilization 102.0% — ICU Level of Service G
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: D Street & Summer Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	36	729	80	100	602	122	31	0	59	59	0	33	
Future Volume (vph)	36	729	80	100	602	122	31	0	59	59	0	33	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	11	11	13	12	15	16	12	11	13	12	
Storage Length (ft)	200		75	175		0	0		0	0		0	
Storage Lanes	1		1	1		0	1		0	1		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor			0.99		0.99								
Frt			0.850		0.975			0.850			0.850		
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1516	3094	1301	1570	3095	0	1787	1599	0	1525	1502	0	
Flt Permitted	0.265			0.283			0.732			0.712			
Satd. Flow (perm)	423	3094	1283	468	3095	0	1377	1599	0	1143	1502	0	
Right Turn on Red			Yes			Yes			No			Yes	
Satd. Flow (RTOR)			149		25						563		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		502			593			362			348		
Travel Time (s)		11.4			13.5			8.2			7.9		
Confl. Bikes (#/hr)			3			14							
Peak Hour Factor	0.95	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.85	0.85	0.85	0.85	
Heavy Vehicles (%)	0%	5%	8%	0%	5%	6%	0%	0%	3%	3%	0%	0%	
Parking (#/hr)						0							
Adj. Flow (vph)	38	767	84	111	669	136	36	0	69	69	0	39	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	38	767	84	111	805	0	36	69	0	69	39	0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA		
Protected Phases	4	1		4	1			3			3		2
Permitted Phases	1		1	1			3			3			
Detector Phase	4	1	1	4	1		3	3		3	3		
Switch Phase													
Minimum Initial (s)	8.0	10.0	10.0	8.0	10.0		8.0	8.0		8.0	8.0		8.0
Minimum Split (s)	16.0	19.0	19.0	16.0	19.0		16.0	16.0		16.0	16.0		30.0
Total Split (s)	16.0	47.0	47.0	16.0	47.0		17.0	17.0		17.0	17.0		30.0
Total Split (%)	14.5%	42.7%	42.7%	14.5%	42.7%		15.5%	15.5%		15.5%	15.5%		27%
Maximum Green (s)	9.0	40.0	40.0	9.0	40.0		10.0	10.0		10.0	10.0		26.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0		4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		0.0
Lost Time Adjust (s)	0.0	-1.0	-1.0	0.0	-1.0		-1.0	-1.0		-1.0	-1.0		
Total Lost Time (s)	7.0	6.0	6.0	7.0	6.0		6.0	6.0		6.0	6.0		
Lead/Lag	Lag	Lead	Lead	Lag	Lead		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	2.0		2.0
Recall Mode	Max	C-Max	C-Max	Max	C-Max		Max	Max		Max	Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													19.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)	61.0	53.0	53.0	61.0	53.0		11.0	11.0		11.0	11.0		
Actuated g/C Ratio	0.55	0.48	0.48	0.55	0.48		0.10	0.10		0.10	0.10		
v/c Ratio	0.12	0.51	0.12	0.32	0.54		0.26	0.43		0.61	0.06		
Control Delay	4.8	8.2	0.3	12.6	18.0		51.1	55.7		70.4	0.2		
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	4.8	8.2	0.3	12.6	18.0		51.1	55.7		70.4	0.2		
LOS	A	A	A	B	B		D	E		E	A		
Approach Delay		7.3			17.4			54.2			45.0		
Approach LOS		A			B			D			D		
Queue Length 50th (ft)	10	234	0	37	149		24	47		47	0		
Queue Length 95th (ft)	m3	15	0	m55	m202		53	88		#100	0		
Internal Link Dist (ft)		422			513			282			268		
Turn Bay Length (ft)	200		75	175									
Base Capacity (vph)	323	1491	695	349	1504		137	159		114	656		
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0		
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0		
Storage Cap Reductn	0	0	0	0	0		0	0		0	0		
Reduced v/c Ratio	0.12	0.51	0.12	0.32	0.54		0.26	0.43		0.61	0.06		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 32 (29%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.61
Intersection Signal Delay: 16.3 Intersection LOS: B
Intersection Capacity Utilization 55.6% 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.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: East Side Drive/World Trade Center Avenue & Summer Street

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø2
Lane Configurations	↑↱		↰	↑↑	↰	↱	
Traffic Volume (vph)	812	16	43	729	1	9	
Future Volume (vph)	812	16	43	729	1	9	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	10	12	11	11	
Storage Length (ft)		0	200		0	0	
Storage Lanes		0	1		1	1	
Taper Length (ft)			25		25		
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00	
Frt	0.997					0.850	
Flt Protected			0.950		0.950		
Satd. Flow (prot)	3239	0	1516	3249	1570	1405	
Flt Permitted			0.252		0.950		
Satd. Flow (perm)	3239	0	402	3249	1570	1405	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	2					10	
Link Speed (mph)	30			30	30		
Link Distance (ft)	228			502	291		
Travel Time (s)	5.2			11.4	6.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	883	17	47	792	1	10	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	900	0	47	792	1	10	
Turn Type	NA		D.P+P	NA	Prot	Prot	
Protected Phases	1		4	1 4	3	3	2
Permitted Phases			1				
Detector Phase	1		4	1 4	3	3	
Switch Phase							
Minimum Initial (s)	10.0		8.0		8.0	8.0	8.0
Minimum Split (s)	17.0		14.0		15.0	15.0	32.0
Total Split (s)	48.0		14.0		16.0	16.0	32.0
Total Split (%)	43.6%		12.7%		14.5%	14.5%	29%
Maximum Green (s)	43.0		9.0		10.0	10.0	28.0
Yellow Time (s)	3.0		3.0		3.0	3.0	4.0
All-Red Time (s)	2.0		2.0		3.0	3.0	0.0
Lost Time Adjust (s)	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0		4.0		5.0	5.0	
Lead/Lag	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		Max		Min	Min	None
Walk Time (s)							7.0
Flash Dont Walk (s)							21.0
Pedestrian Calls (#/hr)							11
Act Effct Green (s)	65.2		75.2	79.2	9.0	9.0	
Actuated g/C Ratio	0.59		0.68	0.72	0.08	0.08	
v/c Ratio	0.47		0.13	0.34	0.01	0.08	
Control Delay	17.0		10.7	8.5	47.0	25.1	
Queue Delay	0.0		0.0	0.1	0.0	0.0	
Total Delay	17.0		10.7	8.6	47.0	25.1	
LOS	B		B	A	D	C	
Approach Delay	17.0			8.7	27.1		
Approach LOS	B			A	C		
Queue Length 50th (ft)	117		1	6	1	0	
Queue Length 95th (ft)	335		m26	156	6	18	
Internal Link Dist (ft)	148			422	211		
Turn Bay Length (ft)			200				
Base Capacity (vph)	1920		375	2339	157	149	
Starvation Cap Reductn	0		0	525	0	0	
Spillback Cap Reductn	0		0	0	0	0	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	0.47		0.13	0.44	0.01	0.07	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 21 (19%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.47
Intersection Signal Delay: 13.1 Intersection LOS: B
Intersection Capacity Utilization 49.7% ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: West Side Drive & Summer Street

Ø1 (R)	Ø2	Ø3	Ø4
48 s	32 s	16 s	14 s

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	334	596	114	29	361	477	75	335	28	283	305	245
Future Volume (vph)	334	596	114	29	361	477	75	335	28	283	305	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	13	12	12	16	16	12	16	12	11	13	12
Storage Length (ft)	155		0	0		0	150		0	200		0
Storage Lanes	1		0	0		1	1		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	0.95	0.91	0.91	1.00	0.95	0.95	0.91	0.91	0.95
Ped Bike Factor		1.00				0.94	0.98	0.99		0.95	0.97	
Frt		0.976				0.850		0.989			0.941	
Flt Protected	0.950				0.996		0.950			0.950	0.994	
Satd. Flow (prot)	1525	3103	0	0	3366	1441	1547	3461	0	1415	2856	0
Flt Permitted	0.413				0.536		0.950			0.950	0.994	
Satd. Flow (perm)	663	3103	0	0	1811	1348	1517	3461	0	1338	2838	0
Right Turn on Red			Yes			No			Yes			Yes
Satd. Flow (RTOR)		25						7			104	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		563			602			311			316	
Travel Time (s)		12.8			13.7			7.1			7.2	
Confl. Peds. (#/hr)				26		32	30		60	60		30
Confl. Bikes (#/hr)			7			2						1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.77	0.77	0.77	0.93	0.93	0.93
Heavy Vehicles (%)	3%	5%	7%	9%	4%	4%	5%	4%	8%	1%	3%	3%
Parking (#/hr)			0						0			
Adj. Flow (vph)	355	634	121	31	384	507	97	435	36	304	328	263
Shared Lane Traffic (%)						0%				26%		
Lane Group Flow (vph)	355	755	0	0	415	507	97	471	0	225	670	0
Turn Type	D.P+P	NA		Perm	NA	pm+ov	Split	NA		Split	NA	
Protected Phases	4	1 4			1	2	3	3		2	2	
Permitted Phases	1			1		1						
Detector Phase	4	1 4		1	1	2	3	3		2	2	
Switch Phase												
Minimum Initial (s)	6.0			8.0	8.0	8.0	8.0	8.0		8.0	8.0	
Minimum Split (s)	15.0			30.0	30.0	28.0	26.0	26.0		28.0	28.0	
Total Split (s)	20.0			35.0	35.0	29.0	26.0	26.0		29.0	29.0	
Total Split (%)	18.2%			31.8%	31.8%	26.4%	23.6%	23.6%		26.4%	26.4%	
Maximum Green (s)	12.0			27.0	27.0	22.0	19.0	19.0		22.0	22.0	
Yellow Time (s)	4.0			4.0	4.0	3.0	3.0	3.0		3.0	3.0	
All-Red Time (s)	4.0			4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lost Time Adjust (s)	-1.0				-1.0	-1.0	-1.0	-1.0		-1.0	-1.0	
Total Lost Time (s)	7.0				7.0	6.0	6.0	6.0		6.0	6.0	
Lead/Lag						Lead	Lag	Lag		Lead	Lead	
Lead-Lag Optimize?												
Vehicle Extension (s)	2.0			2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Recall Mode	Max			C-Max	C-Max	Ped	Max	Max		Ped	Ped	
Walk Time (s)				7.0	7.0	7.0	7.0	7.0		7.0	7.0	
Flash Dont Walk (s)				12.0	12.0	13.0	12.0	12.0		13.0	13.0	
Pedestrian Calls (#/hr)				0	0	0	0	0		0	0	
Act Effct Green (s)	41.0	48.0			28.0	52.0	20.0	20.0		23.0	23.0	
Actuated g/C Ratio	0.37	0.44			0.25	0.47	0.18	0.18		0.21	0.21	
v/c Ratio	1.02	0.55			0.90	0.77	0.35	0.74		0.76	0.99	
Control Delay	66.9	12.2			64.1	30.4	43.3	49.9		39.8	47.3	
Queue Delay	3.5	0.0			0.0	17.3	0.0	3.9		0.1	4.1	
Total Delay	70.4	12.2			64.1	47.7	43.3	53.8		39.9	51.4	
LOS	E	B			E	D	D	D		D	D	
Approach Delay		30.8			55.1			52.0			48.5	
Approach LOS		C			E			D			D	
Queue Length 50th (ft)	~91	70			156	274	60	164		165	213	
Queue Length 95th (ft)	m#300	85			#255	412	94	185		m216	m#330	
Internal Link Dist (ft)		483			522			231			236	
Turn Bay Length (ft)	155						150			200		
Base Capacity (vph)	348	1368			460	656	281	635		295	679	
Starvation Cap Reductn	0	0			0	0	0	0		1	12	
Spillback Cap Reductn	4	0			0	145	0	96		0	0	
Storage Cap Reductn	0	0			0	0	0	0		0	0	
Reduced v/c Ratio	1.03	0.55			0.90	0.99	0.35	0.87		0.77	1.00	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 109 (99%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 45.2 Intersection LOS: D
Intersection Capacity Utilization 97.3% ICU Level of Service F
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: 1: D Street & Summer Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø2
Lane Configurations													
Traffic Volume (vph)	98	807	134	61	452	200	56	0	86	138	0	48	
Future Volume (vph)	98	807	134	61	452	200	56	0	86	138	0	48	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	10	12	11	11	13	12	15	16	12	11	13	12	
Storage Length (ft)	200		75	175		0	0		0	0		0	
Storage Lanes	1		1	1		0	1		0	1		0	
Taper Length (ft)	25			25			25			25			
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	
Ped Bike Factor			0.99		0.99								
Frt			0.850		0.954			0.850			0.850		
Flt Protected	0.950			0.950			0.950			0.950			
Satd. Flow (prot)	1516	3094	1301	1570	3007	0	1787	1599	0	1525	1502	0	
Flt Permitted	0.271			0.207			0.720			0.692			
Satd. Flow (perm)	433	3094	1282	342	3007	0	1354	1599	0	1111	1502	0	
Right Turn on Red			Yes			Yes			No			Yes	
Satd. Flow (RTOR)			149		65						613		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		508			563			362			321		
Travel Time (s)		11.5			12.8			8.2			7.3		
Confl. Bikes (#/hr)			3			14							
Peak Hour Factor	0.95	0.95	0.95	0.90	0.90	0.90	0.85	0.85	0.85	0.85	0.85	0.85	
Heavy Vehicles (%)	0%	5%	8%	0%	5%	6%	0%	0%	3%	3%	0%	0%	
Parking (#/hr)						0							
Adj. Flow (vph)	103	849	141	68	502	222	66	0	101	162	0	56	
Shared Lane Traffic (%)													
Lane Group Flow (vph)	103	849	141	68	724	0	66	101	0	162	56	0	
Turn Type	pm+pt	NA	Perm	pm+pt	NA		Perm	NA		Perm	NA		
Protected Phases	4	1		4	1			3			3		2
Permitted Phases	1		1	1			3			3			
Detector Phase	4	1	1	4	1		3	3		3	3		
Switch Phase													
Minimum Initial (s)	7.0	10.0	10.0	7.0	10.0		8.0	8.0		8.0	8.0		8.0
Minimum Split (s)	14.0	17.0	17.0	14.0	17.0		15.0	15.0		15.0	15.0		30.0
Total Split (s)	14.0	39.0	39.0	14.0	39.0		27.0	27.0		27.0	27.0		30.0
Total Split (%)	12.7%	35.5%	35.5%	12.7%	35.5%		24.5%	24.5%		24.5%	24.5%		27%
Maximum Green (s)	7.0	32.0	32.0	7.0	32.0		20.0	20.0		20.0	20.0		26.0
Yellow Time (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0		4.0
All-Red Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0		0.0
Lost Time Adjust (s)	0.0	-1.0	-1.0	0.0	-1.0		-1.0	-1.0		-1.0	-1.0		
Total Lost Time (s)	7.0	6.0	6.0	7.0	6.0		6.0	6.0		6.0	6.0		
Lead/Lag	Lag	Lead	Lead	Lag	Lead		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	2.0		2.0
Recall Mode	Max	C-Max	C-Max	Max	C-Max		Max	Max		Max	Max		None
Walk Time (s)													7.0
Flash Dont Walk (s)													19.0
Pedestrian Calls (#/hr)													30
Act Effct Green (s)	51.0	45.0	45.0	51.0	45.0		21.0	21.0		21.0	21.0		
Actuated g/C Ratio	0.46	0.41	0.41	0.46	0.41		0.19	0.19		0.19	0.19		
v/c Ratio	0.38	0.67	0.23	0.29	0.57		0.26	0.33		0.76	0.07		
Control Delay	9.6	21.9	5.9	23.5	34.0		41.0	42.0		66.2	0.2		
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Total Delay	9.6	21.9	5.9	23.5	34.0		41.0	42.0		66.2	0.2		
LOS	A	C	A	C	C		D	D		E	A		
Approach Delay		18.7			33.1			41.6			49.3		
Approach LOS		B			C			D			D		
Queue Length 50th (ft)	28	303	24	37	268		40	62		109	0		
Queue Length 95th (ft)	22	#440	72	m46	m298		77	107		#197	0		
Internal Link Dist (ft)		428			483			282			241		
Turn Bay Length (ft)	200		75	175									
Base Capacity (vph)	269	1266	612	236	1268		258	305		212	782		
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0		
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0		
Storage Cap Reductn	0	0	0	0	0		0	0		0	0		
Reduced v/c Ratio	0.38	0.67	0.23	0.29	0.57		0.26	0.33		0.76	0.07		

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 77 (70%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.76
Intersection Signal Delay: 28.3 Intersection LOS: C
Intersection Capacity Utilization 61.6% 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.
m Volume for 95th percentile queue is metered by upstream signal.

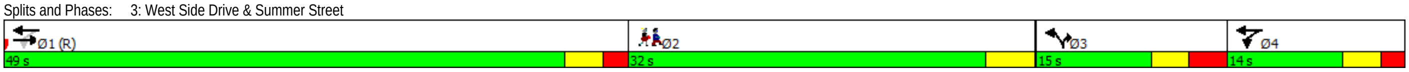
Splits and Phases: 2: East Side Drive/World Trade Center Avenue & Summer Street

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø2
Lane Configurations							
Traffic Volume (vph)	994	2	56	510	4	3	
Future Volume (vph)	994	2	56	510	4	3	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	10	12	11	11	
Storage Length (ft)		0	200		0	0	
Storage Lanes		0	1		1	1	
Taper Length (ft)			25		25		
Lane Util. Factor	0.95	0.95	1.00	0.95	1.00	1.00	
Frt						0.850	
Flt Protected			0.950		0.950		
Satd. Flow (prot)	3249	0	1516	3249	1570	1405	
Flt Permitted			0.189		0.950		
Satd. Flow (perm)	3249	0	302	3249	1570	1405	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)						3	
Link Speed (mph)	30			30	30		
Link Distance (ft)	358			508	345		
Travel Time (s)	8.1			11.5	7.8		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	1080	2	61	554	4	3	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	1082	0	61	554	4	3	
Turn Type	NA		D.P+P	NA	Prot	Prot	
Protected Phases	1		4	1 4	3	3	2
Permitted Phases			1				
Detector Phase	1		4	1 4	3	3	
Switch Phase							
Minimum Initial (s)	10.0		8.0		8.0	8.0	8.0
Minimum Split (s)	17.0		14.0		15.0	15.0	32.0
Total Split (s)	49.0		14.0		15.0	15.0	32.0
Total Split (%)	44.5%		12.7%		13.6%	13.6%	29%
Maximum Green (s)	44.0		9.0		9.0	9.0	28.0
Yellow Time (s)	3.0		3.0		3.0	3.0	4.0
All-Red Time (s)	2.0		2.0		3.0	3.0	0.0
Lost Time Adjust (s)	-1.0		-1.0		-1.0	-1.0	
Total Lost Time (s)	4.0		4.0		5.0	5.0	
Lead/Lag	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		Max		Min	Min	None
Walk Time (s)							7.0
Flash Dont Walk (s)							21.0
Pedestrian Calls (#/hr)							20
Act Effct Green (s)	65.2		75.2	79.2	9.0	9.0	
Actuated g/C Ratio	0.59		0.68	0.72	0.08	0.08	
v/c Ratio	0.56		0.19	0.24	0.03	0.03	
Control Delay	18.8		21.4	17.6	47.2	31.7	
Queue Delay	0.0		0.0	0.0	0.0	0.0	
Total Delay	18.8		21.4	17.6	47.2	31.7	
LOS	B		C	B	D	C	
Approach Delay	18.8			18.0	40.6		
Approach LOS	B			B	D		
Queue Length 50th (ft)	154		1	4	3	0	
Queue Length 95th (ft)	432		m68	230	14	9	
Internal Link Dist (ft)	278			428	265		
Turn Bay Length (ft)			200				
Base Capacity (vph)	1925		316	2339	142	130	
Starvation Cap Reductn	0		0	0	0	0	
Spillback Cap Reductn	0		0	0	0	0	
Storage Cap Reductn	0		0	0	0	0	
Reduced v/c Ratio	0.56		0.19	0.24	0.03	0.02	

Intersection Summary

Area Type: CBD
Cycle Length: 110
Actuated Cycle Length: 110
Offset: 44 (40%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.56
Intersection Signal Delay: 18.6 — Intersection LOS: B
Intersection Capacity Utilization 54.8% — ICU Level of Service A
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 3: West Side Drive & Summer Street



Trip Generation

- Small Program

Omni Boston Hotel - Old Program
Trip Generation Assessment

HOWARD STEIN HUDSON
20-Apr-2017

xx HARD CODED TO BALANCE (Manually change formatting)

Land Use	Size	Category	Directional Split	Average Trip Rate	Unadjusted Vehicle Trips	Assumed National Vehicle Occupancy Rate[1]	Unadjusted Person-Trips	Internal Capture Person-Trips[2]	Pass-By Person-Trips Share	Pass-By Person-Trips	Non-Primary Person-Trips	Primary Person Trips	Transit Share[3]	Transit Person-Trips	Walk/Bike/Other Share[3]	Walk/ Bike/ Other Trips	Auto Share[3]	Auto Person-Trips	% Taxi[4]	Private Auto Person-Trips	Taxi Person-Trips	Assumed Local Auto Occupancy Rate[5]	Assumed Local Auto Occupancy Rate for Taxis[6]	Total Adjusted Private Auto Trips	Total Adjusted Taxi Trips	Total Adjusted Auto (Private + Taxi) Trips
Daily Peak Hour																										
Hotel[7]	300	Total		8.170	2,452	1.84	**4,512**	0	0%	0	0	**4,512**	22%	**992**	41%	**1,850**	37%	**1,670**	30%	1,170	502	1.84	1.20	**636**	**418**	**1,054**
	rooms	In	50%	4.085	1,226	1.84	**2,256**	0	0%	0	0	**2,256**	22%	**496**	41%	**925**	37%	**835**	30%	585	251	1.84	1.20	**318**	**209**	**527**
		Out	50%	4.085	1,226	1.84	**2,256**	0	0%	0	0	**2,256**	22%	**496**	41%	**925**	37%	**835**	30%	585	251	1.84	1.20	**318**	**209**	**527**
Shopping Center[8]	279.5	Total		42.700	11,934	1.78	**21,242**	0	25%	5,310	5,310	**15,932**	34%	**5,416**	27%	**4,304**	39%	**6,212**	14%	5,342	870	1.78	1.20	**3,002**	**726**	**3,728**
	KSF	In	50%	21.350	5,967	1.78	**10,621**	0	25%	2,655	2,655	**7,966**	34%	**2,708**	27%	**2,152**	39%	**3,106**	14%	2,671	435	1.78	1.20	**1,501**	**363**	**1,864**
		Out	50%	21.350	5,967	1.78	**10,621**	0	25%	2,655	2,655	**7,966**	34%	**2,708**	27%	**2,152**	39%	**3106**	14%	2,671	435	1.78	1.20	**1,501**	**363**	**1,864**
Quality Restaurant[9]	10.5	Total		89.950	944	2.20	**2,076**	0	0%	0	0	**2,076**	34%	**706**	27%	**560**	39%	**810**	14%	696	114	2.20	1.20	**316**	**96**	**412**
	KSF	In	50%	44.975	472	2.20	**1,038**	0	0%	0	0	**1,038**	34%	**353**	27%	**280**	39%	**405**	14%	348	57	2.20	1.20	**158**	**48**	**206**
		Out	50%	44.975	472	2.20	**1,038**	0	0%	0	0	**1,038**	34%	**353**	27%	**280**	39%	**405**	14%	348	57	2.20	1.20	**158**	**48**	**206**
Total		Total			**15,330**		**27,830**	**0**		**5,310**	5,310	**22,520**		**7,114**		**6,714**		**8,692**		**7,208**	**1,486**			**3,954**	**1,240**	**5,194**
		In			**7,665**		**13,915**	**0**		**2,655**	2,655	**11,260**		**3,557**		**3,357**		**4,346**		**3,604**	**743**			**1,977**	**620**	**2,597**
		Out			**7,665**		**13,915**	**0**		**2,655**	2,655	**11,260**		**3,557**		**3,357**		**4,346**		**3,604**	**743**			**1,977**	**620**	**2,597**
AM Peak Hour																										
Hotel[7]	300	Total		0.53	159	1.84	**293**	13	0%	0	13	**280**		**51**		**125**		**104**	30%	73	31	1.84	1.20	**39**	**32**	**71**
	rooms	In	59%	0.313	94	1.84	**173**	0	0%	0	0	**173**	20%	**35**	43%	**74**	37%	**64**	30%	45	19	1.84	1.20	**24**	**16**	**40**
		Out	41%	0.217	65	1.84	**120**	13	0%	0	13	**107**	15%	**16**	48%	**51**	37%	**40**	30%	28	12	1.84	1.20	**15**	**16**	**31**
Shopping Center[8]	279.5	Total		0.96	268	1.78	**477**	18	25%	88	106	**371**		**209**		**20**		**142**	14%	122	20	1.78	1.20	**68**	**22**	**90**
	KSF	In	62%	0.595	166	1.78	**295**	13	25%	44	57	**238**	62%	**148**	0%	**0**	38%	**90**	14%	77	13	1.78	1.20	**43**	**11**	**54**
		Out	38%	0.365	102	1.78	**182**	5	25%	44	49	**133**	46%	**61**	15%	**20**	39%	**52**	14%	45	7	1.78	1.20	**25**	**11**	**36**
Quality Restaurant[9]	10.5	Total		0.81	9	2.20	**20**	7	0%	0	7	**13**		**7**		**1**		**5**	14%	5	0	2.20	1.20	**2**	**0**	**2**
	KSF	In	55%	0.446	5	2.20	**11**	6	0%	0	6	**5**	62%	**3**	0%	**0**	38%	**2**	14%	2	0	2.20	1.20	**1**	**0**	**1**
		Out	45%	0.365	4	2.20	**9**	1	0%	0	1	**8**	46%	**4**	15%	**1**	39%	**3**	14%	3	0	2.20	1.20	**1**	**0**	**1**
Total		Total			**436**		**790**	**38**		**88**	126	**664**		**267**		**146**		**251**		**200**	**51**			**109**	**54**	**163**
		In			**265**		**479**	**19**		**44**	63	**416**		**186**		**74**		**156**		**124**	**32**			**68**	**27**	**95**
		Out			**171**		**311**	**19**		**44**	63	**248**		**81**		**72**		**95**		**76**	**19**			**41**	**27**	**68**
PM Peak Hour																										
Hotel[7]	300	Total		0.60	180	1.84	**331**	55	0%	0	55	**276**		**47**		**128**		**101**	30%	71	30	1.84	1.20	**39**	**26**	**65**
	rooms	In	51%	0.306	92	1.84	**169**	32	0%	0	32	**137**	15%	**21**	48%	**66**	37%	**50**	30%	35	15	1.84	1.20	**19**	**13**	**32**
		Out	49%	0.294	88	1.84	**162**	23	0%	0	23	**139**	19%	**26**	44%	**62**	37%	**51**	30%	36	15	1.84	1.20	**20**	**13**	**33**
Shopping Center[8]	279.5	Total		3.71	1,037	1.78	**1,845**	93	25%	424	517	**1,328**		**505**		**306**		**517**	14%	444	73	1.78	1.20	**250**	**64**	**314**
	KSF	In	48%	1.781	498	1.78	**886**	37	25%	212	249	**637**	38%	**242**	23%	**147**	39%	**248**	14%	213	35	1.78	1.20	**120**	**32**	**152**
		Out	52%	1.929	539	1.78	**959**	56	25%	212	268	**691**	38%	**263**	23%	**159**	39%	**269**	14%	231	38	1.78	1.20	**130**	**32**	**162**
Quality Restaurant[9]	10.5	Total		7.49	79	2.20	**174**	54	0%	0	54	**120**		**45**		**28**		**47**	14%	40	7	2.20	1.20	**18**	**8**	**26**
	KSF	In	67%	5.018	53	2.20	**117**	32	0%	0	32	**85**	38%	**32**	23%	**20**	39%	**33**	14%	28	5	2.20	1.20	**13**	**4**	**17**
		Out	33%	2.472	26	2.20	**57**	22	0%	0	22	**35**	38%	**13**	23%	**8**	39%	**14**	14%	12	2	2.20	1.20	**5**	**4**	**9**
Total		Total			**1,296**		**2,350**	**202**		**424**	626	**1,724**		**597**		**462**		**665**		**555**	**110**			**307**	**98**	**405**
		In			**643**		**1,172**	**101**		**212**	313	**859**		**295**		**233**		**331**		**276**	**55**			**152**	**49**	**201**
		Out			**653**		**1,178**	**101**		**212**	313	**865**		**302**		**229**		**334**		**279**	**55**			**155**	**49**	**204**

1. 2009 National vehicle occupancy rates - 1.13:home to work; 1.84: family/personal business; 1.78: shopping; 2.2 social/recreational
2. Based on ITE Trip Generation Handbook, 3rd Edition method
3. Mode shares based on Seaport Square Study
4. Vehicle Trips = 70% Private Auto and 30% Taxi. Taxi trip rate based on CTPS Taxi activity rates for Hotel lane use, as adopted by Central Artery/Tunnel Project
5. Local vehicle occupancy rates based on 2009 National vehicle occupancy rates
6. For taxi cabs, 1.2 passengers per cab. (2.2 minus 1 driver equals 1.2)
7. ITE Trip Generation Manual, 9th Edition, LUC 310 (Hotel), average rate
8. ITE Trip Generation Manual, 9th Edition, LUC 820 (Shopping Center), average rate
9. ITE Trip Generation Manual, 9th Edition, LUC 931 (Quality Restaurant), average rate

- Large Program

Omni Boston Hotel
Trip Generation Assessment

HOWARD STEIN HUDSON
20-Apr-2017

XX HARD CODED TO BALANCE (Manually change formatting)

Land Use	Size	Category	Directional Split	Average Trip Rate	Unadjusted Vehicle Trips	Assumed National Vehicle Occupancy Rate[1]	Unadjusted Person-Trips	Internal Capture Person-Trips[2]	Pass-By Person-Trips Share	Pass-By Person-Trips	Non-Primary Person-Trips	Primary Person Trips	Transit Share[3]	Transit Person-Trips	Walk/Bike/ Other Share[3]	Walk/ Bike/ Other Trips	Auto Share[3]	Auto Person-Trips	% Taxi[4]	Private Auto Person-Trips	Taxi Person-Trips	Assumed Local Auto Occupancy Rate[5]	Assumed Local Auto Occupancy Rate for Taxis[6]	Total Adjusted Private Auto Trips	Total Adjusted Taxi Trips	Total Adjusted Auto (Private + Taxi) Trips
Daily Peak Hour																										
Hotel[7]	1,054	Total		8.170	8,612	1.84	15,846	0	0%	0	0	15,846	22%	3,486	41%	6,496	37%	5,864	30%	4,104	1,760	1.84	1.20	2,230	1,466	3,696
	rooms	In	50%	4.085	4,306	1.84	7,923	0	0%	0	0	7,923	22%	1,743	41%	3,248	37%	2,932	30%	2,052	880	1.84	1.20	1,115	733	1,848
		Out	50%	4.085	4,306	1.84	7,923	0	0%	0	0	7,923	22%	1,743	41%	3,248	37%	2932	30%	2,052	880	1.84	1.20	1,115	733	1,848
Shopping Center[8]	5	Total		42.700	214	1.78	380	0	25%	96	96	284	34%	96	27%	78	39%	110	14%	94	16	1.78	1.20	52	14	66
	KSF	In	50%	21.350	107	1.78	190	0	25%	48	48	142	34%	48	27%	39	39%	55	14%	47	8	1.78	1.20	26	7	33
		Out	50%	21.350	107	1.78	190	0	25%	48	48	142	34%	48	27%	39	39%	55	14%	47	8	1.78	1.20	26	7	33
Quality Restaurant[9]	35	Total		89.950	3,148	2.20	6,926	0	0%	0	0	6,926	34%	2,354	27%	1,870	39%	2,702	14%	2,324	378	2.20	1.20	1,056	316	1,372
	KSF	In	50%	44.975	1,574	2.20	3,463	0	0%	0	0	3,463	34%	1,177	27%	935	39%	1,351	14%	1,162	189	2.20	1.20	528	158	686
		Out	50%	44.975	1,574	2.20	3,463	0	0%	0	0	3,463	34%	1,177	27%	935	39%	1351	14%	1,162	189	2.20	1.20	528	158	686
Total		Total			11,974		23,152	0		96	96	23,056		5,936		8,444		8,676		6,522	2,154			3,338	1,796	5,134
		In			5,987		11,576	0		48	48	11,528		2,968		4,222		4,338		3,261	1,077			1,669	898	2,567
		Out			5,987		11,576	0		48	48	11,528		2,968		4,222		4,338		3,261	1,077			1,669	898	2,567
AM Peak Hour																										
Hotel[7]	1,054	Total		0.53	559	1.84	1,028	3	0%	0	3	1,025		184		462		379	30%	266	114	1.84	1.20	144	112	256
	rooms	In	59%	0.313	330	1.84	607	1	0%	0	1	606	20%	121	43%	261	37%	224	30%	157	67	1.84	1.20	85	56	141
		Out	41%	0.217	229	1.84	421	2	0%	0	2	419	15%	63	48%	201	37%	155	30%	109	47	1.84	1.20	59	56	115
Shopping Center[8]	5	Total		0.96	5	1.78	9	1	25%	2	3	6		3		0		3	14%	3	0	1.78	1.20	2	0	2
	KSF	In	62%	0.595	3	1.78	5	0	25%	1	1	4	62%	2	0%	0	38%	2	14%	2	0	1.78	1.20	1	0	1
		Out	38%	0.365	2	1.78	4	1	25%	1	2	2	46%	1	15%	0	39%	1	14%	1	0	1.78	1.20	1	0	1
Quality Restaurant[9]	35	Total		0.81	29	2.20	64	4	0%	0	4	60		33		4		23	14%	19	4	2.20	1.20	9	4	13
	KSF	In	55%	0.446	16	2.20	35	3	0%	0	3	32	62%	20	0%	0	38%	12	14%	10	2	2.20	1.20	5	2	7
		Out	45%	0.365	13	2.20	29	1	0%	0	1	28	46%	13	15%	4	39%	11	14%	9	2	2.20	1.20	4	2	6
Total		Total			593		1,101	8		2	10	1,091		220		466		405		288	118			155	116	271
		In			349		647	4		1	5	642		143		261		238		169	69			91	58	149
		Out			244		454	4		1	5	449		77		205		167		119	49			64	58	122
PM Peak Hour																										
Hotel[7]	1,054	Total		0.60	633	1.84	1,164	33	0%	0	33	1,131		192		520		419	30%	294	126	1.84	1.20	160	108	268
	rooms	In	51%	0.306	323	1.84	594	14	0%	0	14	580	15%	87	48%	278	37%	215	30%	151	65	1.84	1.20	82	54	136
		Out	49%	0.294	310	1.84	570	19	0%	0	19	551	19%	105	44%	242	37%	204	30%	143	61	1.84	1.20	78	54	132
Shopping Center[8]	5	Total		3.71	19	1.78	34	14	25%	4	18	16		6		4		6	14%	5	1	1.78	1.20	3	2	5
	KSF	In	48%	1.781	9	1.78	16	8	25%	2	10	6	38%	2	23%	2	39%	2	14%	2	0	1.78	1.20	1	1	2
		Out	52%	1.929	10	1.78	18	6	25%	2	8	10	38%	4	23%	2	39%	4	14%	3	1	1.78	1.20	2	1	3
Quality Restaurant[9]	35	Total		7.49	263	2.20	578	45	0%	0	45	533		203		122		208	14%	179	29	2.20	1.20	81	34	115
	KSF	In	67%	5.018	176	2.20	387	24	0%	0	24	363	38%	138	23%	83	39%	142	14%	122	20	2.20	1.20	55	17	72
		Out	33%	2.472	87	2.20	191	21	0%	0	21	170	38%	65	23%	39	39%	66	14%	57	9	2.20	1.20	26	17	43
Total		Total			915		1,776	92		4	96	1,680		401		646		633		478	156			244	144	388
		In			508		997	46		2	48	949		227		363		359		275	85			138	72	210
		Out			407		779	46		2	48	731		174		283		274		203	71			106	72	178

1. 2009 National vehicle occupancy rates - 1.13:home to work; 1.84: family/personal business; 1.78: shopping; 2.2 social/recreational
2. Based on ITE Trip Generation Handbook, 3rd Edition method
3. Mode shares based on Seaport Square Study
4. Vehicle Trips = 70% Private Auto and 30% Taxi. Taxi trip rate based on CTPS Taxi activity rates for Hotel lane use, as adopted by Central Artery/Tunnel Project
5. Local vehicle occupancy rates based on 2009 National vehicle occupancy rates
6. For taxi cabs, 1.2 passengers per cab. (2.2 minus 1 driver equals 1.2)
7. ITE Trip Generation Manual, 9th Edition, LUC 310 (Hotel), average rate
8. ITE Trip Generation Manual, 9th Edition, LUC 820 (Shopping Center), average rate
9. ITE Trip Generation Manual, 9th Edition, LUC 931 (Quality Restaurant), average rate

- Net New Vehicle Trips

Omni Boston Hotel
Trip Generation Assessment

HOWARD STEIN HUDSON
20-Apr-2017

					NET NEW TRIPS		
Land Use	**Size**	**Category**	**Directional Split**	**Average Trip Rate**	**Total Adjusted Private Auto Trips**	**Total Adjusted Taxi Trips**	**Total Adjusted Auto (Private + Taxi) Trips**
Daily Peak Hour							
Hotel[1]	754	Total		8.170	**1,594**	**1,048**	**2,642**
	rooms	In	50%	4.085	**797**	**524**	**1,321**
		Out	50%	4.085	**797**	**524**	**1,321**
Shopping Center[2]	-274.5	Total		42.700	**-2,950**	**-712**	**-3,662**
	KSF	In	50%	21.350	**-1,475**	**-356**	**-1,831**
		Out	50%	21.350	**-1,475**	**-356**	**-1,831**
Quality Restaurant[3]	24.5	Total		89.950	**740**	**220**	**960**
	KSF	In	50%	44.975	**370**	**110**	**480**
		Out	50%	44.975	**370**	**110**	**480**
Total		Total			**-616**	**556**	**-60**
		In			**-308**	**278**	**-30**
		Out			**-308**	**278**	**-30**
AM Peak Hour							
Hotel[1]	754	Total		0.53	**105**	**80**	**185**
	rooms	In	59%	0.313	**61**	**40**	**101**
		Out	41%	0.217	**44**	**40**	**84**
Shopping Center[2]	-274.5	Total		0.96	**-66**	**-22**	**-88**
	KSF	In	62%	0.595	**-42**	**-11**	**-53**
		Out	38%	0.365	**-24**	**-11**	**-35**
Quality Restaurant[3]	24.5	Total		0.81	**7**	**4**	**11**
	KSF	In	55%	0.446	**4**	**2**	**6**
		Out	45%	0.365	**3**	**2**	**5**
Total		Total			**46**	**62**	**108**
		In			**23**	**31**	**54**
		Out			**23**	**31**	**54**
PM Peak Hour							
Hotel[1]	754	Total		0.60	**121**	**82**	**203**
	rooms	In	51%	0.306	**63**	**41**	**104**
		Out	49%	0.294	**58**	**41**	**99**
Shopping Center[2]	-274.5	Total		3.71	**-247**	**-62**	**-309**
	KSF	In	48%	1.781	**-119**	**-31**	**-150**
		Out	52%	1.929	**-128**	**-31**	**-159**
Quality Restaurant[3]	24.5	Total		7.49	**63**	**26**	**89**
	KSF	In	67%	5.018	**42**	**13**	**55**
		Out	33%	2.472	**21**	**13**	**34**
Total		Total			**-63**	**46**	**-17**
		In			**-14**	**23**	**9**
		Out			**-49**	**23**	**-26**

1. ITE Trip Generation Manual, 9th Edition, LUC 310 (Hotel), average rate
2. ITE Trip Generation Manual, 9th Edition, LUC 820 (Shopping Center), average rate
3. ITE Trip Generation Manual, 9th Edition, LUC 931 (Quality Restaurant), average rate

Appendix C

Wind

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
1	A	Spring	15		Standing	24		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	15		Standing	23		Acceptable
	B	Spring	19		Walking	29		Acceptable
		Summer	16	14%	Walking	24		Acceptable
		Fall	18		Walking	27		Acceptable
		Winter	20		Uncomfortable	31		Acceptable
		Annual	19		Walking	28		Acceptable
2	A	Spring	17		Walking	27		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	16		Walking	25		Acceptable
		Winter	19		Walking	30		Acceptable
		Annual	17		Walking	27		Acceptable
	B	Spring	13	-13%	Standing	21	-12%	Acceptable
		Summer	12	-14%	Sitting	18	-14%	Acceptable
		Fall	13	-13%	Standing	20	-13%	Acceptable
		Winter	14	-12%	Standing	23		Acceptable
		Annual	13	-13%	Standing	21	-12%	Acceptable
3	A	Spring	19		Walking	30		Acceptable
		Summer	15		Standing	23		Acceptable
		Fall	18		Walking	28		Acceptable
		Winter	22		Uncomfortable	33		Unacceptable
		Annual	20		Uncomfortable	30		Acceptable
	B	Spring	15		Standing	24		Acceptable
		Summer	13		Standing	21		Acceptable
		Fall	14		Standing	23		Acceptable
		Winter	15		Standing	25		Acceptable
		Annual	15		Standing	24		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
4	A	Spring	20		Uncomfortable	30		Acceptable
		Summer	16		Walking	23		Acceptable
		Fall	19		Walking	28		Acceptable
		Winter	23		Uncomfortable	34		Unacceptable
		Annual	20		Uncomfortable	30		Acceptable
	B	Spring	10		Sitting	16		Acceptable
		Summer	9	12%	Sitting	14		Acceptable
		Fall	10	11%	Sitting	16		Acceptable
		Winter	11		Sitting	17		Acceptable
		Annual	10	11%	Sitting	16		Acceptable
5	A	Spring	20		Uncomfortable	29		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	23		Uncomfortable	33		Unacceptable
		Annual	20		Uncomfortable	29		Acceptable
	B	Spring	8	14%	Sitting	12		Acceptable
		Summer	6		Sitting	10		Acceptable
		Fall	7		Sitting	11		Acceptable
		Winter	8		Sitting	13		Acceptable
		Annual	7		Sitting	12		Acceptable
6	A	Spring	24		Uncomfortable	34		Unacceptable
		Summer	18		Walking	26		Acceptable
		Fall	22		Uncomfortable	31		Acceptable
		Winter	27		Uncomfortable	38		Unacceptable
		Annual	24		Uncomfortable	34		Unacceptable
	B	Spring	7		Sitting	13		Acceptable
		Summer	6		Sitting	11		Acceptable
		Fall	7	17%	Sitting	12		Acceptable
		Winter	7		Sitting	12		Acceptable
		Annual	7	17%	Sitting	12		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
7	A	Spring	24		Uncomfortable	32		Unacceptable
		Summer	18		Walking	25		Acceptable
		Fall	22		Uncomfortable	30		Acceptable
		Winter	27		Uncomfortable	36		Unacceptable
		Annual	24		Uncomfortable	32		Unacceptable
	B	Spring	15		Standing	23		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	15		Standing	23		Acceptable
8	A	Spring	25		Uncomfortable	31		Acceptable
		Summer	19		Walking	23		Acceptable
		Fall	23		Uncomfortable	28		Acceptable
		Winter	26		Uncomfortable	32		Unacceptable
		Annual	24		Uncomfortable	30		Acceptable
	B	Spring	12		Sitting	18		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	10		Sitting	17		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	11		Sitting	18		Acceptable
9	A	Spring	23		Uncomfortable	32		Unacceptable
		Summer	18		Walking	24		Acceptable
		Fall	21		Uncomfortable	30		Acceptable
		Winter	26		Uncomfortable	36		Unacceptable
		Annual	23		Uncomfortable	32		Unacceptable
	B	Spring	16		Walking	22		Acceptable
		Summer	14		Standing	18		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	15		Standing	21		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
10	A	Spring	22		Uncomfortable	31		Acceptable
		Summer	17		Walking	23		Acceptable
		Fall	20		Uncomfortable	28		Acceptable
		Winter	25		Uncomfortable	35		Unacceptable
		Annual	22		Uncomfortable	31		Acceptable
	B	Spring	25		Uncomfortable	32	10%	Unacceptable
		Summer	21		Uncomfortable	25		Acceptable
		Fall	23		Uncomfortable	29		Acceptable
		Winter	27	12%	Uncomfortable	34	13%	Unacceptable
		Annual	24		Uncomfortable	31	11%	Acceptable
11	A	Spring	23		Uncomfortable	34		Unacceptable
		Summer	18		Walking	26		Acceptable
		Fall	22		Uncomfortable	31		Acceptable
		Winter	26		Uncomfortable	38		Unacceptable
		Annual	23		Uncomfortable	34		Unacceptable
	B	Spring	10		Sitting	16		Acceptable
		Summer	9		Sitting	14		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	10		Sitting	17		Acceptable
		Annual	10		Sitting	16		Acceptable
12	A	Spring	22		Uncomfortable	31		Acceptable
		Summer	17		Walking	23		Acceptable
		Fall	21		Uncomfortable	29		Acceptable
		Winter	25		Uncomfortable	35		Unacceptable
		Annual	22		Uncomfortable	31		Acceptable
	B	Spring	13		Standing	21	11%	Acceptable
		Summer	10	11%	Sitting	16	14%	Acceptable
		Fall	12		Sitting	20		Acceptable
		Winter	13		Standing	21	11%	Acceptable
		Annual	12		Sitting	19		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
13	A	Spring	22		Uncomfortable	30		Acceptable
		Summer	17		Walking	23		Acceptable
		Fall	20		Uncomfortable	28		Acceptable
		Winter	25		Uncomfortable	33		Unacceptable
		Annual	22		Uncomfortable	30		Acceptable
	B	Spring	12		Sitting	20		Acceptable
		Summer	9	12%	Sitting	15		Acceptable
		Fall	11		Sitting	19		Acceptable
		Winter	12		Sitting	21	11%	Acceptable
		Annual	11		Sitting	19		Acceptable
14	A	Spring	24		Uncomfortable	34		Unacceptable
		Summer	19		Walking	26		Acceptable
		Fall	23		Uncomfortable	31		Acceptable
		Winter	27		Uncomfortable	37		Unacceptable
		Annual	24		Uncomfortable	33		Unacceptable
	B	Spring	20		Uncomfortable	27		Acceptable
		Summer	17		Walking	22		Acceptable
		Fall	19		Walking	25		Acceptable
		Winter	21		Uncomfortable	28		Acceptable
		Annual	19		Walking	26		Acceptable
15	A	Spring	15		Standing	21		Acceptable
		Summer	12		Sitting	16		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	17		Walking	23		Acceptable
		Annual	15		Standing	21		Acceptable
	B	Spring	15		Standing	23		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	21		Acceptable
		Annual	14		Standing	21		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
16	A	Spring	16		Walking	22		Acceptable
		Summer	13		Standing	17		Acceptable
		Fall	15		Standing	21		Acceptable
		Winter	17		Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable
	B	Spring	13	-13%	Standing	21		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	13	-13%	Standing	19		Acceptable
		Winter	13	-19%	Standing	20	-13%	Acceptable
		Annual	13	-13%	Standing	19		Acceptable
17	A	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
	B	Spring	13	-19%	Standing	19	-14%	Acceptable
		Summer	10	-17%	Sitting	14	-12%	Acceptable
		Fall	13	-13%	Standing	18	-14%	Acceptable
		Winter	14	-18%	Standing	20	-13%	Acceptable
		Annual	13	-13%	Standing	18	-14%	Acceptable
18	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	13		Standing	21		Acceptable
	B	Spring	14		Standing	21		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	15		Standing	21		Acceptable
		Annual	14		Standing	19		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
19	A	Spring	12		Sitting	19		Acceptable
		Summer	10		Sitting	15		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	18		Acceptable
	B	Spring	13		Standing	19		Acceptable
		Summer	9		Sitting	14	-12%	Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	14	-12%	Standing	21		Acceptable
		Annual	12	-14%	Sitting	19		Acceptable
20	A	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	16		Walking	24		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	16		Walking	22		Acceptable
		Winter	18		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable
21	A	Spring	17		Walking	27		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	16		Walking	25		Acceptable
		Winter	19		Walking	29		Acceptable
		Annual	17		Walking	26		Acceptable
	B	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	21		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
22	A	Spring	15		Standing	24		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	15		Standing	23		Acceptable
	B	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	14		Standing	22		Acceptable
23	A	Spring	18		Walking	28		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	17		Walking	26		Acceptable
		Winter	20		Uncomfortable	30		Acceptable
		Annual	18		Walking	27		Acceptable
	B	Spring	21		Uncomfortable	31		Acceptable
		Summer	18		Walking	25		Acceptable
		Fall	20		Uncomfortable	29		Acceptable
		Winter	24		Uncomfortable	34		Unacceptable
		Annual	21		Uncomfortable	31		Acceptable
24	A	Spring	18		Walking	27		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	17		Walking	26		Acceptable
		Winter	20		Uncomfortable	30		Acceptable
		Annual	18		Walking	27		Acceptable
	B	Spring	22		Uncomfortable	32		Unacceptable
		Summer	19		Walking	26		Acceptable
		Fall	21		Uncomfortable	30		Acceptable
		Winter	25		Uncomfortable	35		Unacceptable
		Annual	22		Uncomfortable	31		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
25	A	Spring	17		Walking	26		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	16		Walking	25		Acceptable
		Winter	19		Walking	29		Acceptable
		Annual	17		Walking	26		Acceptable
	B	Spring	18		Walking	27		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	19		Walking	29		Acceptable
		Annual	18		Walking	27		Acceptable
26	A	Spring	18		Walking	27		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	20		Uncomfortable	29		Acceptable
		Annual	18		Walking	26		Acceptable
	B	Spring	17		Walking	26		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	15		Standing	24		Acceptable
		Winter	18		Walking	29		Acceptable
		Annual	16		Walking	26		Acceptable
27	A	Spring	12		Sitting	19		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	13		Standing	22		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	18		Acceptable
		Fall	13		Standing	21		Acceptable
		Winter	15		Standing	24		Acceptable
		Annual	14		Standing	22		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
28	A	Spring	19		Walking	28		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	22		Uncomfortable	32		Unacceptable
		Annual	19		Walking	28		Acceptable
	B	Spring	20		Uncomfortable	30		Acceptable
		Summer	16		Walking	23		Acceptable
		Fall	18		Walking	27		Acceptable
		Winter	22		Uncomfortable	33		Unacceptable
		Annual	20		Uncomfortable	29		Acceptable
29	A	Spring	12		Sitting	20		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	11		Sitting	18		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	13		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	20		Acceptable
		Winter	14		Standing	23		Acceptable
		Annual	13		Standing	21		Acceptable
30	A	Spring	14		Standing	21		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	16		Walking	22		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	18		Walking	25		Acceptable
		Annual	16		Walking	22		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
31	A	Spring	15		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	15		Standing	23		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	14		Standing	21		Acceptable
32	A	Spring	16		Walking	20		Acceptable
		Summer	12		Sitting	15		Acceptable
		Fall	14		Standing	19		Acceptable
		Winter	16		Walking	20		Acceptable
		Annual	15		Standing	19		Acceptable
	B	Spring	20		Uncomfortable	24		Acceptable
		Summer	14		Standing	17		Acceptable
		Fall	18		Walking	22		Acceptable
		Winter	19		Walking	24		Acceptable
		Annual	18		Walking	22		Acceptable
33	A	Spring	22		Uncomfortable	31		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	21		Uncomfortable	29		Acceptable
		Winter	21		Uncomfortable	31		Acceptable
		Annual	20		Uncomfortable	29		Acceptable
	B	Spring	23		Uncomfortable	32		Unacceptable
		Summer	16		Walking	23		Acceptable
		Fall	22		Uncomfortable	30		Acceptable
		Winter	22		Uncomfortable	31		Acceptable
		Annual	21		Uncomfortable	30		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
34	A	Spring	19		Walking	28		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	19		Walking	28		Acceptable
		Annual	18		Walking	26		Acceptable
	B	Spring	18		Walking	27		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	18		Walking	27		Acceptable
		Annual	17		Walking	25		Acceptable
35	A	Spring	14		Standing	22		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	14		Standing	22		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	13		Standing	21		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	14		Standing	22		Acceptable
36	A	Spring	13		Standing	22		Acceptable
		Summer	10		Sitting	17		Acceptable
		Fall	12		Sitting	20		Acceptable
		Winter	13		Standing	22		Acceptable
		Annual	12		Sitting	21		Acceptable
	B	Spring	15	15%	Standing	23		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	21		Acceptable
		Winter	15	15%	Standing	23		Acceptable
		Annual	14	17%	Standing	22		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
37	A	Spring	10		Sitting	17		Acceptable
		Summer	8		Sitting	13		Acceptable
		Fall	10		Sitting	16		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	10		Sitting	16		Acceptable
	B	Spring	10		Sitting	17		Acceptable
		Summer	8		Sitting	12		Acceptable
		Fall	10	11%	Sitting	16		Acceptable
		Winter	11		Sitting	18		Acceptable
		Annual	10		Sitting	16		Acceptable
38	A	Spring	15		Standing	21		Acceptable
		Summer	12		Sitting	16		Acceptable
		Fall	14		Standing	19		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	15		Standing	20		Acceptable
	B	Spring	16		Walking	22		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	15		Standing	21		Acceptable
		Winter	17		Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable
39	A	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
	B	Spring	27		Uncomfortable	36		Unacceptable
		Summer	21		Uncomfortable	29		Acceptable
		Fall	25		Uncomfortable	34		Unacceptable
		Winter	30		Dangerous	41		Unacceptable
		Annual	27		Uncomfortable	36		Unacceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
40	A	Spring	20		Uncomfortable	27		Acceptable
		Summer	15		Standing	19		Acceptable
		Fall	19		Walking	25		Acceptable
		Winter	20		Uncomfortable	27		Acceptable
		Annual	19		Walking	25		Acceptable
	B	Spring	21		Uncomfortable	28		Acceptable
		Summer	15		Standing	20		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	20		Uncomfortable	27		Acceptable
		Annual	19		Walking	26		Acceptable
41	A	Spring	25		Uncomfortable	33		Unacceptable
		Summer	18		Walking	24		Acceptable
		Fall	23		Uncomfortable	30		Acceptable
		Winter	26		Uncomfortable	35		Unacceptable
		Annual	24		Uncomfortable	32		Unacceptable
	B	Spring	26		Uncomfortable	34		Unacceptable
		Summer	19		Walking	25		Acceptable
		Fall	24		Uncomfortable	31		Acceptable
		Winter	27		Uncomfortable	36		Unacceptable
		Annual	25		Uncomfortable	33		Unacceptable
42	A	Spring	18		Walking	28		Acceptable
		Summer	12		Sitting	20		Acceptable
		Fall	16		Walking	25		Acceptable
		Winter	17		Walking	27		Acceptable
		Annual	16		Walking	25		Acceptable
	B	Spring	17		Walking	27		Acceptable
		Summer	12		Sitting	20		Acceptable
		Fall	15		Standing	24		Acceptable
		Winter	16		Walking	26		Acceptable
		Annual	16		Walking	25		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
43	A	Spring	17		Walking		2500%	Acceptable
		Summer	12		Standing		1900%	Acceptable
		Fall	15		Standing		2300%	Acceptable
		Winter	16		Walking		2500%	Acceptable
		Annual	15		Standing		2300%	Acceptable
	B	Spring	17		Walking	26		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18		Walking	27		Acceptable
		Annual	16		Walking	25		Acceptable
44	A	Spring	18		Walking	25		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	20		Uncomfortable	29		Acceptable
		Annual	18		Walking	25		Acceptable
	B	Spring	16		Walking	24		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	15		Standing	24		Acceptable
45	A	Spring	15		Standing	22		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	16		Walking	24		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	15		Standing	22		Acceptable
		Winter	17	13%	Walking	25		Acceptable
		Annual	15		Standing	23		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
46	A	Spring	13		Standing	22		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	20		Acceptable
		Winter	13		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	15		Standing	23		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	15	15%	Standing	22		Acceptable
47	A	Spring	12		Sitting	18		Acceptable
		Summer	10		Sitting	14		Acceptable
		Fall	11		Sitting	17		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	11		Sitting	17		Acceptable
	B	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
48	A	Spring	22		Uncomfortable	30		Acceptable
		Summer	17		Walking	23		Acceptable
		Fall	20		Uncomfortable	28		Acceptable
		Winter	25		Uncomfortable	34		Unacceptable
		Annual	22		Uncomfortable	30		Acceptable
	B	Spring	20		Uncomfortable	29		Acceptable
		Summer	16		Walking	23		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	23		Uncomfortable	33		Unacceptable
		Annual	20		Uncomfortable	29		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
49	A	Spring	19		Walking	27		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	21		Uncomfortable	30		Acceptable
		Annual	19		Walking	27		Acceptable
	B	Spring	15	-17%	Standing	24	-14%	Acceptable
		Summer	12	-20%	Sitting	19	-14%	Acceptable
		Fall	14	-18%	Standing	22	-15%	Acceptable
		Winter	17	-19%	Walking	27	-16%	Acceptable
		Annual	15	-17%	Standing	24	-14%	Acceptable
50	A	Spring	17		Walking	26		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	19		Walking	28		Acceptable
		Annual	17		Walking	26		Acceptable
	B	Spring	16		Walking	25		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18		Walking	27		Acceptable
		Annual	16		Walking	25		Acceptable
51	A	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	10		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	12		Sitting	19		Acceptable
		Annual	12		Sitting	18		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
52	A	Spring	22		Uncomfortable	30		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	21		Uncomfortable	28		Acceptable
		Winter	21		Uncomfortable	29		Acceptable
		Annual	20		Uncomfortable	28		Acceptable
	B	Spring	23		Uncomfortable	31		Acceptable
		Summer	17		Walking	22		Acceptable
		Fall	21		Uncomfortable	29		Acceptable
		Winter	21		Uncomfortable	30		Acceptable
		Annual	21		Uncomfortable	28		Acceptable
53	A	Spring	17		Walking	26		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	14		Standing	23		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable
	B	Spring	16		Walking	25		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	15		Standing	23		Acceptable
54	A	Spring	23		Uncomfortable	33		Unacceptable
		Summer	17		Walking	24		Acceptable
		Fall	21		Uncomfortable	30		Acceptable
		Winter	24		Uncomfortable	34		Unacceptable
		Annual	22		Uncomfortable	31		Acceptable
	B	Spring	26		Uncomfortable	36		Unacceptable
		Summer	21		Uncomfortable	27		Acceptable
		Fall	24		Uncomfortable	33		Unacceptable
		Winter	28		Dangerous	39		Unacceptable
		Annual	25		Uncomfortable	35		Unacceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
55	A	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
	B	Spring	14		Standing	21		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	21		Acceptable
56	A	Spring	15		Standing	21		Acceptable
		Summer	12		Sitting	16		Acceptable
		Fall	13		Standing	19		Acceptable
		Winter	15		Standing	21		Acceptable
		Annual	14		Standing	20		Acceptable
	B	Spring	15		Standing	21		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	19		Acceptable
		Winter	15		Standing	21		Acceptable
		Annual	14		Standing	20		Acceptable
57	A	Spring	14		Standing	23		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	22		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	14		Standing	23		Acceptable
	B	Spring	14		Standing	20		Acceptable
		Summer	11		Sitting	16		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	14		Standing	21		Acceptable
		Annual	13		Standing	19		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
58	A	Spring	16		Walking	25		Acceptable
		Summer	12		Sitting	20		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	18		Walking	28		Acceptable
		Annual	16		Walking	25		Acceptable
	B	Spring	13		Standing	21		Acceptable
		Summer	10		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	23		Acceptable
		Annual	12		Sitting	21		Acceptable
59	A	Spring	22		Uncomfortable	30		Acceptable
		Summer	19		Walking	26		Acceptable
		Fall	21		Uncomfortable	29		Acceptable
		Winter	24		Uncomfortable	32		Unacceptable
		Annual	22		Uncomfortable	30		Acceptable
	B	Spring	22		Uncomfortable	29		Acceptable
		Summer	19		Walking	25		Acceptable
		Fall	20		Uncomfortable	28		Acceptable
		Winter	22		Uncomfortable	30		Acceptable
		Annual	21		Uncomfortable	28		Acceptable
60	A	Spring	15		Standing	24		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	15		Standing	24		Acceptable
	B	Spring	16		Walking	25		Acceptable
		Summer	14		Standing	22		Acceptable
		Fall	15		Standing	24		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	15		Standing	24		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
61	A	Spring	16		Walking	25		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	18		Walking	27		Acceptable
		Annual	16		Walking	25		Acceptable
	B	Spring	15		Standing	22		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15		Standing	23		Acceptable
		Annual	14		Standing	22		Acceptable
62	A	Spring	17		Walking	24		Acceptable
		Summer	14		Standing	19		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	19		Walking	26		Acceptable
		Annual	17		Walking	24		Acceptable
	B	Spring	16		Walking	23		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	17		Walking	24		Acceptable
		Annual	15		Standing	22		Acceptable
63	A	Spring	20		Uncomfortable	28		Acceptable
		Summer	17		Walking	24		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	21		Uncomfortable	30		Acceptable
		Annual	19		Walking	28		Acceptable
	B	Spring	20		Uncomfortable	29		Acceptable
		Summer	17		Walking	24		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	20		Uncomfortable	31		Acceptable
		Annual	19		Walking	28		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
64	A	Spring	18		Walking	28		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	17		Walking	26		Acceptable
		Winter	19		Walking	30		Acceptable
		Annual	18		Walking	27		Acceptable
	B	Spring	16		Walking	26		Acceptable
		Summer	12		Sitting	20		Acceptable
		Fall	15		Standing	25		Acceptable
		Winter	18		Walking	29		Acceptable
		Annual	16		Walking	26		Acceptable
65	A	Spring	18		Walking	26		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	19		Walking	29		Acceptable
		Annual	17		Walking	26		Acceptable
	B	Spring	23		Uncomfortable	31		Acceptable
		Summer	19		Walking	24		Acceptable
		Fall	20		Uncomfortable	28		Acceptable
		Winter	24		Uncomfortable	33		Unacceptable
		Annual	22		Uncomfortable	30		Acceptable
66	A	Spring	21		Uncomfortable	30		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	22		Uncomfortable	32		Unacceptable
		Annual	20		Uncomfortable	29		Acceptable
	B	Spring	22		Uncomfortable	30		Acceptable
		Summer	17		Walking	23		Acceptable
		Fall	20		Uncomfortable	27		Acceptable
		Winter	23		Uncomfortable	32		Unacceptable
		Annual	21		Uncomfortable	29		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
67	A	Spring	17		Walking	26		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	19		Walking	29		Acceptable
		Annual	17		Walking	26		Acceptable
	B	Spring	17		Walking	26		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	19		Walking	29		Acceptable
		Annual	17		Walking	25		Acceptable
68	A	Spring	19		Walking	27		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	20		Uncomfortable	29		Acceptable
		Annual	18		Walking	27		Acceptable
	B	Spring	17		Walking	26		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18		Walking	27		Acceptable
		Annual	16		Walking	25		Acceptable
69	A	Spring	22		Uncomfortable	32		Unacceptable
		Summer	17		Walking	25		Acceptable
		Fall	20		Uncomfortable	29		Acceptable
		Winter	25		Uncomfortable	35		Unacceptable
		Annual	22		Uncomfortable	32		Unacceptable
	B	Spring	21		Uncomfortable	32		Unacceptable
		Summer	16		Walking	24		Acceptable
		Fall	19		Walking	29		Acceptable
		Winter	23		Uncomfortable	34		Unacceptable
		Annual	21		Uncomfortable	31		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
70	A	Spring	15		Standing	22		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	17		Walking	25		Acceptable
		Annual	15		Standing	22		Acceptable
	B	Spring	13		Standing	20		Acceptable
		Summer	10	11%	Sitting	15		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	12		Sitting	20		Acceptable
71	A	Spring	25		Uncomfortable	35		Unacceptable
		Summer	19		Walking	27		Acceptable
		Fall	23		Uncomfortable	33		Unacceptable
		Winter	27		Uncomfortable	39		Unacceptable
		Annual	25		Uncomfortable	35		Unacceptable
	B	Spring	22		Uncomfortable	34		Unacceptable
		Summer	17		Walking	26		Acceptable
		Fall	20		Uncomfortable	31		Acceptable
		Winter	25		Uncomfortable	38		Unacceptable
		Annual	22		Uncomfortable	34		Unacceptable
72	A	Spring	24		Uncomfortable	35		Unacceptable
		Summer	18		Walking	26		Acceptable
		Fall	22		Uncomfortable	32		Unacceptable
		Winter	27		Uncomfortable	38		Unacceptable
		Annual	24		Uncomfortable	34		Unacceptable
	B	Spring	21		Uncomfortable	32		Unacceptable
		Summer	15		Standing	24		Acceptable
		Fall	20		Uncomfortable	30		Acceptable
		Winter	22		Uncomfortable	34		Unacceptable
		Annual	20		Uncomfortable	31		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
73	A	Spring	13		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	16		Walking	25		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	15		Standing	24		Acceptable
		Winter	17		Walking	27		Acceptable
		Annual	16		Walking	25		Acceptable
74	A	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	13		Standing	20		Acceptable
	B	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	18		Acceptable
		Fall	13		Standing	21		Acceptable
		Winter	14		Standing	23		Acceptable
		Annual	13		Standing	21		Acceptable
75	A	Spring	13		Standing	20		Acceptable
		Summer	9		Sitting	15		Acceptable
		Fall	12		Sitting	18		Acceptable
		Winter	12		Sitting	20		Acceptable
		Annual	12		Sitting	19		Acceptable
	B	Spring	15		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	14		Standing	22		Acceptable
		Annual	14		Standing	21		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
76	A	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	15		Standing	23		Acceptable
	B	Spring	15		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	14		Standing	22		Acceptable
77	A	Spring	19		Walking	28		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	21		Uncomfortable	30		Acceptable
		Annual	19		Walking	27		Acceptable
	B	Spring	18		Walking	26		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	19		Walking	28		Acceptable
		Annual	18		Walking	25		Acceptable
78	A	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	16		Walking	24		Acceptable
		Annual	14		Standing	22		Acceptable
	B	Spring	14		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	13		Standing	21		Acceptable
		Winter	15		Standing	24		Acceptable
		Annual	14		Standing	22		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
79	A	Spring	19		Walking	27		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	20		Uncomfortable	30		Acceptable
		Annual	18		Walking	27		Acceptable
	B	Spring	17		Walking	25		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	18		Walking	27		Acceptable
		Annual	16		Walking	24		Acceptable
80	A	Spring	20		Uncomfortable	28		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	22		Uncomfortable	31		Acceptable
		Annual	20		Uncomfortable	28		Acceptable
	B	Spring	19		Walking	27		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	20		Uncomfortable	29		Acceptable
		Annual	19		Walking	26		Acceptable
81	A	Spring	22		Uncomfortable	29		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	20		Uncomfortable	27		Acceptable
		Winter	24		Uncomfortable	31		Acceptable
		Annual	21		Uncomfortable	29		Acceptable
	B	Spring	21		Uncomfortable	28		Acceptable
		Summer	16		Walking	21		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	23		Uncomfortable	31		Acceptable
		Annual	20		Uncomfortable	28		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
82	A	Spring	24		Uncomfortable	28		Acceptable
		Summer	17		Walking	21		Acceptable
		Fall	22		Uncomfortable	26		Acceptable
		Winter	24		Uncomfortable	29		Acceptable
		Annual	22		Uncomfortable	27		Acceptable
	B	Spring	21		Uncomfortable	28		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	23		Uncomfortable	30		Acceptable
		Annual	20		Uncomfortable	28		Acceptable
83	A	Spring	23		Uncomfortable	32		Unacceptable
		Summer	18		Walking	24		Acceptable
		Fall	21		Uncomfortable	29		Acceptable
		Winter	26		Uncomfortable	35		Unacceptable
		Annual	23		Uncomfortable	31		Acceptable
	B	Spring	23		Uncomfortable	32		Unacceptable
		Summer	17		Walking	24		Acceptable
		Fall	21		Uncomfortable	29		Acceptable
		Winter	26		Uncomfortable	35		Unacceptable
		Annual	23		Uncomfortable	31		Acceptable
84	A	Spring	23		Uncomfortable	30		Acceptable
		Summer	18		Walking	23		Acceptable
		Fall	21		Uncomfortable	28		Acceptable
		Winter	26		Uncomfortable	33		Unacceptable
		Annual	23		Uncomfortable	30		Acceptable
	B	Spring	23		Uncomfortable	30		Acceptable
		Summer	17		Walking	23		Acceptable
		Fall	21		Uncomfortable	28		Acceptable
		Winter	25		Uncomfortable	33		Unacceptable
		Annual	22		Uncomfortable	30		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
85	A	Spring	21		Uncomfortable	29		Acceptable
		Summer	16		Walking	22		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	23		Uncomfortable	32		Unacceptable
		Annual	20		Uncomfortable	28		Acceptable
	B	Spring	19		Walking	27		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	20		Uncomfortable	30		Acceptable
		Annual	18		Walking	27		Acceptable
86	A	Spring	16		Walking	25		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable
	B	Spring	21		Uncomfortable	30		Acceptable
		Summer	17		Walking	25		Acceptable
		Fall	20		Uncomfortable	29		Acceptable
		Winter	22		Uncomfortable	33		Unacceptable
		Annual	20		Uncomfortable	30		Acceptable
87	A	Spring	15		Standing	23		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	16		Walking	25		Acceptable
		Annual	14		Standing	22		Acceptable
	B	Spring	16		Walking	24		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
88	A	Spring	17		Walking	26		Acceptable
		Summer	14		Standing	22		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	16		Walking	25		Acceptable
	B	Spring	16	-11%	Walking	24	-11%	Acceptable
		Summer	13	-13%	Standing	19	-14%	Acceptable
		Fall	15	-12%	Standing	23		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable
89	A	Spring	19		Walking	28		Acceptable
		Summer	16		Walking	23		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	20		Uncomfortable	28		Acceptable
		Annual	18		Walking	26		Acceptable
	B	Spring	21		Uncomfortable	29		Acceptable
		Summer	17		Walking	24		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	21		Uncomfortable	29		Acceptable
		Annual	20		Uncomfortable	28		Acceptable
90	A	Spring	17		Walking	27		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	16		Walking	25		Acceptable
	B	Spring	19		Walking	28		Acceptable
		Summer	16		Walking	23		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	19		Walking	28		Acceptable
		Annual	18		Walking	27		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
91	A	Spring	15		Standing	24		Acceptable
		Summer	11		Sitting	18		Acceptable
		Fall	14		Standing	22		Acceptable
		Winter	15		Standing	24		Acceptable
		Annual	14		Standing	23		Acceptable
	B	Spring	15		Standing	24		Acceptable
		Summer	11		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	25		Acceptable
		Annual	14		Standing	23		Acceptable
92	A	Spring	17		Walking	26		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	19		Walking	28		Acceptable
		Annual	17		Walking	25		Acceptable
	B	Spring	17		Walking	26		Acceptable
		Summer	12		Sitting	20		Acceptable
		Fall	15		Standing	24		Acceptable
		Winter	19		Walking	29		Acceptable
		Annual	16		Walking	26		Acceptable
93	A	Spring	15		Standing	21		Acceptable
		Summer	12		Sitting	17		Acceptable
		Fall	14		Standing	20		Acceptable
		Winter	16		Walking	23		Acceptable
		Annual	14		Standing	21		Acceptable
	B	Spring	14		Standing	22		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	13		Standing	20		Acceptable
		Winter	15		Standing	25		Acceptable
		Annual	14		Standing	22		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
94	A	Spring	20		Uncomfortable	27		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	18		Walking	25		Acceptable
		Winter	19		Walking	27		Acceptable
		Annual	18		Walking	25		Acceptable
	B	Spring	21		Uncomfortable	29		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	19		Walking	26		Acceptable
		Winter	20		Uncomfortable	29		Acceptable
		Annual	19		Walking	27		Acceptable
95	A	Spring	23		Uncomfortable	33		Unacceptable
		Summer	17		Walking	25		Acceptable
		Fall	21		Uncomfortable	30		Acceptable
		Winter	23		Uncomfortable	34		Unacceptable
		Annual	21		Uncomfortable	31		Acceptable
	B	Spring	24		Uncomfortable	33		Unacceptable
		Summer	18		Walking	25		Acceptable
		Fall	21		Uncomfortable	30		Acceptable
		Winter	23		Uncomfortable	34		Unacceptable
		Annual	22		Uncomfortable	31		Acceptable
96	A	Spring	29		Dangerous	38		Unacceptable
		Summer	23		Uncomfortable	31		Acceptable
		Fall	27		Uncomfortable	36		Unacceptable
		Winter	32		Dangerous	41		Unacceptable
		Annual	29		Dangerous	38		Unacceptable
	B	Spring	29		Dangerous	38		Unacceptable
		Summer	22		Uncomfortable	30		Acceptable
		Fall	26		Uncomfortable	35		Unacceptable
		Winter	32		Dangerous	41		Unacceptable
		Annual	29		Dangerous	37		Unacceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
97	A	Spring	23		Uncomfortable	32		Unacceptable
		Summer	19		Walking	26		Acceptable
		Fall	22		Uncomfortable	30		Acceptable
		Winter	25		Uncomfortable	34		Unacceptable
		Annual	23		Uncomfortable	31		Acceptable
	B	Spring	23		Uncomfortable	32		Unacceptable
		Summer	19		Walking	26		Acceptable
		Fall	22		Uncomfortable	30		Acceptable
		Winter	25		Uncomfortable	34		Unacceptable
		Annual	23		Uncomfortable	31		Acceptable
98	A	Spring	18		Walking	27		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	18		Walking	28		Acceptable
		Annual	17		Walking	26		Acceptable
	B	Spring	19		Walking	28		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	19		Walking	29		Acceptable
		Annual	18		Walking	27		Acceptable
99	A	Spring	16		Walking	25		Acceptable
		Summer	14		Standing	22		Acceptable
		Fall	16		Walking	24		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable
	B	Spring	19		Walking	28		Acceptable
		Summer	18		Walking	25		Acceptable
		Fall	19		Walking	27		Acceptable
		Winter	20		Uncomfortable	29		Acceptable
		Annual	19		Walking	27		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
100	A	Spring	19		Walking	27		Acceptable
		Summer	14		Standing	20		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	19		Walking	27		Acceptable
		Annual	17		Walking	25		Acceptable
	B	Spring	20		Uncomfortable	29		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	20		Uncomfortable	30		Acceptable
		Annual	18		Walking	28		Acceptable
101	A	Spring	22		Uncomfortable	30		Acceptable
		Summer	19		Walking	25		Acceptable
		Fall	21		Uncomfortable	29		Acceptable
		Winter	24		Uncomfortable	33		Unacceptable
		Annual	22		Uncomfortable	30		Acceptable
	B	Spring	21		Uncomfortable	30		Acceptable
		Summer	17		Walking	24		Acceptable
		Fall	20		Uncomfortable	28		Acceptable
		Winter	23		Uncomfortable	32		Unacceptable
		Annual	21		Uncomfortable	29		Acceptable
102	A	Spring	19		Walking	26		Acceptable
		Summer	15		Standing	20		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	19		Walking	27		Acceptable
		Annual	18		Walking	25		Acceptable
	B	Spring	19		Walking	26		Acceptable
		Summer	15		Standing	20		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	20		Uncomfortable	28		Acceptable
		Annual	18		Walking	25		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
103	A	Spring	18		Walking	26		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	18		Walking	27		Acceptable
		Annual	17		Walking	25		Acceptable
	B	Spring	18		Walking	26		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	17		Walking	25		Acceptable
		Winter	18		Walking	27		Acceptable
		Annual	17		Walking	25		Acceptable
104	A	Spring	18		Walking	27		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	17		Walking	26		Acceptable
		Winter	19		Walking	29		Acceptable
		Annual	18		Walking	27		Acceptable
	B	Spring	19		Walking	28		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	17		Walking	26		Acceptable
		Winter	20		Uncomfortable	29		Acceptable
		Annual	18		Walking	27		Acceptable
105	A	Spring	22		Uncomfortable	30		Acceptable
		Summer	17		Walking	23		Acceptable
		Fall	20		Uncomfortable	27		Acceptable
		Winter	24		Uncomfortable	33		Unacceptable
		Annual	22		Uncomfortable	29		Acceptable
	B	Spring	22		Uncomfortable	30		Acceptable
		Summer	17		Walking	23		Acceptable
		Fall	20		Uncomfortable	27		Acceptable
		Winter	24		Uncomfortable	33		Unacceptable
		Annual	22		Uncomfortable	29		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed Speed (mph)	Mean Wind Speed % Change	Mean Wind Speed Rating	Effective Gust Wind Speed Speed (mph)	Effective Gust Wind Speed % Change	Effective Gust Wind Speed Rating
106	A	Spring	15		Standing	23		Acceptable
		Summer	12		Sitting	18		Acceptable
		Fall	14		Standing	21		Acceptable
		Winter	15		Standing	24		Acceptable
		Annual	14		Standing	22		Acceptable
	B	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
107	A	Spring	19		Walking	29		Acceptable
		Summer	15		Standing	23		Acceptable
		Fall	17		Walking	26		Acceptable
		Winter	20		Uncomfortable	31		Acceptable
		Annual	18		Walking	28		Acceptable
	B	Spring	20		Uncomfortable	30		Acceptable
		Summer	16		Walking	24		Acceptable
		Fall	18		Walking	27		Acceptable
		Winter	21		Uncomfortable	33		Unacceptable
		Annual	19		Walking	30		Acceptable
108	A	Spring	21		Uncomfortable	31		Acceptable
		Summer	16		Walking	23		Acceptable
		Fall	19		Walking	28		Acceptable
		Winter	23		Uncomfortable	33		Unacceptable
		Annual	21		Uncomfortable	30		Acceptable
	B	Spring	21		Uncomfortable	32		Unacceptable
		Summer	16		Walking	24		Acceptable
		Fall	19		Walking	29		Acceptable
		Winter	24		Uncomfortable	35		Unacceptable
		Annual	21		Uncomfortable	31		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
109	A	N/A						
	B	Spring	14		Standing	25		Acceptable
		Summer	11		Sitting	21		Acceptable
		Fall	13		Standing	23		Acceptable
		Winter	15		Standing	27		Acceptable
		Annual	14		Standing	25		Acceptable
110	A	N/A						
	B	Spring	21		Uncomfortable	33		Unacceptable
		Summer	17		Walking	27		Acceptable
		Fall	20		Uncomfortable	31		Acceptable
		Winter	23		Uncomfortable	36		Unacceptable
		Annual	21		Uncomfortable	33		Unacceptable
111	A	N/A						
	B	Spring	16		Walking	26		Acceptable
		Summer	13		Standing	21		Acceptable
		Fall	15		Standing	25		Acceptable
		Winter	19		Walking	30		Acceptable
		Annual	16		Walking	26		Acceptable
112	A	N/A						
	B	Spring	16		Walking	26		Acceptable
		Summer	12		Sitting	21		Acceptable
		Fall	15		Standing	25		Acceptable
		Winter	17		Walking	29		Acceptable
		Annual	15		Standing	26		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
113	A	N/A						
	B	Spring	13		Standing	20		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	13		Standing	21		Acceptable
		Annual	12		Sitting	20		Acceptable
114	A	N/A						
	B	Spring	13		Standing	21		Acceptable
		Summer	11		Sitting	17		Acceptable
		Fall	12		Sitting	19		Acceptable
		Winter	14		Standing	23		Acceptable
		Annual	13		Standing	21		Acceptable
115	A	N/A						
	B	Spring	17		Walking	25		Acceptable
		Summer	15		Standing	21		Acceptable
		Fall	16		Walking	23		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable
116	A	N/A						
	B	Spring	22		Uncomfortable	30		Acceptable
		Summer	19		Walking	25		Acceptable
		Fall	20		Uncomfortable	27		Acceptable
		Winter	22		Uncomfortable	30		Acceptable
		Annual	21		Uncomfortable	28		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating
117	A	N/A						
		Summer	3		Sitting	4		Acceptable
		Fall	3		Sitting	5		Acceptable
		Winter	4		Sitting	5		Acceptable
		Annual	4		Sitting	5		Acceptable
	B	Spring	17		Walking	25		Acceptable
		Summer	15		Standing	22		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	18		Walking	27		Acceptable
		Annual	17		Walking	25		Acceptable
118	A	N/A						
	B	Spring	16		Walking	24		Acceptable
		Summer	13		Standing	20		Acceptable
		Fall	15		Standing	23		Acceptable
		Winter	17		Walking	26		Acceptable
		Annual	16		Walking	24		Acceptable
119	A	N/A						
	B	Spring	19		Walking	27		Acceptable
		Summer	14		Standing	21		Acceptable
		Fall	18		Walking	26		Acceptable
		Winter	21		Uncomfortable	30		Acceptable
		Annual	19		Walking	27		Acceptable
120	A	N/A						
	B	Spring	17		Walking	25		Acceptable
		Summer	13		Standing	19		Acceptable
		Fall	17		Walking	24		Acceptable
		Winter	19		Walking	28		Acceptable
		Annual	17		Walking	25		Acceptable

Table 1: Mean Speed and Effective Gust Categories - Multiple Seasons

Location	Configuration	Season	Mean Wind Speed			Effective Gust Wind Speed		
			Speed (mph)	% Change	Rating	Speed (mph)	% Change	Rating

Configurations		Mean Wind Criteria Speed (mph)		Effective Gust Criteria (mph)	
A	No Build	≤ 12	Comfortable for Sitting	≤ 31	Acceptable
B	Build - Option 2	13 - 15	Comfortable for Standing	> 31	Unacceptable
		16 - 19	Comfortable for Walking		
		20 - 27	Uncomfortable for Walking		
		> 27	Dangerous Conditions		

1) Wind Speeds are for a 1% probability of exceedance; and,

2) % Change is based on comaprison with Configuration A and only those that are greater than 10% are listed

Appendix D

Climate Change Checklist

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.

A.1 - Project Information

Project Name:	Summer Street Hotel
Project Address Primary:	450 Summer Street, Boston, MA
Project Address Additional:	
Project Contact (name / Title / Company / email / phone):	Jason Tilley, Senior Associate, The Davis Companies, (617) 936-4804, jtilley@thedaviscompanies.com

A.2 - Team Description

Owner / Developer:	New Boston Hospitality LLC
Architect:	Elkus Manfredi Architects / Moody Nolan / Stull & Lee Inc.
Engineer (building systems):	Cosentini
Sustainability / LEED:	The Green Engineer
Permitting:	Epsilon Associates, Inc.
Construction Management:	John Moriarty & Associates / Janey Construction Management + Consulting
Climate Change Expert:	Epsilon Associates, Inc.

A.3 - Project Permitting and Phase

At what phase is the project – most recent completed submission at the time of this response?

☐ 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:	Hospitality, Retail
List the First Floor Uses:	*Retail, Lobbies*

What is the principal Construction Type – select most appropriate type?

☐ Wood Frame	☐ Masonry	☑ Steel Frame	☐ Concrete

Describe the building?

Site Area:	*74,397 SF*	Building Area:	*788,500 SF*
Building Height:	*218 ft*	Number of Stories:	*21 Flrs.*
First Floor Elevation (reference Boston City Base):	*31' to 38' BCB 24'6" to 31'6" NAVD88 Elev.*	Are there below grade spaces/levels, if yes how many:	*Yes, 1*

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*	Certified:	*Yes*

A.6 - Building Energy-

What are the base and peak operating energy loads for the building? TBD

Electric:	*(kW)*	Heating:	*(MMBtu/hr)*
What is the planned building Energy Use Intensity:	*(kWh/SF)*	Cooling:	*(Tons/hr)*

What are the peak energy demands of your critical systems in the event of a service interruption?

Electric:	*(kW)*	Heating:	*(MMBtu/hr)*
		Cooling:	*(Tons/hr)*

What is nature and source of your back-up / emergency generators? TBD

Electrical Generation:	*(kW)*		Fuel Source:	
System Type and Number of Units:	☐ 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?

8/91 Deg.	Based on ASHRAE Fundamentals 2013 99.6% heating; 0.4% cooling

What Extreme Heat Event characteristics will be used for project planning – Peak High, Duration, and Frequency?

90 Deg.	*25-90 Days*	*per year*

What Drought characteristics will be used for project planning – Duration and Frequency?

30-90 Days	*0.2 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?

45 Inches / yr.	*4 Inches*	*0.5 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?

105 Peak Wind	*10 Hours*	*0.25 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:	*TBD*
How is performance determined:	Energy model

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:				

What are the insulation (R) values for building envelop elements? TBD

Roof:		Walls / Curtain Wall Assembly:	
Foundation:		Basement / Slab:	
Windows:		Doors:	

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: Considering CHP

Will the project employ Distributed Energy / Smart Grid Infrastructure and /or Systems?

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?

	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:

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:

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:

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:				

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

Describe site conditions?

Site Elevation – Low/High Points:	16' to 39' BCB 9'6" to 32'6" NAVD88
Building Proximity to Water:	*~1,075 Ft.*

Is the site or building located in any of the following?

Coastal Zone:	*Yes*	Velocity Zone:	*No*
Flood Zone:	*Yes*	Area Prone to Flooding:	*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 (500-yr flood)*	Future floodplain delineation updates:	*Yes*

What is the project or building proximity to nearest Coastal, Velocity or Flood Zone or Area Prone to Flooding?

0 Ft.

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:	*3 Ft.*	Frequency of storms:	*0.1 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:	*23.64' BCB 17' NAVD88*	First Floor Elevation:	*31' to 38' BCB 24'6" to 31'6" NAVD88 Elev.*

Will the project employ temporary measures to prevent building flooding (e.g. barricades, flood gates):

	TBD	If Yes, to what elevation	*Boston City Base Elev*
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

Will the project site / building(s) be accessible during periods of inundation or limited access to transportation:

Yes	If yes, to what height above 100 Year Floodplain:	*> 5 ft*

Will the project employ hard and / or soft landscape elements as velocity barriers to reduce wind or wave impacts?

	No
If Yes, describe:	

Will the building remain occupiable without utility power during an extended period of inundation:

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*	☑ 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:	*No*	☐ Surrounding site elevation can be raised	☐ Building ground floor can be raised	☐ Construction been engineered
Describe additional strategies:	The Project will comply with the Massport Flood-proofing Design Guidelines and performance standards for new buildings.			

Has the building been planned and designed to accommodate future resiliency enhancements?

Select appropriate:	*TBD*	☐ 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 E

Accessibility Checklist

Article 80 – Accessibility Checklist

A requirement of the Boston Planning & Development Agency (BPDA)
Article 80 Development Review Process

The Mayor's Commission for Persons with Disabilities strives to reduce architectural, procedural, attitudinal, and communication barriers that affect persons with disabilities in the City of Boston. In 2009, a Disability Advisory Board was appointed by the Mayor to work alongside the Commission in creating universal access throughout the city's built environment. The Disability Advisory Board is made up of 13 volunteer Boston residents with disabilities who have been tasked with representing the accessibility needs of their neighborhoods and increasing inclusion of people with disabilities.

In conformance with this directive, the BDPA has instituted this Accessibility Checklist as a tool to encourage developers to begin thinking about access and inclusion at the beginning of development projects, and strive to go beyond meeting only minimum MAAB / ADAAG compliance requirements. Instead, our goal is for developers to create ideal design for accessibility which will ensure that the built environment provides equitable experiences for all people, regardless of their abilities. As such, any project subject to Boston Zoning Article 80 Small or Large Project Review, including Institutional Master Plan modifications and updates, must complete this Accessibility Checklist thoroughly to provide specific detail about accessibility and inclusion, including descriptions, diagrams, and data.

For more information on compliance requirements, advancing best practices, and learning about progressive approaches to expand accessibility throughout Boston's built environment. Proponents are highly encouraged to meet with Commission staff, prior to filing.

Accessibility Analysis Information Sources:
1. Americans with Disabilities Act – 2010 ADA Standards for Accessible Design
   http://www.ada.gov/2010ADAstandards_index.htm
2. Massachusetts Architectural Access Board 521 CMR
   http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/aab/aab-rules-and-regulations-pdf.html
3. Massachusetts State Building Code 780 CMR
   http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/csl/building-codebbrs.html
4. Massachusetts Office of Disability – Disabled Parking Regulations
   http://www.mass.gov/anf/docs/mod/hp-parking-regulations-summary-mod.pdf
5. MBTA Fixed Route Accessible Transit Stations
   http://www.mbta.com/riding_the_t/accessible_services/
6. City of Boston – Complete Street Guidelines
   http://bostoncompletestreets.org/
7. City of Boston – Mayor's Commission for Persons with Disabilities Advisory Board
   https://www.boston.gov/departments/disabilities-commission
8. City of Boston – Public Works Sidewalk Reconstruction Policy
   http://www.cityofboston.gov/images_documents/sidewalk%20policy%200114_tcm3-41668.pdf
9. City of Boston – Public Improvement Commission Sidewalk Café Policy
   http://www.cityofboston.gov/images_documents/Sidewalk_cafes_tcm3-1845.pdf

Glossary of Terms:
1. ***Accessible Route*** – A continuous and unobstructed path of travel that meets or exceeds the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 20
2. ***Accessible Group 2 Units*** – Residential units with additional floor space that meet or exceed the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 9.4
3. ***Accessible Guestrooms*** – Guestrooms with additional floor space, that meet or exceed the dimensional and inclusionary requirements set forth by MAAB 521 CMR: Section 8.4
4. ***Inclusionary Development Policy (IDP)*** – Program run by the BPDA that preserves access to affordable housing opportunities, in the City. For more information visit: http://www.bostonplans.org/housing/overview
5. ***Public Improvement Commission (PIC)*** – The regulatory body in charge of managing the public right of way. For more information visit: https://www.boston.gov/departments/public-works/public-improvement-commission
6. ***Visitability*** – A place's ability to be accessed and visited by persons with disabilities that cause functional limitations; where architectural barriers do not inhibit access to entrances/doors and bathrooms.

1. Project Information: *If this is a multi-phased or multi-building project, fill out a separate Checklist for each phase/building.*			
Project Name:	Summer Street Hotel		
Primary Project Address:	450 Summer Street, Boston, MA		
Total Number of Phases/Buildings:	1		
Primary Contact (Name / Title / Company / Email / Phone):	Jason Tilley / Senior Associate / The Davis Companies / (617)936-4804 / JTilley@TheDavisCompanies.com		
Owner / Developer:	OH NBH Owner LLC		
Architect:	Elkus Manfredi Architects / Moody Nolan / Stull & Lee Inc.		
Civil Engineer:	Nitsch Engineering		
Landscape Architect:	Mikyoung Kim Design		
Permitting:	Epsilon Associates		
Construction Management:	John Moriarty & Associates / Janey Construction Management + Consulting		
At what stage is the project at time of this questionnaire? Select below:			
	$\boxed{\text{PNF / Expanded PNF Submitted}}$	Draft / Final Project Impact Report Submitted	BPDA Board Approved
	BPDA Design Approved	Under Construction	Construction Completed:
Do you anticipate filing for any variances with the Massachusetts Architectural Access Board (MAAB)? ***If yes,*** identify and explain.	No		

2. Building Classification and Description: *This section identifies preliminary construction information about the project including size and uses.*			
What are the dimensions of the project?			
Site Area:	74,397 *SF*	Building Area:	788,500 *GSF*
Building Height:	218 *FT.*	Number of Stories:	21 *Flrs.*
First Floor Elevation:	24'-6" to 31'6" BCB	Is there below grade space:	*Yes / No*

What is the Construction Type? (Select most appropriate type)				
	Wood Frame	Masonry	Steel Frame	Concrete
What are the principal building uses? (IBC definitions are below – select all appropriate that apply)				
	Residential – One - Three Unit	Residential - Multi-unit, Four +	Institutional	Educational
	Business	Mercantile	Factory	Hospitality
	Laboratory / Medical	Storage, Utility and Other		
List street-level uses of the building:	Retail + Hospitality			

3. Assessment of Existing Infrastructure for Accessibility:

This section explores the proximity to accessible transit lines and institutions, such as (but not limited to) hospitals, elderly & disabled housing, and general neighborhood resources. Identify how the area surrounding the development is accessible for people with mobility impairments and analyze the existing condition of the accessible routes through sidewalk and pedestrian ramp reports.

Provide a description of the neighborhood where this development is located and its identifying topographical characteristics:	The Project site is located in the South Boston waterfront and is surrounded by a mix of uses, including hospitality, residential, retail, office and industrial.
List the surrounding accessible MBTA transit lines and their proximity to development site: commuter rail / subway stations, bus stops:	Silver Line World Trade Center MBTA Station - Approx. 500' to the north along World Trade Center Avenue Bus Stops for the 4 & 7 Buses located at the intersection of D St + Summer St, and at Summer Street opposite World Trade Center Avenue
List the surrounding institutions: hospitals, public housing, elderly and disabled housing developments, educational facilities, others:	None
List the surrounding government buildings: libraries, community centers, recreational facilities, and other related facilities:	Boston Convention and Exhibition Center

4. Surrounding Site Conditions – Existing:

This section identifies current condition of the sidewalks and pedestrian ramps at the development site.

Is the development site within a historic district? ***If yes,*** identify which district:	No
Are there sidewalks and pedestrian ramps existing at the development site? ***If yes***, list the existing sidewalk and pedestrian ramp dimensions, slopes, materials, and physical condition at the development site:	There are existing sidewalks along WTC Ave, Summer St, and D St. There is no sidewalk to the north along Massport Haul Rd. The sidewalk slopes from a max grade of 32'-6" at the northwestern corner of the site to 24'-0" at the southeastern corner. The existing sidewalks are in good condition.

Are the sidewalks and pedestrian ramps existing-to-remain? ***If yes,*** have they been verified as ADA / MAAB compliant (with yellow composite detectable warning surfaces, cast in concrete)? ***If yes,*** provide description and photos:	No

5. Surrounding Site Conditions – Proposed

This section identifies the proposed condition of the walkways and pedestrian ramps around the development site. Sidewalk width contributes to the degree of comfort 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. Wider sidewalks allow people to walk side by side and pass each other comfortably walking alone, walking in pairs, or using a wheelchair.

Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? ***If yes***, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, or Boulevard.	Yes, the proposed sidewalks most closely resemble the Industrial street type.
What are the total dimensions and slopes of the proposed sidewalks? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone:	WTC Avenue: Frontage=6' Pedestrian=10' Furnishing=4' Total=20' Summer St: Frontage= 3' to 6' Pedestrian= 8' to 10' Furnishing= 4' Total=15' to 20' D St: Frontage= 2' Pedestrian= 8' Furnishing= 2' Total=12'
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?	The pedestrian zone will be concrete sidewalk pavers. The furnishing zone will be pavers. The proposed materials will be on a Massport-owned parcel, and the City of Boston pedestrian right-of-way.
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way? ***If yes,*** what are the proposed dimensions of the sidewalk café or furnishings and what will the remaining right-of-way clearance be?	Yes, the width of the proposed seating areas will be 6'. The remaining right-of-way clearances will be 10' along World Trade Center Avenue, and 8' to 10' along Summer Street.
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the Public Improvement Commission (PIC)?	Area is not subject to PIC jurisdiction as it is within Massport-owned land.

Will any portion of the Project be going through the PIC? ***If yes,*** identify PIC actions and provide details.	Area is not subject to PIC jurisdiction as it is within Massport-owned land.

6. 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 – Disabled Parking Regulations.

What is the total number of parking spaces provided at the development site? Will these be in a parking lot or garage?	0 - Parking will be provided in Massport's South Boston Waterfront Transportation Center (SBWTC). A pedestrian bridge, that will be accessible, will connect the Project to the SBWTC.
What is the total number of accessible spaces provided at the development site? How many of these are "Van Accessible" spaces with an 8 foot access aisle?	0 - Accessible parking will be provided in the SBWTC
Will any on-street accessible parking spaces be required? ***If yes,*** has the proponent contacted the Commission for Persons with Disabilities regarding this need?	No
Where is the accessible visitor parking located?	Accessible visitor parking will be located in the SBWTC, and will be connected to the Project by a pedestrian bridge that will be accessible.
Has a drop-off area been identified? ***If yes,*** will it be accessible?	Yes, a drop-off has been identified along Summer Street. It is accessible.

7. Circulation and Accessible Routes:

The primary objective in designing smooth and continuous paths of travel is to create universal access to entryways and common spaces, which accommodates persons of all abilities and allows for visitability with neighbors.

Describe accessibility at each entryway: Example: Flush Condition, Stairs, Ramp, Lift or Elevator:	All public entry areas are flush conditions.
Are the accessible entrances and standard entrance integrated? ***If yes,*** *describe.* ***If no,*** what is the reason?	Yes, the main entrance is also an accessible entrance.

If project is subject to Large Project Review/Institutional Master Plan, describe the accessible routes way-finding / signage package.	TBD
8. Accessible Units (Group 2) and Guestrooms: (If applicable) *In order to facilitate access to housing and hospitality, this section addresses the number of accessible units that are proposed for the development site that remove barriers to housing and hotel rooms.*	
What is the total number of proposed housing units or hotel rooms for the development?	1,054 keys
If a residential development, how many units are for sale? How many are for rent? What is the breakdown of market value units vs. IDP (Inclusionary Development Policy) units?	
If a residential development, how many accessible Group 2 units are being proposed?	
If a residential development, how many accessible Group 2 units will also be IDP units? ***If none***, describe reason.	
If a hospitality development, how many accessible units will feature a wheel-in shower? Will accessible equipment be provided as well? ***If yes,*** provide amount and location of equipment.	23 Accessible Units (out of a total of 53 units with mobility features) have wheel-in showers. All code required (521 CMR, ADA) accessible equipment will be provided and such equipment will be installed / located in the accessible unit or otherwise stored on site and provided by hotel guest services as permitted / required by Code.
Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs / thresholds at entry, step to balcony, others. ***If yes,*** provide reason.	No.
Are there interior elevators, ramps or lifts located in the development for access around architectural barriers and/or to separate floors? ***If yes,*** describe:	Yes, the ground level consists of two main levels. Ramps and a lift are provided for ADA access between levels.

9. Community Impact: *Accessibility and inclusion extend past required compliance with building codes. Providing an overall scheme that allows full and equal participation of persons with disabilities makes the development an asset to the surrounding community*.	
Is this project providing any funding or improvements to the surrounding neighborhood? Examples: adding extra street trees, building or refurbishing a local park, or supporting other community-based initiatives?	Yes, this project will provide new street trees and a sidewalk pedestrian overhead protection system along World Trade Center Avenue.
What inclusion elements does this development provide for persons with disabilities in common social and open spaces? Example: Indoor seating and TVs in common rooms; outdoor seating and barbeque grills in yard. Will all of these spaces and features provide accessibility?	All public spaces and hotel common spaces will provide accessibility.
Are any restrooms planned in common public spaces? ***If yes,*** will any be single-stall, ADA compliant and designated as "Family"/ "Companion" restrooms? ***If no***, explain why not.	Yes, and yes.
Has the proponent reviewed the proposed plan with the City of Boston Disability Commissioner or with their Architectural Access staff? ***If yes,*** did they approve? ***If no,*** what were their comments?	Not yet.
Has the proponent presented the proposed plan to the Disability Advisory Board at one of their monthly meetings? Did the Advisory Board vote to support this project? ***If no,*** what recommendations did the Advisory Board give to make this project more accessible?	Not yet.

10. Attachments *Include a list of all documents you are submitting with this Checklist. This may include drawings, diagrams, photos, or any other material that describes the accessible and inclusive elements of this project.*
Provide a diagram of the accessible routes to and from the accessible parking lot/garage and drop-off areas to the development entry locations, including route distances.
Provide a diagram of the accessible route connections through the site, including distances.
Provide a diagram the accessible route to any roof decks or outdoor courtyard space? (if applicable)
Provide a plan and diagram of the accessible Group 2 units, including locations and route from accessible entry.
Provide any additional drawings, diagrams, photos, or any other material that describes the inclusive and accessible elements of this project. • • • •

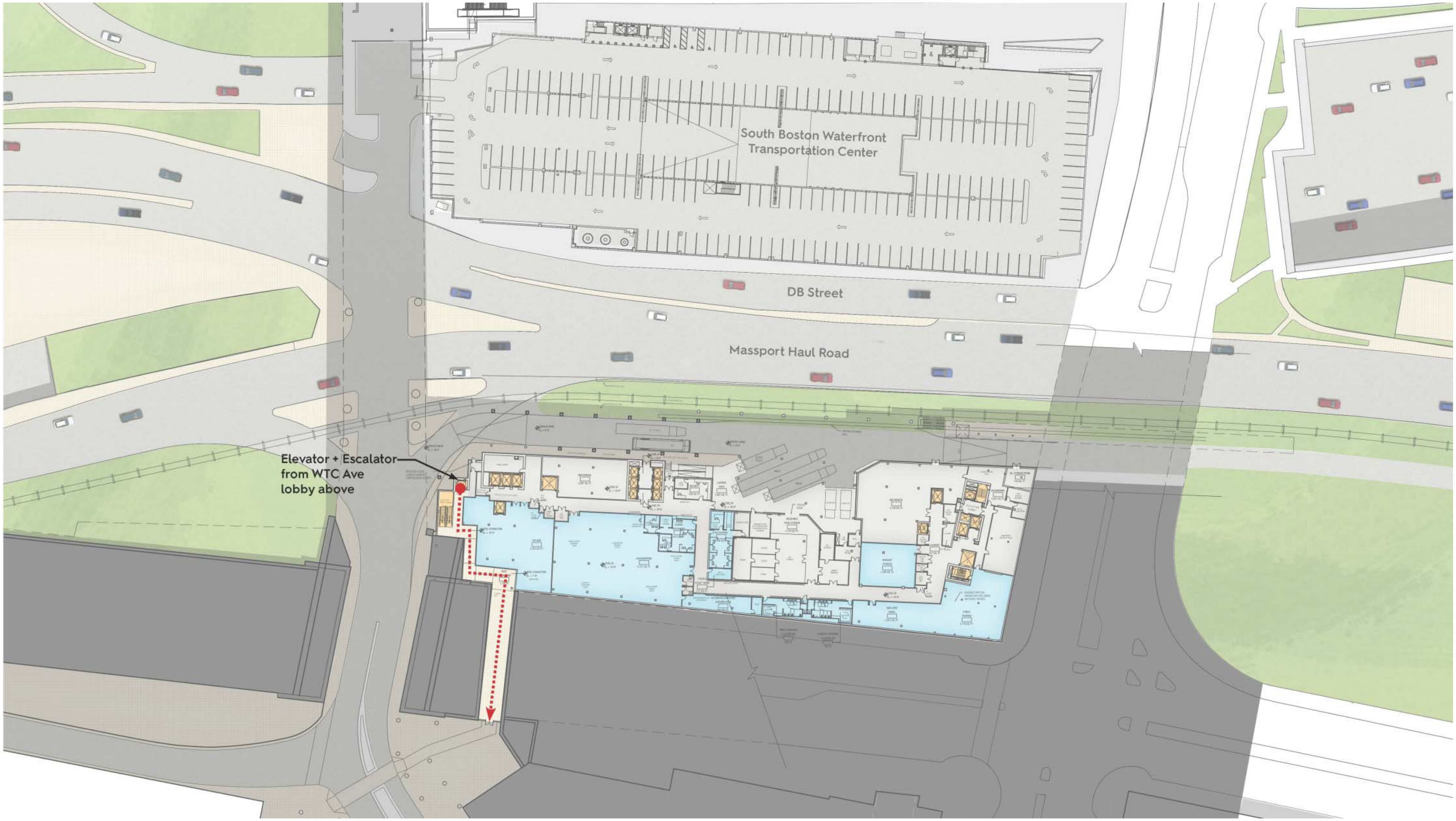
This completes the Article 80 Accessibility Checklist required for your project. Prior to and during the review process, Commission staff are able to provide technical assistance and design review, in order to help achieve ideal accessibility and to ensure that all buildings, sidewalks, parks, and open spaces are usable and welcoming to Boston's diverse residents and visitors, including those with physical, sensory, and other disabilities.

For questions or comments about this checklist, or for more information on best practices for improving accessibility and inclusion, visit www.boston.gov/disability , or our office:

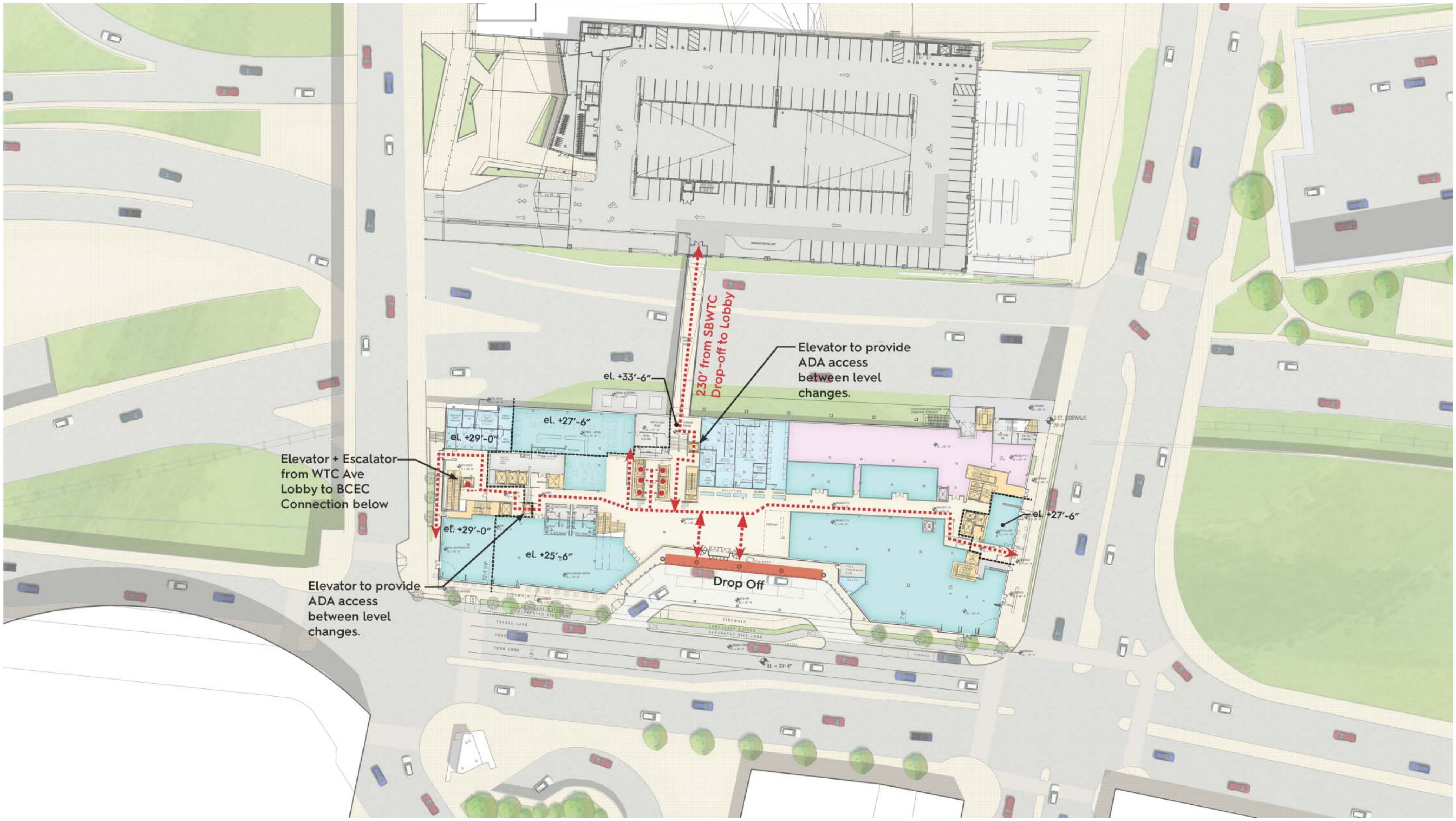
The Mayor's Commission for Persons with Disabilities
1 City Hall Square, Room 967,
Boston MA 02210.

Architectural Access staff can be reached at:

accessibility@boston.gov | patricia.mendez@boston.gov | sarah.leung@boston.gov | 617-635-3682



Summer Street Hotel **Boston, Massachusetts**



Summer Street Hotel **Boston, Massachusetts**

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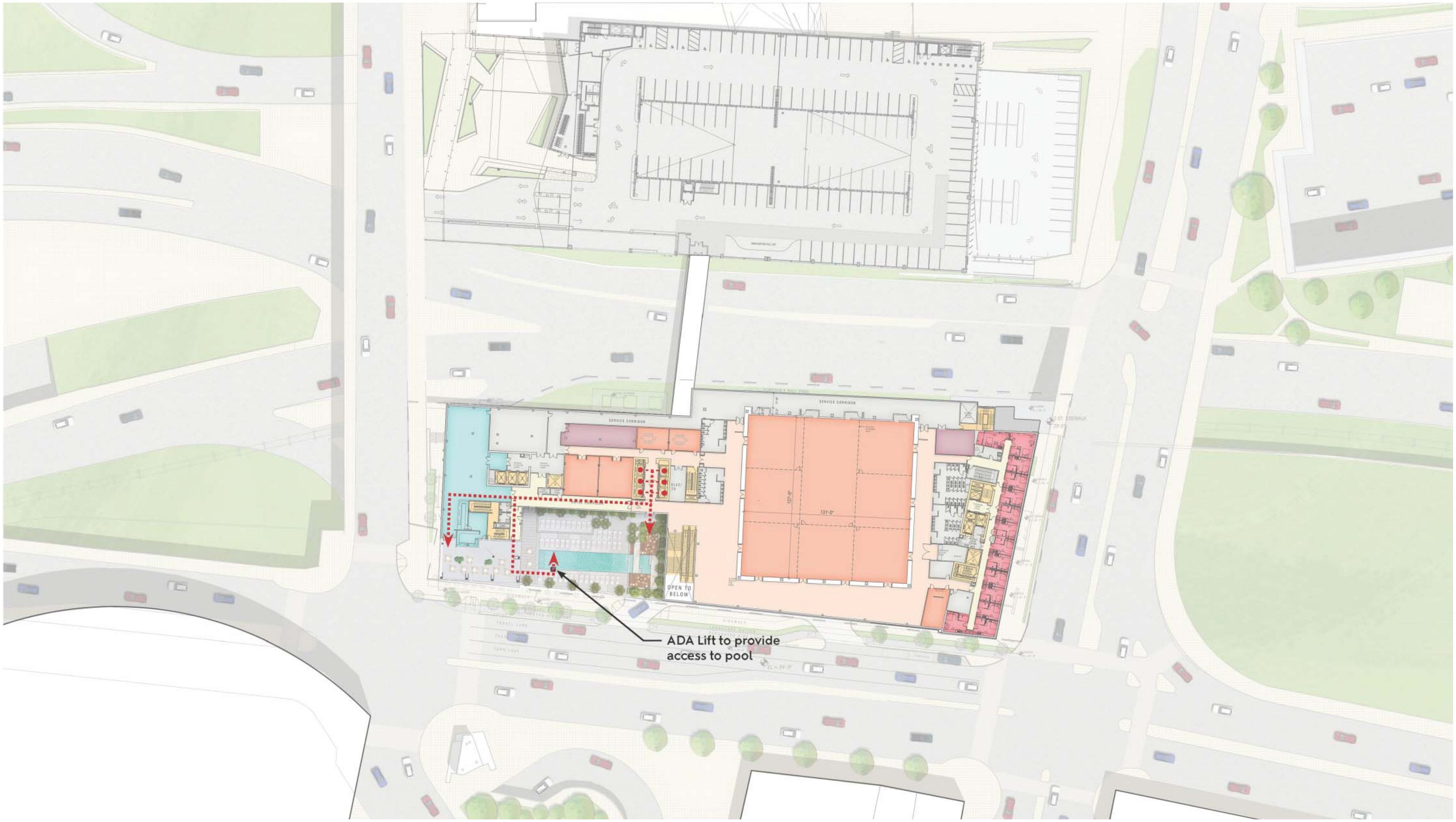
Accessibility
Level 1



Summer Street Hotel **Boston, Massachusetts**

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Accessibility

Level 2