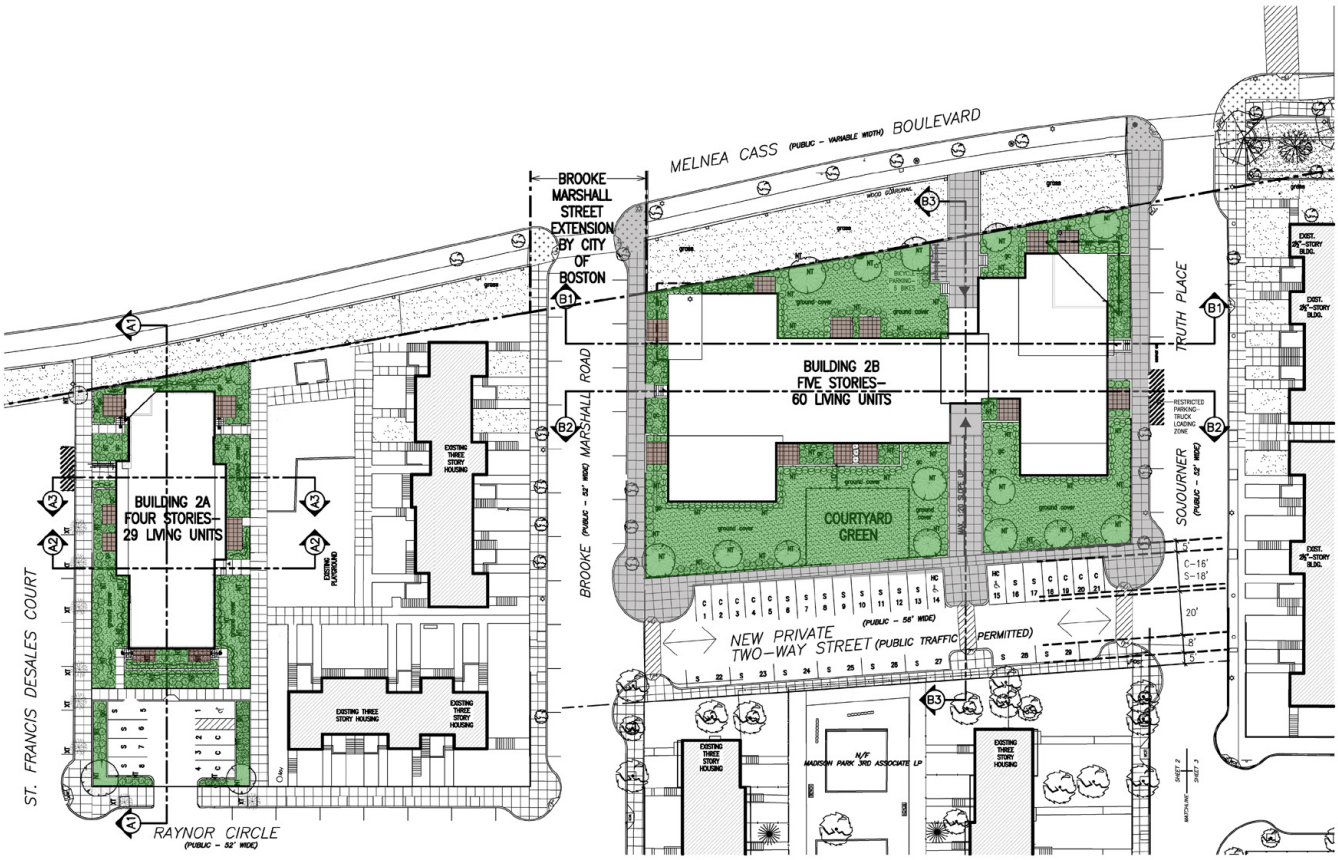

Madison Park Infill Sites

Residential Development

Project Notification Form

Submitted Pursuant to Article 80B of the Boston Zoning Code

Submitted by:
Madison Park Development Corporation
184 Dudley Street
Boston, MA 02119

Submitted to:
Boston Redevelopment Authority
One City Hall Square
Boston, MA 02201

Prepared by:
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In Association with:
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Elton + Hampton Architects
Feldman Land Surveyors
Holly Ben-Joseph, Landscape Architect
Howard/Stein-Hudson Associates, Inc.
McPhail Associates, LLC
Rubin & Rudman LLP

June 4, 2015

Madison Park
Development Corporation

June 4, 2015

Mr. Brian Golden, Director
Boston Redevelopment Authority
Boston City Hall, 9th Floor
Boston, MA 02201
Attn: Mr. Dana Whiteside, Deputy Director
Mr. Gary Uter, Project Assistant

Re: Madison Park Infill Sites
Project Notification Form (PNF)

Dear Director Golden:

Madison Park Development Corporation (the "Proponent") is submitting this Project Notification Form ("PNF"), in accordance with the Article 80B Large Project Review requirements of the Boston Zoning Code to construct a residential development on two sites totaling 63,000 square feet along Melnea Cass Boulevard at 40 Raynor Circle and Brooke Marshall Parcel, and within Madison Park Village in Roxbury ("Proposed Site"). The proposed development includes the demolition of a 1-story building at 40 Raynor Circle and the creation of a residential development consisting of 76 residential (flats and duplex) units on two parcels along Melnea Cass Boulevard at 40 Raynor Circle and Brooke Marshall Road to be served by 8 off-street surface parking spaces plus an additional 29 parking spaces along a relocated new Brooke Marshall Road, private but open to the public through-street (the "Proposed Project").

In accordance with Boston Redevelopment Authority ("BRA") requirements, please find attached 10-copies of the PNF plus a CD disk for placing the PNF filing on the BRA website for public review.

The Proposed Project will lead to new construction and since the gross floor area is more than 50,000 gsf, Article 80 requirements will be triggered and preparation of filing(s) under the City of Boston / BRA Large Project Review required, pursuant to Article 80B of the Code. A Letter of Intent to File a Project Notification Form was filed with the Boston Redevelopment Authority for the Proposed Project on March 27, 2015 (attached as **Appendix A** to the PNF).

The project team has had an opportunity to present its plans to the BRA project and urban design staffs, the Mayor's Office of Neighborhood Services, and other city departments, the residents of the adjacent Madison Park Village and Whittier Street communities, Roxbury neighborhood residents, the Roxbury Strategic Master Plan Oversight Committee and local elected and appointed officials for the neighborhood in order to identify issues/concerns as well as design requirements related to the Proposed Project

The public notice for the PNF is scheduled to appear in the June 5, 2015 issue of the *Boston Herald*.

On behalf of the entire project team, we would like to thank you and the BRA staff assigned to the Madison Park Infill Sites Project, particularly Dana Whiteside, Deputy Director, and Gary Uter, Project Assistant for invaluable assistance provided allowing the Proponent to achieve this comprehensive PNF filing.

We believe that the Proposed Project will be a significant addition to the Roxbury neighborhood to help address the need for additional housing.

Sincerely,
Madison Park Development Corporation

Russell Tanner, Vice President of Real Estate

Attachment: Madison Park Infill Sites, Project Notification Form
(10 Copies Plus CD Disk)

Cc: Erico Lopez, BRA
Sophia Transtamar, Project Manager, Madison Park Development Corporation
Mitchell Fischman, Mitchell L. Fischman Consulting, LLC
James Greene, Rubin & Rudman LLC

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1.0 EXECUTIVE SUMMARY

1.1 Introduction

Madison Park Development Corporation (the "Proponent") is submitting this Project Notification Form ("PNF"), in accordance with the Article 80B-1 Large Project Review requirements of the Boston Zoning Code ("Code"), for a proposed residential development on two sites totaling 89,052 gross square feet along Melnea Cass Boulevard at 40 Raynor Circle and Brooke Marshall Parcel, and within Madison Park Village in Roxbury ("Proposed Site"). The development includes the demolition of a 1-story building at 40 Raynor Circle and the creation of a residential development consisting of 76 residential (flats and duplex) units on two parcels along Melnea Cass Boulevard at 40 Raynor Circle (Assessors Parcel ID 0902230000) and Brooke Marshall Road (Assessors Parcel ID 0902197000) to be served by 8 off-street surface parking spaces plus an additional 29 parking spaces added along a proposed relocated new Brooke Marshall Road private but open to the public through-street (the "Proposed Project").

The Project Site is comprised of approximately 63,000 square feet of land on two sites, approximately 18,000 at the 40 Raynor Street Site and approximately 45,000 sf of land at the Brooke Marshall Parcel. *(This includes the proposed new public through street)*. Except for the 1-story building at 40 Raynor Circle, the remainder of the sites is vacant and separated by an existing Madison Village building (see **Figures 1-1** thru **1-4).**

As part of the Proponent's 76 proposed residential units, on-site affordable units will be provided in accordance with the City of Boston's Inclusionary Development Policy (the "IDP").

The Proposed Project will exceed the 50,000 square foot total build-out size requirement for a project in a Boston neighborhood and therefore will require preparation of filing(s) under the Large Project Review regulations, pursuant to Article 80 of the Code. A Letter of Intent to File a Project Notification Form was filed with the Boston Redevelopment Authority for the Proposed Project on March 27, 2015 (See **Appendix A**).

1.2 Detailed Project Description

1.2.1 Project Site

The Project site is located within the Lower Roxbury Neighborhood, just to the southwest of the Ruggles Massachusetts Bay Transportation Authority (MBTA) Station. The Sites are bounded by St. Francis Desales Court to the northwest; Sojourner Truth Place to the southeast; Raynor Circle to the southwest; and Melnea Cass Boulevard to the northeast.

The Project Site, including the above two identified parcels, is comprised of approximately 63,000 square feet ("sf") of land including approximately 18,000 sf at the 40 Raynor Circle parcel

and approximately 45,000 sf at the Brooke Marshall Road parcel, which also includes 11,720 sf of a roadway portion of Brooke Marshall Road proposed to be discontinued. A relocated right-of-way is proposed to replace this segment of Brooke Marshall Road. The Brooke Marshall Parcel is currently vacant, as described, and the parcel currently located at 40 Raynor Circle consists of a 1-story building where the Proponent currently runs five-day a week community programs. Existing townhouses which are a part of Madison Park Village are located between the two parcels of the Proposed Project site as illustrated in **Figure 1- Project Locus.**

The Project Site is located within an area of significant planning and transportation improvement activities. The Boston Housing Authority has requested $30 million in Choice Neighborhood Implementation funding that includes $17.5 million for housing development which includes support for the Proposed Project. In addition, the City of Boston has committed $7.5 million to be supplemented by federal and state matching funds for the adjacent Melnea Cass Boulevard reconstruction project. The proposed design calms traffic, provides new landscaping, promotes neighborhood businesses, facilitates bike and pedestrian travel, and provides a better connection between the overall Lower Roxbury neighborhood and the Dudley Square Business District.

1.2.2 Project Composition

The Proposed Project will be completed in a single phase, but is divided into two (2) buildings (Buildings 2A and 2B) in order to better assimilate to the immediate neighborhood scale in the existing Madison Park Village (MPV) and to address the importance of the Melnea Cass Boulevard spine.

Site 2A

Site 2A building is a four (4) story, building with a nominal portion being three stories with fourteen (14) stacked, duplex units similar to the current MPV townhouse units, and two (2) flats for accessibility requirements. The site is bounded by Melnea Cass Boulevard *(MCB)*, a major Boston artery, on the north side, and provides a "public" face with an accent tower on the northwest corner; stepped retaining wall to the public sidewalks; and outdoor spaces and balconies facing MCB. The building also includes a primary entry and steps down to three (3) stories, on the west side facing on St. Francis DeSales Court *(FDC)* and a secondary entry and steps down to three (3) stories, on the inner courtyard, shared with existing MPV housing on the east side. An eight (8) off-street parking area is located on the southwest corner that is accessed from Raynor Circle, a local residential street to the south. Trash/recycle needs will be included in the existing MPV facilities currently located on the site, and service will be accessed through the building entry with additional restricted parking zoning on FDC. Management for MPV will pull the dumpsters curbside for trash pick-up.

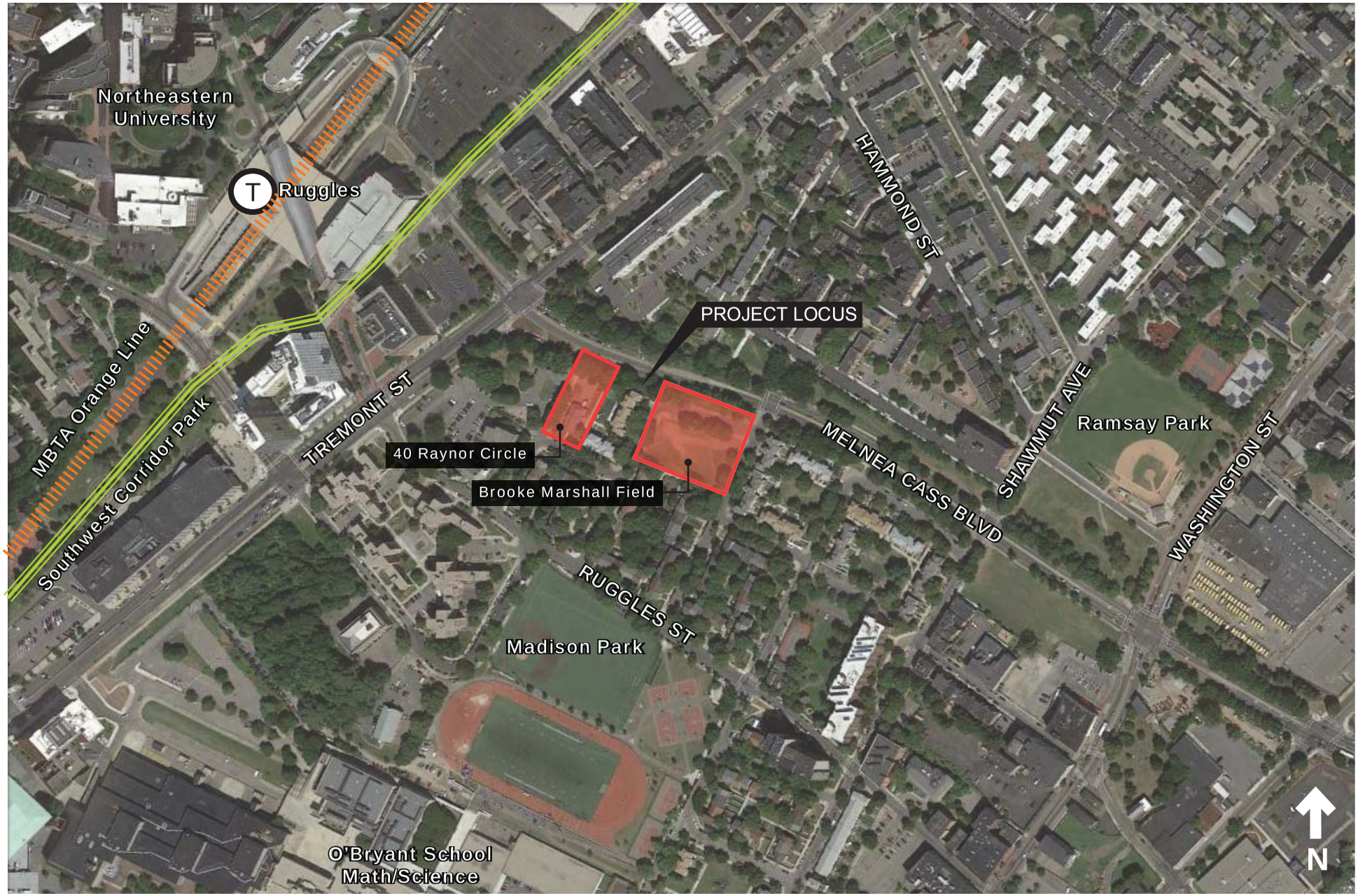

Figure 1-1
Project Locus

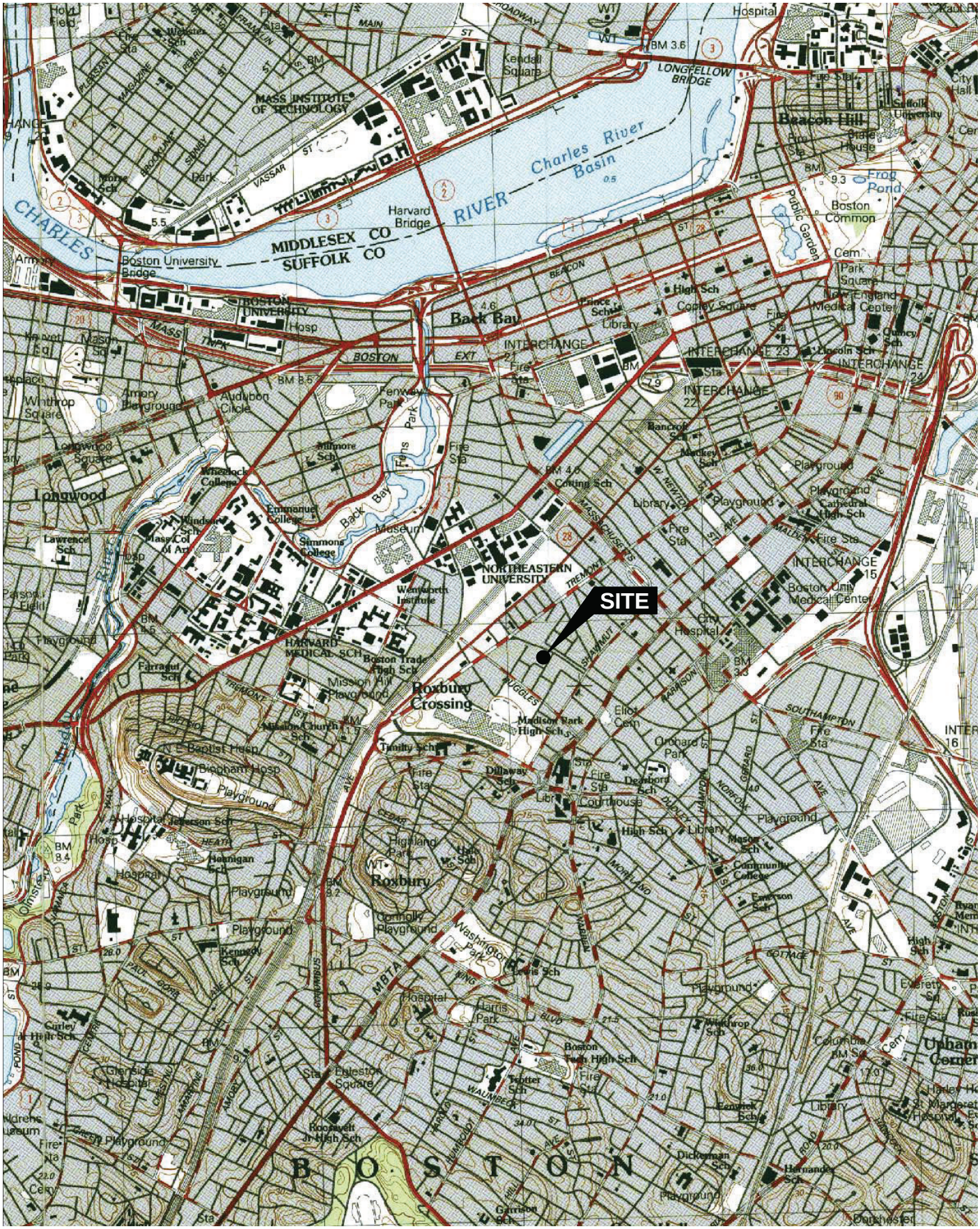

Figure 1-2
USGS Map

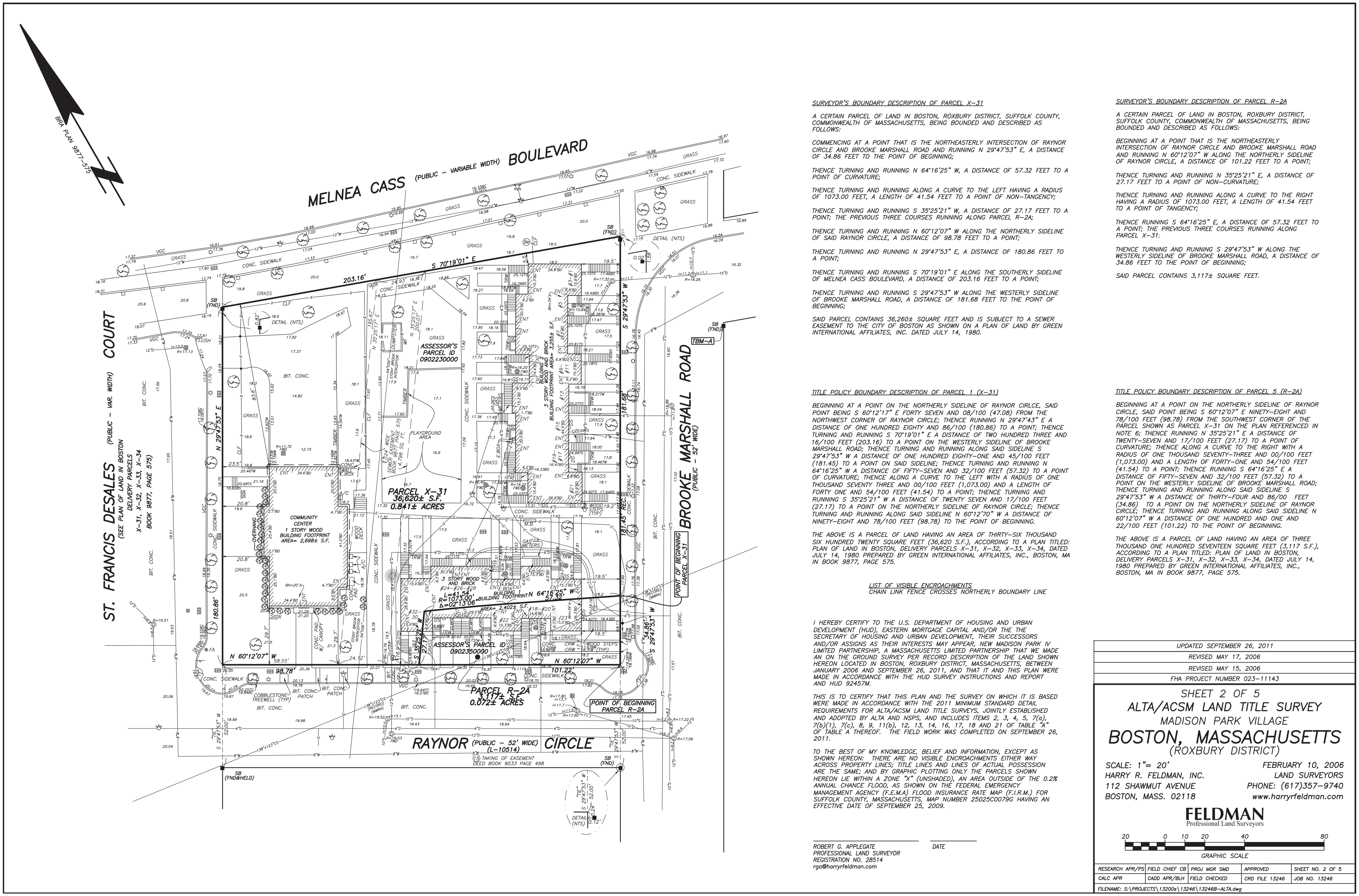

Figure 1 - 3
Existing Conditions - 40 Raynor Circle

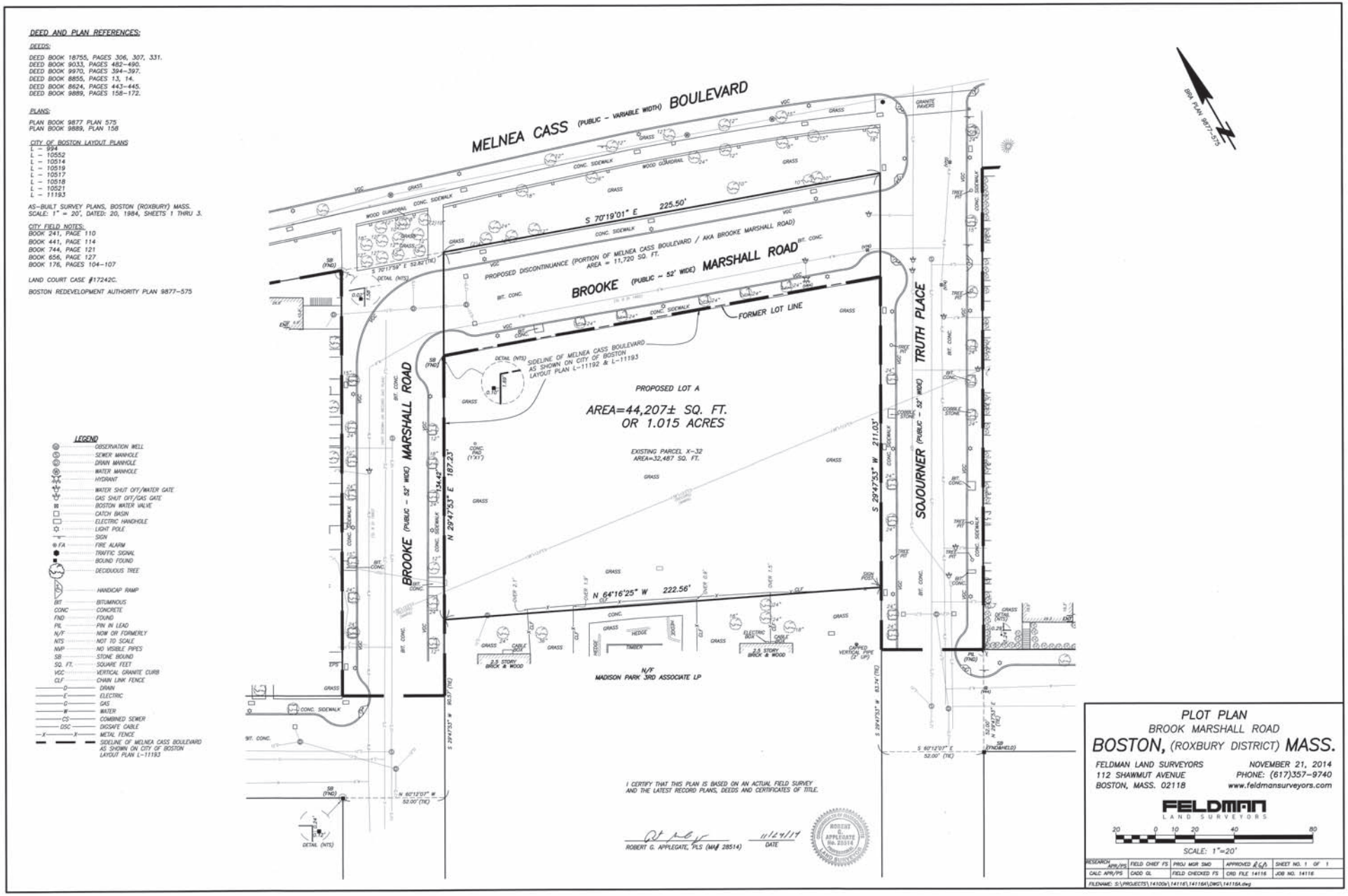

Figure 1 - 4
Existing Conditions - Brooke Marshall Field

Site 2B

The Site 2B circulation plan includes the discontinuance of a "dogleg" portion of Brooke Marshall Road *(BMR)* that runs east-west and parallel to MCB; the extension of BMR to the north by the City of Boston, for a direct connection to MCB and four (4) additional on-street parking spaces; and the creation of a new east-west private through-street *(open to the public)* on the southern edge of the site from Sojourner Truth Place (STP) to BMR with twenty-nine (29) street parking spaces. These changes will enhance the MPV development access to MCB; allow for continued vehicular circulation through MPV in a westerly direction; and provide the needed access to the proposed new development. The combined parcels will allow the new building to front on Melnea Cass Boulevard and create a street-front consistent with plans for the Boulevard.

The Site 2B Building is a five (5) story, building with sixty (60) flats, which shall be located on the Brooke Marshall Field parcel, and on a proposed "discontinuance" portion of BMR. On the north side, the new, combined site is bounded by MCB, and provides a five (5) story "public" face with an accent tower on the northeast corner; the primary building entrance; stepped retaining wall to the public sidewalks; and outdoor spaces and balconies facing MCB. To the west on STP, a small residential street, the building steps down from five to three (5 to 3) stories, similar in height to the MPV units across the street.. The building also includes a secondary entry, facing onto an internal green, which is a continuation of the existing MPV open spaces to the south. To the west, the building is five (5) stories facing onto the extended BMR. Trash/recycle will be addressed with interior trash/recycle room with direct outdoor access to the east to a restricted parking zone on STP. Service for the building shall be accessed at the south side entry with a designated restricted parking area on the proposed new through street.

1.2.3 Project Access and Circulation

Vehicular access/egress to Building 2A will be provided by a full access driveway along Raynor Circle. The driveway will be located at a new curb cut approximately 100 feet south of St. Francis Desales Court and will serve an 8-vehicle parking lot.

Part of the proposed Building 2B development includes the discontinuance of an approximate 11,720 square foot portion of Brooke Marshall Road, the extension of Brooke Marshall Road, by the City of Boston, to provide a direct connection to Melnea Cass Boulevard, and the creation of new two way, east/west through street between Sojourner Truth Place and Brooke Marshall Road.

Vehicular access/egress to Building 2B will be provided on-street by Brooke Marshall Road, Sojourner Truth Court, and a new roadway to be constructed in the southern portion of the parcel. As noted, the new private street will be open to the public and will accommodate two-way travel and will create approximately 29 new on-street parking spaces that will serve Building 2B. Pedestrian access will be provided to all entrances through sidewalks and paths through the

sidewalks and paths through the neighborhood and public ways. For additional, detailed information about street reconfigurations, see **Section 6.7** of this PNF.

Table 1-1 Overall Approximate Dimensions of Madison Park Infill Sites Project

Site 2A	
Lot Area	18,043 sf (0.41 Acres)
Gross Building Footprint Area	5,176 sf
Gross Square Feet	Approx. 20,104 gsf
FAR	1.11
Number of Floors	3 to 4 Stories
Height	36 to 49 Feet Corner Accent – 58 Feet
Site 2B	
Lot Area	33,252 sf (0.76 Acres) *(Does not include new public street)*
Gross Building Footprint Area	13,865 sf
Gross Square Feet	Approx. 68,948 gsf *(excluding basement @ 1,666 gsf)*
FAR	2.07
Number of Floors	3 to 5 Stories
Height	38 to 59 Feet Corner Accent – 70 Feet

1.3 Summary of Project Impacts and Mitigation

1.3.1 Urban Design

The Madison Park Village Infill development is proposed to:

1. Develop Melnea Cass Boulevard parcels with frontage and access to the street;
2. Participate in the Whittier Choice Neighborhood Initiative program;
3. Expand the existing Madison Park Village and provide needed affordable housing

Develop Melnea Cass Boulevard Parcels with Frontage and Access to the Street

When originally conceived, Melnea Cass Boulevard *(MCB)* was designed to be a major through traffic artery, and currently has large vehicular flow and little pedestrian appeal. Most of MCB has no buildings that directly front on the boulevard and less than a handful have a MCB address over its' entire length. The BRA and the Dept. of Transportation have set a goal to change the use and image of MCB. The intention of the recently completed Tropical Foods market, these two (2) proposed new housing buildings, and the future development of the "Crescent" site is to "front" buildings onto the MCB and create a more pedestrian and bike friendly experience.

Participate in the Whittier Choice Neighborhood Revitalization Program

The MPV Infill is proposed to work with the larger Whittier Choice Neighborhood redevelopment which will include:

- Mixed-use development to replace the current BHA Whittier Housing site; and
- A new community center for the larger Whittier/MPV community.

Expand the Existing Madison Park Village and Provide Needed Affordable Housing

Madison Park Village *(MPV)* currently includes five hundred and forty-six (546) units affordable housing for families, disabled and senior citizens, which is fully occupied, with an additional long waiting list of people seeking to live there. The two (2) proposed buildings will provide additional affordable housing to satisfy the existing demand.

The Buildings Have Been Designed to Provide a Transition Between the MPV Residential Neighborhood Scale and Urban MCB Artery, as follow:

- The proposed three and four (4) story, Site 2A Building is intended as a transition between the existing two and one half (2 ½) / sloped roofed MPV #4 development and the anticipated denser and higher "Crescent" development. Additionally, this building has a series of duplex units with direct exterior entries and outdoor space to complement the existing MPV townhouse life style.

- The proposed three and five (3 & 5) story, Site 2B Building is intended provide more a MCB presence at the important Sojourner Truth Place village entry *(which has a traffic signal)* with the visible main entry, an enhanced pedestrian experience, a corner accent, and a transition down to the lower/sloped roofed MPV #4 development.

As a transit-oriented development, the proposed project will feature incentives that promote MBTA ridership to tenants and residents of the development.

The Proposed Project is located less than a 5-minute walk to the MBTA Ruggles Orange Line station, is on several continuous bus line, and is close to the Silver Line, allowing residents to be connected to the transit network that reaches beyond the Boston Metro area. It is also in close proximity to Hubway's bicycle sharing program located at Roxbury Crossing, Washington/Lexon, and Dudley Square, with additional locations planned as part of the MCB revitalization and within a few minutes' walk to a Zipcar vehicle-share location.

1.3.2 Sustainable Design

The Proponent and the Project design team are committed to an integrated design approach and are using the LEED for Homes Mid-Rise Rating System Checklist and intend to meet certification requirements as presented in **Section 3.5** and in **Figure 3.28A and 3.28B** at the end of **Section 3.0**. This rating will meet or exceed Boston's Green Building standard with a preliminary projected Silver Certification level. The LEED rating system tracks the sustainable features of the project by achieving points in following categories: Innovation and Design Process; Location and Linkages; Sustainable Sites; Water Efficiency; Energy and Atmosphere; Materials and Resources; Indoor Environmental Quality; and Awareness and Education.

1.3.3 Response to Climate Change Resiliency and Adaptability Questionnaire

The Proponent's response to the Climate Change Resiliency and Adaptability Questionnaire is contained in **Appendix C.**

1.3.4 Wind

The heights of the proposed structures will not exceed 70 within the height defined in the new U-district requirements. Wind conditions are expected to be similar to the existing at the nearby buildings that range from two to twelve (2-12) stories in Madison Park Village and the Ruggles Crossing area, and, therefore, no new pedestrian level wind impacts are anticipate

1.3.5 Shadow

A shadow study was prepared to identify any adverse shading from Proposed Project on the neighborhood. The solstices and equinoxes were studied as a sample representative of the shadow cycle throughout a year. From the morning until the afternoon, new shadows introduced by this proposal fall primarily on portions of development lot, on Francis Desales Court, and on Melnea Cass Boulevard (MCB) to the east and north. In the late afternoon and evening, especially in winter, shadows cross MCB, and, to a more limited extent, existing MPV housing facing on Brooke Marshall Road and Sojourner Truth Place. Through this analysis, we are able to conclude that the proposed building massing scheme has minimal impact on existing neighborhood shadow patterns.

New shadows introduced by the Proposed Project fall primarily in the adjacent buildings' yard spaces, on St. Francis Desales Court, Brooke Marshall Road, Melnea Cass Boulevard, and at limited times onto two (2) existing MPV #4 housing buildings. Our analysis does not account for foliage shadows; only building shadows and site topography. (see **Section 4.1** for greater detail and the shadow studies).

1.3.6 Daylight

Although the Proposed Project will lead to an increase in daylight obstruction when compared to the existing condition with vacant land and a one-story building, the Proposed Project is along or adjacent to Melnea Cass Boulevard, a wide thoroughfare, which will mitigate any changes to daylight impacts from the Proposed Project. The Proposed Project will reach a maximum of 49 and 59 feet in height, which is somewhat higher than the existing nearby buildings, but at a significant distance from these buildings. As a result, daylight obstruction values from the Proposed Project are expected to be consistent with and typical of the surrounding neighborhood.

1.3.7 Solar Glare

It is not expected that the Proposed Project will include the use of reflective glass or other reflective materials on the building facades that would result in adverse impacts from reflected solar glare.

1.3.8 Air Quality

A microscale air quality analysis was not performed for this Project due to its projected extremely small motor vehicle trip generation. The extremely small number of motor vehicle trips generated by the Proposed Project will not have a significant impact on the delays or the level of service at the local intersections. Therefore, the motor vehicle traffic generated by the project will not have a significant impact on air quality at any intersection in the Project area and a microscale air quality analysis is not necessary for this Project. The air quality in the Project area is expected to remain safely in compliance with the NAAQS for CO after the Project is built.

1.3.9 Noise Analysis

The design for the Proposed Project is expected to include some limited rooftop mechanical equipment. The Project is not expected to create a noise nuisance condition and will fully comply with the sound level limits of the City of Boston Noise Regulations.

1.3.10 Stormwater Management and Water Quality

Best management practices and sustainable design will be incorporated into the Project wherever practical and applicable.

Stormwater management systems will be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS) and provide oil & water separation, as well as phosphorus reduction in compliance with current Boston Water and Sewer Commission (BWSC) requirements. Utility connections will be designed to minimize impacts to the surrounding area and all appropriate permits and approvals will be acquired prior to construction.
The proposed stormwater management systems will include a combination of deep sump catch basins, water quality units and groundwater recharge systems.

The project will increase the amount of impervious area at the site compared to the existing conditions. It is anticipated that the stormwater recharge systems will collect roof runoff and infiltrate it into the ground with a gravity recharge system. The underground recharge system, and any required site closed drainage systems, will be designed so that there will be no increase in the peak rate of stormwater discharge from the developed condition compared to the existing condition. In addition, for any portions of the project where recharge systems cannot be accommodated, water quality units will be installed to reduce pollutants in runoff per BWSC standards prior to discharge.

All improvements and connections to BWSC infrastructure will be reviewed as part of the Commission's Site Plan Review process. The process includes a comprehensive design review of the proposed service connections, assessment of project demands, and system capacity

1.3.11 Solid and Hazardous Waste

Solid Waste

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

Upon completion of construction, The Proposed Project will generate approximately 111 tons of solid waste per year, based on the assumption that each residential unit generates 8 lbs of solid waste per day. Residential waste will be stored in outside dumpsters that will be picked up by private haulers for Site Building 2A. Trash/recycle for Site Building 2B will be addressed with interior trash/recycle room with direct outdoor access to the east to a restricted parking zone on STP.

Hazardous Waste

In March 2015, McPhail Associates, LLC performed a Phase I Environmental Site Assessment ("ESA") for the project site. The ESA included a review of municipal records which found no Recognized Environmental Conditions ("RECs") connected to the subject site. The site is not a DEP-listed release site and is not listed in the available city, state, and/or federal records.

The majority of DEP-listed disposal sites are either located at distances greater than 0.25-miles from the subject site, are down-gradient or cross-gradient with respect to the subject site, and/or have achieved a Permanent Solution in accordance with the Massachusetts Contingency Plan (MCP) which indicates that a condition of No Significant Risk exists and, therefore these sites are not likely to pose a threat of impact to the subject site. Three (3) release sites were further evaluated for their potential to impact the subject property, and each was found not likely to have a threat of impact to the site. Additional information on these sites is discussed in more detail in **Section 4.4.**

1.3.12 Geotechnical/Groundwater Impacts Analysis

In general, the subsurface soil conditions within the proposed building sites consist of fill material (including urban ash and cinders) and organic deposit material overlaying marine sand or marine clay. The granular fill deposit was observed to vary from a compact to very dense, brown to dark brown silty sandy and gravel with ash, cinders and brick to gravel with some sand and trace silt with concrete. Below the fill deposit is a highly compressible organic deposit of soft to stiff black organic peat and/or organic silt. Underlying the fill or organic deposits was marine sand or clay.

Rather than incur premium off-site disposal costs for portions of the excess excavated soils generated at the site, the soil will be reused on site as much as possible. Groundwater was encountered at depths ranging from approximately 5 to 12 feet below the existing ground surface at Site Building 2A and at depths ranging from approximately 9 to 13 feet below the existing ground surface at Site Building 2B.

Given the proposed building configurations and potentially unsuitable subsurface conditions for construction, it is anticipated that the proposed buildings will be supported by conventional spread footing foundations in conjunction with a soil-supported slab-on-grade after the existing unsuitable soils within the footprint of the proposed buildings are improved. The existing unsuitable soils within the footprint of the proposed buildings will be improved using aggregate piers (AP). The AP-improved soils will extend to below the building entrances and walkways adjacent to the proposed building to mitigate the potential for differential settlements near the building that could result in tripping hazards.

Roof drains and runoff from impermeable outdoor surfaces will be led to local storm drains. Construction mitigation measures will be incorporated into the Proposed Project to avoid the potential for ground movement and settlement during excavation, and potential impacts on, utility lines and roadways.

1.3.13 Construction Impacts Analysis

Section 4.6 presents impacts likely to result from the construction of the Madison Park Infill Sites Project and the steps that will be taken to avoid or minimize environmental and transportation-related impacts. Construction methodologies and scheduling will aim to minimize impacts on the

surrounding environment. The Proponent will insure that the general contractors will be responsible for developing construction phasing and staging plans and for coordinating construction activities with all appropriate regulatory agencies. The Project's geotechnical consultant will also provide consulting services associated with foundation design recommendations, prepare geotechnical specifications, and review the construction contractor's proposed procedures.

The construction period for the Proposed Project is expected to extend for approximately eighteen (18) months, commencing in the First Quarter 2016 and reaching completion in the Fourth Quarter 2017.

1.3.14 Wetlands/Flood Hazard Zone

The existing Project Site is not a part of a wetland resource area regulated by the Massachusetts Wetland Protection Act. Based on the Preliminary Flood Insurance Rate Maps (FIRM) for Suffolk County, the Project site is not located in a special flood hazard area, floodway area, or other flood area.

1.3.15 Historic Resources Component

According to files at the Massachusetts Historical Commission, the on-site structures are not listed in the National or State Register of Historic Places, or the Inventory of Historical and Archaeological Assets of the Commonwealth. It is not expected that the Project will cause adverse impacts on any historic or architectural elements of nearby historic resources outside the Project Site.

The Project Site is not within, nor does it directly abut, any listed historic districts or resources. The area surrounding the Project Site is a busy commercial district. Residential, retail and commercial uses characterize much of the area along Melnea Cass Boulevard, Ruggles Street, and Tremont Street. The closest resource is the Saint Francis de Sales Roman Catholic Church, which is listed on the Inventory of Historic Places and located southwest of the Project Site. Within the ¼-mile radius of the Project Site there are three National Register Districts – the Lower Roxbury Historic District, the Frederick Douglass Square Historic District, and the Dudley Square Historic District (and Extension) – and six properties listed on the Massachusetts Cultural Resource Information System (MACRIS) inventory of historic places, not including properties within the National Register Districts. (See **Section 5.0** for additional information and for a map of historic resources within ¼ mile of the Project Site).

1.3.16 Infrastructure Systems Component

The Project's Civil and MEP Engineers will coordinate with the City agencies and private utility companies responsible for the area's utility systems as the design progresses. Utility connections

will be designed to minimize impacts to the surrounding area and all appropriate permits and approvals will be acquired prior to construction.

- St. Francis Desales Court includes a water line and some drainage structures connected to 12-inch drain lines.

- Raynor Circle has a 4-inch gas line, an 8-inch water line, a 10-inch sewer line, and drainage structures connected to a 12-inch drain line that flows towards Brooke Marshall Road.

- Brooke Marshall Road contains a 3-inch gas line, an 8-inch water line, a 10-inch sewer line and a 12-inch drain line. Electrical service is also available on Brooke Marshall Road.

- Sojourner Truth Place has a 6-inch gas line, an 8-inch water line, a 12-inch sewer line and a 12-inch drain line.

The existing sewer system and water distribution and storm drain systems are shown in the figures in **Section 6.0.**

The Boston Water and Sewer Commission (BWSC) owns and operates the sanitary sewer, storm drain, and water distribution systems in the City of Boston. A BWSC approved Site Plan and General Service Application is required for the construction of proposed sewer, storm drain, and water connections to the main lines in the adjacent streets. Proposed connections to these public utilities will be designed in conformance with BWSC's design standards, Sewer Use and Water Distribution System Regulations, and Requirements for Site Plans. The Proponent's Civil Engineer will submit a Site Plan Review Application to BWSC. Upon approval of the Site Plan, a General Service Application will be submitted by the Utility Contractor, for approval prior to construction. The Site Plans will indicate the existing and proposed sewer lines, storm drain lines, and water mains within the site and in the abutting public ways. The Site Plans will show any existing utilities to be abandoned, the location and design of proposed utility services, and the limit of work to be performed in the public ways. Abandoned services will be cut and capped at the main lines according to BWSC standards.

The following reviews or specifications will be coordinated with the respective city agencies and utility companies:

- The Boston Fire Department reviews projects with respect to fire protection measures such as fire department connections, standpipes and hydrants.

- Energy and telecommunication system sizing and connections will be coordinated by the MEP Engineer with the respective utility providers.

- New utility connections will be authorized by the City of Boston Public Works Department through the street opening permit process.

1.3.17 Transportation Component

Section 7.0 presents the comprehensive transportation study completed by HSH for the proposed Project in conformance with the BTD *Transportation Access Plan Guidelines* (2001). The study analyzes existing conditions within the Project study area, as well as conditions forecast to be in place under the five-year planning horizon of 2019. Based on the results of the study, the Project is expected to generate approximately 288 new vehicular trips on a daily basis, with 17 new trips during the weekday a.m. peak hour and 22 new trips during the weekday p.m. peak hour. The Project is expected to have minimal impact on the surrounding roadway network.

The Project consists of the development of 76 residential units to be located in two separate buildings located along Melnea Cass Boulevard. One parcel is located at 40 Raynor Circle (Site 2A) and will consist of 16 residential units and will be provided with 8 on-site parking spaces. The second parcel will be along Brooke Marshall Road (Site 2B) and will consist of 60 residential units. The development of Site Building 2B requires the discontinuance of the portion of Brooke Marshall Road that runs in an east-west direction, perpendicular to Melnea Cass Boulevard. To allow vehicles access between Sojourner Truth Court and Brooke Marshall Road, a new two-way roadway will be constructed in the southern portion of Site 2B. A total of 29 parking spaces will also be provided along the new private street open to the public, which will be designated to Site Building 2B.

Vehicular access/egress to Site 2A will be provided by a full access driveway located along Raynor Circle. The driveway will be located at a new curb cut approximately 100 feet south of St. Francis Desales Court and will serve the 8-vehicle parking lot. Vehicular access/egress to site 2B will be provided on-street by the new roadway and Brooke Marshall Road. Pedestrian access to both sites will be provided to all entrances through sidewalks and paths throughout the neighborhood and public ways. Loading, deliveries, move-in/move-out, and trash pick-up will take place in a dedicated loading area on Raynor Circle for Site 2A, with the possibility to use the proposed 8-vehicle parking lot at Site 2A to accommodate some of these operations.. Site 2B will have three (3) parking spaces, along the newly relocated Brooke Marshall Field Road, dedicated as a loading area.

The Proponent will encourage MBTA ridership and is committed to implementing a program that supports the City's efforts to reduce dependency on the automobile by encouraging alternatives to driving alone, especially during peak travel periods.

The transportation analysis employed mode use data for the area surrounding the Project site based on 2000 U.S. Census data and BTD data for Area 15, and identifies the number of trips generated by the Project by mode. Due to the transit-oriented nature of the Project and non-auto alternatives such as ZipCar, and Hubway, is anticipated that many of the Project-generated trips

will occur via transit, on foot, and by bicycle. Due to the low volume of vehicle trips generated by the Project, the overall LOS at the study area intersections will remain unchanged from No-Build Conditions.

Due to the low volume of vehicle trips generated by the Project, the overall LOS at the study area intersections will remain unchanged from No-Build Conditions.

1.3.18 Response to Accessibility Guidelines

The Proponent's response to the City of Boston Accessibility Guidelines is contained in **Appendix D.**

2.0 GENERAL INFORMATION

2.1 Applicant Information

2.1.1 Project Proponent

The Proponent is Madison Park Development Corporation ("MPDC"). Founded in 1966, MPDC is one of the nation's first community-based, non-profit organizations to independently develop affordable housing for low and moderate income residents. Since its beginning, MPDC has worked to create and expand economic opportunities for low and moderate income people.

MPDC's mission today remains true to the organization's history- to develop and preserve quality, mixed-income housing in Roxbury, and to promote the renaissance of Dudley Square as a thriving neighborhood business district, recognized as a center of commerce and culture that anchors the economic revitalization of Roxbury.

Real Estate Development & Asset Management

For over 40 years, MPDC has been at the forefront of the physical redevelopment of Roxbury. MPDC has a strong track record of producing affordable and high quality housing for low and moderate income families. MPDC's commitment and impact can be seen in the development of 1,212 rental apartments, and 125 units of student housing, and 113 homeownership units. As a result, more than 3,000 people choose to live in MPDC-owned housing in the Roxbury, South End and Mattapan neighborhoods of Boston.

In addition to the housing MPDC developed, the organization also redeveloped over 76,000 square feet of retail and office space in Dudley Square. Commercial space houses several businesses and not-for-profit organizations that employ over 250 people.

MPDC has done extensive work with rehabilitation of historic buildings. Projects such as Hibernian Hall represent the preservation of important historic sites that contribute to the character and vitality of Roxbury.

MPDC values partnership and recognizes the benefit of working collaboratively with other organizations. Over the last several years, MPDC partnered with Trinity Financial, Haley House and Peabody Properties on development projects. MPDC also works with Winn Residential, Trinity Management, Maloney Properties, and Peabody Properties to insure the successful management of all of the organizations residential and commercial properties.

2.1.2 Project Team

Project Name	Madison Park Infill Sites – Buildings 2A & 2B
Property Owner/Developer	**Madison Park Economic Development Corporation (Owner Bldg 2A); Madison Park Development Corporation (Owner Bldg 2B) and Madison Park Development Corporation (Developer)** 184 Dudley Street Roxbury, MA 02119 Russell Tanner, Vice President of Real Estate rtanner@madison-park.org Tel: 617-849-6245 Sophia Transtamar, Project Manager stranstamar@madiosn-park.org Tel: 617-849-6248
Article 80 Permitting Consultant	**Mitchell L. Fischman Consulting ("MLF Consulting") LLC** 41 Brush Hill Road Newton, MA 02461 Mitchell L. Fischman, Principal mitchfischman@gmail.com Tel: 781-760-1726 Darlene Wynne Darlene.Wynne@gmail.com Tel : 978-771-7495
Legal Counsel/Outreach	**Rubin and Rudman LLP** 50 Rowes Wharf Boston, MA 02110 Tel: 617-330-7000 James H. Greene, Esq. JGreene@rubinrudman.com Tel: 617-330-7097
Architect/Sustainability	**Elton + Hampton Architects** 103 Terrace Street Roxbury Crossing, MA 02120 Eltonhamptonarchitects.com P. Nicholas Elton - Principal nick@eltonhamptonarchitects.com Tel: 617-708-1071 Jae Chung jae@eltonhamptonarchitects.com

Transportation Planner/Engineer	**Howard Stein Hudson** 11 Beacon Street, Suite 1010 Boston, MA 02108 Tel: 617-482-7080 Michael Santos, P.E., PTOE msantos@hasassoc.com Tel: 617-348-3350
Civil Engineer	**Doyle Engineering, Inc.** 14 Spring Street Waltham, MA 02451 Tel: 781-850-2731 William Doyle, PE, President wdoyle@doyleeng.com Cynthia Theriault ctheriault@doyleeng.com
Landscape Architect	**Holly Ben-Joseph, Landscape Architect** 43 Bradford Street, Suite 300 Concord, MA 01742 hollydbj@gmail.com Tel: 508-451-3388
Environmental/21E Engineer	**McPhail Associates, LLC** 2269 Massachusetts Avenue Cambridge, MA 02140 Tel: 617-868-1420 Ambrose J. Donovan, L.S.P., P.E. AJD@mcphailgeo.com Tel: 617-868-1420
Surveyor	**Feldman Land Surveyors** 112 Shawmut Avenue Boston, MA 02118 Tel: 617-357-9740 Sean McDonough, Vice President smcdonagh@feldmansurveyors.com
Geotechnical Engineer	**McPhail Associates, LLC** 2269 Massachusetts Avenue Cambridge, MA 02140 Tel: 617-868-1420 Ambrose J. Donovan, L.S.P., P.E. AJD@mcphailgeo.com Tel: 617-868-1420

Schedule	Madison Park Infill Sites- Site Buildings 2A and 2B
Construction Commencement	Third Quarter 2016
Construction Completion	Fourth Quarter 2018
Status of Project Design	Schematic

2.1.3 Legal Information

Legal Judgments or Actions Pending Concerning the Proposed Project:

None.

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

There are no tax arrears on property owned by the Proponent.

Nature and Extent of Any and All Public Easements:

The Project Site is bounded by streets containing sewer, electric, telephone, and gas utilities.

2.2 Public Benefits

The Proposed Project will provide substantial public benefits to the City of Boston and the Lower Roxbury neighborhood. The Proposed Project will generate both direct and indirect significant economic benefits. The Proposed Project provides for:

- Creating seventy-six (76) units of affordable residential housing including four (4) handicap accessible units;
- Complementing and further developing the existing Madison Park Village (MPV) development, and providing an important interface with Melnea Cass Boulevard;
- Improving the streetscape along Melnea Cass Boulevard by creating building frontages, main entry points and private patios/yards along this section of the boulevard;
- Improving streetscape amenities to enhance the pedestrian landscape and experience;
- Contributing to the health and wellness of residents in the area through the creation of green central courts, common area plantings and outdoor sitting areas within the development;
- Establishing a premier example of sustainable and environmentally responsible construction and development;
- Creating construction period jobs;

- Creating eight (8) new off-street parking spaces and an estimated twenty-nine (29) new parking spaces along a relocated Brooke Marshall Road which will be private but open to the public and designated to Site Building 2B; and
- Adding new annual property taxes for the City of Boston.

2.3 Regulatory Controls and Permits

The Project Site was the subject of a larger zoning map amendment (Map Amendment No. 597), approved by the Boston Zoning Commission on January 14, 2015, and by the Mayor on January 15, 2015. In accordance with this zoning map amendment, the Project Site has been designated as being within a "U" Urban Renewal Area Overlay District. Based upon the approvals by the BRA, Zoning Commission and the Mayor, the use and dimensional requirements applicable to the Proposed Project are set forth in the South End and Campus High Urban Renewal Plans, which stipulate that the Site may be used for residential use and that the dimensional controls applicable to the Proposed Project are to be determined by the Authority Approval. Additionally, the proposed buildings shall be consistent and compatible with surrounding development respecting material, form and scale, subject also to Authority Approval. As set forth in the Authority's Development Agreement with the Developer, and as referenced in the Land Use and Building requirements set forth below, the Proposed Project is consistent with the dimensional and use restrictions within the applicable Urban Renewal Plans. Therefore, upon the issuance of a design approval certification for the Proposed Project by the Authority, and the Authority's determination of other requirements such as off-street parking and loading which will be reviewed in accordance with the Article 80 process, the Proposed Project will be in compliance with the Zoning Code. Design elements of the Proposed Project will also be reviewed pursuant to Large Project Review.

Table 2-1 Land Use and Building Requirements

Categories	Urban Renewal Requirement	Proposed Project
Permitted Land Use	Residential	Residential
Maximum Setback	AA	Complies
Maximum Height	AA	Complies
Maximum Net Density	AA	Complies
Minimum Parking Ratio	AA	Complies
Planning & Design Requirements	B	Complies

AA = Subject to Authority Approval

BB = Development shall be consistent with and compatible with surrounding Development respecting material, form and scale, subject to Authority Approval.

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

Agency Name	Permit or Action*
State Agencies	
MA Department of Environmental Protection, Division of Water Pollution Control	Sewer Connection Self Certification
Local Agencies	
Boston Redevelopment Authority	Article 80 Review and Execution of Related Agreements; Section 80B-6 Certificate of Compliance; Design Approval Certification; and
Boston Transportation Department	Transportation Access Plan Agreement; Construction Management Plan
Boston Department of Public Works Public Improvements Commission	Street Discontinuance and Relocation; Extension of Existing Public Street; Possible Sidewalk Repair Plan; Curb-Cut Permit; Street/Sidewalk Occupancy Permit; Permit for Street Opening;
Boston Fire Department	Approval of Fire Safety Equipment
Boston Water and Sewer Commission	Approval for Sewer and Water and Connections; Construction Site Dewatering; and Storm Drainage
Boston Department of Inspectional Services	Building Permits; Certificates of Occupancy; Other Construction-Related Permits

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

2.5 Public Review Process and Agency Coordination

In support of the required Article 80 Large Project Review process, the Proponent has conducted, and will continue to conduct, extensive community outreach with neighbors and abutters of the Site, including meetings and discussions with the residents of the adjacent Madison Park Village and Whittier Street communities, Roxbury neighborhood residents, the Roxbury Strategic Master Plan Oversight Committee and local elected and appointed officials for the neighborhood in order to identify issues/concerns as well as design requirements related to the Proposed Project. Over the past several months, the Proponent and its team have also met with the BRA project team being coordinated by Dana Whiteside, Deputy Director, and Gary Uter, Project Assistant.

Numerous organized meetings with the surrounding neighborhood interest groups, abutting property owners, organizations and nearby residents have been held, including the following:

- Roxbury Strategic Master Plan Oversight Committee Working Session, June 23, 2014;
- Community forum & breakout discussion sessions including resident representation from Roxbury, Whittier Street Apartments, Madison Park Village, and elected officials at Madison Park, June 28, 2014;
- Roxbury Strategic Master Plan Oversight Committee Meeting, July 7, 2014;
- Community presentation at Boston Central Elder Services with Spanish interpreter, September 17, 2014; and
- Meeting with resident group of Madison Park Village and Whittier Street Apartments, March 10, 2015.

In accordance with Article 80 requirements, an Impact Advisory Group ("IAG") has been formed and BRA-sponsored neighborhood meeting will be scheduled to review the PNF and receive community comments on the Proposed Project during the public review period. The Proponent requested in its Letter of Intent to File the PNF that the BRA, in forming its Impact Advisory Committee (the "IAG"). encourage and seek participation from Roxbury residents living less than 0.5 miles from the Proposed Project location, as well as active members of resident committees for communities adjacent to the Proposed Project, to serve as members on such IAG during the Article 80 review process.

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

2.6 Development Impact Payment ("DIP") Status

Based on current schematic design plans, it is <u>not</u> anticipated that Development Impact Payments ("DIP"), in accordance with Article 80B-7 of the Code, will be required for Proposed Project. The Proposed Project is expected to have no non-residential FAR square feet, and be below the 100,000 gsf threshold where a DIP is required.

3.0 URBAN DESIGN AND SUSTAINABILITY COMPONENT

3.1 Building Massing

The project is composed of two (2) buildings that serve to fill-in some of vacant "missing teeth" lots facing on Melnea Cass Boulevard (MCB). The building massing is informed by the urban design and programmatic requirements previously outlined in the urban design section, including:

1. Develop Melnea Cass Boulevard *(MCB)* into a viable community street;
2. Participate in the Whittier Choice Neighborhood Initiative program; and
3. Expand the existing Madison Park Village and provide needed affordable housing.

To achieve project priorities, the massing is as follows:

Site 2A: The Site Building 2A is a four (4) story building bounded by Melnea Cass Boulevard (MCB), a major Boston artery, on the north side. The building provides an articulated, full four (4) story facade on MCB with an accent tower on the northwest corner which is more visible from both MCB and St. Francis DeSales Court *(FDC)* to the west. The building also steps down to three (3) stories, on the west side facing on FDC and on the inner courtyard, which is shared with existing MPV housing on the east side. The massing is broken down to complement the smaller townhouse MPV buildings, but also serves as a transition structure to the anticipated, larger, complex on the corner "Crescent Parcel" site.

Site 2B: Site Building 2B is a five (5) story, building which shall be located on a MPV vacant lot, and a proposed "discontinuance" portion of Brooke Marshall Road *(BMR)*. On the north side, the new, combined site is bounded by MCB, and provides a five (5) story, "public" face with an accent tower on the northeast corner; which is more visible from MCB and Sojourner Truth Place (STP). To the west on STP, a smaller residential street, the building steps down from five to three (5 to 3) stories, similar in height to the MPV residential housing across the street. The building forms a U-shape facing south around an internal green, which is a continuation of the MPV open spaces to the south. To the west, the building is five (5) stories facing onto the proposed extended BMR out to MCB.

3.2 Building Design:

The project includes two buildings about a block apart within the MPV community, with the intention that buildings read as part of the new redevelopment, but also relate and complement the existing surrounding MPV context. Thus, both buildings incorporate similar architectural design features including:

- Articulated façades that breaks the buildings into smaller residential scale portions;

- Varied eave lines, in height, detail, and treatment, to further define the buildings' elements;

- Projecting, contemporary, sleek, metal-clad parapets in higher portions of the buildings;

- Corner accent towers with a curved metal roofs and MPV signage;

- Exterior patio doors with patios and "Juliet" balconies to provide façade interest, visual presence, and oversight on the street;

- Casement and awning windows; and

- Stepped retaining walls to create raised transition area between the building and public sidewalk, thus providing more tenant privacy, and opportunity for the building to use outdoor space.

Building 2A: The smaller Site Building 2A includes fourteen (14) stacked, duplex units similar to the current MPV townhouse units, and two (2) flats, with one designed to meet the accessibility requirements. The general building massing has a principal directionality along St. Francis DeSales Court but also presents a "public" face and outlook towards MCB. The building includes entries on the public street side and towards the interior courtyard shares with existing MPV #4 housing.

Building 2B: The larger Site Building 2B includes sixty (60) flats, ranging from one to four (1 to 4) bedrooms. The general building massing has a principal directionality and outlook towards MCB, provides the orthogonal form in conformance with Brooke Marshall/Sojourner Truth Place geometry, but also responds with stepped plan changes to the diagonal route of MCB in a northeasterly direction. Distinctive features on this larger, 2B, main building that are not included in Building 2A include:

- An articulated façade that breaks the building into three (3) distinctive sections; and

- A glass and aluminum "front" entry curtain wall from grade through the upper floors to define the entry spine with a projecting entry canopy. This entry spine penetrates through the building to the south side as a major defining building element

3.3 Materials

The cladding material for the buildings includes a series of fiber-cement products, corrugated sheet metal, and a limited amount of masonry. In general many of these materials are identical or similar to the current

and proposed exterior treatments on much of the low-rise portion of the existing MPV housing. The exterior envelop of the buildings are designed: to accent the architectural delineation that breaks the buildings down to residential scale; to provide a varied and interesting building texture, while remaining within a defined building vocabulary; to augment, complement, extend and contribute to the MPV context; and to provide transition from this low-rise MPV area to the expected denser "crescent parcel" site and the Melnea Cass thorough-fare.

Siding treatments proposed for both buildings include:

- **Siding Type #1: Fiber-cement panels with stainless steel accent reglets at panel connections:** These 4' x 8' panels *(but usually cut to meet the architectural requirements)* come in factor-applied colors and will be applied over a rigid, sheathed polyisocyanurate panels with a highly permeable building wrap/rain-screen. This treatment is confined to the corner accent towers of both buildings, which will also include MPV graphics or title to identify and announce the village community. *(See drawings in Section #3 for locations.)*
- **Siding Type #2: Fiber-cement 18" planks with beveled tongue and groove edges:** These are applied flat with no overlap. These panels come in factory-applied colors and will be applied over a rigid, sheathed polyisocyanurate panels with a highly permeable building wrap/rain-screen. This siding is used as the main building envelop and has a strong horizontal accent. *(See drawings in Section #3 for locations.)*
- **Siding Type #3: Painted steel corrugated steel sheets:** These sheets come in 3' width to the full length required up to 60'. The panels are applied flat with a 2" overlap and are proposed to be installed horizontally. These panels come in factory-applied colors and will be applied over a rigid, sheathed polyisocyanurate panels with a highly permeable building wrap/rain-screen. This siding is used as the secondary accent building envelop and has a strong horizontal directionality. *(See drawings in Section #3 for locations.)*
- **Siding Type #4: Fiber-cement panels with painted vinyl/composite battens at panel connections:** These 4' x 8' panels *(but usually cut to meet the architectural requirements)* come in factory-applied colors and will be applied over a rigid, sheathed polyisocyanurate panels with a highly permeable building wrap/rain-screen. This siding application is provide to accent and distinguish specific building portions. (See drawings at the end of **Section3.0** for locations.)

Colors for these products are not proposed at this time, but shall include a strong community review process.

Additional exterior elements on both buildings include:

- **Fiberglass Frame, Awning, Casement, and Fixed Glazed Windows:** These come in a selection of manufacturer colors.
- **Insulated, Fiberglass, and Glazed Patio Doors:** These will be used at exterior patios, and "Juliet" balconies and will be field painted.

- **Galvanized Steel Pipe and Metal Exterior Guardrails:** These will be supplied at exterior 'Juliet" balconies and the color will be integrated in the galvanizing process.
- **Exterior Steel and Glass Entry Canopies:** These will provide exterior rain shelter and be an accent component, with exposed support cables, and large stainless steel address numbers integrated above the canopies on the public street sides.

Additional siding treatments proposed for Building 2B include:

- **Siding Type #5: Masonry Building Base:** Portions of the first (1st) floor up to the second (2nd) floor level shall be clad in a decorative, and varied, concrete block in a pattern of texture and color. *(See drawings in Section #3 for locations.)*
- **Glass and Aluminum "Front" Entry Curtain Wall:** As described above, this shall be a critical element is breaking down the scale of this building to residential - scale components.

3.4 Views

The views along Melnea Cass Boulevard have been carefully articulated to create variation along the street wall. Building heights as well as materials changes create variation along the street. The gap between the proposed buildings and existing MPV housing allow for sunlight to run through the project and reach interior areas of the MPV community. Current existing views of the abutting low rise MPV housing is changed to provide screening from the major traffic arteries and are substituted with tranquil semi-public, landscaped courtyards.

3.5 Landscape Design

The landscape design plan on the public sides of the project first and foremost is guided by Boston's Complete Streets initiative, which features a multimodal, green, and smart approach to design. The plants selection will:

- Be informed to be similar or compatible with existing landscaping found in the rest of the Madison Park Village;
- Include only drought tolerant plants for landscaping as listed in appropriate UMass literature;
- No in-ground irrigation system is proposed for the sites; and
- Include only non-invasive plantings as listed in the MA Invasive Plant Advisory Group.

The components of the landscape plan include:

- Three edge conditions which have a public faces including the highly public Melnea Cass Boulevard; the series of smaller residential side street in MPV; and the proposed new residential private through-street which is open to the public.
- Two interior shared-use courtyards, including one open to the public street, the other only partially visible to the public.

- Individual smaller residential yards that include plantings to create privacy and the sense of individual dedicated yard spaces.

The most prominent public side of the project faces Melnea Cass Boulevard ("MCB"). The current design of the building sets the first residential floor at about 3' above the street level, and there currently is a buffer zone owned by the City of Boston that requires the building to be set back between 40' and 50' from MCB. At present, the City of Boston is engaged in a design process to determine the uses and design of this area, but they have indicated that it will include a bicycle path, a pedestrian walkway, and a tree strip. This will leave an area that is not fully determined to date. The first floors of the buildings are set about 3' above the street grade to allow for some privacy for the first floor residential units. To support the residential use on the first floor, the site design includes a retaining wall at the MCB property line. This will create some generous green spaces that will include strong planted conifer bushes at the retaining wall edge and around the private patio integrated into the yards facing on MCB, several deciduous and decorative flowering trees, and some perennial planting beds. The open areas on these yards will be landscaped with ground cover. At Site Building 2B, the main building entry faces on MCB, and this area will be treated with strong perennial planting and supportive conifer landscape to provide a year around screening from the first floor housing.

On the smaller residential streets, the buildings are placed closer to public streets, but still include some raised private residential patio and individual yard space for the residents. Along these edges strong conifer planting will be incorporated to screen yards, patios, and to serve as foundation plantings, as well as decorative picket metal fencing to define private areas. The open yard areas will include perennial planting beds and ground cover. Few trees will be added in these areas because there are a large number of existing street tree that are proposed to remain. It is assumed that on the new portion of Brooke Marshall Road that the City of Boston will add street trees to similar in type and spacing to the existing street trees.

The treatment on the proposed new street at Site Building 2B will include some new deciduous street and specimen ornamental trees on the proposed courtyard space at the south side of Building 2B. The intention is to create/extend the existing central green in the MPV block to the south across the new street and into the southern side of Building 2B. The green will be provided to augment the pair of playgrounds in MPV green to the south and provide a sitting/meeting area in the new green. The edge to the new street shall be more transparent with accent plantings, perennial plantings and open decorative fencing.

At Site Building 2A, an additional courtyard is created to the east of the new building that is enclosed on three sides with new and existing MPV housing. This inner courtyard currently has a playground that will remain for continued use. There are similar private yards to those outlined facing on the residential street, and will receive similar landscape treatments. Building 2A, also includes an off-street parking lot which is proposed to receive conifer screening on three sides and deciduous trees at the corners.

The preliminary placement of landscape is delineated on the site plans and first floor plans included in this submission. (See drawings at the end of **Section 3.0**).

3.5 Sustainable Design/Energy Conservation

3.5.1 Introduction

Sustainability informs every design decision. Enduring and efficient buildings conserve embodied energy and reduce the need for natural resources. The Proposed Project embraces the opportunity to positively influence the urban environment. Its urban location takes advantage of existing infrastructure while enabling convenient access to mass transportation that will reduce dependence on single occupant vehicle trips and minimize transportation impacts. The buildings will be prepared to be Photovoltaic Systems (PV) system- ready and both buildings are excellent candidate as there is no shading over the proposed roofs. If funding is secured, photo-voltaic solar panels will be incorporated to provide site-produced electricity which will reduce the need to purchase grid power.

The Proponent and the Project design team are committed to an integrated design approach and are using the LEED for Homes Mid-Rise Project Checklist along with third-party oversight and intend to be LEED Silver certifiable as presented in **Figures 3.28A** and **3.28B** at the end of this section. This rating will meet or exceed Boston's Green Building standard. The LEED rating system tracks the sustainable features of the project by achieving points in following categories: Innovation and Design Process, Location and Linkages, Sustainable Sites; Water Efficiency; Energy and Atmosphere; Materials and Resources; Indoor Environmental Quality; and Awareness and Education. We will complete items from the lists below that are sufficient to meet Silver status, but not necessarily all of the specific points identified below.

3.5.2 Innovation and Design Process

The prerequisites and credits, which the Proposed Project hopes to achieve in this category, are listed below by building:

Building 2A

ID 1.1 Preliminary Rating: (Prerequisite)

- The project team will organize a Preliminary Rating meeting with the design team and complete the Preliminary Checklist; it was decided to pursue Silver certification as the target goal.

ID 1.2 Energy Expertise for Mid-Rise: (Prerequisite)

- The team has both expertise for Mid-Rise systems and experience modeling ASHRAE 90.1 energy simulation for LEED for Homes Mid-Rise. Core members have met from inception and will meet through to the completion of the construction documents.

ID 1.3 Professional Credentialed with Respect to LEED for homes (1 credit)

- The team leader is LEED AP accredited professional and will be assigned throughout the duration of the project.

ID 2.1 Durability Planning: (Prerequisite)

- The durability evaluation form and durability inspection checklist will be completed as the design advances.

ID 2.2 Durability Management: (Prerequisite)

- The Proponent plans to use the durability inspection checklist throughout construction as both an inspection tool and a project management tool for weekly review, to ensure each measure is satisfactorily completed.

Building 2B

ID 1.1 Preliminary Rating: (Prerequisite)

- The project team will organize a Preliminary Rating meeting with the design team and complete the Preliminary Checklist; it was decided to pursue Silver certification as the target goal.

ID 1.2 Energy Expertise for Mid-Rise: (Prerequisite)

- The team has both expertise for Mid-Rise systems and experience modeling ASHRAE 90.1 energy simulation for LEED for Homes Mid-Rise. Core members have met from inception and will meet through to the completion of the construction documents.

ID 1.3 Professional Credentialed with Respect to LEED for homes (1 credit)

- The team leader is LEED AP accredited professional and will be assigned throughout the duration of the project.

ID 2.1 Durability Planning: (Prerequisite)

- The durability evaluation form and durability inspection checklist will be completed as the design advances.

ID 2.2 Durability Management: (Prerequisite)

- The Proponent plans to use the durability inspection checklist throughout construction as both an inspection tool and a project management tool for weekly review, to ensure each measure is satisfactorily completed.

3.5.3 Location and Linkages

Building 2A

LL 2 Site Selection: (2 credits)

- The Site does not violate any of the listed environmental sensitivity criteria.

LL 3.2 Infill: (2 credits)

- 75% or more of the perimeter borders previously developed land. The Site is composed of several existing buildings with offices, repair garage, and storage garage uses; the surrounding neighborhood is built-up with two and three-family homes.

LL 4 Existing Infrastructure: (1 credit)

- The Site is within ½ mile of existing water and sewer service lines.

LL 5.1 – 5.3 Community Resources/Public Transit: (3 credits)

- The Site has outstanding transit options. The site is located within a half-mile of the Ruggles Street and Roxbury Crossing Stations along the MBTA Orange Line. The Orange Line operates with headways of approximately 5 minutes during the peak periods and 8 minute headways during the off peak periods. The Dudley Square bus station is located within a half-mile of the Project site. Several MBTA bus routes are also located within a quarter-mile of the Project site. The Proposed Project is expected to generate a total of 190 transit trips per day.

LL 6 Access to Open Space: (1 credit)

- The Site will meet the criteria of being proximate to space greater than ¾ acre within ¼ mile. The Madison Park playing field / court area is within ¼ mile and is greater than ¾ acre.

Building 2B

LL 2 Site Selection: (2 credits)

- The Site does not violate any of the listed environmental sensitivity criteria.

LL 3.2 Infill: (2 credits)

- 75% or more of the perimeter borders previously developed land. The Site is composed of several existing buildings with offices, repair garage, and storage garage uses; the surrounding neighborhood is built-up with two and three-family homes.

LL 4 Existing Infrastructure: (1 credit)

- The Site is within ½ mile of existing water and sewer service lines.

LL 5.1 – 5.3 Community Resources/Public Transit: (3 credits)

- The Site has outstanding transit options. The site is located within a half-mile of Ruggles Street and Roxbury Crossing Stations along the MBTA Orange Line. The Orange Line operates with headways of approximately 5 minutes during the peak periods and 8 minute headways during the off peak periods. The Dudley Square bus station is located within a half-mile of the Project site. Several MBTA bus routes are also located within a quarter-mile of the Project site. The Proposed Project is expected to generate a total of 190 transit trips per day.

LL 6 Access to Open Space: (1 credit)

- The Site will meet the criteria of being proximate to space greater than ¾ acre within ¼ mile. The Madison Park playing field / court area is within ¼ mile and is greater than ¾ acre.

3.5.4 Sustainable Sites

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

Building 2A

SS 1.1 Erosion Controls during Construction: (Prerequisite)

- The project team will develop and implement an erosion control plan prior to start of construction which will meet each of the required LEED provisions (a – e).

SS 2.1 No invasive plants: (Prerequisite)

- No invasive species will be scheduled or specified in the landscape plan.

SS 2.2 Basic Landscape Design: (1 credit)

- Any installed turf will be drought-tolerant; will not be used in densely shaded areas; and will not be placed in areas with > 25% slope. Mulch, or soils amendments will be used as appropriate, and compacted soil will be tilled to >/= 6 inches.

SS 2.3 Limit Conventional Turf: (1 credit)

- Conventional turf will be kept to 40% of designed softscape, or less.

SS 2.4 Drought Tolerant Plants: (1 credit)

- The landscape architect will select drought tolerant plants (90% or more) for the landscaping plan. Lists of plants and their quantities of each plant will be provided.

SS 2.5 Reduce Overall Irrigation Demand by at least 20% for MID-RISE: (1 credit)

- A professional landscape architect shall design the landscape and irrigation system to reduce overall irrigation water usage. Estimates will be calculated and prepared by said professional landscape architect; reduction goal 20-24%.

SS3.2 Reduce Local Heat Island Effects: (1 credit)

- The roof will be installed with high-albedo material on 75% or more of the roof area.

SS4.2 Permanent Erosion Controls: (1 credit)

- Terracing and retaining walls will be used on steep sloped areas of the Site.

SS 4.3 Storm Water Quality Control for Mid-Rise: (2 credits)

- The Proposed Project will use in-field performance monitoring to demonstrate compliance.

SS 5 Pest control alternatives (2 credits)

- The Proposed Project will employ at minimum 4 of the collection of pest control alternatives.

SS 6.1 Compact Development, Moderate Density for Mid-Rise: (2 credits)

- The Proposed Project will have an approximate density of 38 units per acre, meeting the moderate Density threshold.

SS7.1 Public Transit Mid-Rise: (2 credits)

- The number of transit rides available within ½ mile of the project is in excess of 60 per weekday.

Building 2B

SS 1.1 Erosion Controls during Construction: (Prerequisite)

- The project team will develop and implement an erosion control plan prior to start of construction which will meet each of the required LEED provisions (a – e).

SS 1.2 Minimize Disturbed Area of Site for Mid-Rise: (1 credit)

- Project density is estimated at 78.6 units/ acre, fulfilling item D “Build with housing density for the project that is equal to or greater than 40 units per acre”.

SS 2.1 No invasive plants: (Prerequisite)

- No invasive species will be scheduled or specified in the landscape plan.

SS 2.2 Basic Landscape Design: (1 credit)

- Any installed turf will be drought-tolerant; will not be used in densely shaded areas; and will not be placed in areas with > 25% slope. Mulch, or soils amendments will be used as appropriate, and compacted soil will be tilled to >/= 6 inches.

SS 2.3 Limit Conventional Turf: (1 credit)

- Conventional turf will be kept to 40% of designed softscape, or less.

SS 2.4 Drought Tolerant Plants: (1 credit)

- The landscape architect will select drought tolerant plants (90% or more) for the landscaping plan. Lists of plants and their quantities of each plant will be provided.

SS 2.5 Reduce Overall Irrigation Demand by at least 20% for MID-RISE: (1 credit)

- A professional landscape architect shall design the landscape and irrigation system to reduce overall irrigation water usage. Estimates will be calculated and prepared by said professional landscape architect; reduction goal 20-24%

SS3.2 Reduce Local Heat Island Effects: (1 credit)

- The roof will be installed with high-albedo material on 75% or more of the roof area.

SS4.2 Permanent Erosion Controls: (1 credit)

- Terracing and retaining walls will be used on steep sloped areas of the Site.

SS 4.3 Storm Water Quality Control for Mid-Rise: (2 credits)

- The Proposed Project will use in-field performance monitoring to demonstrate compliance.

SS 5 Pest control alternatives (2 credits)

- The Proposed Project will employ at minimum 4 of the collection of pest control alternatives

SS 6.2 Compact Development, High Density for Mid-Rise: (3 credits)

- The Proposed Project will have an approximate density of 78.6 units per acre, meeting the High Density threshold.

SS7.1 Public Transit Mid-Rise: (2 credits)

- The number of transit rides available within ½ mile of the project is in excess of 60 per weekday.

3.5.5 Water Efficiency

Buildings are major users of our potable water supply and conservation of water preserves a natural resource while reducing the amount of energy and chemicals used for sewage treatment. The goal of the Water Efficiency credit category is to encourage smarter use of water, inside and out. Water reduction is typically achieved through more efficient appliances, fixtures and fittings inside and water-wise landscaping outside.

Building 2A

WE 2.1 High-Efficiency Irrigation system, Mid-Rise (2 credits)

- Irrigation best-practices will be employed to maximize this credit.

WE 3.1 High Efficiency Fixtures and Fittings: (3 credits)

- Shower heads with 1.75 or less GPM, lavatory faucets will use 1.5 or less GPM and the toilets selected will be less than 1.3 gallons per flush.

WE 3.3 Water Efficient Appliances for Mid-Rise: (2 credits)

- The project will be using high-efficiency clothes washers and dishwashers.

Building 2B

WE 2.1 High-Efficiency Irrigation system, Mid-Rise (2 credits)

- Irrigation best-practices will be employed to maximize this credit.

WE 3.1 High Efficiency Fixtures and Fittings: (3 credits)

- Shower heads with 1.75 or less GPM, lavatory faucets will use 1.5 or less GPM and the toilets selected will be less than 1.3 gallons per flush.

WE 3.3 Water Efficient Appliances for Mid-Rise: (2 credits)

The project will be using high-efficiency clothes washers and dishwashers.

3.5.6 Energy and Atmosphere

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

Building 2A

EA 1.1 Minimum Energy Performance for Mid-Rise: (Prerequisite)

- The Proposed Project will exceed the 15% minimum reduction in energy use according to the ASHRAE90.1 simulation.

EA 1.2 Testing and Verification for Mid-Rise: (Prerequisite)

- The Proposed Project intends to comply with Option 1, Testing & Verification protocol.

EA 1.3 Optimize Energy Performance for Mid-Rise: (7 credits)

- The Proposed Project intends to reach at least a 20% better than reference in the ASHRAE with EPA simulation modeling.

EA 7.2 Pipe Insulation: (1 credit)

- All domestic hot water piping will have R4 pipe insulation installed.

EA 11.1 Refrigerant Charge Test: (Prerequisite)

- All refrigerant lines for air conditioning will be third-party charge tested per manufacturer's standards.

EA 11.2 Appropriate HVAC Refrigerants: (1 credit)

- This project will install an HVAC system with non-HCFC refrigerant (e.g. R-410a)

Building 2B

EA 1.1 Minimum Energy Performance for Mid-Rise: (Prerequisite)

- The Proposed Project will exceed the 15% minimum reduction in energy use according to the ASHRAE90.1 simulation.

EA 1.2 Testing and Verification for Mid-Rise: (Prerequisite)

- The Proposed Project intends to comply with Option 1, Testing & Verification protocol.

EA 1.3 Optimize Energy Performance for Mid-Rise: (7 credits)

- The Proposed Project intends to reach at least a 20% better than reference in the ASHRAE with EPA simulation modeling.

EA 7.2 Pipe Insulation: (1 credit)

- All domestic hot water piping will have R4 pipe insulation installed.

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- All refrigerant lines for air conditioning will be third-party charge tested per manufacturer's standards.

EA 11.2 Appropriate HVAC Refrigerants: (1 credit)

- This project will install an HVAC system with non-HCFC refrigerant (e.g. R-410a)

3.5.7 Materials and Resources

During both construction and operations, buildings generate a lot of waste and use a lot of materials and resources. This credit category encourages the selection of sustainable materials, including those that are harvested and manufactured locally, contain high-recycled content, and

are rapidly renewable. It also promotes the reduction of waste through building and material reuse, construction waste management, and ongoing recycling programs.

Building 2A

MR 1.1 Framing Order Waste Factor: (Prerequisite)

- A calculation of the wood necessary to frame the building and orders of the amount of wood purchased will be made. Orders are not expected to exceed the calculation by more than 10%.

MR 1.2 Detailed Framing Documents: (1 credit)

- Prior to the construction phase, detailed plans on scope of work and accompanying architectural details will be prepared and reviewed by team for use on the work site.

MR 1.3 Detailed Cut List and Lumber Order: (1 credit)

- Prior to the construction phase, detailed plans on scope of work and accompanying architectural details will be prepared and reviewed by team for use on the work site.

MR 2.1 FSC Certified Tropical Woods: (Prerequisite)

- Suppliers will be notified of requirement for FSC products and requested to provide information for the country of origin for each wood product. Any tropical woods used will be FSC Certified.

MR 2.2 Environmentally Preferable Products (min.3 credits)

- The Proposed Project will select environmentally preferable products in accordance with the EPP table to earn a minimum of 3 credits.

MR 3.1 Construction Waste Management Planning: (Prerequisite)

- The Proposed Project will investigate any recycling opportunities in the area and document the waste diverted from the landfill.

MR 3.2 Construction Waste Reduction: (0.5 credit)

- The Proposed Project will limit the total amounts of waste that will go to the landfill by targeting a 50% reduction.

Building 2B

MR 1.1 Framing Order Waste Factor: (Prerequisite)

- A calculation of the wood necessary to frame the building and orders of the amount of wood purchased will be made. Orders are not expected to exceed the calculation by more than 10%.

MR 1.2 Detailed Framing Documents: (1 credit)

- Prior to the construction phase, detailed plans on scope of work and accompanying architectural details will be prepared and reviewed by team for use on the work site.

MR 1.3 Detailed Cut List and Lumber Order: (1 credit)

- Prior to the construction phase, detailed plans on scope of work and accompanying architectural details will be prepared and reviewed by team for use on the work site.

MR 2.1 FSC Certified Tropical Woods: (Prerequisite)

- Suppliers will be notified of requirement for FSC products and requested to provide information for the country of origin for each wood product. Any tropical woods used will be FSC Certified.

MR 2.2 Environmentally Preferable Products (min.3 credits)

- The Proposed Project will select environmentally preferable products in accordance with the EPP table to earn a minimum of 3 credits.

MR 3.1 Construction Waste Management Planning: (Prerequisite)

- The Proposed Project will investigate any recycling opportunities in the area and document the waste diverted from the landfill.

MR 3.2 Construction Waste Reduction: (0.5 credit)

- The Proposed Project will limit the total amounts of waste that will go to the landfill by targeting a 50% reduction.

3.5.8 Indoor Environmental Quality

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

Building 2A

EQ 2 Basic Combustion Venting Measures for Mid-Rise: (Prerequisite)

- These measures are included in the design as requirements for basic code compliance in our region. There will be no fireplaces in any of the units and all other measures will be met.

EQ 4.1 Basic Outdoor Air Ventilation: (Prerequisite)

- Continuous ventilation will be provided to each unit to meet the ASHRAE 62.2 – 2007 and ASHRAE 62.1 – 2007 (sec. 4-7) ventilation standards.

EQ 4.2 Enhanced Outdoor Air Ventilation for MID-RISE (2 credits)

- This project will install a system to provide heat transfer between the incoming outdoor air system and the exhaust air stream; this system will be chosen from a list of certified systems.

EQ 5.1 Basic Local Exhaust: (Prerequisite)

- Bath fans and kitchen area exhaust fans will be ASHRAE 62.2 – 2007 compliant. All of the LEED and ENERGY STAR criteria will be met.

EQ 5.2 Enhanced Local Exhaust: (1 credit)

- An automatic time will be installed in every bathroom designed to operate the fan for a timed interval after the occupant leaves for a minimum period of 20 minutes.

EQ 6.1 Room by Room Load Calculations: (Prerequisite)

- Room by room load calculations will be provided by the HVAC engineer or responsible party stating the calculations were performed according to ACCA Manual J and D.

EQ 7.1 Air Filtering: (Prerequisite) (good filters)

- MERV 8 filters will be installed on ducted distribution systems.

EQ 8.1 Indoor Contaminant Control During Construction: (1 credit)

- All ductwork will be sealed throughout construction so that debris doesn't contaminate the distribution systems.

EQ 10.3 Detached garage or no garage for MID-RISE: (1 credit)

- No garage will be provided

EQ 11 Environmental Tobacco Smoke Control (0.5 credit)

- Restrictions on public smoking will be implemented to reduce smoke exposure and transfer.

EQ 12.1 Compartmentalization of Units (Prerequisite)

- A thorough air-sealing protocol will be implemented to ensure leakage below 0.30 CFM50 per sq. ft. of enclosure.

Building 2B

EQ 2 Basic Combustion Venting Measures for Mid-Rise: (Prerequisite)

- These measures are included in the design as requirements for basic code compliance in our region. There will be no fireplaces in any of the units and all other measures will be met.

EQ 4.1 Basic Outdoor Air Ventilation for MID-RISE: (Prerequisite)

- Continuous ventilation will be provided to each unit to meet the ASHRAE 62.2 – 2007 and ASHRAE 62.1 – 2007 (sec. 4-7) ventilation standards.

EQ 4.2 Enhanced Outdoor Air Ventilation for MID-RISE (2 credits)

- This project will install a system to provide heat transfer between the incoming outdoor air system and the exhaust air stream; this system will be chosen from a list of certified systems.

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- Bath fans and kitchen area exhaust fans will be ASHRAE 62.2 – 2007 compliant. All of the LEED and ENERGY STAR criteria will be met.

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- An automatic time will be installed in every bathroom designed to operate the fan for a timed interval after the occupant leaves for a minimum period of 20 minutes.

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- All ductwork will be sealed throughout construction so that debris doesn't contaminate the distribution systems.

EQ 10.3 Detached garage or no garage for MID-RISE: (1 credit)

- No garage will be provided

EQ 11 Environmental Tobacco Smoke Control (0.5 credit)

- Restrictions on public smoking will be implemented to reduce smoke exposure and transfer.

EQ 12.1 Compartmentalization of Units (Prerequisite)

- A thorough air-sealing protocol will be implemented to ensure leakage below 0.30 CFM50 per sq. ft. of enclosure.

3.5.9 Awareness and Education

Building 2A

AE 1.1 Education of the Homeowner: (Prerequisite)

- An electronic Home Owner's Manual will be created and provided to all occupants.
- A one-hour walk through will be conducted with the occupants in group trainings.

AE 1.3 Public Awareness: (1 credit)

- The Proponent will create a website about the project, highlighting the benefits of LEED Homes.
- The Proponent will work with regional publications on a newspaper article about the Proposed Project.
- The contractor's project sign will include LEED for Homes signage at the exterior of the building site.

AE 2 Education of the Building Manager: (1 credit)

- An operations and training manual will be created and provided to the building manager and a one-hour walk-through will be conducted with the building manager.

Building 2B

AE 1.1 Education of the Homeowner: (Prerequisite)

- An electronic Home Owner's Manual will be created and provided to all occupants.
- A one-hour walk through will be conducted with the occupants in group trainings.

AE 1.3 Public Awareness: (1 credit)

- The Proponent will create a website about the project, highlighting the benefits of LEED Homes.
- The Proponent will work with regional publications on a newspaper article about the Proposed Project.
- The contractor's project sign will include LEED for Homes signage at the exterior of the building site.

AE 2 Education of the Building Manager: (1 credit)

- An operations and training manual will be created and provided to the building manager and a one-hour walk-through will be conducted with the building manager.

3.6 Urban Design Drawings and LEED Checklists

A listing of the urban design drawings and perspectives, and the LEED Checklists are contained below with the figures on the following pages:

Figure 3.1: Locus Plan – Buildings 2A & 2B
Figure 3.2: Existing Site Survey
Figure 3.3: Existing Conditions Photographs – Site 2A
Figure 3.4: Existing Conditions Photographs – Site 2B
Figure 3.5: Existing Conditions Photographs – Site 2B
Figure 3.6: Existing Conditions Photographs – Site 2B
Figure 3.7: Existing Conditions Photographs – Site 2B
Figure 3.8: Site Plan – Buildings 2A & 2B
Figure 3.9: First Floor w/Site Plan – Building 2A
Figure 3.10: Building A Floor Plans
Figure 3.11: Building A Cross Sections
Figure 3.12: Building A Exterior Elevations
Figure 3.13: First Floor w/Site Plan – Building 2B
Figure 3.14: Building B Floor Plans
Figure 3.15: Building B Cross Sections
Figure 3.16: Building B Exterior Elevations
Figure 3.17: Building B Exterior Elevations
Figure 3.18: Project Rendering – Bird's Eye View from North East Corner of the Site
Figure 3.19: Project Rendering – Bird's Eye View from South East Corner of the Site
Figure 3.20: Project Rendering – Bird's Eye View from South West Corner of the Site
Figure 3.21: Project Rendering – Bird's Eye View from North West Corner of the Site
Figure 3.22: Project Rendering – Street View - Corner of Melnea Cass & Sojourner Truth *(Looking West)*
Figure 3.23: Project Rendering – Street View - Corner of Melnea Cass & Francis Desales *(Looking East)*
Figure 3.24: Project Rendering – West Street View from Francis Desales Court - Site 2A *(Looking East)*
Figure 3.25: Project Rendering – South Street View from the rear new street – Site 2A (*Looking North)*
Figure 3.26: Project Rendering – Streetscape View -Corner of Melnea Cass & Sojourner Truth *(Looking South & West)*
Figure 3.27: Project Renderings - Street View - Corner of Melnea Cass & Brooke Marshall *(Looking South & East)*
Figure 3.28A: LEED Checklists – Building 2A
Figure 3.28B: LEED Checklists – Building 2B

LOCUSPLAN - BUILDING 2A & 2B

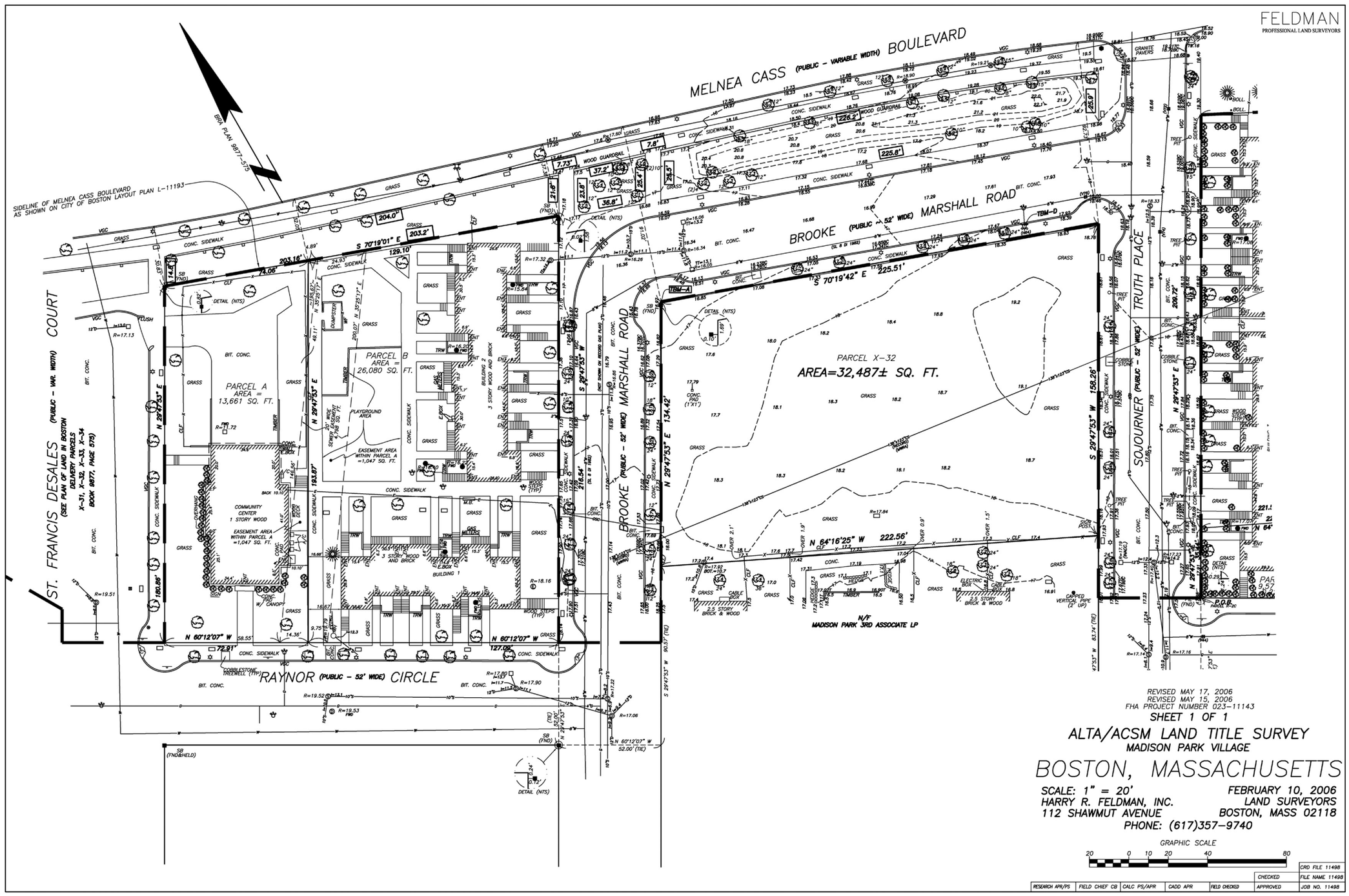
FIGURE 3.1

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

PHASE 2:
Locus Plan - Building 2A & 2B

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects



EXISTING SITE SURVEY

FIGURE 3.2

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

PHASE 2:
Existing Site Survey

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

VIEW 1

VIEW 2

VIEW 3

KEY MAP

EXISTING CONDITION PHOTOGRAPHS: SITE 2A

FIGURE 3.3

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

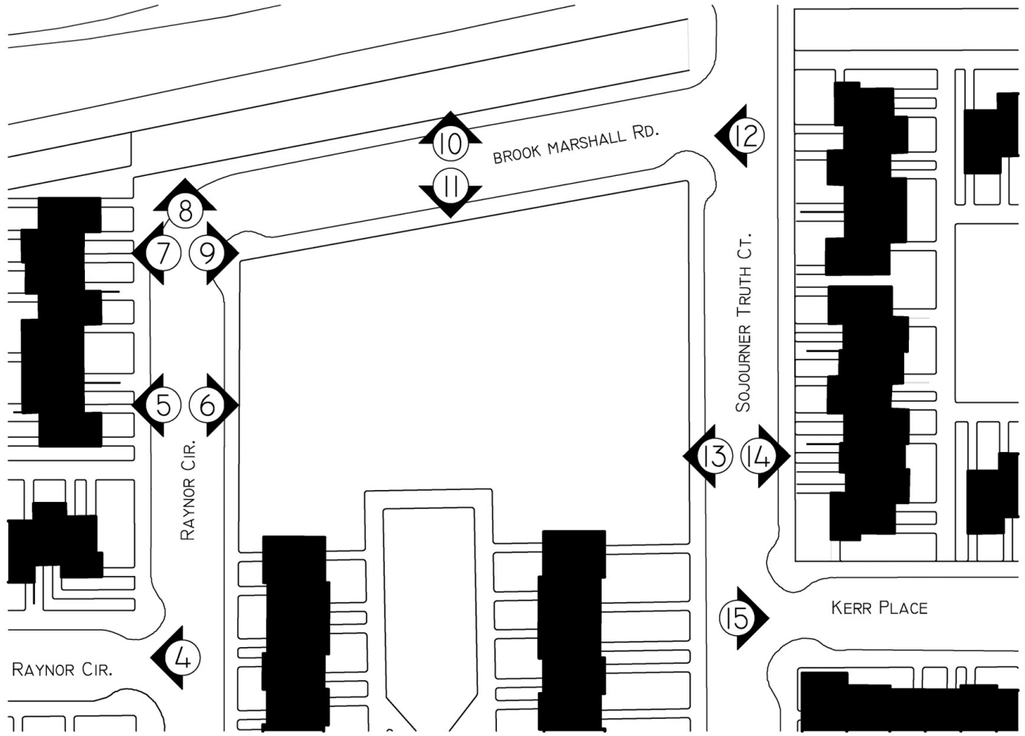
PHASE 2:
Existing Condition Photograph :
Site 2A

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

VIEW 4

VIEW 5

VIEW 6



KEY MAP

EXISTING CONDITION PHOTOGRAPHS: SITE 2B

FIGURE 3.4

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

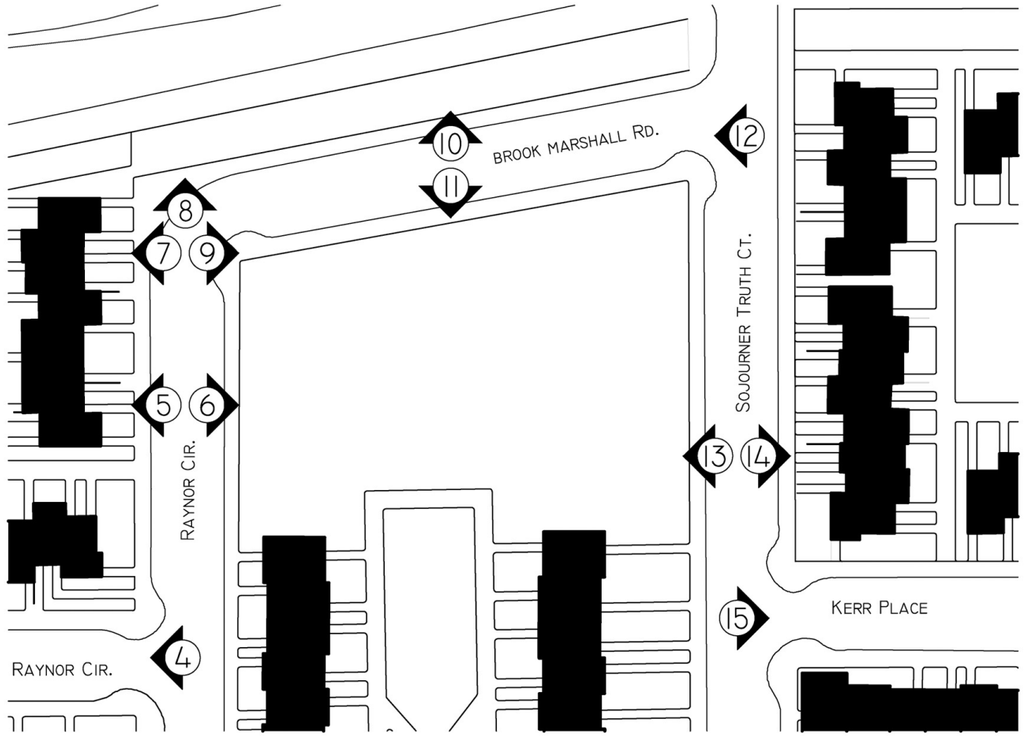
PHASE 2:
Existing Condition Photograph :
Site 2B

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

VIEW 7

VIEW 8

VIEW 9



KEY MAP

EXISTING CONDITION PHOTOGRAPHS: SITE 2B

FIGURE 3.5

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

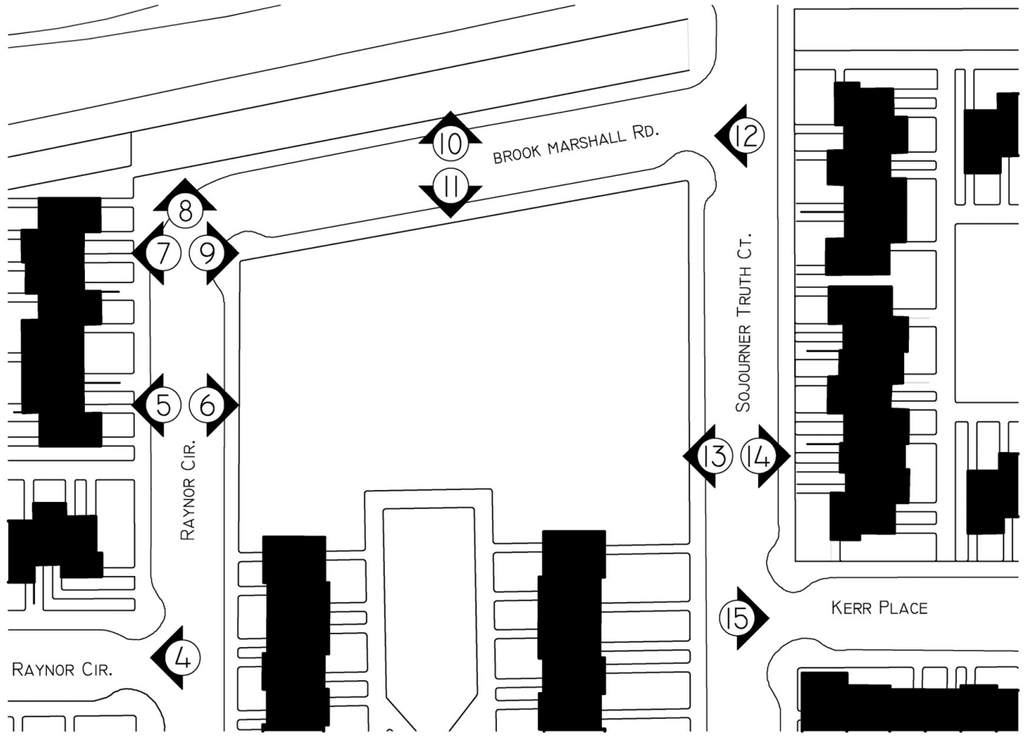
PHASE 2:
Existing Condition Photograph :
Site 2B

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

VIEW 10

VIEW 11

VIEW 12



KEY MAP

EXISTING CONDITION PHOTOGRAPHS: SITE 2B

FIGURE 3.6

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

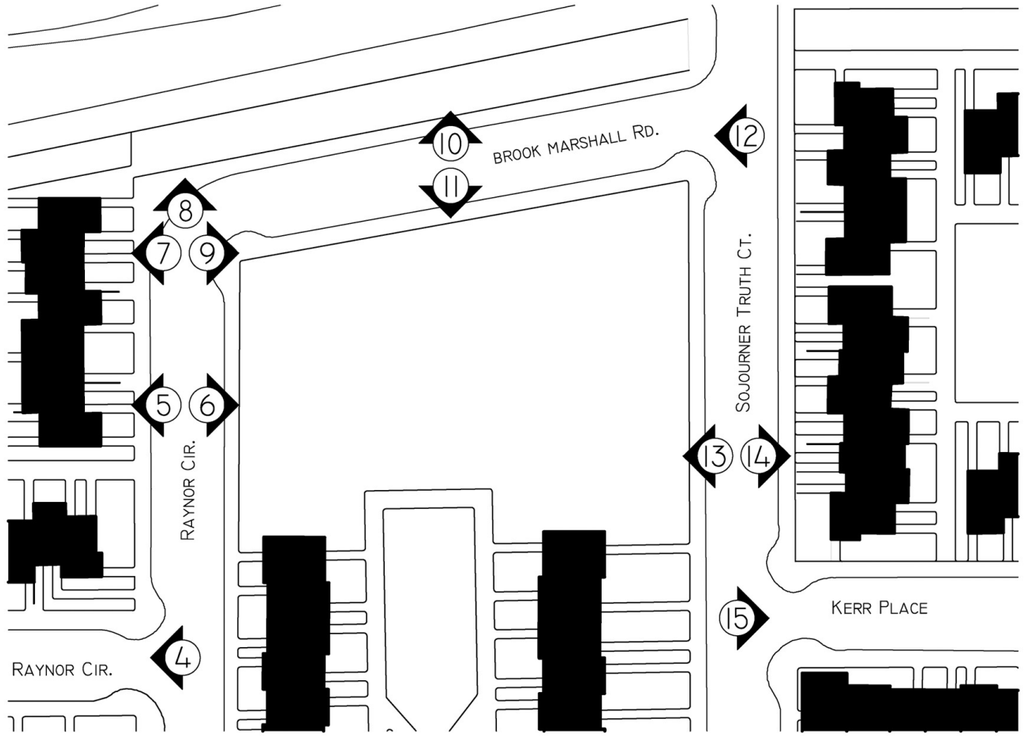
PHASE 2:
Existing Condition Photograph :
Site 2B

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

VIEW 13

VIEW 14

VIEW 15



KEY MAP

EXISTING CONDITION PHOTOGRAPHS: SITE 2B

FIGURE 3.7

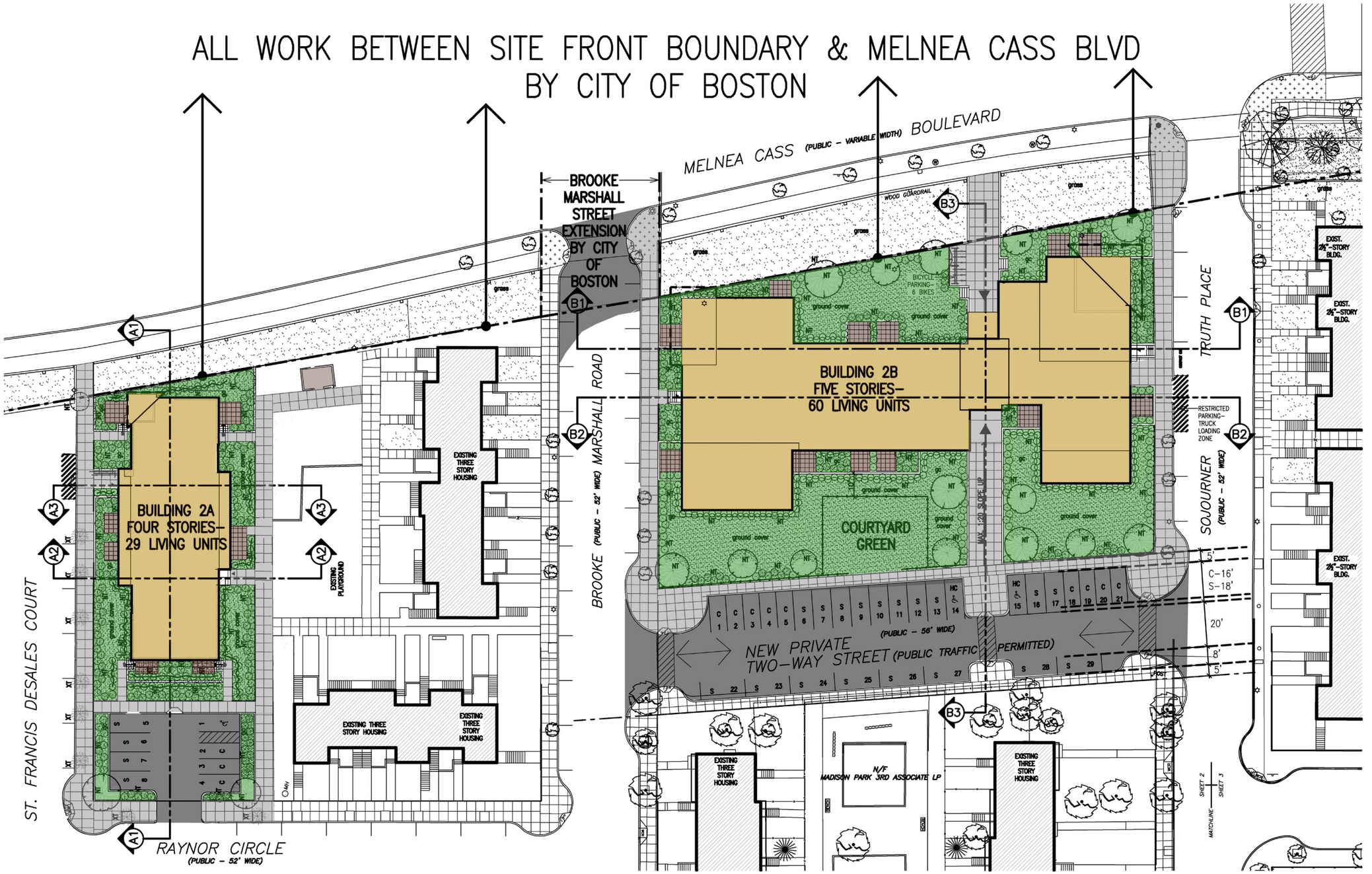
ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

PHASE 2:
Existing Condition Photograph :
Site 2B

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

ALL WORK BETWEEN SITE FRONT BOUNDARY & MELNEA CASS BLVD
BY CITY OF BOSTON



SITE PLAN - BUILDINGS 2A & 2B

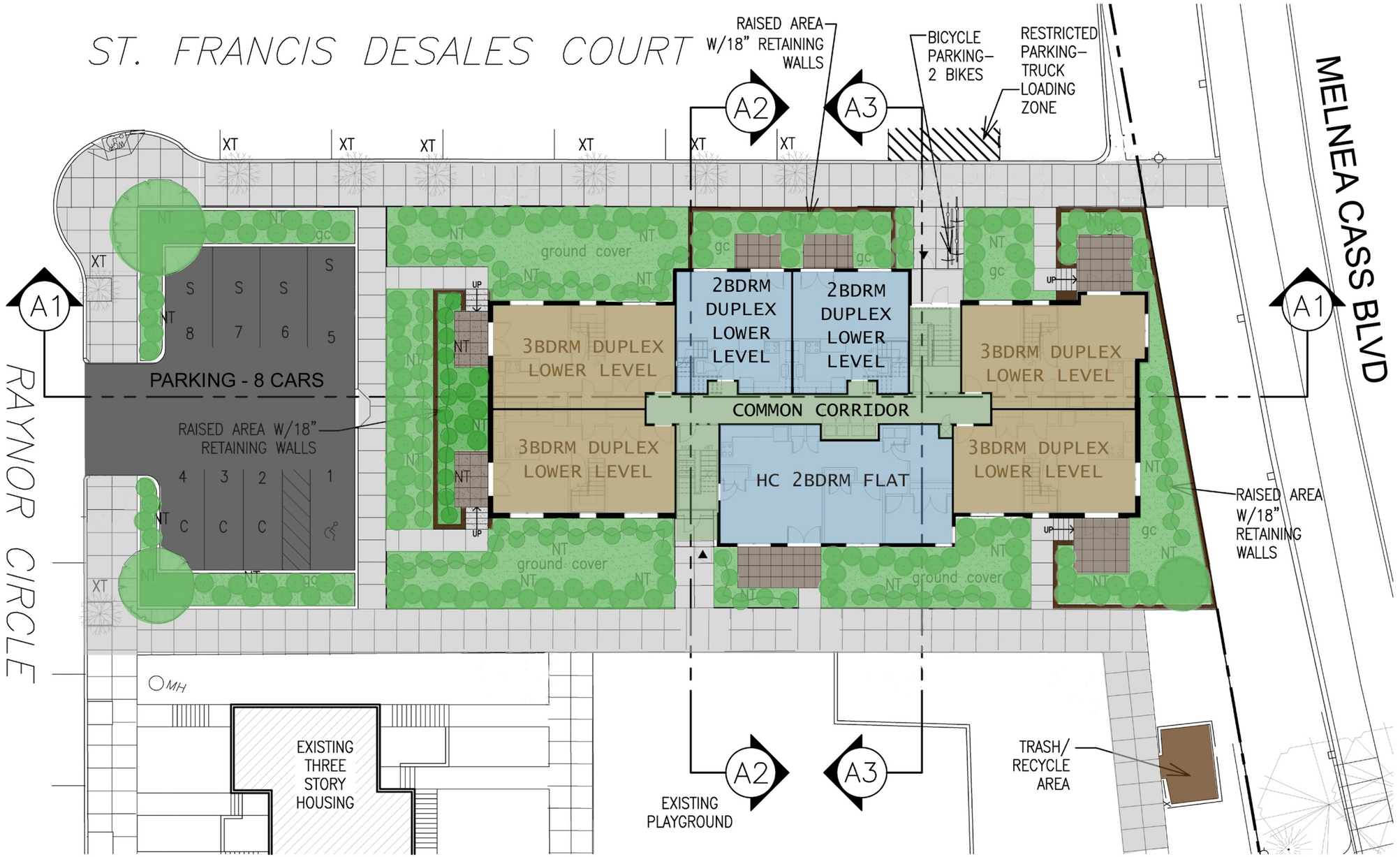
FIGURE 3.8

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

PHASE 2:
Site Plan - Bldgs 2A & 2B

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects



1ST FLOOR W/SITE PLAN - BUILDING 2A

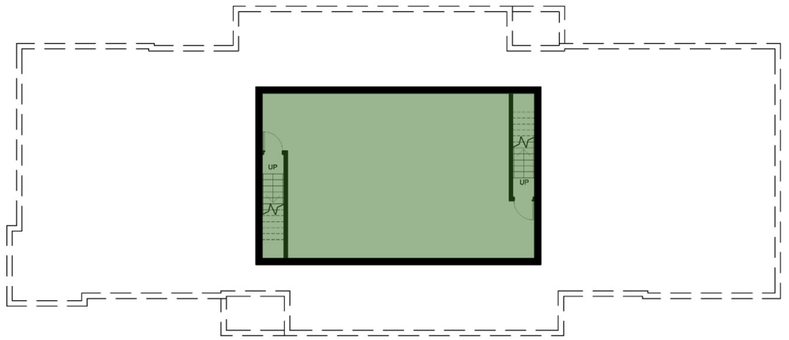
FIGURE 3.9

ELTON + HAMPTON ARCHITECTS

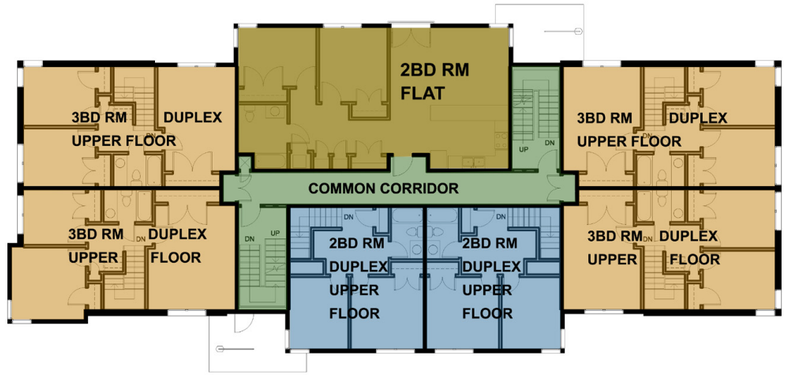
Madison Park Infill Sites
Boston, MA

PHASE 2:
1st Floor W/Site Plan - Bldg 2A

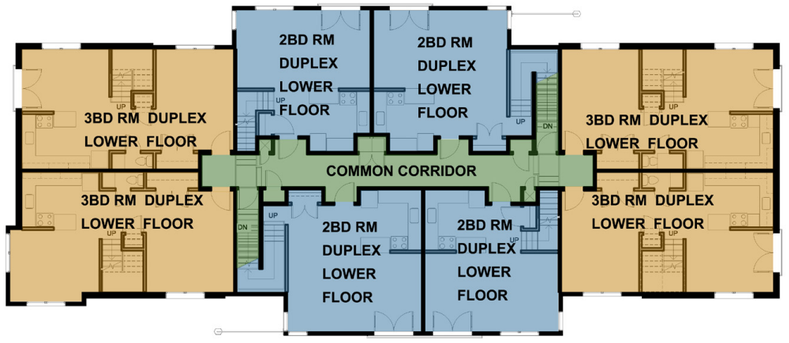
April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects



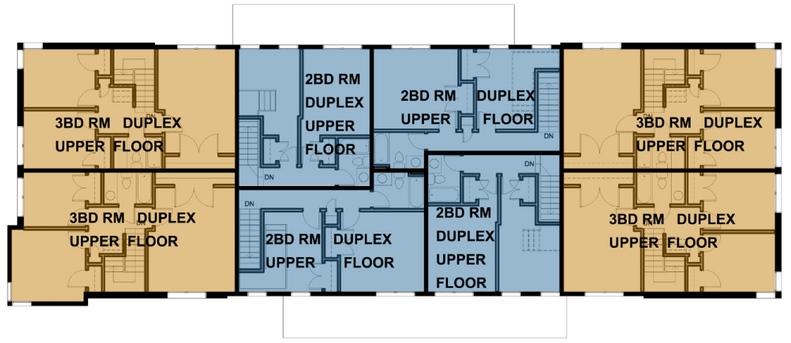
Basement Plan



2nd Floor Plan



3rd Floor Plan



4th Floor Plan

BUILDING 2A FLOOR PLANS

FIGURE 3.10

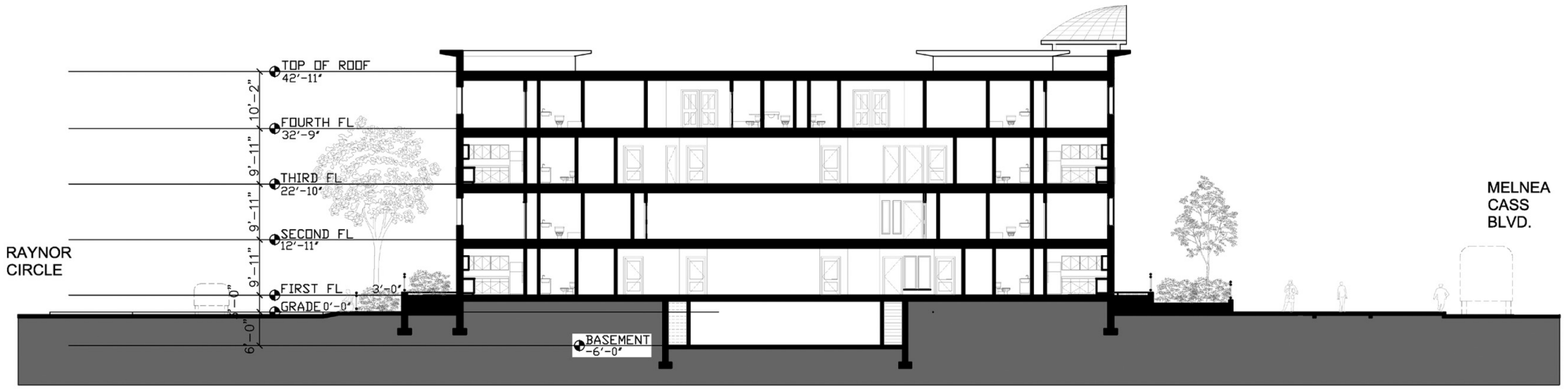
ELTON + HAMPTON ARCHITECTS

PHASE 2:
Bldg 2A Floor Plans

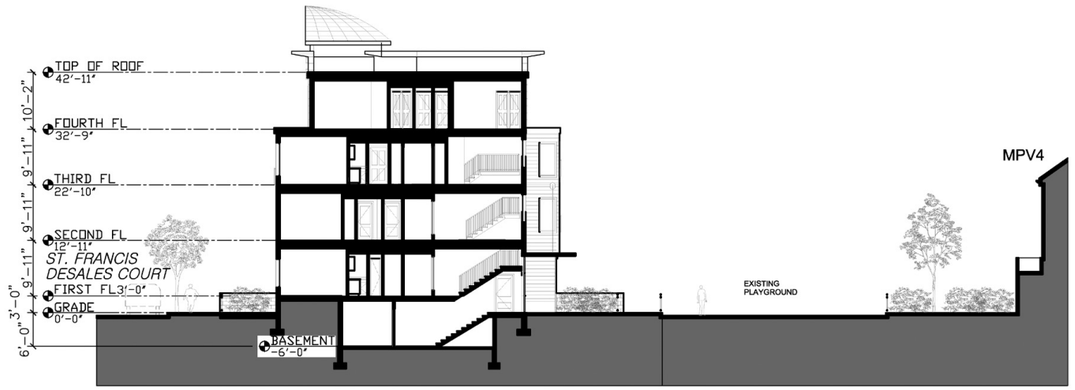
Madison Park Infill Sites
Boston, MA

ARCHITECT : Elton + Hampton Architects

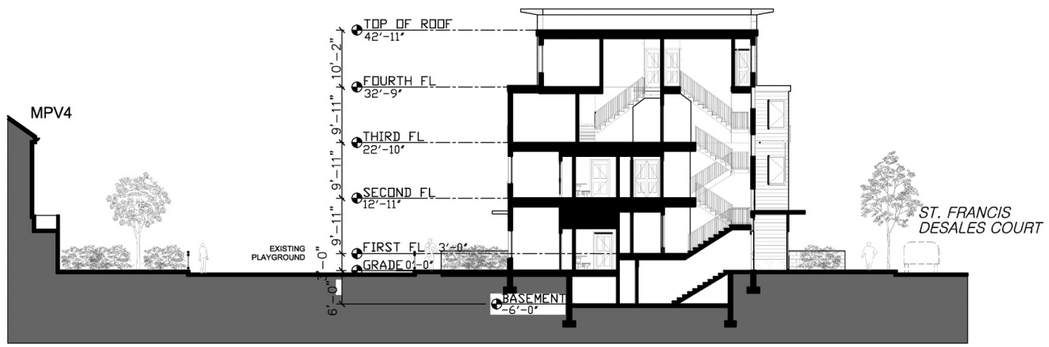
April 28, 2015 | DEVELOPER : Madison Park Development Corporation



SECTION A1



SECTION A2



SECTION A3

BUILDING 2A - CROSS SECTIONS

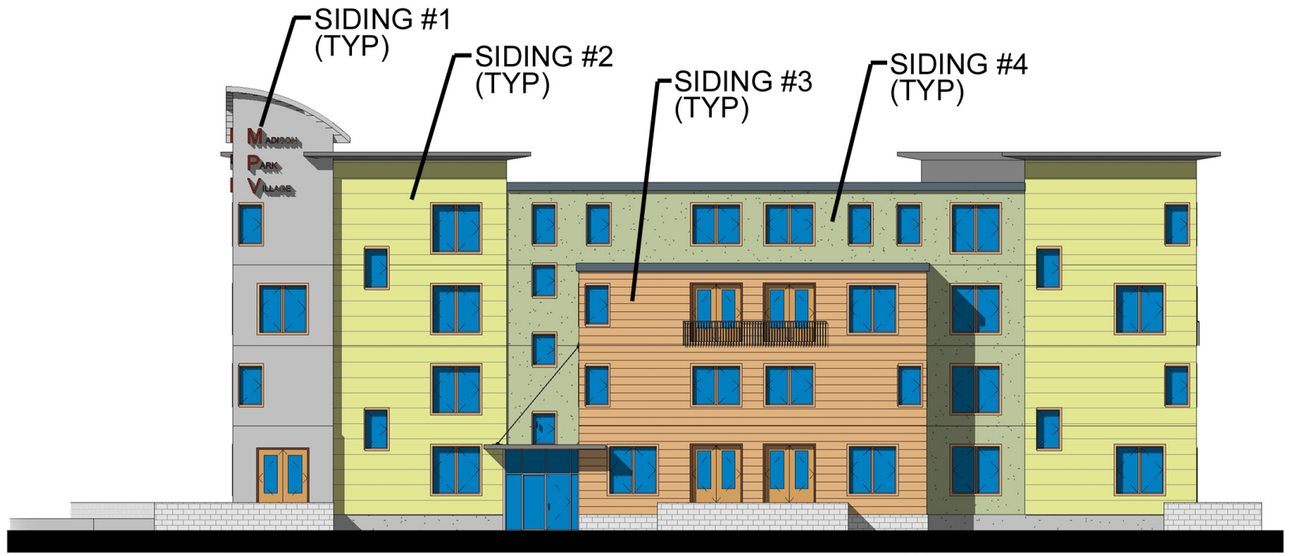
FIGURE 3.11

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

PHASE 2:
Bldg 2A - Cross Sections

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects



FRONT (WEST) ELEVATION - FRANCIS DESALES COURT

LEFT (NORTH) ELEVATION -
MELNEA CASS BLVD

REAR (EAST) ELEVATION - INNER COURTYARD

RIGHT (SOUTH) ELEVATION -
RAYNOR CIRCLE

BUILDING 2A - EXTERIOR ELEVATIONS

FIGURE 3.12

ELTON + HAMPTON ARCHITECTS

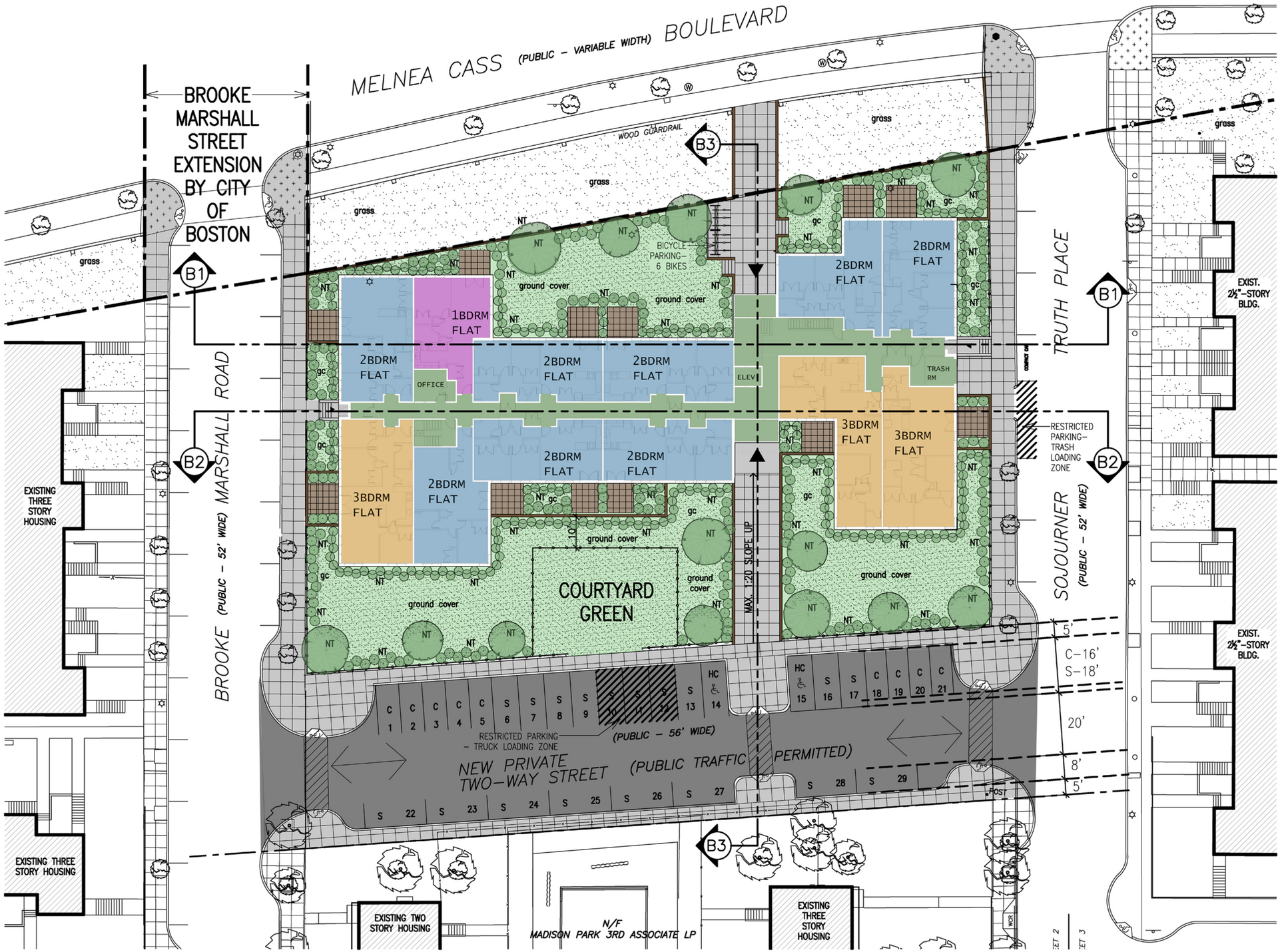
Madison Park Infill Sites
Boston, MA

PHASE 2:
Bldg 2A Exterior Elevaions

ARCHITECT : Elton + Hampton Architects

DEVELOPER : Madison Park Development Corporation

April 28, 2015



1ST FLOOR W/SITE PLAN - BUILDING 2B

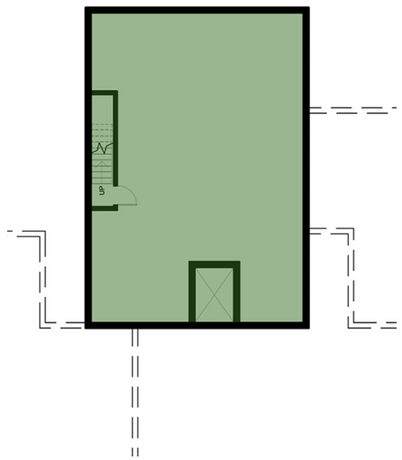
FIGURE 3.13

ELTON + HAMPTON ARCHITECTS

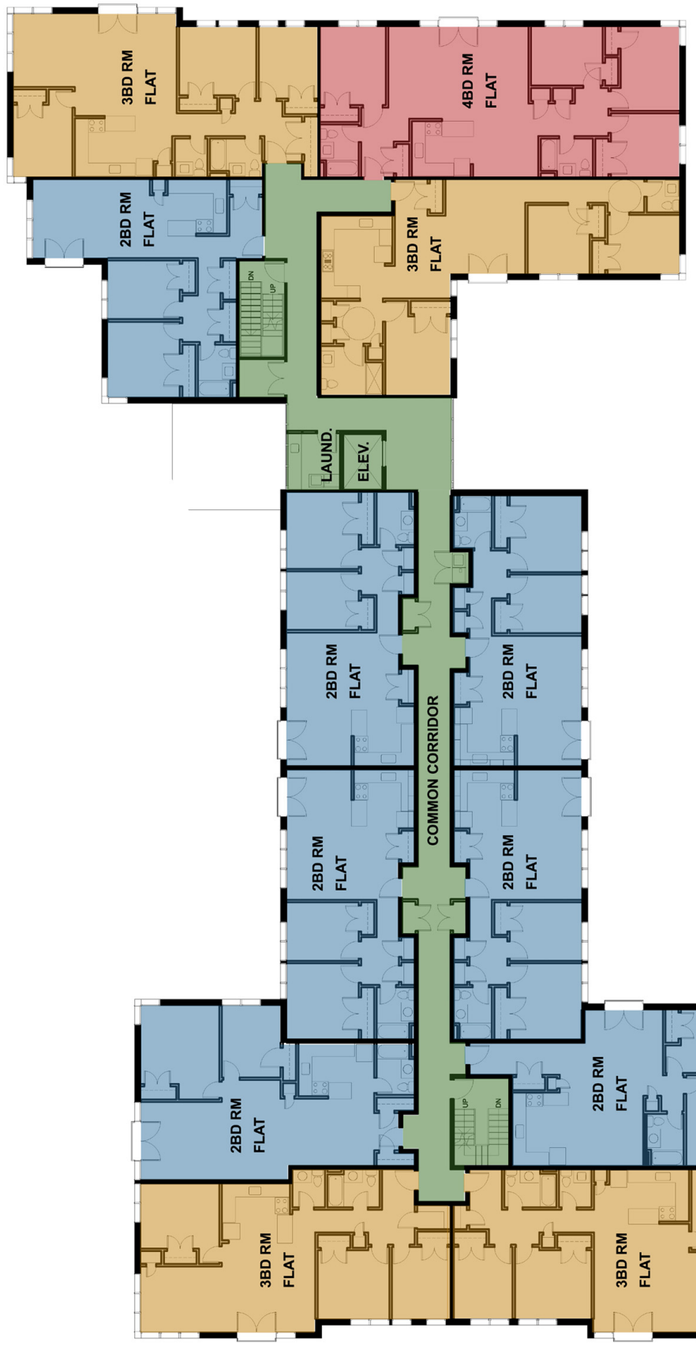
Madison Park Infill Sites
Boston, MA

PHASE 2:
1st Floor w/Site Plan - Bldg 2B

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects



Basement Plan



2nd/3rd Floor Plan

4th/5th Floor Plan

BUILDING 2B FLOOR PLANS

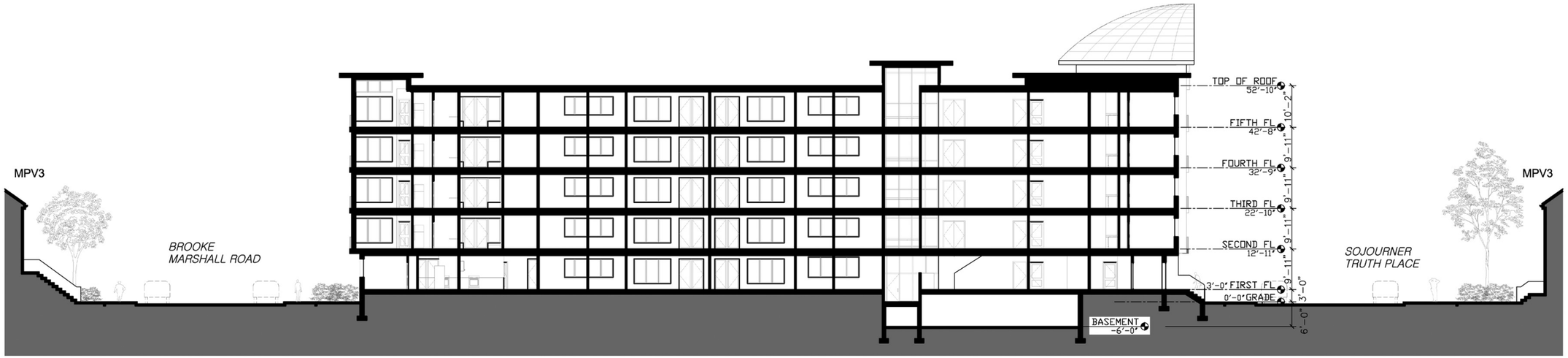
FIGURE 3.14

ELTON + HAMPTON ARCHITECTS

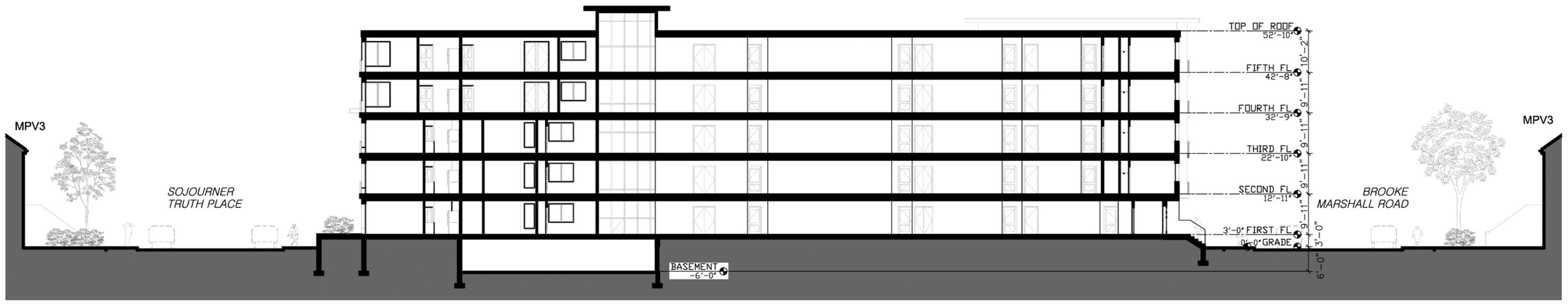
Madison Park Infill Sites
Boston, MA

PHASE 2:
Bldg 2B Floor Plans

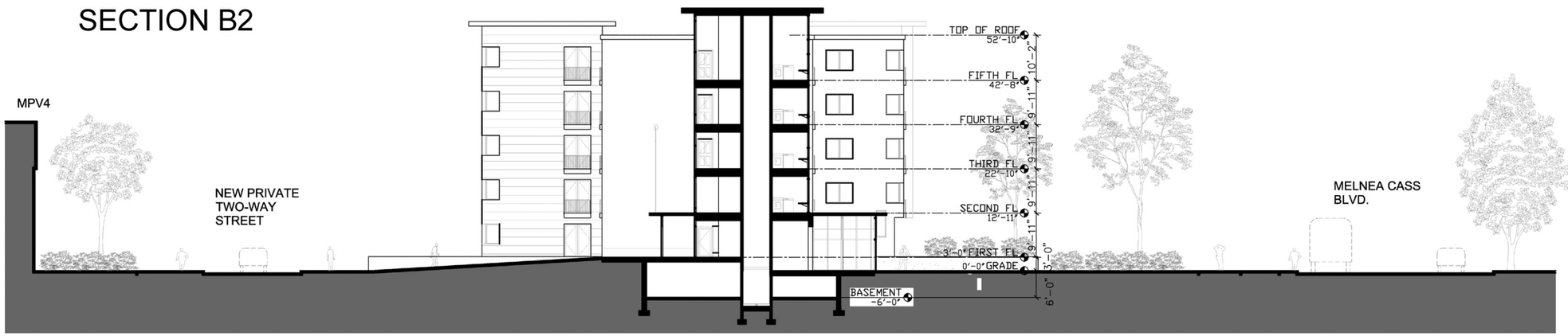
April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects



SECTION B1



SECTION B2



SECTION B3

BUILDING 2B - CROSS SECTIONS

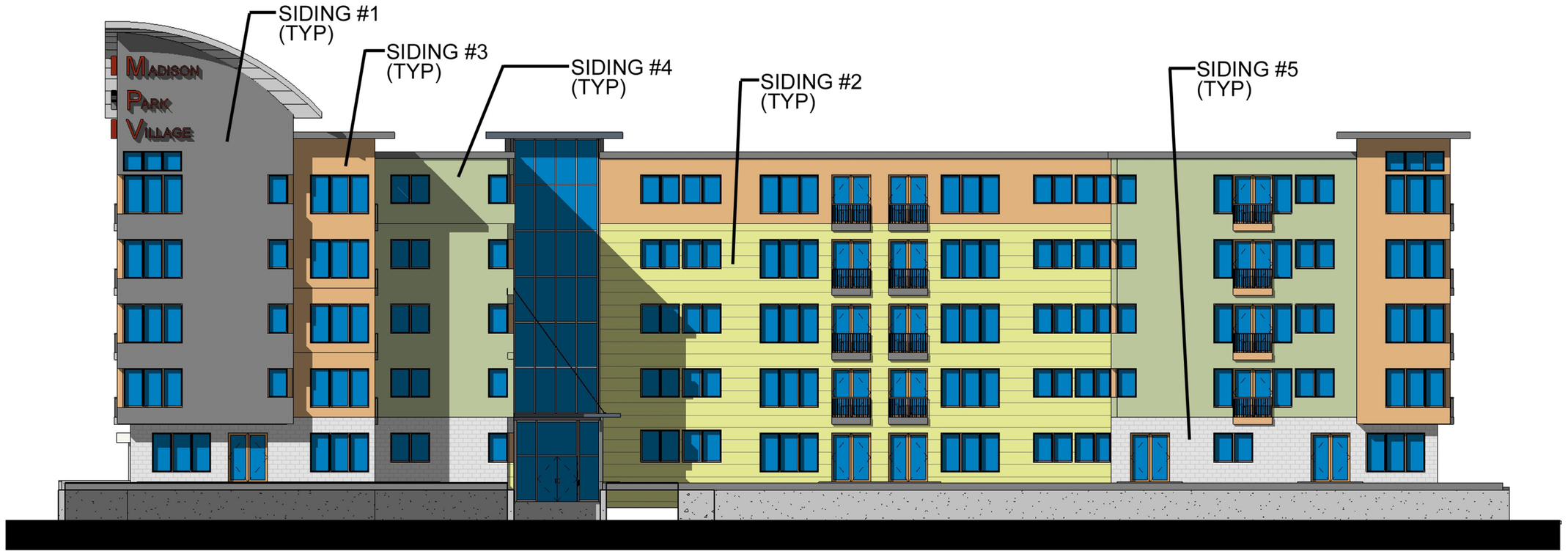
FIGURE 3.15

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

PHASE 2:
Bldg 2B - Cross Sections

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects



FRONT (NORTH) ELEVATION - MELNEA CASS BOULEVARD

LEFT (EAST) ELEVATION -
SOJOURNOR TRUTH PLACE

BUILDING 2B - EXTERIOR ELEVATIONS

FIGURE 3.16

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

PHASE 2:
Bldg 2B - Exterior Elevations

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

REAR (SOUTH) ELEVATION - INNER COURTYARD & NEW PRIVATE STREET

RIGHT (WEST) ELEVATION - BROOKE MARSHALL ROAD

BUILDING 2B - EXTERIOR ELEVATIONS

FIGURE 3.17

ELTON + HAMPTON ARCHITECTS

PHASE 2:
Bldg 2B - Exterior Elevations

Madison Park Infill Sites
Boston, MA

ARCHITECT : Elton + Hampton Architects

April 28, 2015 | DEVELOPER : Madison Park Development Corporation

Bird's Eye View from North East Corner of the Site

FIGURE 3.18

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

PHASE 2:
Bird's Eye View from North East
Corner of the Site

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

Bird's Eye View from South East Corner of the Site

FIGURE 3.19

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

PHASE 2:
Bird's Eye View from South East Corner of the Site

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

Bird’s Eye View from South West Corner of the Site

FIGURE 3.20

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

PHASE 2:
Bird’s Eye View from South West
Corner of the Site

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

Bird’s Eye View from North West Corner of the Site

FIGURE 3.21

ELTON + HAMPTON ARCHITECTS

PHASE 2:
Bird's Eye View from North West
Corner of the Site

Madison Park Infill Sites
Boston, MA

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

Street View - Corner of Melnea Cass & Sojourner Truth (Looking West)

FIGURE 3.22

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

PHASE 2:
Street View - Corner of Melnea Cass
& Sojourner Truth (Looking West)

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

Street View - Corner of Melnea Cass & Francis Desales (Looking East)

FIGURE 3.23

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

PHASE 2:
Street View - Corner of Melnea Cass & Francis Desales (Looking East)

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

West Street View from Francis Desales Court - Site 2A (Looking East)

FIGURE 3.24

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

PHASE 2:
West Street View from Francis Desales Court - Site 2A (Looking East)

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

South Street View from the rear new street - Site 2B (Looking North)

FIGURE 3.25

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

PHASE 2:
South Street View from the rear
new street - Site 2B (Looking North)

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

Streetscape View - Corner of Melnea Cass & Sojourner Truth (Looking South & West)

FIGURE 3.26

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

PHASE 2:
Streetscape View - Corner of Melnea
Cass & Sojourner Truth
(Looking South & West)

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

Street View - Corner of Melnea Cass & Brooke Marshall
(Looking South & East)

FIGURE 3.27

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

PHASE 2:
Street View - Corner of Melnea Cass & Brooke Marshall (Looking South & East)

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

FIGURE 3.28A LEED for Homes Mid-rise Simplified Project Checklist

for Homes

Builder Name:	*To Be Determined*
Project Team Leader (if different):	*Nick Elton, Elton+Hampton Architects*
Home Address (Street/City/State):	*Brooke Marshall Rd/Melnea Cass Blvd., Boston, Ma.*

Project Description:

Building type: *Mid-rise multi-family* # of stories: *4*

# of units: *16* Avg. Home Size Adjustment: *-10*

Adjusted Certification Thresholds

Certified: *35.0* Gold: *65.0*

Silver: *50.0* Platinum: *80.0*

Project Point Total

Prelim: *53 + 11 maybe pts* Final: *0*

Certification Level

Prelim: *Not Certified* Final: *Not Certified*

Final Credit Category Total Points

ID: 0 *SS: 0* *EA: 0* *EQ: 0*

LL: 0 *WE: 0* *MR: 0* *AE: 0*

Min. Point Thresholds Not Met for Prelim. OR Final Rating

date last updated :
last updated by :

					Max Pts	Project Points Preliminary Y/Pts	Maybe	No	Final Y/Pts
Innovation and Design Process (ID)			(No Minimum Points Required)		Max				
1. Integrated Project Planning		1.1	Preliminary Rating		Prereq	Y			
		1.2	Energy Expertise for MID-RISE		Prereq	Y			
		1.3	Professional Credentialed with Respect to LEED for Homes		1	1	0		0
		1.4	Design Charrette		1	0	1		0
		1.5	Building Orientation for Solar Design		1	0	0		0
		1.6	Trades Training for MID-RISE		1	0	1		0
2. Durability Management Process		2.1	Durability Planning		Prereq	Y			
		2.2	Durability Management		Prereq	Y			
		2.3	Third-Party Durability Management Verification		3	0	3		0
3.Innovative or Regional Design	☒	3.1	Innovation #1 _____		1	0	0		0
	☒	3.2	Innovation #2 _____		1	0	0		0
	☒	3.3	Innovation #3 _____		1	0	0		0
	☒	3.4	Innovation #4		1	0	0		0
				Sub-Total for ID Category:	**11**	1	5		0
Location and Linkages (LL)			(No Minimum Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. LEED ND		1	LEED for Neighborhood Development	**LL2-6**	10	0	0		0
2. Site Selection	☒	2	Site Selection		2	2	0		0
3. Preferred Locations		3.1	Edge Development		1	0	0		0
		3.2	Infill	**LL 3.1**	2	2	0		0
		3.3	Brownfield Redevelopment for MID-RISE		1	0	0	N	0
4. Infrastructure		4	Existing Infrastructure		1	1	0		0
5. Community Resources/ Transit		5.1	Basic Community Resources for MID-RISE		1	0	0		0
		5.2	Extensive Community Resources for MID-RISE	**LL 5.1, 5.3**	2	0	0		0
		5.3	Outstanding Community Resources for MID-RISE	**LL 5.1, 5.2**	3	3	0		0
6. Access to Open Space		6	Access to Open Space		1	1	0		0
				Sub-Total for LL Category:	**10**	9	0		0
Sustainable Sites (SS)			(Minimum of 5 SS Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. Site Stewardship		1.1	Erosion Controls During Construction		Prerequisite	Y			
		1.2	Minimize Disturbed Area of Site for MID-RISE		1	1	0		0
2. Landscaping	☒	2.1	No Invasive Plants		Prerequisite	Y			
	☒	2.2	Basic Landscape Design	**SS 2.5**	1	1	0		0
	☒	2.3	Limit Conventional Turf for MID-RISE	**SS 2.5**	2	1	1		0
	☒	2.4	Drought Tolerant Plants for MID-RISE	**SS 2.5**	1	1	1		0
	☒	2.5	Reduce Overall Irrigation Demand by at Least 20% for MID-RISE		3	1	1		0
3. Local Heat Island Effects	☒	3.1	Reduce Site Heat Island Effects for MID-RISE		1	0	1		0
	☒	3.2	Reduce Roof Heat Island Effects for MID-RISE		1	1	0		0
4. Surface Water Management	☒	4.1	Permeable Lot for MID-RISE		2	0	1		0
		4.2	Permanent Erosion Controls		1	1	0		0
	☒	4.3	Stormwater Quality Control for MID-RISE		2	2	0		0
5. Nontoxic Pest Control		5	Pest Control Alternatives		2	2	0		0
6. Compact Development		6.1	Moderate Density for MID-RISE		2	2	0		0
		6.2	High Density for MID-RISE	**SS 6.1, 6.3**	3	0	0		0
		6.3	Very High Density for MID-RISE	**SS 6.1, 6.2**	4	0	0		0
7. Alternative Transportation		7.1	Public Transit for MID-RISE		2	2	0		0
		7.2	Bicycle Storage for MID-RISE		1	1	0		0
		7.3	Parking Capacity/Low-Emitting Vehicles for MID-RISE		1	0	0		0
				Sub-Total for SS Category:	**22**	15	4		0

LEED for Homes Mid-rise Pilot Simplified Project Checklist (continued)

					Max Pts	Project Points Preliminary		Final
Water Efficiency (WE)			(Minimum of 3 WE Points Required)	OR	Max	Y/Pts	Maybe	No	Y/Pts
1. Water Reuse	☒	1	Water Reuse for MID-RISE		5	0	0		0
2. Irrigation System	☒	2.1	High Efficiency Irrigation System for MID-RISE	**WE 2.2**	2	2	0		0
	☒	2.2	Reduce Overall Irrigation Demand by at Least 45% for MID-RISE		2	0	0		0
3. Indoor Water Use		3.1	High-Efficiency Fixtures and Fittings		3	3	0		0
		3.2	Very High Efficiency Fixtures and Fittings		6	0	0		0
		3.3	Water Efficient Appliances for MID-RISE		2	2	0		0
				Sub-Total for WE Category:	**15**	7	0		0
Energy and Atmosphere (EA)			(Minimum of 0 EA Points Required)	OR	Max	Y/Pts	Maybe	No	Y/Pts
1. Optimize Energy Performance		1.1	Minimum Energy Performance for MID-RISE		Prereq	Y			
		1.2	Testing and Verification for MID-RISE		Prereq	Y			
		1.3	Optimize Energy Performance for MID-RISE		34	7	0		0
7. Water Heating	☒	7.1	Efficient Hot Water Distribution		2	0	0		0
		7.2	Pipe Insulation		1	1	0		0
11. Residential Refrigerant Management		11.1	Refrigerant Charge Test		Prereq	Y			
		11.2	Appropriate HVAC Refrigerants		1	1	0		0
				Sub-Total for EA Category:	**38**	9	0		0
Materials and Resources (MR)			(Minimum of 2 MR Points Required)	OR	Max	Y/Pts	Maybe	No	Y/Pts
1. Material-Efficient Framing		1.1	Framing Order Waste Factor Limit		Prereq	Y			
		1.2	Detailed Framing Documents	**MR 1.5**	1	1	0		0
		1.3	Detailed Cut List and Lumber Order	**MR 1.5**	1	1	0		0
		1.4	Framing Efficiencies	**MR 1.5**	3	0	0		0
		1.5	Off-site Fabrication		4	0	0		0
2. Environmentally Preferable Products	☒	2.1	FSC Certified Tropical Wood		Prereq	Y			
	☒	2.2	Environmentally Preferable Products		8	3	0		0
3. Waste Management		3.1	Construction Waste Management Planning		Prereq	Y			
		3.2	Construction Waste Reduction		3	0.5	0		0
				Sub-Total for MR Category:	**16**	5.5	0		0
Indoor Environmental Quality (EQ)			(Minimum of 6 EQ Points Required)	OR	Max	Y/Pts	Maybe	No	Y/Pts
2. Combustion Venting		2	Basic Combustion Venting Measures		Prereq	Y			
3. Moisture Control		3	Moisture Load Control		1	0	0		0
4. Outdoor Air Ventilation	☒	4.1	Basic Outdoor Air Ventilation for MID-RISE		Prereq	Y			
		4.2	Enhanced Outdoor Air Ventilation for MID-RISE		2	2	0		0
		4.3	Third-Party Performance Testing for MID-RISE		1	0	0		0
5. Local Exhaust	☒	5.1	Basic Local Exhaust		Prerequisite	Y			
		5.2	Enhanced Local Exhaust		1	1	0		0
		5.3	Third-Party Performance Testing		1	0	0		0
6. Distribution of Space Heating and Cooling	☒	6.1	Room-by-Room Load Calculations		Prereq	Y			
		6.2	Return Air Flow / Room by Room Controls		1	0	0		0
		6.3	Third-Party Performance Test / Multiple Zones		2	0	0		0
7. Air Filtering		7.1	Good Filters		Prereq	Y			
		7.2	Better Filters	**EQ 7.3**	1	0	0		0
		7.3	Best Filters		2	0	0		0
8. Contaminant Control	☒	8.1	Indoor Contaminant Control during Construction		1	1	0		0
		8.2	Indoor Contaminant Control for MID-RISE		2	0	0		0
	☒	8.3	Preoccupancy Flush		1	0	0		0
9. Radon Protection	☒	9.1	Radon-Resistant Construction in High-Risk Areas		Prereq	N/A			
	☒	9.2	Radon-Resistant Construction in Moderate-Risk Areas		1	0	0		0
10. Garage Pollutant Protection		10.1	No HVAC in Garage for MID-RISE		Prereq	Y			
		10.2	Minimize Pollutants from Garage for MID-RISE	**EQ 10.3**	2	0	0		0
		10.3	Detached Garage or No Garage for MID-RISE		3	0	0		0
11. ETS Control		11	Environnmental Tobacco Smoke Reduction for MID-RISE		1	0.5	0		0
12. Compartmentalization of Units		12.1	Compartmentalization of Units		Prereq	Y			
		12.2	Enhanced Compartmentalization of Units		1	0	1		0
				Sub-Total for EQ Category:	**21**	4.5	1		0
Awareness and Education (AE)			(Minimum of 0 AE Points Required)		Max	Y/Pts	Maybe	No	Y/Pts
1. Education of the Homeowner or Tenant	☒	1.1	Basic Operations Training		Prereq	Y			
	☒	1.2	Enhanced Training		1	0	1		0
		1.3	Public Awareness		1	1	0		0
2. Education of Building Manager	☒	2	Education of Building Manager		1	1	0		0
				Sub-Total for AE Category:	**3**	2	1		0

LEED for Homes
Multi-family Home Size Adjuster Calculator

This approach can be used to determine an overall home size adjuster for for multi-family buildings, but it cannot be used to determine an overall home size adjuster for a complex with multiple multi-family buildings. If a project includes multiple multi-family buildings, each building must have its own home size adjustment. This weighted approach cannot be used for multiple single-family homes.

Please input the floor area for each type of space within the building below. Input the # of units in each building, and the average square footage for units with the corresponding bedroom number. For example, if the building has three 2-bedroom units that are 1300, 1400, and 1500 square feet, insert "3" in cell G24 and "1400" in cell H24. Please leave zeros or blanks where appropriate.

Types of Spaces	Floor area, total square feet
Conditioned	16550
Unconditioned	0
Total	16550

Areas of the Building	Floor area, total square feet
In-unit	16550
Common areas, residential	1164
Non-residential	0

	0-Bedroom		1-Bedroom		2-Bedroom		3-Bedroom		4-Bedroom		5-Bedroom		6-Bedroom		Total Units
	# of units	Avg. ft²	# of units	Avg. ft²	# of units	Avg. ft²	# of units	Avg. ft²	# of units	Avg. ft²	# of units	Avg. ft²	# of units	Avg. ft²	
LEED Building					8	870	8	1195							16

	Unit Adjustment	Unit Adjustment	Unit Adjustment	Unit Adjustment	Unit Adjustment	Unit Adjustment	Unit Adjustment
LEED Building			-10.0	-10.0			

Overall average adjustment:	-10.0

Average # of bedrooms per unit:	2.5

Average square footage per unit:	1032.5

Return to the Summary tab

FIGURE 3.28B LEED for Homes Mid-rise Simplified Project Checklist

for Homes

Builder Name:	*To Be Determined*
Project Team Leader (if different):	*Nick Elton, Elton+Hampton Architects*
Home Address (Street/City/State):	*Brooke Marshall Rd/Melnea Cass Blvd., Boston, Ma.*

Project Description:

Building type: *Mid-rise multi-family* # of stories: *5*

# of units: *60* Avg. Home Size Adjustment: *-10*

Adjusted Certification Thresholds

Certified: *35.0* Gold: *65.0*

Silver: *50.0* Platinum: *80.0*

Project Point Total

Prelim: *54 + 11 maybe pts* Final: *0*

Certification Level

Prelim: *Not Certified* Final: *Not Certified*

Final Credit Category Total Points

ID: 0 *SS: 0* *EA: 0* *EQ: 0*

LL: 0 *WE: 0* *MR: 0* *AE: 0*

Min. Point Thresholds Not Met for Prelim. OR Final Rating

date last updated :
last updated by :

					Max Pts	Project Points Preliminary Y/Pts	Maybe	No	Final Y/Pts
Innovation and Design Process (ID)			(No Minimum Points Required)		Max	Y/Pts	Maybe	No	Y/Pts
1. Integrated Project Planning		1.1	Preliminary Rating		Prereq	Y			
		1.2	Energy Expertise for MID-RISE		Prereq	Y			
		1.3	Professional Credentialed with Respect to LEED for Homes		1	1	0		0
		1.4	Design Charrette		1	0	1		0
		1.5	Building Orientation for Solar Design		1	0	0		0
		1.6	Trades Training for MID-RISE		1	0	1		0
2. Durability Management Process		2.1	Durability Planning		Prereq	Y			
		2.2	Durability Management		Prereq	Y			
		2.3	Third-Party Durability Management Verification		3	0	3		0
3.Innovative or Regional Design	☒	3.1	Innovation #1 _____		1	0	0		0
	☒	3.2	Innovation #2 _____		1	0	0		0
	☒	3.3	Innovation #3 _____		1	0	0		0
	☒	3.4	Innovation #4		1	0	0		0
				Sub-Total for ID Category:	*11*	*1*	*5*		*0*
Location and Linkages (LL)			(No Minimum Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. LEED ND		1	LEED for Neighborhood Development	**LL2-6**	10	0	0		0
2. Site Selection	☒	2	Site Selection		2	2	0		0
3. Preferred Locations		3.1	Edge Development		1	0	0		0
		3.2	Infill	**LL 3.1**	2	2	0		0
		3.3	Brownfield Redevelopment for MID-RISE		1	0	0	N	0
4. Infrastructure		4	Existing Infrastructure		1	1	0		0
5. Community Resources/ Transit		5.1	Basic Community Resources for MID-RISE		1	0	0		0
		5.2	Extensive Community Resources for MID-RISE	**LL 5.1, 5.3**	2	0	0		0
		5.3	Outstanding Community Resources for MID-RISE	**LL 5.1, 5.2**	3	3	0		0
6. Access to Open Space		6	Access to Open Space		1	1	0		0
				Sub-Total for LL Category:	*10*	*9*	*0*		*0*
Sustainable Sites (SS)			(Minimum of 5 SS Points Required)	*OR*	Max	Y/Pts	Maybe	No	Y/Pts
1. Site Stewardship		1.1	Erosion Controls During Construction		Prerequisite	Y			
		1.2	Minimize Disturbed Area of Site for MID-RISE		1	1	0		0
2. Landscaping	☒	2.1	No Invasive Plants		Prerequisite	Y			
	☒	2.2	Basic Landscape Design	**SS 2.5**	1	1	0		0
	☒	2.3	Limit Conventional Turf for MID-RISE	**SS 2.5**	2	1	1		0
	☒	2.4	Drought Tolerant Plants for MID-RISE	**SS 2.5**	1	1	1		0
	☒	2.5	Reduce Overall Irrigation Demand by at Least 20% for MID-RISE		3	1	1		0
3. Local Heat Island Effects	☒	3.1	Reduce Site Heat Island Effects for MID-RISE		1	0	1		0
	☒	3.2	Reduce Roof Heat Island Effects for MID-RISE		1	1	0		0
4. Surface Water Management	☒	4.1	Permeable Lot for MID-RISE		2	0	1		0
		4.2	Permanent Erosion Controls		1	1	0		0
	☒	4.3	Stormwater Quality Control for MID-RISE		2	2	0		0
5. Nontoxic Pest Control		5	Pest Control Alternatives		2	2	0		0
6. Compact Development		6.1	Moderate Density for MID-RISE		2	0	0		0
		6.2	High Density for MID-RISE	**SS 6.1, 6.3**	3	3	0		0
		6.3	Very High Density for MID-RISE	**SS 6.1, 6.2**	4	0	0		0
7. Alternative Transportation		7.1	Public Transit for MID-RISE		2	2	0		0
		7.2	Bicycle Storage for MID-RISE		1	1	0		0
		7.3	Parking Capacity/Low-Emitting Vehicles for MID-RISE		1	0	0		0
				Sub-Total for SS Category:	*22*	*16*	*4*		*0*

LEED for Homes Mid-rise Pilot Simplified Project Checklist (continued)

					Max Pts	Project Points Preliminary			Final
Water Efficiency (WE)			(Minimum of 3 WE Points Required)	OR	Max	Y/Pts	Maybe	No	Y/Pts
1. Water Reuse		1	Water Reuse for MID-RISE		5	0	0		0
2. Irrigation System		2.1	High Efficiency Irrigation System for MID-RISE	**WE 2.2**	2	2	0		0
		2.2	Reduce Overall Irrigation Demand by at Least 45% for MID-RISE		2	0	0		0
3. Indoor Water Use		3.1	High-Efficiency Fixtures and Fittings		3	3	0		0
		3.2	Very High Efficiency Fixtures and Fittings		6	0	0		0
		3.3	Water Efficient Appliances for MID-RISE		2	2	0		0
				Sub-Total for WE Category:	**15**	7	0		0
Energy and Atmosphere (EA)			(Minimum of 0 EA Points Required)	OR	Max	Y/Pts	Maybe	No	Y/Pts
1. Optimize Energy Performance		1.1	Minimum Energy Performance for MID-RISE		Prereq	Y			
		1.2	Testing and Verification for MID-RISE		Prereq	Y			
		1.3	Optimize Energy Performance for MID-RISE		34	7	0		0
7. Water Heating		7.1	Efficient Hot Water Distribution		2	0	0		0
		7.2	Pipe Insulation		1	1	0		0
11. Residential Refrigerant Management		11.1	Refrigerant Charge Test		Prereq	Y			
		11.2	Appropriate HVAC Refrigerants		1	1	0		0
				Sub-Total for EA Category:	**38**	9	0		0
Materials and Resources (MR)			(Minimum of 2 MR Points Required)	OR	Max	Y/Pts	Maybe	No	Y/Pts
1. Material-Efficient Framing		1.1	Framing Order Waste Factor Limit		Prereq	Y			
		1.2	Detailed Framing Documents	**MR 1.5**	1	1	0		0
		1.3	Detailed Cut List and Lumber Order	**MR 1.5**	1	1	0		0
		1.4	Framing Efficiencies	**MR 1.5**	3	0	0		0
		1.5	Off-site Fabrication		4	0	0		0
2. Environmentally Preferable Products		2.1	FSC Certified Tropical Wood		Prereq	Y			
		2.2	Environmentally Preferable Products		8	3	0		0
3. Waste Management		3.1	Construction Waste Management Planning		Prereq	Y			
		3.2	Construction Waste Reduction		3	0.5	0		0
				Sub-Total for MR Category:	**16**	5.5	0		0
Indoor Environmental Quality (EQ)			(Minimum of 6 EQ Points Required)	OR	Max	Y/Pts	Maybe	No	Y/Pts
2. Combustion Venting		2	Basic Combustion Venting Measures		Prereq	Y			
3. Moisture Control		3	Moisture Load Control		1	0	0		0
4. Outdoor Air Ventilation		4.1	Basic Outdoor Air Ventilation for MID-RISE		Prereq	Y			
		4.2	Enhanced Outdoor Air Ventilation for MID-RISE		2	2	0		0
		4.3	Third-Party Performance Testing for MID-RISE		1	0	0		0
5. Local Exhaust		5.1	Basic Local Exhaust		Prerequisite	Y			
		5.2	Enhanced Local Exhaust		1	1	0		0
		5.3	Third-Party Performance Testing		1	0	0		0
6. Distribution of Space Heating and Cooling		6.1	Room-by-Room Load Calculations		Prereq	Y			
		6.2	Return Air Flow / Room by Room Controls		1	0	0		0
		6.3	Third-Party Performance Test / Multiple Zones		2	0	0		0
7. Air Filtering		7.1	Good Filters		Prereq	Y			
		7.2	Better Filters	**EQ 7.3**	1	0	0		0
		7.3	Best Filters		2	0	0		0
8. Contaminant Control		8.1	Indoor Contaminant Control during Construction		1	1	0		0
		8.2	Indoor Contaminant Control for MID-RISE		2	0	0		0
		8.3	Preoccupancy Flush		1	0	0		0
9. Radon Protection		9.1	Radon-Resistant Construction in High-Risk Areas		Prereq	N/A			
		9.2	Radon-Resistant Construction in Moderate-Risk Areas		1	0	0		0
10. Garage Pollutant Protection		10.1	No HVAC in Garage for MID-RISE		Prereq	Y			
		10.2	Minimize Pollutants from Garage for MID-RISE	**EQ 10.3**	2	0	0		0
		10.3	Detached Garage or No Garage for MID-RISE		3	0	0		0
11. ETS Control		11	Environnmental Tobacco Smoke Reduction for MID-RISE		1	0.5	0		0
12. Compartmentalization of Units		12.1	Compartmentalization of Units		Prereq	Y			
		12.2	Enhanced Compartmentalization of Units		1	0	1		0
				Sub-Total for EQ Category:	**21**	4.5	1		0
Awareness and Education (AE)			(Minimum of 0 AE Points Required)		Max	Y/Pts	Maybe	No	Y/Pts
1. Education of the Homeowner or Tenant		1.1	Basic Operations Training		Prereq	Y			
		1.2	Enhanced Training		1	0	1		0
		1.3	Public Awareness		1	1	0		0
2. Education of Building Manager		2	Education of Building Manager		1	1	0		0
				Sub-Total for AE Category:	**3**	2	1		0

LEED for Homes
Multi-family Home Size Adjuster Calculator

This approach can be used to determine an overall home size adjuster for for multi-family buildings, but it cannot be used to determine an overall home size adjuster for a complex with multiple multi-family buildings. If a project includes multiple multi-family buildings, each building must have its own home size adjustment. This weighted approach cannot be used for multiple single-family homes.

Please input the floor area for each type of space within the building below. Input the # of units in each building, and the average square footage for units with the corresponding bedroom number. For example, if the building has three 2-bedroom units that are 1300, 1400, and 1500 square feet, insert "3" in cell G24 and "1400" in cell H24. Please leave zeros or blanks where appropriate.

Types of Spaces	Floor area, total square feet
Conditioned	64082
Unconditioned	0
Total	64082

Areas of the Building	Floor area, total square feet
In-unit	54425
Common areas, residential	7913
Non-residential	1666

	0-Bedroom		1-Bedroom		2-Bedroom		3-Bedroom		4-Bedroom		5-Bedroom		6-Bedroom		Total Units
	# of units	Avg. ft²	# of units	Avg. ft²	# of units	Avg. ft²	# of units	Avg. ft²	# of units	Avg. ft²	# of units	Avg. ft²	# of units	Avg. ft²	
LEED Building			1	674	40	822	17	1081	2	1247					60

	Unit Adjustment	Unit Adjustment	Unit Adjustment	Unit Adjustment	Unit Adjustment	Unit Adjustment	Unit Adjustment
LEED Building		-7.5	-10.0	-10.0	-10.0		

Overall average adjustment:	**-10.0**

Average # of bedrooms per unit:	**2.3**

Average square footage per unit:	**907.1**

Return to the Summary tab

4.0 ENVIRONMENTAL PROTECTION COMPONENT

4.1 Shadow Impacts Analysis

4.1.1 Introduction

The following shadow analysis was prepared to analyze the shade impact of the project on the surrounding neighborhood. It was used to avoid adverse conditions for the neighborhood. In accordance with BRA development review guidelines, the following times and dates were evaluated as a sample representative of the shadow cycle throughout a year.

Time of Year/Date	Time of Day
Vernal Equinox (March 21)	9:00 am, 12:00 noon, 3:00 pm
Summer Solstice (June 22)	9:00 am, 12:00 noon, 3:00 pm, 6:00 pm
Autumnal Equinox (September 21)	9:00am, 12:00noon, 3:00pm, 6:00 pm
Winter Solstice (December 21)	9:00 am, 12:00 noon, 3:00 pm

4.1.2 Vernal Equinox (March 21)

Figure 4.1 depicts shadows on March 21 during three time periods.

At 9:00 am shadows extend across Brooke Marshall Road, part way onto St. Francis Desales Court and on the proposed buildings yard spaces.

At 12:00 noon, the shadows fall on the proposed buildings yard spaces.

At 3:00 pm the shadows extend slightly onto Melnea Cass Boulevard, and on the proposed buildings yard spaces.

4.1.3 Summer Solstice (June 21)

Figure 4.2 depicts shadow impacts on June 21 during four time periods.

At 9:00 am shadows fall across Brooke Marshall Road, slightly onto St. Francis Desales Court and on the proposed buildings yard spaces..

At 12:00 noon, shadows fall on the proposed buildings yard spaces.

A t 3:00 pm, shadows fall partway across Sojourner Truth Court and on the proposed buildings yard spaces.

At 6:00 pm, shadows extend across Sojourner Truth Court, across the inner courtyard between Building 2A and MPV housing on Brooke Marshall Road, on the west *(front)* elevations of MPV #4 units at 2-10 Sojourner Truth Court, and on the proposed buildings yard spaces.

4.1.4 Autumnal Equinox (September 21)

Figure 4.3 depicts shadow impacts on September 21 during four time periods.

At 9:00 am shadows extend across Brooke Marshall Road, part way on St. Francis Desales Court and on the proposed buildings yard spaces.

At 12:00 noon, the shadows fall on the proposed buildings yard spaces.

At 3:00 pm the shadows extend slightly onto Melnea Cass Boulevard, and on the proposed building's yard spaces.

At 6:00 pm the shadows extend across Melnea Cass Boulevard, shading west *(rear)* elevations on MPV #4 at units at 1-21 Brooke Marshall Road and west *(front)* elevations of MPV #4 units at 2-10 Sojourner Truth Court, and on the proposed buildings yard spaces.

4.1.5 Winter Solstice (December 21)

Figure 4.4 depicts shadow impacts on December 21 during three time periods. Winter sun casts the longest shadows of the year.

At 9:00 am shadows cross Brooke Marshall Road, cross St. Francis Desales Court, partially cross Melnea Cass and on the proposed buildings yard spaces.

At 12:00 noon, shadows fall onto Melnea Cass Boulevard, and on the proposed buildings yard spaces.

At 3:00 pm, shadows extend across Melnea Cass Boulevard, and on the proposed buildings yard spaces.

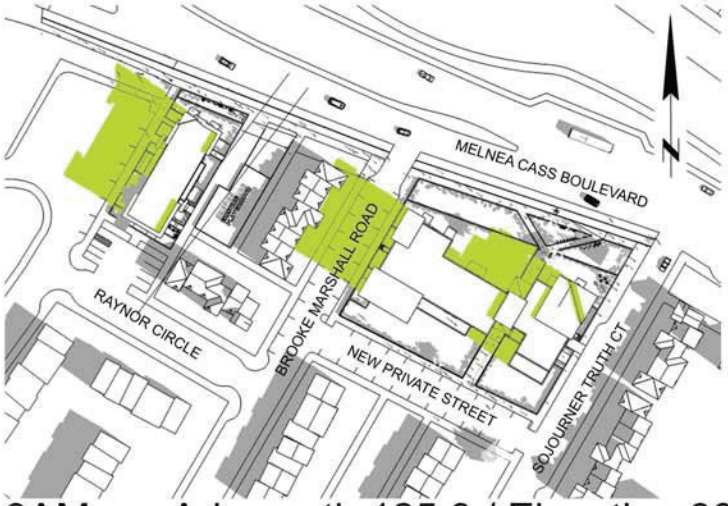
4.1.5 Summary

New shadows introduced by the Proposed Project fall primarily in the adjacent buildings' yard spaces, on St. Francis Desales Court, Brooke Marshall Road, Melnea Cass Boulevard, and at limited times onto two (2) existing MPV #4 housing buildings. Our analysis does not account for foliage shadows; only building shadows and site topography.

Vernal Equinox - March 21

Net New Shadow

Existing Shadow



9AM Arizumuth 125.8 / Elevation 33.1

12PM Arizumuth 183.2 / Elevation 48.0

3PM Arizumuth 238.4 / Elevation 30.5

FIGURE 4.1

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

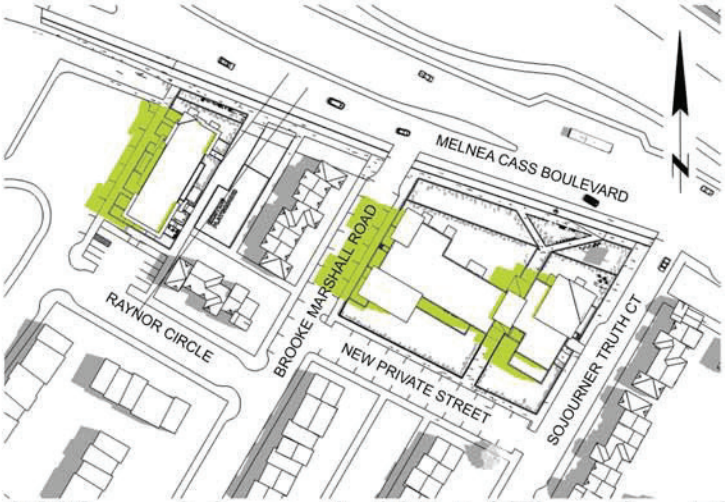
PHASE 2:
Bldg 2A & 2B Shadow Study -
Vernal Equinox - March 21

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

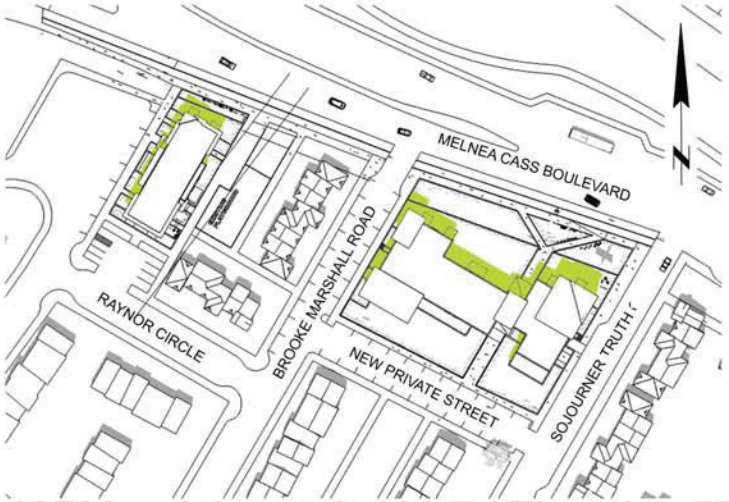
Summer Solstice - June 22

Net New Shadow

Existing Shadow



9AM Arizumuth 105.5 / Elevation 50.8



12PM Arizumuth 189.7 / Elevation 70.9

3PM Arizumuth 260.4 / Elevation 45.9

6PM Arizumuth 289.9 / Elevation 13.2

FIGURE 4.2

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

PHASE 2:
Bldg 2A & 2B Shadow Study -
Summer Solstice - June 22

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

Autumnal Equinox - Sept. 21

Net New Shadow

Existing Shadow

9AM Arizumuth 129.0 / Elevation 35.37

12PM Arizumuth 188.5 / Elevation 47.9

3PM Arizumuth 241.5 / Elevation 28.3

6PM Arizumuth 274.2 / Elevation -3.8
(astronomical twilight at -18)

FIGURE 4.3

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

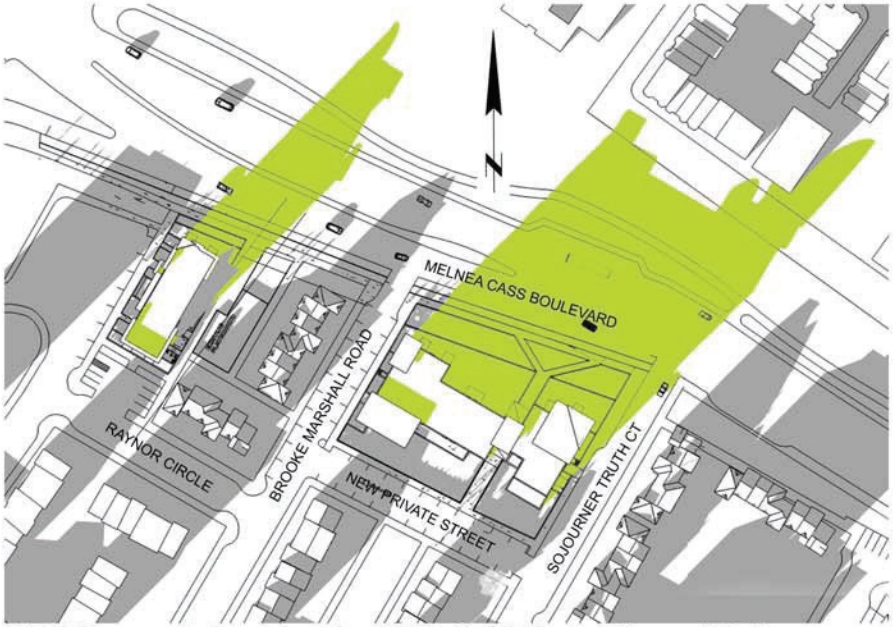
PHASE 2:
Bldg 2A & 2B Shadow Study -
Autumnal Equinox - Sept. 21

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

Winter Solstice - Dec. 21

9AM Arizumuth 142.0 / Elevation 14.4

12PM Arizumuth 184.4 / Elevation 24.1



3PM Arizumuth 225.0 / Elevation 10.1

Net New Shadow

Existing Shadow

FIGURE 4.4

ELTON + HAMPTON ARCHITECTS

Madison Park Infill Sites
Boston, MA

PHASE 2:
Bldg 2A & 2B Shadow Study -
Winter Solstice - December 21

April 28, 2015 | DEVELOPER : Madison Park Development Corporation ARCHITECT : Elton + Hampton Architects

4.2 Stormwater Management and Water Quality

The Proposed Project will improve the quality of stormwater leaving this site. 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 filtrating silt sacs 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.

The Proposed Project will promote stormwater recharge to groundwater. It is anticipated that the equivalent of 1 inch over the site's impervious area will be recharged as prescribed in BWSC's Site Plan Requirements. Stormwater runoff from vehicular areas will be pretreated through the use of deep sump catch basins and water quality treatment structures where warranted. An operation and maintenance plan will be developed to support the long-term functionality of the proposed stormwater management system.

The project will meet the Department of Environmental Protection's (DEP) Stormwater Management Standards for Redevelopment (Standard 7). All necessary dewatering will be conducted in accordance with applicable MWRA, BWSC, or NPDES discharge permits. An EPA NPDES Construction General Permit will be submitted prior to construction. Once construction is complete, the Project will be in compliance with local and state stormwater management policies.

4.3 Solid and Hazardous Waste Materials

4.3.1 Solid Waste

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

Upon completion of construction, The Proposed Project will generate approximately 111 tons of solid waste per year, based on the assumption that each residential unit generates 8 lbs of solid waste per day. Residential waste will be stored in outside dumpsters that will be picked up by private haulers.

The Proposed Project will also include ambitious goals for construction waste management in order to meet the requirements for the LEED™ rating system.

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

4.4 Hazardous Waste and Materials

McPhail Associates performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-13 of the property identified as Madison Park Village Extension (Site Buildings 2A and 2B) located in the Roxbury neighborhood of Boston, Massachusetts in March 2015. This assessment identified no Recognized Environmental Conditions, and no Historical RECs and/or Controlled RECs in connection with the subject site.

The subject site is not a DEP-listed release site. Further, the subject site is not listed in the available city, state, and/or federal records searched by EDR, Inc. The majority of DEP-listed disposal sites are either located at distances greater than 0.25-miles from the subject site, are down-gradient or cross-gradient with respect to the subject site, and/or have achieved a Permanent Solution in accordance with the Massachusetts Contingency Plan (MCP) which indicates that a condition of No Significant Risk exists and, therefore these sites are not likely to pose a threat of impact to the subject site. However, three (3) release sites, described below, were further evaluated for their potential to impact the subject property, and each was found not likely to have a threat of impact to the site.

4.4.1 90 Windsor Street; RTN 3-29641

This release site is located approximately 200 feet to the north of the subject site parcels. A Release Abatement Measure (RAM) Plan prepared by CDW Consultants, Inc. (CDW) in September 2013 identified elevated levels of benzo(a)pyrene, lead, chromium and nickel exceeding applicable reportable concentrations (RCs). Reported to the DEP as a 120-day reporting in November 2010, a Phase I Tier Classification Report prepared by CDW was submitted to the DEP in December 2011. The site is classified as a Tier II release site.

A supplemental subsurface exploration conducted by CDW in August 2013 indicated detections of naphthalene, total petroleum hydrocarbons (TPH) and polychlorinated biphenyls (PCBs); however, no new reportable conditions were identified. CDW proposed RAM that included the excavation and disposal of two (2) feet of soil.

A 500-gallon underground storage tank (UST) was found during RAM activities in October 2013, which postponed the completion of the RAM activities due to the cost of removal. Reportedly, no evidence of a release was observed in the vicinity of the UST. Approximately 130 cubic yards of soil were excavated and removed from the site, prior to finding the UST. Confirmatory samples were collected from the bottom of the excavation and analyzed for EPH including PAHs, cadmium, chromium and nickel. Reportedly, a concentration of 3,850 ppm of TPH was identified in one of the samples; however, CDW indicated that corresponding EPH concentrations were below the applicable RCs.

Based on the location, distance from the subject site, nature of release site contamination and lack of groundwater encountered at the release site, this release condition is not considered likely to

pose a threat of impact to the subject site and therefore is not considered an REC with respect to the subject site.

4.4.2 180 Ruggles Street; RTN 3-29839

This release site is located approximately 300 feet to the southwest of the subject site parcels. According to a report prepared by Clean Soils Environmental, Ltd. (CSE) in April 2011, an overfill of 40 gallons of No. 4 fuel oil occurred at this site on March 3, 2011. An IRA notification was made to the DEP on the same day. Response actions included the application of absorbent to the impacted pavement and excavation of impacted soil. From March 3, 2011 to April 4, 2011, eight (8) 55-gallon drums of oily solids were accumulated and disposed of off-site under a manifest and 26.66 tons of impacted soil were excavated and disposed off-site under a Bill of Lading. Groundwater was not encountered during the excavation of the impacted soils.

CSE conducted a Method 1 Risk Characterization using soil samples obtained from this release site and determined that no Significant Risk exists for the release site. The DEP database indicates that CSE submitted a Class A-2 Response Action Outcome (RAO) for this release site on April 28, 2011. A Class A-2 RAO indicates a condition of No Significant Risk exists and Permanent Solution had been achieved at the site. Therefore, this release site is not considered an REC with respect to the subject site.

4.4.3 1050 Tremont Street; RTN 3-17515

This release site is located approximately 200 feet to the north of the subject site. According to a Phase II Comprehensive Site Investigation, Phase III Identification, Evaluation and Selection of Comprehensive Remedial Action Alternatives, Method 3 Risk Characterization and RAO Statement Report prepared by Enstrat Strategic Environmental Services in November 2004, coal ash and municipal debris was reportedly utilized as backfill at the release site.

During an initial rehabilitation of the 1050 Tremont Street property in August 1998, excavated soils were analyzed for soil disposal purposes. Reportedly, results indicated concentrations of lead and PAHs exceeding RCS-1 standards. The DEP was notified of the release condition in November 1998. Reportedly, further remedial activities at the release site were conducted as part of a RAM and site subsurface investigations were completed to characterize the nature and extent of soil contamination and potential groundwater contamination.

Based on the characterization of the soil samples, soil was excavated to a depth of 2 to 3 feet below ground surface and was backfilled with imported fill. This excavation was completed in conjunction with the implementation of an Activity and Use Limitation (AUL) to achieve a condition of No Significant Risk. A Method 3 Risk Characterization indicated that site conditions do not pose a significant risk to human health and the environment based on the implementation of an AUL. The release site associated with RTN 3-17515 achieved a Permanent

Solution in the form of a Class A-3 RAO, which indicates that a condition of No Significant Risk exists based on the implementation of an AUL. Therefore this release site is not considered an REC with respect to the subject site.

The Proponent is also expecting to retain an environmental consultant licensed to address hazardous waste issues, known as a Licensed Site Professional, and environmental legal counsel to ensure that any additional testing and cleanup and any redevelopment of the site comply with the MCP and other applicable laws governing hazardous waste cleanup.

4.5 Geotechnical/Groundwater Impacts Analysis

The following provides a summary of the geotechnical and groundwater impacts on the proposed building construction at Madison Park Village Extension in Roxbury, MA. Under contract with the Project Geotechnical Engineer, McPhail Associates of Cambridge MA, thirteen (13) soil test borings were performed at the project site by Geologic Earth Exploration, Inc. of Norfolk, MA between November 20 and December 3, 2014.

Five (5) of the completed borings were completed at Parcel 8 (RAY), and the remaining eight (8) borings were completed at Parcel 9 (BMF). Standard 1-3/8-inch I.D. split-spoon samples and standard penetration tests were generally obtained at 5-foot intervals of depth. Borings completed at Parcel 8 were drilled in the marine clay deposit to depths ranging from 26 to 41 feet below existing ground surface. Borings completed at Parcel 9 were drilled in the natural marine clay deposit to depths ranging from 31 to 51 feet below ground surface, with the exception of borings MA-12 and MA-13 within the City of Boston property portion of the site which were terminated at a depth of 16 feet below ground surface, and borings MA-7 and MA-10 which were advanced to a depth of 81 feet below existing ground surface.

In general, the subsurface soil conditions within the proposed building sites consists of fill material (including urban ash and cinders) and organic deposit material, which are unsuitable for support of the proposed building, overlaying marine sand (Parcel 8) or marine clay (Parcel 9), generally. Rather than incur premium off-site disposal costs for portions of the excess excavated soils generated at the site, the soil will be reused on site as much as possible.

Groundwater was encountered at depths ranging from approximately 5 to 12 feet below the existing ground surface at Parcel 8, corresponding to Elevations +8.5 to +6.4, and at depths ranging from approximately 9 to 13 feet below the existing ground surface at Parcel 9, corresponding to Elevations +8 to +6. The lowest level slab at each parcel is understood to be proposed at a depth of 7 feet below ground surface, corresponding to about Elevation +10 to +11.

Based upon recommendations from McPhail, and given the proposed building configurations and subsurface conditions, the proposed residential buildings will be supported by conventional spread footing foundations in conjunction with a soil-supported slab-on-grade after the existing unsuitable soils within the footprint of the proposed buildings are improved using aggregate piers (AP). The AP-

improved soils will extend to below the building entrances and walkways adjacent to the proposed building to mitigate the potential for differential settlements near the building that could result in tripping hazards.

The configuration of the proposed lowest level slab is proposed to be located at about 7 feet below finish grade (about Elevation +10 to +11) at the proposed building locations, and the understood groundwater level generally at about 9 to 13 feet below ground surface (about Elevation +8 to +6) at Parcel 9 and at about 5 to 12 feet below ground surface (about Elevation +8.5 to +6.4) at Parcel 8. Therefore, the lowest level and adjacent foundations will be constructed with perimeter and underslab drainage and vapor barriers to protect the lowest level against groundwater intrusion. The perimeter below-grade foundation walls will receive damp proofing. The portions of the buildings that will be constructed with crawl spaces are recommended to consist of a mud slab underlain by a polyethylene vapor barrier. All localized depressions in the lowest level slabs extending below grade (such as pits, etc.) should be provided with properly tied continuous waterstops in all construction joints and metallic waterproofing to protect against groundwater intrusion.

Placement of fill material within the proposed building footprints is not anticipated to be necessary during construction of the proposed buildings, however, should fill be placed within the footprint of the proposed buildings prior to installation of the APs, the fill material may consist of Ordinary Fill. Ordinary Fill should be placed in maximum 6-inch lifts and compacted to at least 92 percent of the material's Modified Proctor maximum dry density. Should fill be placed within the footprint of the proposed buildings after the installation of the APs, the fill should consist of Gravel Fill placed in maximum 6-inch lifts and compacted to at least 95 percent of the material's Modified Proctor maximum dry density.

Any groundwater removed from the excavation will be discharged under a NPDES general or exclusion permit. Construction mitigation measures will be incorporated into the Project to avoid the potential for ground movement and settlement during excavation, and potential impacts on utility lines and roadways.

4.6 Construction Impact

The following section describes impacts likely to result from the construction of the Madison Park Infill Site development and the steps that will be taken to avoid or minimize environmental and transportation-related impacts. Construction methodologies and scheduling will aim to minimize impacts on the surrounding environment. The Proponent will insure that the general contractors will be responsible for developing staging plans and for coordinating construction activities with all appropriate regulatory agencies. The Project's geotechnical consultant will also provide consulting services associated with foundation design recommendations, prepare geotechnical specifications, and review the construction contractor's proposed procedures.

4.6.1 Construction Management Plan

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

Construction methodologies that will ensure safety will be employed, signage will include General Contractor contact information with emergency contact numbers.

4.6.2 Proposed Construction Program

Construction Activity Schedule

The construction period for the proposed Madison Park Infill Site development is expected to last approximately eighteen months, beginning in the First Quarter 2016 and reaching completion in the Fourth Quarter 2017. The City of Boston Noise and Work Ordinances will dictate the normal work hours, which will be from 7:00 AM to 6:00 PM, Monday through Friday. Saturday work will be only in the event of schedule delay or unusual tasks such as street openings, etc.

Perimeter Protection/Public Safety

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

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

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

4.6.3 Construction Traffic Impacts

Construction Vehicle Routes

Specific truck routes will be established with BTD through the CMPs. These established truck routes will prohibit truck travel on residential side streets. Construction contracts will include

clauses restricting truck travel to BTD requirements. Maps showing approved truck routes will be provided to all suppliers, contractors, and subcontractors. It is anticipated that all deliveries will be via Washington Street directly to the site, not passing through residential areas in Jamaica Plain.

Construction Worker Parking

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

Limited parking in designated areas of the Project Site and lay-down area(s) will be allowed. Parking will be discouraged in the immediate neighborhood. Further, given the Proposed Project's close proximity to transit service (e.g., MBTA Orange Line as well as bus service) public transit use will be encouraged with the Proponent and general contractor working to ensure the construction workers are informed of the many public transportation options immediately adjacent to this area. Terms and conditions related to worker parking will be written into each subcontractor's contract. The general contractors will provide a weekly orientation with all new personnel to ensure enforcement of this policy.

Pedestrian Traffic

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

4.6.4 Construction Environmental Impacts and Mitigation

Construction Air Quality

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

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

- Using wetting agents to control and suppress dust from construction debris;
- Ensuring that all trucks traveling to and from the Project Site will be fully covered;

- Removing construction debris regularly;
- Monitoring construction practices closely to ensure any emissions of dust are negligible;
- Cleaning streets and sidewalks to minimize dust and dirt accumulation;
- Monitoring construction activities by the job site superintendent; and
- Wheel-washing trucks before they leave the Project Site during the excavation phase.

Erosion and sediment control measures will be implemented during construction to minimize the transport of site soils to off-site areas and Boston Water and Sewer ("BWSC") storm drain systems. During construction, existing catch basins will be protected from sediments with filter fabric, silt sacks or hay bale filters.

Construction Noise Impacts

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

- Initiating a proactive program for compliance to the City of Boston's noise limitation requirements;
- Scheduling of work during regular working hours as much as possible;
- Using mufflers on all equipment and ongoing maintenance of intake and exhaust mufflers;
- Muffling enclosures on continuously operating equipment, such as air compressors and power and welding generators;
- Scheduling construction activities so as to avoid the simultaneous operation of the noisiest construction activities;
- Turning off all idling equipment;
- Reminding truck drivers that trucks cannot idle more than five (5) minutes unless the engine is required for operational activity;
- Locating noisy equipment at locations that protect sensitive receptors and neighborhood homes through shielding or distance;
- Installing a site barricade as required;
- Identifying and maintaining truck routes to minimize traffic and noise throughout the project; and
- Maintaining all equipment to have proper sound attenuation devices.

4.6.5 Rodent Control

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

4.6.6 Utility Protection During Construction

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

4.7 Wetlands/Flood Hazard Zone

The existing Project Site is not a part of a wetland resource area regulated by the Massachusetts Wetland Protection Act.

Based on the Preliminary Flood Insurance Rate Maps (FIRM) for Suffolk County, the Project site is not located in a special flood hazard area, floodway area, or other flood area (See **Figure 4.7-1 Wetlands/Flood Hazard Zones**).

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

Source:
Preliminary Flood Insurance Rate Maps for Suffolk County
https://msc.fema.gov/portal

Figure 4.7 - 1
Wetlands/Flood Hazard Zones

5.0 HISTORIC RESOURCES COMPONENT

This section provides a discussion of the history of the Project Site and the historic resources/districts in the Project vicinity.

5.1 Historic Resources on the Project Site and Property History

The project site consists of two non-adjacent parcels: Parcel #0902230010 (Site 2A) and Parcel # 0902197000 (Site 2B). An existing one-story wood-framed community building containing a day care center and public computer lab currently occupies Site 2A, in addition to paved and landscaped areas. Site 2B is currently undeveloped land utilized as a vacant land and roadway, the latter of which will be acquired and relocated, on the site, as part of this project. A review of Sanborn Maps from the late 1800s to the 1960s reviewed by the site's hazardous waste consultant, McPhail Associates, indicates that Site 2A contained multiple residential buildings and Site 2B was occupied by Madison Square Park. Available Sanborn Maps from 1988 to 2002 depict both Site 2A and Site 2B as undeveloped and vacant.

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

5.2 Historic Districts and Resources

The Project Site is not within, nor does it directly abut, any listed historic districts or resources. The area surrounding the Project Site is a busy commercial district. Residential, retail and commercial uses characterize much of the area along Melnea Cass Boulevard, Ruggles Street, and Tremont Street. The historic resources within, or just beyond, one-quarter-mile radius of the Proposed Project are summarized in **Table 5-1** that follows.

5.2.1 13-15 Ruggles Street

Constructed in 1895 by Simon Goldsmith, the four 22x60 foot buildings that make up 9 – 15 Ruggles Street were constructed in a rusticated Classical Revival style. Each originally housed three families; however, one of the buildings, 11 Ruggles Street, was partially demolished and its entrance is bricked in. 13-15 Ruggles Street, which falls within the ¼ mile radius of the Project Site, is listed in the Inventory of Historic Places and is part of the Dudley Square Historic District Extension. Project activities will not impact the building.

5.2.2 Lafayette School

A Classical Revival style school building constructed in 1910 by the City of Boston and designed by J.B. Blair. Located at 25 Ruggles Street, adjacent to 9-15 Ruggles Street described above, the Lafayette School is also part of the Dudley Square Historic District Extension. The school was converted into a plumbing supply warehouse and, later, an assisted living facility. Project activities will not impact the building.

5.2.3 Goldsmith Block

The Goldsmith Block, now referred to as Ruggles/Shawmut Housing, located at 41 Ruggles Street and 746-750 Shawmut Ave, is a classical revival style building constructed in 1892. It was one of the earliest apartment buildings in Lower Roxbury. The architect was Cornelius A. Russell, who designed many other properties in the area. The property was listed in the State and National Registers of Historic Places, noting the building's significance for its association with Lower Roxbury's immigrant population (particularly tied to the Jewish community) and for its "architectural distinction in a neighborhood ravaged by urban renewal."[1] It is part of the Dudley Square Historic District Extension. Project activities will not impact the building.

5.2.4 Saint Francis de Sales Roman Catholic Church

Saint Francis de Sales Roman Catholic Church, located at 175 Ruggles Street, was constructed in 1897 and later in 1934 and 1972. It is presently St. Katherine Drexel Parish and serves Boston's Nigerian Catholic community. In spite of these additions/renovations, the parish appears to be in good condition and retains the characteristic style of Gothic Revival architecture. No information is available about its architect. Project activities will not impact the project.

5.2.5 Berger Engineering and Surveying Instrument Factory

Located at 37 Williams Street, this industrial building was built by entrepreneurs George Moffette and Henry J. Preston in 1902 as a manufacturing facility for surveying instruments.[2] The sons of the partners were trained in the manufacture of survey instruments in Stuttgart, Germany. The factory remained in use for that purpose until 1947, when Charles S. Narins of New York acquired the company. Though added to the National Register of Historic Places in 1980, it does not represent a distinctive architectural style and added to the National and State Register of Historic Places in 1980. The Project will not impact this structure.

[1] MHC Inventory Form, recorded December 2004

[2] http://www.surveyhistory.org/c__l__berger_&_sons_inc_.htm

5.2.6 Lower Roxbury Historic District

This 32-acre district just north of the Project Site consists of 36 buildings surrounding Coventry, Cunard, and Walpole Streets. Built from approximately 1870 to 1925, the contributing buildings include religious structures, commercial structures, warehouses, and residential buildings, and represent several styles, including renaissance, classical revival, and Late Gothic Revival. Construction dates of these buildings range from 1850 to 1949, and are primarily masonry buildings averaging four to five stories.

5.2.7 Frederick Douglass Square Historic District

The Frederick Douglass Square Historic District, located just north of the Project Site, is roughly bounded by Hammond, Cabot, and Windsor Streets in Lower Roxbury. Centering on Frederick Douglass Square, known as "The Square," a forum for political rallies, protest meetings, and public celebrations for the abolitionist cause. The oldest building in the district dates from approximately 1860. A number of the buildings served as stations in the Underground Railroad, and a number of slave "tunnels" are believed to still exist in the area, according to the inventory form. The streets to the southeast of the square are occupied by brick row houses contrasted in 1871 by the Tremont Improvement Company, for whom Madison Park was its most prestigious address. Buildings in the area are modest representations of Queen Anne, Gothic, and Second Empire architectural styles. The 50-acre district is listed in the State and National Registers of Historic Places.

5.2.8 Dudley Station Historic District

The Dudley Station Historic District is a y-shaped 200-acre district located at the intersection of Washington, Warren, and Dudley Streets in Roxbury. The 29 contributing buildings represent a range of architectural styles from the 19th and 20th centuries in masonry commercial forms: Italianate, Second Empire, High Victorian Gothic, Queen Anne, Second Renaissance Revival, Neo-Georgian. These buildings date from approximately the 1870s to 1920s when the area surrounding Dudley Railroad Station was a hub of industry and commerce for all of Roxbury, even prior to its annexation to Boston. Many of the buildings were designed by prominent Boston architects.[3] According to the Inventory-Nomination form, in general the buildings in the district have been underutilized and "have suffered certain inappropriate renovations, especially at the ground floor." One of the buildings in this district, the Hotel Comfort, is located within the ¼-mile radius of the Project Site. The district is presently undergoing renovation and will not be impacted by project activities.

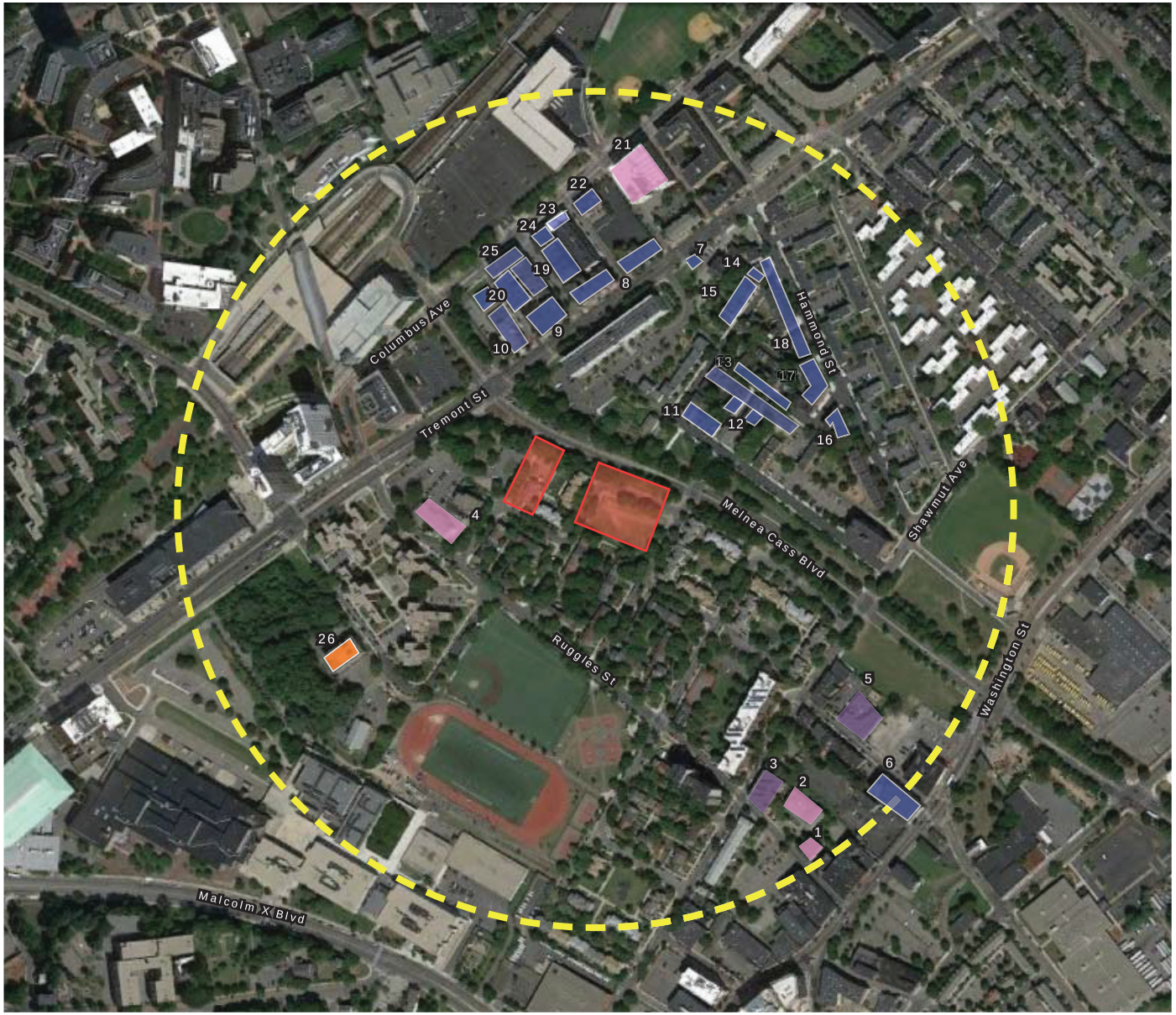
[3] http://www.discoverroxbury.org/roxbury-s-history

Table 5-1 Individual Historic Resources in the Vicinity of the Project Site

Name (Key to Historic Resources, Figure 5-1)	**Address**	**Listing/Designation**
13-15 Ruggles Street (#1) [1]	13-15 Ruggles Street	Inventory of Historic Places
Lafayette School (#2) [1]	25 Ruggles Street	Inventory of Historic Places
Goldsmith Block (#3)[1]	41 Ruggles Street, 746-750 Shawmut Avenue	National Register Individual Property
Saint Francis de Sales Roman Catholic Church (#4)	159 Ruggles Street	Inventory of Historic Places
The Berger Engineering and Surveying Factory (#5)	37 Williams Street	National Register Individual Property
Dudley Station Historic District (Building #6)	Washington, Warren, and Dudley Streets	National Register District
Lower Roxbury Historic District (Buildings #8, 9, 10, 19, 20, 22, 23, 24 and 25)	Coventry, Cunard, and Walpole Streets	National Register District
Frederick Douglass Square Historic District (Buildings #7, 11, 12, 13, 14, 15, 16, 17, and 18)	Hammond, Cabot, and Windsor Streets	National Register District
Whittier Street Health Unit	20 Whittier Street	May be eligible for National Register. Not listed on MACRIS.

Notes:

[1] Each of these properties is part of the Dudley Station Historic District Extension, an extension of the Dudley Station Historic District.



= 1/4 mile buffer
= Project Site
= Property on MACRIS Inventory of Historic Places
= National Register Individual Property
= National Register District
= Eligible for National Register

1 = 13-15 Ruggles St
2 = Lafayette School - 25 Ruggles St
3 = Goldsmith Block - 41 Ruggles St
4 = Saint Francis de Sales Roman Catholic Church -159 Ruggles St
5 = Berger Engineering and Surveying Instrument Factory - 37 Williams St
6 = Hotel Comfort - Dudley Station Historic District - 2121 - 2131 Washington St
7 = 1002 Tremont St - Frederick Douglass Square Historic District
8 = 1011-1033 Tremont St - Lower Roxbury Historic District
9 = The Burlingame - 1057-1063 Tremont St - Lower Roxbury Historic District
10 = Saint Cyrian's Episcopal Church and Parish House - 1075 Tremont St - Lower Roxbury Historic District
11 = 71-85 Windsor St - Frederick Douglass Square Historic District
12 = 23 - 37 Greenwich Court - Frederick Douglass Square Historic District
13 = 2-57 Greenwich St - Frederick Douglass Square Historic District
14 = Saint Francis de Sales Roman Catholic Rectory - 1 Warwick St - Frederick Douglass Square Historic District
15 = 3 - 48 Warwick St - Frederick Douglass Square Historic District
16 = William H. Smith Apartment Building - 46 Hammond St - Frederick Douglass Square Historic District - Preservation Restriction
17 = The Delano - 60 Hammond St - Frederick Douglass Square Historic District
18 = 62 - 108 Hammond St - Frederick Douglass Square Historic District
19 = 31- 44 Cunard St - Lower Roxbury Historic District
20 = 19-24 St Cyprian's Place - Lower Roxbury Historic District
21 = Waitt and Bond Cigar Factory - 716 Columbus Ave
22 = 748 - 752 Columbus Ave - Lower Roxbury Historic District
23 = 768 Columbus Ave - Lower Roxbury Historic District
24 = 772 - 778 Columbus Ave - Lower Roxbury Historic District - Preservation Restriction
25 = 780 Columbus Ave - Lower Roxbury Historic District
26 = Whittier Street Health Unit - 20 Whittier St

Figure 5 - 1
Historic Resources

5.3 Archaeological Resources

No known archaeological resources were located within the Project site during the review of Massachusetts Historic Commission files and MACRIS, therefore no impacts to archaeological resources are anticipated

6.0 INFRASTRUCTURE SYSTEMS COMPONENT

This section outlines the existing utilities surrounding the Project site, the connections required to provide service to the Propose Project, and any impacts on the existing utility systems that may result from the construction of the Proposed Project and identifies mitigation measures to address these impacts. The following utility systems are discussed herein:

- Sewer
- Domestic Water
- Fire Protection
- Drainage
- Electricity
- Telecommunications and Cable
- Steam and Gas

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

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

The proposed project is a new residential development on two sites totaling 89,052 gross square feet along Melnea Cass Boulevard at 40 Raynor Circle (Site 2A) and Brooke Marshall Field (Site 2B), and within Madison Park Village in Roxbury ("Proposed Site"). The development includes the demolition of a 1-story building at 40 Raynor Circle (Site 2A) and the creation of a residential development consisting of 76 residential (flats and duplex) units on two parcels along Melnea Cass Boulevard at 40 Raynor Circle (Site 2A) (Assessors Parcel ID 0902230001) and Brooke Marshall Road (Site 2B*)* (Assessors Parcel ID 0902197000).

The Project site is located just to the southwest of the Ruggles Massachusetts Bay Transportation Authority (MBTA) Station. The Sites are bounded by St. Francis Desales Court to the northwest; Sojourner Truth Place to the southeast; Raynor Circle to the southwest; and Melnea Cass Boulevard to the northeast.

The Project Site, including the above two identified parcels, is comprised of approximately 63,000 square feet ("sf") of land including approximately 18,000 sf at the 40 Raynor Circle (Site 2A) parcel and approximately 45,000 sf at the Brooke Marshall Road (Site 2B) parcel, which also includes 11,720 sf of a roadway portion of Brooke Marshall Road proposed to be discontinued. At Site 2B, a relocated right-of-way is proposed to replace this segment of Brooke Marshall Road. Brooke Marshall Field is currently vacant, as described, and the parcel currently located at 40 Raynor Circle (Site 2A) consists of a 1-story building where the Proponent currently runs five-day a week community programs. Existing townhouses which are a part of Madison Park Village are located between the two parcels of the Proposed Project site.

6.1 Sanitary Sewer System

6.1.1 Existing Sewer System

The Boston Water and Sewer Commission ("BWSC") owns and maintains the sewer systems adjacent to the site (See **Figure 6.1**). Currently, BWSC has 10-inch sanitary sewer pipes in Raynor Circle and Brooke Marshall Road and a 12-inch sanitary sewer pipe in Sojourner Truth Place. The eventual discharge of these pipes is to a 15-inch combined sanitary sewer pipe in Washington Street. The BWSC lines connect to the Massachusetts Water Resource Authority (MWRA) system and ultimately discharge into the Deer Island Treatment Facility.

6.1.2 Project-Generated Sewage Flow

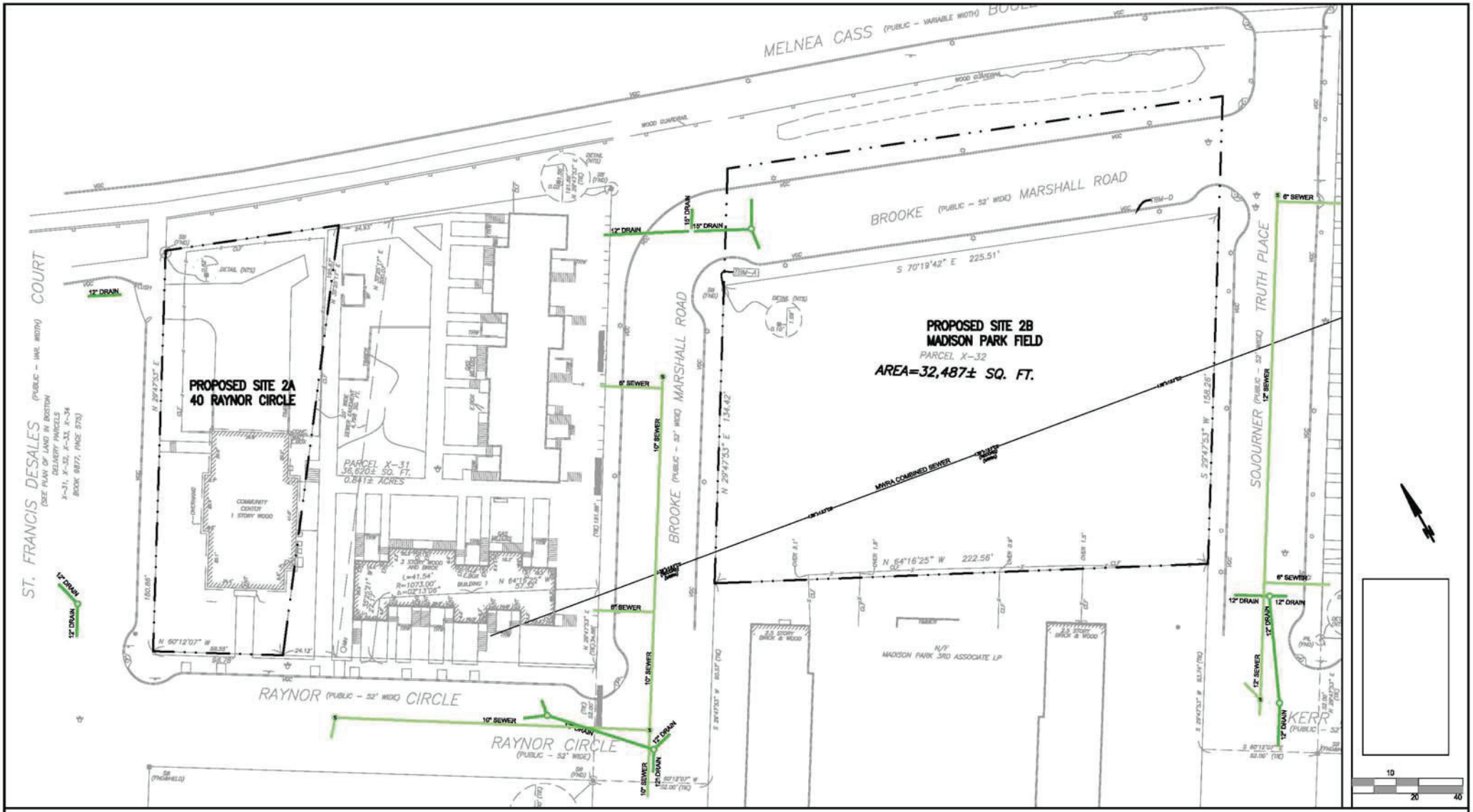
The Project's sewage generation rates were estimated using Massachusetts State Environmental Code (Title 5) at 310 CMR 15.203. This reference lists typical generation values for the sources listed in **Table 6-1**. Other wastewater generation includes the cooling systems of each building. As shown in the **Table 6-1,** the residential area will have average daily flows of approximately 19,800 gallons per day (gpd) of sanitary sewage.

Table 6-1 Projected Sanitary Sewer Flows- Sewage Generation

Use	GSF	314 CMR Value (gpd/unit)	Estimated Maximum Daily Flow (gpd)
Residential Building 2A	16 units / 40 bedrooms	110 /bedroom	4,400
Residential Building 2B	60 units / 140 bedrooms	110 /bedroom	15,400
		Total	**19,800**

6.1.3 Sanitary Sewage Connection

40 Raynor Circle *(Site 2A)* and the residential development at Brooke Marshall Road *(Site 2B)* will each have a six-inch sanitary service lateral. The construction of all connections and



MADISON PARK VILLAGE

ROXBURY, MA

BWSC Sewer and Drain As Built

March 7, 2015

OWNER/DEVELOPER: Madison Park Development Corp.

CIVIL ENGINEER: Doyle Engineering, Inc.

Figure 6-1

structures will be performed so as to minimize any effects on the adjacent streets and to ensure that adequate facilities are available to service the site and surrounding area during construction. It should be noted these sewer flows will be kept separate from all storm drain service connections. All appropriate permits and approvals will be obtained prior to construction.

6.2 Water Supply System

6.2.1 Existing Conditions

An 8-inch diameter water main runs within Raynor Circle and St. Francis Desales Court adjacent to the proposed building at 40 Raynor Circle (Site 2A). An 8-inch diameter water main runs within Brooke Marshall Road and Sojourner Truth Place adjacent to the proposed buildings at Brooke Marshall Road (Site 2B) (see **Figure 6-2**).

There are existing fire hydrants on Melnea Cass, and Brooke Marshall Road. There are no capacity issues anticipated for serving the Project with water from the city system.

6.2.2 Proposed Water System

The Project's water demand estimates for domestic water sources are based on the Project's estimated sewage generation detailed in **Table 6-1**. A conservative factor of 1.1 is applied to the average daily wastewater flows. This factor accounts for consumption and other miscellaneous losses. Therefore, it is estimated that the proposed site will consume approximately 21,780 gpd of domestic water.

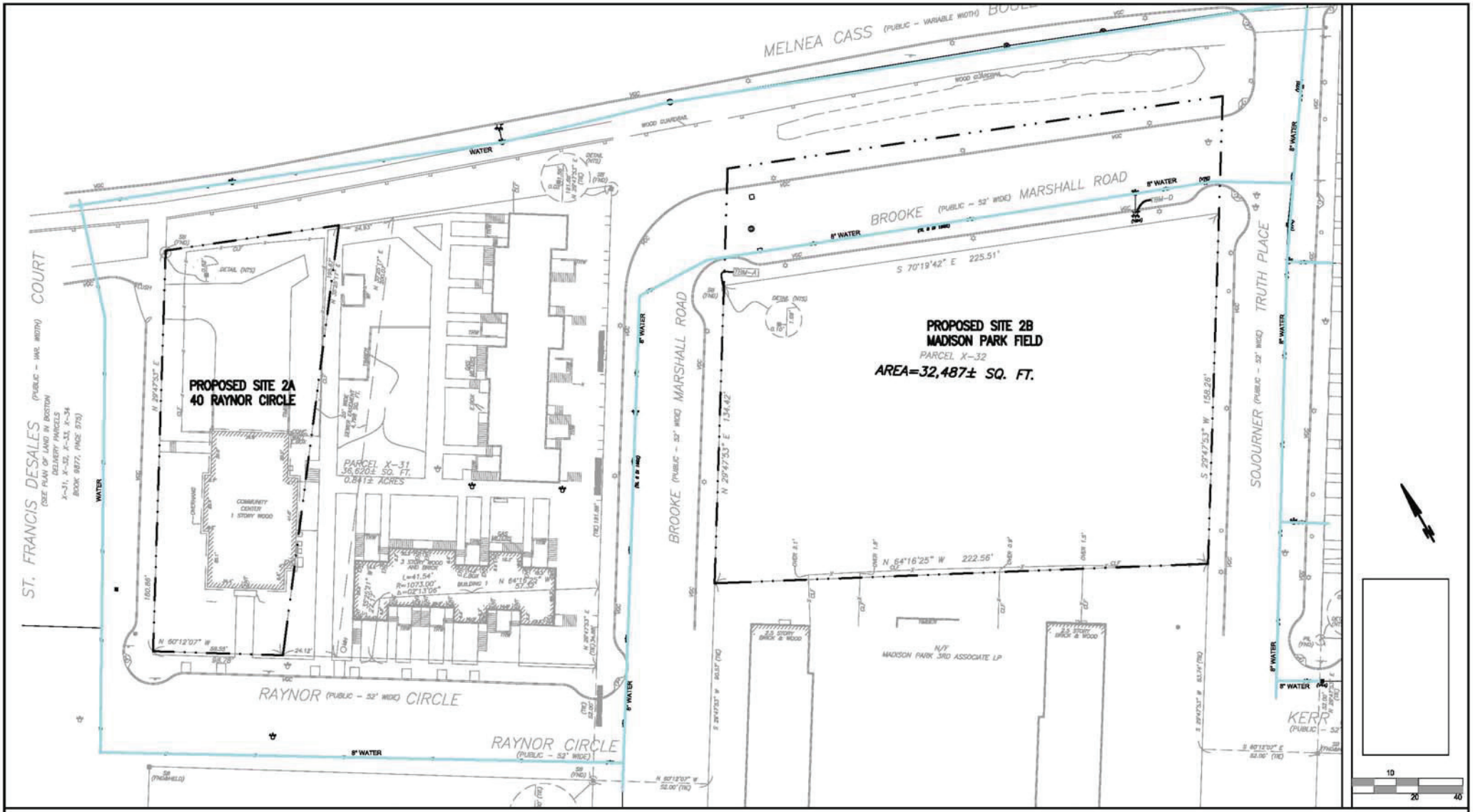
The residential development at Brooke Marshall Road (Site 2B) will be serviced by a single domestic water service line and a single 6" fire protection line. The residences at 40 Raynor Circle (Site 2A) will be serviced by a domestic service water service line and a fire protection line. It is anticipated that the service lines will be connected to the existing water mains on Brooke Marshal Road (Site 2B) and Raynor Circle (Site 2A), respectively. The water will be supplied by the BWSC's system.

It is anticipated that the 8-inch water line in the portion of Brooke Marshall Road that is to be discontinued will be removed and relocated to the new road. In addition, a fire hydrant at the discontinued portion of Brooke Marshall Road will be relocated.

6.3 Stormwater System

6.3.1 Existing Conditions

Currently, 40 Raynor Circle *(Site 2A)* is occupied by a single-story wood structure, a bituminous concrete parking areas, a concrete walkway, and vegetation (grass). The site stormwater runoff from the parking area enters a catch basins via sheet flow. There are no existing detention or



MADISON PARK VILLAGE

ROXBURY, MA

BWSC Water As Built

March 7, 2015

OWNER/DEVELOPER: Madison Park Development Corp.

CIVIL ENGINEER: Doyle Engineering, Inc.

Figure 6-2

infiltration facilities, nor water quality methods in place currently to treat stormwater runoff. Runoff from this site otherwise flows untreated into St. Francis Desales Court or Raynor Circle.

There are existing 12-inch drain lines in St. Francis Desales Court and the southeastern portion of Raynor Circle.

Currently, the site at Brooke Marshall Field (Site 2B) is vacant. Runoff flows unimpeded towards Brooke Marshall Road in a generally westerly direction. There are two existing catch basins in the portion of Brooke Marshall Road that is to be discontinued that direct runoff to a drain manhole and 15-inch drain line that flows towards Melnea Cass Boulevard. In addition, there are two catch basins on Sojourner Truth Place.

6.3.2 Proposed Conditions

The BWSC and the Massachusetts Department of Environmental Protection (MassDEP) are systematically separating stormwater and wastewater over time to prevent flooding of the system resulting in periodic overflows of combined sewage into receiving waters. Within the City of Boston, the BWSC is the agency charged with applying and enforcing all stormwater management requirements for projects that do not fall within Conservation Commission jurisdiction. The Proponent will work with the BWSC to meet their separation objectives.

It is anticipated that two catch basins, a drain manhole and associated drainage pipe in the portion of Brooke Marshall Road that is to be discontinued will be removed as part of this project.

6.3.3 Water Quality and Stormwater Management

The Project will not 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 the BWSC storm drain systems. During construction, existing catch basins will be protected with filter fabric, hay bales, and/or crushed stone, to provide for sediment removal from runoff. These controls will be inspected and maintained throughout the construction phase until all areas of disturbance have been stabilized through the placement of pavement, structure and vegetative cover.

All necessary dewatering will be conducted in accordance with any applicable MWRA and BWSC construction discharge permits as they apply to the project. Once construction is complete, the Project will be in compliance with all BWSC stormwater management policies. See below for additional information.

6.3.4 Mitigation Measures

Based on an initial project introduction meeting with the BWSC, the following stormwater management objectives will need to be met:

1. Match pre development peak runoff rates for the 2 through 100-Yr., 24 -Hr. rainfall events;
2. Infiltrate 1" first flush runoff from all impervious surfaces on site; and
3. Separate all stormwater from sanitary sewage discharges from the project.

These objectives are independent of any performance requirements for LEED Certification that the project may pursue.

All necessary dewatering will be conducted in accordance with applicable MWRA and BWSC discharge permits. Once construction is complete, the Proposed Project will be in compliance with local and state stormwater management policies.

6.3.5 Coordinate with the Boston Water and Sewer Commission

Proposed connections to the BWSC's water, sanitary sewer and storm drain systems will be designed in conformance with the BWSC's design standards, Sewer Use and Water Distribution System Regulations, and Requirements for Site Plans. The Proponent will submit a Site Plan Review application package for approval prior to construction. The site plan will indicate existing and proposed water mains, sanitary sewers, and stormwater lines. The preliminary plan includes cutting & capping of the existing services as well as proposed connections (see **Figure 6.3**).

6.4 Energy Requirements and Service

6.4.1 Existing and Proposed Electrical Service

Nstar provides electric service to the City of Boston. 40 Raynor Circle (Site 2A) is currently served with underground electric wires connecting to electric duct banks within Brooke Marshall Road (Site 2B). There is currently no electric service from the Brooke Marshall Field Site.

Electric power design for new services will be coordinated with NSTAR as the design phase progresses and electric consumption is determined.

6.4.2 Natural Gas Requirements

National Grid provides natural gas services in the area. There is an existing 4-inch gas main in Raynor Circle (Site 2A), 3-inch gas main in Brooke Marshall Road (Site 2B), and a 6-inch gas main in Sojourner Truth Place.

It is anticipated that new gas services will be provided to each of the proposed buildings from the mains in the adjacent streets. In addition, there is a gas shut off valve at the intersection of Brooke Marshall Road and Sojourner Truth Place that will need to be relocated. Gas meter locations will be coordinated with the project architect and the utility provider.

6.4.3 Telecommunications System

Verizon New England and Comcast provide telephone and cable services in the area. These are underground telephone and cable service lines in the adjacent streets. New telephone and cable lines will be constructed underground to the proposed buildings. The exact number of providers and duct bank conduit requirements will be determined during the design phase (see **Figure 6-3** for preliminary connection location on Raynor Circle (Site 2A) and Brooke Marshall Road (Site 2B).

6.4.4 Steam Systems

At this time, the Proposed Project is not expected to require steam service.

6.5 Existing Street Layout

Currently Brooke Marshall Road (Site 2B) is a two way street that extends from Ruggles Street in a northerly direction towards Melnea Cass Boulevard for a distance of approximately 500 feet and then runs east approximately 225 feet where it intersects with Sojourner Truth Court.

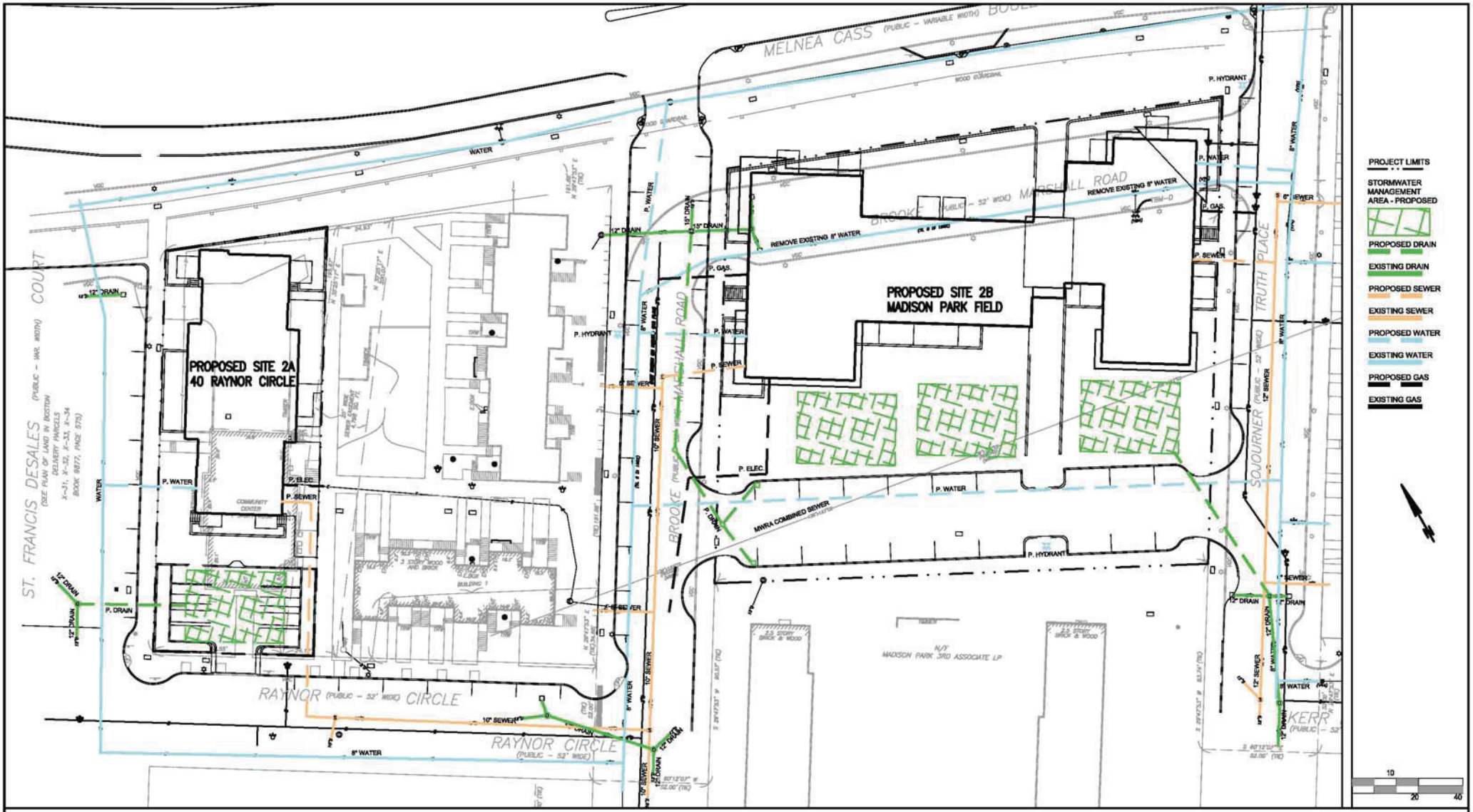
6.6 Proposed Street Layout & Construction Sequence

Madison Park Village, (MPV) proposes to discontinue the 225 foot long east/west portion of Brooke Marshall Road and create a dead-end in Brooke Marshall Road approximately 50-feet south of Melnea Cass Boulevard. Madison Park Village understands that the City of Boston will be extending Brooke Marshall Road from the dead-end, north to Melnea Cass Boulevard as part of the Melnea Cass Boulevard improvement project that will occur in the future.

The east/west (225 foot) portion of Brooke Marshall Road includes an 8-inch water line and drainage structures. The proposed drainage for the area of Brooke Marshall that is discontinued will fall within the proposed development site and will be mitigated as the site is developed, through the site design and construction. The water line will be relocated as part of this project.

As the 225 foot east/west portion of Brooke Marshall Road is discontinued the east/west link will no longer exist so MPV proposes to construct a “private way, open to public travel” south of the development parcel that will link Brooke Marshall Road to Sojourner Truth Place. The new private way is proposed as a 56-foot wide right-of-way that includes 29 parking spaces including nine (9) compact, two (2) handicap, and eighteen (18) standard spaces as laid out on the proposed site plan. Five-foot sidewalks are proposed on both sides of the proposed private way. The new intersection created between Brooke Marshall and the Private Way is designed to accommodate the latest emergency vehicle turning radii and will comply with the requirements set forth by the Boston Fire Department.

The temporary dead-end created at the northern end of Brooke Marshall will be approximately 140-feet. City of Boston regulations state that dead-ends roads less than 150 feet are allowed without the



MADISON PARK VILLAGE

ROXBURY, MA

March 7, 2015

OWNER/DEVELOPER: Madison Park Development Corp.

PROPOSED UTILITIES

PENDING APPROVALS

CIVIL ENGINEER: Doyle Engineering, Inc.

Figure 6-3

requirement for a typical cul-de-sac turnaround. The proposal will create a "hammer-head" turn-around for passenger vehicles so that the dead-end can be conveniently utilized for parking. The proposal does not provide a full cul-de-sac right-of-way and turnaround for emergency vehicles. See **Figures 6.4** to **6.7** that shows the sequence of the proposed road construction.

The anticipated process includes:

- Figure 6.4 - Existing Site 2B Site Plan
- Figure 6.5 - Site 2B with New Private Street & Current Brooke Marshall Road
- Figure 6.6 - Site 2B with New Private Street & Brooke Marshall Dead End
- Figure 6.7 - Proposed Site 2B Completed

6.7 Utility Protection During Construction

Existing public and private infrastructure located within nearby public rights-of-way will be protected during Project construction. The installation of proposed utility connections within public ways will be undertaken in accordance with 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.

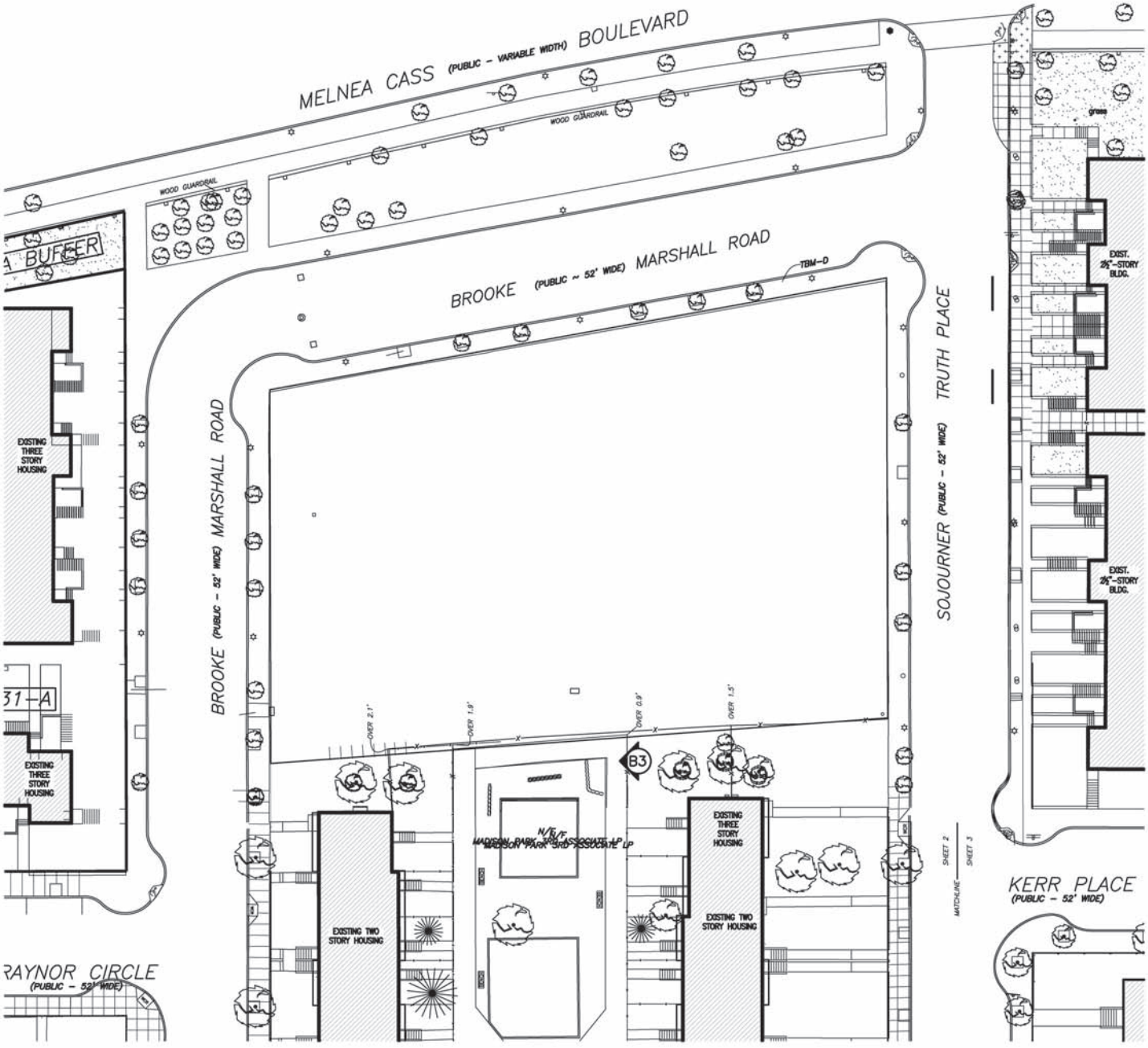


FIGURE 6.4
EXISTING SITE 2B SITE PLAN

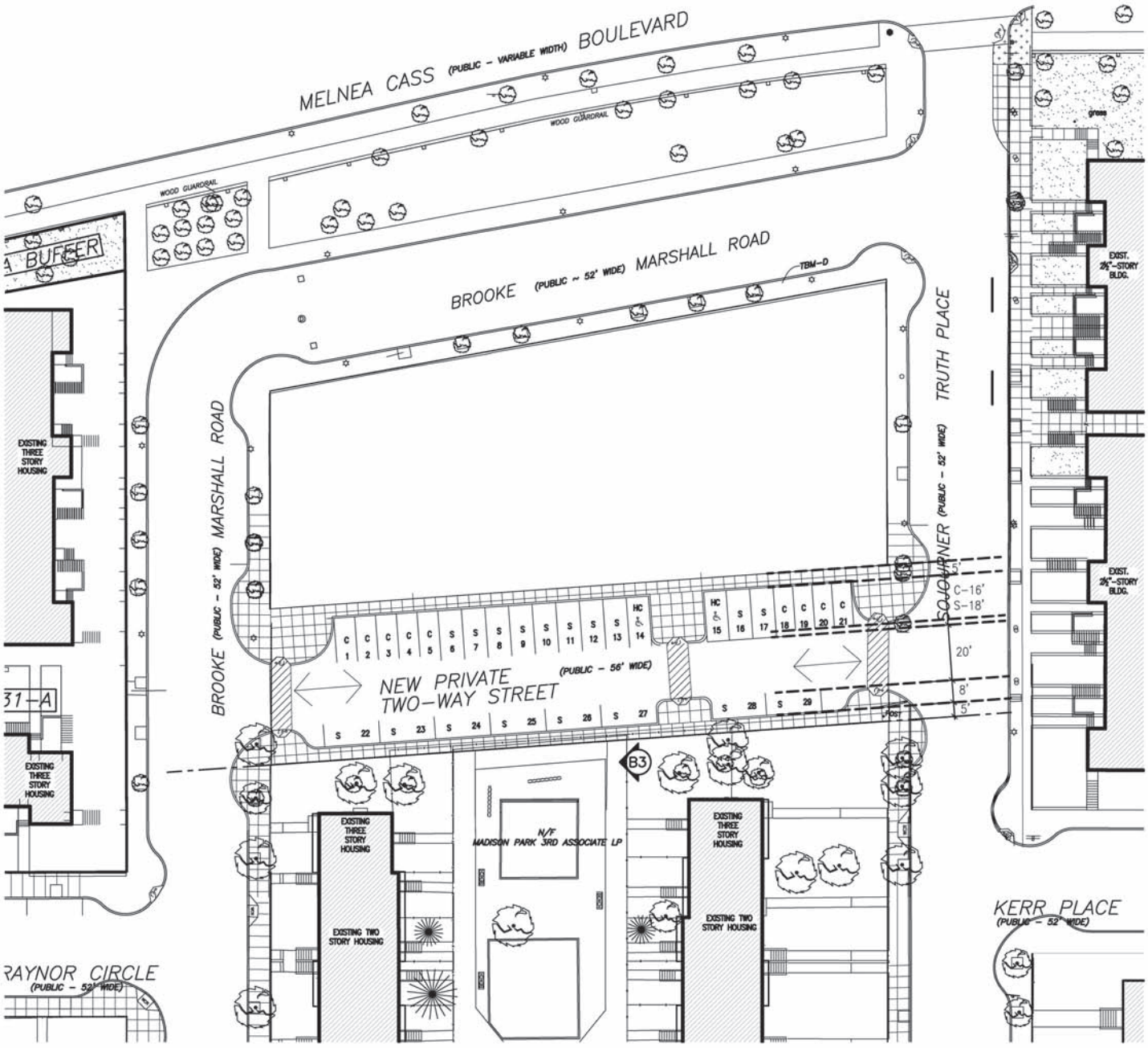


FIGURE 6.5
SITE 2B WITH NEW PRIVATE STREET
& CURRENT BROOKE MARSHALL RD

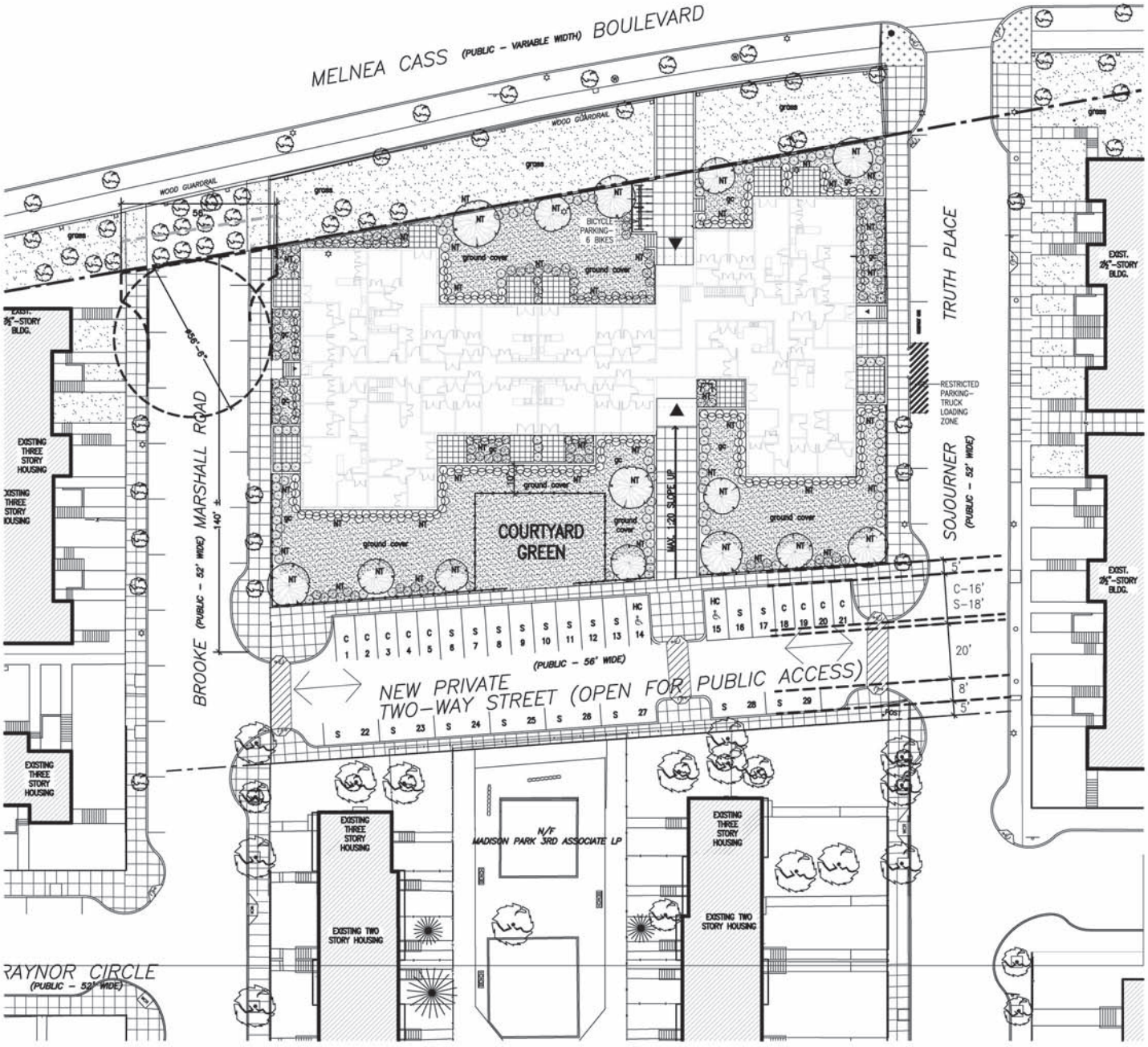


FIGURE 6.6
SITE 2A WITH NEW PRIVATE STREET,
& BROOKE MARSHALL RD DEAD END

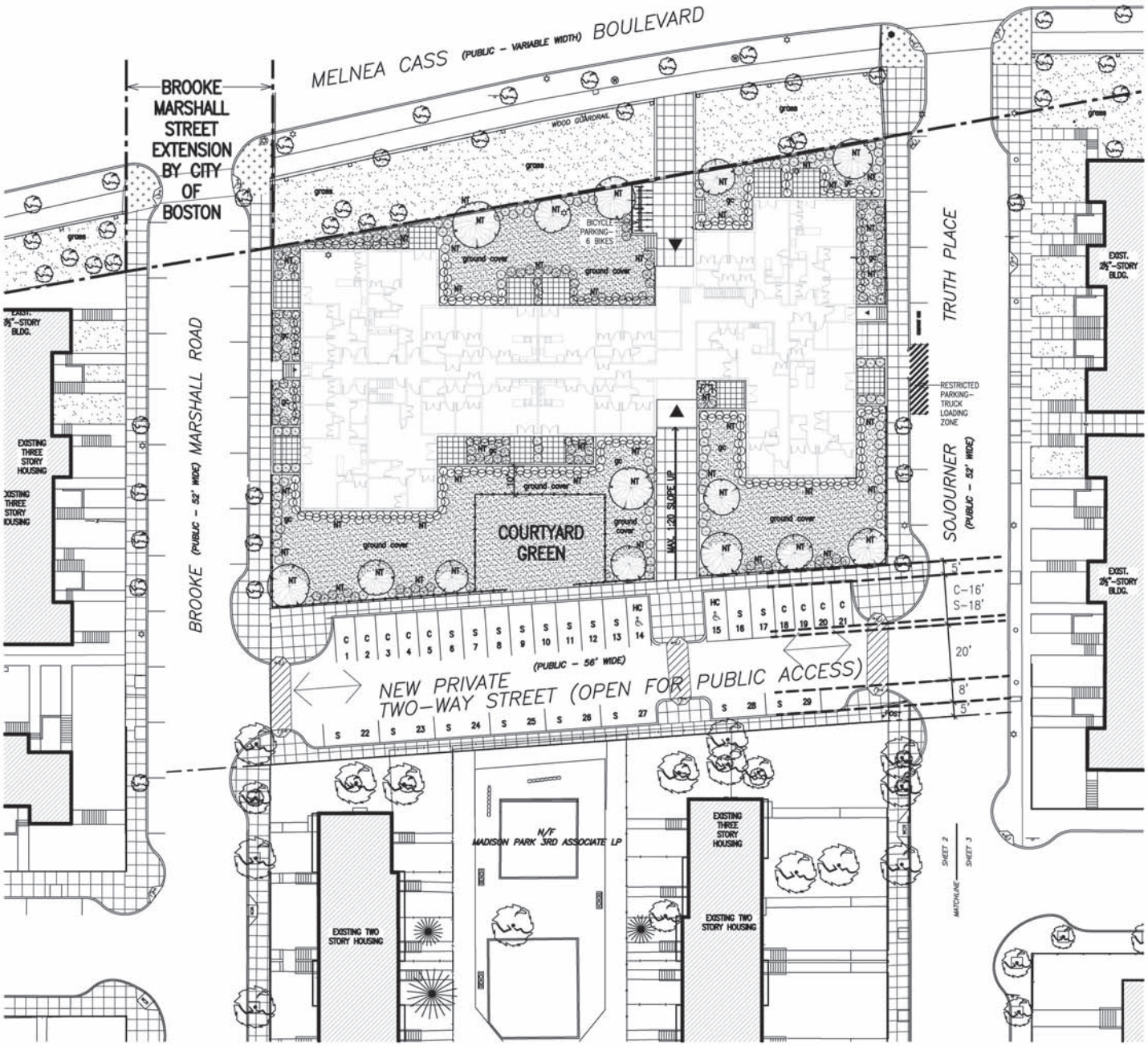


FIGURE 6.7
PROPOSED SITE 2B COMPLETED

7.0 TRANSPORTATION COMPONENT

7.1 Introduction

7.1.1 Purpose of the Transportation Component

Howard Stein Hudson (HSH) has conducted an evaluation of the transportation impacts of the Madison Park Apartments (the "Project" and/or the "Site"), a proposed redevelopment containing 76 residential units in two new buildings with a total of 37 vehicular parking spaces located off Melnea Cass Boulevard in Madison Park Village, located in the Roxbury section of Boston. The following transportation study adheres to the Boston Transportation Department (BTD) *Transportation Access Plan Guidelines* and Boston Redevelopment Authority's (BRA) *Development Review Guidelines* (2006). This study includes an evaluation of existing transportation conditions; future transportation conditions with and without the Project; roadway, pedestrian, and bicycle conditions; transportation issues; parking and loading; pedestrian and bicycle circulation; proposed mitigation; and transportation goals for the Project.

7.1.2 Project Description

The Project site consists of two parcels located along Melnea Cass Boulevard within the Madison Park Village in Roxbury. The Project includes the demolition of an existing structure located at 40 Raynor Circle and the construction of a 16-unit residential building (Site 2A). The second building will consist of 60 residential units and will be located on a vacant parcel of land along Brooke Marshall Road (Site 2B). Site 2A is bounded by St. Francis Desales Court to the west, Melnea Cass Boulevard to the north, Raynor Circle to the south, and existing residential buildings to the east. Site 2B will consist of 60 residential units and is bounded by Brooke Marshall Road to the west, Melnea Cass Boulevard to the north, Sojourner Truth Court to the east, and residential buildings to the south. A total of 8 parking spaces will be provided on Site 2A. The development of Site 2B will include the discontinuance of the portion of Brooke Marshall Road that runs in the east-west direction, parallel to Melnea Cass Boulevard and intersects with Sojourner Truth Court to the east. This discontinuance will create an approximate 140-foot long portion of Brooke Marshall Road with no outlet. This portion of Brooke Marshall Road currently serves an existing three story residential building and on-street parking spaces. A new two-way roadway will be constructed in the southern portion of the parcel that will allow access to be maintained between Sojourner Truth Court and Brooke Marshall Road. A total of 29 parking spaces will be created along the new private roadway open to the public, which will be designated to Site Building 2B.

Vehicular access/egress to Site 2A will be provided by a full access driveway along Raynor Circle. The driveway will be located at a new curb cut approximately 100 feet south of St.

Francis Desales Court and will serve the 8-vehicle parking lot. Vehicular access/egress to Site 2B will be provided on-street by the new roadway and Brooke Marshall Road. Pedestrian access to both sites will be provided to all entrances through sidewalks and paths through the neighborhood and public ways.

7.1.3 Study Area

The study area includes intersections along Melnea Cass Boulevard in the vicinity of the Site. As shown in **Figure 7.1**, the study area includes the following five intersections:

- Melnea Cass Boulevard/Tremont Street (signalized);
- Melnea Cass Boulevard/Shawmut Avenue (signalized); and
- Melnea Cass Boulevard/Sojourner Truth Court (signalized).

7.1.4 Study Methodology

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

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

The future transportation conditions analysis evaluates potential transportation impacts associated with the Project. Long-term impacts are evaluated for the year 2019, based on a five-year horizon from the existing year (2014). Expected roadway, parking, transit, pedestrian, bicycle accommodation, and loading capacities and deficiencies are identified. This section includes the following scenarios:

- The 2019 No-Build conditions scenario includes both general background traffic growth and traffic growth associated with specific developments and transportation improvements that are planned in the vicinity of the Project site.
- The 2019 Build conditions scenario includes adding project-generated traffic volume estimates for a full-build-out scenario to the traffic volumes developed as part of the 2019 No-Build conditions scenario.

The final part of the transportation study identifies measures to mitigate Project-related impacts, if any exist. These impacts include any traffic, pedestrian, bicycle, transit, parking, safety, or

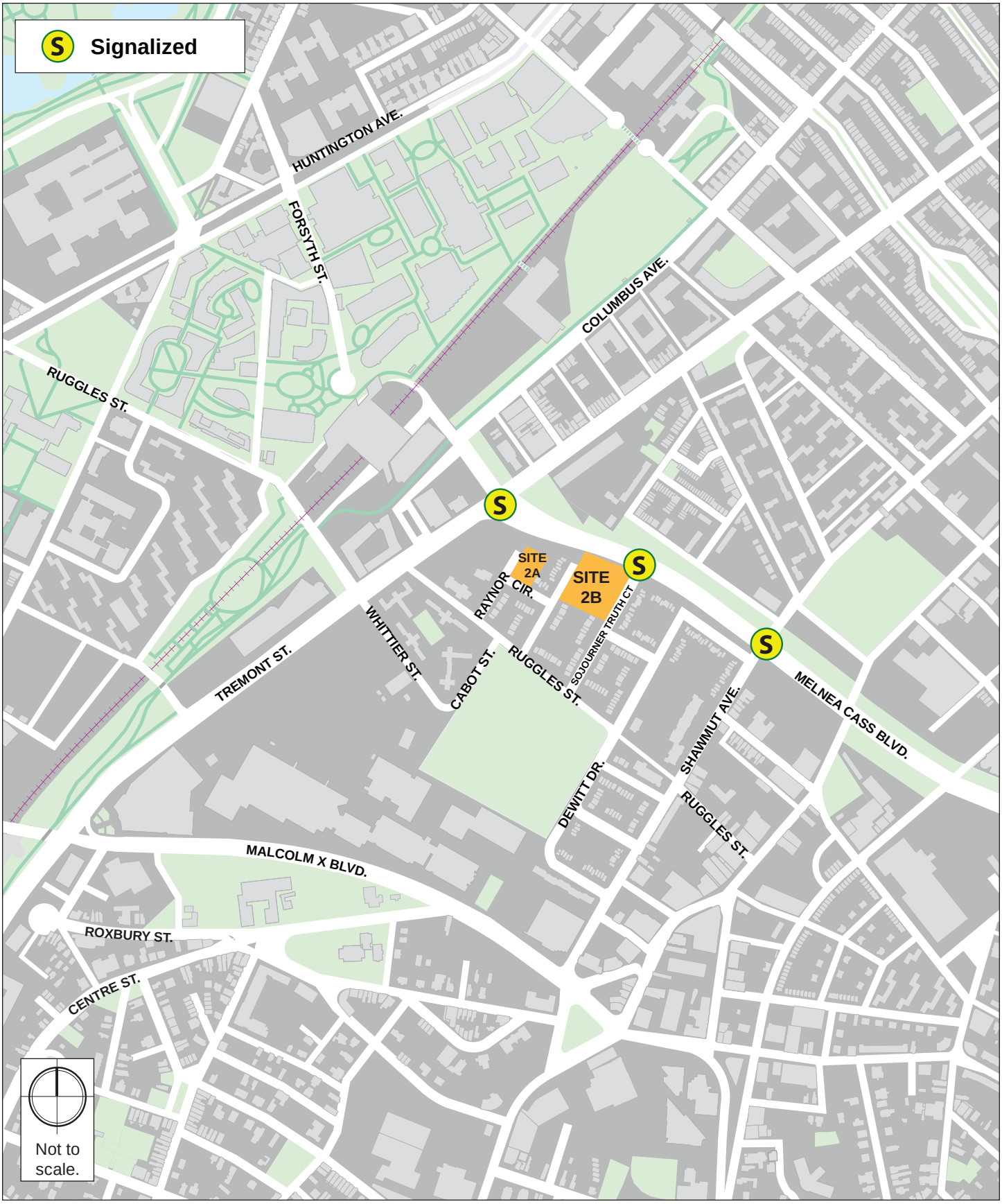


Figure 7.1

Study Area Intersections

construction-related issues that are necessary to accommodate the Project. An evaluation of short-term traffic impacts associated with construction activities is also provided.

7.2 Existing Conditions

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

7.2.1 Existing Roadway Conditions

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

Melnea Cass Boulevard is an urban principal arterial roadway under BTD jurisdiction that runs in an east-west direction between Columbus Avenue at Northeastern University in the west and the Massachusetts Avenue Connector at Interstate 93 in the east. Within the study area, Melnea Cass Boulevard consists of two lanes in each direction separated by a median with an additional left turn lane at the intersection of Tremont Street. Parking is prohibited along Melnea Cass Boulevard within the study area. Sidewalks are provided along both sides of the street and range in width from 5 to 20 feet. The South Bay Harbor Trail is a mixed-use path that runs along the north side of the roadway.

Tremont Street is an urban principal arterial roadway under BTD jurisdiction that runs in a north-south direction between Cambridge Street in downtown Boston in the north and Huntington Avenue in Mission Hill to the south. Within the study area, Tremont Street consists of three lanes in each direction with additional turning lanes at Melnea Cass Boulevard and Ruggles Street. Within the study area, parking is prohibited along both sides of Tremont Street. Sidewalks are provided along both sides of the street and range in width from nine to 24 feet.

Shawmut Avenue is an urban minor arterial roadway under BTD jurisdiction that runs in a north-south direction between Tremont Street in the south and Washington Street in the north. Within the study area, Shawmut Avenue consists of one westbound unmarked travel lane with parking on both sides of the roadway. Sidewalks are provided on both sides of the roadway and range from 5 feet to 8 feet wide.

Sojourner Truth Court is a local roadway under BTD jurisdiction that runs in a north-south direction between Ruggles Street in the south and Melnea Cass Boulevard in the north. In the study area, Sojourner Truth Court consists of two way travel with no pavement markings. Parking is allowed on both sides of the roadway. Sidewalks are provided on both sides of the roadway and range from 5 feet to 8 feet wide. Sojourner Truth Court is also named Kerr Way at the intersection with Melnea Cass Boulevard.

7.2.2 Existing Intersection Conditions

Melnea Cass Boulevard/Tremont Street is a four-way signalized intersection with four approaches. The Tremont Street northbound approach consists of a shared left-turn/through lane, a through lane, and a channelized right-turn only lane. The Tremont Street southbound approach consists of a shared left-turn/through lane and a shared through/right-turn lane. The Melnea Cass Boulevard westbound approach consists of one left-turn only lane, one shared left-turn/through lane, and one shared through/right-turn lane. The Melnea Cass Boulevard eastbound approach consists of a shared left-turn/through lane and a shared through/right-turn lane. The Melnea Cass Boulevard approaches travel lanes are separated by a raised median.

Concrete sidewalks are provided along both sides of all approaches. Crosswalks, handicap accessible ramps, and count-down pedestrian signal indications are provided across all of the intersection approaches.

Melnea Cass Boulevard/Shawmut Avenue is a four-way signalized intersection with three approaches. Shawmut Avenue is one-way in the southbound direction at the intersection. The Shawmut Avenue southbound approach consists of a wide lane with no pavement markings that operates as a shared left-turn/through lane and a shared through/right-turn lane. The Melnea Cass Boulevard westbound approach consists of a shared left-turn/through lane and a through lane. The Melnea Cass Boulevard southbound approach consists of a through lane and a shared through/right-turn lane.

Concrete sidewalks are provided along both sides of all approaches. Crosswalks, handicap accessible ramps, and count-down pedestrian signal indications are provided across all of the intersection approaches.

Melnea Cass Boulevard/Sojourner Truth Court is a three-way signalized intersection with three approaches. The Sojourner Truth Court northbound approach consists of a shared left-turn/right-turn lane. The Melnea Cass Boulevard westbound approach consists of a shared left-turn/through lane and a through lane. The Melnea Cass Boulevard eastbound approach consists of a through lane and a shared through/right-turn lane.

Concrete sidewalks are provided along both sides of all approaches. Crosswalks and handicap accessible ramps are provided across all of the intersection approaches. Countdown pedestrian signal indications are only provided across Melnea Cass Boulevard.

7.2.3 Existing Traffic Conditions

Traffic counts were conducted on October 15th, 2014 at the study area intersections during the a.m. and p.m. peak periods (7:00 – 9:00 a.m. and 4:00 p.m. – 6:00 p.m., respectively). The peak hours generally occur between 7:30–8:30 a.m. and 4:45–5:45 p.m.

Figures 7.2 and **7.3** show the existing peak-hour turning volumes for the study area intersections for the a.m. and p.m. peak hours, respectively. Complete traffic count data are provided in the **Appendix B**.

7.2.4 Existing Traffic Operations

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 6) 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). Field observations were performed by HSH to collect intersection geometry such as number of turning lanes, lane length, and lane width that were then incorporated into the operations analysis.

LOS designations are based on average delay per vehicle for all vehicles entering an intersection. **Table 7.1** displays the intersection LOS criteria. LOS A indicates the most favorable condition, with minimum traffic delay, while LOS F represents the worst condition. LOS D or better is typically considered acceptable in an urban area. However, LOS E or F is often typical for a stop controlled minor street that intersects a major roadway and does not necessarily indicate that the operations at the intersection are poor or failing.

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

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

The 50th percentile queue length, measured in feet, represents the maximum queue length during a cycle of the traffic signal with typical (or median) entering traffic volumes.

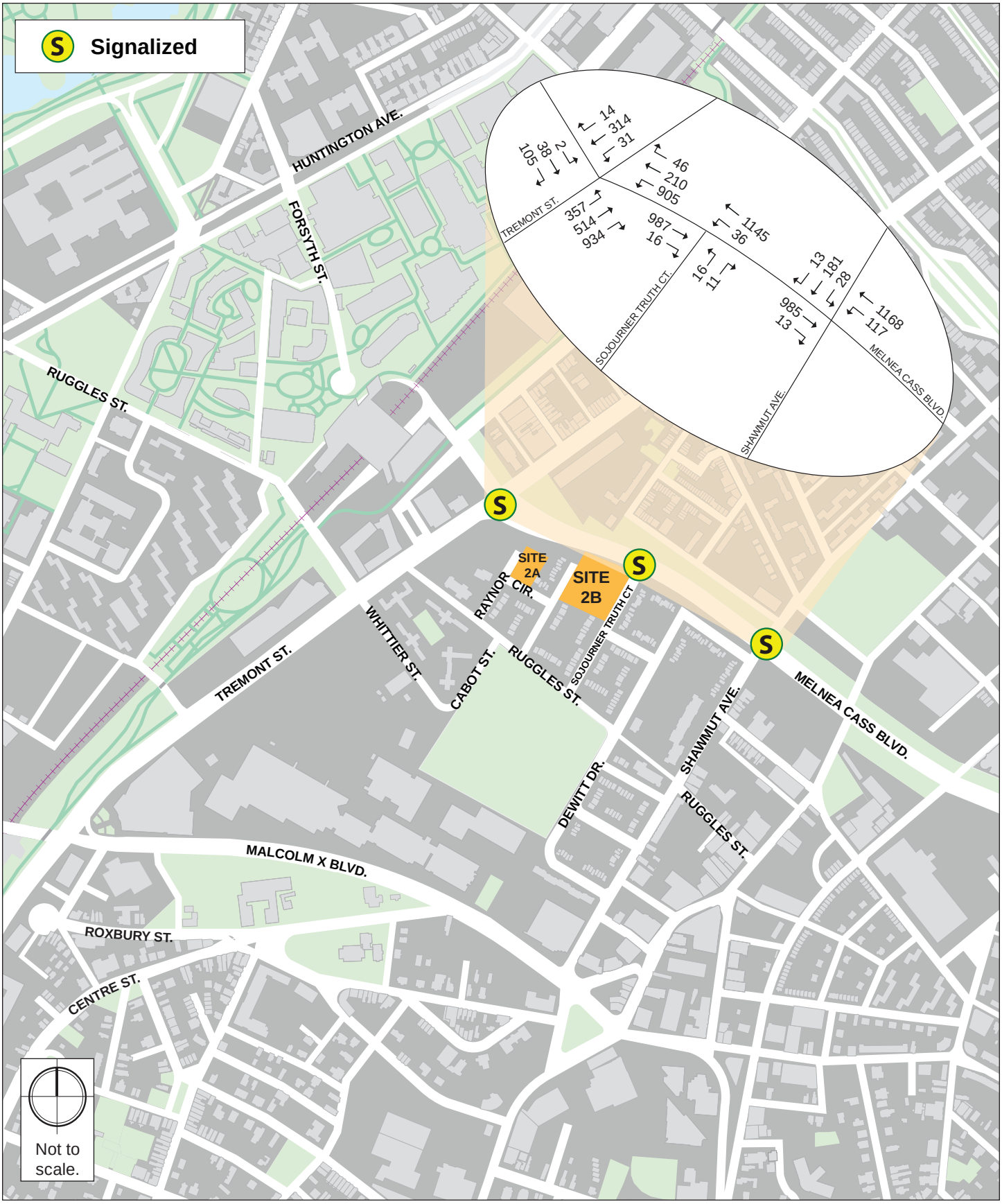


Figure 7.2

Existing Conditions (2014) Turning Movement Volumes, a.m. Peak Hour

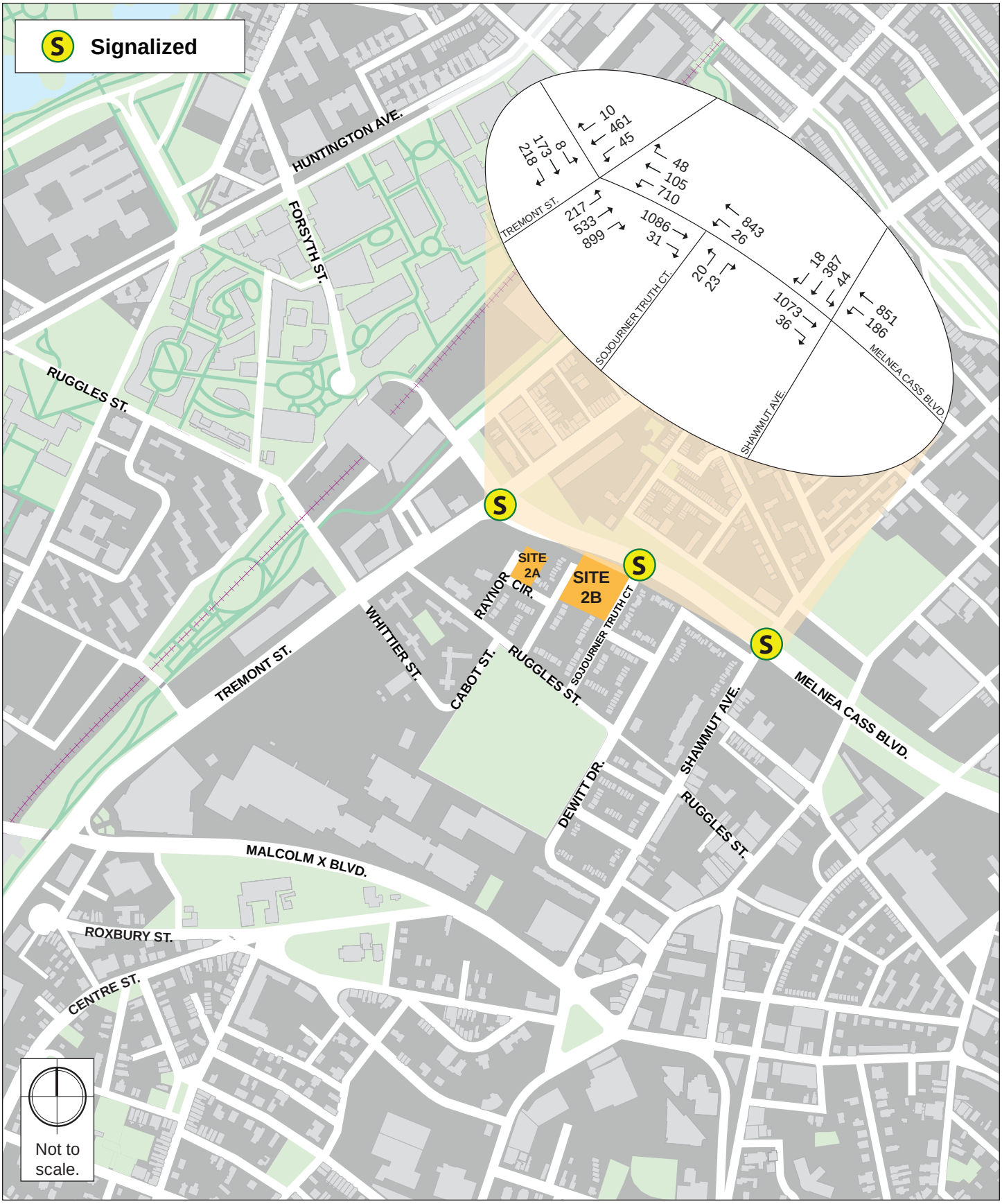


Figure 7.3

Existing Conditions (2014) Turning Movement Volumes, p.m. Peak Hour

The 95th percentile queue length, measured in feet, represents the farthest extent of the vehicle queue (to the last stopped vehicle) upstream from the stop line during five percent of all signal cycles. The 95th percentile queue will not be seen during each cycle. The queue would be this long only five percent of the time and would typically not occur during off-peak hours. Since volumes fluctuate throughout the hour, the 95th percentile queue represents what can be considered a "worst case" scenario. Queues at the intersection are generally below the 95th percentile queue throughout the course of the peak hour. It is also unlikely that the 95th percentile queues for each approach to the intersection will occur simultaneously.

Table 7.1 Level of Service Criteria (HCM Excerpt)

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

Source: 2000 Highway Capacity Manual, Transportation Research Board.

Tables 7.2 and **7.3** present the 2014 Existing conditions operations analysis for the study area intersections during the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in **Appendix B**.

Table 7.2 Existing (2014) Level of Service Summary, a.m. Peak Hour

Intersection/Approach	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Melnea Cass Boulevard/Tremont Street	**D**	**44.4**	**-**	**-**	**-**
Tremont Street NB left/thru|thru	C	20.4	0.73	269	370
Tremont Street NB right	A	8.6	0.70	216	625
Tremont Street SB left/thru|thru/right	D	45.1	0.57	161	240
Melnea Cass Boulevard WB left	F	>80.0	>1.00	~549	#789
Melnea Cass Boulevard WB left/thru|thru/right	E	64.4	>1.00dl	353	#475
Melnea Cass Boulevard EB left/thru|thru/right	C	30.0	0.62	20	55
Melnea Cass Boulevard/Shawmut Avenue	**B**	**16.4**	**-**	**-**	**-**
Shawmut Avenue SB left/thru|thru/right	E	58.3	0.70	115	127
Melnea Cass Boulevard WB left/thru|thru	B	15.1	0.85	161	#260
Melnea Cass Boulevard EB thru|thru/right	A	6.6	0.49	176	64
Melnea Cass Boulevard/Sojourner Truth Court	**A**	**3.9**	**-**	**-**	**-**
Sojourner Truth Court NB left/right	D	44.9	0.30	13	44
Melnea Cass Boulevard WB left/thru|thru	A	3.6	0.53	78	195
Melnea Cass Boulevard EB thru|thru/right	A	3.2	0.38	52	214

dl = Defacto Left-Turn Lane.
~ = 50th percentile volume exceeds capacity. Queue shown is the maximum after 2 cycles
# = 95th percentile volume exceeds capacity. Queue shown is the maximum after 2 cycles.
Grey shading indicates LOS E or LOS F.

Table 7.3 Existing (2014) Level of Service Summary, p.m. Peak Hour

Intersection/Approach	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Melnea Cass Boulevard/Tremont Street	**D**	**40.6**	**-**	**-**	**-**
Tremont Street NB left/thru|thru	C	31.5	0.79	286	353
Tremont Street NB right	A	6.7	0.66	191	340
Tremont Street SB left/thru|thru/right	D	43.8	0.67	228	299
Melnea Cass Boulevard WB left	F	>80.0	0.97	384	#612
Melnea Cass Boulevard WB left/thru|thru/right	D	50.9	0.93dl	250	321
Melnea Cass Boulevard EB left/thru|thru/right	E	70.3	0.97	125	#237
Melnea Cass Boulevard/Shawmut Avenue	**C**	**24.1**	**-**	**-**	**-**
Shawmut Avenue SB left/thru|thru/right	E	57.4	0.79	187	236
Melnea Cass Boulevard WB left/thru|thru	C	22.5	0.87	156	#266
Melnea Cass Boulevard EB thru|thru/right	B	12.4	0.61	284	123
Melnea Cass Boulevard/Sojourner Truth Court	**A**	**5.1**	**-**	**-**	**-**
Sojourner Truth Court NB left/right	D	41.7	0.49	23	42
Melnea Cass Boulevard WB left/thru|thru	A	3.9	0.41	32	m162
Melnea Cass Boulevard EB thru|thru/right	A	4.2	0.43	65	267

dl = Defacto Left-Turn Lane.
~ = 50th percentile volume exceeds capacity. Queue shown is the maximum after 2 cycles
# = 95th percentile volume exceeds capacity. Queue shown is the maximum after 2 cycles.
Grey shading indicates LOS E or LOS F.

The intersection of **Melnea Cass Boulevard/Tremont Street** currently operates at LOS D during both the a.m. and p.m. peak hours. The Melnea Cass Boulevard westbound left turn lane currently operates at LOS F during both the a.m. peak hour and the p.m. peak hour. The Melnea Cass Boulevard westbound left/thru|thru/right movement group operates at LOS E during the a.m. peak hour. The Melnea Cass Boulevard eastbound left/thru|thru/right movement group operates at LOS E during the p.m. peak hour. The longest queues at the intersection occur in the Melnea Cass Boulevard westbound left-turn lane in both the a.m. and p.m. peak hours.

The intersection of **Melnea Cass Boulevard/Shawmut Avenue** currently operates at LOS B during the a.m. peak hour and LOS C during the p.m. peak hour. The Shawmut Avenue southbound movement operates at LOS E during both the a.m. and p.m. peak hours. The longest queues at the intersection occur on the Melnea Cass Boulevard westbound approach both the a.m. and the p.m. peak hours.

The intersection of **Melnea Cass Boulevard/Sojourner Truth Court** currently operates at LOS A during both the a.m. and p.m. peak hours. The longest average queues at the intersection occur along the Melnea Cass Boulevard eastbound approach during both the a.m. and the p.m. peak hours.

7.2.6 Existing Parking and Curb Use

Curb use regulations adjacent to the Project site include unrestricted parking, 2-hour parking, and resident only parking. Parking is prohibited along Tremont Street and Melnea Cass Boulevard. Parking on Ruggles Street, Sojourner Truth Court, Raynor Circle, and Brooke Marshall Road consist of a mix of unrestricted parking, two-hour parking, and residential parking. MBTA bus stops are provided along Tremont Street, Ruggles Street, and Melnea Cass Boulevard within the study area. **Figure 7.4** illustrates the on-street parking regulations in the vicinity of the study area.

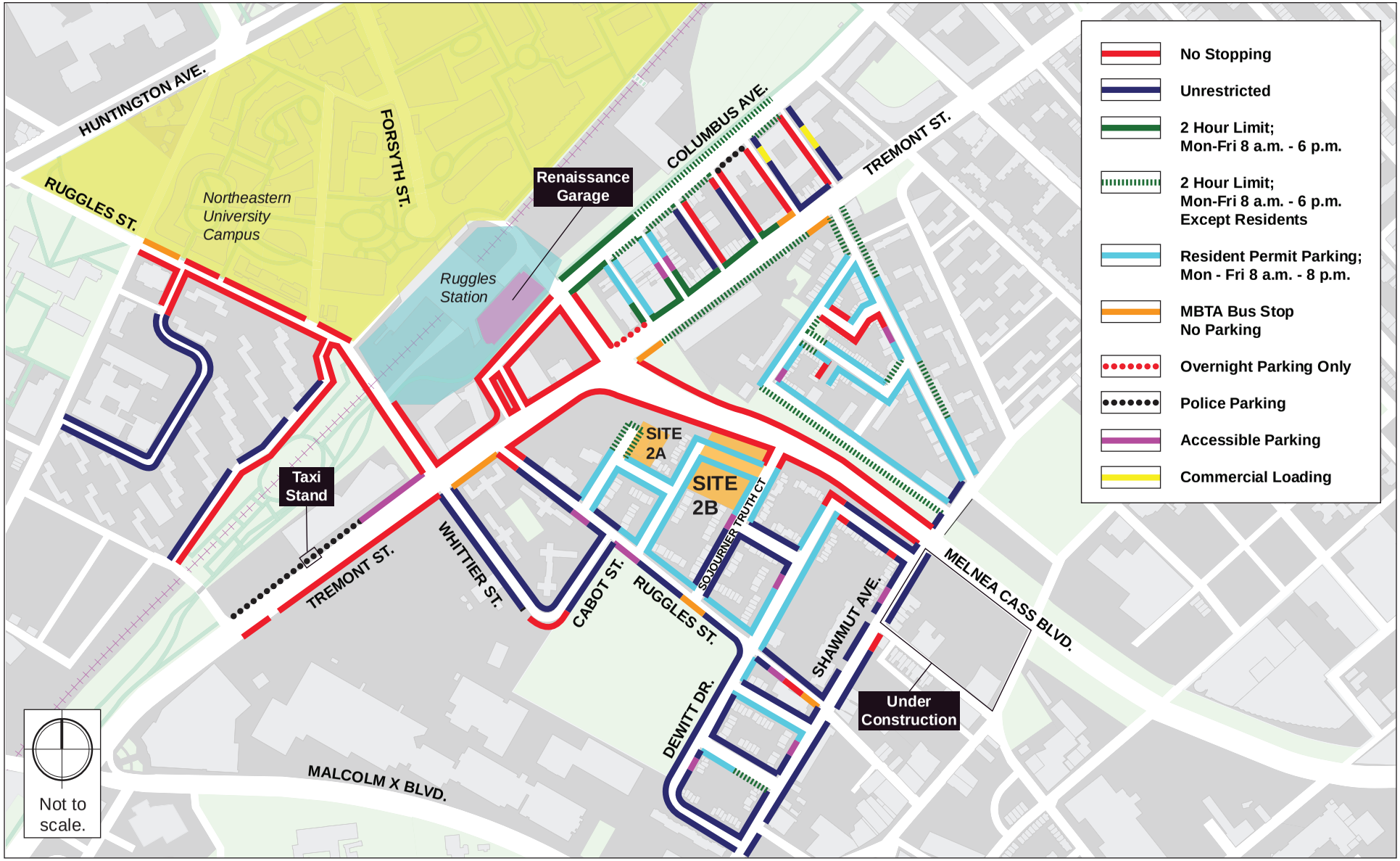


Figure 7.4
On-street Parking

7.2.7 Existing Public Transportation Facilities

The Project site is well-served by public transportation and is less than a quarter mile east of the Ruggles MBTA Station, which provides bus, rapid transit, and commuter rail service. The MBTA public transportation services are shown in **Figure 7.5** and summarized in **Table 7.4.**

Table 7.4 Public Transportation Services

Line/Route #	Description	Peak-hour Headways (minutes)[1]
Rapid Transit Routes		
Orange Line	Ruggles Station	5
Local Bus Routes		
#8	Harbor Point/UMASS – Kenmore Station via B.U. Medical Center & Dudley Station	14
#15	Kane Square or Fields Corner Station – Ruggles Station via Uphams Corner	20
#19	Fields Corner Station – Kenmore or Ruggles Station via Grove Hall and Dudley Station	9-14
#22	Ashmount Station – Ruggles Station via Talbot Avenue & Jackson Square	7-8
#23	Ashmount Station – Ruggles Station via Washington Street	5-6
#28	Mattapan Station – Ruggles Station via Dudley Station	7
#42	Forest Hills Station – Dudley or Ruggles Station via Washington Street	15
#43	Ruggles Station – Park & Tremont Station via Tremont Street	18-22
#44	Jackson Sq. Station – Ruggles Station via Seaver Street & Humboldt Avenue	12-14
#45	Franklin Park Zoo – Ruggles Station via Blue Hills Avenue	10
#47	Central Square Cambridge – Broadway Station via B.U. Medical Center, Dudley Station & Longwood Medical Area	10-20
CT2	Sullivan Station – Ruggles Station via Kendall/MIT	20
CT3	Beth Israel Deaconess Medical Center – Andrew Station via B.U. Medical Center	20
Commuter Rail Routes[2]		
Needham	Needham – Ruggles Station	30-55
Providence/Stoughton	Providence/Stoughton – Ruggles Station	30-55
Franklin	Franklin – Ruggles Station	25-45

[1] Headway is the scheduled time between trains or buses. Source: www.mbta.com, April 2014

[2] Commuter rail routes have irregular headways; customers typically plan trips according to schedule rather than using walk-up services.

Figure 7.5
Public Transportation

Rapid Transit Routes

The MBTA Orange Line subway can be accessed at Ruggles Station, west of the Project site and provides service from Forest Hills Station in Jamaica Plain through downtown Boston to Oak Grove Station in Malden, Massachusetts. The Orange Line provides inbound and outbound service approximately every five minutes Monday through Friday and every ten minutes on nights and weekends. Ruggles Station provides access to approximately 10,433 entering passengers throughout the day, the 18th highest in the MBTA subway system[4].

Local Bus Routes

The Project site is located within convenient walking distance Ruggles Station, which is less than a quarter mile away. A total of 13 different MBTA bus routes operate out of Ruggles Station. The specific routes are shown in **Table 7.4**. The primary MBTA bus routes serving the Project site are the CT3 bus, the #8 bus, the #19 bus, the #43 bus, and the #47 bus, which provides service along Ruggles Street, Melnea Cass Boulevard, and/or Tremont Street. The buses operate on 10-15-minute headways in the a.m. and p.m. peak periods and on 30-minute headways during off-peak periods.

Commuter Rail Routes

At Ruggles Station, The Needham, Providence/Stoughton, and Franklin commuter rail lines can be accessed at Ruggles Station.

The Needham MBTA commuter rail line provides access between Needham Heights and South Station in downtown Boston. On a weekday, the Needham Line has 16 inbound trains that run between 6:10 a.m. and 10:47 p.m. and 16 outbound trains that run between 7:05 a.m. and 11:09 p.m. A total of 12 inbound and 12 outbound trains stop at Ruggles Station.

The Providence/Stoughton MBTA commuter rail line provides access between either Wickford Junction, Rhode Island or Stoughton and South Station in downtown Boston. On a weekday, the Providence/Stoughton line has 36 inbound trains that run between 4:50 a.m. and 12:25 a.m. and 41 outbound trains that run between 5:11 a.m. and 1:06 a.m. A total of 10 inbound trains and 24 outbound trains stop at Ruggles Station. Additionally, 9 trains on Saturday and 7 trains on Sunday operate on the Providence/Stoughton Line with limited stops. All weekend trains stop at Ruggles Station.

The Franklin MBTA commuter rail line provides access between Forge Park/495 and South Station in Downtown Boston. On a weekday, the Franklin line has 19 inbound trains that run between 5:05 a.m. and 12:41 a.m. and 18 outbound trains that run between 4:00 a.m. and 12:51 a.m. A total of 7 inbound and 12 outbound trains stop at Ruggles Station. Additionally, 9 trains

[4] Ridership and Service Statistics (14th Edition); Central Transportation Planning Staff; Boston, MA; 2014.

on Saturday and 7 trains on Sunday operate on the Providence/Stoughton Line with limited stops. All weekend trains stop at Ruggles Station.

7.2.8 Existing Pedestrian Facilities

To assess the level of pedestrian activity throughout the study area, pedestrian counts were conducted on October 15th, 2014. The 2014 Existing a.m. and p.m. peak-hour pedestrian volumes are shown in **Figure 7.6**. Detailed pedestrian count data is provided in **Appendix B.**.

As shown on **Figure 7.6**, pedestrian activity in the vicinity of the Project site is relatively light under 50 pedestrians per hour), with the highest occurrence of pedestrians at the intersection of Melnea Cass Boulevard/Tremont Street.

Sidewalks in the Project area are in good condition and supply adequate capacity. A site visit noted that in certain areas tree roots and overgrown vegetation have created cracks and an uneven surface. Crosswalks, handicap ramps, and pedestrian signal equipment are provided at each of the three study area intersections. The Project site is also conveniently located within walking distance of Ruggles Station. In addition, the presence of utility poles, street lights, and overgrown vegetation greatly reduce the effective width of the sidewalk adjacent to the Project Site.

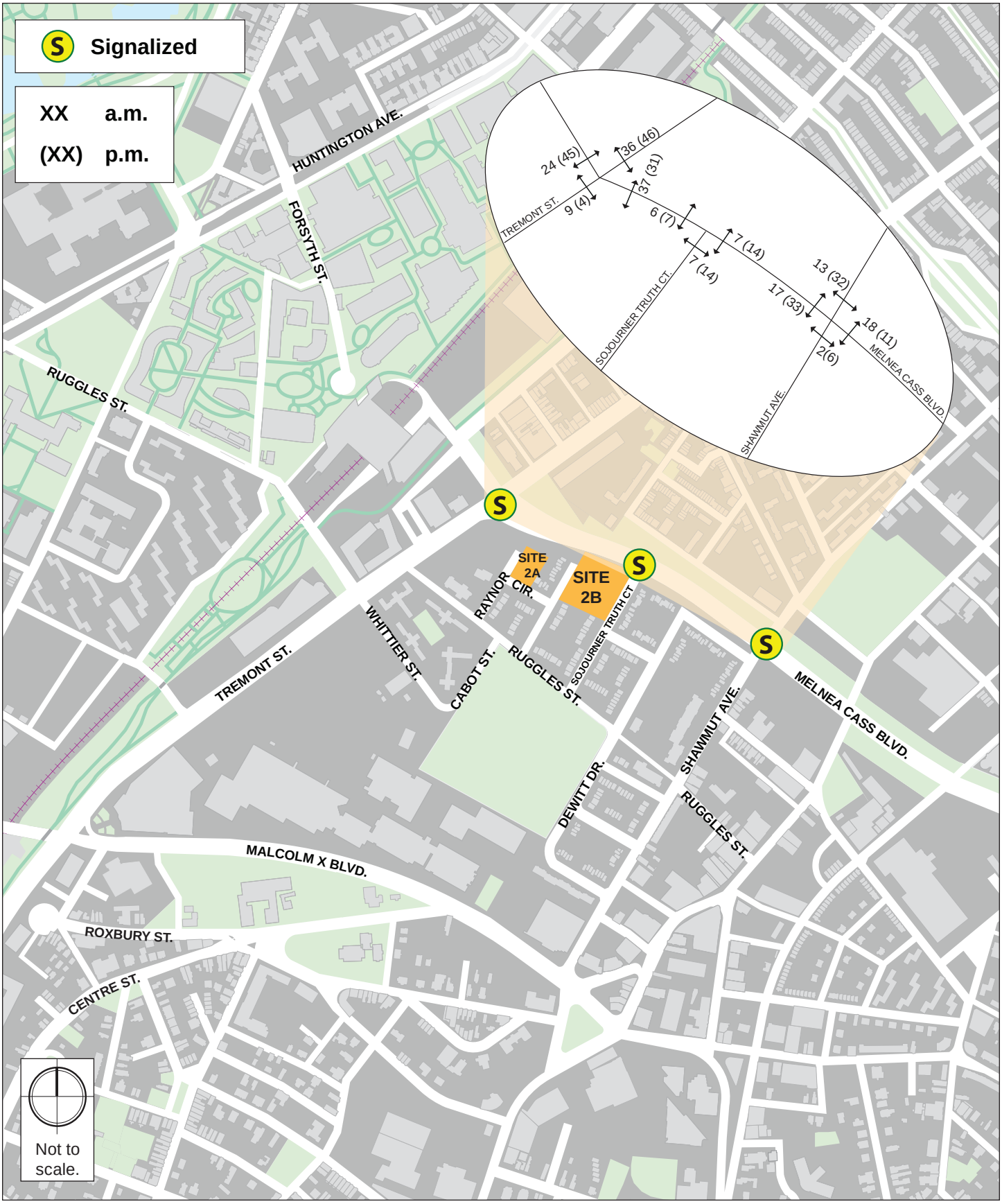


Figure 7.6

Existing Conditions (2014) Pedestrian Volumes, a.m. and p.m. Peak Hour

7.2.9 Existing Bicycle Facilities

In recent years, bicycle use has increased dramatically throughout the City of Boston. The Project Site is conveniently located within a quarter mile of the South Bay Harbor Trail and Southwest Corridor Park. The South Bay Harbor trail runs between Ruggles Station to Boston's Harborwalk on the Fort Point Channel, which provides approximately 3.5 miles of biking, walking and jogging paths. In the study area, the South Bay Harbor Trail runs along the east side of Melnea Cass Boulevard. The Southwest Corridor Park runs between Forest Hills and Back Bay Station, which provides approximately 4.7 miles of biking, walking, and jogging paths. In the study area, the Southwest Corridor Park runs adjacent to Ruggles Station.

The roadways adjacent to the Project site have no designated bicycle lanes or markings. In the vicinity of the study area, Ruggles Street is designated as an intermediate bike route, suitable for riders with some on road experience, on the 2010-2011 Boston Bikes Map. The Southwest Corridor Path and the South Bay Harbor Trail are both designated as beginner-level bike routes, suitable for all types of cyclists including newer cyclists, cyclists with limited on-road experience, and/or children.

The 2014 Existing a.m. and p.m. peak-hour bicycle turning movement counts appear in **Figure 7.7**. Detailed bicycle counts provided in **Appendix B.**

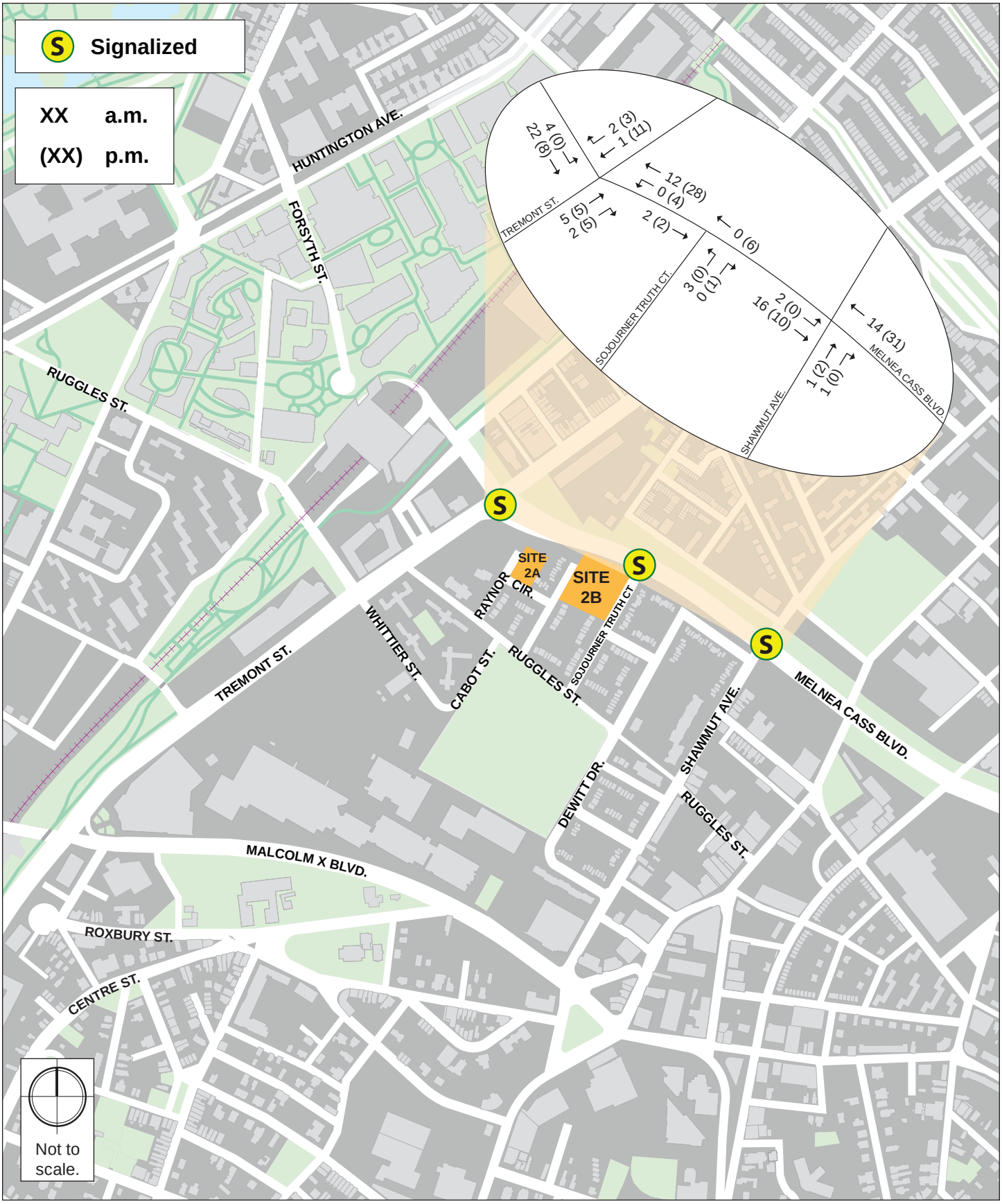


Figure 7.7

Existing Conditions (2014) Bicycle Volumes, a.m. and p.m. Peak Hour

7.2.10 Car and Bike Sharing Services

Car sharing, predominantly served by Zipcar and Enterprise CarShare in the Boston area, enables easy access to short term vehicular transportation. Vehicles are rented on an hourly or daily basis, and all vehicle costs (gas, maintenance, insurance, and parking) are included in the rental fee. Vehicles are checked out for a specific time period and returned to their designated location.

Nearby car sharing services provide an important transportation option and reduce the need for private vehicle ownership. A map of all car sharing locations within the Project site vicinity is shown in **Figure 7.8**.

Hubway is the bicycle sharing system in the Boston area, which was launched in 2011 and consists of over 140 stations and 1,300 bicycles. The nearest Hubway station is located at Ruggles Station approximately 500 feet to the west of the Project site. An additional Hubway station is located at Dudley Station approximately 0.4 miles to the southeast of the Project Site. Both of the Hubway station house approximately 15 bicycles. A map of all Hubway stations within the study area is shown in **Figure 7.9**.

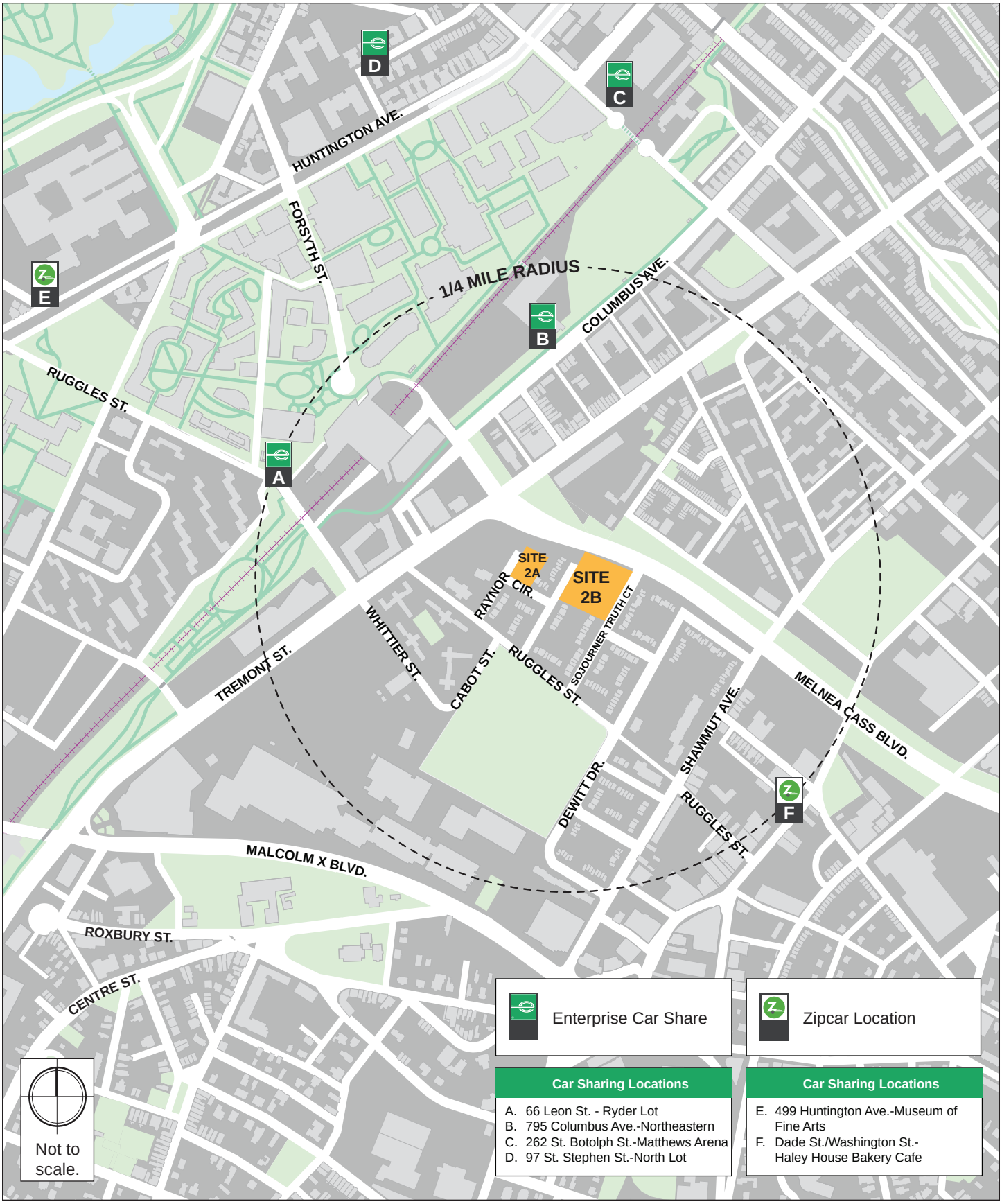


Figure 7.8

Car Sharing

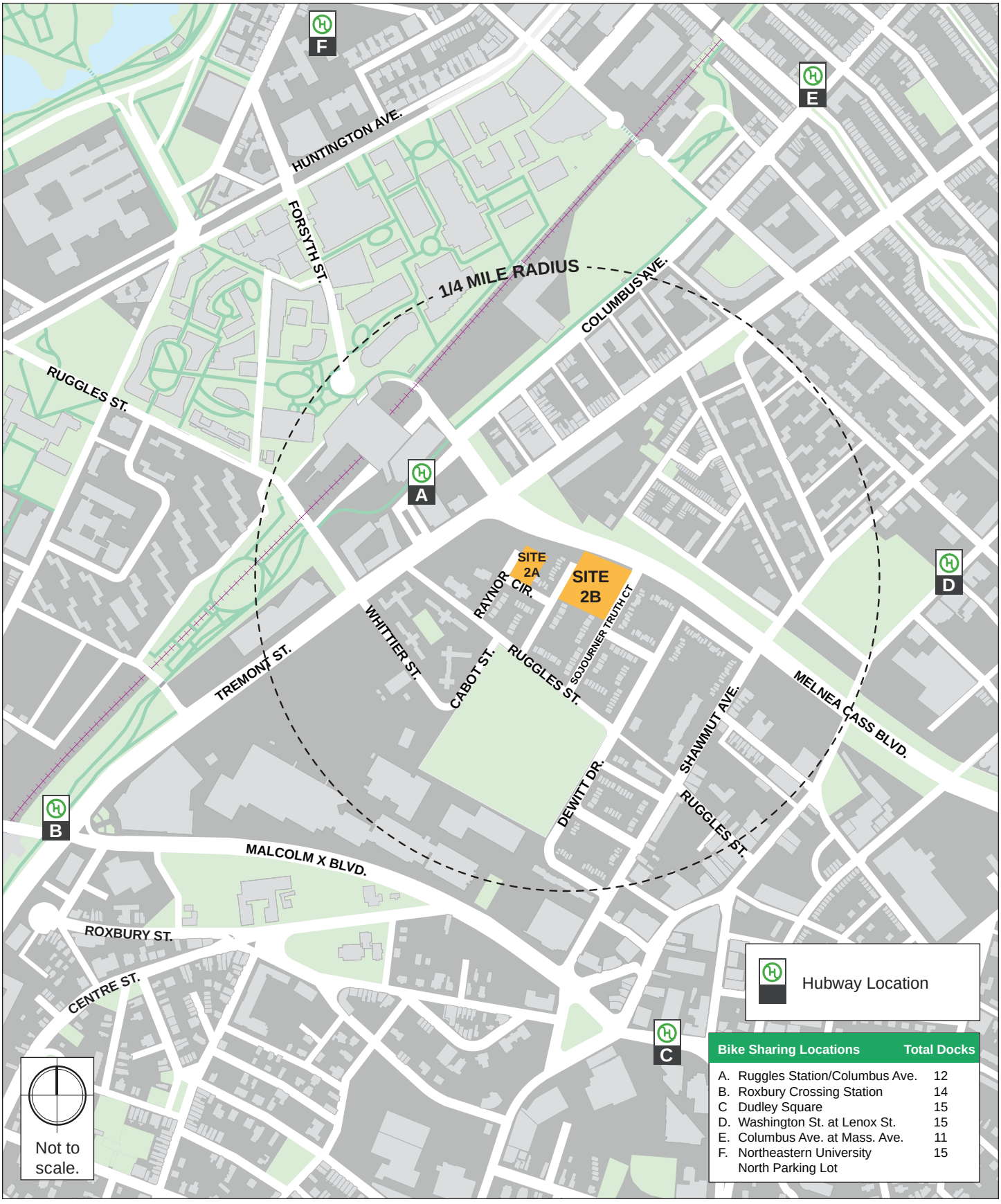


Figure 7.9

Bike Sharing

7.3 Future Conditions

For transportation impact analyses, it is standard practice to evaluate two future conditions: No-Build conditions (without the proposed project) and Build conditions (with the proposed project). In accordance with BTD guidelines, these conditions are projected to a future date five years from the Existing conditions year. For this evaluation of this Project, 2019 was selected as the horizon year for the future conditions analyses.

This section presents a description of the 2019 future conditions scenarios and includes an evaluation of the transportation facilities under the No-Build and Build conditions.

7.3.1 No-Build Conditions

The No-Build conditions reflect a future scenario that incorporates any anticipated traffic volume changes independent of the Project and any planned infrastructure improvements that will affect travel patterns throughout the study area. Infrastructure improvements include roadway, public transportation, pedestrian and bicycle improvements. Background traffic growth is based on two factors: an annual growth rate and growth associated with specific developments near the project.

Background Traffic Growth

Two methodologies are used to account for future traffic growth, independent of the Project. The first methodology accounts for general background traffic growth that may be affected by changes in demographics, automobile usage, and automobile ownership. Based on an assessment of traffic volume data from 2000 to 2013 near the Northeastern University campus, in the vicinity of the Project site, traffic volumes have remained relatively constant or negative in recent years. However, to account for any unforeseen growth, this analysis assumes a general background growth rate of one-half percent per year.

The second methodology identifies any specific planned developments that are expected to affect traffic patterns throughout the study area within the future analysis time horizon. The following projects, which are depicted in **Figure 7.10,** are located in the vicinity of the study area and, where appropriate, traffic volumes associated with these projects were also incorporated into the future conditions traffic volumes.

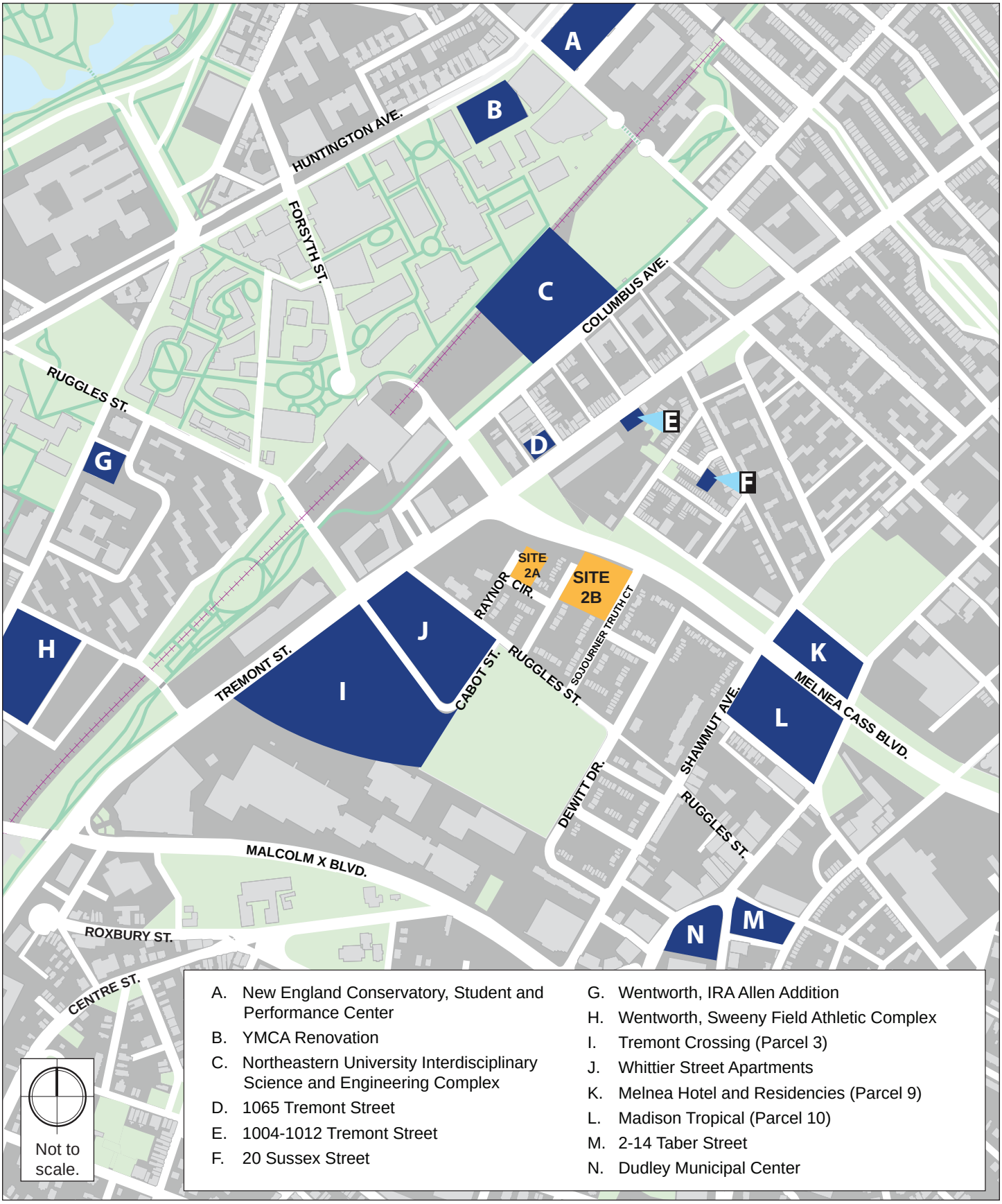


Figure 7.10

Background Development Projects

- ***Tremont Crossing (P-3)***. This proposed mixed-use building consists of 438,275 gross square feet (gsf) of retail space, 233,784 gsf of office space, 300 residential units, 37,520 gsf of museum space, 200 hotel rooms, and 1,502 parking spaces. This project is currently under review.

- ***Northeastern University Institutional Master Plan (IMP).*** This proposed amendment consists of amending the existing IMP plan by changing the size of West Village Residence Hall G and the Computer Science Building.

- ***Northeastern University – Interdisciplinary Science and Engineering Center.*** This project calls for the construction of a 197,000 gsf of research and office space, including new faculty, interdisciplinary research clusters and collaborative space, specialized teaching labs, classrooms, student space, and café open to the public. This project is currently under construction.

- ***Melnea Hotel and Residencies (Parcel 9).*** This proposed mixed-use building consists of 145 hotel rooms, 50 housing rental units, 8,000 gsf of ground-floor retail space, and 3,600 gsf of ballroom space, with approximately 120 parking spaces and covered secure storage for 70 bicycles. This project has been approved.

- ***Madison Tropical (Parcel 10).*** This proposed three mixed-use buildings consist of approximately 40,000 sf of supermarket (Tropical Foods), 54,000 sf of office/retail building and the rehabilitation of a 44,000 sf existing structure for the provision of residential units and retail space. This project is currently under construction.

- ***New England Conservatory – Student Life and Performance Center*** – This project consists of the construction of a new 135,000 sf residence hall and student life center and a 65,000 sf academic and administration building. A letter of intent has been filed with the BRA for this project

- ***YMCA Renovation*** – This project includes the demolition of the existing pool and squash courts for a new gymnasium, aquatic center, and new squash courts. The remaining interior portion of the YMCA will also be renovated. This project is currently under construction.

- ***1065 Tremont Street*** – This project consists of the construction of a new six story building with approximately 16 rental units, 1,000 sf ground floor retail space, and 17 surface parking spaces. This project has been approved by the BRA.

- ***1004-1012 Tremont Street*** – This project consists of the construction of a 14,882 sf mixed-use building with approximately 7 rental units, 2,224 sf ground floor retail, and 6 surface parking spaces. This project has been approved by the BRA.

- ***20 Sussex Street*** – Calls for the construction of 4 new residential units. This project has been approved by the BRA.

- ***Wentworth – IRA Allen Building Addition*** – This project includes the construction of teaching labs, classrooms and offices. Construction of this project is complete.

- ***Wentworth – New Sweeney Field Athletics Complex*** – This project includes the construction of a state-of-the-art athletic field atop a single story structure that will contain approximately 330 parking spaces. This project is has been approved by the BRA.

- ***Dudley Municipal Building*** – This project consists of the construction of a new 200,000 sf headquarters for the Boston Public Schools, which will house over 500 employees. The project will include 20,000 sf of ground floor retail space, as well as studio space open to the public to showcase students' artwork and host community gatherings. This project is currently under construction.

- ***2-14 Taber Street*** – This project consists of the construction of a three story building with approximately 23,559 sf of space. Phase I involves the construction of the approximate 7,853 sf ground floor retail space, and Phase II calls for the construction of the approximate 15,706 office space. This project has been approved by the BRA.

Planned Infrastructure Improvements

The following planned infrastructure projects are located in proximity to the Project site.

Melnea Cass Boulevard Improvement Project – The Boston Transportation Department is working with the Roxbury community to redesign Melnea Cass Boulevard with the goal of making it a neighborhood friendly corridor. The scope includes the development of roadway and streetscape designs that create a pedestrian friendly environment, ensure efficient traffic flow, accommodate transit vehicles and bicycles and promote economic development.

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

This project is currently in the pre-design stage. Because a design option has not yet been selected, these improvements were not incorporated into the future conditions analysis scenarios.

Tremont Crossing Mitigation Improvements – The Proponent of the Tremont Crossing mixed-use development project, located along Whittier Street, opposite the Project site, is proposing to convert Whittier Street from one-way to two-way operation between Tremont Street and Downing Street and to provide a left-turn lane along Tremont Street southbound to allow left-turns onto Whittier Street.

No-Build Conditions Traffic Volumes

To develop the 2019 No-Build conditions traffic volumes at the study area intersections a half-percent per year annual growth rate was applied to the 2014 Existing conditions traffic volumes, then the traffic volumes associated with the background development projects listed above were added.

The 2019 No-Build a.m. and p.m. peak hour traffic volumes are show in **Figure 7.11** and **Figure 7.12**, respectively.

No-Build Conditions Traffic Operations

The 2019 No-Build conditions scenario analysis uses the same methodology as the 2014 Existing conditions scenario analysis. **Table 7.5** and **Table 7.6** present the 2019 No-Build conditions operations analysis for the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in **Appendix B**.

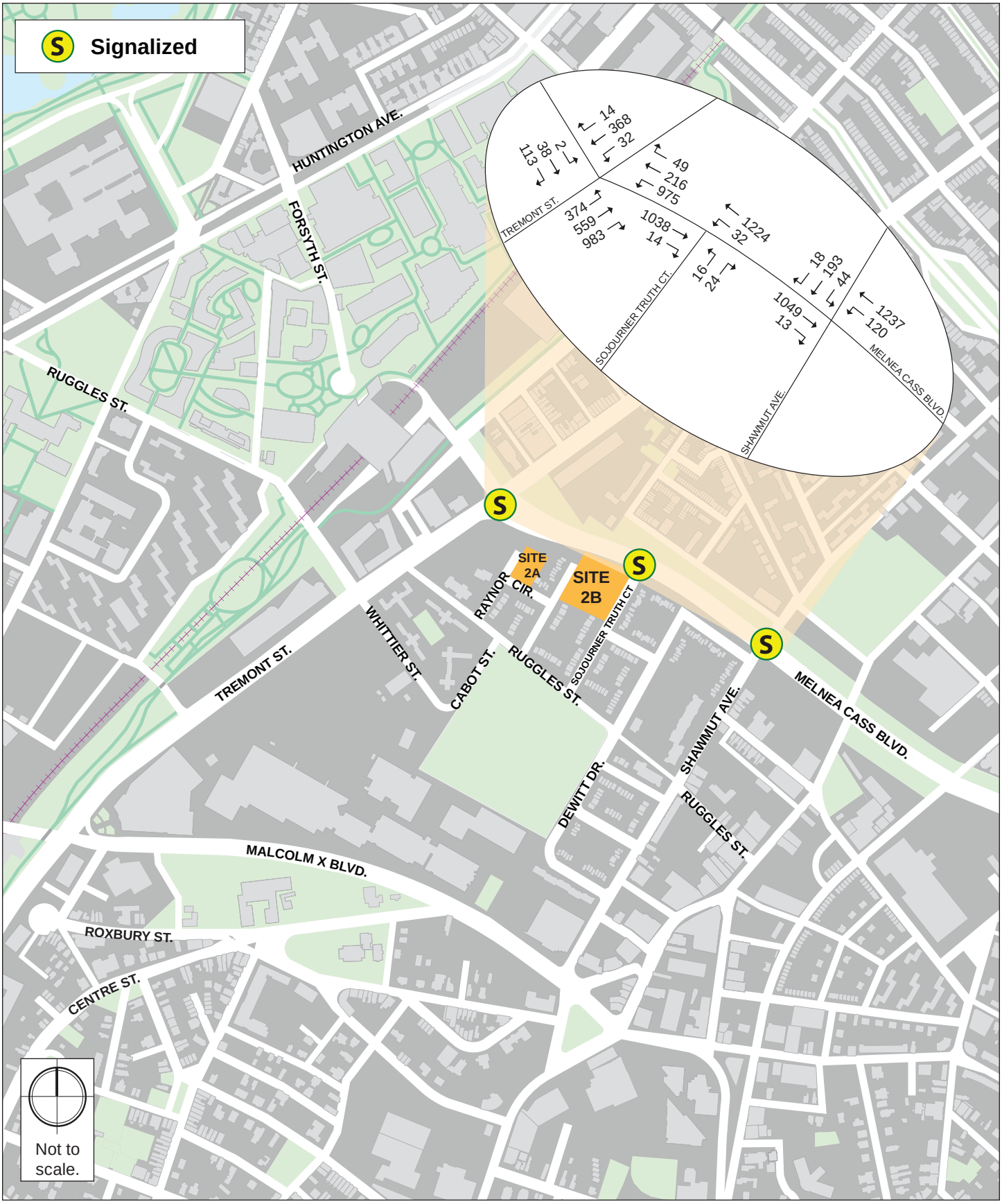


Figure 7.11

No-Build Conditions (2019) Turning Movement Volumes, a.m. Peak Hour

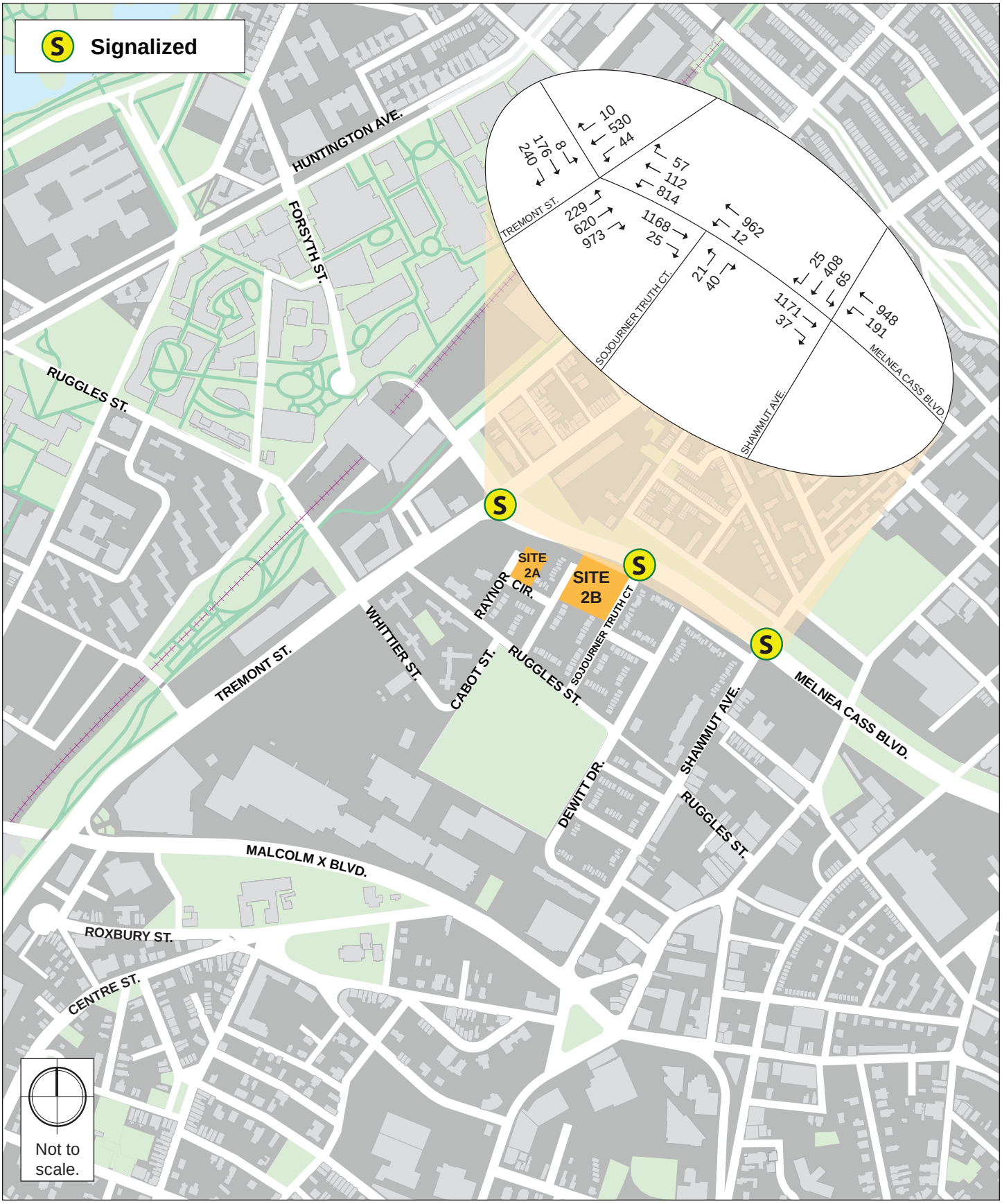


Figure 7.12

No-Build Conditions (2019) Turning Movement Volumes, p.m. Peak Hour

Table 7.5 No-Build Conditions (2019) Level of Service Summary, a.m. Peak Hour

Intersection/Approach	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Melnea Cass Boulevard/Tremont Street	**D**	**52.1**	**-**	**-**	**-**
Tremont Street NB left/thru|thru	C	22.7	0.79	301	410
Tremont Street NB right	A	10.0	0.73	249	618
Tremont Street SB left/thru|thru/right	D	49.8	0.69	194	#311
Melnea Cass Boulevard WB left	F	>80.0	>1.00	~625	#870
Melnea Cass Boulevard WB left/thru|thru/right	E	73.7	>1.00dl	384	#525
Melnea Cass Boulevard EB left/thru|thru/right	C	29.4	0.63	20	56
Melnea Cass Boulevard/Shawmut Avenue	**C**	**21.6**	**-**	**-**	**-**
Shawmut Avenue SB left/thru|thru/right	E	58.7	0.74	132	143
Melnea Cass Boulevard WB left/thru|thru	C	24.4	0.93	193	#392
Melnea Cass Boulevard EB thru|thru/right	A	7.3	0.53	205	72
Melnea Cass Boulevard/Sojourner Truth Court	**A**	**4.6**	**-**	**-**	**-**
Sojourner Truth Court NB left/right	D	38.5	0.39	13	50
Melnea Cass Boulevard WB left/thru|thru	A	4.3	0.58	86	m202
Melnea Cass Boulevard EB thru|thru/right	A	3.7	0.41	56	236

dl = Defacto Left-Turn Lane.
~ = 50th percentile volume exceeds capacity. Queue shown is the maximum after 2 cycles
# = 95th percentile volume exceeds capacity. Queue shown is the maximum after 2 cycles.

Table 7.6 No-Build Conditions (2019) Level of Service Summary, p.m. Peak Hour

Intersection/Approach	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Melnea Cass Boulevard/Tremont Street	**D**	**49.1**	**-**	**-**	**-**
Tremont Street NB left/thru|thru	D	42.7	0.93	338	#459
Tremont Street NB right	A	9.2	0.71	280	767
Tremont Street SB left/thru|thru/right	D	52.2	0.82	274	357
Melnea Cass Boulevard WB left	F	>80.0	>1.00	~502	#739
Melnea Cass Boulevard WB left/thru|thru/right	D	54.6	>1.00dl	293	374
Melnea Cass Boulevard EB left/thru|thru/right	E	70.1	0.98	132	#251
Melnea Cass Boulevard/Shawmut Avenue	**C**	**33.5**	**-**	**-**	**-**
Shawmut Avenue SB left/thru|thru/right	E	57.7	0.82	207	263
Melnea Cass Boulevard WB left/thru|thru	D	43.0	0.99	195	#345
Melnea Cass Boulevard EB thru|thru/right	B	14.6	0.68	343	137
Melnea Cass Boulevard/Sojourner Truth Court	**A**	**5.9**	**-**	**-**	**-**
Sojourner Truth Court NB left/right	D	36.5	0.58	24	43
Melnea Cass Boulevard WB left/thru|thru	A	4.5	0.45	50	m161
Melnea Cass Boulevard EB thru|thru/right	A	4.9	0.48	74	308

dl = Defacto Left-Turn Lane.
~ = 50th percentile volume exceeds capacity. Queue shown is the maximum after 2 cycles
# = 95th percentile volume exceeds capacity. Queue shown is the maximum after 2 cycles.
Grey shading indicates a decrease to LOS E or LOS F when compared to the Existing conditions analysis.

The intersection of **Melnea Cass Boulevard/Tremont Street** continues to operate at LOS D during both the a.m. and p.m. peak hours in the No-Build scenario. The longest queues at the intersection continue to occur along the Melnea Cass Boulevard westbound left turn lane during both the a.m. and p.m. peak hours.

The intersection of **Melnea Cass Boulevard/Shawmut Avenue** decreases from LOS B to LOS C during the a.m. peak hour and continues to operate at LOS C during the p.m. peak hour in the No-Build scenario. The longest queues at the intersection continue to occur on the Melnea Cass Boulevard westbound approach both the a.m. and the p.m. peak hours.

The intersection of **Melnea Cass Boulevard/Sojourner Truth Court** continues to operate at LOS A during both the a.m. and p.m. peak hours in the No-Build scenario. The longest average queues at the intersection continue to occur along the Melnea Cass Boulevard eastbound approach during both the a.m. and the p.m. peak hours.

7.3.2 Build Conditions

As previously summarized, the Madison Park Apartments will consist of approximately 76 residential units to be located in two new buildings located off Melnea Cass Boulevard. Site 2A

is located at 40 Raynor Circle and will consist of 16 residential units with 8 off-street parking spaces. Site 2B is located along Brooke Marshall Road and will consist of 60 residential units.

Site Access and Circulation

Vehicular access/egress to Site 2A will be provided by a full access driveway along Raynor Circle. The driveway will be located at a new curb cut approximately 100 feet south of St. Francis Desales Court and will serve the 8-vehicle parking lot.

The development of Site 2B will include the discontinuance of the portion of Brooke Marshall Road that runs in the east-west direction, parallel to Melnea Cass Boulevard. This discontinuance will create the need for a new connection between Sojourner Truth Court and Brooke Marshall Road. A new two-way roadway will be constructed in the southern portion of Site 2B that will allow this access to be maintained. A total of 29 parking spaces will also be created along the new Private street open to the public, which will be designated to Building 2B. The majority of the trips traveling to/from the Project site are expected to use the intersection of Melnea Cass Boulevard/Sojourner Truth Court. A smaller portion of the trips will travel to/from the Project site by using the intersections of Tremont Street/Whittier Street and Tremont Street/Ruggles Street. The site access plan is illustrated in **Figure 7.13**.

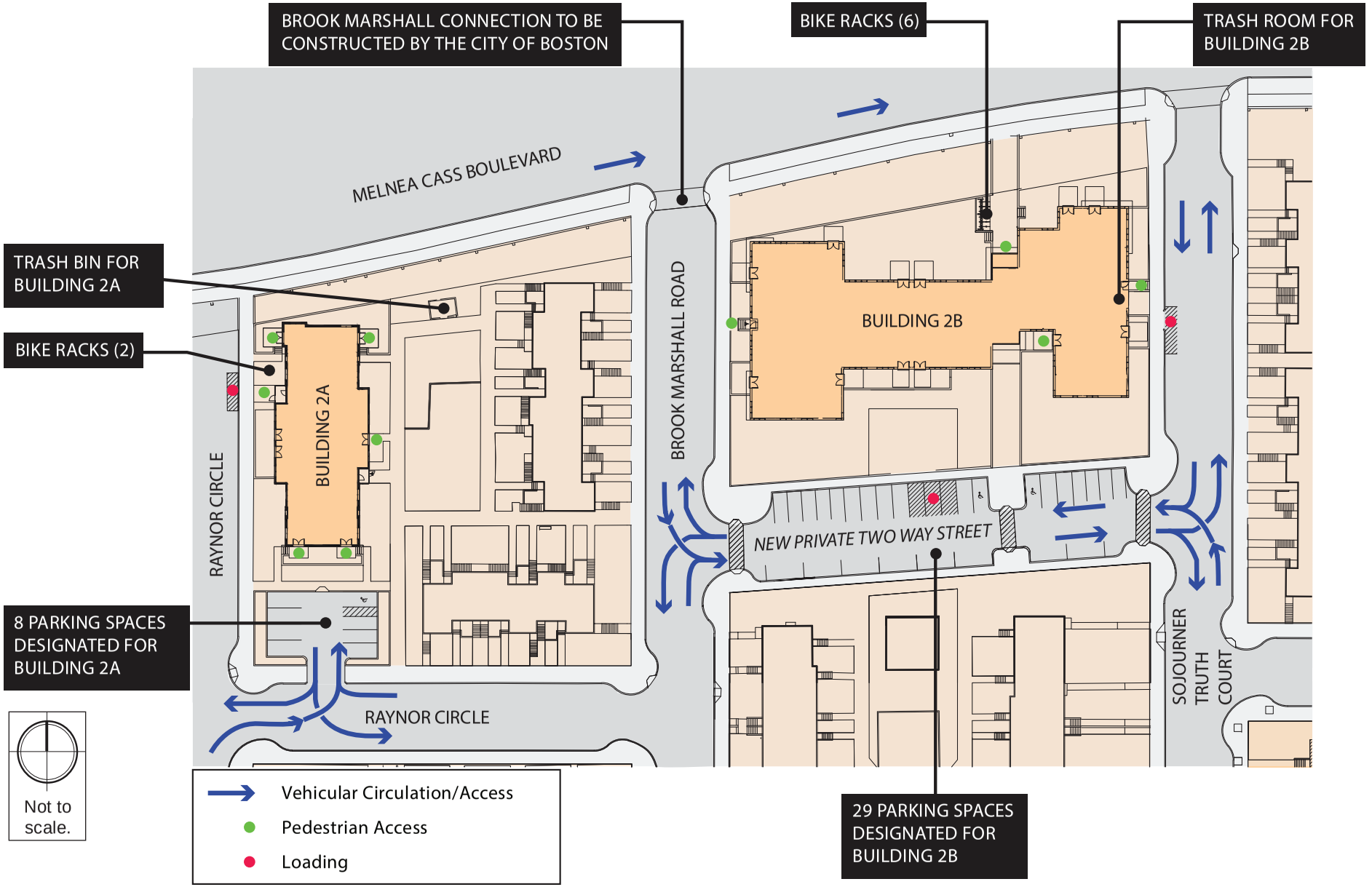


Figure 7.13
Site Access Plan

Trip Generation

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

To estimate the number of trips expected to be generated by the Project, data published by the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual*[5] were used. ITE provides data to estimate the total number of unadjusted vehicular trips associated with the Project. In an urban setting well served by transit, adjustments are necessary to account for other travel mode shares such as walking, bicycling, and transit.

Trip generation estimates for the Project were derived using the following Land Use Codes (LUC):

LUC 220 – Apartment. The apartment land use can be a rental dwelling unit located within the same building with at least three other dwelling units. Trip generation estimates are based on average vehicle trip rates per unit.

Mode Split

The BTD publishes vehicle, transit, and walking mode split rates for different areas of Boston. The Project is located within designated Area 15. The unadjusted vehicular trips were converted to person trips by using vehicle occupancy rates published by the Federal Highway Administration (FHWA)[6]. The BTD's travel mode share data for Area 15 are shown in **Table 7.7**.

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

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

Table 7.7 Peak Hour Mode Split Assumptions

Land Use	Direction	Walk/Bike Share[1]	Transit Share[1]	Auto Share[1]	Local Vehicle Occupancy Rate[2]
Daily					
Residential	In	26%	17%	57%	1.13
	Out	26%	17%	57%	1.13
a.m. Peak Hour					
Residential	In	27%	19%	54%	1.13
	Out	27%	29%	44%	1.13
p.m. Peak Hour					
Residential	In	27%	29%	44%	1.13
	Out	27%	19%	54%	1.13

1. Boston Transportation Department mode share data for Area 15 for the residential and retail use.
2. 2009 National Household Travel Survey.

Vehicle Trip Generation

The trip generation process described above yields the adjusted vehicle trips associated with the Project. The Project-generated new vehicle trips are summarized in **Table 7.8**, with detailed trip generation information provided in **Appendix B.**

Table 7.8 Project Vehicle Trip Generation

Time Period	Direction	Apartments[1]
Daily	In	144
	Out	144
	Total	288
a.m. Peak Hour	In	4
	Out	13
	Total	17
p.m. Peak Hour	In	13
	Out	9
	Total	22

1. Based on ITE LUC 220 – Apartment.

As shown in **Table 7.8**, the Project is expected to generate approximately 288 new daily vehicle trips (144 trips in and 144 trips out), with 17 new vehicle trips during the a.m. peak hour (4 in and 13 out) and 22 new vehicle trips during the p.m. peak hour (13 in and 9 out). This corresponds to an increase of approximately one vehicle trip every three minutes on the adjacent roadway network during the peak periods.

Trip Distribution

The trip distribution identifies the various travel paths for vehicles traveling to and from the Project Site. Trip distribution patterns for the Project were based on BTD's origin-destination data for Area 15. The trip distribution patterns were refined based on existing traffic patterns and review of the adjacent roadway network. The trip distribution pattern for the Project is illustrated in **Figure 7.14**.

The Project-generated vehicle trips were assigned to the study area roadway network based on the trip distribution patterns shown in **Figure 7.14** and are shown in **Figure 7.15** and **Figure 7.16** for the a.m. and p.m. peak hours, respectively. The Project-generated trips were added to the 2019 No-Build conditions traffic volumes to develop the 2019 Build conditions peak hour traffic volume networks and are shown in **Figure 7.17** and **Figure 7.18** for the a.m. and p.m. peak hours, respectively.

Figure 7.14
Trip Distribution

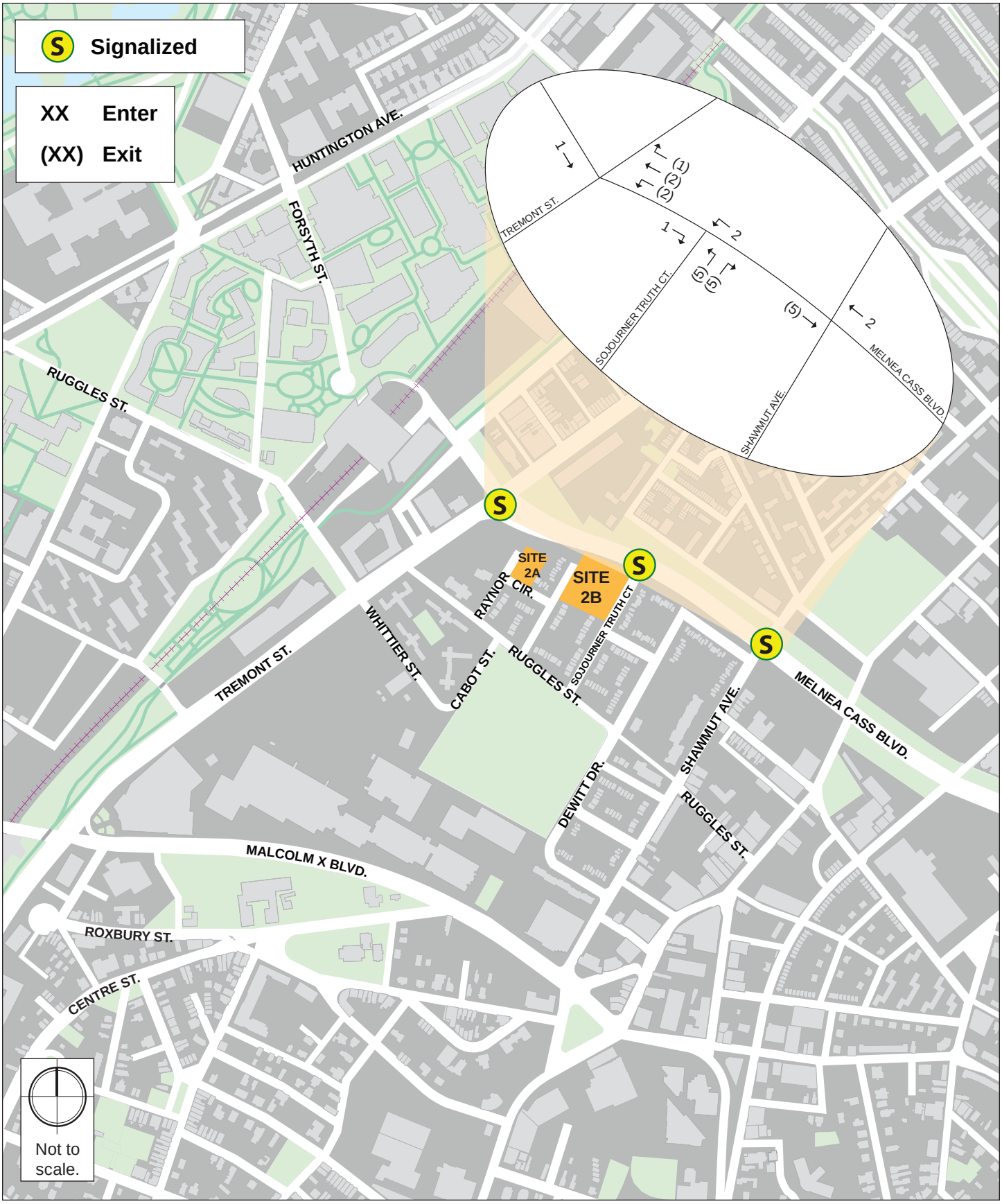


Figure 7.15

Project-generated Trips, a.m. Peak Hour

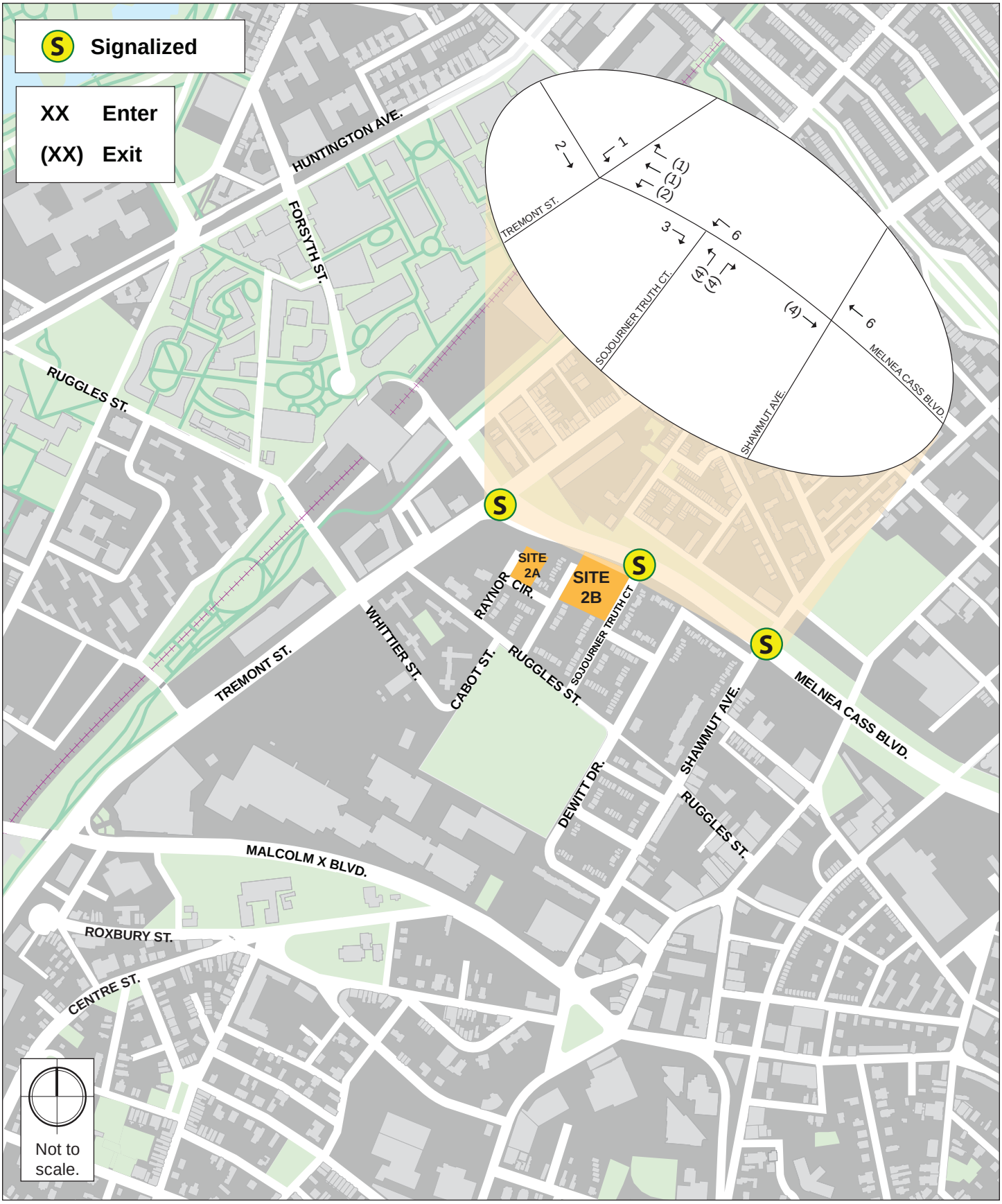


Figure 7.16

Project-generated Trips, p.m. Peak Hour

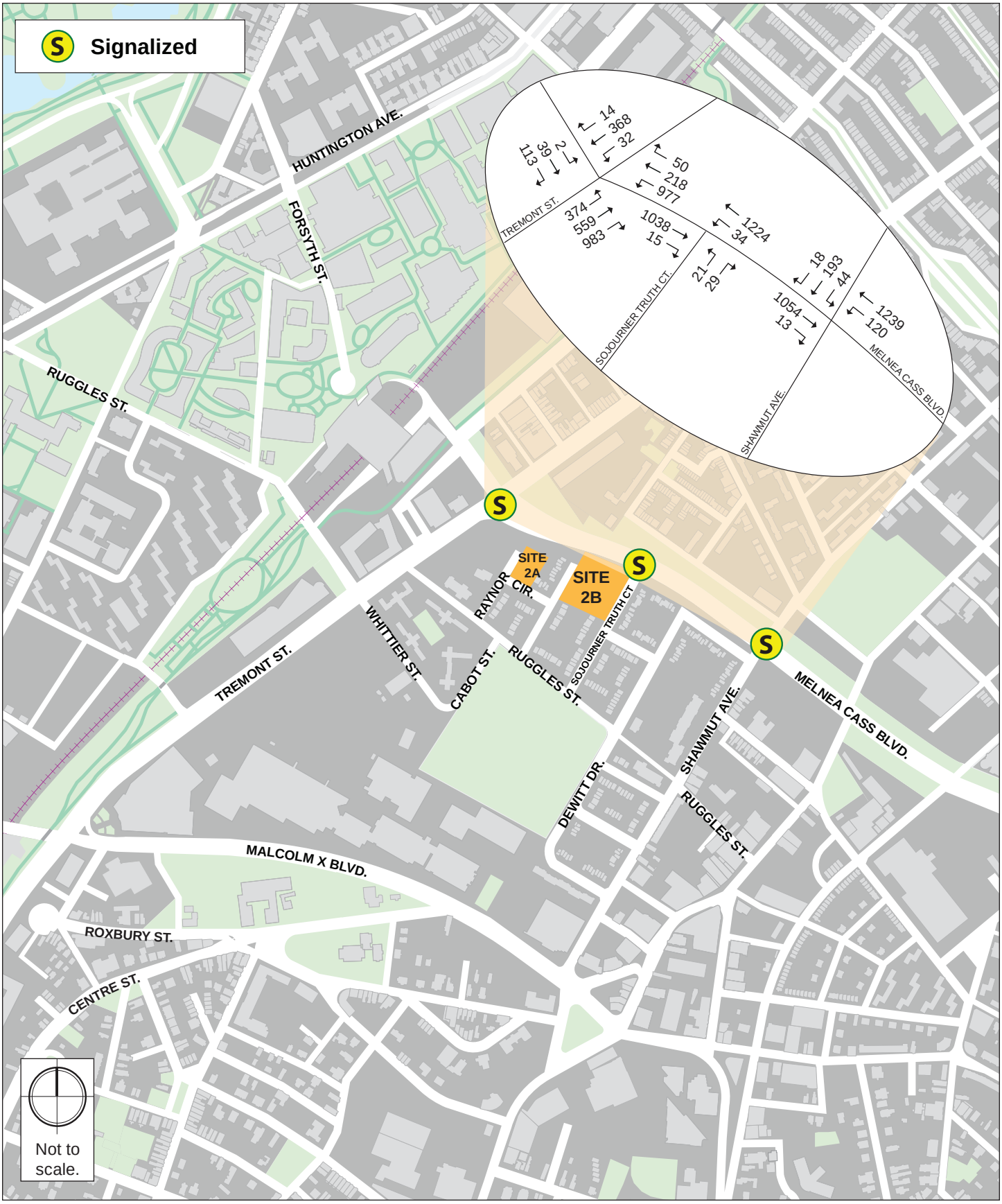


Figure 7.17

Build Conditions (2019) Turning Movement Volumes, a.m. Peak Hour

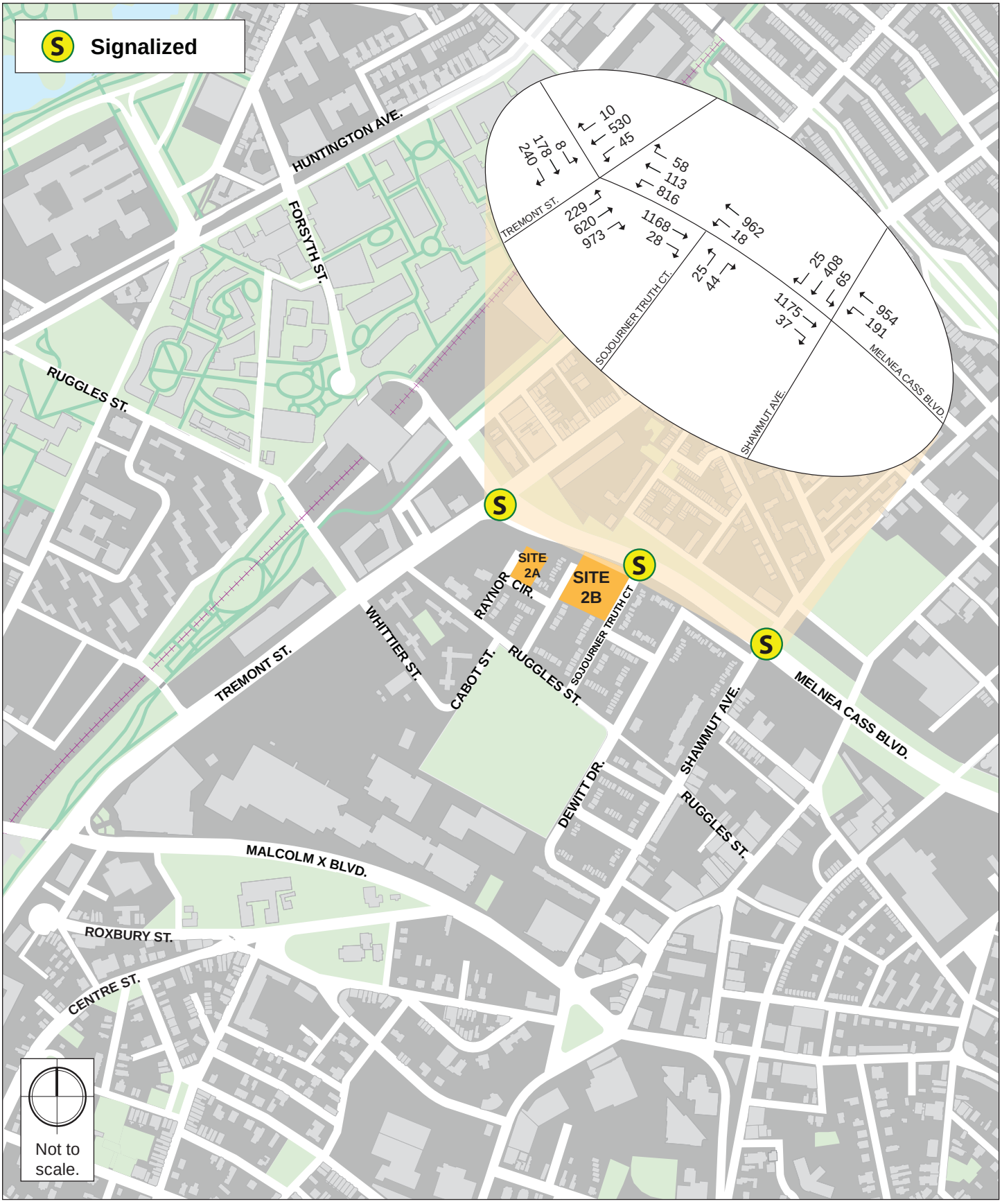


Figure 7.18

Build Conditions (2019) Turning Movement Volumes, p.m. Peak Hour

Build Conditions Traffic Operations

The 2019 Build conditions scenario analyses uses the same methodology as the 2014 Existing and 2019 No-Build conditions scenario analyses. The results of the 2019 Build conditions traffic analysis at study area intersections are presented in **Table 7.9** and **Table 7.10** for the a.m. and p.m. peak hours, respectively. The detailed analysis sheets are provided in the **Appendix B**.

Table 7.9 Build Conditions (2019) Level of Service Summary, a.m. Peak Hour

Intersection Approach	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Melnea Cass Boulevard/Tremont Street	**D**	**52.4**	**-**	**-**	**-**
Tremont Street NB left/thru|thru	C	22.5	0.79	302	410
Tremont Street NB right	A	9.9	0.73	250	613
Tremont Street SB left/thru|thru/right	D	49.8	0.69	194	#311
Melnea Cass Boulevard WB left	F	>80.0	>1.00	~626	#871
Melnea Cass Boulevard WB left/thru|thru/right	E	74.8	>1.00dl	387	#530
Melnea Cass Boulevard EB left/thru|thru/right	C	29.8	0.64	21	56
Melnea Cass Boulevard/Shawmut Avenue	**C**	**21.8**	**-**	**-**	**-**
Shawmut Avenue SB left/thru|thru/right	E	58.7	0.74	132	143
Melnea Cass Boulevard WB left/thru|thru	C	24.8	0.94	193	#397
Melnea Cass Boulevard EB thru|thru/right	A	7.4	0.53	208	74
Melnea Cass Boulevard/Sojourner Truth Court	**A**	**5.0**	**-**	**-**	**-**
Sojourner Truth Court NB left/right	D	39.6	0.45	18	59
Melnea Cass Boulevard WB left/thru|thru	A	4.5	0.58	91	m203
Melnea Cass Boulevard EB thru|thru/right	A	3.9	0.41	58	244

dl = Defacto Left-Turn Lane.
~ = 50th percentile volume exceeds capacity. Queue shown is the maximum after 2 cycles
# = 95th percentile volume exceeds capacity. Queue shown is the maximum after 2 cycles.

Table 7.10 Build Conditions (2019) Level of Service Summary, p.m. Peak Hour

Intersection Approach	LOS	Delay (seconds)	V/C Ratio	50th Percentile Queue (ft)	95th Percentile Queue (ft)
Melnea Cass Boulevard/Tremont Street	**D**	**49.7**	**-**	**-**	**-**
Tremont Street NB left/thru|thru	D	42.7	0.93	338	#460
Tremont Street NB right	A	9.2	0.71	280	767
Tremont Street SB left/thru|thru/right	D	52.7	0.83	275	358
Melnea Cass Boulevard WB left	F	>80.0	>1.00	~504	#743
Melnea Cass Boulevard WB left/thru|thru/right	D	54.8	>1.00dl	295	375
Melnea Cass Boulevard EB left/thru|thru/right	E	74.0	0.99	135	#256
Melnea Cass Boulevard/Shawmut Avenue	**C**	**34.2**	**-**	**-**	**-**
Shawmut Avenue SB left/thru|thru/right	E	57.7	0.82	207	263
Melnea Cass Boulevard WB left/thru|thru	D	45.1	1.00	~201	#355
Melnea Cass Boulevard EB thru|thru/right	B	14.5	0.69	347	140
Melnea Cass Boulevard/Sojourner Truth Court	**A**	**6.6**	**-**	**-**	**-**
Sojourner Truth Court NB left/right	D	40.1	0.62	32	50
Melnea Cass Boulevard WB left/thru|thru	A	5.0	0.46	143	m161
Melnea Cass Boulevard EB thru|thru/right	A	5.2	0.48	81	321

dl = Defacto Left-Turn Lane.
~ = 50th percentile volume exceeds capacity. Queue shown is the maximum after 2 cycles
# = 95th percentile volume exceeds capacity. Queue shown is the maximum after 2 cycles.

The intersection of **Melnea Cass Boulevard/Tremont Street** continues to operate at LOS D during both the a.m. and p.m. peak hours in the Build scenario. The longest queues at the intersection continue to occur in the Melnea Cass Boulevard westbound left turn lane in both the a.m. and p.m. peak hours.

The intersection of **Melnea Cass Boulevard/Shawmut Avenue** continues to operate at LOS C during both the a.m. and p.m. peak hours in the Build scenario. The longest queues at the intersection continue to occur on the Melnea Cass Boulevard westbound approach both the a.m. and the p.m. peak hours.

The intersection of **Melnea Cass Boulevard/Kerr Way** continues to operate at LOS A during both the a.m. and p.m. peak hours in the Build scenario. The longest average queues at the intersection continue to occur along the Melnea Cass Boulevard eastbound approach during both the a.m. and the p.m. peak hours.

Based on the results of this analysis, the proposed Project is expected to have minimal impact on the traffic operations throughout the study area.

Parking

The Project will include a total of 8 off-street parking spaces that will serve Site 2A at 40 Raynor Circle. A total of 29 new parking spaces will be provided along the new two-way private street open to the public, which will be located in the southern portion of Site 2B, connecting Sojourner Truth Court and Brooke Marshall Road. These parking spaces will be privately owned and will be designated to Building 2B. The existing parking regulations throughout the adjacent public roadway network will be maintained.

Public Transportation

Based on the transit mode shares presented in **Table 7.7**, the future transit trips associated with the Project were estimated and are summarized in **Table 7.11**.

Table 7.11 Project Transit Trips

Time Period	Direction	Apartments[1]
Daily	In	49
	Out	49
	Total	98
a.m. Peak Hour	In	2
	Out	10
	Total	12
p.m. Peak Hour	In	10
	Out	3
	Total	13

1. Based on ITE LUC 220 – Apartment.

As shown in **Table 7.11**, the Project will generate an estimated 98 new transit trips over the course of an average day. Approximately 12 new transit trips will occur during the a.m. peak hour (2 alighting and 10 boarding), and 13 new trips will occur during the p.m. peak hour (10 alighting and 3 boarding).

Pedestrians

Based on the walk mode shares presented in **Table 7.7**, the future walk trips were estimated and are summarized in **Table 7.12**.

Table 7.12 Project Pedestrian Trips

Time Period	Direction	Apartments[1]
Daily	In	74
	Out	74
	Total	148
a.m. Peak Hour	In	2
	Out	9
	Total	11
p.m. Peak Hour	In	9
	Out	5
	Total	14

1. Based on ITE LUC 220 – Apartment.

Over the course of a day, the Project will generate an estimated 148 new pedestrian trips and an additional 98 new transit trips that will require a walk to or from the Site. This results in an additional 246 new pedestrian trips per day. Approximately 11 new pedestrian trips (with an additional 12 transit trips) will occur during the a.m. peak hour and 14 new pedestrian trips (with an additional 13 transit trips) will occur during the p.m. peak hour.

Bicycle Accommodations

Bicycle storage racks will be provided at each building to accommodate residents and visitors of the Project.

All bicycle racks, signs, and parking areas will conform to BTD guidelines and be located in safe, secure locations. The Proponent will work with BTD to identify the most appropriate quantity and location for bicycle racks on the Project Site as part of the Transportation Access Plan Agreement (TAPA) process.

Loading and Service Accommodations

Loading and deliveries for the Project will occur curbside for both parcels. Designated loading areas are proposed along the west side of Sojourner Truth Court to serve Site 2B and along the east side of St. Francis Desales Court to serve Site 2A. Loading may also occur in the private parking spaces located along the new two-way roadway.

All recycling and trash collection will occur inside the buildings and then wheeled/carried out on the scheduled trash and recycling pick-up days. Most residential deliveries are made in smaller vehicles—cars, vans, or small panel trucks. Building management will coordinate all residential

move-in and move-out activity and schedule this activity during off-peak hours, when possible. Move-in and move-out activity is generally infrequent once the building is fully occupied.

7.4 Transportation Mitigation Measures

While the traffic impacts associated with the new Project generated trips are minimal, the Proponent will continue to work with the City of Boston to create a Project that efficiently serves vehicle trips, improves the pedestrian environment, and encourages transit and bicycle usage. As part of the Project, the Proponent will bring all abutting sidewalks and pedestrian ramps to the City of Boston standards in accordance with the Boston Complete Streets design guidelines. This will include the reconstruction and widening of the sidewalks where possible the installation of new, accessible ramps, improvements to street lighting where necessary, planting of street trees, and providing bicycle storage racks surrounding the site, where appropriate. The Proponent is also committed to the following roadway reconfiguration plans:

- Discontinue the east-west portion of Brooke Marshall Road that runs parallel to Melnea Cass Boulevard to allow for the development of the proposed building. This results in an approximately 140-foot long section of Brooke Marshall Road that will have no outlet. In the event the connection to Melnea Cass Boulevard is not approved and installed by the City of Boston, the design will incorporate a turnaround area for passenger vehicles.

- Construct a new two-way roadway in the southern portion of Site 2A to connect Sojourner Truth Court with Brooke Marshall Road. This connection will allow access to be maintained throughout the neighborhood upon the discontinuance of the portion of Brooke Marshall Road. Approximately 29 parking spaces will also be created along this new street that will be private, but open to the public and will be designated to Site Building 2B's access and parking requirements.

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

The Proponent will also produce a Construction Management Plan (CMP) for review and approval by BTD. The CMP will detail the schedule, staging, parking, delivery, and other associated impacts of the construction of the Project. See **Section 7.6** for additional information related to the CMP.

7.5 Transportation Demand Management

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

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

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

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

- **Orientation Packets:** The Proponent will provide orientation packets to new residents containing information on available transportation choices, including transit routes/schedules and nearby Zipcar locations. On-site management will work with residents and tenants as they move in to help facilitate transportation for new arrivals.

- **Bicycle Accommodation:** The Proponent will provide external bicycle racks located near the building entrances.

- **Transportation Coordinator:** The Proponent will designate a transportation coordinator to oversee transportation issues including parking, service and loading, and deliveries and will work with residents as they move in to raise awareness of public transportation, bicycling, and walking opportunities.

- **Project Web Site:** The web site will include transportation-related information for residents, workers, and visitors.

7.6 Evaluation of Short-Term Construction Impacts

Details of the overall construction schedule, working hours, number of construction workers, worker transportation and parking, number of construction vehicles, and routes will be addressed in detail in a Construction Management Plan (CMP) to be filed with BTD in accordance with the City's transportation maintenance plan requirements. The CMP will also address the need for pedestrian detours, lanes closures, and/or parking restrictions, if necessary, to accommodate a safe and secure work zone.

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

- Construction workers will be encouraged to use public transportation and/or carpool.
- A subsidy for MBTA passes will be considered for full-time employees; and
- Secure spaces will be provided on-site for workers' supplies and tools so they do not have to be brought to the site each day.

8.0 COORDINATION WITH GOVERNMENTAL AGENCIES

8.1 Architectural Access Board Requirements

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

8.2 Massachusetts Environmental Policy Act

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

8.3 Boston Civic Design Commission

The Proposed Project is below the 100,000 gross square feet of proposed floor area threshold requiring review by the Boston Civic Design Commission ("BCDC"), but the BCDC has discretion to decide to review projects below this threshold.

9.0 PROJECT CERTIFICATION

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

Madison Park Development Corporation

Signature of Proponent

Date 6/2/15

Mitchell L. Fischman Consulting LLC

Signature of Preparer

Date 6/2/15

Mitchell L. Fischman, Principal

Appendix A

APPENDIX A – LETTER OF INTENT TO FILE PNF, MARCH 27, 2015

Madison Park Development Corporation

March 27, 2015

Mr. Brian Golden, Director
Boston Redevelopment Authority
One City Hall Plaza, 9th Floor
Boston, MA 02201

Attn: **Mr. Dana Whiteside, Deputy Director**
Mr. Gary Uter, Project Assistant

Re: **Letter of Intent to File Project Notification Form (PNF)**
Madison Park Infill Sites

Dear Director Golden:

Pursuant to the *Executive Order Relative to the Provision of Mitigation by Development Projects in Boston* issued on October 10, 2000, as amended, this letter is to notify the Boston Redevelopment Authority (the "BRA") of Madison Park Development Corporation's (the "Proponent's") intent to file an Expanded Project Notification Form ("PNF") with the BRA pursuant to Article 80B, Large Project Review requirements of the Boston Zoning Code (the "Code"). The proposed development site, as described below, is within Madison Park Village, along Melnea Cass Boulevard in the Roxbury neighborhood, and is in the midst of a very active transportation node that includes major MBTA bus lines, the Ruggles and Dudley Square MBTA stations within ½ mile of the site. Please see **Figure 1. Project Locus.**

Proposed Development

The Proponent proposes demolition of a 1-story building at 40 Raynor Circle and the creation of a residential development consisting of 76 residential (flats and duplex) units on two parcels along Melnea Cass Boulevard at 40 Raynor Circle (Assessors Parcel ID 0902230000) and Brooke Marshall Road (Assessors Parcel ID 0902197000) to be served by 8 off-street surface parking spaces plus additional parking spaces added along a proposed relocated new Brooke Marshall Road public through-street (the "Proposed Project"). As part of this proposal, on-site affordable units will be provided in accordance with the City of Boston's Inclusionary Development Policy (the "IDP").

Project Site

The Project Site, including the above two identified parcels, is comprised of approximately 63,000 square feet ("sf") of land including approximately 18,000 sf at the 40 Raynor Circle parcel and approximately 45,000 sf at the Brooke Marshall Road parcel, which also includes 11,720 sf of a roadway portion of Brooke Marshall Road proposed to be discontinued. A relocated right-of-way is proposed to replace this segment of Brooke Marshall Road. Brooke Marshall Field is currently vacant, as described, and the parcel currently located at 40 Raynor Circle consists of a 1-story building where the Proponent currently runs five-day a week community programs.

Existing townhouses which are a part of Madison Park Village are located between the two parcels of the Proposed Project site as illustrated in **Figure 1- Project Locus**.

Article 80 Compliance

The Proposed Project will exceed the 50,000 square foot total build-out size requirement for a project located in a Boston neighborhood and therefore requires preparation of filing(s) under the Large Project Review regulations, pursuant to Article 80 of the Code. The proposed Expanded PNF filing is expected to address many issues normally presented in a Draft Project Impact Report ("DPIR") including a transportation analysis, urban design and sustainability component, handicap and disability access, and shadow, infrastructure, historic resources, and other environmental evaluations that will help explain potential project impacts from the proposed uses, and any needed mitigation measures to reduce these impacts.

Zoning Code Compliance

The Project Site was the subject of a larger zoning map amendment (Map Amendment No. 597), approved by the Boston Zoning Commission on January 14, 2015, and by the Mayor on January 15, 2015. In accordance with this zoning map amendment, the Project Site has been designated as being within a "U" Urban Renewal Area Overlay District. Based upon the approvals by the BRA, Zoning Commission and the Mayor, the use and dimensional requirements applicable to the Proposed Project are set forth in the South End and Campus High Urban Renewal Plans, which stipulate that the Site may be used for residential use with the dimensional controls applicable to the Proposed Project subject to Authority Approval, and the proposed buildings shall be consistent and compatible with surrounding development respecting material, form and scale, subject to Authority Approval. The Proposed Project is consistent with the dimensional and use restrictions within the applicable Urban Renewal Plans. Therefore, upon the issuance of a design approval certification for the Proposed Project by the Authority, and the Authority's determination of other requirements such as off-street parking and loading which will be reviewed in accordance with the Article 80 process, the Proposed Project will be in compliance with the Zoning Code.

Community Outreach

In support of the required Article 80 Large Project Review process, the Proponent has conducted, and will continue to conduct, extensive community outreach with neighbors and abutters of the Site, including meetings and discussions with the residents of the adjacent Madison Park Village and Whittier Street communities, Roxbury neighborhood residents, the Roxbury Strategic Master Plan Oversight Committee and local elected and appointed officials for the neighborhood. Over the past several months, the Proponent and its team have also met with the BRA project team being coordinated by Dana Whiteside, Deputy Director, and Gary Uter, Project Assistant.

The Proponent request that the BRA, in forming its Impact Advisory Committee (the "IAG") encourage and seek participation from Roxbury residents living less than 0.5 miles from the Proposed Project location, as well as active members of resident committees for communities adjacent to the Proposed Project, to serve as members on such IAG during the Article 80 review process.

Thank you for your time and attention on this Proposed Project, and our team looks forward to working with you towards a successful outcome. Please contact me at your convenience if you have any questions regarding the Proposed Project.

Sincerely,

MADISON PARK DEVELOPMENT CORPORATION

Russell Tanner, Vice President of Real Estate

Attachment: **Figure 1. Project Locus – Madison Park Infill Sites**

cc: City Councilor Tito Jackson
State Senator Sonia Chang-Diaz
State Representative Gloria L. Fox
Kaira Fox, Mayor's Office of Neighborhood Services
Erico Lopez, Boston Redevelopment Authority
Dana Whiteside, Boston Redevelopment Authority
Gary Uter, Project Assistant
Sophia Transtamar, Madison Park Development Corporation
James Greene, Esq., Rubin and Rudman
Mitchell L. Fischman, MLF Consulting LLC
Cory Mian, Preservation of Affordable Housing
Kate Bennett, Boston Housing Authority

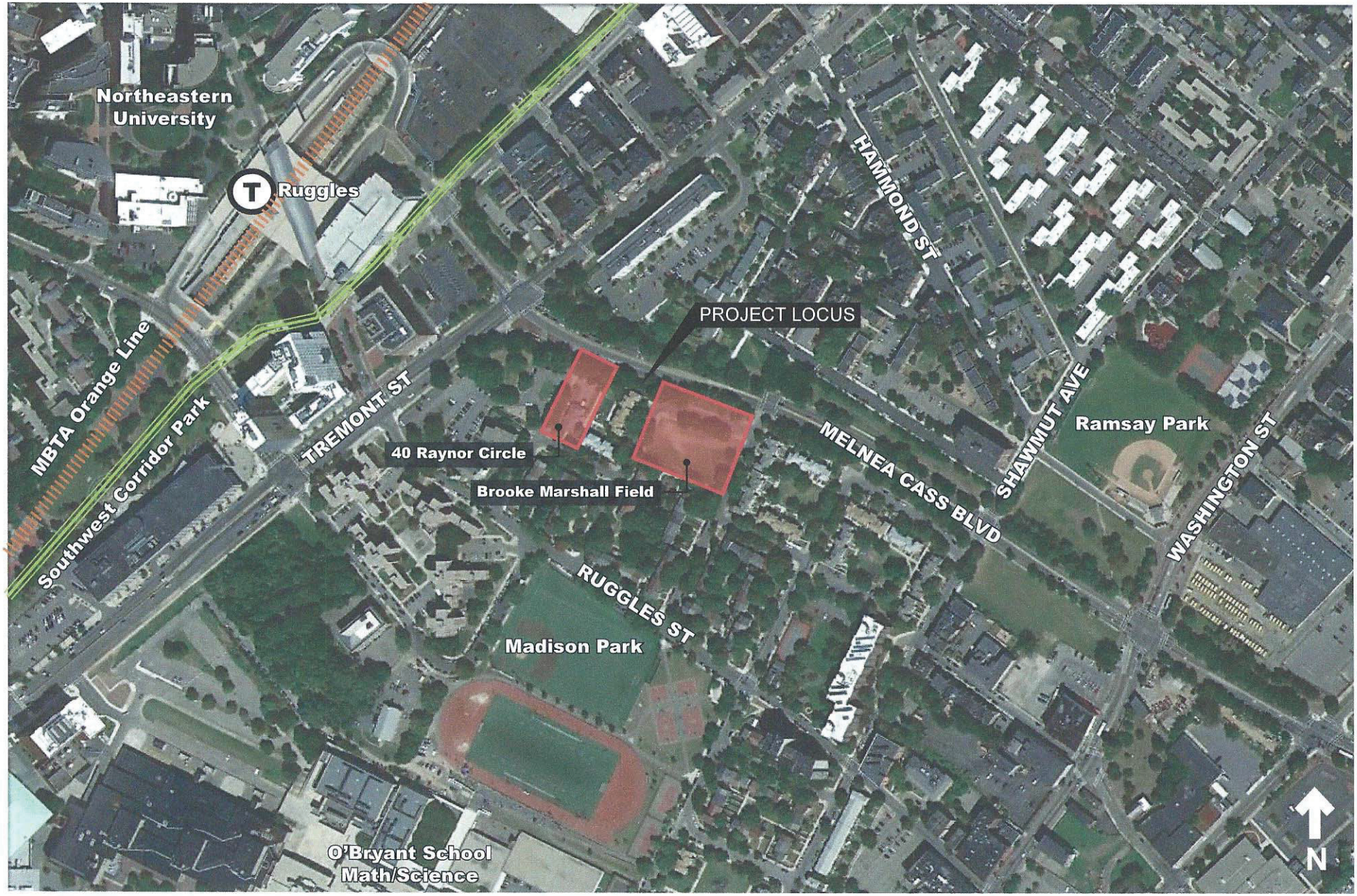


Figure 1
Project Locus

Appendix B

APPENDIX B – TRANSPORTATION APPENDIX

TRANSPORTATION TECHNICAL APPENDIX

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

TRAFFIC COUNTS

Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 1

Groups Printed- Cars - Trucks

	Tremont St From North			Melnea Cass Blvd From East			Tremont St From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	10	83	3	198	28	8	74	106	234	0	16	24	784
07:15 AM	2	85	1	232	50	9	71	117	197	0	16	29	809
07:30 AM	10	91	1	228	55	7	101	115	258	0	7	32	905
07:45 AM	8	86	5	211	51	16	81	126	263	0	13	24	884
Total	30	345	10	869	184	40	327	464	952	0	52	109	3382
08:00 AM	4	70	4	239	49	10	95	135	206	2	10	28	852
08:15 AM	9	67	4	219	53	13	80	138	207	0	8	21	819
08:30 AM	4	65	2	198	55	9	86	128	210	0	6	31	794
08:45 AM	10	77	3	198	42	13	97	163	210	0	7	24	844
Total	27	279	13	854	199	45	358	564	833	2	31	104	3309
Grand Total	57	624	23	1723	383	85	685	1028	1785	2	83	213	6691
Apprch %	8.1	88.6	3.3	78.6	17.5	3.9	19.6	29.4	51	0.7	27.9	71.5	
Total %	0.9	9.3	0.3	25.8	5.7	1.3	10.2	15.4	26.7	0	1.2	3.2	
Cars	55	611	13	1639	349	81	658	1000	1709	2	78	212	6407
% Cars	96.5	97.9	56.5	95.1	91.1	95.3	96.1	97.3	95.7	100	94	99.5	95.8
Trucks	2	13	10	84	34	4	27	28	76	0	5	1	284
% Trucks	3.5	2.1	43.5	4.9	8.9	4.7	3.9	2.7	4.3	0	6	0.5	4.2

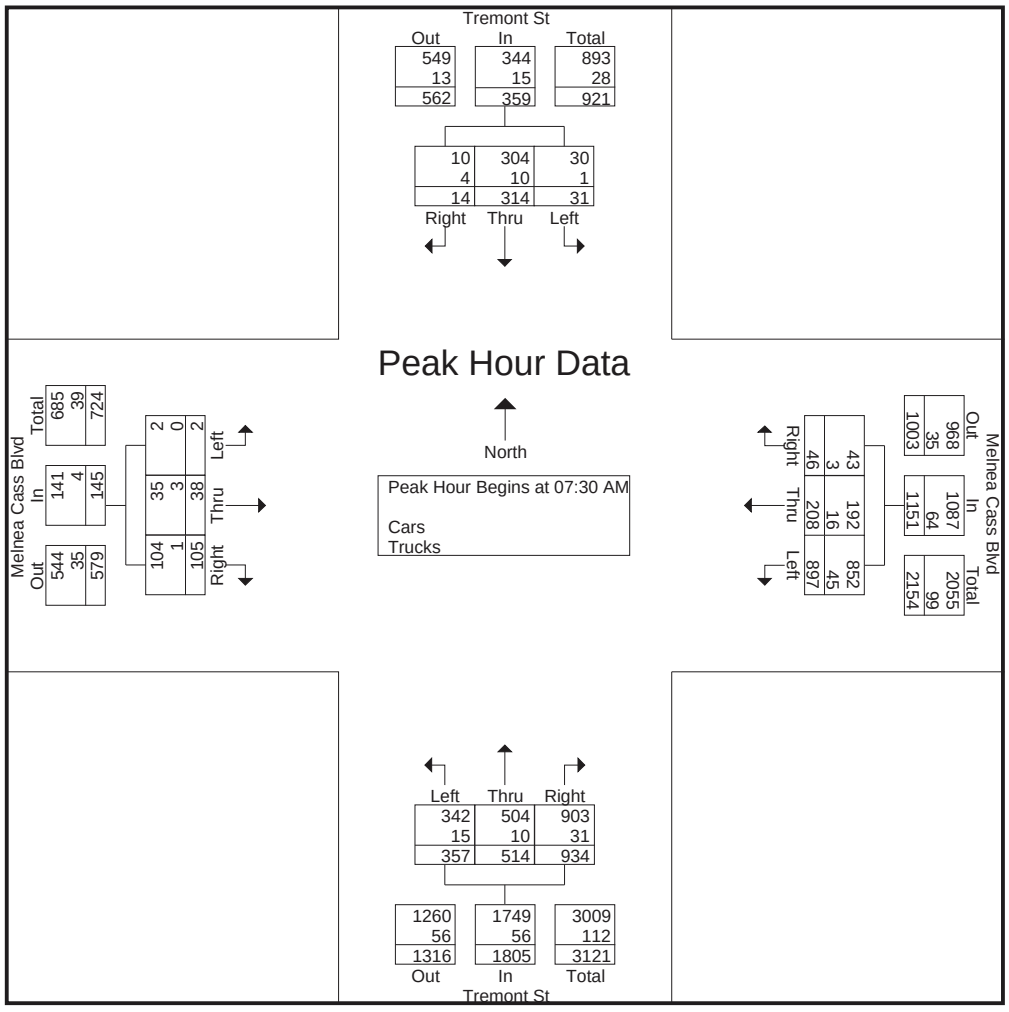
Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 2

	Tremont St From North				Melnea Cass Blvd From East				Tremont St From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	**10**	**91**	1	**102**	228	**55**	7	290	**101**	115	258	**474**	0	7	**32**	39	**905**
07:45 AM	8	86	**5**	99	211	51	**16**	278	81	126	**263**	470	0	**13**	24	37	884
08:00 AM	4	70	4	78	**239**	49	10	**298**	95	135	206	436	**2**	10	28	**40**	852
08:15 AM	9	67	4	80	219	53	13	285	80	**138**	207	425	0	8	21	29	819
Total Volume	31	314	14	359	897	208	46	1151	357	514	934	1805	2	38	105	145	3460
% App. Total	8.6	87.5	3.9		77.9	18.1	4		19.8	28.5	51.7		1.4	26.2	72.4		
PHF	.775	.863	.700	.880	.938	.945	.719	.966	.884	.931	.888	.952	.250	.731	.820	.906	.956
Cars	30	304	10	344	852	192	43	1087	342	504	903	1749	2	35	104	141	3321
% Cars	96.8	96.8	71.4	95.8	95.0	92.3	93.5	94.4	95.8	98.1	96.7	96.9	100	92.1	99.0	97.2	96.0
Trucks	1	10	4	15	45	16	3	64	15	10	31	56	0	3	1	4	139
% Trucks	3.2	3.2	28.6	4.2	5.0	7.7	6.5	5.6	4.2	1.9	3.3	3.1	0	7.9	1.0	2.8	4.0



Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

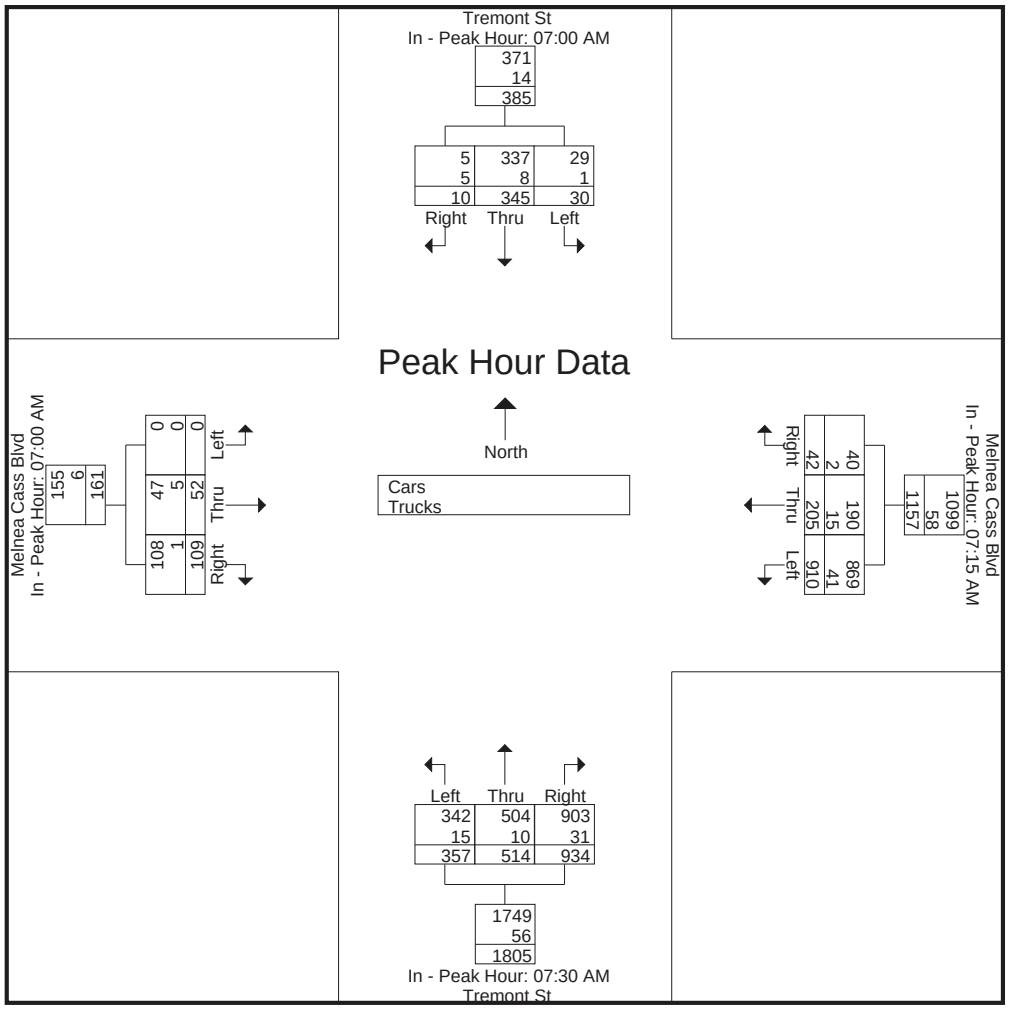
File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 3

	Tremont St From North				Melnea Cass Blvd From East				Tremont St From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:00 AM				07:15 AM				07:30 AM				07:00 AM				
+0 mins.	**10**	83	3	96	232	50	9	291	**101**	115	258	**474**	0	**16**	24	40	
+15 mins.	2	85	1	88	228	**55**	7	290	81	126	**263**	470	0	16	29	**45**	
+30 mins.	10	**91**	1	**102**	211	51	**16**	278	95	135	206	436	0	7	**32**	39	
+45 mins.	8	86	**5**	99	**239**	49	10	**298**	80	**138**	207	425	0	13	24	37	
Total Volume	30	345	10	385	910	205	42	1157	357	514	934	1805	0	52	109	161	
% App. Total	7.8	89.6	2.6		78.7	17.7	3.6		19.8	28.5	51.7		0	32.3	67.7		
PHF	.750	.948	.500	.944	.952	.932	.656	.971	.884	.931	.888	.952	.000	.813	.852	.894	
Cars	29	337	5	371	869	190	40	1099	342	504	903	1749	0	47	108	155	
% Cars	96.7	97.7	50	96.4	95.5	92.7	95.2	95	95.8	98.1	96.7	96.9	0	90.4	99.1	96.3	
Trucks	1	8	5	14	41	15	2	58	15	10	31	56	0	5	1	6	
% Trucks	3.3	2.3	50	3.6	4.5	7.3	4.8	5	4.2	1.9	3.3	3.1	0	9.6	0.9	3.7	



Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 4

Groups Printed- Cars

	Tremont St From North			Melnea Cass Blvd From East			Tremont St From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	10	81	0	182	23	8	68	99	224	0	15	24	734
07:15 AM	2	84	0	225	46	9	68	114	190	0	15	29	782
07:30 AM	10	87	1	211	52	6	99	113	251	0	6	32	868
07:45 AM	7	85	4	203	45	15	80	124	251	0	11	23	848
Total	29	337	5	821	166	38	315	450	916	0	47	108	3232
08:00 AM	4	69	1	230	47	10	88	132	199	2	10	28	820
08:15 AM	9	63	4	208	48	12	75	135	202	0	8	21	785
08:30 AM	4	65	1	191	53	8	85	125	203	0	6	31	772
08:45 AM	9	77	2	189	35	13	95	158	189	0	7	24	798
Total	26	274	8	818	183	43	343	550	793	2	31	104	3175
Grand Total	55	611	13	1639	349	81	658	1000	1709	2	78	212	6407
Apprch %	8.1	90	1.9	79.2	16.9	3.9	19.5	29.7	50.8	0.7	26.7	72.6	
Total %	0.9	9.5	0.2	25.6	5.4	1.3	10.3	15.6	26.7	0	1.2	3.3	

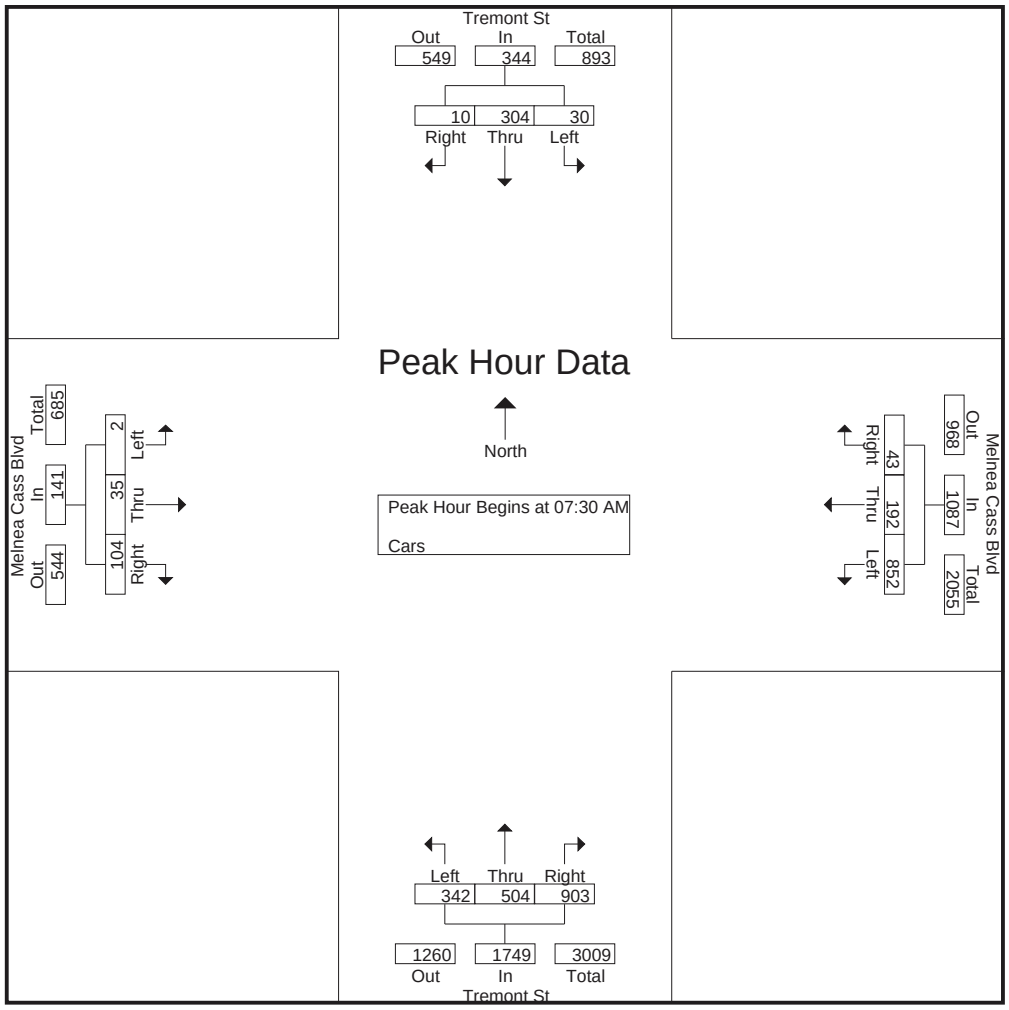
Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 5

	Tremont St From North				Melnea Cass Blvd From East				Tremont St From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	**10**	**87**	1	**98**	211	**52**	6	269	**99**	113	**251**	**463**	0	6	**32**	38	**868**
07:45 AM	7	85	**4**	96	203	45	**15**	263	80	124	251	455	0	**11**	23	34	848
08:00 AM	4	69	1	74	**230**	47	10	**287**	88	132	199	419	**2**	10	28	**40**	820
08:15 AM	9	63	4	76	208	48	12	268	75	**135**	202	412	0	8	21	29	785
Total Volume	30	304	10	344	852	192	43	1087	342	504	903	1749	2	35	104	141	3321
% App. Total	8.7	88.4	2.9		78.4	17.7	4		19.6	28.8	51.6		1.4	24.8	73.8		
PHF	.750	.874	.625	.878	.926	.923	.717	.947	.864	.933	.899	.944	.250	.795	.813	.881	.957



Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

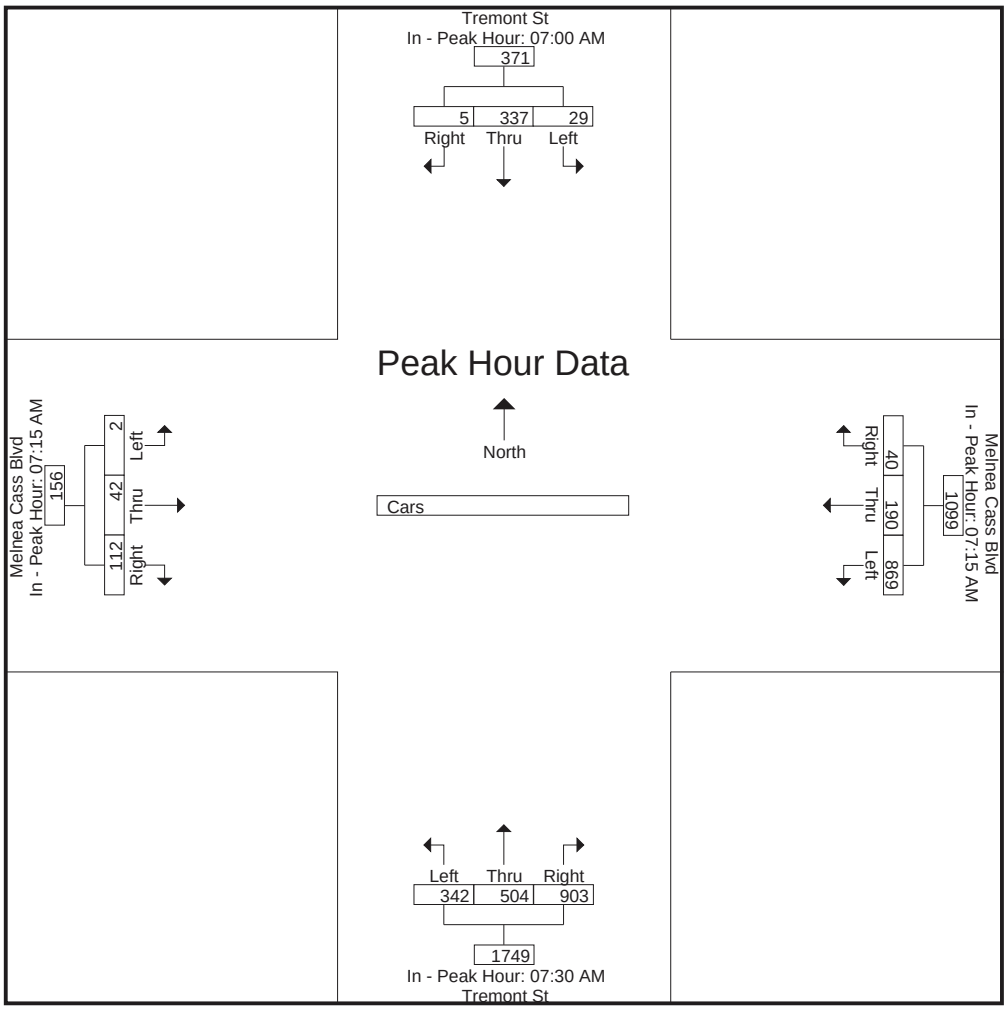
File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 6

	Tremont St From North				Melnea Cass Blvd From East				Tremont St From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:00 AM				07:15 AM				07:30 AM				07:15 AM				
+0 mins.	**10**	81	0	91	225	46	9	280	**99**	113	**251**	**463**	0	**15**	29	**44**	
+15 mins.	2	84	0	86	211	**52**	6	269	80	124	251	455	0	6	**32**	38	
+30 mins.	10	**87**	1	**98**	203	45	**15**	263	88	132	199	419	0	11	23	34	
+45 mins.	7	85	**4**	96	**230**	47	10	**287**	75	**135**	202	412	**2**	10	28	40	
Total Volume	29	337	5	371	869	190	40	1099	342	504	903	1749	2	42	112	156	
% App. Total	7.8	90.8	1.3		79.1	17.3	3.6		19.6	28.8	51.6		1.3	26.9	71.8		
PHF	.725	.968	.313	.946	.945	.913	.667	.957	.864	.933	.899	.944	.250	.700	.875	.886	



Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 7

Groups Printed- Trucks

	Tremont St From North			Melnea Cass Blvd From East			Tremont St From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	0	2	3	16	5	0	6	7	10	0	1	0	50
07:15 AM	0	1	1	7	4	0	3	3	7	0	1	0	27
07:30 AM	0	4	0	17	3	1	2	2	7	0	1	0	37
07:45 AM	1	1	1	8	6	1	1	2	12	0	2	1	36
Total	1	8	5	48	18	2	12	14	36	0	5	1	150
08:00 AM	0	1	3	9	2	0	7	3	7	0	0	0	32
08:15 AM	0	4	0	11	5	1	5	3	5	0	0	0	34
08:30 AM	0	0	1	7	2	1	1	3	7	0	0	0	22
08:45 AM	1	0	1	9	7	0	2	5	21	0	0	0	46
Total	1	5	5	36	16	2	15	14	40	0	0	0	134
Grand Total	2	13	10	84	34	4	27	28	76	0	5	1	284
Apprch %	8	52	40	68.9	27.9	3.3	20.6	21.4	58	0	83.3	16.7	
Total %	0.7	4.6	3.5	29.6	12	1.4	9.5	9.9	26.8	0	1.8	0.4	

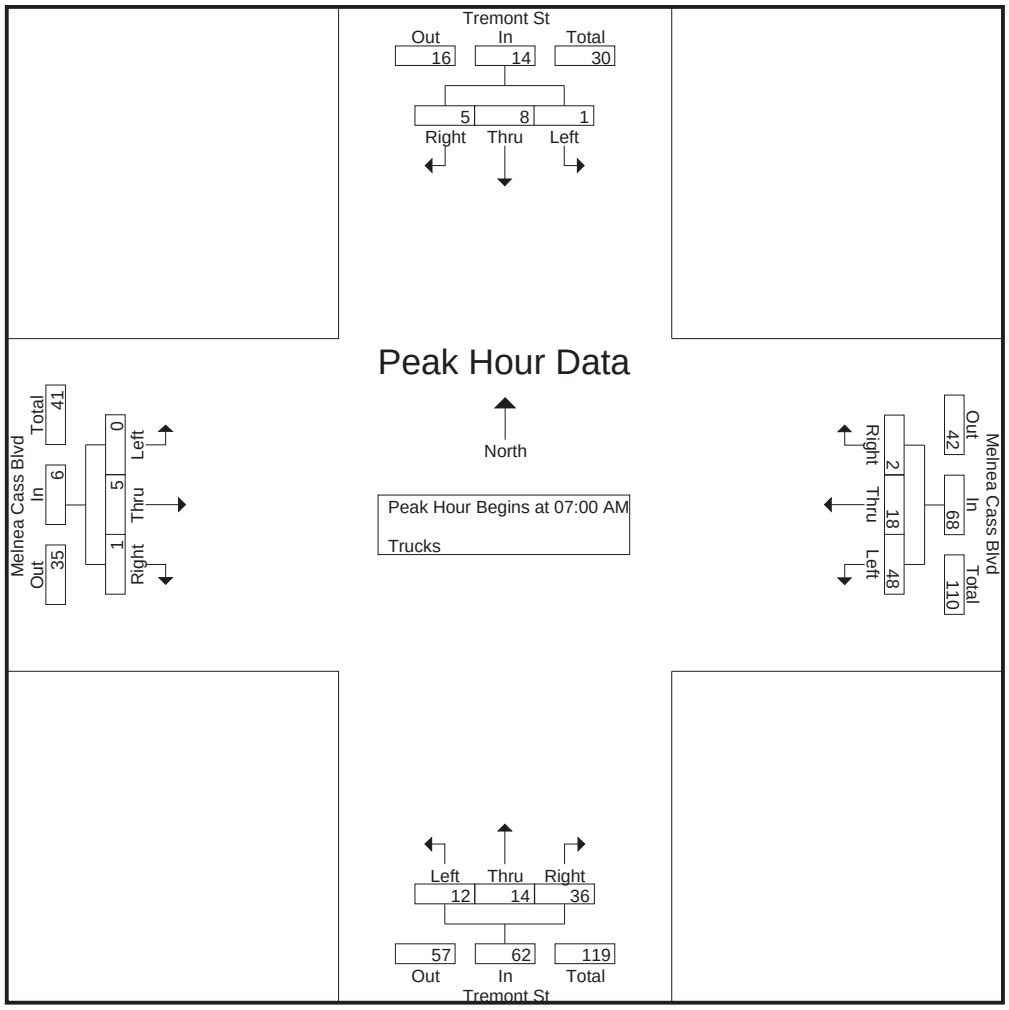
Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 8

	Tremont St From North				Melnea Cass Blvd From East				Tremont St From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	0	2	**3**	**5**	16	5	0	**21**	**6**	**7**	10	**23**	0	1	0	1	**50**
07:15 AM	0	1	1	2	7	4	0	11	3	3	7	13	0	1	0	1	27
07:30 AM	0	**4**	0	4	**17**	3	**1**	21	2	2	7	11	0	1	0	1	37
07:45 AM	**1**	1	1	3	8	**6**	1	15	1	2	**12**	15	0	**2**	**1**	**3**	36
Total Volume	1	8	5	14	48	18	2	68	12	14	36	62	0	5	1	6	150
% App. Total	7.1	57.1	35.7		70.6	26.5	2.9		19.4	22.6	58.1		0	83.3	16.7		
PHF	.250	.500	.417	.700	.706	.750	.500	.810	.500	.500	.750	.674	.000	.625	.250	.500	.750



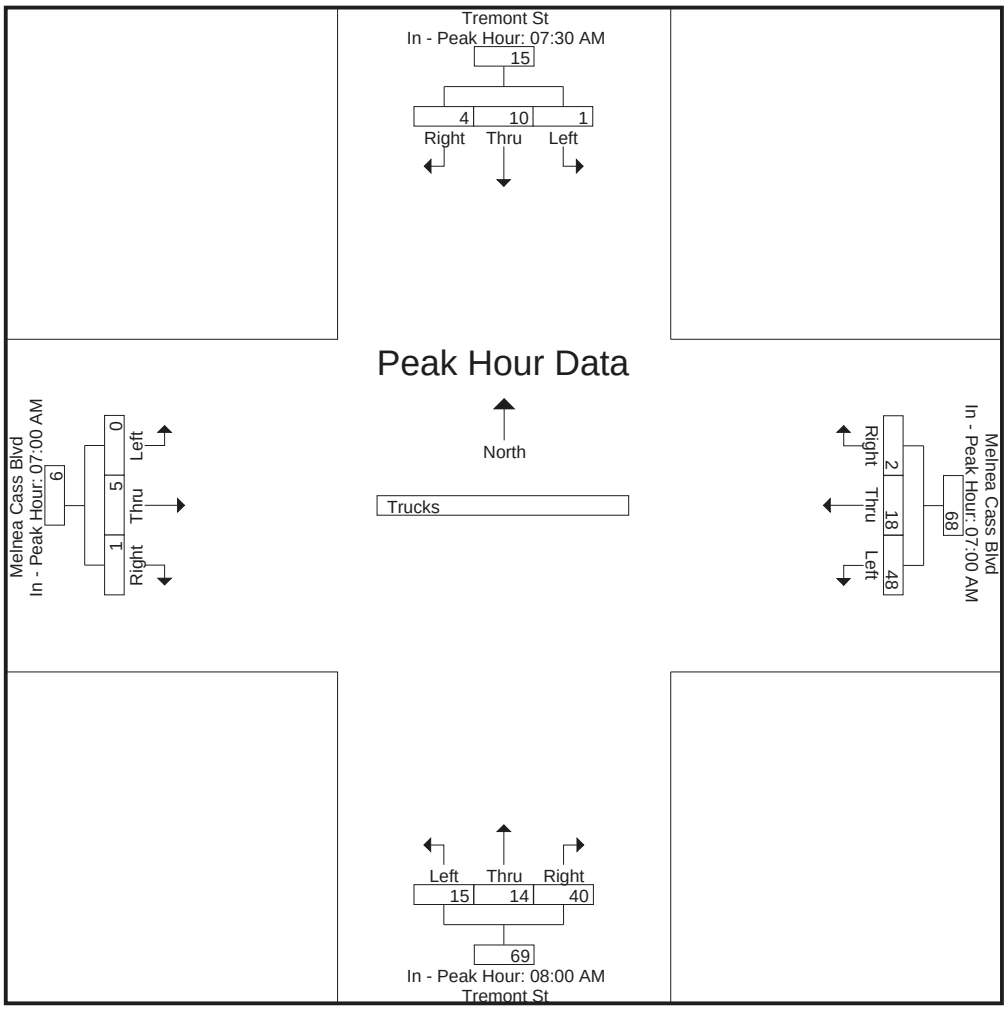
Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 9

	Tremont St From North				Melnea Cass Blvd From East				Tremont St From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:30 AM				07:00 AM				08:00 AM				07:00 AM				
+0 mins.	0	**4**	0	**4**	16	5	0	**21**	**7**	3	7	17	0	1	0	1	
+15 mins.	**1**	1	1	3	7	4	0	11	5	3	5	13	0	1	0	1	
+30 mins.	0	1	**3**	4	**17**	3	**1**	21	1	3	7	11	0	1	0	1	
+45 mins.	0	4	0	4	8	**6**	1	15	2	**5**	**21**	**28**	0	**2**	**1**	**3**	
Total Volume	1	10	4	15	48	18	2	68	15	14	40	69	0	5	1	6	
% App. Total	6.7	66.7	26.7		70.6	26.5	2.9		21.7	20.3	58		0	83.3	16.7		
PHF	.250	.625	.333	.938	.706	.750	.500	.810	.536	.700	.476	.616	.000	.625	.250	.500	



Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014

Groups Printed- Bikes Peds

	Tremont St From North				Melnea Cass Blvd From East				Tremont St From South				Melnea Cass Blvd From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	1	1	6	0	0	0	3	0	0	1	0	0	1	0	1	10	4	14
07:15 AM	0	1	0	7	0	2	0	0	0	1	0	4	1	5	0	6	17	10	27
07:30 AM	0	0	0	9	0	5	0	8	0	1	0	0	1	6	0	8	25	13	38
07:45 AM	0	1	2	5	0	2	0	8	0	1	1	3	3	5	0	5	21	15	36
Total	0	3	3	27	0	9	0	19	0	3	2	7	5	17	0	20	73	42	115
08:00 AM	0	0	0	4	0	4	0	12	0	0	0	1	0	4	0	7	24	8	32
08:15 AM	0	0	0	11	0	1	0	8	0	3	1	5	0	7	0	2	26	12	38
08:30 AM	0	0	0	10	0	1	0	6	1	1	2	3	0	6	0	6	25	11	36
08:45 AM	0	0	0	11	0	2	0	11	1	3	1	0	1	8	0	9	31	16	47
Total	0	0	0	36	0	8	0	37	2	7	4	9	1	25	0	24	106	47	153
Grand Total	0	3	3	63	0	17	0	56	2	10	6	16	6	42	0	44	179	89	268
Apprch %	0	50	50		0	100	0		11.1	55.6	33.3		12.5	87.5	0				
Total %	0	3.4	3.4		0	19.1	0		2.2	11.2	6.7		6.7	47.2	0		66.8	33.2	

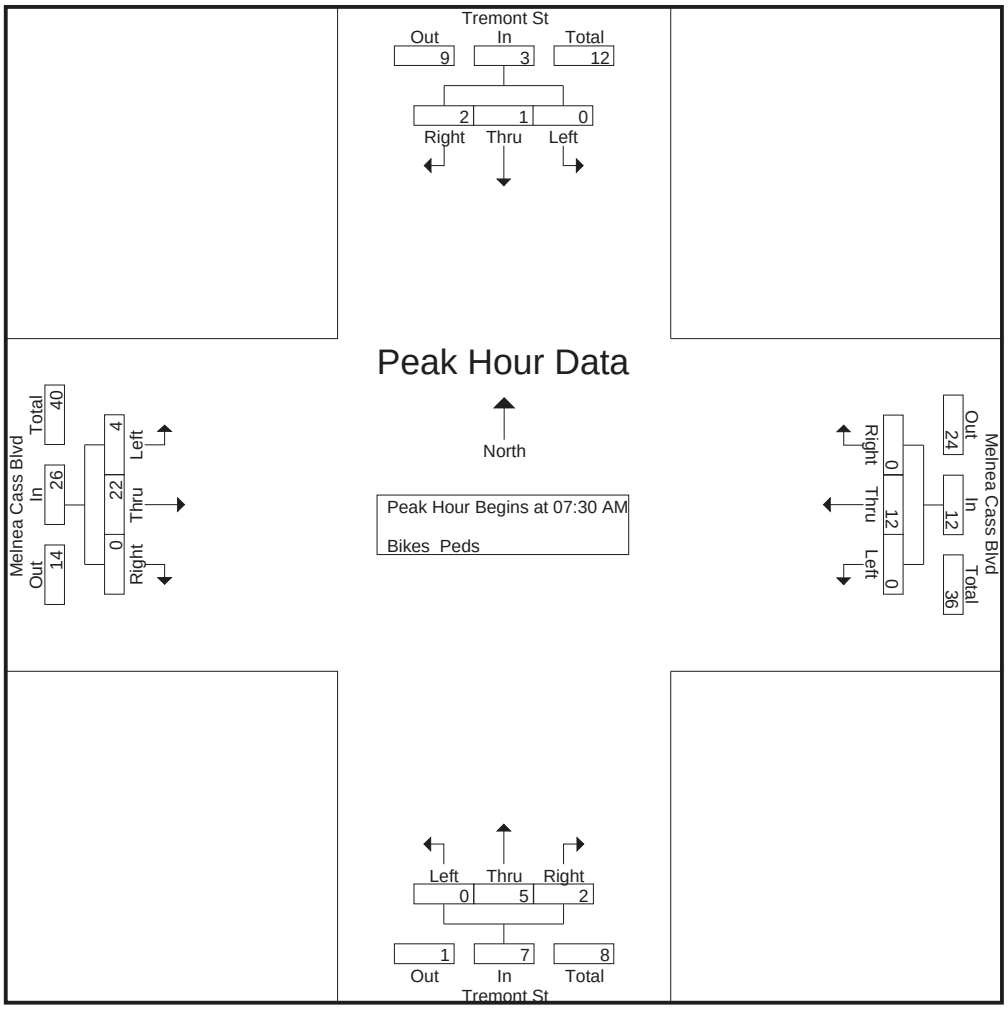
Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 11

	Tremont St From North				Melnea Cass Blvd From East				Tremont St From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	0	0	0	0	0	**5**	0	**5**	0	1	0	1	1	6	0	7	13
07:45 AM	0	**1**	**2**	**3**	0	2	0	2	0	1	**1**	2	**3**	5	0	**8**	**15**
08:00 AM	0	0	0	0	0	4	0	4	0	0	0	0	0	4	0	4	8
08:15 AM	0	0	0	0	0	1	0	1	0	**3**	1	**4**	0	**7**	0	7	12
Total Volume	0	1	2	3	0	12	0	12	0	5	2	7	4	22	0	26	48
% App. Total	0	33.3	66.7		0	100	0		0	71.4	28.6		15.4	84.6	0		
PHF	.000	.250	.250	.250	.000	.600	.000	.600	.000	.417	.500	.438	.333	.786	.000	.813	.800



Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

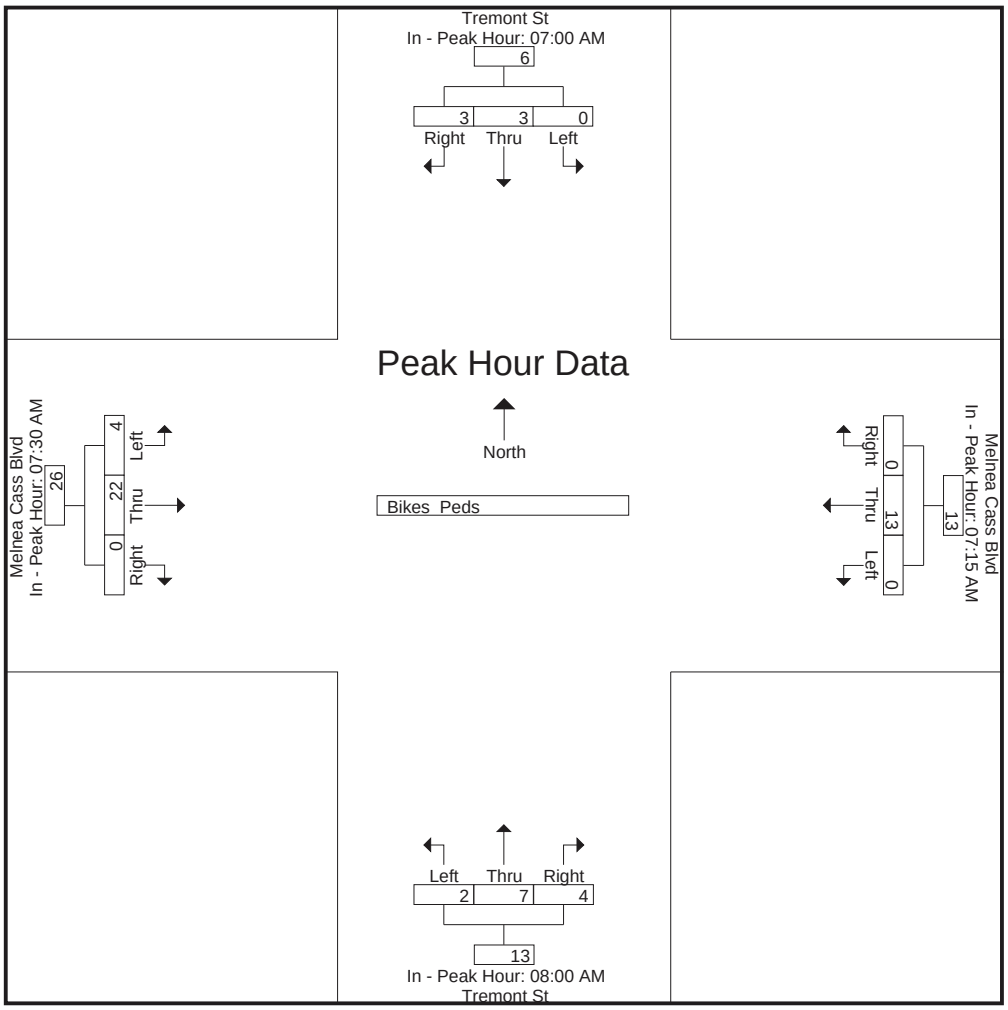
File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 12

	Tremont St From North				Melnea Cass Blvd From East				Tremont St From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:00 AM				07:15 AM				08:00 AM				07:30 AM			
+0 mins.	0	**1**	1	2	0	2	0	2	0	0	0	0	1	6	0	7
+15 mins.	0	1	0	1	0	**5**	0	**5**	0	**3**	1	4	**3**	5	0	**8**
+30 mins.	0	0	0	0	0	2	0	2	**1**	1	**2**	4	0	4	0	4
+45 mins.	0	1	**2**	**3**	0	4	0	4	1	3	1	**5**	0	**7**	0	7
Total Volume	0	3	3	6	0	13	0	13	2	7	4	13	4	22	0	26
% App. Total	0	50	50		0	100	0		15.4	53.8	30.8		15.4	84.6	0	
PHF	.000	.750	.375	.500	.000	.650	.000	.650	.500	.583	.500	.650	.333	.786	.000	.813



Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 1

Groups Printed- Cars - Trucks

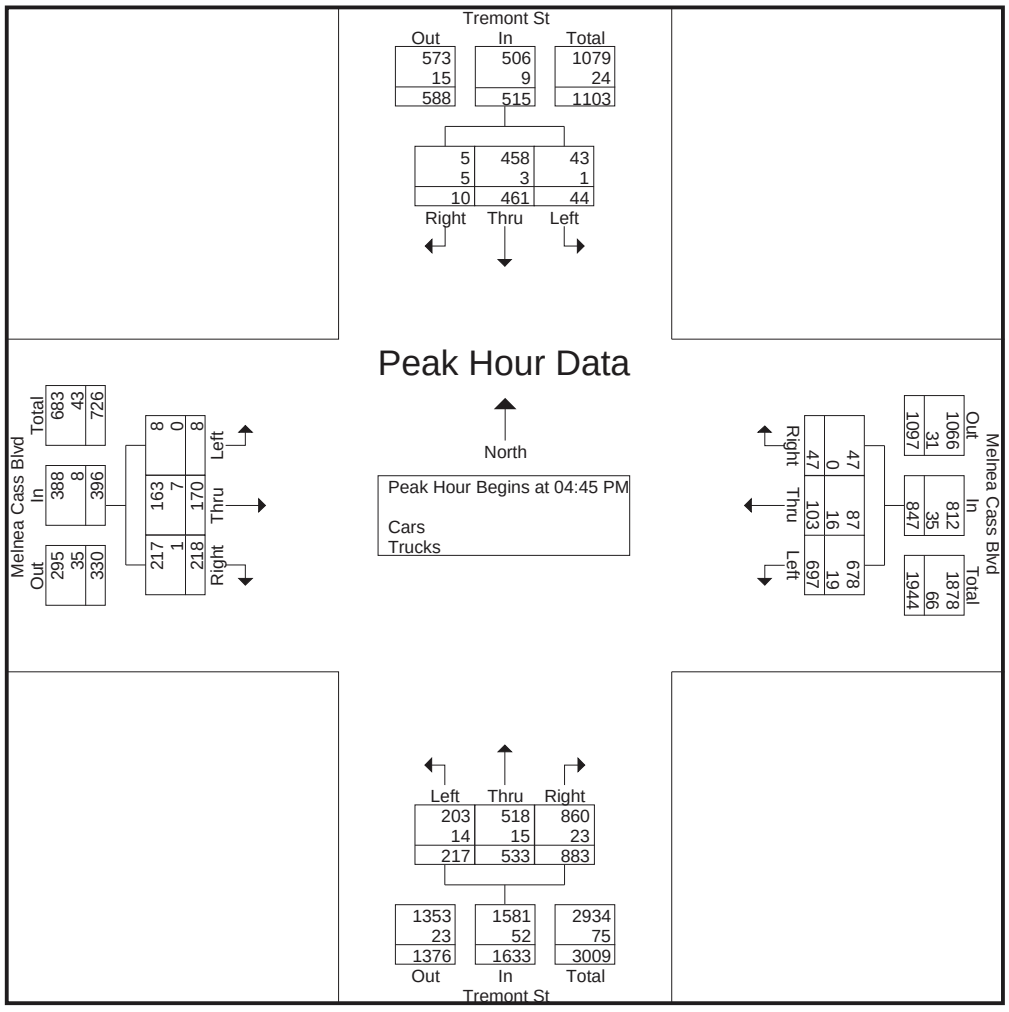
	Tremont St From North			Melnea Cass Blvd From East			Tremont St From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	13	127	0	196	17	13	35	119	208	1	41	56	826
04:15 PM	23	129	5	148	16	10	44	127	206	0	48	57	813
04:30 PM	5	101	2	200	22	15	42	100	213	2	44	50	796
04:45 PM	10	124	5	154	24	9	47	142	228	2	39	65	849
Total	51	481	12	698	79	47	168	488	855	5	172	228	3284
05:00 PM	15	102	1	178	26	15	55	122	202	1	41	60	818
05:15 PM	6	124	3	198	26	10	52	138	229	3	44	52	885
05:30 PM	13	111	1	167	27	13	63	131	224	2	46	41	839
05:45 PM	16	91	5	182	26	5	49	109	214	2	43	64	806
Total	50	428	10	725	105	43	219	500	869	8	174	217	3348
Grand Total	101	909	22	1423	184	90	387	988	1724	13	346	445	6632
Apprch %	9.8	88.1	2.1	83.9	10.8	5.3	12.5	31.9	55.6	1.6	43	55.3	
Total %	1.5	13.7	0.3	21.5	2.8	1.4	5.8	14.9	26	0.2	5.2	6.7	
Cars	99	901	12	1386	151	90	362	962	1673	13	334	443	6426
% Cars	98	99.1	54.5	97.4	82.1	100	93.5	97.4	97	100	96.5	99.6	96.9
Trucks	2	8	10	37	33	0	25	26	51	0	12	2	206
% Trucks	2	0.9	45.5	2.6	17.9	0	6.5	2.6	3	0	3.5	0.4	3.1

Accurate Counts
978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 2

	Tremont St From North				Melnea Cass Blvd From East				Tremont St From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	10	**124**	**5**	**139**	154	24	9	187	47	**142**	228	417	2	39	**65**	**106**	849
05:00 PM	**15**	102	1	118	178	26	**15**	219	55	122	202	379	1	41	60	102	818
05:15 PM	6	124	3	133	**198**	26	10	**234**	52	138	**229**	**419**	**3**	44	52	99	**885**
05:30 PM	13	111	1	125	167	**27**	13	207	**63**	131	224	418	2	**46**	41	89	839
Total Volume	44	461	10	515	697	103	47	847	217	533	883	1633	8	170	218	396	3391
% App. Total	8.5	89.5	1.9		82.3	12.2	5.5		13.3	32.6	54.1		2	42.9	55.1		
PHF	.733	.929	.500	.926	.880	.954	.783	.905	.861	.938	.964	.974	.667	.924	.838	.934	.958
Cars	43	458	5	506	678	87	47	812	203	518	860	1581	8	163	217	388	3287
% Cars	97.7	99.3	50.0	98.3	97.3	84.5	100	95.9	93.5	97.2	97.4	96.8	100	95.9	99.5	98.0	96.9
Trucks	1	3	5	9	19	16	0	35	14	15	23	52	0	7	1	8	104
% Trucks	2.3	0.7	50.0	1.7	2.7	15.5	0	4.1	6.5	2.8	2.6	3.2	0	4.1	0.5	2.0	3.1



Accurate Counts
978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

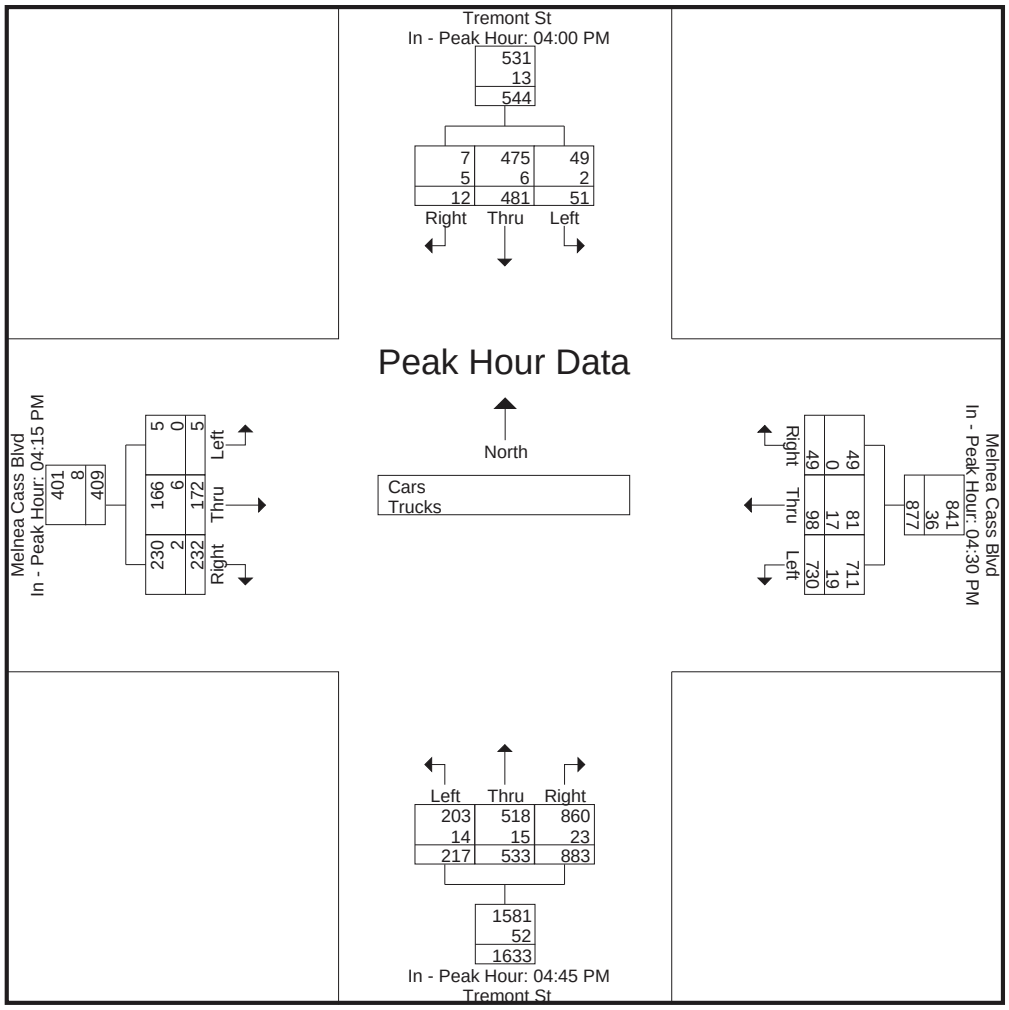
File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014

	Tremont St From North				Melnea Cass Blvd From East				Tremont St From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total

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

Peak Hour for Each Approach Begins at:

	04:00 PM				04:30 PM				04:45 PM				04:15 PM				
+0 mins.	13	127	0	140	**200**	22	**15**	**237**	47	**142**	228	417	0	**48**	57	105	
+15 mins.	**23**	**129**	**5**	**157**	154	24	9	187	55	122	202	379	**2**	44	50	96	
+30 mins.	5	101	2	108	178	**26**	15	219	52	138	**229**	**419**	2	39	**65**	**106**	
+45 mins.	10	124	5	139	198	26	10	234	**63**	131	224	418	1	41	60	102	
Total Volume	51	481	12	544	730	98	49	877	217	533	883	1633	5	172	232	409	
% App. Total	9.4	88.4	2.2		83.2	11.2	5.6		13.3	32.6	54.1		1.2	42.1	56.7		
PHF	.554	.932	.600	.866	.913	.942	.817	.925	.861	.938	.964	.974	.625	.896	.892	.965	
Cars	49	475	7	531	711	81	49	841	203	518	860	1581	5	166	230	401	
% Cars	96.1	98.8	58.3	97.6	97.4	82.7	100	95.9	93.5	97.2	97.4	96.8	100	96.5	99.1	98	
Trucks	2	6	5	13	19	17	0	36	14	15	23	52	0	6	2	8	
% Trucks	3.9	1.2	41.7	2.4	2.6	17.3	0	4.1	6.5	2.8	2.6	3.2	0	3.5	0.9	2	



Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 4

Groups Printed- Cars

	Tremont St From North			Melnea Cass Blvd From East			Tremont St From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	12	124	0	187	12	13	33	115	202	1	40	56	795
04:15 PM	23	129	3	146	11	10	41	122	199	0	46	57	787
04:30 PM	5	100	1	198	17	15	40	99	203	2	42	49	771
04:45 PM	9	122	3	147	20	9	46	135	225	2	37	65	820
Total	49	475	7	678	60	47	160	471	829	5	165	227	3173
05:00 PM	15	102	0	173	19	15	51	118	198	1	41	59	792
05:15 PM	6	123	1	193	25	10	47	137	218	3	41	52	856
05:30 PM	13	111	1	165	23	13	59	128	219	2	44	41	819
05:45 PM	16	90	3	177	24	5	45	108	209	2	43	64	786
Total	50	426	5	708	91	43	202	491	844	8	169	216	3253
Grand Total	99	901	12	1386	151	90	362	962	1673	13	334	443	6426
Apprch %	9.8	89	1.2	85.2	9.3	5.5	12.1	32.1	55.8	1.6	42.3	56.1	
Total %	1.5	14	0.2	21.6	2.3	1.4	5.6	15	26	0.2	5.2	6.9	

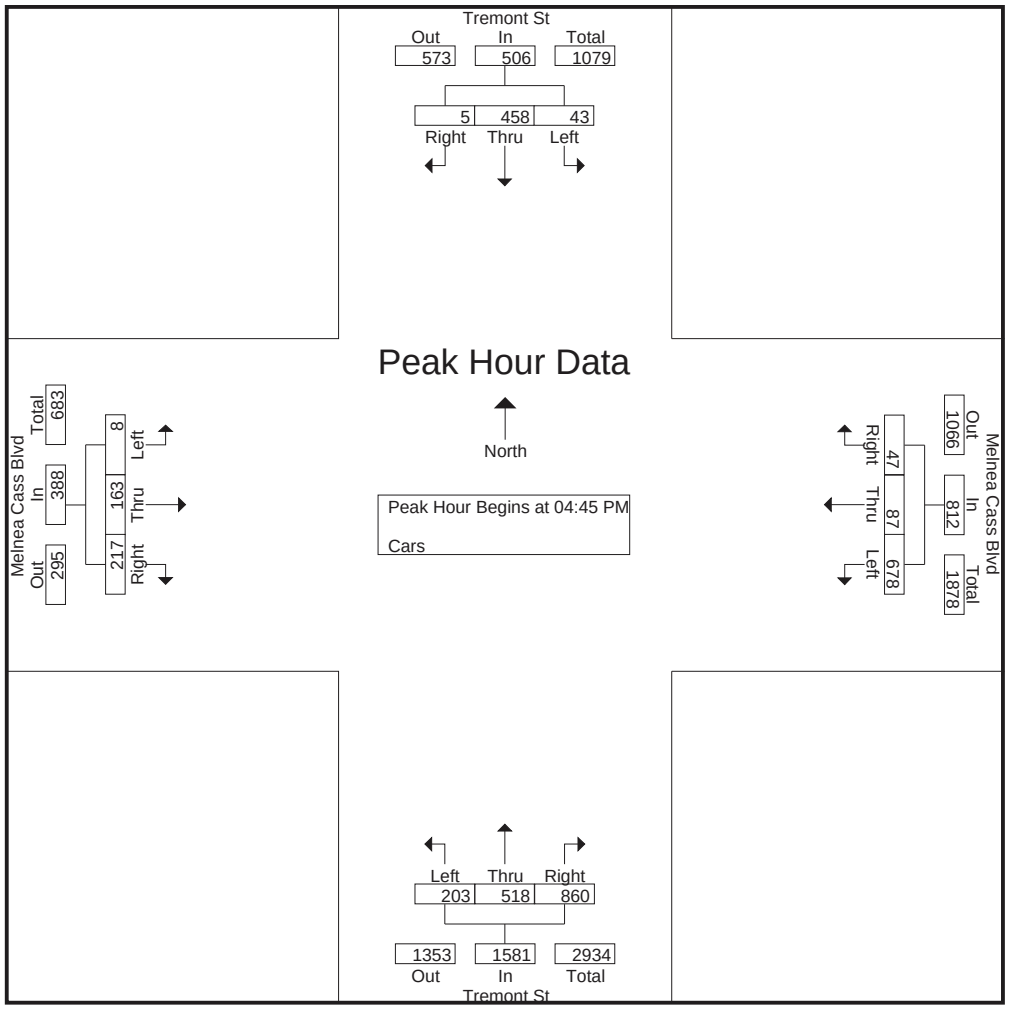
Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 5

	Tremont St From North				Melnea Cass Blvd From East				Tremont St From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	9	122	**3**	**134**	147	20	9	176	46	135	**225**	**406**	2	37	**65**	**104**	820
05:00 PM	**15**	102	0	117	173	19	**15**	207	51	118	198	367	1	41	59	101	792
05:15 PM	6	**123**	1	130	**193**	**25**	10	**228**	47	**137**	218	402	**3**	41	52	96	**856**
05:30 PM	13	111	1	125	165	23	13	201	**59**	128	219	406	2	**44**	41	87	819
Total Volume	43	458	5	506	678	87	47	812	203	518	860	1581	8	163	217	388	3287
% App. Total	8.5	90.5	1		83.5	10.7	5.8		12.8	32.8	54.4		2.1	42	55.9		
PHF	.717	.931	.417	.944	.878	.870	.783	.890	.860	.945	.956	.974	.667	.926	.835	.933	.960



Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

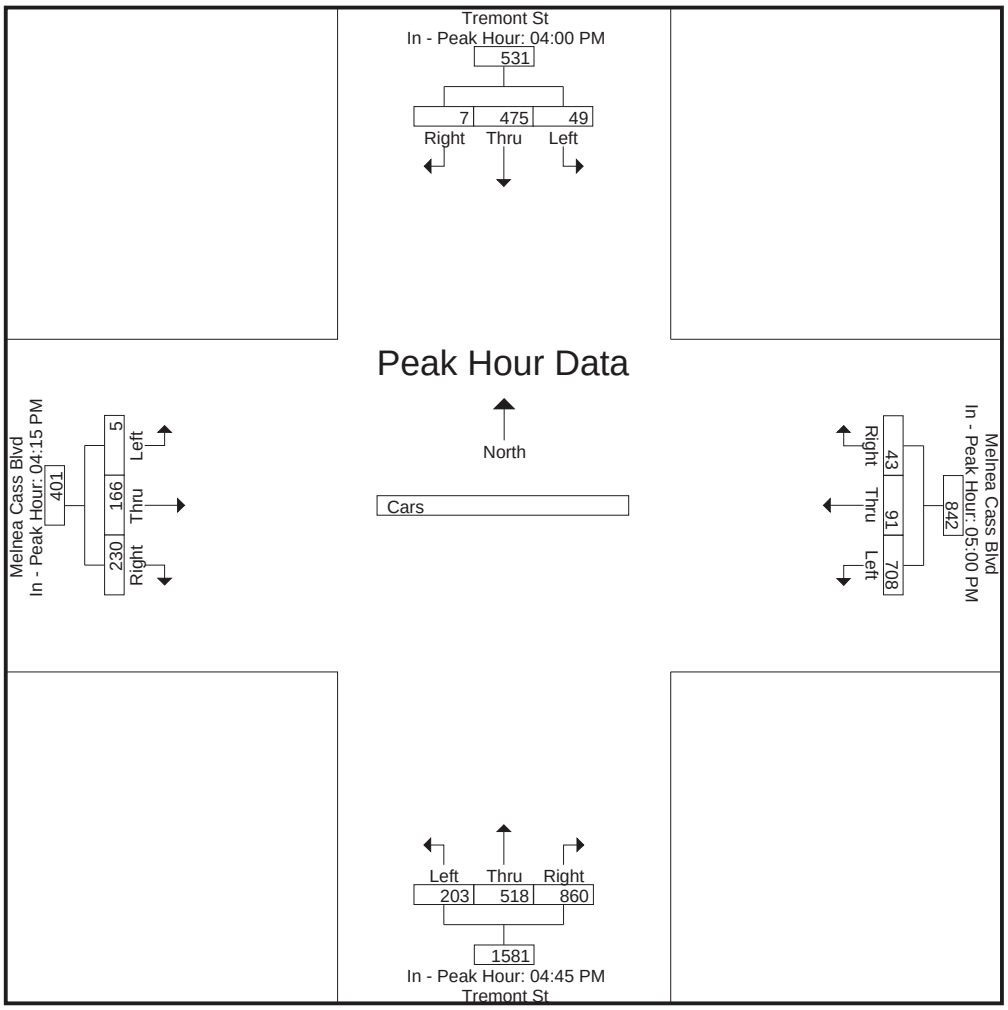
File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 6

	Tremont St From North				Melnea Cass Blvd From East				Tremont St From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total

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

Peak Hour for Each Approach Begins at:

	04:00 PM				05:00 PM				04:45 PM				04:15 PM			
+0 mins.	12	124	0	136	173	19	**15**	207	46	135	**225**	**406**	0	**46**	57	103
+15 mins.	**23**	**129**	**3**	**155**	**193**	**25**	10	**228**	51	118	198	367	**2**	42	49	93
+30 mins.	5	100	1	106	165	23	13	201	47	**137**	218	402	2	37	**65**	**104**
+45 mins.	9	122	3	134	177	24	5	206	**59**	128	219	406	1	41	59	101
Total Volume	49	475	7	531	708	91	43	842	203	518	860	1581	5	166	230	401
% App. Total	9.2	89.5	1.3		84.1	10.8	5.1		12.8	32.8	54.4		1.2	41.4	57.4	
PHF	.533	.921	.583	.856	.917	.910	.717	.923	.860	.945	.956	.974	.625	.902	.885	.964



Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 7

Groups Printed- Trucks

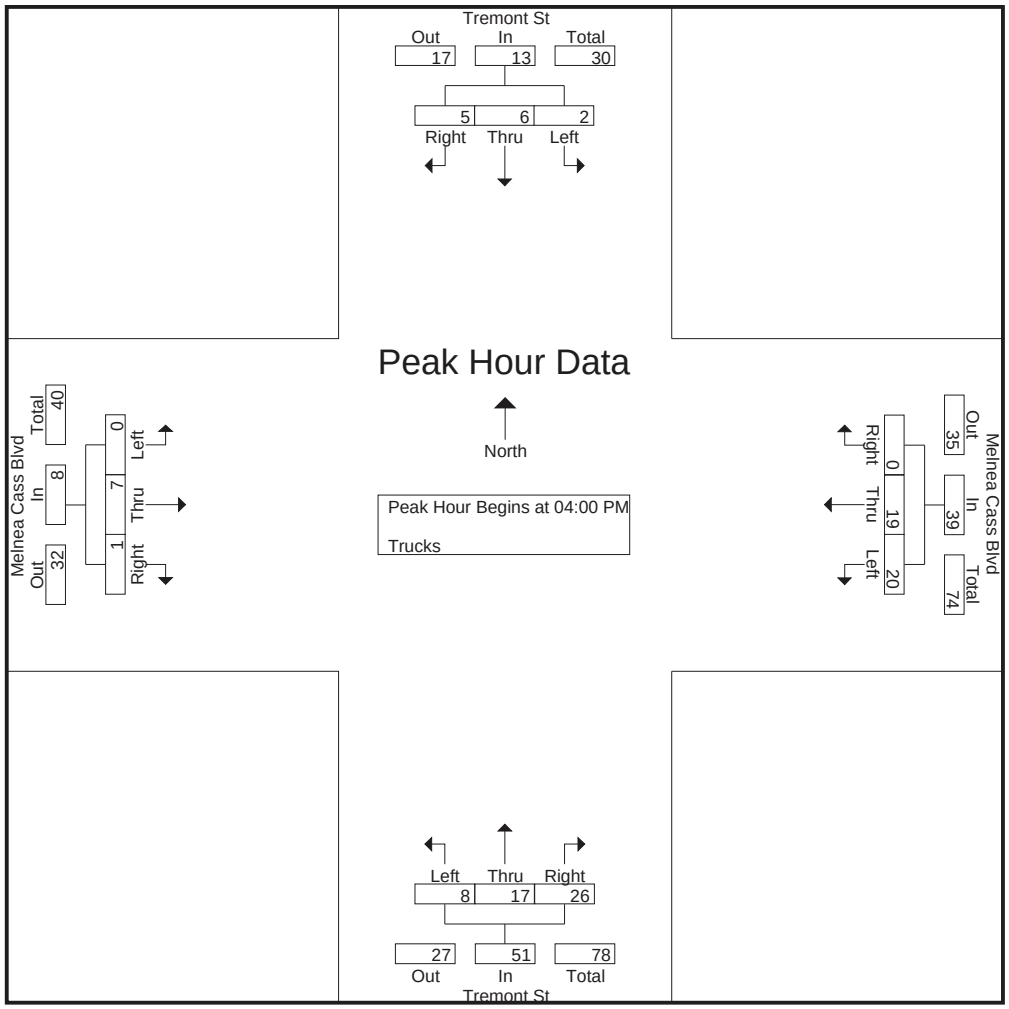
	Tremont St From North			Melnea Cass Blvd From East			Tremont St From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	1	3	0	9	5	0	2	4	6	0	1	0	31
04:15 PM	0	0	2	2	5	0	3	5	7	0	2	0	26
04:30 PM	0	1	1	2	5	0	2	1	10	0	2	1	25
04:45 PM	1	2	2	7	4	0	1	7	3	0	2	0	29
Total	2	6	5	20	19	0	8	17	26	0	7	1	111
05:00 PM	0	0	1	5	7	0	4	4	4	0	0	1	26
05:15 PM	0	1	2	5	1	0	5	1	11	0	3	0	29
05:30 PM	0	0	0	2	4	0	4	3	5	0	2	0	20
05:45 PM	0	1	2	5	2	0	4	1	5	0	0	0	20
Total	0	2	5	17	14	0	17	9	25	0	5	1	95
Grand Total	2	8	10	37	33	0	25	26	51	0	12	2	206
Apprch %	10	40	50	52.9	47.1	0	24.5	25.5	50	0	85.7	14.3	
Total %	1	3.9	4.9	18	16	0	12.1	12.6	24.8	0	5.8	1	

Accurate Counts
978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 8

	Tremont St From North				Melnea Cass Blvd From East				Tremont St From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	**1**	**3**	0	4	**9**	**5**	0	**14**	2	4	6	12	0	1	0	1	**31**
04:15 PM	0	0	**2**	2	2	5	0	7	**3**	5	7	**15**	0	**2**	0	2	26
04:30 PM	0	1	1	2	2	5	0	7	2	1	**10**	13	0	2	**1**	**3**	25
04:45 PM	1	2	2	**5**	7	4	0	11	1	**7**	3	11	0	2	0	2	29
Total Volume	2	6	5	13	20	19	0	39	8	17	26	51	0	7	1	8	111
% App. Total	15.4	46.2	38.5		51.3	48.7	0		15.7	33.3	51		0	87.5	12.5		
PHF	.500	.500	.625	.650	.556	.950	.000	.696	.667	.607	.650	.850	.000	.875	.250	.667	.895



Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

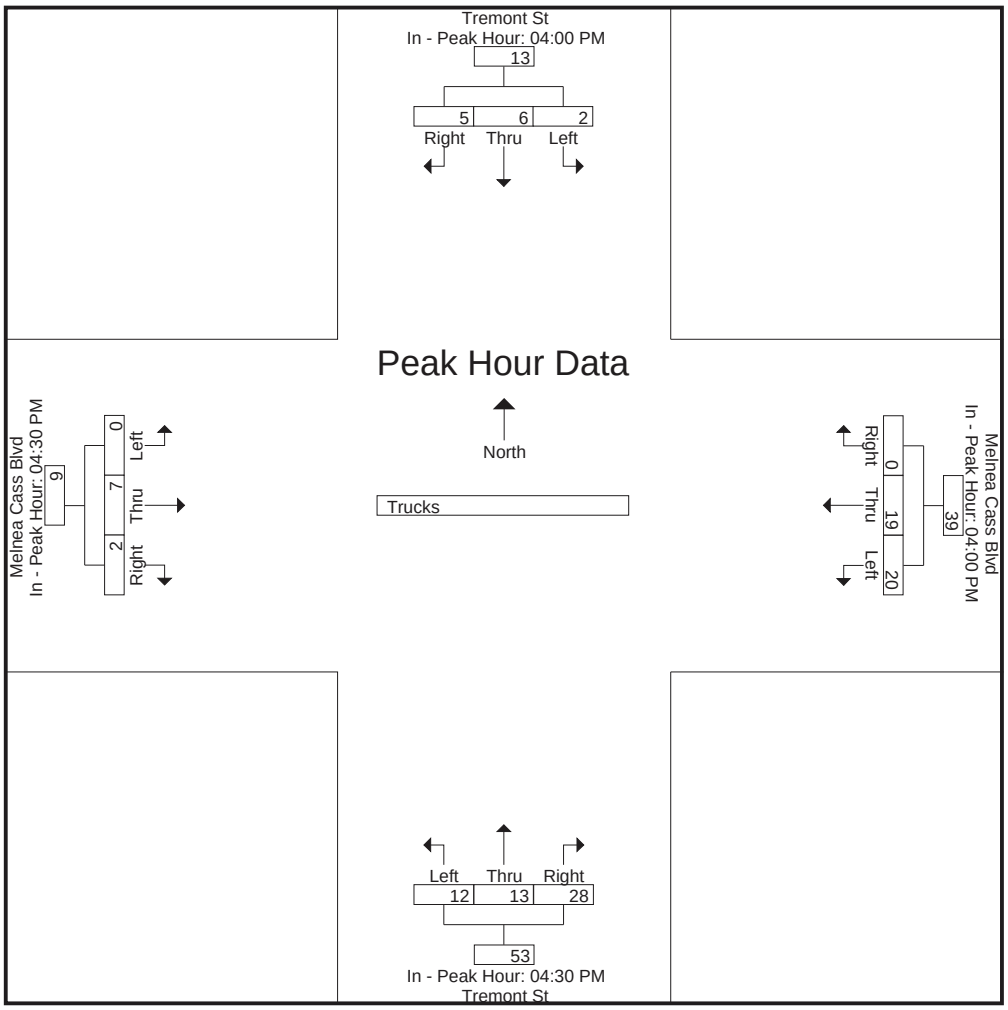
File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 9

	Tremont St From North				Melnea Cass Blvd From East				Tremont St From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total

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

Peak Hour for Each Approach Begins at:

	04:00 PM				04:00 PM				04:30 PM				04:30 PM				
+0 mins.	**1**	**3**	0	4	**9**	**5**	0	**14**	2	1	10	13	0	2	**1**	**3**	
+15 mins.	0	0	**2**	2	2	5	0	7	1	**7**	3	11	0	2	0	2	
+30 mins.	0	1	1	2	2	5	0	7	4	4	4	12	0	0	1	1	
+45 mins.	1	2	2	**5**	7	4	0	11	**5**	1	**11**	**17**	0	**3**	0	3	
Total Volume	2	6	5	13	20	19	0	39	12	13	28	53	0	7	2	9	
% App. Total	15.4	46.2	38.5		51.3	48.7	0		22.6	24.5	52.8		0	77.8	22.2		
PHF	.500	.500	.625	.650	.556	.950	.000	.696	.600	.464	.636	.779	.000	.583	.500	.750	



Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014

Groups Printed- Bikes Peds

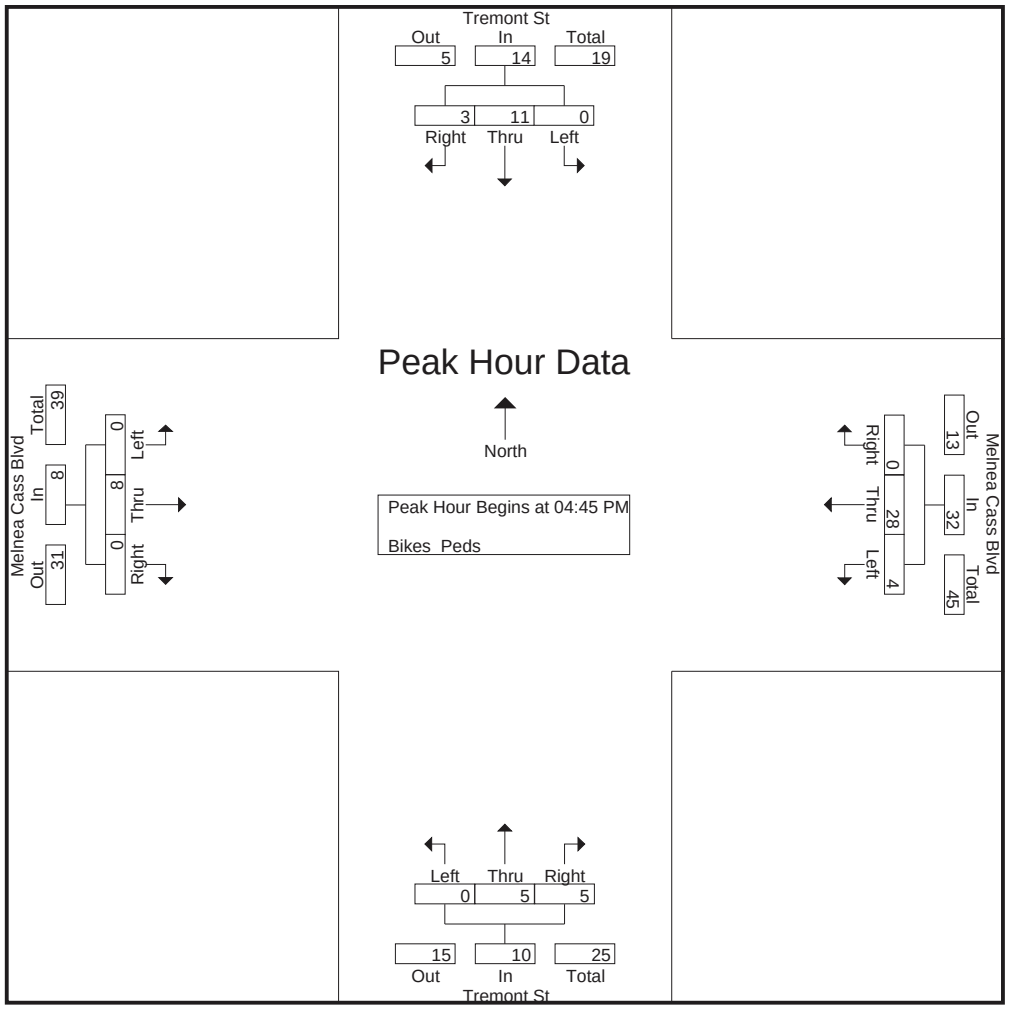
	Tremont St From North				Melnea Cass Blvd From East				Tremont St From South				Melnea Cass Blvd From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	8	0	3	0	4	0	0	0	0	0	0	0	4	16	3	19
04:15 PM	0	2	1	6	0	6	0	11	0	1	1	0	0	0	0	6	23	11	34
04:30 PM	0	3	0	11	1	3	0	5	0	0	1	1	0	1	0	8	25	9	34
04:45 PM	0	2	0	9	2	4	0	5	0	1	1	1	0	1	0	9	24	11	35
Total	0	7	1	34	3	16	0	25	0	2	3	2	0	2	0	27	88	34	122
05:00 PM	0	4	0	10	0	7	0	2	0	3	3	0	0	2	0	11	23	19	42
05:15 PM	0	3	2	9	2	9	0	9	0	1	0	1	0	0	0	11	30	17	47
05:30 PM	0	2	1	9	0	8	0	11	0	0	1	1	0	5	0	7	28	17	45
05:45 PM	0	1	0	18	0	5	0	9	0	1	0	2	1	1	0	16	45	9	54
Total	0	10	3	46	2	29	0	31	0	5	4	4	1	8	0	45	126	62	188
Grand Total	0	17	4	80	5	45	0	56	0	7	7	6	1	10	0	72	214	96	310
Apprch %	0	81	19		10	90	0		0	50	50		9.1	90.9	0				
Total %	0	17.7	4.2		5.2	46.9	0		0	7.3	7.3		1	10.4	0		69	31	

Accurate Counts
978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 11

	Tremont St From North				Melnea Cass Blvd From East				Tremont St From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	2	0	2	**2**	4	0	6	0	1	1	2	0	1	0	1	11
05:00 PM	0	**4**	0	4	0	7	0	7	0	**3**	**3**	**6**	0	2	0	2	**19**
05:15 PM	0	3	**2**	**5**	2	**9**	0	**11**	0	1	0	1	0	0	0	0	17
05:30 PM	0	2	1	3	0	8	0	8	0	0	1	1	0	**5**	0	**5**	17
Total Volume	0	11	3	14	4	28	0	32	0	5	5	10	0	8	0	8	64
% App. Total	0	78.6	21.4		12.5	87.5	0		0	50	50		0	100	0		
PHF	.000	.688	.375	.700	.500	.778	.000	.727	.000	.417	.417	.417	.000	.400	.000	.400	.842



Accurate Counts

978-664-2565

N/S Street : Tremont Street
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

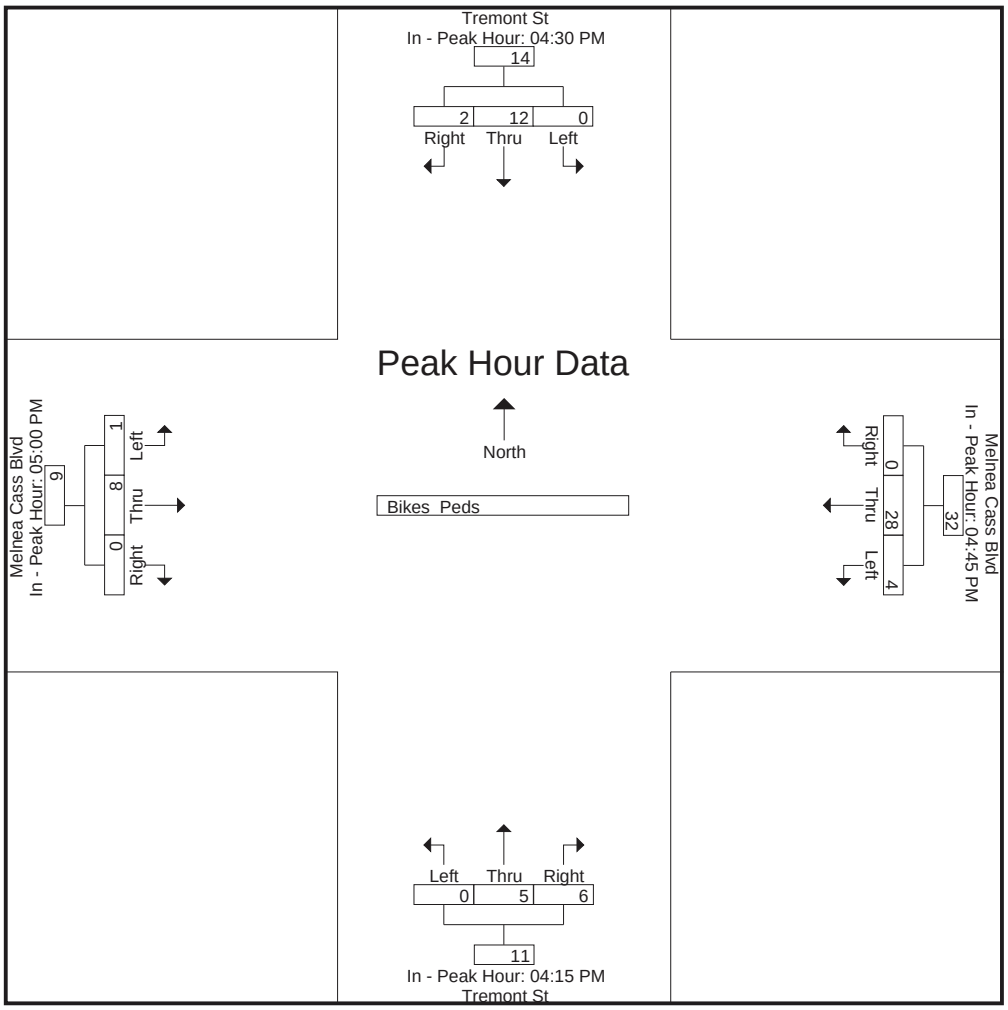
File Name : 14006001
Site Code : 14006001
Start Date : 10/15/2014
Page No : 12

	Tremont St From North				Melnea Cass Blvd From East				Tremont St From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total

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

Peak Hour for Each Approach Begins at:

	04:30 PM				04:45 PM				04:15 PM				05:00 PM			
+0 mins.	0	3	0	3	**2**	4	0	6	0	1	1	2	0	2	0	2
+15 mins.	0	2	0	2	0	7	0	7	0	0	1	1	0	0	0	0
+30 mins.	0	**4**	0	4	2	**9**	0	**11**	0	1	1	2	0	**5**	0	**5**
+45 mins.	0	3	**2**	**5**	0	8	0	8	0	**3**	**3**	**6**	**1**	1	0	2
Total Volume	0	12	2	14	4	28	0	32	0	5	6	11	1	8	0	9
% App. Total	0	85.7	14.3		12.5	87.5	0		0	45.5	54.5		11.1	88.9	0	
PHF	.000	.750	.250	.700	.500	.778	.000	.727	.000	.417	.500	.458	.250	.400	.000	.450



Accurate Counts

978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 1

Groups Printed- Cars - Trucks

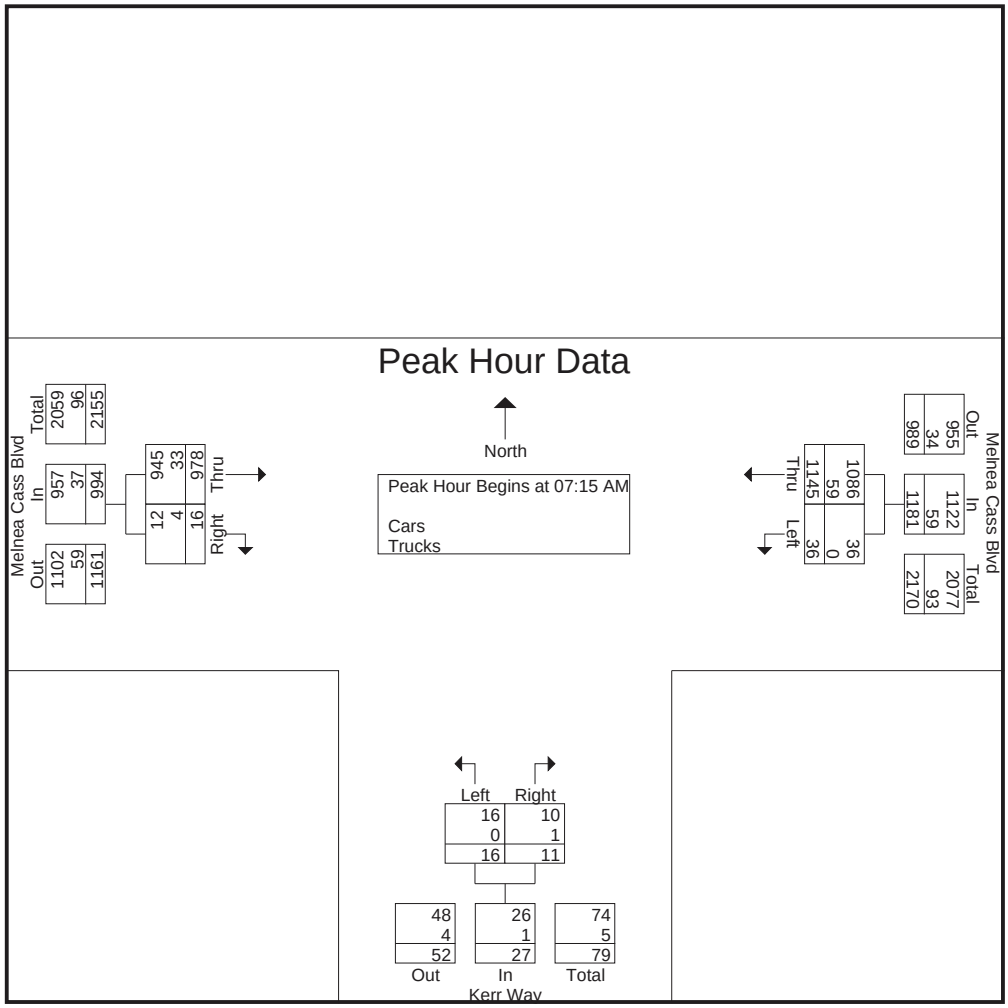
	Melnea Cass Blvd From East		Kerr Way From South		Melnea Cass Blvd From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	8	246	2	6	270	6	538
07:15 AM	10	274	1	3	221	4	513
07:30 AM	7	307	3	1	258	6	582
07:45 AM	11	251	8	3	275	2	550
Total	36	1078	14	13	1024	18	2183
08:00 AM	8	313	4	4	224	4	557
08:15 AM	4	272	2	8	210	7	503
08:30 AM	10	252	6	6	232	2	508
08:45 AM	9	256	7	5	231	4	512
Total	31	1093	19	23	897	17	2080
Grand Total	67	2171	33	36	1921	35	4263
Apprch %	3	97	47.8	52.2	98.2	1.8	
Total %	1.6	50.9	0.8	0.8	45.1	0.8	
Cars	66	2050	32	34	1840	30	4052
% Cars	98.5	94.4	97	94.4	95.8	85.7	95.1
Trucks	1	121	1	2	81	5	211
% Trucks	1.5	5.6	3	5.6	4.2	14.3	4.9

Accurate Counts
978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 2

	Melnea Cass Blvd From East			Kerr Way From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	10	274	284	1	3	4	221	4	225	513
07:30 AM	7	307	314	3	1	4	258	**6**	264	**582**
07:45 AM	**11**	251	262	**8**	3	**11**	**275**	2	**277**	550
08:00 AM	8	**313**	**321**	4	**4**	8	224	4	228	557
Total Volume	36	1145	1181	16	11	27	978	16	994	2202
% App. Total	3	97		59.3	40.7		98.4	1.6		
PHF	.818	.915	.920	.500	.688	.614	.889	.667	.897	.946
Cars	36	1086	1122	16	10	26	945	12	957	2105
% Cars	100	94.8	95.0	100	90.9	96.3	96.6	75.0	96.3	95.6
Trucks	0	59	59	0	1	1	33	4	37	97
% Trucks	0	5.2	5.0	0	9.1	3.7	3.4	25.0	3.7	4.4

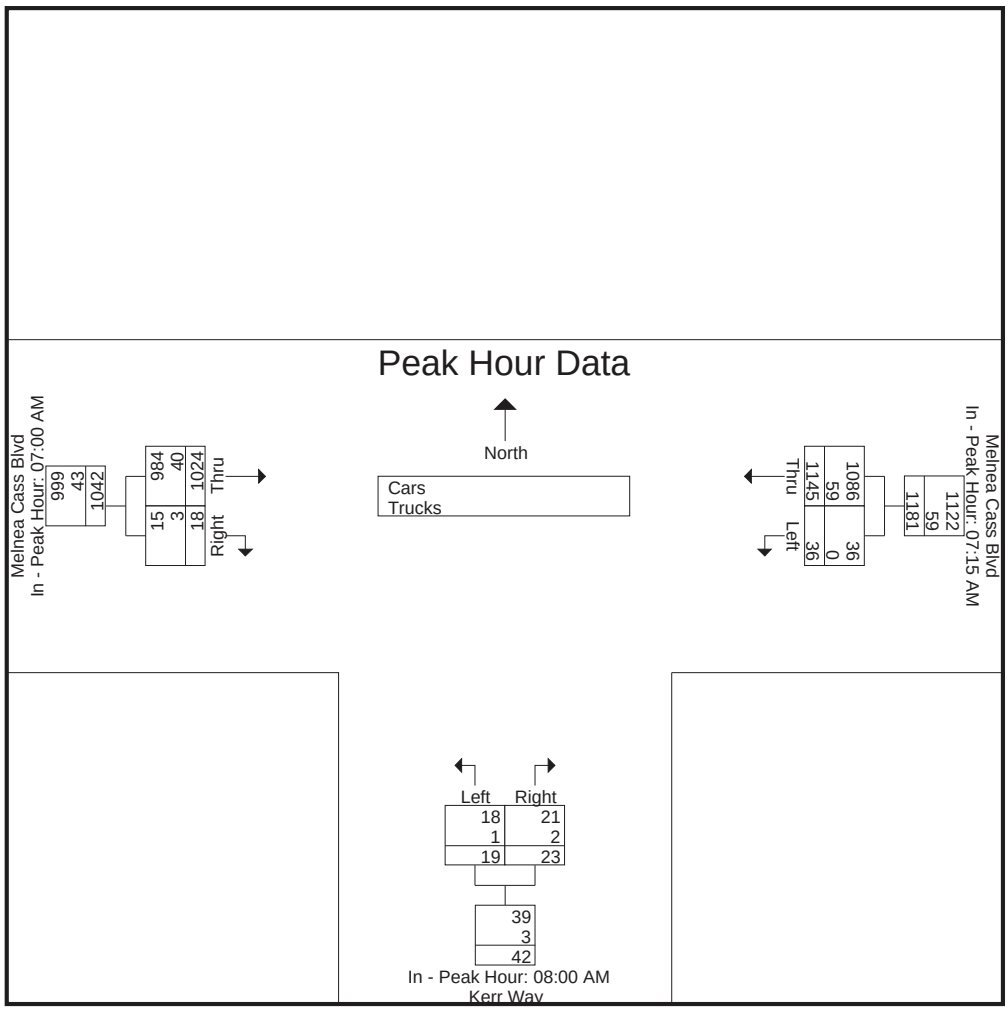


Accurate Counts
978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 3

	Melnea Cass Blvd From East			Kerr Way From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Each Approach Begins at:										
	07:15 AM			08:00 AM			07:00 AM			
+0 mins.	10	274	284	4	4	8	270	**6**	276	
+15 mins.	7	307	314	2	**8**	10	221	4	225	
+30 mins.	**11**	251	262	6	6	**12**	258	6	264	
+45 mins.	8	**313**	**321**	**7**	5	12	**275**	2	**277**	
Total Volume	36	1145	1181	19	23	42	1024	18	1042	
% App. Total	3	97		45.2	54.8		98.3	1.7		
PHF	.818	.915	.920	.679	.719	.875	.931	.750	.940	
Cars	36	1086	1122	18	21	39	984	15	999	
% Cars	100	94.8	95	94.7	91.3	92.9	96.1	83.3	95.9	
Trucks	0	59	59	1	2	3	40	3	43	
% Trucks	0	5.2	5	5.3	8.7	7.1	3.9	16.7	4.1	



Accurate Counts

978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 4

Groups Printed- Cars

	Melnea Cass Blvd From East		Kerr Way From South		Melnea Cass Blvd From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	8	226	2	6	258	5	505
07:15 AM	10	261	1	3	213	4	492
07:30 AM	7	289	3	1	251	4	555
07:45 AM	11	234	8	3	262	2	520
Total	36	1010	14	13	984	15	2072
08:00 AM	8	302	4	3	219	2	538
08:15 AM	4	256	2	8	204	7	481
08:30 AM	9	241	5	5	226	2	488
08:45 AM	9	241	7	5	207	4	473
Total	30	1040	18	21	856	15	1980
Grand Total	66	2050	32	34	1840	30	4052
Apprch %	3.1	96.9	48.5	51.5	98.4	1.6	
Total %	1.6	50.6	0.8	0.8	45.4	0.7	

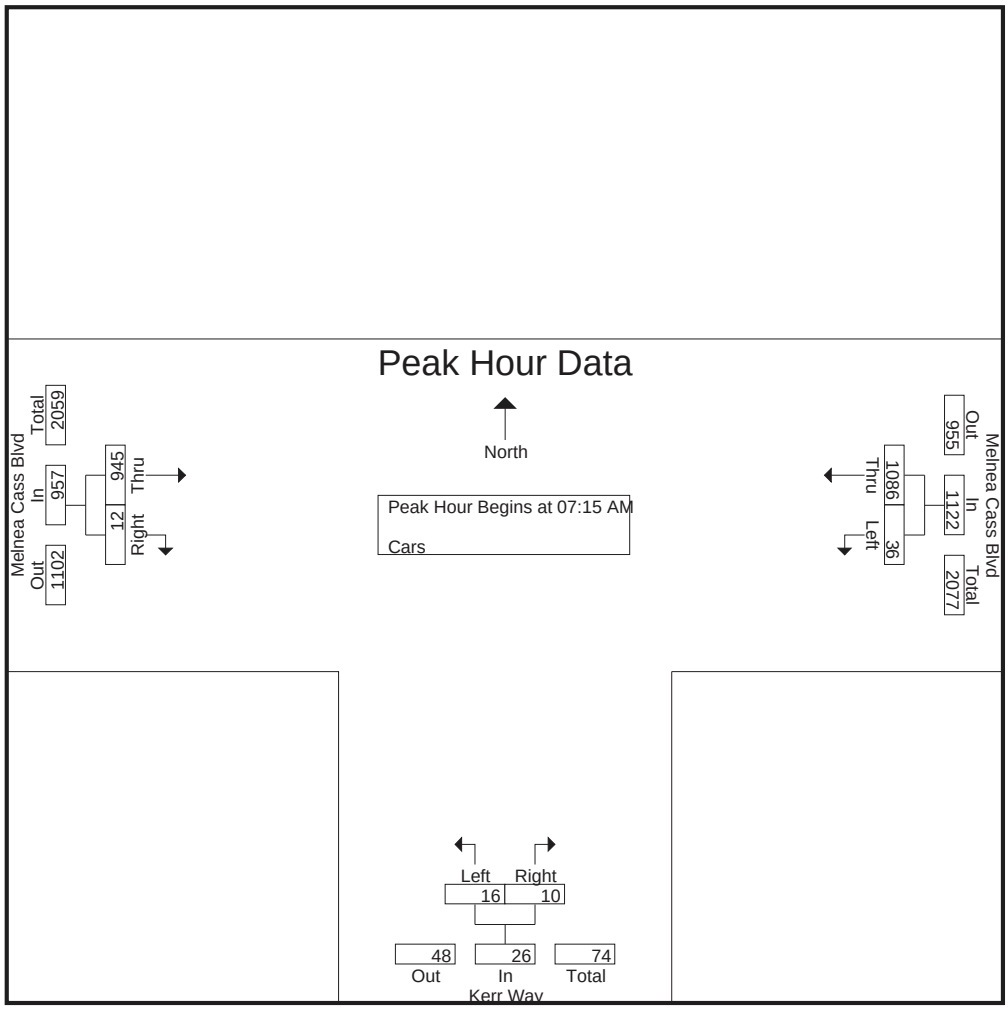
Accurate Counts

978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 5

	Melnea Cass Blvd From East			Kerr Way From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:15 AM										
07:15 AM	10	261	271	1	**3**	4	213	**4**	217	492
07:30 AM	7	289	296	3	1	4	251	4	255	**555**
07:45 AM	**11**	234	245	**8**	3	**11**	**262**	2	**264**	520
08:00 AM	8	**302**	**310**	4	3	7	219	2	221	538
Total Volume	36	1086	1122	16	10	26	945	12	957	2105
% App. Total	3.2	96.8		61.5	38.5		98.7	1.3		
PHF	.818	.899	.905	.500	.833	.591	.902	.750	.906	.948

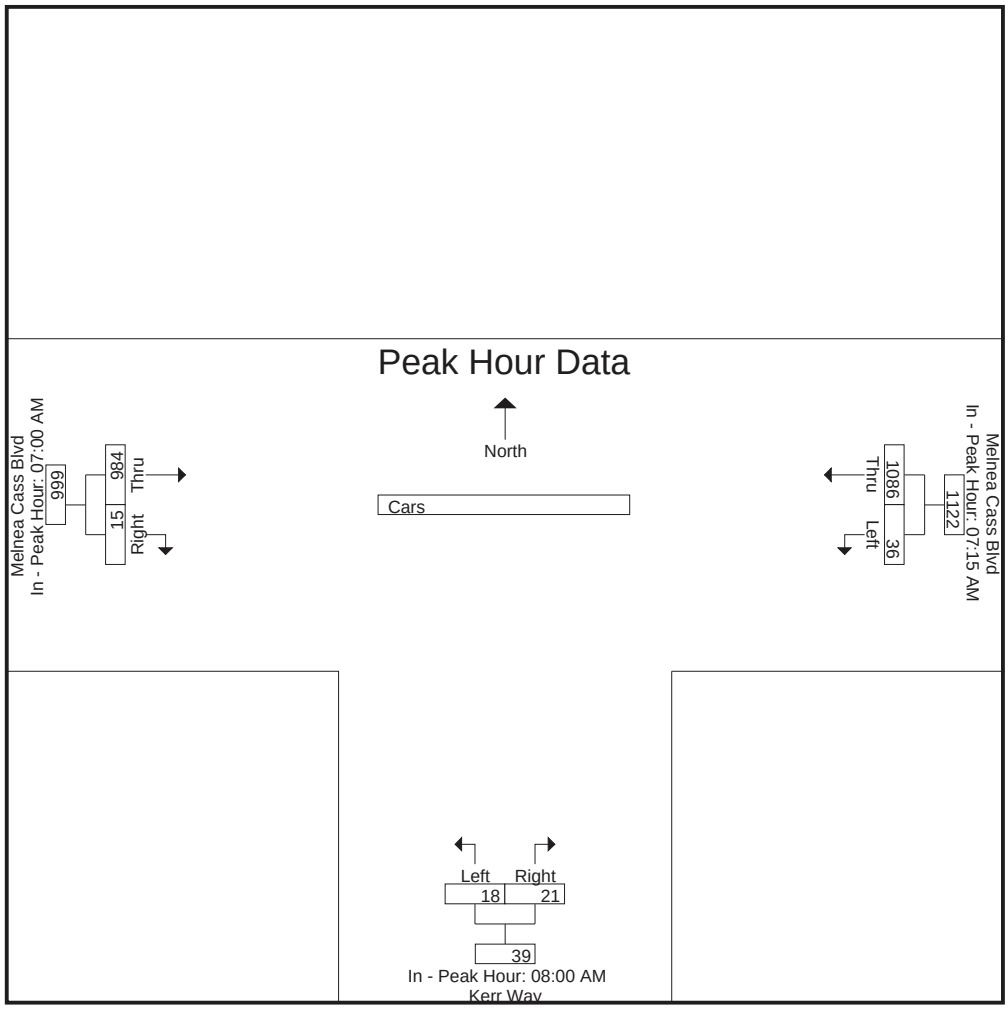


Accurate Counts
978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 6

	Melnea Cass Blvd From East			Kerr Way From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Each Approach Begins at:										
	07:15 AM			08:00 AM			07:00 AM			
+0 mins.	10	261	271	4	3	7	258	**5**	263	
+15 mins.	7	289	296	2	**8**	10	213	4	217	
+30 mins.	**11**	234	245	5	5	10	251	4	255	
+45 mins.	8	**302**	**310**	**7**	5	**12**	**262**	2	**264**	
Total Volume	36	1086	1122	18	21	39	984	15	999	
% App. Total	3.2	96.8		46.2	53.8		98.5	1.5		
PHF	.818	.899	.905	.643	.656	.813	.939	.750	.946	



Accurate Counts

978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014

Groups Printed- Trucks

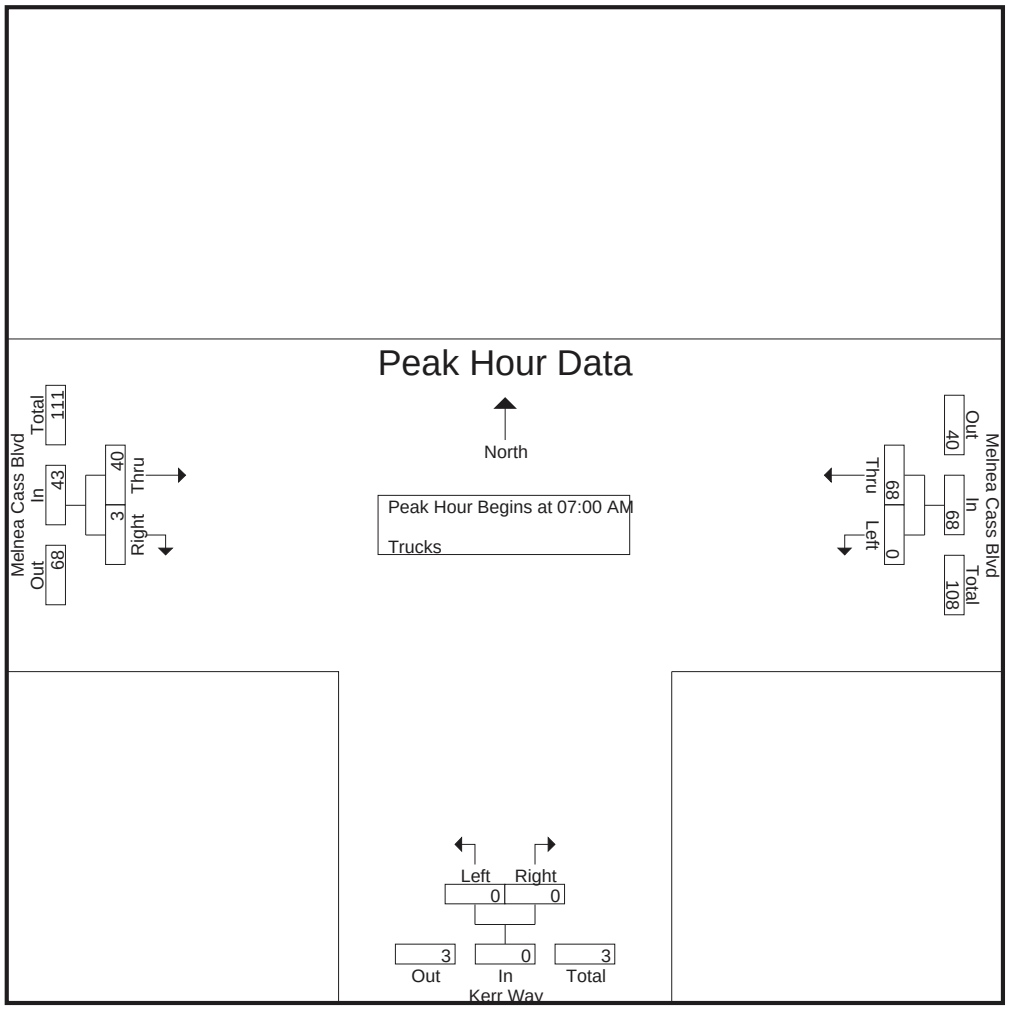
	Melnea Cass Blvd From East		Kerr Way From South		Melnea Cass Blvd From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
07:00 AM	0	20	0	0	12	1	33
07:15 AM	0	13	0	0	8	0	21
07:30 AM	0	18	0	0	7	2	27
07:45 AM	0	17	0	0	13	0	30
Total	0	68	0	0	40	3	111
08:00 AM	0	11	0	1	5	2	19
08:15 AM	0	16	0	0	6	0	22
08:30 AM	1	11	1	1	6	0	20
08:45 AM	0	15	0	0	24	0	39
Total	1	53	1	2	41	2	100
Grand Total	1	121	1	2	81	5	211
Apprch %	0.8	99.2	33.3	66.7	94.2	5.8	
Total %	0.5	57.3	0.5	0.9	38.4	2.4	

Accurate Counts
978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 8

	Melnea Cass Blvd From East			Kerr Way From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:00 AM										
07:00 AM	0	**20**	**20**	0	0	0	12	1	**13**	**33**
07:15 AM	0	13	13	0	0	0	8	0	8	21
07:30 AM	0	18	18	0	0	0	7	**2**	9	27
07:45 AM	0	17	17	0	0	0	**13**	0	13	30
Total Volume	0	68	68	0	0	0	40	3	43	111
% App. Total	0	100		0	0		93	7		
PHF	.000	.850	.850	.000	.000	.000	.769	.375	.827	.841



Accurate Counts
978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
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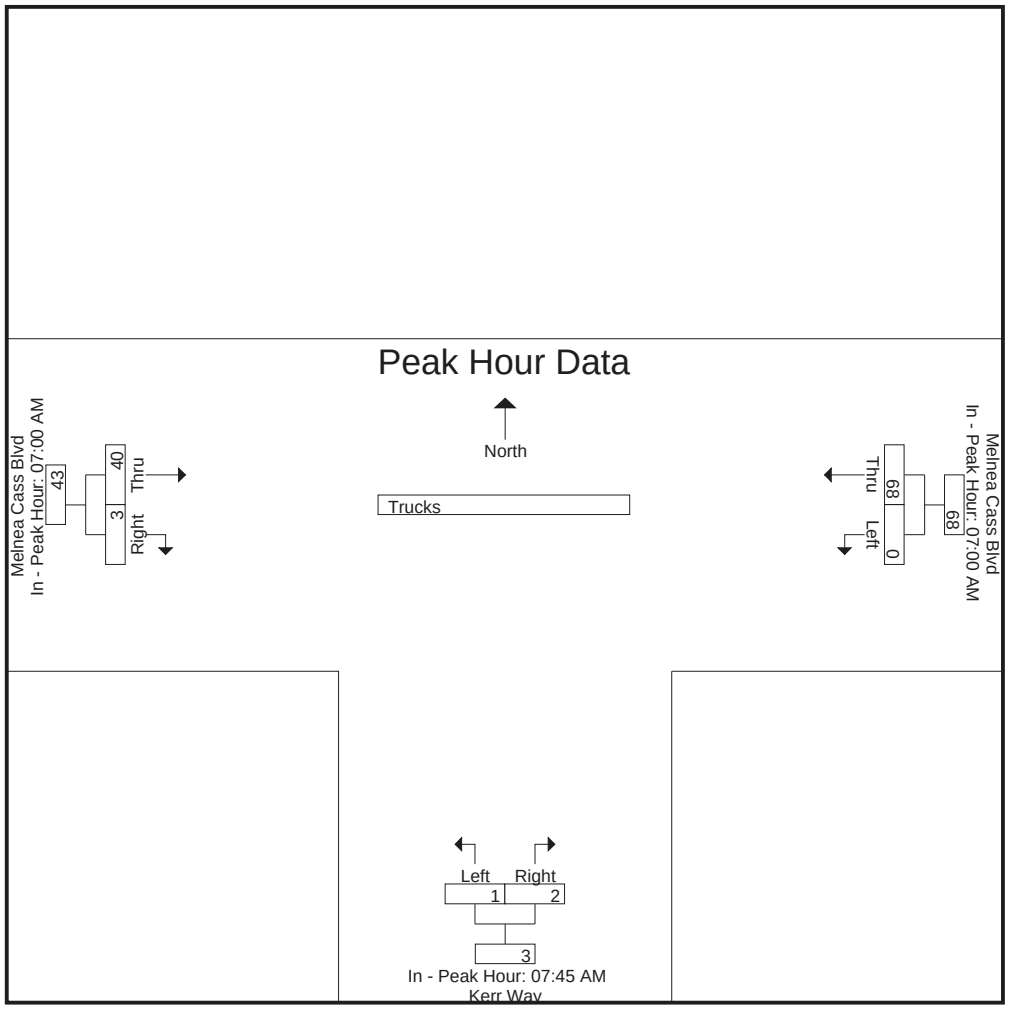
	Melnea Cass Blvd From East			Kerr Way From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Each Approach Begins at:										
	07:00 AM			07:45 AM			07:00 AM			
+0 mins.	0	**20**	**20**	0	0	0	12	1	**13**	
+15 mins.	0	13	13	0	**1**	1	8	0	8	
+30 mins.	0	18	18	0	0	0	7	**2**	9	
+45 mins.	0	17	17	**1**	1	**2**	**13**	0	13	
Total Volume	0	68	68	1	2	3	40	3	43	
% App. Total	0	100		33.3	66.7		93	7		
PHF	.000	.850	.850	.250	.500	.375	.769	.375	.827	



Accurate Counts

978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014

Groups Printed- Bikes Peds

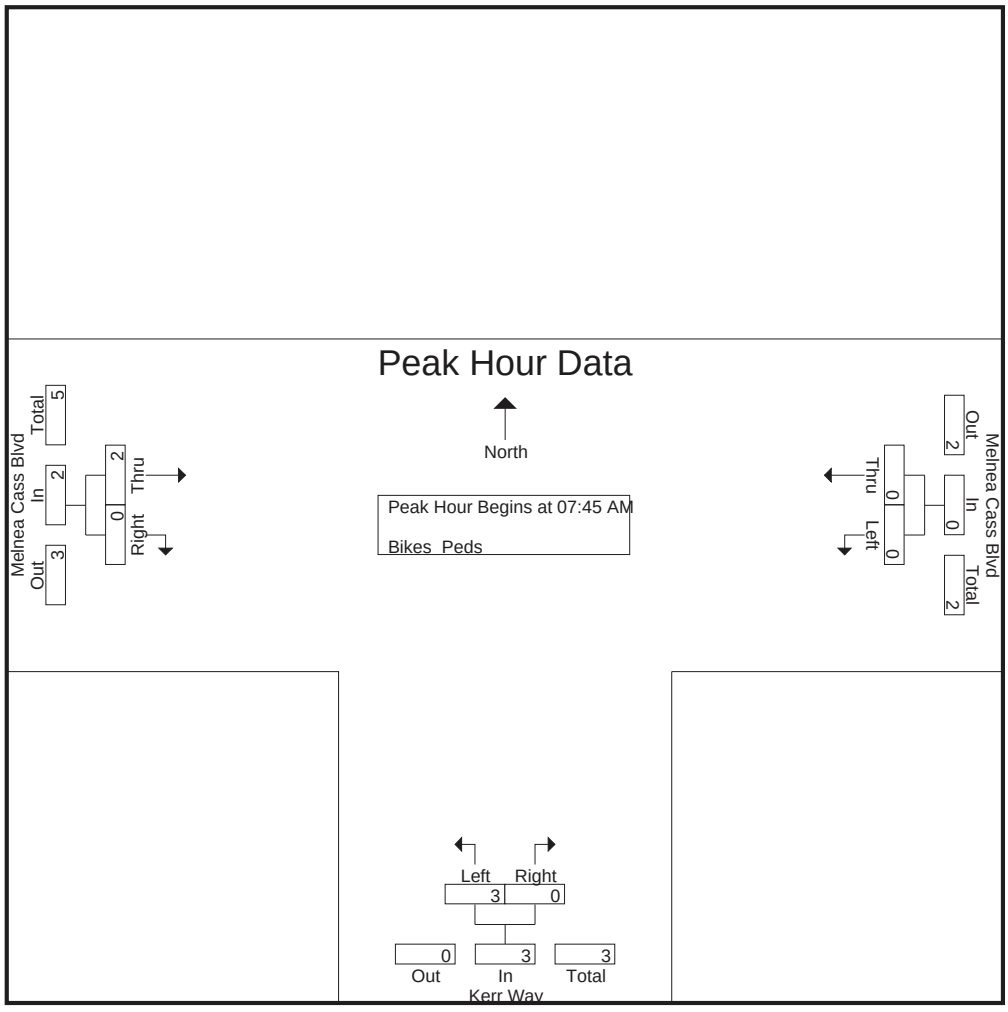
	Melnea Cass Blvd From East			Kerr Way From South			Melnea Cass Blvd From West					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	3	0	0	2	0	0	0	5	0	5
07:15 AM	0	0	1	0	0	3	0	0	0	4	0	4
07:30 AM	0	0	0	0	0	0	1	0	2	2	1	3
07:45 AM	0	0	1	0	0	2	1	0	1	4	1	5
Total	0	0	5	0	0	7	2	0	3	15	2	17
08:00 AM	0	0	0	0	0	1	0	0	1	2	0	2
08:15 AM	0	0	2	0	0	5	0	0	2	9	0	9
08:30 AM	0	0	3	3	0	1	1	0	1	5	4	9
08:45 AM	0	0	2	0	0	0	1	0	2	4	1	5
Total	0	0	7	3	0	7	2	0	6	20	5	25
Grand Total	0	0	12	3	0	14	4	0	9	35	7	42
Apprch %	0	0		100	0		100	0				
Total %	0	0		42.9	0		57.1	0		83.3	16.7	

Accurate Counts
978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 11

	Melnea Cass Blvd From East			Kerr Way From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 07:45 AM										
07:45 AM	0	0	0	0	0	0	**1**	0	**1**	1
08:00 AM	0	0	0	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	0	0
08:30 AM	0	0	0	**3**	0	**3**	1	0	1	**4**
Total Volume	0	0	0	3	0	3	2	0	2	5
% App. Total	0	0		100	0		100	0		
PHF	.000	.000	.000	.250	.000	.250	.500	.000	.500	.313

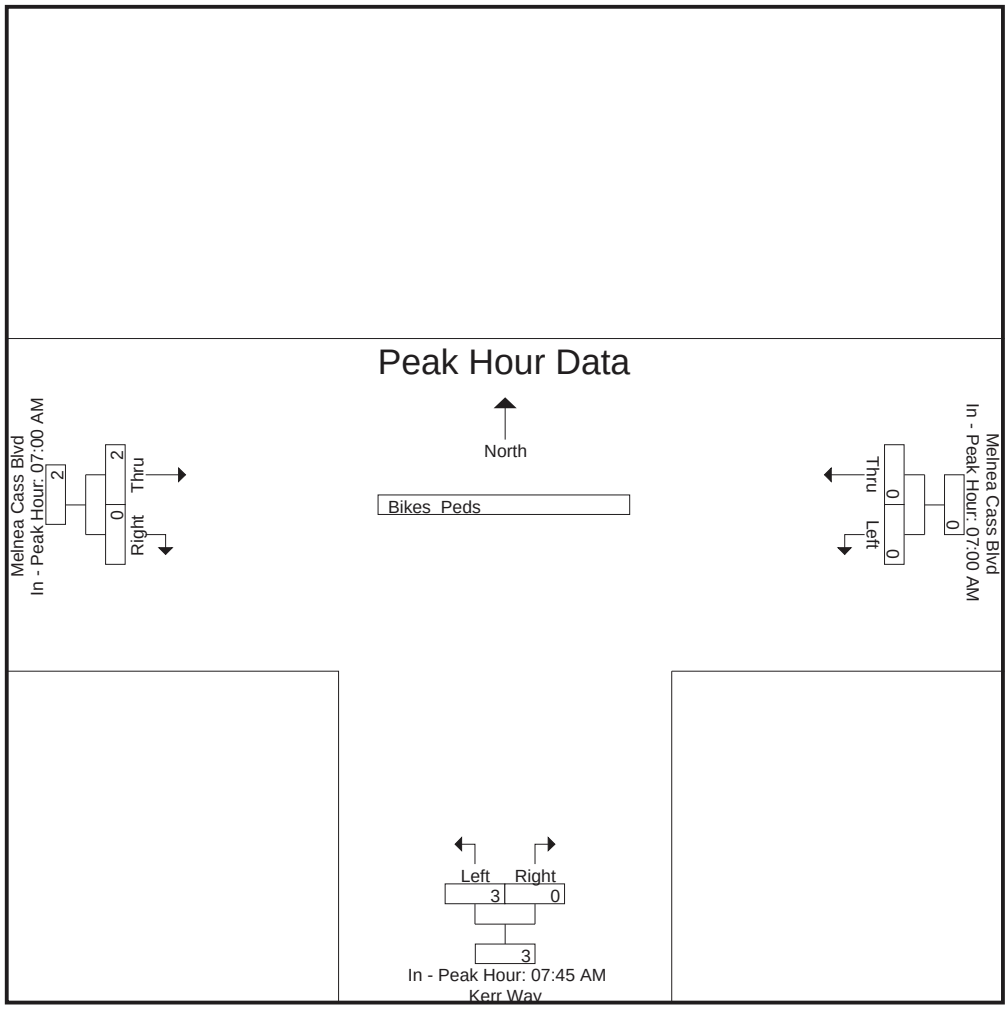


Accurate Counts
978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 12

	Melnea Cass Blvd From East			Kerr Way From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1										
Peak Hour for Each Approach Begins at:										
	07:00 AM			07:45 AM			07:00 AM			
+0 mins.	0	0	0	0	0	0	0	0	0	
+15 mins.	0	0	0	0	0	0	0	0	0	
+30 mins.	0	0	0	0	0	0	**1**	0	**1**	
+45 mins.	0	0	0	**3**	0	**3**	1	0	1	
Total Volume	0	0	0	3	0	3	2	0	2	
% App. Total	0	0		100	0		100	0		
PHF	.000	.000	.000	.250	.000	.250	.500	.000	.500	



Accurate Counts

978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 1

Groups Printed- Cars - Trucks

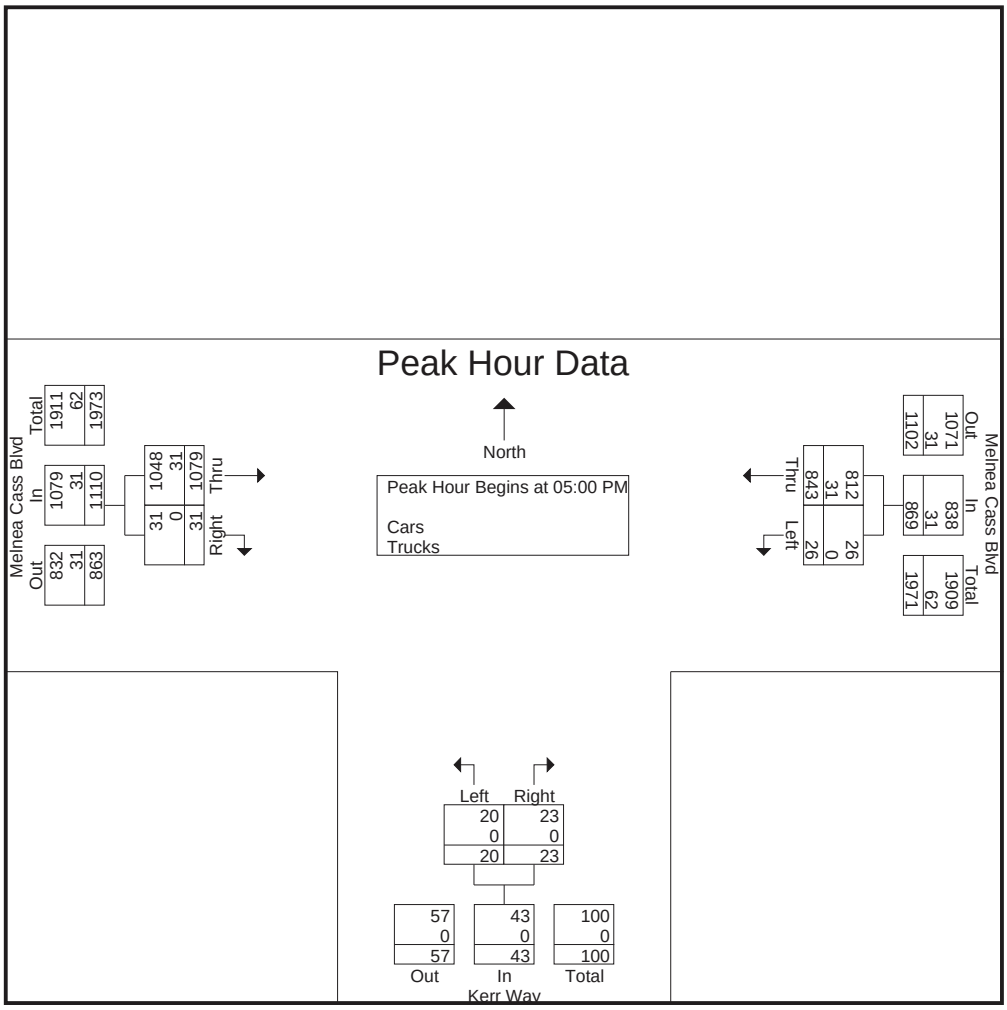
	Melnea Cass Blvd From East		Kerr Way From South		Melnea Cass Blvd From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	4	239	2	7	270	4	526
04:15 PM	8	178	3	6	272	8	475
04:30 PM	9	218	6	9	250	9	501
04:45 PM	8	210	5	7	257	5	492
Total	29	845	16	29	1049	26	1994
05:00 PM	7	206	3	6	258	10	490
05:15 PM	8	215	6	5	280	8	522
05:30 PM	5	187	7	9	264	5	477
05:45 PM	6	235	4	3	277	8	533
Total	26	843	20	23	1079	31	2022
Grand Total	55	1688	36	52	2128	57	4016
Apprch %	3.2	96.8	40.9	59.1	97.4	2.6	
Total %	1.4	42	0.9	1.3	53	1.4	
Cars	54	1615	36	52	2065	55	3877
% Cars	98.2	95.7	100	100	97	96.5	96.5
Trucks	1	73	0	0	63	2	139
% Trucks	1.8	4.3	0	0	3	3.5	3.5

Accurate Counts
978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 2

	Melnea Cass Blvd From East			Kerr Way From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	7	206	213	3	6	9	258	**10**	268	490
05:15 PM	**8**	215	223	6	5	11	**280**	8	**288**	522
05:30 PM	5	187	192	**7**	**9**	**16**	264	5	269	477
05:45 PM	6	**235**	**241**	4	3	7	277	8	285	**533**
Total Volume	26	843	869	20	23	43	1079	31	1110	2022
% App. Total	3	97		46.5	53.5		97.2	2.8		
PHF	.813	.897	.901	.714	.639	.672	.963	.775	.964	.948
Cars	26	812	838	20	23	43	1048	31	1079	1960
% Cars	100	96.3	96.4	100	100	100	97.1	100	97.2	96.9
Trucks	0	31	31	0	0	0	31	0	31	62
% Trucks	0	3.7	3.6	0	0	0	2.9	0	2.8	3.1



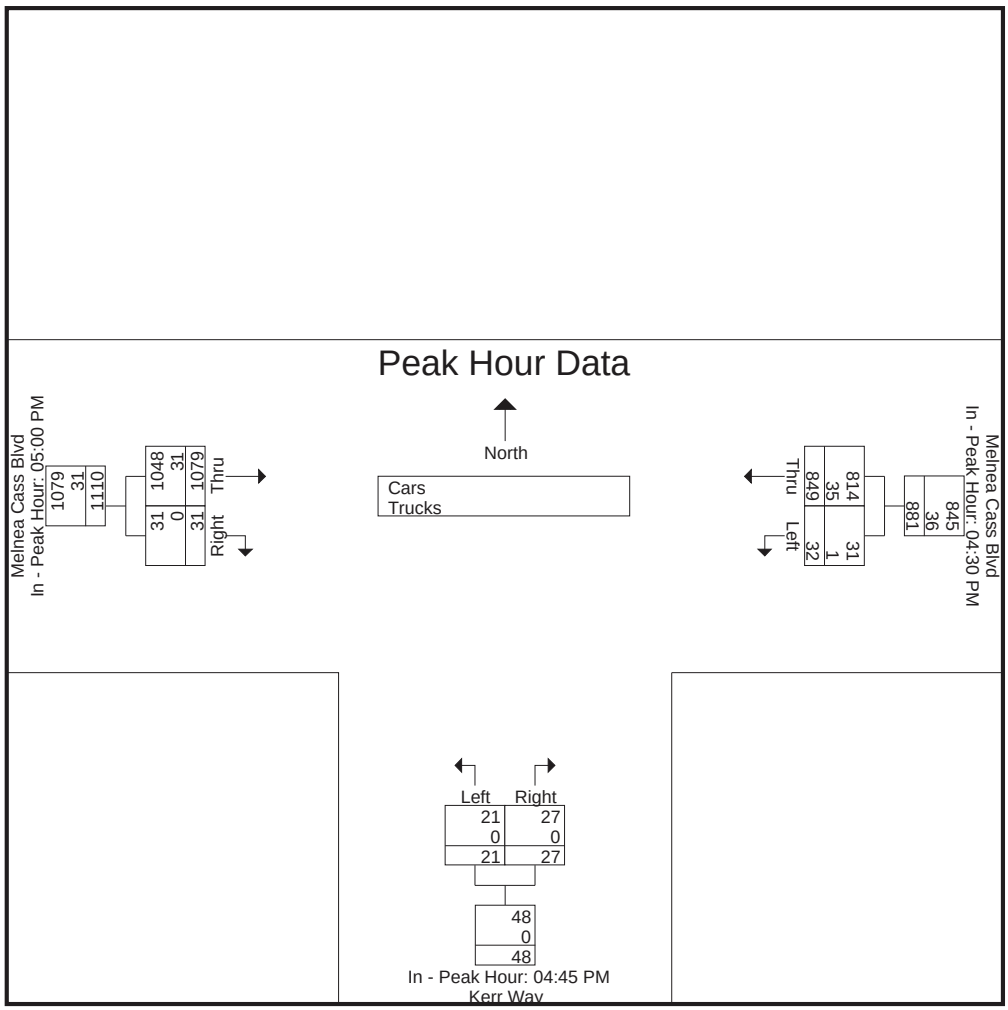
Accurate Counts

978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 3

	Melnea Cass Blvd From East			Kerr Way From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Each Approach Begins at:										
	04:30 PM			04:45 PM			05:00 PM			
+0 mins.	**9**	**218**	**227**	5	7	12	258	**10**	268	
+15 mins.	8	210	218	3	6	9	**280**	8	**288**	
+30 mins.	7	206	213	6	5	11	264	5	269	
+45 mins.	8	215	223	**7**	**9**	**16**	277	8	285	
Total Volume	32	849	881	21	27	48	1079	31	1110	
% App. Total	3.6	96.4		43.8	56.2		97.2	2.8		
PHF	.889	.974	.970	.750	.750	.750	.963	.775	.964	
Cars	31	814	845	21	27	48	1048	31	1079	
% Cars	96.9	95.9	95.9	100	100	100	97.1	100	97.2	
Trucks	1	35	36	0	0	0	31	0	31	
% Trucks	3.1	4.1	4.1	0	0	0	2.9	0	2.8	



Accurate Counts
978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 4

Groups Printed- Cars

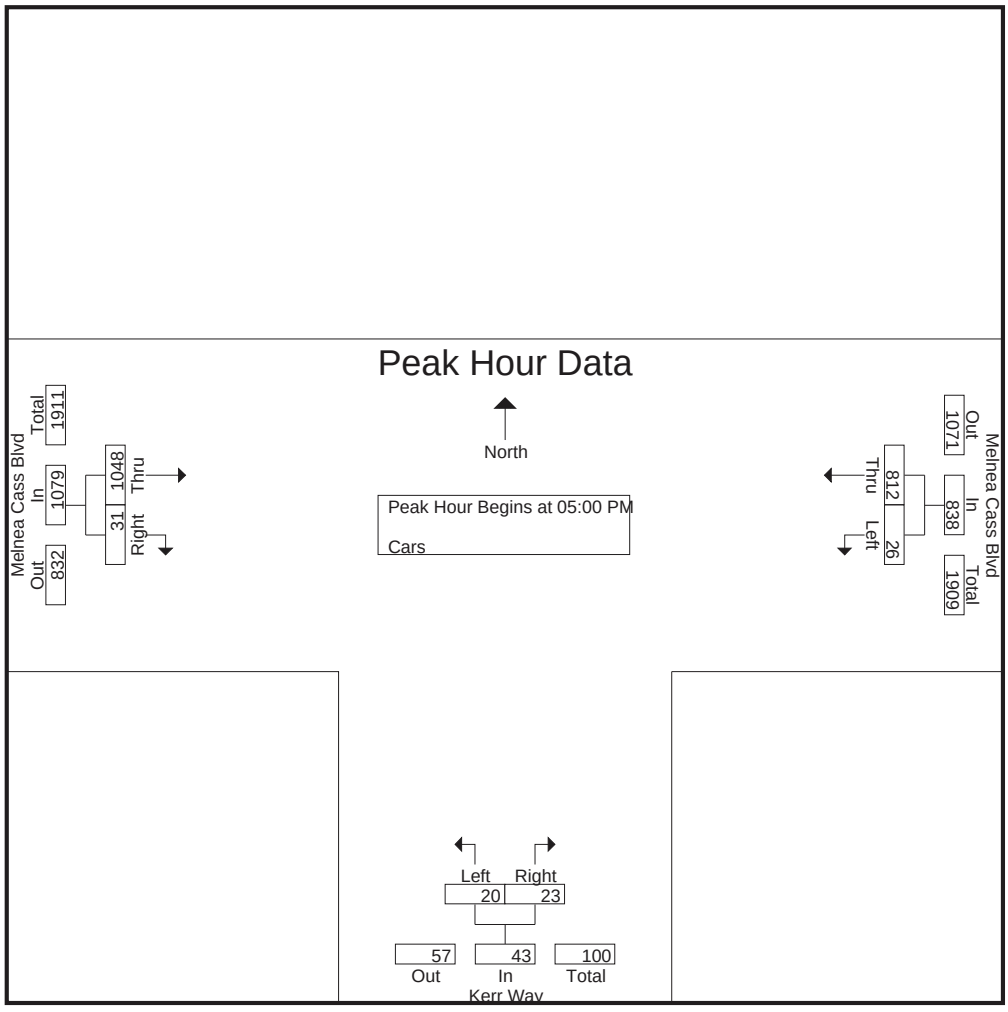
	Melnea Cass Blvd From East		Kerr Way From South		Melnea Cass Blvd From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	4	223	2	7	263	3	502
04:15 PM	8	171	3	6	264	8	460
04:30 PM	9	213	6	9	238	9	484
04:45 PM	7	196	5	7	252	4	471
Total	28	803	16	29	1017	24	1917
05:00 PM	7	194	3	6	253	10	473
05:15 PM	8	211	6	5	267	8	505
05:30 PM	5	181	7	9	257	5	464
05:45 PM	6	226	4	3	271	8	518
Total	26	812	20	23	1048	31	1960
Grand Total	54	1615	36	52	2065	55	3877
Apprch %	3.2	96.8	40.9	59.1	97.4	2.6	
Total %	1.4	41.7	0.9	1.3	53.3	1.4	

Accurate Counts
978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 5

	Melnea Cass Blvd From East			Kerr Way From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 05:00 PM										
05:00 PM	7	194	201	3	6	9	253	**10**	263	473
05:15 PM	**8**	211	219	6	5	11	267	8	275	505
05:30 PM	5	181	186	**7**	**9**	**16**	257	5	262	464
05:45 PM	6	**226**	**232**	4	3	7	**271**	8	**279**	**518**
Total Volume	26	812	838	20	23	43	1048	31	1079	1960
% App. Total	3.1	96.9		46.5	53.5		97.1	2.9		
PHF	.813	.898	.903	.714	.639	.672	.967	.775	.967	.946

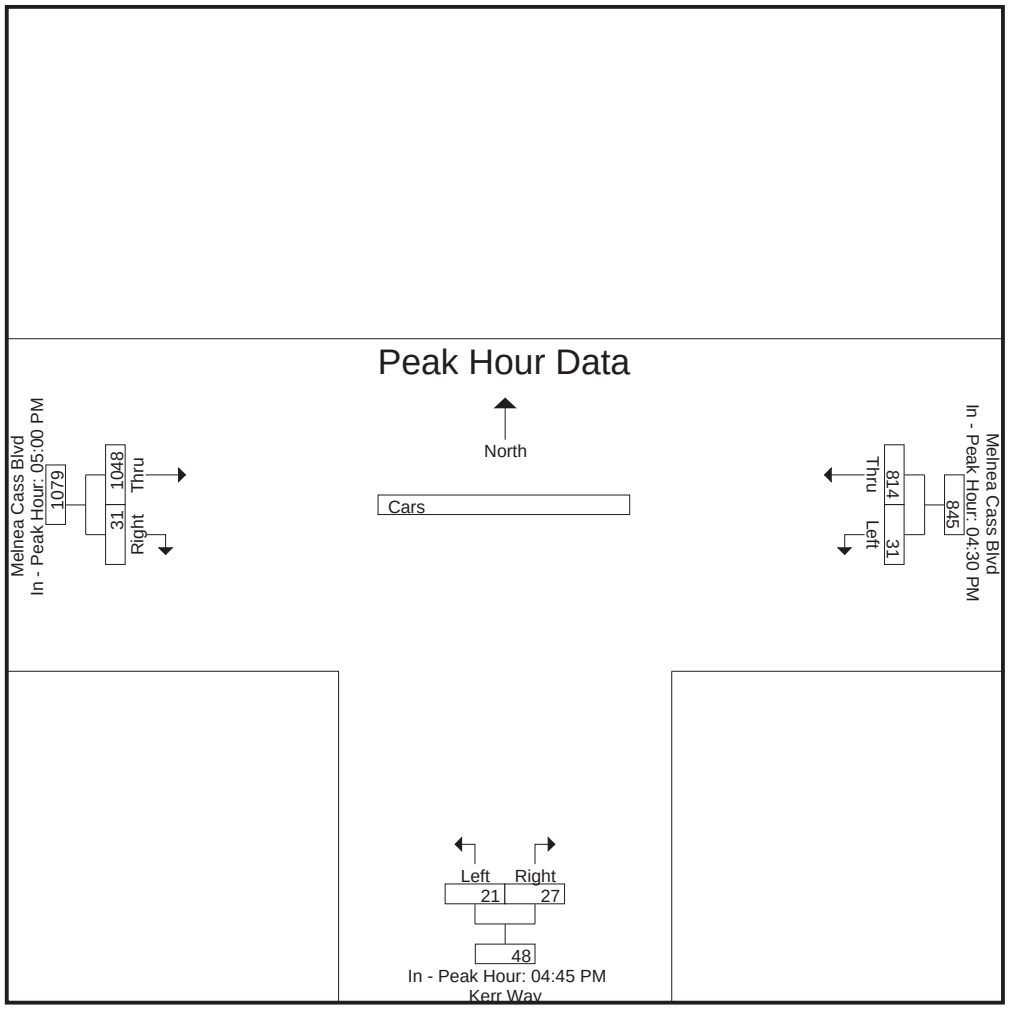


Accurate Counts
978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 6

	Melnea Cass Blvd From East			Kerr Way From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Each Approach Begins at:										
	04:30 PM			04:45 PM			05:00 PM			
+0 mins.	**9**	**213**	**222**	5	7	12	253	**10**	263	
+15 mins.	7	196	203	3	6	9	267	8	275	
+30 mins.	7	194	201	6	5	11	257	5	262	
+45 mins.	8	211	219	**7**	**9**	**16**	**271**	8	**279**	
Total Volume	31	814	845	21	27	48	1048	31	1079	
% App. Total	3.7	96.3		43.8	56.2		97.1	2.9		
PHF	.861	.955	.952	.750	.750	.750	.967	.775	.967	



Accurate Counts

978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014

Groups Printed- Trucks

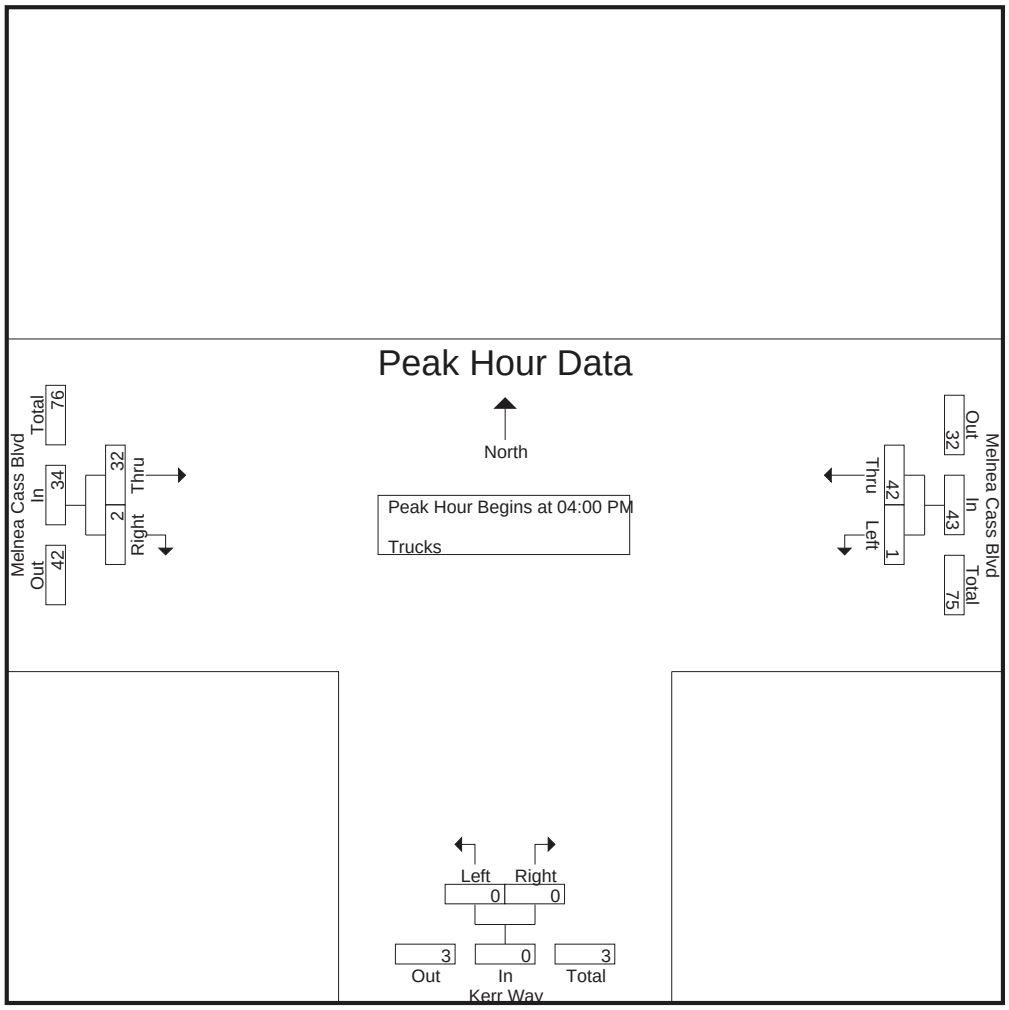
	Melnea Cass Blvd From East		Kerr Way From South		Melnea Cass Blvd From West		
Start Time	Left	Thru	Left	Right	Thru	Right	Int. Total
04:00 PM	0	16	0	0	7	1	24
04:15 PM	0	7	0	0	8	0	15
04:30 PM	0	5	0	0	12	0	17
04:45 PM	1	14	0	0	5	1	21
Total	1	42	0	0	32	2	77
05:00 PM	0	12	0	0	5	0	17
05:15 PM	0	4	0	0	13	0	17
05:30 PM	0	6	0	0	7	0	13
05:45 PM	0	9	0	0	6	0	15
Total	0	31	0	0	31	0	62
Grand Total	1	73	0	0	63	2	139
Apprch %	1.4	98.6	0	0	96.9	3.1	
Total %	0.7	52.5	0	0	45.3	1.4	

Accurate Counts
978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 8

	Melnea Cass Blvd From East			Kerr Way From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:00 PM										
04:00 PM	0	**16**	**16**	0	0	0	7	**1**	8	**24**
04:15 PM	0	7	7	0	0	0	8	0	8	15
04:30 PM	0	5	5	0	0	0	**12**	0	**12**	17
04:45 PM	**1**	14	15	0	0	0	5	1	6	21
Total Volume	1	42	43	0	0	0	32	2	34	77
% App. Total	2.3	97.7		0	0		94.1	5.9		
PHF	.250	.656	.672	.000	.000	.000	.667	.500	.708	.802



Accurate Counts

978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

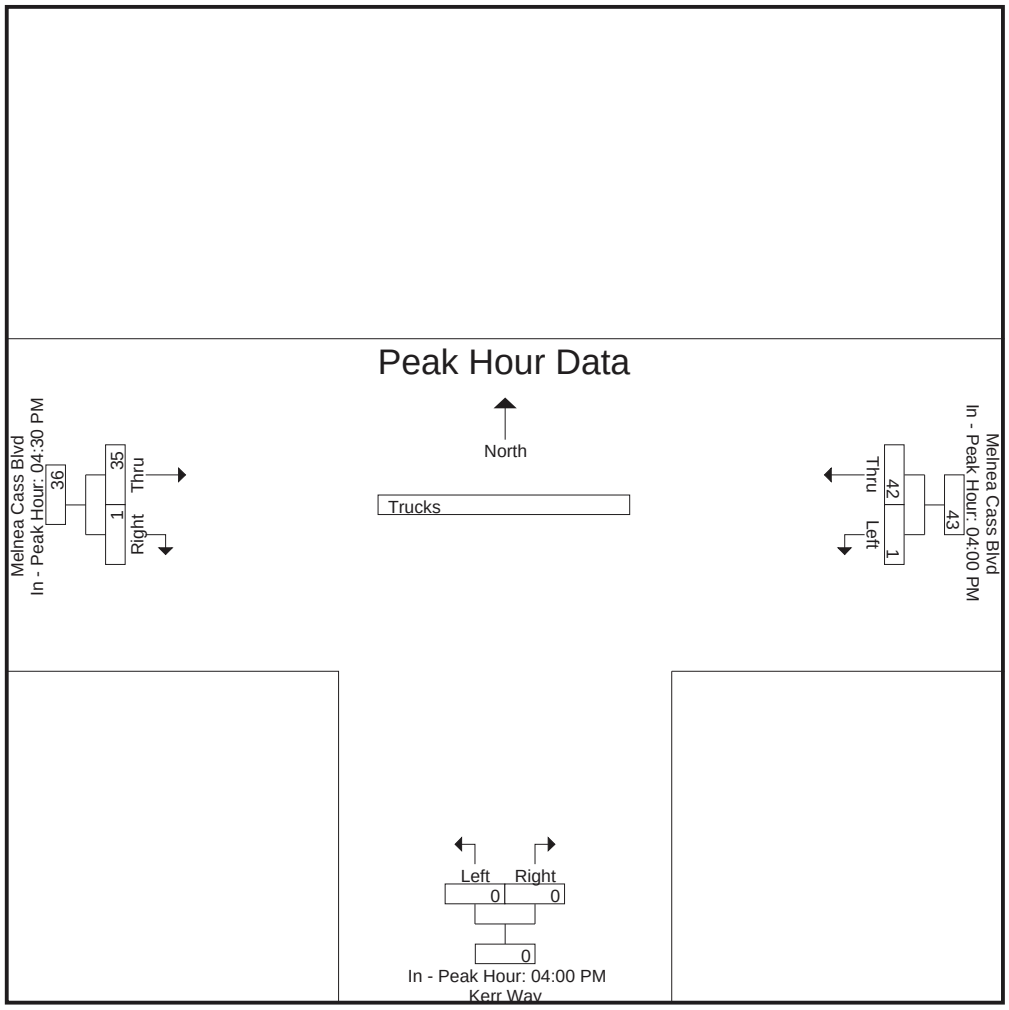
File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 9

	Melnea Cass Blvd From East			Kerr Way From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total

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

Peak Hour for Each Approach Begins at:

	04:00 PM			04:00 PM			04:30 PM		
+0 mins.	0	**16**	**16**	0	0	0	12	0	12
+15 mins.	0	7	7	0	0	0	5	**1**	6
+30 mins.	0	5	5	0	0	0	5	0	5
+45 mins.	**1**	14	15	0	0	0	**13**	0	**13**
Total Volume	1	42	43	0	0	0	35	1	36
% App. Total	2.3	97.7		0	0		97.2	2.8	
PHF	.250	.656	.672	.000	.000	.000	.673	.250	.692



Accurate Counts

978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014

Groups Printed- Bikes Peds

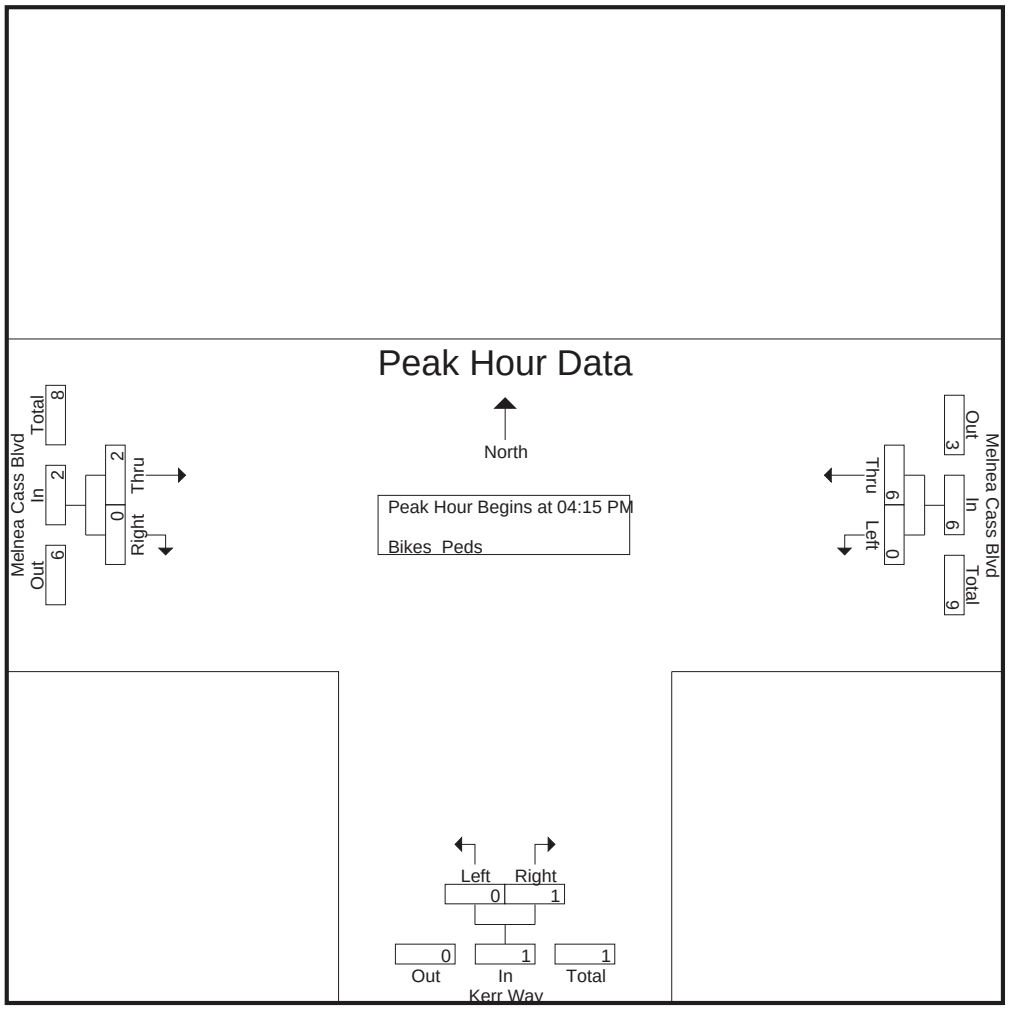
	Melnea Cass Blvd From East			Kerr Way From South			Melnea Cass Blvd From West					
Start Time	Left	Thru	Peds	Left	Right	Peds	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	1	0	0	3	2	0	1	5	2	7
04:15 PM	0	1	0	0	0	4	1	0	0	4	2	6
04:30 PM	0	2	5	0	0	7	1	0	2	14	3	17
04:45 PM	0	1	7	0	0	1	0	0	1	9	1	10
Total	0	4	13	0	0	15	4	0	4	32	8	40
05:00 PM	0	2	0	0	1	1	0	0	4	5	3	8
05:15 PM	0	2	2	0	0	5	0	0	0	7	2	9
05:30 PM	0	0	3	0	0	2	1	0	0	5	1	6
05:45 PM	0	0	9	0	0	1	0	0	1	11	0	11
Total	0	4	14	0	1	9	1	0	5	28	6	34
Grand Total	0	8	27	0	1	24	5	0	9	60	14	74
Apprch %	0	100		0	100		100	0				
Total %	0	57.1		0	7.1		35.7	0		81.1	18.9	

Accurate Counts
978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 11

	Melnea Cass Blvd From East			Kerr Way From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1										
Peak Hour for Entire Intersection Begins at 04:15 PM										
04:15 PM	0	1	1	0	0	0	**1**	0	**1**	2
04:30 PM	0	**2**	**2**	0	0	0	1	0	1	**3**
04:45 PM	0	1	1	0	0	0	0	0	0	1
05:00 PM	0	2	2	0	**1**	**1**	0	0	0	3
Total Volume	0	6	6	0	1	1	2	0	2	9
% App. Total	0	100		0	100		100	0		
PHF	.000	.750	.750	.000	.250	.250	.500	.000	.500	.750



Accurate Counts

978-664-2565

N/S Street : Kerr Way
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

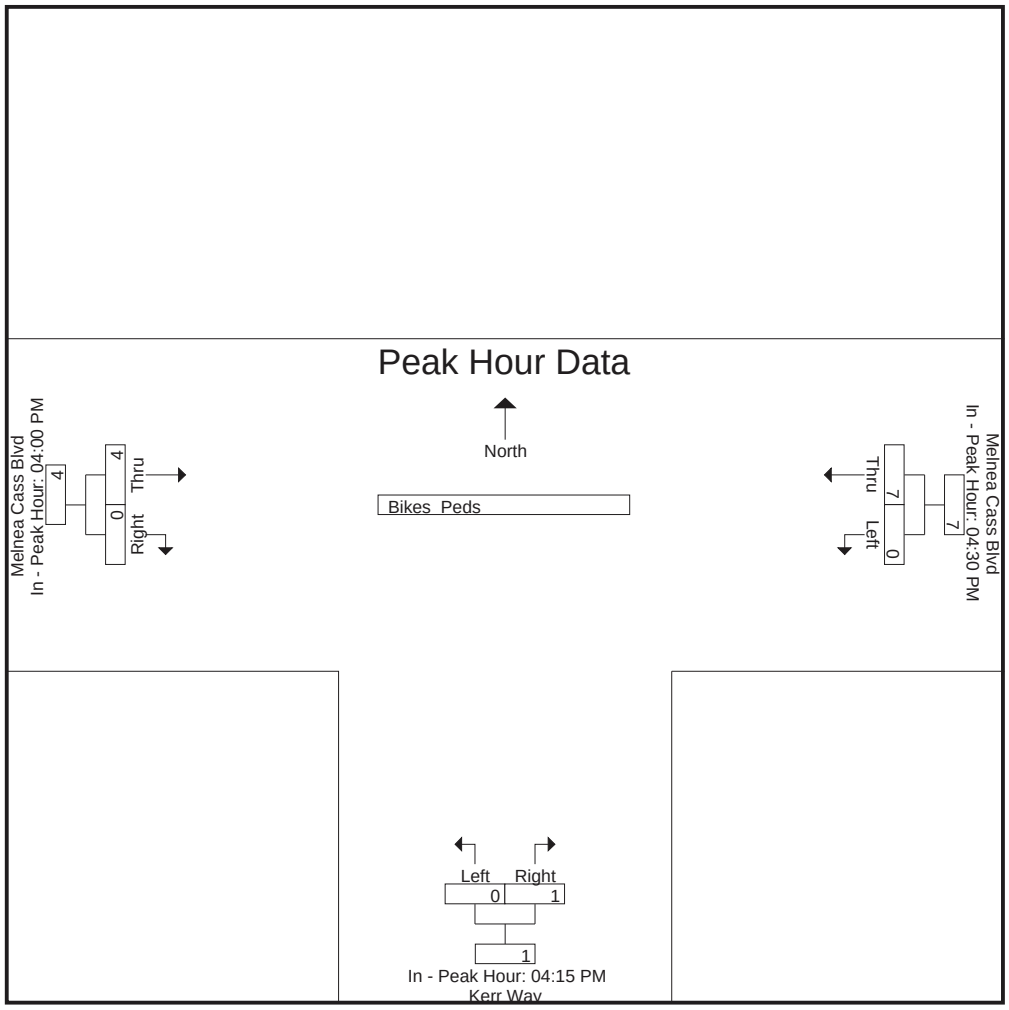
File Name : 14006002
Site Code : 14006002
Start Date : 10/15/2014
Page No : 12

	Melnea Cass Blvd From East			Kerr Way From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	App. Total	Left	Right	App. Total	Thru	Right	App. Total	Int. Total

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

Peak Hour for Each Approach Begins at:

	04:30 PM			04:15 PM			04:00 PM		
+0 mins.	0	**2**	**2**	0	0	0	**2**	0	**2**
+15 mins.	0	1	1	0	0	0	1	0	1
+30 mins.	0	2	2	0	0	0	1	0	1
+45 mins.	0	2	2	0	**1**	**1**	0	0	0
Total Volume	0	7	7	0	1	1	4	0	4
% App. Total	0	100		0	100		100	0	
PHF	.000	.875	.875	.000	.250	.250	.500	.000	.500



Accurate Counts

978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014
Page No : 1

Groups Printed- Cars - Trucks

	Shawmut Ave From North			Melnea Cass Blvd From East			Shawmut Ave From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	6	40	1	36	253	0	0	0	0	0	254	4	594
07:15 AM	7	39	4	28	291	0	0	0	0	0	227	3	599
07:30 AM	6	37	3	28	305	0	0	0	0	0	253	5	637
07:45 AM	8	30	2	33	270	0	0	0	0	0	261	2	606
Total	27	146	10	125	1119	0	0	0	0	0	995	14	2436
08:00 AM	6	52	4	28	302	0	0	0	0	0	222	1	615
08:15 AM	8	62	4	28	287	0	0	0	0	0	222	5	616
08:30 AM	10	56	4	31	246	0	0	0	0	0	241	1	589
08:45 AM	8	52	5	23	265	0	0	0	0	0	234	2	589
Total	32	222	17	110	1100	0	0	0	0	0	919	9	2409
Grand Total	59	368	27	235	2219	0	0	0	0	0	1914	23	4845
Apprch %	13	81.1	5.9	9.6	90.4	0	0	0	0	0	98.8	1.2	
Total %	1.2	7.6	0.6	4.9	45.8	0	0	0	0	0	39.5	0.5	
Cars	56	345	26	228	2101	0	0	0	0	0	1831	22	4609
% Cars	94.9	93.8	96.3	97	94.7	0	0	0	0	0	95.7	95.7	95.1
Trucks	3	23	1	7	118	0	0	0	0	0	83	1	236
% Trucks	5.1	6.2	3.7	3	5.3	0	0	0	0	0	4.3	4.3	4.9

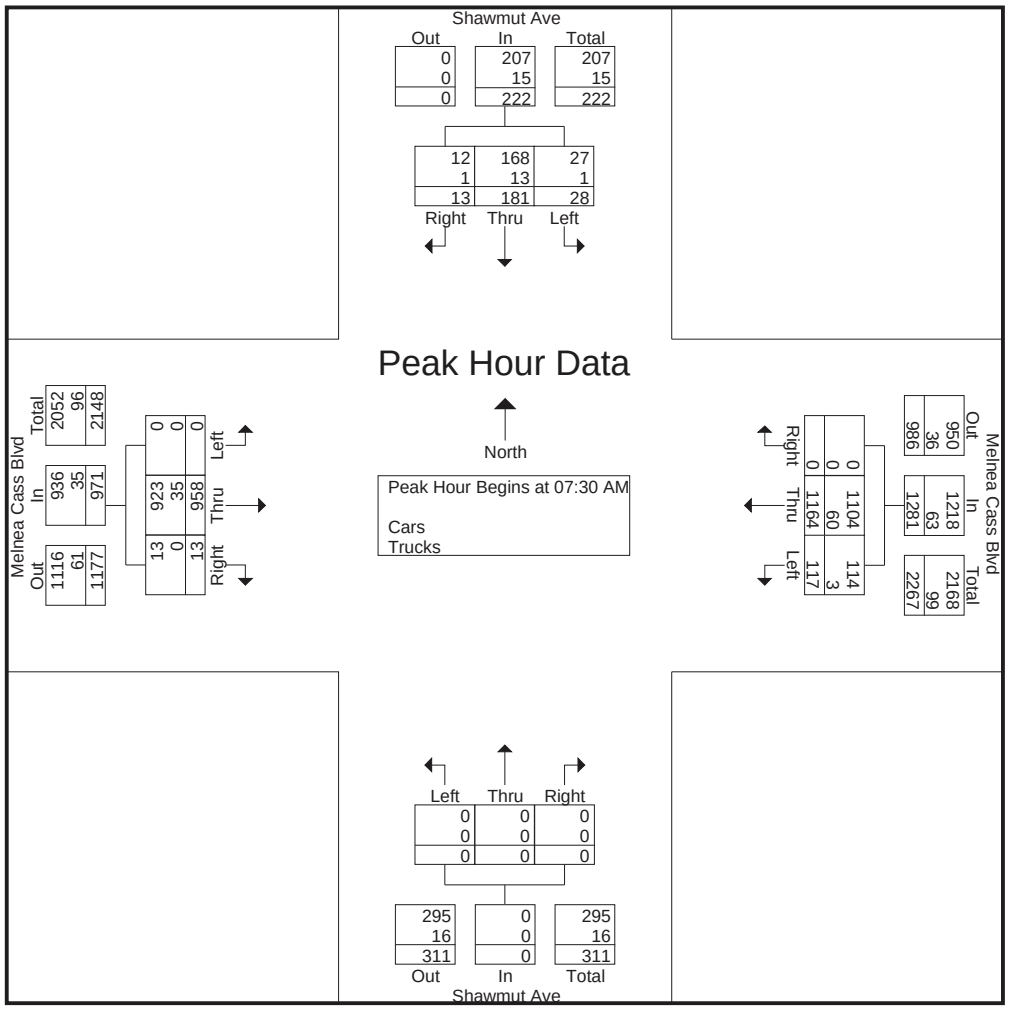
Accurate Counts

978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014
Page No : 2

	Shawmut Ave From North				Melnea Cass Blvd From East				Shawmut Ave From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	6	37	3	46	28	**305**	0	**333**	0	0	0	0	0	253	**5**	258	**637**
07:45 AM	**8**	30	2	40	**33**	270	0	303	0	0	0	0	0	**261**	2	**263**	606
08:00 AM	6	52	**4**	62	28	302	0	330	0	0	0	0	0	222	1	223	615
08:15 AM	8	**62**	4	**74**	28	287	0	315	0	0	0	0	0	222	5	227	616
Total Volume	28	181	13	222	117	1164	0	1281	0	0	0	0	0	958	13	971	2474
% App. Total	12.6	81.5	5.9		9.1	90.9	0		0	0	0		0	98.7	1.3		
PHF	.875	.730	.813	.750	.886	.954	.000	.962	.000	.000	.000	.000	.000	.918	.650	.923	.971
Cars	27	168	12	207	114	1104	0	1218	0	0	0	0	0	923	13	936	2361
% Cars	96.4	92.8	92.3	93.2	97.4	94.8	0	95.1	0	0	0	0	0	96.3	100	96.4	95.4
Trucks	1	13	1	15	3	60	0	63	0	0	0	0	0	35	0	35	113
% Trucks	3.6	7.2	7.7	6.8	2.6	5.2	0	4.9	0	0	0	0	0	3.7	0	3.6	4.6

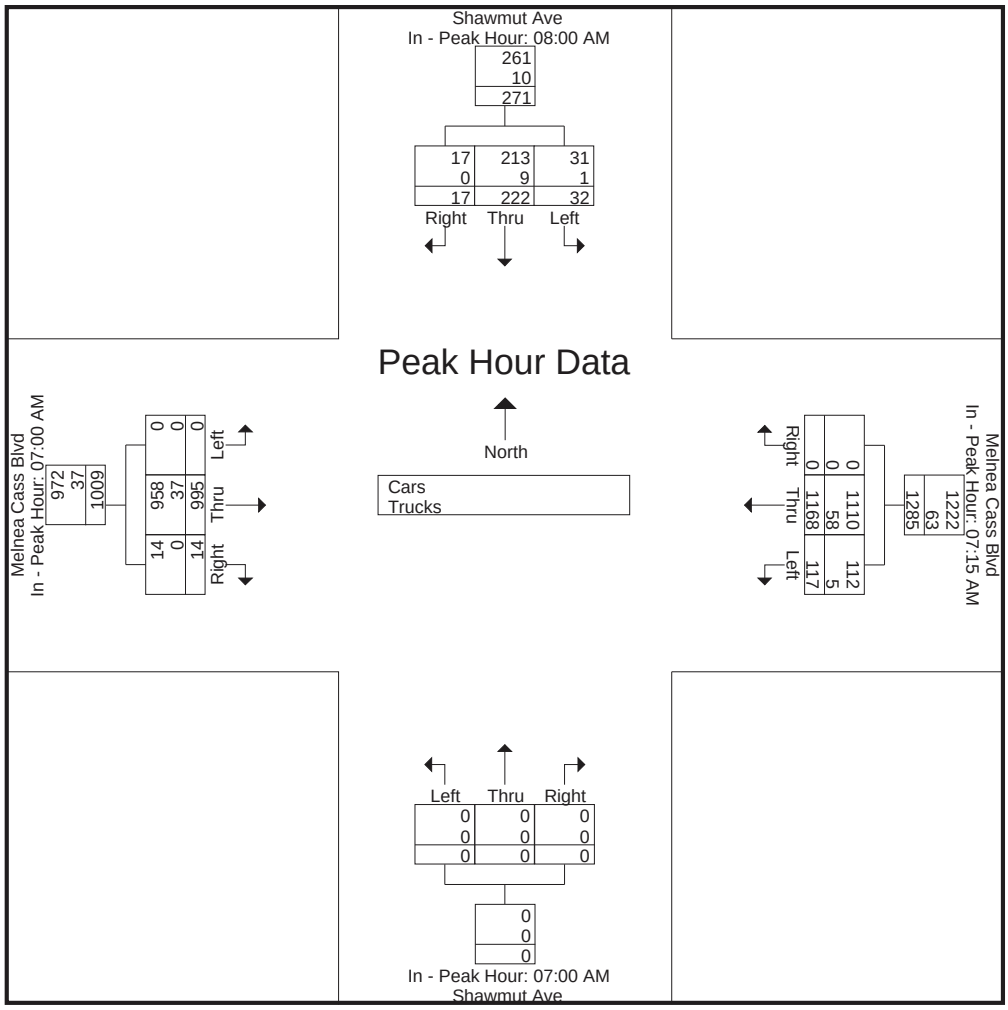


Accurate Counts
978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014
Page No : 3

	Shawmut Ave From North				Melnea Cass Blvd From East				Shawmut Ave From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	08:00 AM				07:15 AM				07:00 AM				07:00 AM				
+0 mins.	6	52	4	62	28	291	0	319	0	0	0	0	0	254	4	258	
+15 mins.	8	**62**	4	**74**	28	**305**	0	**333**	0	0	0	0	0	227	3	230	
+30 mins.	**10**	56	4	70	**33**	270	0	303	0	0	0	0	0	253	**5**	258	
+45 mins.	8	52	**5**	65	28	302	0	330	0	0	0	0	0	**261**	2	**263**	
Total Volume	32	222	17	271	117	1168	0	1285	0	0	0	0	0	995	14	1009	
% App. Total	11.8	81.9	6.3		9.1	90.9	0		0	0	0		0	98.6	1.4		
PHF	.800	.895	.850	.916	.886	.957	.000	.965	.000	.000	.000	.000	.000	.953	.700	.959	
Cars	31	213	17	261	112	1110	0	1222	0	0	0	0	0	958	14	972	
% Cars	96.9	95.9	100	96.3	95.7	95	0	95.1	0	0	0	0	0	96.3	100	96.3	
Trucks	1	9	0	10	5	58	0	63	0	0	0	0	0	37	0	37	
% Trucks	3.1	4.1	0	3.7	4.3	5	0	4.9	0	0	0	0	0	3.7	0	3.7	



Accurate Counts

978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014

Groups Printed- Cars

	Shawmut Ave From North			Melnea Cass Blvd From East			Shawmut Ave From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	5	35	1	34	234	0	0	0	0	0	243	4	556
07:15 AM	7	37	4	26	278	0	0	0	0	0	218	3	573
07:30 AM	6	34	3	27	287	0	0	0	0	0	245	5	607
07:45 AM	7	26	1	32	255	0	0	0	0	0	252	2	575
Total	25	132	9	119	1054	0	0	0	0	0	958	14	2311
08:00 AM	6	46	4	27	290	0	0	0	0	0	212	1	586
08:15 AM	8	62	4	28	272	0	0	0	0	0	214	5	593
08:30 AM	10	55	4	31	234	0	0	0	0	0	236	1	571
08:45 AM	7	50	5	23	251	0	0	0	0	0	211	1	548
Total	31	213	17	109	1047	0	0	0	0	0	873	8	2298
Grand Total	56	345	26	228	2101	0	0	0	0	0	1831	22	4609
Apprch %	13.1	80.8	6.1	9.8	90.2	0	0	0	0	0	98.8	1.2	
Total %	1.2	7.5	0.6	4.9	45.6	0	0	0	0	0	39.7	0.5	

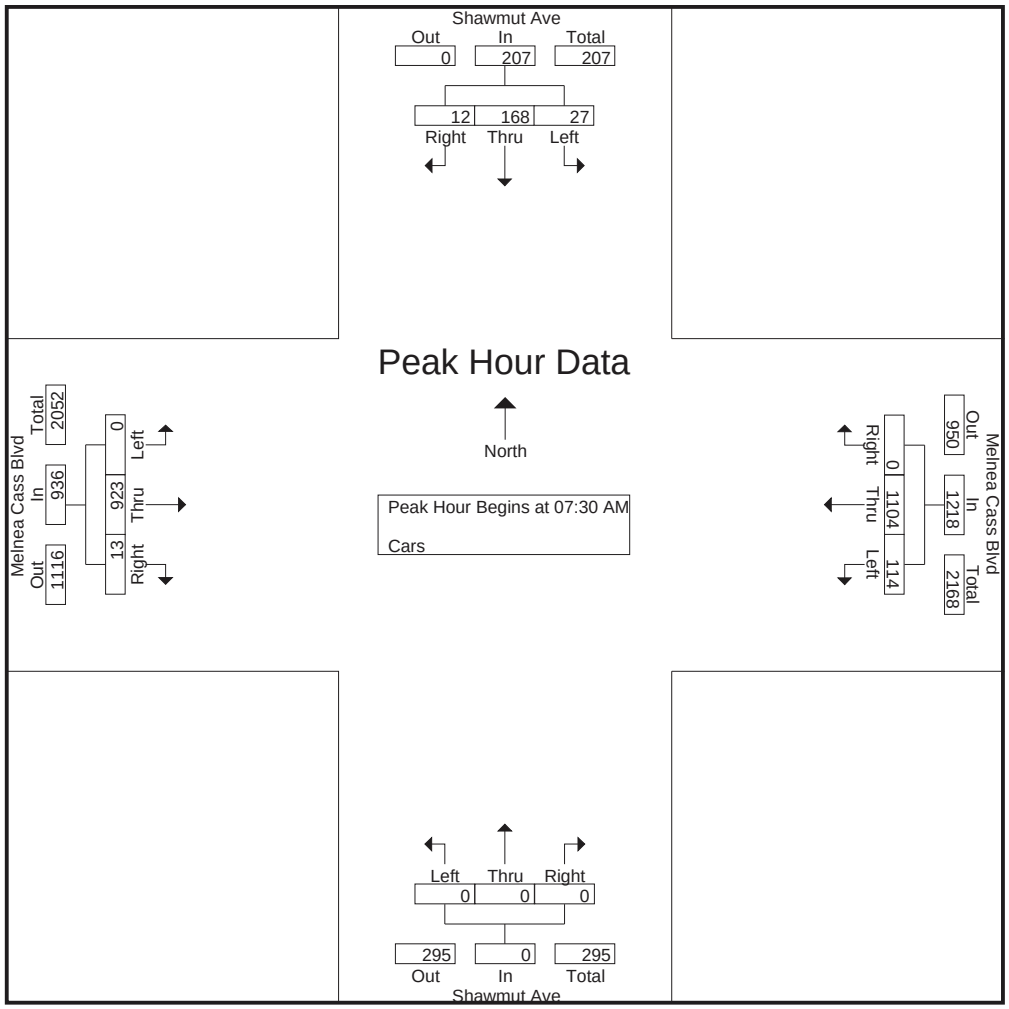
Accurate Counts

978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014
Page No : 5

	Shawmut Ave From North				Melnea Cass Blvd From East				Shawmut Ave From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:30 AM																	
07:30 AM	6	34	3	43	27	287	0	314	0	0	0	0	0	245	**5**	250	**607**
07:45 AM	7	26	1	34	**32**	255	0	287	0	0	0	0	0	**252**	2	**254**	575
08:00 AM	6	46	**4**	56	27	**290**	0	**317**	0	0	0	0	0	212	1	213	586
08:15 AM	**8**	**62**	4	**74**	28	272	0	300	0	0	0	0	0	214	5	219	593
Total Volume	27	168	12	207	114	1104	0	1218	0	0	0	0	0	923	13	936	2361
% App. Total	13	81.2	5.8		9.4	90.6	0		0	0	0		0	98.6	1.4		
PHF	.844	.677	.750	.699	.891	.952	.000	.961	.000	.000	.000	.000	.000	.916	.650	.921	.972



Accurate Counts
978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

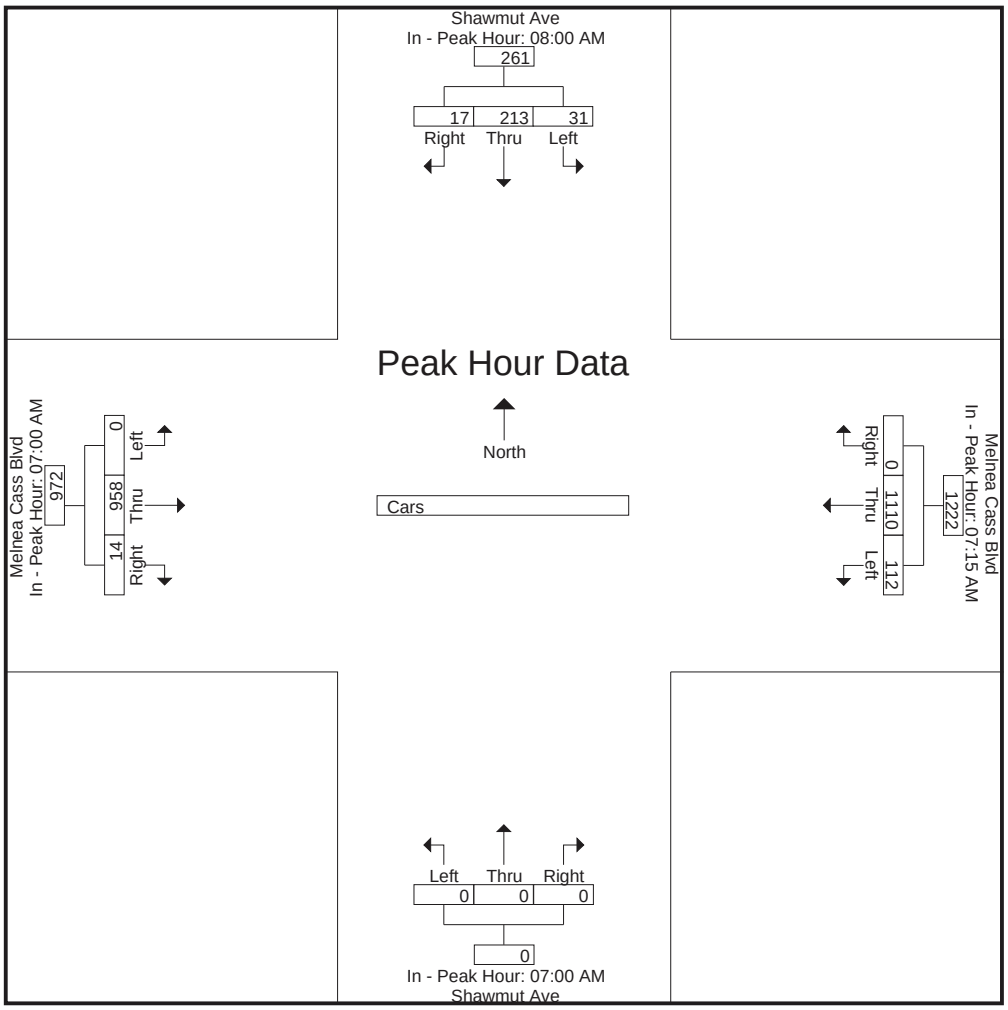
File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014
Page No : 6

	Shawmut Ave From North				Melnea Cass Blvd From East				Shawmut Ave From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	08:00 AM				07:15 AM				07:00 AM				07:00 AM				
+0 mins.	6	46	4	56	26	278	0	304	0	0	0	0	0	243	4	247	
+15 mins.	8	**62**	4	**74**	27	287	0	314	0	0	0	0	0	218	3	221	
+30 mins.	**10**	55	4	69	**32**	255	0	287	0	0	0	0	0	245	**5**	250	
+45 mins.	7	50	**5**	62	27	**290**	0	**317**	0	0	0	0	0	**252**	2	**254**	
Total Volume	31	213	17	261	112	1110	0	1222	0	0	0	0	0	958	14	972	
% App. Total	11.9	81.6	6.5		9.2	90.8	0		0	0	0		0	98.6	1.4		
PHF	.775	.859	.850	.882	.875	.957	.000	.964	.000	.000	.000	.000	.000	.950	.700	.957	



Accurate Counts

978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014

Groups Printed- Trucks

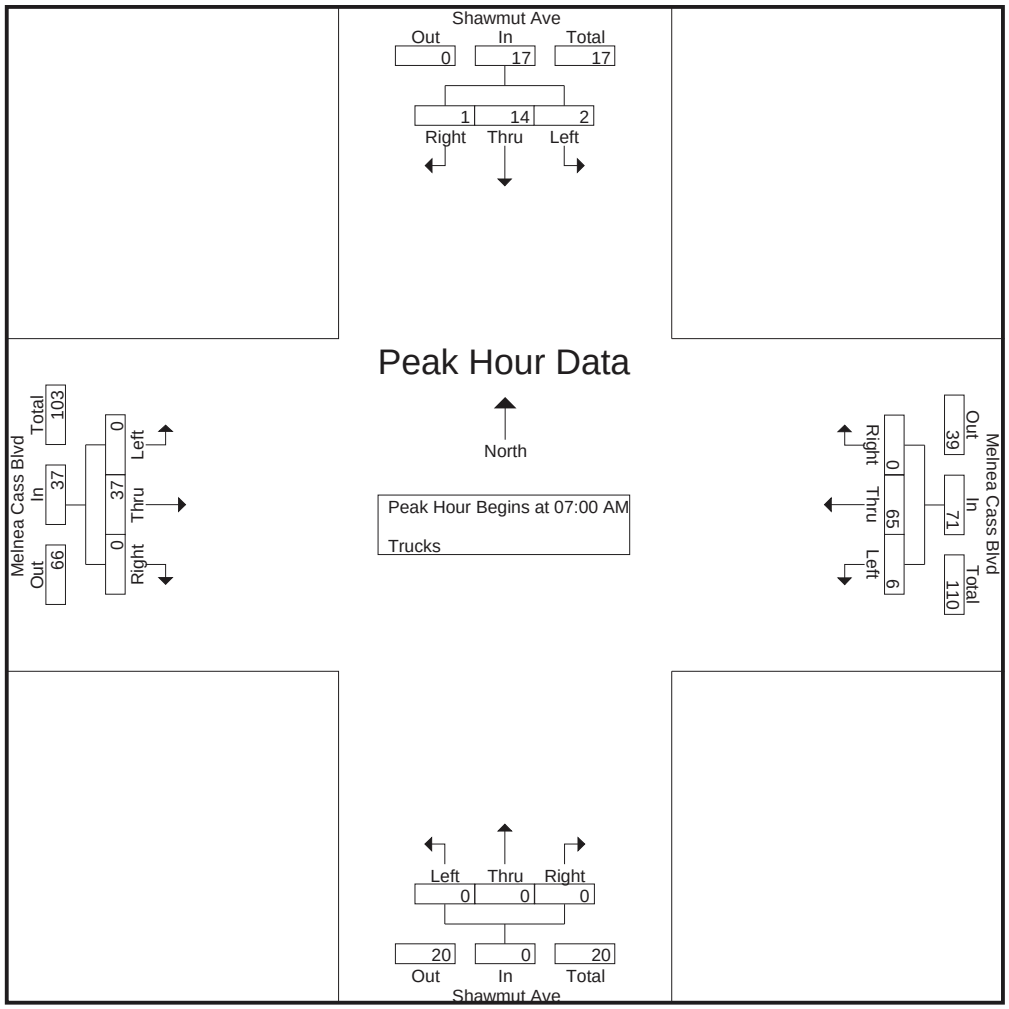
	Shawmut Ave From North			Melnea Cass Blvd From East			Shawmut Ave From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
07:00 AM	1	5	0	2	19	0	0	0	0	0	11	0	38
07:15 AM	0	2	0	2	13	0	0	0	0	0	9	0	26
07:30 AM	0	3	0	1	18	0	0	0	0	0	8	0	30
07:45 AM	1	4	1	1	15	0	0	0	0	0	9	0	31
Total	2	14	1	6	65	0	0	0	0	0	37	0	125
08:00 AM	0	6	0	1	12	0	0	0	0	0	10	0	29
08:15 AM	0	0	0	0	15	0	0	0	0	0	8	0	23
08:30 AM	0	1	0	0	12	0	0	0	0	0	5	0	18
08:45 AM	1	2	0	0	14	0	0	0	0	0	23	1	41
Total	1	9	0	1	53	0	0	0	0	0	46	1	111
Grand Total	3	23	1	7	118	0	0	0	0	0	83	1	236
Apprch %	11.1	85.2	3.7	5.6	94.4	0	0	0	0	0	98.8	1.2	
Total %	1.3	9.7	0.4	3	50	0	0	0	0	0	35.2	0.4	

Accurate Counts
978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014
Page No : 8

	Shawmut Ave From North				Melnea Cass Blvd From East				Shawmut Ave From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:00 AM																	
07:00 AM	**1**	**5**	0	**6**	**2**	**19**	0	**21**	0	0	0	0	0	**11**	0	**11**	**38**
07:15 AM	0	2	0	2	2	13	0	15	0	0	0	0	0	9	0	9	26
07:30 AM	0	3	0	3	1	18	0	19	0	0	0	0	0	8	0	8	30
07:45 AM	1	4	**1**	6	1	15	0	16	0	0	0	0	0	9	0	9	31
Total Volume	2	14	1	17	6	65	0	71	0	0	0	0	0	37	0	37	125
% App. Total	11.8	82.4	5.9		8.5	91.5	0		0	0	0		0	100	0		
PHF	.500	.700	.250	.708	.750	.855	.000	.845	.000	.000	.000	.000	.000	.841	.000	.841	.822



Accurate Counts

978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

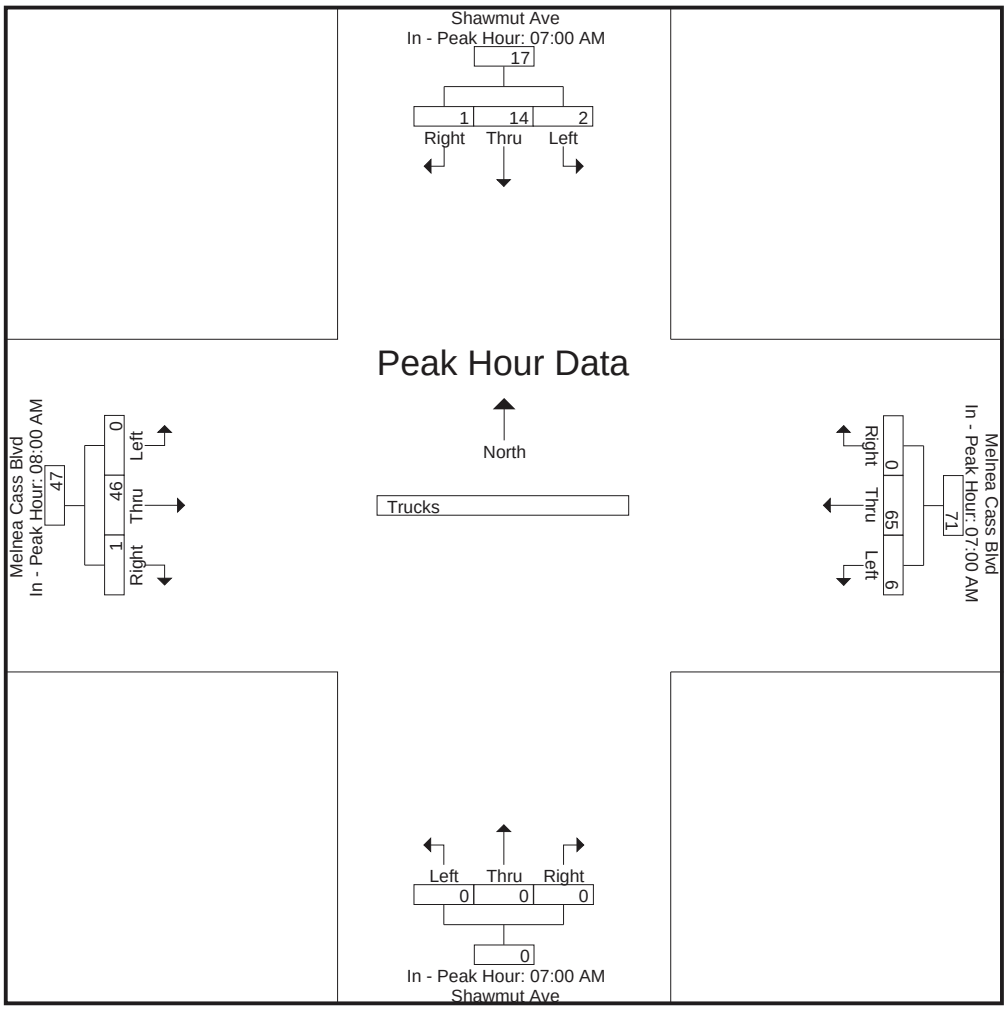
File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014
Page No : 9

	Shawmut Ave From North				Melnea Cass Blvd From East				Shawmut Ave From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Each Approach Begins at:

	07:00 AM				07:00 AM				07:00 AM				08:00 AM				
+0 mins.	**1**	**5**	0	**6**	**2**	**19**	0	**21**	0	0	0	0	0	10	0	10	
+15 mins.	0	2	0	2	2	13	0	15	0	0	0	0	0	8	0	8	
+30 mins.	0	3	0	3	1	18	0	19	0	0	0	0	0	5	0	5	
+45 mins.	1	4	**1**	6	1	15	0	16	0	0	0	0	0	**23**	**1**	**24**	
Total Volume	2	14	1	17	6	65	0	71	0	0	0	0	0	46	1	47	
% App. Total	11.8	82.4	5.9		8.5	91.5	0		0	0	0		0	97.9	2.1		
PHF	.500	.700	.250	.708	.750	.855	.000	.845	.000	.000	.000	.000	.000	.500	.250	.490	



Accurate Counts

978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014

Groups Printed- Bikes Peds

	Shawmut Ave From North				Melnea Cass Blvd From East				Shawmut Ave From South				Melnea Cass Blvd From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
07:00 AM	0	0	0	4	0	0	0	2	0	0	0	0	0	0	0	10	16	0	16
07:15 AM	0	0	0	5	0	3	0	2	0	0	1	1	1	3	0	3	11	8	19
07:30 AM	0	0	0	1	0	5	0	2	0	0	0	0	1	6	0	3	6	12	18
07:45 AM	0	0	0	5	0	2	0	1	0	0	0	0	0	3	0	11	17	5	22
Total	0	0	0	15	0	10	0	7	0	0	1	1	2	12	0	27	50	25	75
08:00 AM	0	0	0	6	0	4	0	3	0	1	0	0	0	4	0	7	16	9	25
08:15 AM	0	1	0	2	0	0	0	2	0	0	0	1	0	4	0	6	11	5	16
08:30 AM	0	1	0	0	0	0	0	4	0	0	0	0	0	2	0	0	4	3	7
08:45 AM	0	0	0	5	0	0	0	9	0	0	0	1	0	6	0	4	19	6	25
Total	0	2	0	13	0	4	0	18	0	1	0	2	0	16	0	17	50	23	73
Grand Total	0	2	0	28	0	14	0	25	0	1	1	3	2	28	0	44	100	48	148
Apprch %	0	100	0		0	100	0		0	50	50		6.7	93.3	0				
Total %	0	4.2	0		0	29.2	0		0	2.1	2.1		4.2	58.3	0		67.6	32.4	

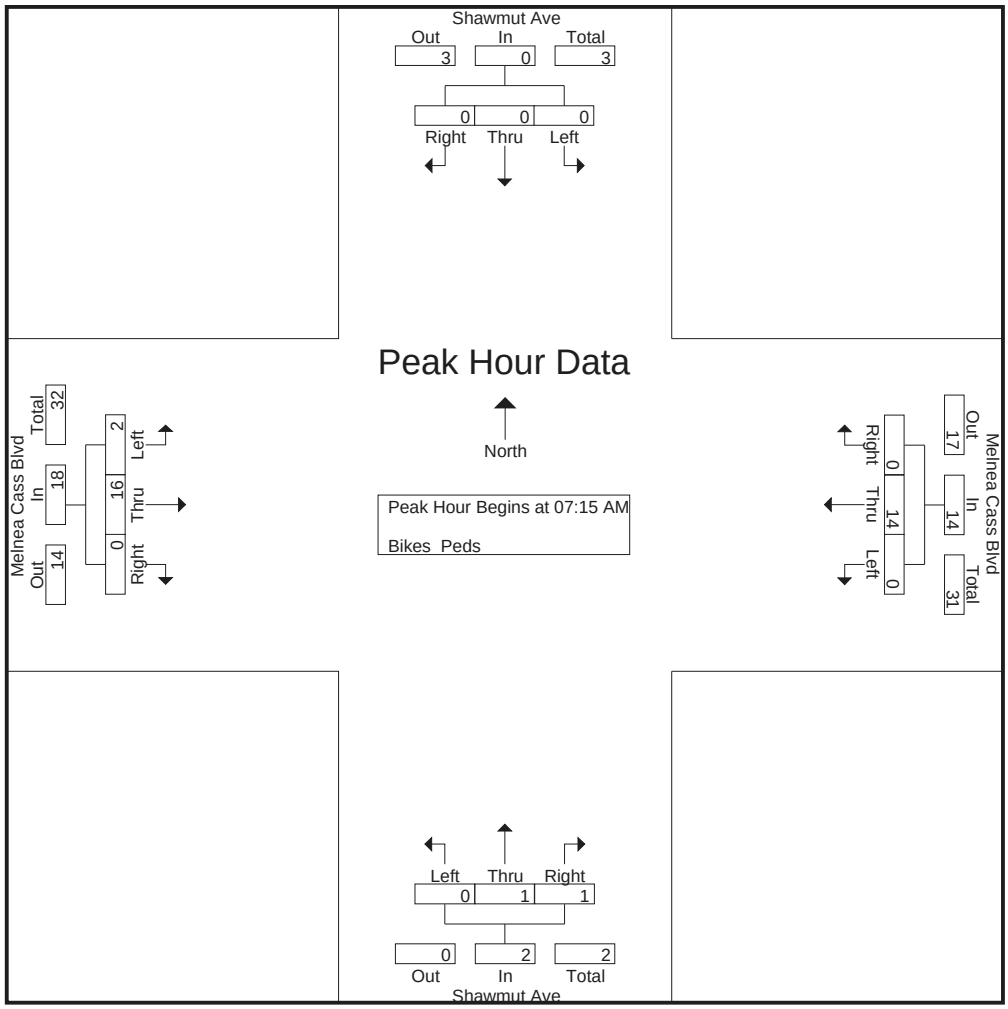
Accurate Counts

978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014
Page No : 11

	Shawmut Ave From North				Melnea Cass Blvd From East				Shawmut Ave From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	0	0	0	0	3	0	3	0	0	**1**	**1**	**1**	3	0	4	8
07:30 AM	0	0	0	0	0	**5**	0	**5**	0	0	0	0	1	**6**	0	**7**	**12**
07:45 AM	0	0	0	0	0	2	0	2	0	0	0	0	0	3	0	3	5
08:00 AM	0	0	0	0	0	4	0	4	0	**1**	0	1	0	4	0	4	9
Total Volume	0	0	0	0	0	14	0	14	0	1	1	2	2	16	0	18	34
% App. Total	0	0	0		0	100	0		0	50	50		11.1	88.9	0		
PHF	.000	.000	.000	.000	.000	.700	.000	.700	.000	.250	.250	.500	.500	.667	.000	.643	.708



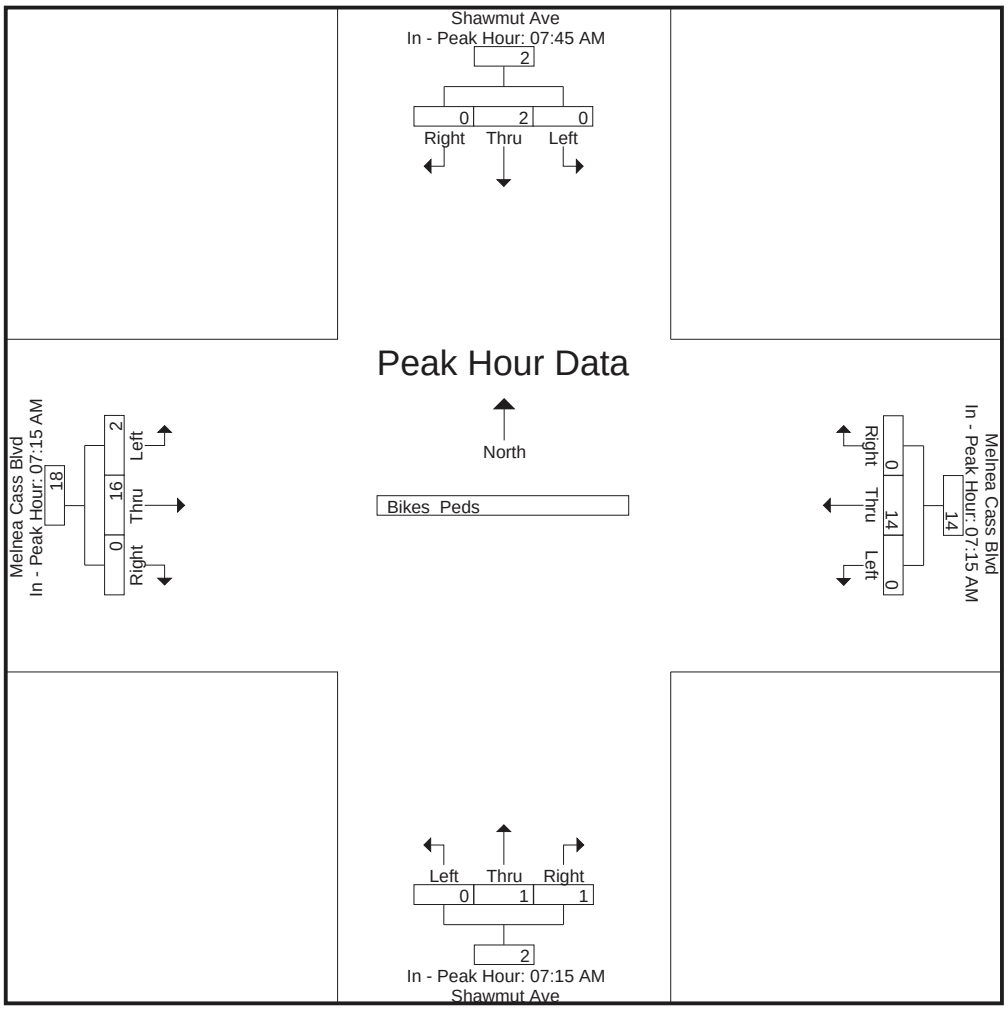
Accurate Counts

978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014
Page No : 12

	Shawmut Ave From North				Melnea Cass Blvd From East				Shawmut Ave From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	07:45 AM				07:15 AM				07:15 AM				07:15 AM				
+0 mins.	0	0	0	0	0	3	0	3	0	0	**1**	**1**	**1**	3	0	4	
+15 mins.	0	0	0	0	0	**5**	0	**5**	0	0	0	0	1	**6**	0	**7**	
+30 mins.	0	**1**	0	**1**	0	2	0	2	0	0	0	0	0	3	0	3	
+45 mins.	0	1	0	1	0	4	0	4	0	**1**	0	1	0	4	0	4	
Total Volume	0	2	0	2	0	14	0	14	0	1	1	2	2	16	0	18	
% App. Total	0	100	0		0	100	0		0	50	50		11.1	88.9	0		
PHF	.000	.500	.000	.500	.000	.700	.000	.700	.000	.250	.250	.500	.500	.667	.000	.643	



Accurate Counts

978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014
Page No : 1

Groups Printed- Cars - Trucks

	Shawmut Ave From North			Melnea Cass Blvd From East			Shawmut Ave From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	7	100	5	53	226	0	0	0	0	0	265	8	664
04:15 PM	16	64	2	52	180	0	0	0	0	0	259	9	582
04:30 PM	10	90	6	31	209	0	0	0	0	0	245	6	597
04:45 PM	13	87	7	44	217	0	0	0	0	0	274	12	654
Total	46	341	20	180	832	0	0	0	0	0	1043	35	2497
05:00 PM	11	105	3	46	204	0	0	0	0	0	242	6	617
05:15 PM	9	99	4	51	230	0	0	0	0	0	292	11	696
05:30 PM	11	96	4	45	192	0	0	0	0	0	265	7	620
05:45 PM	12	69	4	41	241	0	0	0	0	0	269	13	649
Total	43	369	15	183	867	0	0	0	0	0	1068	37	2582
Grand Total	89	710	35	363	1699	0	0	0	0	0	2111	72	5079
Apprch %	10.7	85.1	4.2	17.6	82.4	0	0	0	0	0	96.7	3.3	
Total %	1.8	14	0.7	7.1	33.5	0	0	0	0	0	41.6	1.4	
Cars	85	705	35	360	1627	0	0	0	0	0	2050	69	4931
% Cars	95.5	99.3	100	99.2	95.8	0	0	0	0	0	97.1	95.8	97.1
Trucks	4	5	0	3	72	0	0	0	0	0	61	3	148
% Trucks	4.5	0.7	0	0.8	4.2	0	0	0	0	0	2.9	4.2	2.9

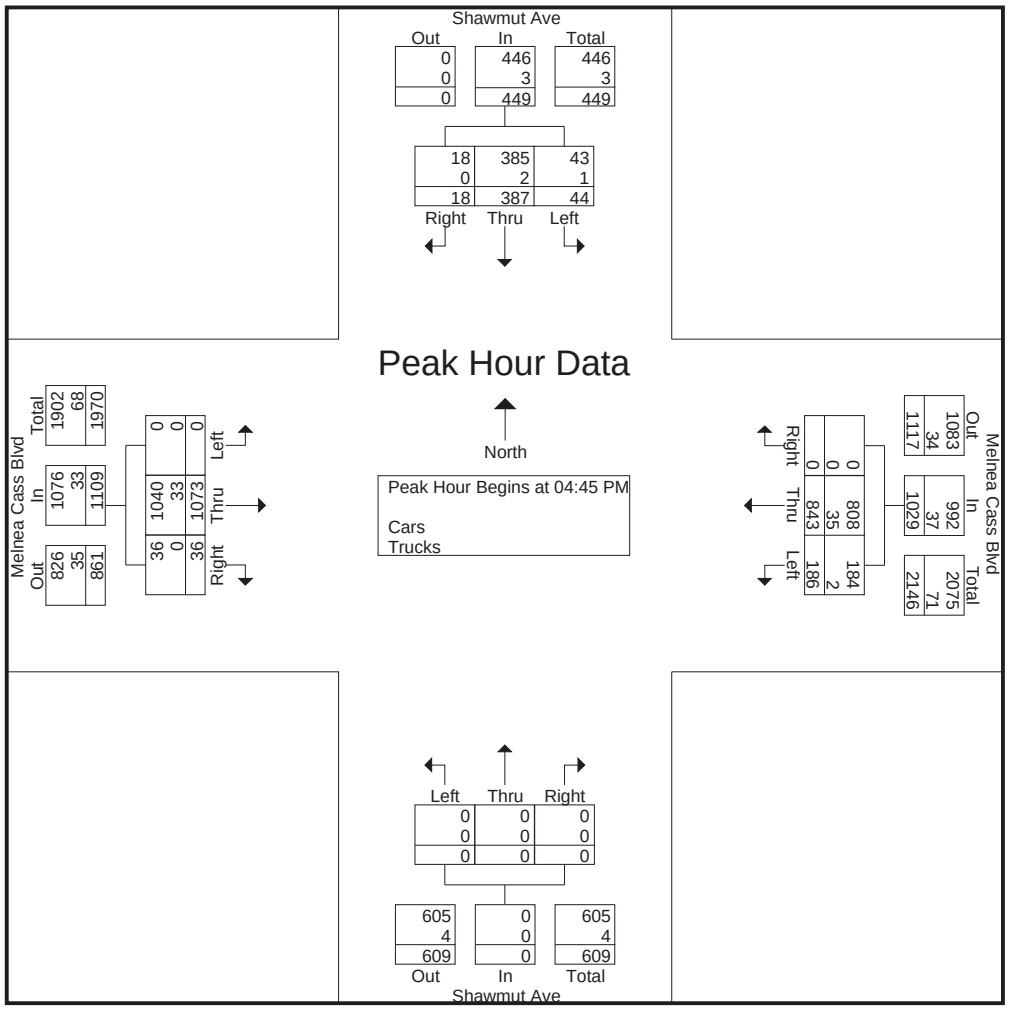
Accurate Counts

978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014
Page No : 2

	Shawmut Ave From North				Melnea Cass Blvd From East				Shawmut Ave From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	**13**	87	**7**	107	44	217	0	261	0	0	0	0	0	274	**12**	286	654
05:00 PM	11	**105**	3	**119**	46	204	0	250	0	0	0	0	0	242	6	248	617
05:15 PM	9	99	4	112	**51**	**230**	0	**281**	0	0	0	0	0	**292**	11	**303**	**696**
05:30 PM	11	96	4	111	45	192	0	237	0	0	0	0	0	265	7	272	620
Total Volume	44	387	18	449	186	843	0	1029	0	0	0	0	0	1073	36	1109	2587
% App. Total	9.8	86.2	4		18.1	81.9	0		0	0	0		0	96.8	3.2		
PHF	.846	.921	.643	.943	.912	.916	.000	.915	.000	.000	.000	.000	.000	.919	.750	.915	.929
Cars	43	385	18	446	184	808	0	992	0	0	0	0	0	1040	36	1076	2514
% Cars	97.7	99.5	100	99.3	98.9	95.8	0	96.4	0	0	0	0	0	96.9	100	97.0	97.2
Trucks	1	2	0	3	2	35	0	37	0	0	0	0	0	33	0	33	73
% Trucks	2.3	0.5	0	0.7	1.1	4.2	0	3.6	0	0	0	0	0	3.1	0	3.0	2.8



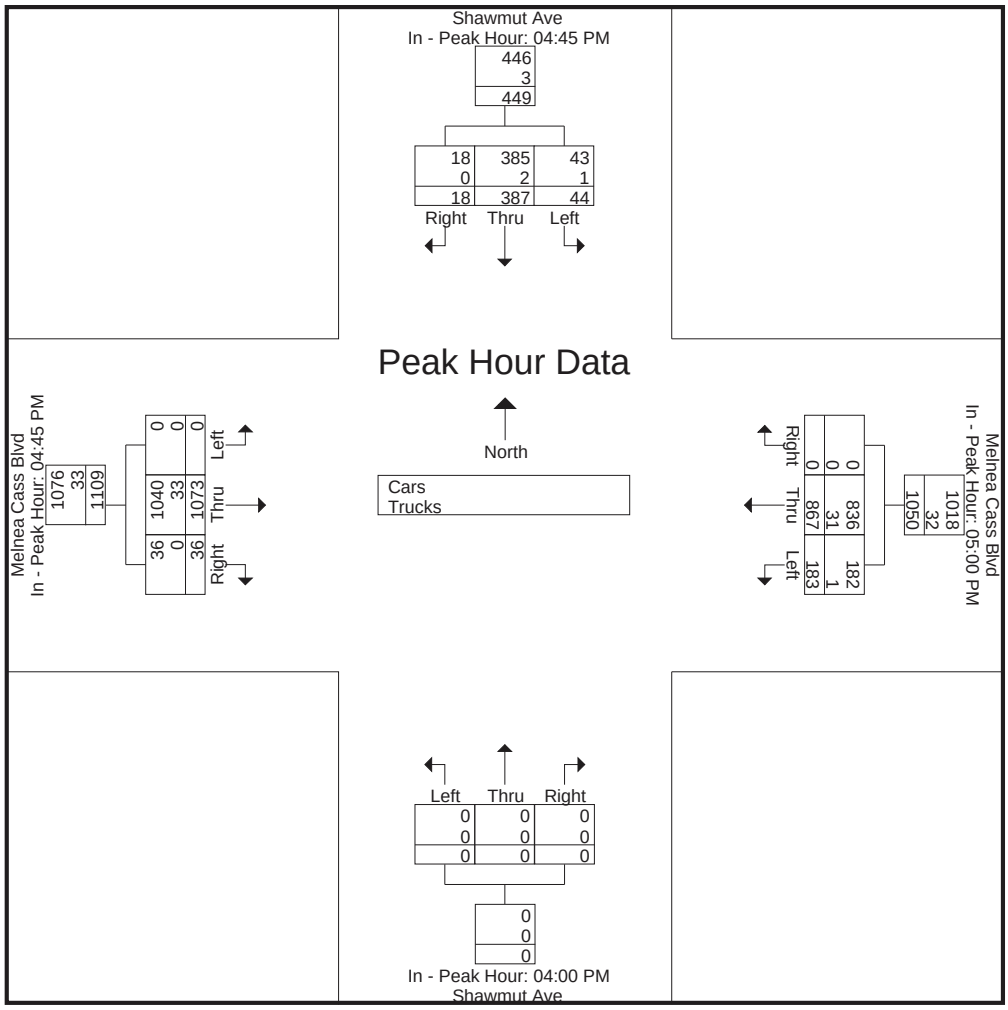
Accurate Counts

978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014
Page No : 3

	Shawmut Ave From North				Melnea Cass Blvd From East				Shawmut Ave From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:45 PM				05:00 PM				04:00 PM				04:45 PM				
+0 mins.	**13**	87	**7**	107	46	204	0	250	0	0	0	0	0	274	**12**	286	
+15 mins.	11	**105**	3	**119**	**51**	230	0	281	0	0	0	0	0	242	6	248	
+30 mins.	9	99	4	112	45	192	0	237	0	0	0	0	0	**292**	11	**303**	
+45 mins.	11	96	4	111	41	**241**	0	**282**	0	0	0	0	0	265	7	272	
Total Volume	44	387	18	449	183	867	0	1050	0	0	0	0	0	1073	36	1109	
% App. Total	9.8	86.2	4		17.4	82.6	0		0	0	0		0	96.8	3.2		
PHF	.846	.921	.643	.943	.897	.899	.000	.931	.000	.000	.000	.000	.000	.919	.750	.915	
Cars	43	385	18	446	182	836	0	1018	0	0	0	0	0	1040	36	1076	
% Cars	97.7	99.5	100	99.3	99.5	96.4	0	97	0	0	0	0	0	96.9	100	97	
Trucks	1	2	0	3	1	31	0	32	0	0	0	0	0	33	0	33	
% Trucks	2.3	0.5	0	0.7	0.5	3.6	0	3	0	0	0	0	0	3.1	0	3	



Accurate Counts

978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014

Groups Printed- Cars

	Shawmut Ave From North			Melnea Cass Blvd From East			Shawmut Ave From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	7	97	5	53	210	0	0	0	0	0	259	6	637
04:15 PM	14	64	2	51	173	0	0	0	0	0	252	9	565
04:30 PM	10	90	6	31	205	0	0	0	0	0	235	6	583
04:45 PM	12	86	7	43	203	0	0	0	0	0	266	12	629
Total	43	337	20	178	791	0	0	0	0	0	1012	33	2414
05:00 PM	11	105	3	46	192	0	0	0	0	0	238	6	601
05:15 PM	9	98	4	51	226	0	0	0	0	0	278	11	677
05:30 PM	11	96	4	44	187	0	0	0	0	0	258	7	607
05:45 PM	11	69	4	41	231	0	0	0	0	0	264	12	632
Total	42	368	15	182	836	0	0	0	0	0	1038	36	2517
Grand Total	85	705	35	360	1627	0	0	0	0	0	2050	69	4931
Apprch %	10.3	85.5	4.2	18.1	81.9	0	0	0	0	0	96.7	3.3	
Total %	1.7	14.3	0.7	7.3	33	0	0	0	0	0	41.6	1.4	

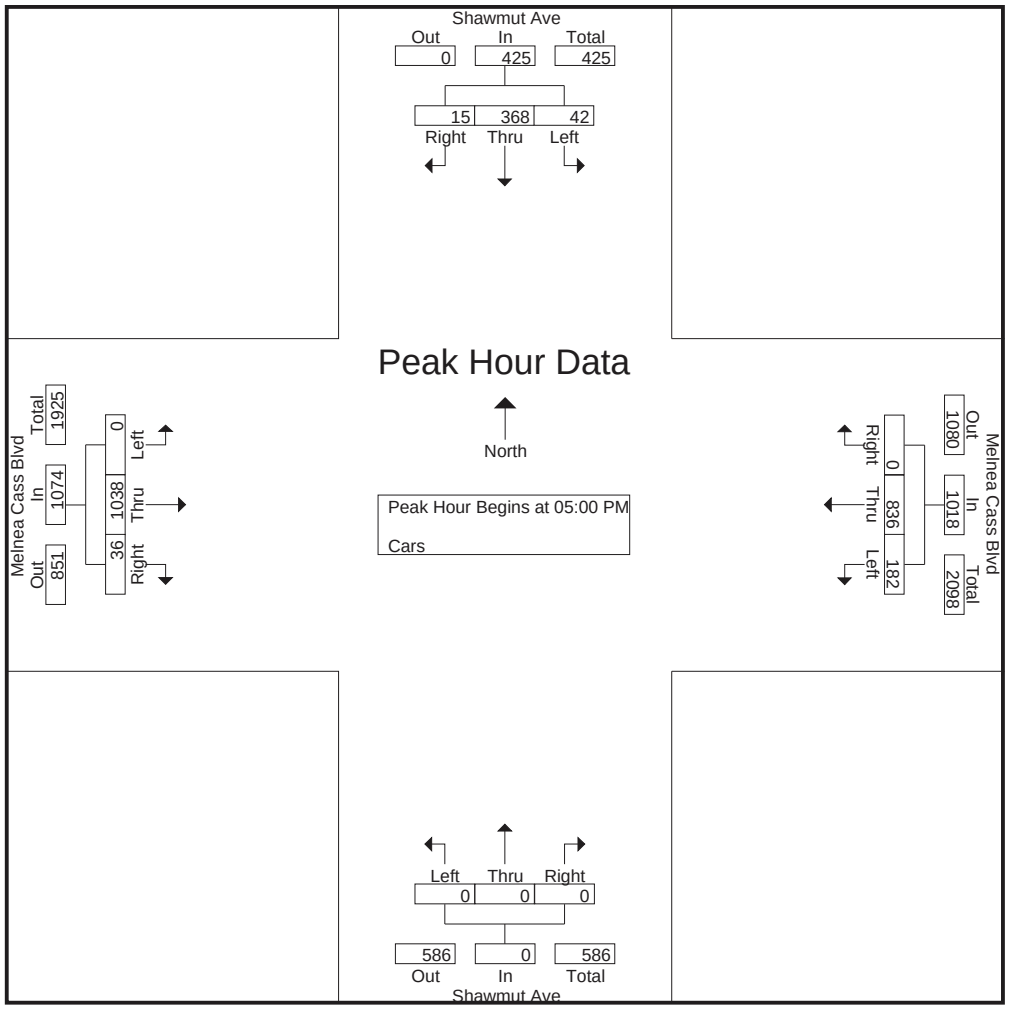
Accurate Counts

978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014
Page No : 5

	Shawmut Ave From North				Melnea Cass Blvd From East				Shawmut Ave From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	**11**	**105**	3	**119**	46	192	0	238	0	0	0	0	0	238	6	244	601
05:15 PM	9	98	**4**	111	**51**	226	0	**277**	0	0	0	0	0	**278**	11	**289**	**677**
05:30 PM	11	96	4	111	44	187	0	231	0	0	0	0	0	258	7	265	607
05:45 PM	11	69	4	84	41	**231**	0	272	0	0	0	0	0	264	**12**	276	632
Total Volume	42	368	15	425	182	836	0	1018	0	0	0	0	0	1038	36	1074	2517
% App. Total	9.9	86.6	3.5		17.9	82.1	0		0	0	0		0	96.6	3.4		
PHF	.955	.876	.938	.893	.892	.905	.000	.919	.000	.000	.000	.000	.000	.933	.750	.929	.929



Accurate Counts

978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

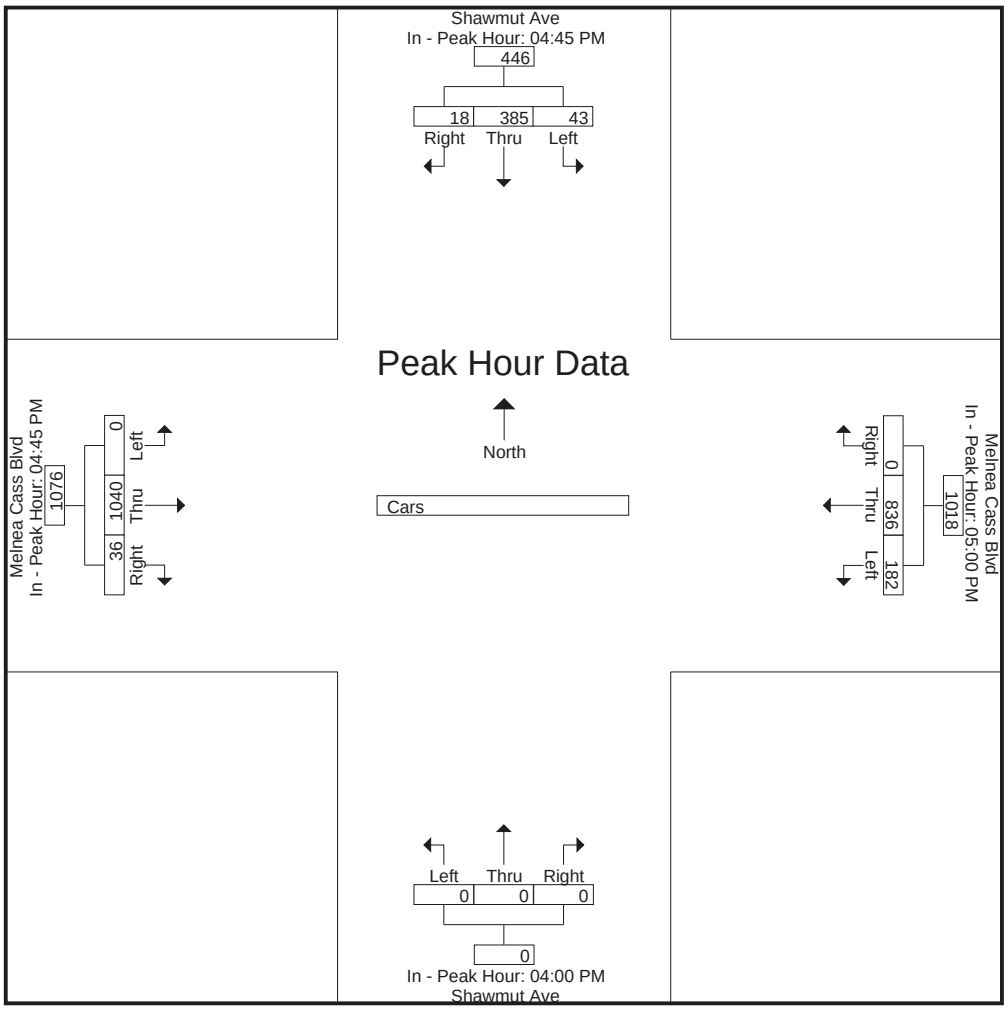
File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014
Page No : 6

	Shawmut Ave From North				Melnea Cass Blvd From East				Shawmut Ave From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total

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

Peak Hour for Each Approach Begins at:

	04:45 PM				05:00 PM				04:00 PM				04:45 PM			
+0 mins.	**12**	86	**7**	105	46	192	0	238	0	0	0	0	0	266	**12**	278
+15 mins.	11	**105**	3	**119**	**51**	226	0	**277**	0	0	0	0	0	238	6	244
+30 mins.	9	98	4	111	44	187	0	231	0	0	0	0	0	**278**	11	**289**
+45 mins.	11	96	4	111	41	**231**	0	272	0	0	0	0	0	258	7	265
Total Volume	43	385	18	446	182	836	0	1018	0	0	0	0	0	1040	36	1076
% App. Total	9.6	86.3	4		17.9	82.1	0		0	0	0		0	96.7	3.3	
PHF	.896	.917	.643	.937	.892	.905	.000	.919	.000	.000	.000	.000	.000	.935	.750	.931



Accurate Counts

978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014

Groups Printed- Trucks

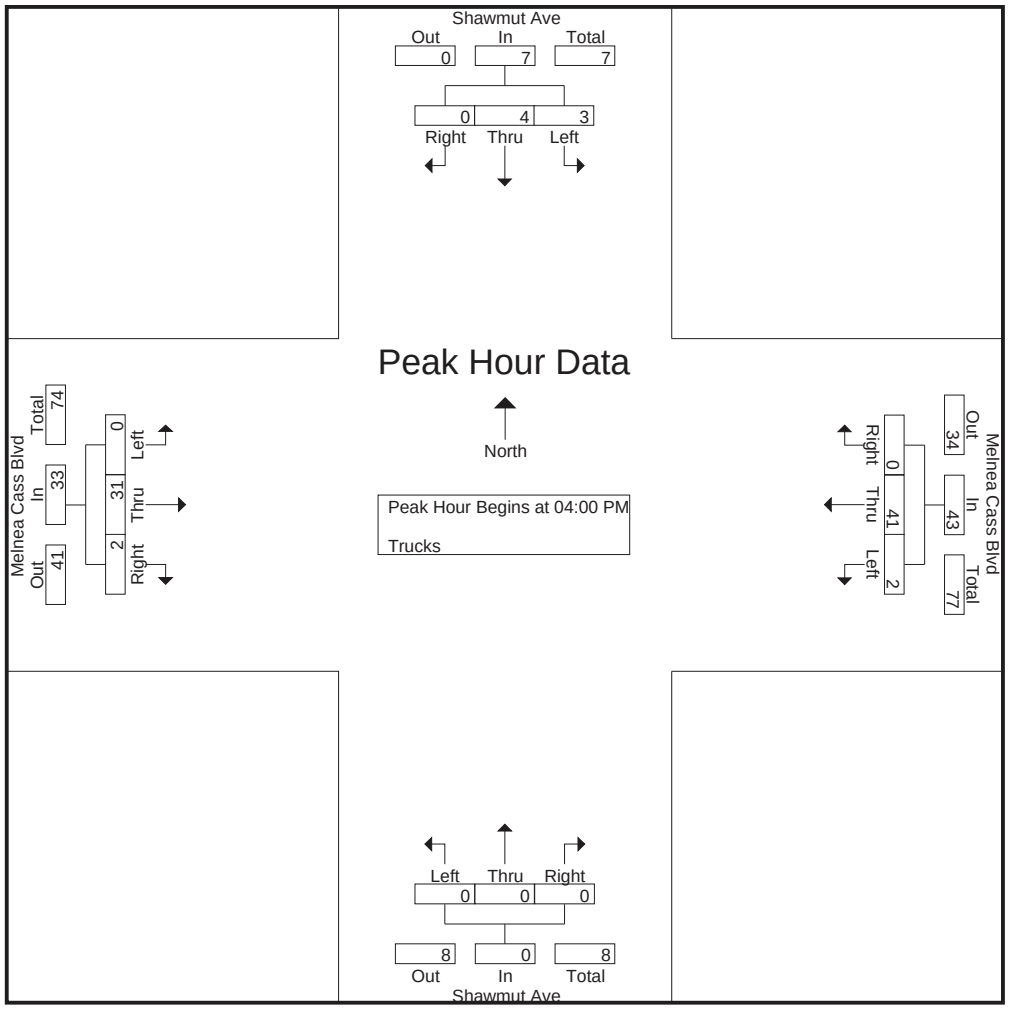
	Shawmut Ave From North			Melnea Cass Blvd From East			Shawmut Ave From South			Melnea Cass Blvd From West			
Start Time	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Int. Total
04:00 PM	0	3	0	0	16	0	0	0	0	0	6	2	27
04:15 PM	2	0	0	1	7	0	0	0	0	0	7	0	17
04:30 PM	0	0	0	0	4	0	0	0	0	0	10	0	14
04:45 PM	1	1	0	1	14	0	0	0	0	0	8	0	25
Total	3	4	0	2	41	0	0	0	0	0	31	2	83
05:00 PM	0	0	0	0	12	0	0	0	0	0	4	0	16
05:15 PM	0	1	0	0	4	0	0	0	0	0	14	0	19
05:30 PM	0	0	0	1	5	0	0	0	0	0	7	0	13
05:45 PM	1	0	0	0	10	0	0	0	0	0	5	1	17
Total	1	1	0	1	31	0	0	0	0	0	30	1	65
Grand Total	4	5	0	3	72	0	0	0	0	0	61	3	148
Apprch %	44.4	55.6	0	4	96	0	0	0	0	0	95.3	4.7	
Total %	2.7	3.4	0	2	48.6	0	0	0	0	0	41.2	2	

Accurate Counts
978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014
Page No : 8

	Shawmut Ave From North				Melnea Cass Blvd From East				Shawmut Ave From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:00 PM																	
04:00 PM	0	**3**	0	**3**	0	**16**	0	**16**	0	0	0	0	0	6	**2**	8	**27**
04:15 PM	**2**	0	0	2	**1**	7	0	8	0	0	0	0	0	7	0	7	17
04:30 PM	0	0	0	0	0	4	0	4	0	0	0	0	0	**10**	0	**10**	14
04:45 PM	1	1	0	2	1	14	0	15	0	0	0	0	0	8	0	8	25
Total Volume	3	4	0	7	2	41	0	43	0	0	0	0	0	31	2	33	83
% App. Total	42.9	57.1	0		4.7	95.3	0		0	0	0		0	93.9	6.1		
PHF	.375	.333	.000	.583	.500	.641	.000	.672	.000	.000	.000	.000	.000	.775	.250	.825	.769



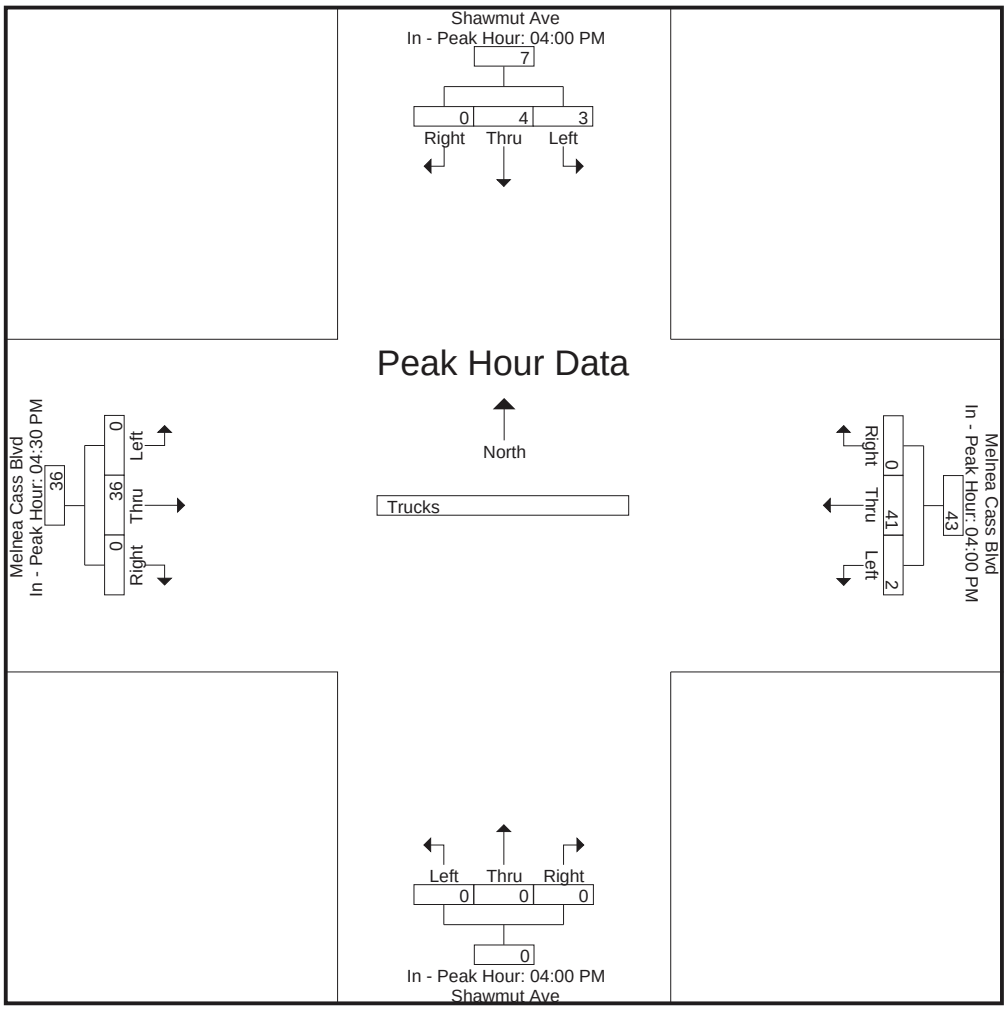
Accurate Counts

978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014
Page No : 9

	Shawmut Ave From North				Melnea Cass Blvd From East				Shawmut Ave From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Each Approach Begins at:																	
	04:00 PM				04:00 PM				04:00 PM				04:30 PM				
+0 mins.	0	**3**	0	**3**	0	**16**	0	**16**	0	0	0	0	0	10	0	10	
+15 mins.	**2**	0	0	2	**1**	7	0	8	0	0	0	0	0	8	0	8	
+30 mins.	0	0	0	0	0	4	0	4	0	0	0	0	0	4	0	4	
+45 mins.	1	1	0	2	1	14	0	15	0	0	0	0	0	**14**	0	**14**	
Total Volume	3	4	0	7	2	41	0	43	0	0	0	0	0	36	0	36	
% App. Total	42.9	57.1	0		4.7	95.3	0		0	0	0		0	100	0		
PHF	.375	.333	.000	.583	.500	.641	.000	.672	.000	.000	.000	.000	.000	.643	.000	.643	



Accurate Counts
978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014

Groups Printed- Bikes Peds

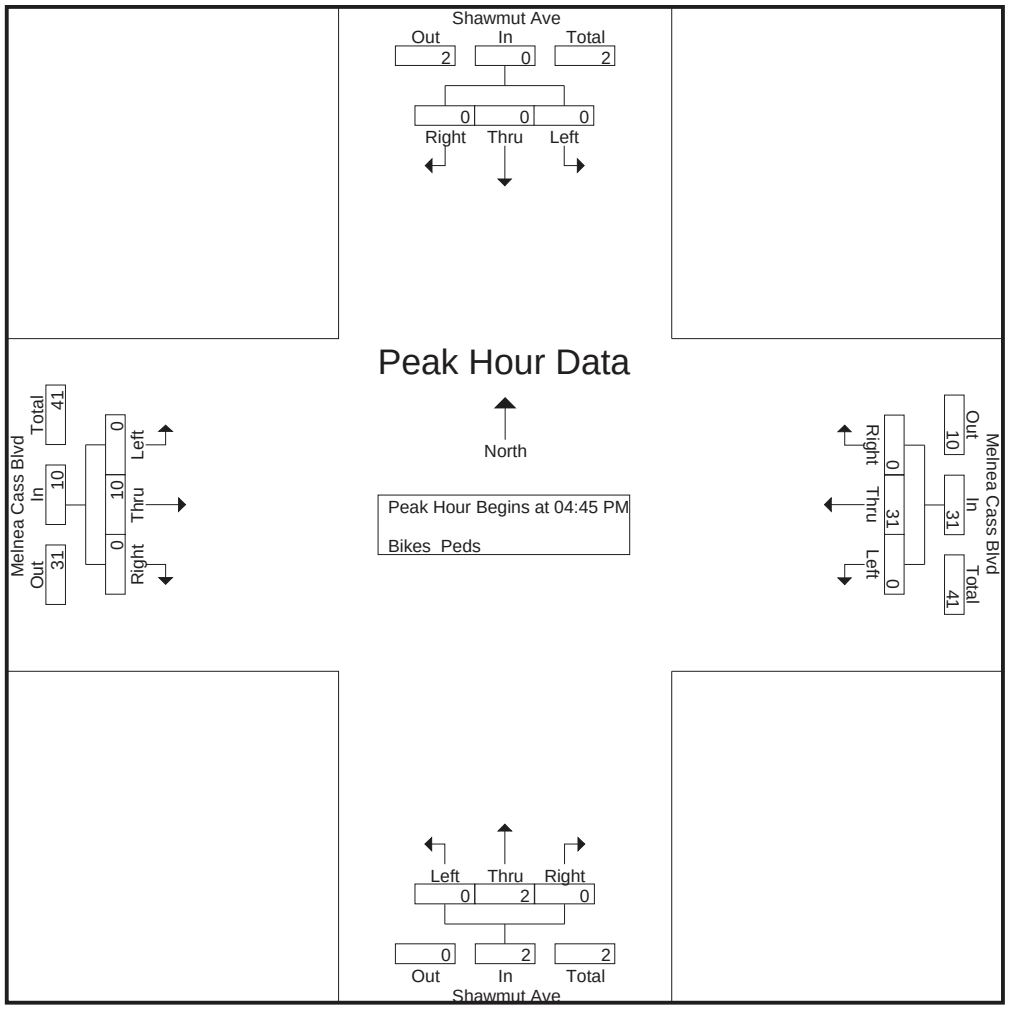
	Shawmut Ave From North				Melnea Cass Blvd From East				Shawmut Ave From South				Melnea Cass Blvd From West						
Start Time	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Left	Thru	Right	Peds	Exclu. Total	Inclu. Total	Int. Total
04:00 PM	0	0	0	6	1	1	0	2	0	0	0	2	0	0	0	11	21	2	23
04:15 PM	1	1	0	4	0	4	0	1	0	0	0	0	0	2	0	11	16	8	24
04:30 PM	0	3	0	5	0	3	0	3	0	2	0	1	0	1	0	6	15	9	24
04:45 PM	0	0	0	4	0	7	0	1	0	1	0	0	0	4	0	1	6	12	18
Total	1	4	0	19	1	15	0	7	0	3	0	3	0	7	0	29	58	31	89
05:00 PM	0	0	0	6	0	3	0	4	0	0	0	0	0	1	0	2	12	4	16
05:15 PM	0	0	0	10	0	10	0	1	0	1	0	0	0	1	0	6	17	12	29
05:30 PM	0	0	0	6	0	11	0	1	0	0	0	3	0	4	0	9	19	15	34
05:45 PM	0	1	0	10	0	4	0	5	0	3	0	3	0	0	0	16	34	8	42
Total	0	1	0	32	0	28	0	11	0	4	0	6	0	6	0	33	82	39	121
Grand Total	1	5	0	51	1	43	0	18	0	7	0	9	0	13	0	62	140	70	210
Apprch %	16.7	83.3	0		2.3	97.7	0		0	100	0		0	100	0				
Total %	1.4	7.1	0		1.4	61.4	0		0	10	0		0	18.6	0		66.7	33.3	

Accurate Counts
978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014
Page No : 11

	Shawmut Ave From North				Melnea Cass Blvd From East				Shawmut Ave From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	0	0	0	0	0	7	0	7	0	**1**	0	**1**	0	**4**	0	**4**	12
05:00 PM	0	0	0	0	0	3	0	3	0	0	0	0	0	1	0	1	4
05:15 PM	0	0	0	0	0	10	0	10	0	1	0	1	0	1	0	1	12
05:30 PM	0	0	0	0	0	**11**	0	**11**	0	0	0	0	0	4	0	4	**15**
Total Volume	0	0	0	0	0	31	0	31	0	2	0	2	0	10	0	10	43
% App. Total	0	0	0		0	100	0		0	100	0		0	100	0		
PHF	.000	.000	.000	.000	.000	.705	.000	.705	.000	.500	.000	.500	.000	.625	.000	.625	.717



Accurate Counts

978-664-2565

N/S Street : Shawmut Avenue
E/W Street : Melnea Cass Boulevard
City/State : Boston, MA
Weather : Clear

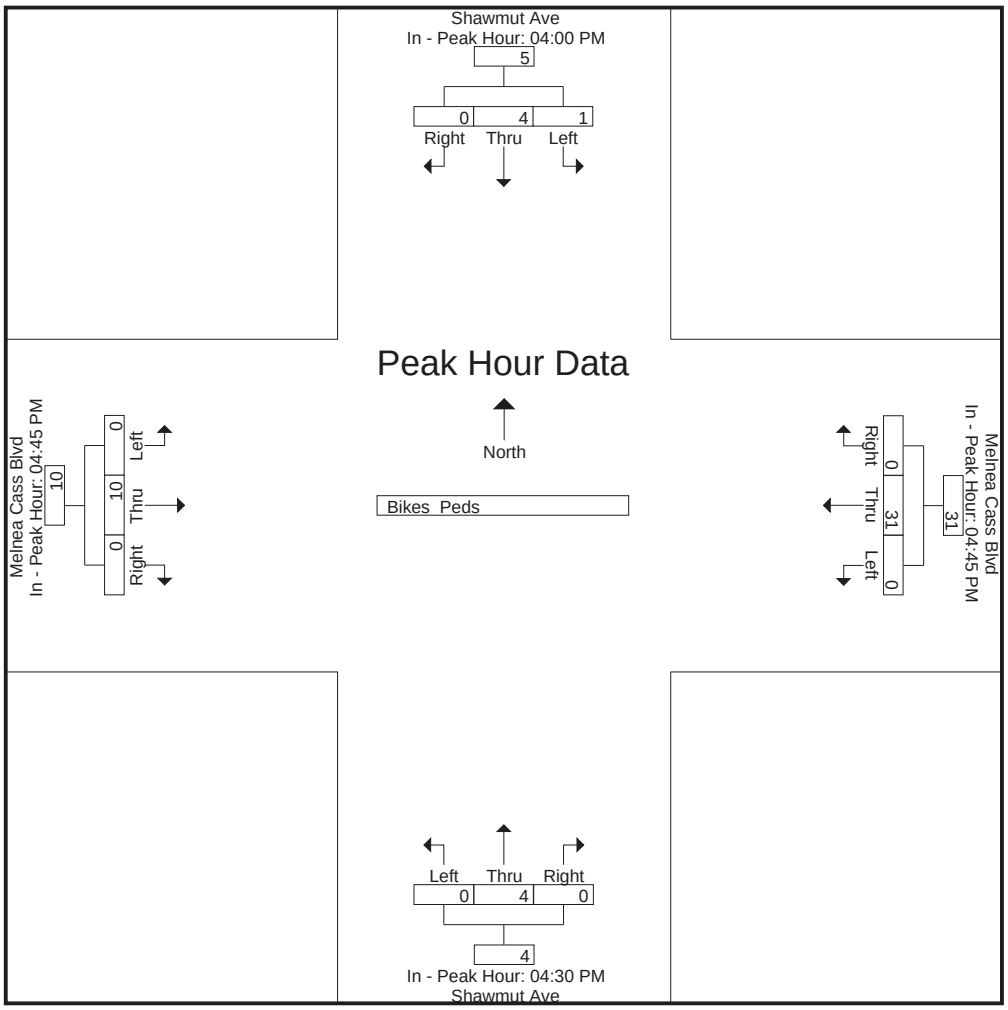
File Name : 14006003
Site Code : 14006003
Start Date : 10/15/2014
Page No : 12

	Shawmut Ave From North				Melnea Cass Blvd From East				Shawmut Ave From South				Melnea Cass Blvd From West				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total

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

Peak Hour for Each Approach Begins at:

	04:00 PM				04:45 PM				04:30 PM				04:45 PM				
+0 mins.	0	0	0	0	0	7	0	7	0	**2**	0	**2**	0	**4**	0	**4**	
+15 mins.	**1**	1	0	2	0	3	0	3	0	1	0	1	0	1	0	1	
+30 mins.	0	**3**	0	**3**	0	10	0	10	0	0	0	0	0	1	0	1	
+45 mins.	0	0	0	0	0	**11**	0	**11**	0	1	0	1	0	4	0	4	
Total Volume	1	4	0	5	0	31	0	31	0	4	0	4	0	10	0	10	
% App. Total	20	80	0		0	100	0		0	100	0		0	100	0		
PHF	.250	.333	.000	.417	.000	.705	.000	.705	.000	.500	.000	.500	.000	.625	.000	.625	



INTERSECTION CAPACITY ANALYSIS WORKSHEETS

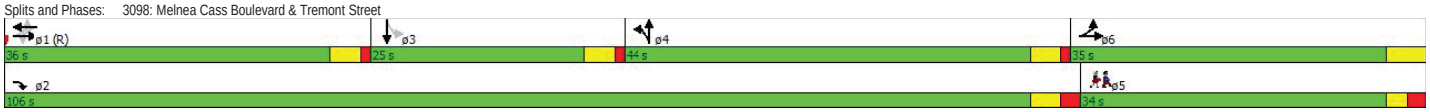
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5
Lane Configurations													
Volume (vph)	357	514	934	31	314	14	905	210	46	2	38	105	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	
Storage Length (ft)	0		0	0		0	300		0	0		0	
Storage Lanes	0		1	0		0	1		0	0		0	
Taper Length (ft)	25			25			100			25			
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	0.91	0.91	0.95	0.95	0.95	0.95	
Frt			0.850		0.994			0.990			0.892		
Flt Protected		0.980			0.996		0.950	0.969			0.999		
Satd. Flow (prot)	0	3097	1411	0	3092	0	1408	2816	0	0	2815	0	
Flt Permitted		0.616			0.736		0.950	0.969			0.702		
Satd. Flow (perm)	0	1946	1411	0	2285	0	1408	2816	0	0	1978	0	
Right Turn on Red			No			No			No			Yes	
Satd. Flow (RTOR)											115		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		473			530			743			330		
Travel Time (s)		10.8			12.0			16.9			7.5		
Peak Hour Factor	0.95	0.95	0.95	0.88	0.88	0.88	0.97	0.97	0.97	0.91	0.91	0.91	
Heavy Vehicles (%)	4%	2%	3%	3%	3%	29%	5%	8%	7%	0%	8%	1%	
Adj. Flow (vph)	376	541	983	35	357	16	933	216	47	2	42	115	
Shared Lane Traffic (%)							50%						
Lane Group Flow (vph)	0	917	983	0	408	0	466	730	0	0	159	0	
Turn Type	D.P+P	NA	custom	Perm	NA		Split	NA		Perm	NA		
Protected Phases	6	1 6	2!		1		4	4			3!		5
Permitted Phases	1			1						3			
Detector Phase	6	1 6	2	1	1		4	4		3	3		
Switch Phase													
Minimum Initial (s)	4.0		8.0	10.0	10.0		10.0	10.0		8.0	8.0		1.0
Minimum Split (s)	8.0		21.0	26.0	26.0		14.0	14.0		24.0	24.0		22.0
Total Split (s)	35.0		106.0	36.0	36.0		44.0	44.0		25.0	25.0		34.0
Total Split (%)	25.0%		75.7%	25.7%	25.7%		31.4%	31.4%		17.9%	17.9%		24%
Maximum Green (s)	31.0		101.0	32.0	32.0		40.0	40.0		21.0	21.0		30.0
Yellow Time (s)	4.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0		2.0
All-Red Time (s)	0.0		2.0	1.0	1.0		1.0	1.0		1.0	1.0		2.0
Lost Time Adjust (s)			0.0		0.0		0.0	0.0			0.0		
Total Lost Time (s)			5.0		4.0		4.0	4.0			4.0		
Lead/Lag	Lag		Lead	Lead	Lead		Lead	Lead		Lag	Lag		Lag
Lead-Lag Optimize?			Yes	Yes	Yes								Yes
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0	2.0		2.0	2.0		0.2
Recall Mode	None		Max	C-Max	C-Max		None	None		None	None		None
Walk Time (s)				7.0	7.0					7.0	7.0		7.0
Flash Dont Walk (s)				15.0	15.0					13.0	13.0		11.0
Pedestrian Calls (#/hr)				0	0					5	5		0
Act Effct Green (s)		73.3	140.0		44.2		40.0	40.0			10.7		
Actuated g/C Ratio		0.52	1.00		0.32		0.29	0.29			0.08		
v/c Ratio		0.73	0.70		0.57		1.16	1.11dl			0.62		
Control Delay		20.4	8.6		45.1		140.1	64.4			30.0		
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0		
Total Delay		20.4	8.6		45.1		140.1	64.4			30.0		
LOS		C	A		D		F	E			C		
Approach Delay		14.3			45.1			93.9			30.0		
Approach LOS		B			D			F			C		
90th %ile Green (s)	31.0		135.0	33.0	33.0		40.0	40.0		20.0	20.0		0.0
90th %ile Term Code	Max		Coord	Coord	Coord		Max	Max		Ped	Ped		Skip
70th %ile Green (s)	31.0		135.0	43.5	43.5		40.0	40.0		9.5	9.5		0.0
70th %ile Term Code	Max		Coord	Coord	Coord		Max	Max		Gap	Gap		Skip
50th %ile Green (s)	31.0		135.0	45.0	45.0		40.0	40.0		8.0	8.0		0.0
50th %ile Term Code	Max		Coord	Coord	Coord		Max	Max		Min	Min		Skip
30th %ile Green (s)	28.7		135.0	47.3	47.3		40.0	40.0		8.0	8.0		0.0
30th %ile Term Code	Gap		Coord	Coord	Coord		Max	Max		Min	Min		Skip
10th %ile Green (s)	23.7		135.0	52.3	52.3		40.0	40.0		8.0	8.0		0.0
10th %ile Term Code	Gap		Coord	Coord	Coord		Max	Max		Min	Min		Skip
Stops (vph)		565	305		298		373	648			45		
Fuel Used(gal)		10	7		6		18	17			2		
CO Emissions (g/hr)		696	473		449		1228	1186			105		
NOx Emissions (g/hr)		135	92		87		239	231			20		
VOC Emissions (g/hr)		161	110		104		285	275			24		
Dilemma Vehicles (#)		0	0		0		0	0			0		
Queue Length 50th (ft)		269	216		161		~549	353			20		
Queue Length 95th (ft)		370	625		240		#789	#475			55		
Internal Link Dist (ft)		393			450			663			250		
Turn Bay Length (ft)							300						
Base Capacity (vph)		1291	1411		721		402	804			394		
Starvation Cap Reductn		0	0		0		0	0			0		
Spillback Cap Reductn		0	0		0		0	0			0		
Storage Cap Reductn		0	0		0		0	0			0		
Reduced v/c Ratio		0.71	0.70		0.57		1.16	0.91			0.40		

Intersection Summary

Area Type: CBD
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 12 (9%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.16
Intersection Signal Delay: 44.4 Intersection LOS: D
Intersection Capacity Utilization 92.9% 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.
! Phase conflict between lane groups.

Splits and Phases: 3098: Melnea Cass Boulevard & Tremont Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	28	181	13	117	1168	0	0	985	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	0.95	0.95
Frt					0.991						0.998	
Flt Protected					0.994			0.995				
Satd. Flow (prot)	0	0	0	0	3400	0	0	3084	0	0	3119	0
Flt Permitted					0.994			0.661				
Satd. Flow (perm)	0	0	0	0	3400	0	0	2049	0	0	3119	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					4						2	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		726			360			529			673	
Travel Time (s)		16.5			8.2			12.0			15.3	
Peak Hour Factor	0.92	0.92	0.92	0.75	0.75	0.75	0.96	0.96	0.96	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	4%	7%	8%	3%	5%	0%	0%	4%	0%
Adj. Flow (vph)	0	0	0	37	241	17	122	1217	0	0	1071	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	295	0	0	1339	0	0	1085	0
Turn Type				Perm	NA		D.P+P	NA			NA	
Protected Phases					6		5	1 5			1	
Permitted Phases				6			1					
Detector Phase				6	6		1 5	1 5			1	
Switch Phase												
Minimum Initial (s)				6.0	6.0		4.0				15.0	
Minimum Split (s)				25.0	25.0		8.0				22.0	
Total Split (s)				26.0	26.0		10.0				84.0	
Total Split (%)				21.7%	21.7%		8.3%				70.0%	
Maximum Green (s)				21.0	21.0		6.0				79.0	
Yellow Time (s)				3.0	3.0		3.0				3.0	
All-Red Time (s)				2.0	2.0		1.0				2.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					5.0						5.0	
Lead/Lag				Lag	Lag		Lead					
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0				2.0	
Recall Mode				None	None		None				C-Max	
Walk Time (s)				8.0	8.0						8.0	
Flash Dont Walk (s)				12.0	12.0						9.0	
Pedestrian Calls (#/hr)				5	5						0	
Act Effct Green (s)					14.8			90.2			85.2	
Actuated g/C Ratio					0.12			0.75			0.71	
v/c Ratio					0.70			0.85			0.49	
Control Delay					58.3			15.1			6.6	
Queue Delay					0.0			0.0			0.0	
Total Delay					58.3			15.1			6.6	
LOS					E			B			A	
Approach Delay					58.3			15.1			6.6	
Approach LOS					E			B			A	
90th %ile Green (s)				20.0	20.0		6.0				80.0	
90th %ile Term Code				Ped	Ped		Max				Coord	
70th %ile Green (s)				16.3	16.3		6.0				83.7	
70th %ile Term Code				Gap	Gap		Max				Coord	
50th %ile Green (s)				14.6	14.6		6.0				85.4	
50th %ile Term Code				Gap	Gap		Max				Coord	
30th %ile Green (s)				12.9	12.9		6.0				87.1	
30th %ile Term Code				Gap	Gap		Max				Coord	
10th %ile Green (s)				10.4	10.4		6.0				89.6	
10th %ile Term Code				Gap	Gap		Max				Coord	
Stops (vph)					204			470			327	
Fuel Used(gal)					4			12			8	
CO Emissions (g/hr)					306			829			587	
NOx Emissions (g/hr)					59			161			114	
VOC Emissions (g/hr)					71			192			136	
Dilemma Vehicles (#)					0			0			0	
Queue Length 50th (ft)					115			161			176	
Queue Length 95th (ft)					127			#260			64	
Internal Link Dist (ft)		646			280			449			593	
Turn Bay Length (ft)												
Base Capacity (vph)					598			1582			2214	
Starvation Cap Reductn					0			0			0	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					0.49			0.85			0.49	

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 46 (38%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 16.4 Intersection LOS: B
Intersection Capacity Utilization 89.8% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2088: Melnea Cass Boulevard & Shawmut Avenue

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø2
Lane Configurations							
Volume (vph)	16	11	36	1145	987	16	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	
Frt	0.944				0.998		
Flt Protected	0.972			0.998			
Satd. Flow (prot)	1537	0	0	3093	3137	0	
Flt Permitted	0.972			0.879			
Satd. Flow (perm)	1537	0	0	2724	3137	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	12				3		
Link Speed (mph)	30			30	30		
Link Distance (ft)	339			673	743		
Travel Time (s)	7.7			15.3	16.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.95	0.95	
Heavy Vehicles (%)	0%	5%	0%	5%	3%	25%	
Adj. Flow (vph)	17	12	39	1245	1039	17	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	29	0	0	1284	1056	0	
Turn Type	NA		Perm	NA	NA		
Protected Phases	5			1	1		2
Permitted Phases			1				
Detector Phase	5		1	1	1		
Switch Phase							
Minimum Initial (s)	6.0		15.0	15.0	15.0		1.0
Minimum Split (s)	11.0		19.0	19.0	19.0		18.0
Total Split (s)	18.0		84.0	84.0	84.0		18.0
Total Split (%)	15.0%		70.0%	70.0%	70.0%		15%
Maximum Green (s)	13.0		80.0	80.0	80.0		14.0
Yellow Time (s)	3.0		3.0	3.0	3.0		2.0
All-Red Time (s)	2.0		1.0	1.0	1.0		2.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	5.0			4.0	4.0		
Lead/Lag			Lead	Lead	Lead		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0
Recall Mode	None		C-Max	C-Max	C-Max		None
Walk Time (s)							8.0
Flash Dont Walk (s)							6.0
Pedestrian Calls (#/hr)							5
Act Effct Green (s)	6.7			106.7	106.7		
Actuated g/C Ratio	0.06			0.89	0.89		
v/c Ratio	0.30			0.53	0.38		
Control Delay	44.9			3.4	3.2		
Queue Delay	0.0			0.1	0.0		
Total Delay	44.9			3.6	3.2		
LOS	D			A	A		
Approach Delay	44.9			3.6	3.2		
Approach LOS	D			A	A		
90th %ile Green (s)	8.7		84.3	84.3	84.3		14.0
90th %ile Term Code	Gap		Coord	Coord	Coord		Ped
70th %ile Green (s)	6.9		104.1	104.1	104.1		0.0
70th %ile Term Code	Gap		Coord	Coord	Coord		Skip
50th %ile Green (s)	6.0		105.0	105.0	105.0		0.0
50th %ile Term Code	Min		Coord	Coord	Coord		Skip
30th %ile Green (s)	0.0		116.0	116.0	116.0		0.0
30th %ile Term Code	Skip		Coord	Coord	Coord		Skip
10th %ile Green (s)	0.0		116.0	116.0	116.0		0.0
10th %ile Term Code	Skip		Coord	Coord	Coord		Skip
Stops (vph)	18			170	180		
Fuel Used(gal)	0			8	7		
CO Emissions (g/hr)	29			557	521		
NOx Emissions (g/hr)	6			108	101		
VOC Emissions (g/hr)	7			129	121		
Dilemma Vehicles (#)	0			0	0		
Queue Length 50th (ft)	13			78	52		
Queue Length 95th (ft)	44			195	214		
Internal Link Dist (ft)	259			593	663		
Turn Bay Length (ft)							
Base Capacity (vph)	177			2421	2789		
Starvation Cap Reductn	0			251	0		
Spillback Cap Reductn	0			0	0		
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.16			0.59	0.38		

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 42 (35%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.53
Intersection Signal Delay: 3.9 Intersection LOS: A
Intersection Capacity Utilization 76.6% ICU Level of Service D
Analysis Period (min) 15

Splits and Phases: 2087: Melnea Cass Boulevard & Kerr Way

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5
Lane Configurations													
Volume (vph)	217	533	899	45	461	10	710	105	48	8	173	218	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	
Storage Length (ft)	0		0	0		0	300		0	0		0	
Storage Lanes	0		1	0		0	1		0	0		0	
Taper Length (ft)	25			25			100			25			
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	0.91	0.91	0.95	0.95	0.95	0.95	
Ped Bike Factor		0.99	0.99		1.00			1.00			0.98		
Frt			0.850		0.997			0.986			0.918		
Flt Protected		0.986			0.996		0.950	0.966			0.999		
Satd. Flow (prot)	0	3076	1411	0	3155	0	1435	2803	0	0	2862	0	
Flt Permitted		0.595			0.740		0.950	0.966			0.687		
Satd. Flow (perm)	0	1841	1393	0	2342	0	1435	2803	0	0	1968	0	
Right Turn on Red			No			No			No			Yes	
Satd. Flow (RTOR)											182		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		473			530			743			330		
Travel Time (s)		10.8			12.0			16.9			7.5		
Confl. Peds. (#/hr)	45			31		45				46		4	
Confl. Bikes (#/hr)			5			11			32			8	
Peak Hour Factor	0.97	0.97	0.97	0.93	0.93	0.93	0.91	0.91	0.91	0.93	0.93	0.93	
Heavy Vehicles (%)	7%	3%	3%	2%	1%	50%	3%	16%	0%	0%	4%	1%	
Adj. Flow (vph)	224	549	927	48	496	11	780	115	53	9	186	234	
Shared Lane Traffic (%)							50%						
Lane Group Flow (vph)	0	773	927	0	555	0	390	558	0	0	429	0	
Turn Type	D.P+P	NA	custom	Perm	NA		Split	NA		Perm	NA		
Protected Phases	6	1 6	2!		1		4	4			3!		5
Permitted Phases	1		Free	1						3			
Detector Phase	1 7	1 6	2	1	1		4	4		3	3		
Switch Phase													
Minimum Initial (s)	4.0		8.0	10.0	10.0		10.0	10.0		8.0	8.0		1.0
Minimum Split (s)	8.0		12.0	26.0	26.0		14.0	14.0		24.0	24.0		22.0
Total Split (s)	19.0		106.0	52.0	52.0		44.0	44.0		25.0	25.0		34.0
Total Split (%)	13.6%		75.7%	37.1%	37.1%		31.4%	31.4%		17.9%	17.9%		24%
Maximum Green (s)	15.0		102.0	48.0	48.0		40.0	40.0		21.0	21.0		30.0
Yellow Time (s)	4.0		3.5	3.0	3.0		3.0	3.0		3.0	3.0		3.5
All-Red Time (s)	0.0		0.5	1.0	1.0		1.0	1.0		1.0	1.0		0.5
Lost Time Adjust (s)			0.0		0.0		0.0	0.0			0.0		
Total Lost Time (s)			4.0		4.0		4.0	4.0			4.0		
Lead/Lag	Lag		Lead	Lead	Lead		Lead	Lead		Lag	Lag		Lag
Lead-Lag Optimize?			Yes	Yes	Yes								Yes
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	Max		Min	C-Max	C-Max		None	None		None	None		None
Walk Time (s)				7.0	7.0					7.0	7.0		7.0
Flash Dont Walk (s)				15.0	15.0					13.0	13.0		11.0
Pedestrian Calls (#/hr)				0	0					5	5		0
Act Effct Green (s)		64.3	140.0		49.3		39.3	39.3			20.4		
Actuated g/C Ratio		0.46	1.00		0.35		0.28	0.28			0.15		
v/c Ratio		0.79	0.66		0.67		0.97	0.93dl			0.97		
Control Delay		31.5	6.7		43.8		87.1	50.9			70.3		
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0		
Total Delay		31.5	6.7		43.8		87.1	50.9			70.3		
LOS		C	A		D		F	D			E		
Approach Delay		18.0			43.8			65.8			70.3		
Approach LOS		B			D			E			E		
90th %ile Green (s)	15.0		136.0	48.0	48.0		40.0	40.0		21.0	21.0		0.0
90th %ile Term Code	MaxR		Coord	Coord	Coord		Max	Max		Max	Max		Skip
70th %ile Green (s)	15.0		136.0	48.0	48.0		40.0	40.0		21.0	21.0		0.0
70th %ile Term Code	MaxR		Coord	Coord	Coord		Max	Max		Max	Max		Skip
50th %ile Green (s)	15.0		136.0	48.0	48.0		40.0	40.0		21.0	21.0		0.0
50th %ile Term Code	MaxR		Coord	Coord	Coord		Max	Max		Max	Max		Skip
30th %ile Green (s)	15.0		136.0	48.0	48.0		40.0	40.0		21.0	21.0		0.0
30th %ile Term Code	MaxR		Coord	Coord	Coord		Max	Max		Max	Max		Skip
10th %ile Green (s)	15.0		136.0	54.6	54.6		36.5	36.5		17.9	17.9		0.0
10th %ile Term Code	MaxR		Coord	Coord	Coord		Gap	Gap		Gap	Gap		Skip
Stops (vph)		742	280		433		315	448			213		
Fuel Used(gal)		12	6		9		10	11			8		
CO Emissions (g/hr)		816	425		638		705	747			553		
NOx Emissions (g/hr)		159	83		124		137	145			108		
VOC Emissions (g/hr)		189	99		148		163	173			128		
Dilemma Vehicles (#)		0	0		0		0	0			0		
Queue Length 50th (ft)		286	191		228		384	250			125		
Queue Length 95th (ft)		353	340		299		#612	321			#237		
Internal Link Dist (ft)		393			450			663			250		
Turn Bay Length (ft)							300						
Base Capacity (vph)		977	1411		824		410	800			449		
Starvation Cap Reductn		0	0		0		0	0			0		
Spillback Cap Reductn		0	0		0		0	0			0		
Storage Cap Reductn		0	0		0		0	0			0		
Reduced v/c Ratio		0.79	0.66		0.67		0.95	0.70			0.96		

Intersection Summary

Area Type: CBD
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 81 (58%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.97
Intersection Signal Delay: 40.6 Intersection LOS: D
Intersection Capacity Utilization 90.9% ICU Level of Service E
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.
! Phase conflict between lane groups.

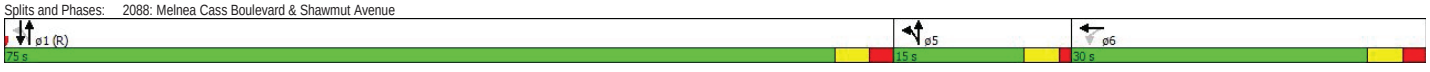
Splits and Phases: 3098: Melnea Cass Boulevard & Tremont Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	44	387	18	186	851	0	0	1073	36
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor					1.00						1.00	
Frt					0.994						0.995	
Flt Protected					0.995			0.991				
Satd. Flow (prot)	0	0	0	0	3594	0	0	3112	0	0	3137	0
Flt Permitted					0.995			0.531				
Satd. Flow (perm)	0	0	0	0	3587	0	0	1667	0	0	3137	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					3						5	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		726			360			529			673	
Travel Time (s)		16.5			8.2			12.0			15.3	
Confl. Peds. (#/hr)				11		33	6		32	32		6
Confl. Bikes (#/hr)									31			10
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	1%	0%	1%	4%	0%	0%	3%	0%
Adj. Flow (vph)	0	0	0	47	412	19	202	925	0	0	1166	39
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	478	0	0	1127	0	0	1205	0
Turn Type				Perm	NA		D.P+P	NA			NA	
Protected Phases					6		5	1 5			1	
Permitted Phases				6			1					
Detector Phase				6	6		1 5	1 5			1	
Switch Phase												
Minimum Initial (s)				6.0	6.0		4.0				15.0	
Minimum Split (s)				25.0	25.0		8.0				21.0	
Total Split (s)				30.0	30.0		15.0				75.0	
Total Split (%)				25.0%	25.0%		12.5%				62.5%	
Maximum Green (s)				25.0	25.0		11.0				70.0	
Yellow Time (s)				3.0	3.0		3.0				3.0	
All-Red Time (s)				2.0	2.0		1.0				2.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					5.0						5.0	
Lead/Lag				Lag	Lag		Lead					
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		1.0				2.0	
Recall Mode				None	None		None				C-Max	
Walk Time (s)				8.0	8.0						7.0	
Flash Dont Walk (s)				12.0	12.0						9.0	
Pedestrian Calls (#/hr)				5	5						0	
Act Effct Green (s)					20.1			84.9			75.4	
Actuated g/C Ratio					0.17			0.71			0.63	
v/c Ratio					0.79			0.87			0.61	
Control Delay					57.4			22.5			12.4	
Queue Delay					0.0			0.0			0.0	
Total Delay					57.4			22.5			12.4	
LOS					E			C			B	
Approach Delay					57.4			22.5			12.4	
Approach LOS					E			C			B	
90th %ile Green (s)				25.0	25.0		11.0				70.0	
90th %ile Term Code				Max	Max		Max				Coord	
70th %ile Green (s)				22.3	22.3		11.0				72.7	
70th %ile Term Code				Gap	Gap		Max				Coord	
50th %ile Green (s)				20.2	20.2		11.0				74.8	
50th %ile Term Code				Gap	Gap		Max				Coord	
30th %ile Green (s)				18.1	18.1		9.9				78.0	
30th %ile Term Code				Gap	Gap		Gap				Coord	
10th %ile Green (s)				15.1	15.1		9.3				81.6	
10th %ile Term Code				Gap	Gap		Gap				Coord	
Stops (vph)					417			427			551	
Fuel Used(gal)					9			11			12	
CO Emissions (g/hr)					616			796			815	
NOx Emissions (g/hr)					120			155			159	
VOC Emissions (g/hr)					143			184			189	
Dilemma Vehicles (#)					0			0			0	
Queue Length 50th (ft)					187			156			284	
Queue Length 95th (ft)					236			#266			123	
Internal Link Dist (ft)		646			280			449			593	
Turn Bay Length (ft)												
Base Capacity (vph)					749			1306			1973	
Starvation Cap Reductn					0			0			59	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					0.64			0.86			0.63	

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 28 (23%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 24.1 Intersection LOS: C
Intersection Capacity Utilization 94.7% 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.

Splits and Phases: 2088: Melnea Cass Boulevard & Shawmut Avenue



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø2
Lane Configurations							
Volume (vph)	20	23	26	843	1086	31	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	
Ped Bike Factor				1.00	1.00		
Frt	0.928				0.996		
Flt Protected	0.977			0.999			
Satd. Flow (prot)	1550	0	0	3125	3142	0	
Flt Permitted	0.977			0.883			
Satd. Flow (perm)	1550	0	0	2762	3142	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	34				5		
Link Speed (mph)	30			30	30		
Link Distance (ft)	339			673	743		
Travel Time (s)	7.7			15.3	16.9		
Confl. Peds. (#/hr)			14			14	
Confl. Bikes (#/hr)						2	
Peak Hour Factor	0.67	0.67	0.90	0.90	0.96	0.96	
Heavy Vehicles (%)	0%	0%	0%	4%	3%	0%	
Adj. Flow (vph)	30	34	29	937	1131	32	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	64	0	0	966	1163	0	
Turn Type	NA		Perm	NA	NA		
Protected Phases	5			1	1		2
Permitted Phases			1				
Detector Phase	5		1	1	1		
Switch Phase							
Minimum Initial (s)	6.0		15.0	15.0	15.0		1.0
Minimum Split (s)	12.0		19.0	19.0	19.0		18.0
Total Split (s)	20.0		82.0	82.0	82.0		18.0
Total Split (%)	16.7%		68.3%	68.3%	68.3%		15%
Maximum Green (s)	15.0		78.0	78.0	78.0		14.0
Yellow Time (s)	3.0		3.0	3.0	3.0		2.0
All-Red Time (s)	2.0		1.0	1.0	1.0		2.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	5.0			4.0	4.0		
Lead/Lag			Lead	Lead	Lead		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0
Recall Mode	None		C-Max	C-Max	C-Max		None
Walk Time (s)							8.0
Flash Dont Walk (s)							6.0
Pedestrian Calls (#/hr)							10
Act Effct Green (s)	7.7			102.7	102.7		
Actuated g/C Ratio	0.06			0.86	0.86		
v/c Ratio	0.49			0.41	0.43		
Control Delay	41.7			3.9	4.2		
Queue Delay	0.0			0.0	0.0		
Total Delay	41.7			3.9	4.2		
LOS	D			A	A		
Approach Delay	41.7			3.9	4.2		
Approach LOS	D			A	A		
90th %ile Green (s)	11.2		81.8	81.8	81.8		14.0
90th %ile Term Code	Gap		Coord	Coord	Coord		Ped
70th %ile Green (s)	8.6		102.4	102.4	102.4		0.0
70th %ile Term Code	Gap		Coord	Coord	Coord		Skip
50th %ile Green (s)	6.8		104.2	104.2	104.2		0.0
50th %ile Term Code	Gap		Coord	Coord	Coord		Skip
30th %ile Green (s)	6.0		105.0	105.0	105.0		0.0
30th %ile Term Code	Min		Coord	Coord	Coord		Skip
10th %ile Green (s)	0.0		116.0	116.0	116.0		0.0
10th %ile Term Code	Skip		Coord	Coord	Coord		Skip
Stops (vph)	22			167	259		
Fuel Used(gal)	1			6	9		
CO Emissions (g/hr)	42			431	618		
NOx Emissions (g/hr)	8			84	120		
VOC Emissions (g/hr)	10			100	143		
Dilemma Vehicles (#)	0			0	0		
Queue Length 50th (ft)	23			32	65		
Queue Length 95th (ft)	42			m162	267		
Internal Link Dist (ft)	259			593	663		
Turn Bay Length (ft)							
Base Capacity (vph)	223			2363	2689		
Starvation Cap Reductn	0			0	0		
Spillback Cap Reductn	0			0	0		
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.29			0.41	0.43		

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 26 (22%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.49			
Intersection Signal Delay: 5.1		Intersection LOS: A	
Intersection Capacity Utilization 59.3%		ICU Level of Service B	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 2087: Melnea Cass Boulevard & Kerr Way

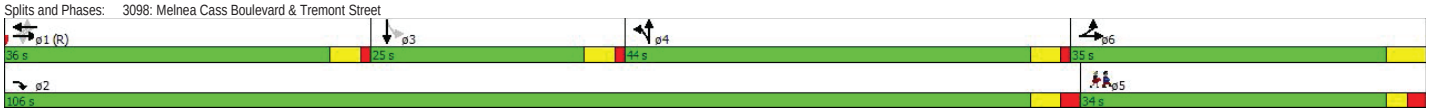
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5
Lane Configurations													
Volume (vph)	374	559	983	32	368	14	975	216	49	2	38	113	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	
Storage Length (ft)	0		0	0		0	300		0	0		0	
Storage Lanes	0		1	0		0	1		0	0		0	
Taper Length (ft)	25			25			100			25			
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	0.91	0.91	0.95	0.95	0.95	0.95	
Frt			0.850		0.995			0.990			0.889		
Flt Protected		0.980			0.996		0.950	0.969			0.999		
Satd. Flow (prot)	0	3097	1411	0	3099	0	1408	2817	0	0	2809	0	
Flt Permitted		0.589			0.709		0.950	0.969			0.702		
Satd. Flow (perm)	0	1861	1411	0	2206	0	1408	2817	0	0	1974	0	
Right Turn on Red			No			No			No			Yes	
Satd. Flow (RTOR)											124		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		473			530			743			330		
Travel Time (s)		10.8			12.0			16.9			7.5		
Peak Hour Factor	0.95	0.95	0.95	0.88	0.88	0.88	0.97	0.97	0.97	0.91	0.91	0.91	
Heavy Vehicles (%)	4%	2%	3%	3%	3%	29%	5%	8%	7%	0%	8%	1%	
Adj. Flow (vph)	394	588	1035	36	418	16	1005	223	51	2	42	124	
Shared Lane Traffic (%)							50%						
Lane Group Flow (vph)	0	982	1035	0	470	0	502	777	0	0	168	0	
Turn Type	D.P+P	NA	custom	Perm	NA		Split	NA		Perm	NA		
Protected Phases	6	1 6	2!		1		4	4			3!		5
Permitted Phases	1			1						3			
Detector Phase	6	1 6	2	1	1		4	4		3	3		
Switch Phase													
Minimum Initial (s)	4.0		8.0	10.0	10.0		10.0	10.0		8.0	8.0		1.0
Minimum Split (s)	8.0		21.0	26.0	26.0		14.0	14.0		24.0	24.0		22.0
Total Split (s)	35.0		106.0	36.0	36.0		44.0	44.0		25.0	25.0		34.0
Total Split (%)	25.0%		75.7%	25.7%	25.7%		31.4%	31.4%		17.9%	17.9%		24%
Maximum Green (s)	31.0		101.0	32.0	32.0		40.0	40.0		21.0	21.0		30.0
Yellow Time (s)	4.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0		2.0
All-Red Time (s)	0.0		2.0	1.0	1.0		1.0	1.0		1.0	1.0		2.0
Lost Time Adjust (s)			0.0		0.0		0.0	0.0			0.0		
Total Lost Time (s)			5.0		4.0		4.0	4.0			4.0		
Lead/Lag	Lag		Lead	Lead	Lead		Lead	Lead		Lag	Lag		Lag
Lead-Lag Optimize?			Yes	Yes	Yes								Yes
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0	2.0		2.0	2.0		0.2
Recall Mode	None		Max	C-Max	C-Max		None	None		None	None		None
Walk Time (s)				7.0	7.0					7.0	7.0		7.0
Flash Dont Walk (s)				15.0	15.0					13.0	13.0		11.0
Pedestrian Calls (#/hr)				0	0					5	5		0
Act Effct Green (s)		73.3	140.0		43.1		40.0	40.0			10.7		
Actuated g/C Ratio		0.52	1.00		0.31		0.29	0.29			0.08		
v/c Ratio		0.79	0.73		0.69		1.25	1.20dl			0.63		
Control Delay		22.7	10.0		49.8		172.6	73.7			29.4		
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0		
Total Delay		22.7	10.0		49.8		172.6	73.7			29.4		
LOS		C	A		D		F	E			C		
Approach Delay		16.1			49.8			112.6			29.4		
Approach LOS		B			D			F			C		
90th %ile Green (s)	31.0		135.0	33.0	33.0		40.0	40.0		20.0	20.0		0.0
90th %ile Term Code	Max		Coord	Coord	Coord		Max	Max		Ped	Ped		Skip
70th %ile Green (s)	31.0		135.0	43.4	43.4		40.0	40.0		9.6	9.6		0.0
70th %ile Term Code	Max		Coord	Coord	Coord		Max	Max		Gap	Gap		Skip
50th %ile Green (s)	31.0		135.0	45.0	45.0		40.0	40.0		8.0	8.0		0.0
50th %ile Term Code	Max		Coord	Coord	Coord		Max	Max		Min	Min		Skip
30th %ile Green (s)	31.0		135.0	45.0	45.0		40.0	40.0		8.0	8.0		0.0
30th %ile Term Code	Max		Coord	Coord	Coord		Max	Max		Min	Min		Skip
10th %ile Green (s)	27.1		135.0	48.9	48.9		40.0	40.0		8.0	8.0		0.0
10th %ile Term Code	Gap		Coord	Coord	Coord		Max	Max		Min	Min		Skip
Stops (vph)		622	331		344		387	681			46		
Fuel Used(gal)		11	7		8		22	19			2		
CO Emissions (g/hr)		782	521		546		1543	1360			109		
NOx Emissions (g/hr)		152	101		106		300	265			21		
VOC Emissions (g/hr)		181	121		126		358	315			25		
Dilemma Vehicles (#)		0	0		0		0	0			0		
Queue Length 50th (ft)		301	249		194		~625	384			20		
Queue Length 95th (ft)		410	618		#311		#870	#525			56		
Internal Link Dist (ft)		393			450			663			250		
Turn Bay Length (ft)							300						
Base Capacity (vph)		1257	1411		678		402	804			401		
Starvation Cap Reductn		0	0		0		0	0			0		
Spillback Cap Reductn		0	0		0		0	0			0		
Storage Cap Reductn		0	0		0		0	0			0		
Reduced v/c Ratio		0.78	0.73		0.69		1.25	0.97			0.42		

Intersection Summary

Area Type: CBD
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 12 (9%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.25
Intersection Signal Delay: 52.1 Intersection LOS: D
Intersection Capacity Utilization 98.0% 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.
! Phase conflict between lane groups.

Splits and Phases: 3098: Melnea Cass Boulevard & Tremont Street

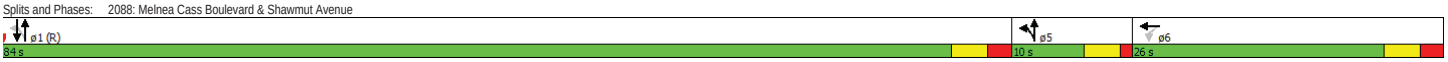


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	44	193	18	120	1237	0	0	1049	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	0.95	0.95
Frt					0.989						0.998	
Flt Protected					0.991			0.996				
Satd. Flow (prot)	0	0	0	0	3387	0	0	3087	0	0	3119	0
Flt Permitted					0.991			0.639				
Satd. Flow (perm)	0	0	0	0	3387	0	0	1981	0	0	3119	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					6						2	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		726			360			529			673	
Travel Time (s)		16.5			8.2			12.0			15.3	
Peak Hour Factor	0.92	0.92	0.92	0.75	0.75	0.75	0.96	0.96	0.96	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	4%	7%	8%	3%	5%	0%	0%	4%	0%
Adj. Flow (vph)	0	0	0	59	257	24	125	1289	0	0	1140	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	340	0	0	1414	0	0	1154	0
Turn Type				Perm	NA		D.P+P	NA			NA	
Protected Phases					6		5	1 5			1	
Permitted Phases				6			1					
Detector Phase				6	6		1 5	1 5			1	
Switch Phase												
Minimum Initial (s)				6.0	6.0		4.0				15.0	
Minimum Split (s)				25.0	25.0		8.0				22.0	
Total Split (s)				26.0	26.0		10.0				84.0	
Total Split (%)				21.7%	21.7%		8.3%				70.0%	
Maximum Green (s)				21.0	21.0		6.0				79.0	
Yellow Time (s)				3.0	3.0		3.0				3.0	
All-Red Time (s)				2.0	2.0		1.0				2.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					5.0						5.0	
Lead/Lag				Lag	Lag		Lead					
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0				2.0	
Recall Mode				None	None		None				C-Max	
Walk Time (s)				8.0	8.0						8.0	
Flash Dont Walk (s)				12.0	12.0						9.0	
Pedestrian Calls (#/hr)				5	5						0	
Act Effct Green (s)					16.1			88.9			83.9	
Actuated g/C Ratio					0.13			0.74			0.70	
v/c Ratio					0.74			0.93			0.53	
Control Delay					58.7			24.4			7.3	
Queue Delay					0.0			0.0			0.0	
Total Delay					58.7			24.4			7.3	
LOS					E			C			A	
Approach Delay					58.7			24.4			7.3	
Approach LOS					E			C			A	
Queue Length 50th (ft)					132			193			205	
Queue Length 95th (ft)					143			#392			72	
Internal Link Dist (ft)		646			280			449			593	
Turn Bay Length (ft)												
Base Capacity (vph)					597			1513			2180	
Starvation Cap Reductn					0			0			97	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					0.57			0.93			0.55	

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 46 (38%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 21.6 Intersection LOS: C
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.

Splits and Phases: 2088: Melnea Cass Boulevard & Shawmut Avenue

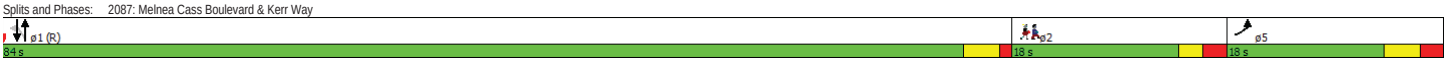


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø2
Lane Configurations							
Volume (vph)	16	24	32	1224	1038	14	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	
Frt	0.918				0.998		
Flt Protected	0.981			0.999			
Satd. Flow (prot)	1495	0	0	3095	3139	0	
Flt Permitted	0.981			0.888			
Satd. Flow (perm)	1495	0	0	2751	3139	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	26				2		
Link Speed (mph)	30			30	30		
Link Distance (ft)	339			673	743		
Travel Time (s)	7.7			15.3	16.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.95	0.95	
Heavy Vehicles (%)	0%	5%	0%	5%	3%	25%	
Adj. Flow (vph)	17	26	35	1330	1093	15	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	43	0	0	1365	1108	0	
Turn Type	NA		Perm	NA	NA		
Protected Phases	5			1	1		2
Permitted Phases			1				
Detector Phase	5		1	1	1		
Switch Phase							
Minimum Initial (s)	6.0		15.0	15.0	15.0		1.0
Minimum Split (s)	11.0		19.0	19.0	19.0		18.0
Total Split (s)	18.0		84.0	84.0	84.0		18.0
Total Split (%)	15.0%		70.0%	70.0%	70.0%		15%
Maximum Green (s)	13.0		80.0	80.0	80.0		14.0
Yellow Time (s)	3.0		3.0	3.0	3.0		2.0
All-Red Time (s)	2.0		1.0	1.0	1.0		2.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	5.0			4.0	4.0		
Lead/Lag			Lead	Lead	Lead		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0
Recall Mode	None		C-Max	C-Max	C-Max		None
Walk Time (s)							8.0
Flash Dont Walk (s)							6.0
Pedestrian Calls (#/hr)							5
Act Effct Green (s)	7.0			103.4	103.4		
Actuated g/C Ratio	0.06			0.86	0.86		
v/c Ratio	0.39			0.58	0.41		
Control Delay	38.5			4.1	3.7		
Queue Delay	0.0			0.2	0.0		
Total Delay	38.5			4.3	3.7		
LOS	D			A	A		
Approach Delay	38.5			4.3	3.7		
Approach LOS	D			A	A		
Queue Length 50th (ft)	13			86	56		
Queue Length 95th (ft)	50			m202	236		
Internal Link Dist (ft)	259			593	663		
Turn Bay Length (ft)							
Base Capacity (vph)	185			2371	2705		
Starvation Cap Reductn	0			279	0		
Spillback Cap Reductn	0			0	0		
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.23			0.65	0.41		

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 42 (35%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 4.6 Intersection LOS: A
Intersection Capacity Utilization 75.6% ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2087: Melnea Cass Boulevard & Kerr Way



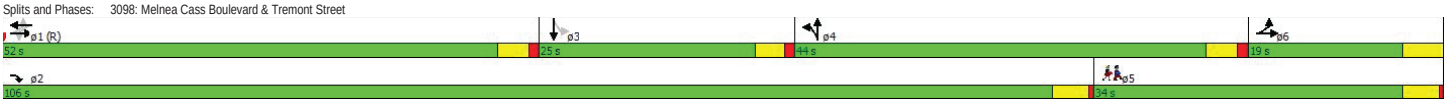
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5
Lane Configurations													
Volume (vph)	229	620	973	44	530	10	814	112	57	8	176	240	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	
Storage Length (ft)	0		0	0		0	300		0	0		0	
Storage Lanes	0		1	0		0	1		0	0		0	
Taper Length (ft)	25			25			100			25			
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	0.91	0.91	0.95	0.95	0.95	0.95	
Ped Bike Factor		0.99	0.99		1.00			1.00			0.98		
Frt			0.850		0.997			0.985			0.915		
Flt Protected		0.987			0.996		0.950	0.966			0.999		
Satd. Flow (prot)	0	3081	1411	0	3159	0	1435	2804	0	0	2853	0	
Flt Permitted		0.570			0.705		0.950	0.966			0.690		
Satd. Flow (perm)	0	1769	1393	0	2236	0	1435	2804	0	0	1970	0	
Right Turn on Red			No			No			No			Yes	
Satd. Flow (RTOR)											200		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		473			530			743			330		
Travel Time (s)		10.8			12.0			16.9			7.5		
Confl. Peds. (#/hr)	45			31		45				46		4	
Confl. Bikes (#/hr)			5			11			32			8	
Peak Hour Factor	0.97	0.97	0.97	0.93	0.93	0.93	0.91	0.91	0.91	0.93	0.93	0.93	
Heavy Vehicles (%)	7%	3%	3%	2%	1%	50%	3%	16%	0%	0%	4%	1%	
Adj. Flow (vph)	236	639	1003	47	570	11	895	123	63	9	189	258	
Shared Lane Traffic (%)							50%						
Lane Group Flow (vph)	0	875	1003	0	628	0	447	634	0	0	456	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(ft)		0			0			20			12		
Link Offset(ft)		0			0			0			0		
Crosswalk Width(ft)		16			16			16			16		
Two way Left Turn Lane													
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	
Turning Speed (mph)	15		9	15		9	15		9	15		9	
Number of Detectors	1	2	1	1	2		1	2		1	2		
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru		
Leading Detector (ft)	20	100	20	20	100		20	100		20	100		
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0		
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0		
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6		
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 2 Position(ft)		94			94			94			94		
Detector 2 Size(ft)		6			6			6			6		
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		
Turn Type	D.P+P	NA	custom	Perm	NA		Split	NA		Perm	NA		
Protected Phases	6	1 6	2!		1		4	4			3!		5
Permitted Phases	1		Free	1						3			
Detector Phase	1 7	1 6	2	1	1		4	4		3	3		
Switch Phase													
Minimum Initial (s)	4.0		8.0	10.0	10.0		10.0	10.0		8.0	8.0		1.0
Minimum Split (s)	8.0		12.0	26.0	26.0		14.0	14.0		24.0	24.0		22.0
Total Split (s)	19.0		106.0	52.0	52.0		44.0	44.0		25.0	25.0		34.0
Total Split (%)	13.6%		75.7%	37.1%	37.1%		31.4%	31.4%		17.9%	17.9%		24%
Maximum Green (s)	15.0		102.0	48.0	48.0		40.0	40.0		21.0	21.0		30.0
Yellow Time (s)	4.0		3.5	3.0	3.0		3.0	3.0		3.0	3.0		3.5
All-Red Time (s)	0.0		0.5	1.0	1.0		1.0	1.0		1.0	1.0		0.5
Lost Time Adjust (s)			0.0		0.0		0.0	0.0			0.0		
Total Lost Time (s)			4.0		4.0		4.0	4.0			4.0		
Lead/Lag	Lag		Lead	Lead	Lead		Lead	Lead		Lag	Lag		Lag
Lead-Lag Optimize?			Yes	Yes	Yes								Yes
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	Max		Min	C-Max	C-Max		None	None		None	None		None
Walk Time (s)				7.0	7.0					7.0	7.0		7.0
Flash Dont Walk (s)				15.0	15.0					13.0	13.0		11.0
Pedestrian Calls (#/hr)				0	0					5	5		0
Act Effct Green (s)		63.0	140.0		48.0		40.0	40.0			21.0		
Actuated g/C Ratio		0.45	1.00		0.34		0.29	0.29			0.15		
v/c Ratio		0.93	0.71		0.82		1.09	1.05dl			0.98		
Control Delay		42.7	9.2		52.2		117.4	54.6			70.1		
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0		
Total Delay		42.7	9.2		52.2		117.4	54.6			70.1		
LOS		D	A		D		F	D			E		
Approach Delay		24.8			52.2			80.5			70.1		
Approach LOS		C			D			F			E		
Queue Length 50th (ft)		338	280		274		~502	293			132		
Queue Length 95th (ft)		#459	767		357		#739	374			#251		
Internal Link Dist (ft)		393			450			663			250		
Turn Bay Length (ft)							300						
Base Capacity (vph)		936	1411		766		410	801			465		
Starvation Cap Reductn		0	0		0		0	0			0		
Spillback Cap Reductn		0	0		0		0	0			0		
Storage Cap Reductn		0	0		0		0	0			0		
Reduced v/c Ratio		0.93	0.71		0.82		1.09	0.79			0.98		

Intersection Summary

Area Type: CBD
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 81 (58%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 49.1 Intersection LOS: D
Intersection Capacity Utilization 97.9% 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.
! Phase conflict between lane groups.

Splits and Phases: 3098: Melnea Cass Boulevard & Tremont Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	65	408	25	191	948	0	0	1171	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor					0.99						1.00	
Frt					0.992						0.995	
Flt Protected					0.994			0.992				
Satd. Flow (prot)	0	0	0	0	3579	0	0	3114	0	0	3137	0
Flt Permitted					0.994			0.514				
Satd. Flow (perm)	0	0	0	0	3570	0	0	1614	0	0	3137	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					4						4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		726			360			529			673	
Travel Time (s)		16.5			8.2			12.0			15.3	
Confl. Peds. (#/hr)				11		33	6		32	32		6
Confl. Bikes (#/hr)									31			10
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	1%	0%	1%	4%	0%	0%	3%	0%
Adj. Flow (vph)	0	0	0	69	434	27	208	1030	0	0	1273	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	530	0	0	1238	0	0	1313	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			8			8	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	0.97	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2		1	2			2	
Detector Template				Left	Thru		Left	Thru			Thru	
Leading Detector (ft)				20	100		20	100			100	
Trailing Detector (ft)				0	0		0	0			0	
Detector 1 Position(ft)				0	0		0	0			0	
Detector 1 Size(ft)				20	6		20	6			6	
Detector 1 Type				Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0		0.0	0.0			0.0	
Detector 1 Queue (s)				0.0	0.0		0.0	0.0			0.0	
Detector 1 Delay (s)				0.0	0.0		0.0	0.0			0.0	
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA		D.P+P	NA			NA	
Protected Phases					6		5	1 5			1	
Permitted Phases				6			1					
Detector Phase				6	6		1 5	1 5			1	
Switch Phase												
Minimum Initial (s)				6.0	6.0		4.0				15.0	
Minimum Split (s)				25.0	25.0		8.0				21.0	
Total Split (s)				30.0	30.0		15.0				75.0	
Total Split (%)				25.0%	25.0%		12.5%				62.5%	
Maximum Green (s)				25.0	25.0		11.0				70.0	
Yellow Time (s)				3.0	3.0		3.0				3.0	
All-Red Time (s)				2.0	2.0		1.0				2.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					5.0						5.0	
Lead/Lag				Lag	Lag		Lead					
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		1.0				2.0	
Recall Mode				None	None		None				C-Max	
Walk Time (s)				8.0	8.0						7.0	
Flash Dont Walk (s)				12.0	12.0						9.0	
Pedestrian Calls (#/hr)				5	5						0	
Act Effct Green (s)					21.7			83.3			73.3	
Actuated g/C Ratio					0.18			0.69			0.61	
v/c Ratio					0.82			0.99			0.68	
Control Delay					57.7			43.0			14.6	
Queue Delay					0.0			0.0			0.0	
Total Delay					57.7			43.0			14.6	
LOS					E			D			B	
Approach Delay					57.7			43.0			14.6	
Approach LOS					E			D			B	
Queue Length 50th (ft)					207			195			343	
Queue Length 95th (ft)					263			#345			137	
Internal Link Dist (ft)		646			280			449			593	
Turn Bay Length (ft)												
Base Capacity (vph)					746			1245			1918	
Starvation Cap Reductn					0			0			29	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					0.71			0.99			0.70	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 28 (23%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 33.5		Intersection LOS: C	
Intersection Capacity Utilization 101.4%		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: 2088: Melnea Cass Boulevard & Shawmut Avenue

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø2
Lane Configurations							
Volume (vph)	21	40	12	962	1168	25	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	
Ped Bike Factor				1.00	1.00		
Frt	0.911				0.997		
Flt Protected	0.983			0.999			
Satd. Flow (prot)	1531	0	0	3122	3145	0	
Flt Permitted	0.983			0.933			
Satd. Flow (perm)	1531	0	0	2916	3145	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	60				4		
Link Speed (mph)	30			30	30		
Link Distance (ft)	339			673	743		
Travel Time (s)	7.7			15.3	16.9		
Confl. Peds. (#/hr)			14			14	
Confl. Bikes (#/hr)						2	
Peak Hour Factor	0.67	0.67	0.90	0.90	0.96	0.96	
Heavy Vehicles (%)	0%	0%	0%	4%	3%	0%	
Adj. Flow (vph)	31	60	13	1069	1217	26	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	91	0	0	1082	1243	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			12	8		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	
Turning Speed (mph)	15	9	15			9	
Number of Detectors	1		1	2	2		
Detector Template	Left		Left	Thru	Thru		
Leading Detector (ft)	20		20	100	100		
Trailing Detector (ft)	0		0	0	0		
Detector 1 Position(ft)	0		0	0	0		
Detector 1 Size(ft)	20		20	6	6		
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0		0.0	0.0	0.0		
Detector 1 Queue (s)	0.0		0.0	0.0	0.0		
Detector 1 Delay (s)	0.0		0.0	0.0	0.0		
Detector 2 Position(ft)				94	94		
Detector 2 Size(ft)				6	6		
Detector 2 Type				Cl+Ex	Cl+Ex		
Detector 2 Channel							
Detector 2 Extend (s)				0.0	0.0		
Turn Type	NA		Perm	NA	NA		
Protected Phases	5			1	1		2
Permitted Phases			1				
Detector Phase	5		1	1	1		
Switch Phase							
Minimum Initial (s)	6.0		15.0	15.0	15.0		1.0
Minimum Split (s)	12.0		19.0	19.0	19.0		18.0
Total Split (s)	20.0		82.0	82.0	82.0		18.0
Total Split (%)	16.7%		68.3%	68.3%	68.3%		15%
Maximum Green (s)	15.0		78.0	78.0	78.0		14.0
Yellow Time (s)	3.0		3.0	3.0	3.0		2.0
All-Red Time (s)	2.0		1.0	1.0	1.0		2.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	5.0			4.0	4.0		
Lead/Lag			Lead	Lead	Lead		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0
Recall Mode	None		C-Max	C-Max	C-Max		None
Walk Time (s)							8.0
Flash Dont Walk (s)							6.0
Pedestrian Calls (#/hr)							10
Act Effct Green (s)	8.1			99.3	99.3		
Actuated g/C Ratio	0.07			0.83	0.83		
v/c Ratio	0.58			0.45	0.48		
Control Delay	36.5			4.5	4.9		
Queue Delay	0.0			0.0	0.0		
Total Delay	36.5			4.5	4.9		
LOS	D			A	A		
Approach Delay	36.5			4.5	4.9		
Approach LOS	D			A	A		
Queue Length 50th (ft)	24			50	74		
Queue Length 95th (ft)	43			m161	308		
Internal Link Dist (ft)	259			593	663		
Turn Bay Length (ft)							
Base Capacity (vph)	243			2414	2604		
Starvation Cap Reductn	0			0	0		
Spillback Cap Reductn	0			0	0		
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.37			0.45	0.48		

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 26 (22%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.58			
Intersection Signal Delay: 5.9		Intersection LOS: A	
Intersection Capacity Utilization 51.4%		ICU Level of Service A	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 2087: Melnea Cass Boulevard & Kerr Way

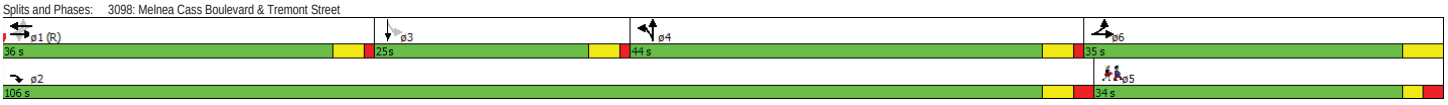
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5
Lane Configurations													
Volume (vph)	374	559	983	32	368	14	977	218	50	2	39	113	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	
Storage Length (ft)	0		0	0		0	300		0	0		0	
Storage Lanes	0		1	0		0	1		0	0		0	
Taper Length (ft)	25			25			100			25			
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	0.91	0.91	0.95	0.95	0.95	0.95	
Frt			0.850		0.995			0.990			0.890		
Flt Protected		0.980			0.996		0.950	0.969			0.999		
Satd. Flow (prot)	0	3097	1411	0	3099	0	1408	2817	0	0	2811	0	
Flt Permitted		0.588			0.709		0.950	0.969			0.702		
Satd. Flow (perm)	0	1858	1411	0	2206	0	1408	2817	0	0	1975	0	
Right Turn on Red			No			No			No			Yes	
Satd. Flow (RTOR)											124		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		473			530			743			330		
Travel Time (s)		10.8			12.0			16.9			7.5		
Peak Hour Factor	0.95	0.95	0.95	0.88	0.88	0.88	0.97	0.97	0.97	0.91	0.91	0.91	
Heavy Vehicles (%)	4%	2%	3%	3%	3%	29%	5%	8%	7%	0%	8%	1%	
Adj. Flow (vph)	394	588	1035	36	418	16	1007	225	52	2	43	124	
Shared Lane Traffic (%)							50%						
Lane Group Flow (vph)	0	982	1035	0	470	0	503	781	0	0	169	0	
Turn Type	D.P+P	NA	custom	Perm	NA		Split	NA		Perm	NA		
Protected Phases	6	1 6	2!		1		4	4			3!		5
Permitted Phases	1			1						3			
Detector Phase	6	1 6	2	1	1		4	4		3	3		
Switch Phase													
Minimum Initial (s)	4.0		8.0	10.0	10.0		10.0	10.0		8.0	8.0		1.0
Minimum Split (s)	8.0		21.0	26.0	26.0		14.0	14.0		24.0	24.0		22.0
Total Split (s)	35.0		106.0	36.0	36.0		44.0	44.0		25.0	25.0		34.0
Total Split (%)	25.0%		75.7%	25.7%	25.7%		31.4%	31.4%		17.9%	17.9%		24%
Maximum Green (s)	31.0		101.0	32.0	32.0		40.0	40.0		21.0	21.0		30.0
Yellow Time (s)	4.0		3.0	3.0	3.0		3.0	3.0		3.0	3.0		2.0
All-Red Time (s)	0.0		2.0	1.0	1.0		1.0	1.0		1.0	1.0		2.0
Lost Time Adjust (s)			0.0		0.0		0.0	0.0			0.0		
Total Lost Time (s)			5.0		4.0		4.0	4.0			4.0		
Lead/Lag	Lag		Lead	Lead	Lead		Lead	Lead		Lag	Lag		Lag
Lead-Lag Optimize?			Yes	Yes	Yes								Yes
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0	2.0		2.0	2.0		0.2
Recall Mode	None		Max	C-Max	C-Max		None	None		None	None		None
Walk Time (s)				7.0	7.0					7.0	7.0		7.0
Flash Dont Walk (s)				15.0	15.0					13.0	13.0		11.0
Pedestrian Calls (#/hr)				0	0					5	5		0
Act Effct Green (s)		73.3	140.0		43.0		40.0	40.0			10.7		
Actuated g/C Ratio		0.52	1.00		0.31		0.29	0.29			0.08		
v/c Ratio		0.79	0.73		0.69		1.25	1.20dl			0.64		
Control Delay		22.5	9.9		49.8		173.6	74.8			29.8		
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0		
Total Delay		22.5	9.9		49.8		173.6	74.8			29.8		
LOS		C	A		D		F	E			C		
Approach Delay		16.1			49.8			113.5			29.8		
Approach LOS		B			D			F			C		
90th %ile Green (s)	31.0		135.0	33.0	33.0		40.0	40.0		20.0	20.0		0.0
90th %ile Term Code	Max		Coord	Coord	Coord		Max	Max		Ped	Ped		Skip
70th %ile Green (s)	31.0		135.0	43.3	43.3		40.0	40.0		9.7	9.7		0.0
70th %ile Term Code	Max		Coord	Coord	Coord		Max	Max		Gap	Gap		Skip
50th %ile Green (s)	31.0		135.0	45.0	45.0		40.0	40.0		8.0	8.0		0.0
50th %ile Term Code	Max		Coord	Coord	Coord		Max	Max		Min	Min		Skip
30th %ile Green (s)	31.0		135.0	45.0	45.0		40.0	40.0		8.0	8.0		0.0
30th %ile Term Code	Max		Coord	Coord	Coord		Max	Max		Min	Min		Skip
10th %ile Green (s)	27.1		135.0	48.9	48.9		40.0	40.0		8.0	8.0		0.0
10th %ile Term Code	Gap		Coord	Coord	Coord		Max	Max		Min	Min		Skip
Stops (vph)		624	329		344		387	684			47		
Fuel Used(gal)		11	7		8		22	20			2		
CO Emissions (g/hr)		780	519		546		1553	1378			111		
NOx Emissions (g/hr)		152	101		106		302	268			22		
VOC Emissions (g/hr)		181	120		127		360	319			26		
Dilemma Vehicles (#)		0	0		0		0	0			0		
Queue Length 50th (ft)		302	250		194		~626	387			21		
Queue Length 95th (ft)		410	613		#311		#871	#530			56		
Internal Link Dist (ft)		393			450			663			250		
Turn Bay Length (ft)							300						
Base Capacity (vph)		1256	1411		678		402	804			401		
Starvation Cap Reductn		0	0		0		0	0			0		
Spillback Cap Reductn		0	0		0		0	0			0		
Storage Cap Reductn		0	0		0		0	0			0		
Reduced v/c Ratio		0.78	0.73		0.69		1.25	0.97			0.42		

Intersection Summary

Area Type: CBD
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 12 (9%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.25
Intersection Signal Delay: 52.4 — Intersection LOS: D
Intersection Capacity Utilization 98.0% — 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.
! Phase conflict between lane groups.

Splits and Phases: 3098: Melnea Cass Boulevard & Tremont Street

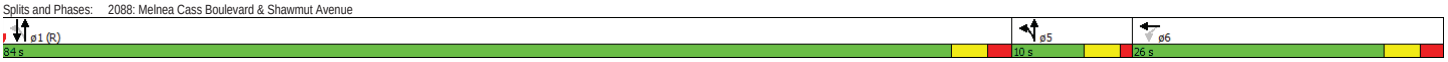


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	44	193	18	120	1239	0	0	1054	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	0.95	0.95
Frt					0.989						0.998	
Flt Protected					0.991			0.996				
Satd. Flow (prot)	0	0	0	0	3387	0	0	3087	0	0	3119	0
Flt Permitted					0.991			0.638				
Satd. Flow (perm)	0	0	0	0	3387	0	0	1977	0	0	3119	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					6						2	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		726			360			529			673	
Travel Time (s)		16.5			8.2			12.0			15.3	
Peak Hour Factor	0.92	0.92	0.92	0.75	0.75	0.75	0.96	0.96	0.96	0.92	0.92	0.92
Heavy Vehicles (%)	2%	2%	2%	4%	7%	8%	3%	5%	0%	0%	4%	0%
Adj. Flow (vph)	0	0	0	59	257	24	125	1291	0	0	1146	14
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	340	0	0	1416	0	0	1160	0
Turn Type				Perm	NA		D.P+P	NA			NA	
Protected Phases					6		5	1 5			1	
Permitted Phases				6			1					
Detector Phase				6	6		1 5	1 5			1	
Switch Phase												
Minimum Initial (s)				6.0	6.0		4.0				15.0	
Minimum Split (s)				25.0	25.0		8.0				22.0	
Total Split (s)				26.0	26.0		10.0				84.0	
Total Split (%)				21.7%	21.7%		8.3%				70.0%	
Maximum Green (s)				21.0	21.0		6.0				79.0	
Yellow Time (s)				3.0	3.0		3.0				3.0	
All-Red Time (s)				2.0	2.0		1.0				2.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					5.0						5.0	
Lead/Lag				Lag	Lag		Lead					
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		2.0				2.0	
Recall Mode				None	None		None				C-Max	
Walk Time (s)				8.0	8.0						8.0	
Flash Dont Walk (s)				12.0	12.0						9.0	
Pedestrian Calls (#/hr)				5	5						0	
Act Effct Green (s)					16.1			88.9			83.9	
Actuated g/C Ratio					0.13			0.74			0.70	
v/c Ratio					0.74			0.94			0.53	
Control Delay					58.7			24.8			7.3	
Queue Delay					0.0			0.0			0.0	
Total Delay					58.7			24.8			7.4	
LOS					E			C			A	
Approach Delay					58.7			24.8			7.4	
Approach LOS					E			C			A	
Queue Length 50th (ft)					132			193			208	
Queue Length 95th (ft)					143			#397			74	
Internal Link Dist (ft)		646			280			449			593	
Turn Bay Length (ft)												
Base Capacity (vph)					597			1510			2180	
Starvation Cap Reductn					0			0			95	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					0.57			0.94			0.56	

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 46 (38%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 21.8 Intersection LOS: C
Intersection Capacity Utilization 95.2% 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.

Splits and Phases: 2088: Melnea Cass Boulevard & Shawmut Avenue

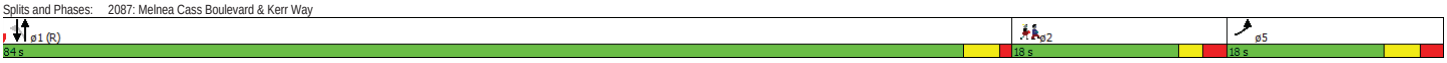


Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø2
Lane Configurations							
Volume (vph)	21	29	34	1224	1038	15	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	
Frt	0.921				0.998		
Flt Protected	0.980			0.999			
Satd. Flow (prot)	1500	0	0	3095	3138	0	
Flt Permitted	0.980			0.883			
Satd. Flow (perm)	1500	0	0	2736	3138	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	32				3		
Link Speed (mph)	30			30	30		
Link Distance (ft)	339			673	743		
Travel Time (s)	7.7			15.3	16.9		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.95	0.95	
Heavy Vehicles (%)	0%	5%	0%	5%	3%	25%	
Adj. Flow (vph)	23	32	37	1330	1093	16	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	55	0	0	1367	1109	0	
Turn Type	NA		Perm	NA	NA		
Protected Phases	5			1	1		2
Permitted Phases			1				
Detector Phase	5		1	1	1		
Switch Phase							
Minimum Initial (s)	6.0		15.0	15.0	15.0		1.0
Minimum Split (s)	11.0		19.0	19.0	19.0		18.0
Total Split (s)	18.0		84.0	84.0	84.0		18.0
Total Split (%)	15.0%		70.0%	70.0%	70.0%		15%
Maximum Green (s)	13.0		80.0	80.0	80.0		14.0
Yellow Time (s)	3.0		3.0	3.0	3.0		2.0
All-Red Time (s)	2.0		1.0	1.0	1.0		2.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	5.0			4.0	4.0		
Lead/Lag			Lead	Lead	Lead		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0
Recall Mode	None		C-Max	C-Max	C-Max		None
Walk Time (s)							8.0
Flash Dont Walk (s)							6.0
Pedestrian Calls (#/hr)							5
Act Effct Green (s)	7.4			103.0	103.0		
Actuated g/C Ratio	0.06			0.86	0.86		
v/c Ratio	0.45			0.58	0.41		
Control Delay	39.6			4.3	3.9		
Queue Delay	0.0			0.2	0.0		
Total Delay	39.6			4.5	3.9		
LOS	D			A	A		
Approach Delay	39.6			4.5	3.9		
Approach LOS	D			A	A		
Queue Length 50th (ft)	18			91	58		
Queue Length 95th (ft)	59			m203	244		
Internal Link Dist (ft)	259			593	663		
Turn Bay Length (ft)							
Base Capacity (vph)	191			2349	2695		
Starvation Cap Reductn	0			269	0		
Spillback Cap Reductn	0			0	0		
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.29			0.66	0.41		

Intersection Summary

Area Type: CBD
Cycle Length: 120
Actuated Cycle Length: 120
Offset: 42 (35%), Referenced to phase 1:NBSB, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 5.0 Intersection LOS: A
Intersection Capacity Utilization 77.3% ICU Level of Service D
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2087: Melnea Cass Boulevard & Kerr Way



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	ø5
Lane Configurations													
Volume (vph)	229	620	973	45	530	10	816	113	58	8	178	240	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	12	12	12	12	12	12	
Storage Length (ft)	0		0	0		0	300		0	0		0	
Storage Lanes	0		1	0		0	1		0	0		0	
Taper Length (ft)	25			25			100			25			
Lane Util. Factor	0.95	0.95	1.00	0.95	0.95	0.95	0.91	0.91	0.95	0.95	0.95	0.95	
Ped Bike Factor		0.99	0.99		1.00			1.00			0.98		
Frt			0.850		0.997			0.985			0.916		
Flt Protected		0.987			0.996		0.950	0.966			0.999		
Satd. Flow (prot)	0	3081	1411	0	3159	0	1435	2804	0	0	2856	0	
Flt Permitted		0.570			0.701		0.950	0.966			0.690		
Satd. Flow (perm)	0	1769	1393	0	2224	0	1435	2804	0	0	1973	0	
Right Turn on Red			No			No			No			Yes	
Satd. Flow (RTOR)											195		
Link Speed (mph)		30			30			30			30		
Link Distance (ft)		473			530			743			330		
Travel Time (s)		10.8			12.0			16.9			7.5		
Confl. Peds. (#/hr)	45			31		45				46		4	
Confl. Bikes (#/hr)			5			11			32			8	
Peak Hour Factor	0.97	0.97	0.97	0.93	0.93	0.93	0.91	0.91	0.91	0.93	0.93	0.93	
Heavy Vehicles (%)	7%	3%	3%	2%	1%	50%	3%	16%	0%	0%	4%	1%	
Adj. Flow (vph)	236	639	1003	48	570	11	897	124	64	9	191	258	
Shared Lane Traffic (%)							50%						
Lane Group Flow (vph)	0	875	1003	0	629	0	448	637	0	0	458	0	
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right	
Median Width(ft)		0			0			20			12		
Link Offset(ft)		0			0			0			0		
Crosswalk Width(ft)		16			16			16			16		
Two way Left Turn Lane													
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	
Turning Speed (mph)	15		9	15		9	15		9	15		9	
Number of Detectors	1	2	1	1	2		1	2		1	2		
Detector Template	Left	Thru	Right	Left	Thru		Left	Thru		Left	Thru		
Leading Detector (ft)	20	100	20	20	100		20	100		20	100		
Trailing Detector (ft)	0	0	0	0	0		0	0		0	0		
Detector 1 Position(ft)	0	0	0	0	0		0	0		0	0		
Detector 1 Size(ft)	20	6	20	20	6		20	6		20	6		
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		
Detector 1 Channel													
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0		
Detector 2 Position(ft)		94			94			94			94		
Detector 2 Size(ft)		6			6			6			6		
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex		
Detector 2 Channel													
Detector 2 Extend (s)		0.0			0.0			0.0			0.0		
Turn Type	D.P+P	NA	custom	Perm	NA		Split	NA		Perm	NA		
Protected Phases	6	1 6	2!		1		4	4			3!		5
Permitted Phases	1		Free	1						3			
Detector Phase	1 7	1 6	2	1	1		4	4		3	3		
Switch Phase													
Minimum Initial (s)	4.0		8.0	10.0	10.0		10.0	10.0		8.0	8.0		1.0
Minimum Split (s)	8.0		12.0	26.0	26.0		14.0	14.0		24.0	24.0		22.0
Total Split (s)	19.0		106.0	52.0	52.0		44.0	44.0		25.0	25.0		34.0
Total Split (%)	13.6%		75.7%	37.1%	37.1%		31.4%	31.4%		17.9%	17.9%		24%
Maximum Green (s)	15.0		102.0	48.0	48.0		40.0	40.0		21.0	21.0		30.0
Yellow Time (s)	4.0		3.5	3.0	3.0		3.0	3.0		3.0	3.0		3.5
All-Red Time (s)	0.0		0.5	1.0	1.0		1.0	1.0		1.0	1.0		0.5
Lost Time Adjust (s)			0.0		0.0		0.0	0.0			0.0		
Total Lost Time (s)			4.0		4.0		4.0	4.0			4.0		
Lead/Lag	Lag		Lead	Lead	Lead		Lead	Lead		Lag	Lag		Lag
Lead-Lag Optimize?			Yes	Yes	Yes								Yes
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0	2.0		2.0	2.0		2.0
Recall Mode	Max		Min	C-Max	C-Max		None	None		None	None		None
Walk Time (s)				7.0	7.0					7.0	7.0		7.0
Flash Dont Walk (s)				15.0	15.0					13.0	13.0		11.0
Pedestrian Calls (#/hr)				0	0					5	5		0
Act Effct Green (s)		63.0	140.0		48.0		40.0	40.0			21.0		
Actuated g/C Ratio		0.45	1.00		0.34		0.29	0.29			0.15		
v/c Ratio		0.93	0.71		0.83		1.09	1.05dl			0.99		
Control Delay		42.7	9.2		52.7		118.1	54.8			74.0		
Queue Delay		0.0	0.0		0.0		0.0	0.0			0.0		
Total Delay		42.7	9.2		52.7		118.1	54.8			74.0		
LOS		D	A		D		F	D			E		
Approach Delay		24.8			52.7			80.9			74.0		
Approach LOS		C			D			F			E		
Queue Length 50th (ft)		338	280		275		~504	295			135		
Queue Length 95th (ft)		#460	767		358		#743	375			#256		
Internal Link Dist (ft)		393			450			663			250		
Turn Bay Length (ft)							300						
Base Capacity (vph)		936	1411		762		410	801			461		
Starvation Cap Reductn		0	0		0		0	0			0		
Spillback Cap Reductn		0	0		0		0	0			0		
Storage Cap Reductn		0	0		0		0	0			0		
Reduced v/c Ratio		0.93	0.71		0.83		1.09	0.80			0.99		

Intersection Summary

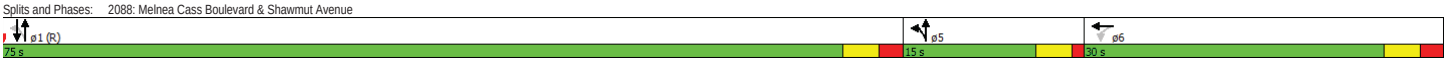
Area Type: CBD
Cycle Length: 140
Actuated Cycle Length: 140
Offset: 81 (58%), Referenced to phase 1:EBWB, Start of Green
Natural Cycle: 130
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.09
Intersection Signal Delay: 49.7 Intersection LOS: D
Intersection Capacity Utilization 98.0% ICU Level 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.
! Phase conflict between lane groups.

Splits and Phases: 3098: Melnea Cass Boulevard & Tremont Street

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	65	408	25	191	954	0	0	1175	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	12	12	12	12	12	12
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	1.00	1.00	0.95	0.95
Ped Bike Factor					0.99						1.00	
Frt					0.992						0.995	
Flt Protected					0.994			0.992				
Satd. Flow (prot)	0	0	0	0	3579	0	0	3114	0	0	3137	0
Flt Permitted					0.994			0.513				
Satd. Flow (perm)	0	0	0	0	3570	0	0	1610	0	0	3137	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					4						4	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		726			360			529			673	
Travel Time (s)		16.5			8.2			12.0			15.3	
Confl. Peds. (#/hr)				11		33	6		32	32		6
Confl. Bikes (#/hr)									31			10
Peak Hour Factor	0.92	0.92	0.92	0.94	0.94	0.94	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	0%	0%	0%	2%	1%	0%	1%	4%	0%	0%	3%	0%
Adj. Flow (vph)	0	0	0	69	434	27	208	1037	0	0	1277	40
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	0	0	0	530	0	0	1245	0	0	1317	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			8			8	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.14	1.14	1.14	1.14	0.97	1.14	1.14	1.14	1.14	1.14	1.14	1.14
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors				1	2		1	2			2	
Detector Template				Left	Thru		Left	Thru			Thru	
Leading Detector (ft)				20	100		20	100			100	
Trailing Detector (ft)				0	0		0	0			0	
Detector 1 Position(ft)				0	0		0	0			0	
Detector 1 Size(ft)				20	6		20	6			6	
Detector 1 Type				Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)				0.0	0.0		0.0	0.0			0.0	
Detector 1 Queue (s)				0.0	0.0		0.0	0.0			0.0	
Detector 1 Delay (s)				0.0	0.0		0.0	0.0			0.0	
Detector 2 Position(ft)					94			94			94	
Detector 2 Size(ft)					6			6			6	
Detector 2 Type					Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)					0.0			0.0			0.0	
Turn Type				Perm	NA		D.P+P	NA			NA	
Protected Phases					6		5	1 5			1	
Permitted Phases				6			1					
Detector Phase				6	6		1 5	1 5			1	
Switch Phase												
Minimum Initial (s)				6.0	6.0		4.0				15.0	
Minimum Split (s)				25.0	25.0		8.0				21.0	
Total Split (s)				30.0	30.0		15.0				75.0	
Total Split (%)				25.0%	25.0%		12.5%				62.5%	
Maximum Green (s)				25.0	25.0		11.0				70.0	
Yellow Time (s)				3.0	3.0		3.0				3.0	
All-Red Time (s)				2.0	2.0		1.0				2.0	
Lost Time Adjust (s)					0.0						0.0	
Total Lost Time (s)					5.0						5.0	
Lead/Lag				Lag	Lag		Lead					
Lead-Lag Optimize?												
Vehicle Extension (s)				2.0	2.0		1.0				2.0	
Recall Mode				None	None		None				C-Max	
Walk Time (s)				8.0	8.0						7.0	
Flash Dont Walk (s)				12.0	12.0						9.0	
Pedestrian Calls (#/hr)				5	5						0	
Act Effct Green (s)					21.7			83.3			73.3	
Actuated g/C Ratio					0.18			0.69			0.61	
v/c Ratio					0.82			1.00			0.69	
Control Delay					57.7			45.1			14.5	
Queue Delay					0.0			0.0			0.0	
Total Delay					57.7			45.1			14.5	
LOS					E			D			B	
Approach Delay					57.7			45.1			14.5	
Approach LOS					E			D			B	
Queue Length 50th (ft)					207			~201			347	
Queue Length 95th (ft)					263			#355			140	
Internal Link Dist (ft)		646			280			449			593	
Turn Bay Length (ft)												
Base Capacity (vph)					746			1243			1918	
Starvation Cap Reductn					0			0			26	
Spillback Cap Reductn					0			0			0	
Storage Cap Reductn					0			0			0	
Reduced v/c Ratio					0.71			1.00			0.70	

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 28 (23%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 120			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 34.2		Intersection LOS: C	
Intersection Capacity Utilization 101.7%		ICU Level of Service G	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

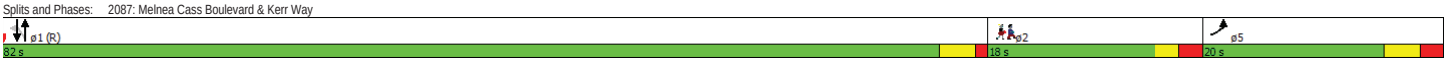
Splits and Phases: 2088: Melnea Cass Boulevard & Shawmut Avenue



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR	ø2
Lane Configurations							
Volume (vph)	25	44	18	962	1168	28	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Lane Width (ft)	12	12	12	12	12	12	
Lane Util. Factor	1.00	1.00	0.95	0.95	0.95	0.95	
Ped Bike Factor				1.00	1.00		
Frt	0.913				0.997		
Flt Protected	0.982			0.999			
Satd. Flow (prot)	1533	0	0	3123	3145	0	
Flt Permitted	0.982			0.913			
Satd. Flow (perm)	1533	0	0	2854	3145	0	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)	61				4		
Link Speed (mph)	30			30	30		
Link Distance (ft)	339			673	743		
Travel Time (s)	7.7			15.3	16.9		
Confl. Peds. (#/hr)			14			14	
Confl. Bikes (#/hr)						2	
Peak Hour Factor	0.67	0.67	0.90	0.90	0.96	0.96	
Heavy Vehicles (%)	0%	0%	0%	4%	3%	0%	
Adj. Flow (vph)	37	66	20	1069	1217	29	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	103	0	0	1089	1246	0	
Enter Blocked Intersection	No	No	No	No	No	No	
Lane Alignment	Left	Right	Left	Left	Left	Right	
Median Width(ft)	12			12	8		
Link Offset(ft)	0			0	0		
Crosswalk Width(ft)	16			16	16		
Two way Left Turn Lane							
Headway Factor	1.14	1.14	1.14	1.14	1.14	1.14	
Turning Speed (mph)	15	9	15			9	
Number of Detectors	1		1	2	2		
Detector Template	Left		Left	Thru	Thru		
Leading Detector (ft)	20		20	100	100		
Trailing Detector (ft)	0		0	0	0		
Detector 1 Position(ft)	0		0	0	0		
Detector 1 Size(ft)	20		20	6	6		
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex		
Detector 1 Channel							
Detector 1 Extend (s)	0.0		0.0	0.0	0.0		
Detector 1 Queue (s)	0.0		0.0	0.0	0.0		
Detector 1 Delay (s)	0.0		0.0	0.0	0.0		
Detector 2 Position(ft)				94	94		
Detector 2 Size(ft)				6	6		
Detector 2 Type				Cl+Ex	Cl+Ex		
Detector 2 Channel							
Detector 2 Extend (s)				0.0	0.0		
Turn Type	NA		Perm	NA	NA		
Protected Phases	5			1	1		2
Permitted Phases			1				
Detector Phase	5		1	1	1		
Switch Phase							
Minimum Initial (s)	6.0		15.0	15.0	15.0		1.0
Minimum Split (s)	12.0		19.0	19.0	19.0		18.0
Total Split (s)	20.0		82.0	82.0	82.0		18.0
Total Split (%)	16.7%		68.3%	68.3%	68.3%		15%
Maximum Green (s)	15.0		78.0	78.0	78.0		14.0
Yellow Time (s)	3.0		3.0	3.0	3.0		2.0
All-Red Time (s)	2.0		1.0	1.0	1.0		2.0
Lost Time Adjust (s)	0.0			0.0	0.0		
Total Lost Time (s)	5.0			4.0	4.0		
Lead/Lag			Lead	Lead	Lead		Lag
Lead-Lag Optimize?							
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0
Recall Mode	None		C-Max	C-Max	C-Max		None
Walk Time (s)							8.0
Flash Dont Walk (s)							6.0
Pedestrian Calls (#/hr)							10
Act Effct Green (s)	8.7			98.7	98.7		
Actuated g/C Ratio	0.07			0.82	0.82		
v/c Ratio	0.62			0.46	0.48		
Control Delay	40.1			4.8	5.2		
Queue Delay	0.0			0.2	0.0		
Total Delay	40.1			5.0	5.2		
LOS	D			A	A		
Approach Delay	40.1			5.0	5.2		
Approach LOS	D			A	A		
Queue Length 50th (ft)	32			143	81		
Queue Length 95th (ft)	50			m161	321		
Internal Link Dist (ft)	259			593	663		
Turn Bay Length (ft)							
Base Capacity (vph)	245			2347	2587		
Starvation Cap Reductn	0			461	0		
Spillback Cap Reductn	0			0	0		
Storage Cap Reductn	0			0	0		
Reduced v/c Ratio	0.42			0.58	0.48		

Intersection Summary			
Area Type:	CBD		
Cycle Length: 120			
Actuated Cycle Length: 120			
Offset: 26 (22%), Referenced to phase 1:NBSB, Start of Green			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.62			
Intersection Signal Delay: 6.6		Intersection LOS: A	
Intersection Capacity Utilization 56.3%		ICU Level of Service B	
Analysis Period (min) 15			
m Volume for 95th percentile queue is metered by upstream signal.			

Splits and Phases: 2087: Melnea Cass Boulevard & Kerr Way



TRIP GENERATION CALCULATIONS

Madison Park Apartments
Trip Generation Assessment--Daily

HOWARD/STEIN-HUDSON ASSOCIATES
26-May-15

			Vehicular Trip Generation					Conversion to Person Trips		Mode Share Split							Vehicular Trips		
Land Use	Size	Category	Unadjusted Vehicle Trips	Internal trips	Pass-by %	Pass-By Trips	Less capture trips	Assumed national vehicle occupancy rate[1]	Converted to New Person trips	Transit Share[2]	Transit Trips	Walk/Bike/ Other Share[2]	Walk/ Bike/ Other Trips	Vehicle Share[2]	Total Vehicle Person Trips	Pass-By vehicle Share	Total Vehicle Pass-By Person Trips	Assumed local auto occupancy rate for autos[3]	Total Adjusted Auto Trips	Total Adjusted Auto Trips (Pass-By)
Daily																				
Apartment[4]	73	Total	486	0			486	1.13	**550**		**94**		**144**		**314**			1.13	**278**	
	Units	In	243		0.00		243	1.13	**275**	17%	**47**	26%	**72**	57%	**157**			1.13	**139**	
		Out	243		0.00		243	1.13	**275**	17%	**47**	26%	**72**	57%	**157**			1.13	**139**	
AM Peak Hour																				
Apartment[4]	73	Total	37	0			37	1.13	**42**		**12**		**11**		**19**			1.13	**17**	
	Units	In	7		0.00		7	1.13	**8**	19%	**2**	27%	**2**	54%	**4**			1.13	**4**	
		Out	30		0.00		30	1.13	**34**	29%	**10**	27%	**9**	44%	**15**			1.13	**13**	
PM Peak Hour																				
Apartment[4]	73	Total	45	0			45	1.13	**51**		**13**		**14**		**25**			1.13	**22**	
	Units	In	29		0.00		29	1.13	**33**	29%	**10**	27%	**9**	44%	**15**			1.13	**13**	
		Out	16		0.00		16	1.13	**18**	19%	**3**	27%	**5**	54%	**10**			1.13	**9**	

1. 2009 National vehicle occupancy rates - 1.13:home to work; 1.84: family/personal business; 1.78: shopping; 2.2 social/recreational
2. Mode shares based on peak-hour BTD Data for Area 4.
3. Local vehicle occupancy rates based on 2009 National vehicle occupancy rates.
4. ITE Trip Generation Rate, 9th Edition, LUC 220 (Residential), Average rate

Appendix C

APPENDIX C – RESPONSE TO CLIMATE CHANGE PREPAREDNESS AND RESILIENCY CHECKLIST FOR NEW CONSTRUCTION

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:	Madison Park Village Infill
Project Address Primary:	Melena Cass Boulevard
Project Address Additional:	40 Raynor Circle
Project Contact (name / Title / Company / email / phone):	Russell Tanner, Director of Real Estate, Madison Park Development Corp. russ.tanner@verizon.net, 617-849-6245

A.2 - Team Description

Owner / Developer:	Madison Park Development Corporation
Architect:	Elton + Hampton Architects
Engineer (building systems):	TBD
Sustainability / LEED:	TBD
Permitting:	MLF Consulting LLC
Construction Management:	TBD
Climate Change Expert:	

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:	Multifamily Residential
List the First Floor Uses:	Residential

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

☑ Wood Frame	Masonry	Steel Frame	Concrete

Describe the building?

Site Area:	51,295 *SF*	Building Area:	89,052 *SF*
Building Height:	58/75 *Ft.*	Number of Stories:	3,4, & 5 *Flrs.*
First Floor Elevation (reference Boston City Base):	18.5 & 20.7 *Elev.*	Are there below grade spaces/levels, if yes how many:	Basement – One (1) Level below grade

A.5 - Green Building

Which LEED Rating System(s) and version has or will your project use (by area for multiple rating systems)?

Select by Primary Use:	New Construction	Core & Shell	Healthcare	Schools
	Retail	**Homes Midrise**	Homes	Other
Select LEED Outcome:	Certified	**Silver**	Gold	Platinum

Will the project be USGBC Registered and / or USGBC Certified?

Registered:	*Yes / No*	Certified:	*Yes / No*
	No		**No**

A.6 - Building Energy

The Proponent does not have an MEP consultant on the team to date. We will follow up with an update as soon as possible

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

Electric:	*(kW)*	Heating:	*(MMBtu/hr)*
What is the planned building Energy Use Intensity:	*(kbut/SF or 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?

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?

9/88 Deg.

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

88 Deg.	3.Days	2 Events / yr.

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

60 Days	1 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.	3.5/5/9Inches	2yr/10yr/100yr frequency.

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	*Hours*	*Events / yr.*

B.2 - Mitigation Strategies

What will be the overall energy performance, based on use, of the project and how will performance be determined?

Building energy use below code:	20%
How is performance determined:	ASHREA 90.1 – 2007 Energy Use Simulation

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?

Roof:	R = 38	Walls / Curtain Wall Assembly:	R = 24
Foundation:	R = 10	Basement / Slab:	R = 10
Windows:	R = 3.22 / U =.31	Doors:	R = 2.85 / U =.35

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:				

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?

No

Describe site conditions?

Site Elevation – Low/High Points:	*Boston City Base* **15.5 & 17.7** *Elev.(Ft.)*
Building Proximity to Water:	**13,500 Ft.**

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

Coastal Zone:	**No**	Velocity Zone:	**No**
Flood Zone:	**No**	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:	**No**	Future floodplain delineation updates:	**No**

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

13,500 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:	*Ft.*	Frequency of storms:	*per year*

C.3 - Building Flood Proofing

Describe any strategies to limit storm and flood damage and to maintain functionality during an extended periods of disruption.

What will be the Building Flood Proof Elevation and First Floor Elevation:

Flood Proof Elevation:	*Boston City Base Elev.(Ft.)*	First Floor Elevation:	*Boston City Base Elev. (Ft.)*

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

	Yes / No	If Yes, to what elevation	*Boston City Base Elev. (Ft.)*
If Yes, describe:			

What measures will be taken to ensure the integrity of critical building systems during a flood or severe storm event:

Systems located above 1st Floor.	Water tight utility conduits	Waste water back flow prevention	Storm water back flow prevention

Were the differing effects of fresh water and salt water flooding considered:

Yes / No

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

Yes / No	If yes, to what height above 100 Year Floodplain:	*Boston City Base Elev. (Ft.)*

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

Yes / No

If Yes, describe:

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

Yes / No	If Yes, for how long:	*days*

Describe any additional strategies to addressing sea level rise and or sever storm impacts:

C.4 - Building Resilience and Adaptability

Describe any strategies that would support rapid recovery after a weather event and accommodate future building changes that respond to climate change:

Will the building be able to withstand severe storm impacts and endure temporary inundation?

Select appropriate:	*Yes / No*	Hardened / Resilient Ground Floor Construction	Temporary shutters and or barricades	Resilient site design, materials and construction

Can the site and building be reasonably modified to increase Building Flood Proof Elevation?

Select appropriate:	*Yes / No*	Surrounding site elevation can be raised	Building ground floor can be raised	Construction been engineered
Describe additional strategies:				

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

Select appropriate:	*Yes / No*	**Solar PV**	Solar Thermal	Clean Energy / CHP System(s)
		Potable water storage	Wastewater storage	Back up energy systems & fuel
Describe any specific or additional strategies:				

Thank you for completing the Boston Climate Change Resilience and Preparedness Checklist!

For questions or comments about this checklist or Climate Change Resiliency and Preparedness best practices, please contact: John.Dalzell.BRA@cityofboston.gov

Appendix D

APPENDIX D – RESPONSE TO CITY OF BOSTON ACCESSIBILITY GUIDELINES

Accessibility Checklist

(to be added to the BRA Development Review Guidelines)

In 2009, a nine-member Advisory Board was appointed to the Commission for Persons with Disabilities in an effort to reduce architectural, procedural, attitudinal, and communication barriers affecting persons with disabilities in the City of Boston. These efforts were instituted to work toward creating universal access in the built environment.

In line with these priorities, the Accessibility Checklist aims to support the inclusion of people with disabilities. In order to complete the Checklist, you must provide specific detail, including descriptions, diagrams and data, of the universal access elements that will ensure all individuals have an equal experience that includes full participation in the built environment throughout the proposed buildings and open space.

In conformance with this directive, all development projects subject to Boston Zoning Article 80 Small and Large Project Review, including all Institutional Master Plan modifications and updates, are to complete the following checklist and provide any necessary responses regarding the following:

- improvements for pedestrian and vehicular circulation and access;
- encourage new buildings and public spaces to be designed to enhance and preserve Boston's system of parks, squares, walkways, and active shopping streets;
- ensure that persons with disabilities have full access to buildings open to the public;
- afford such persons the educational, employment, and recreational opportunities available to all citizens; and
- preserve and increase the supply of living space accessible to persons with disabilities.

We would like to thank you in advance for your time and effort in advancing best practices and progressive approaches to expand accessibility throughout Boston's built environment.

Accessibility Analysis Information Sources:

1. Americans with Disabilities Act – 2010 ADA Standards for Accessible Design
    a. http://www.ada.gov/2010ADAstandards_index.htm
2. Massachusetts Architectural Access Board 521 CMR
    a. http://www.mass.gov/eopss/consumer-prot-and-bus-lic/license-type/aab/aab-rules-and-regulations-pdf.html
3. Boston Complete Street Guidelines
    a. http://bostoncompletestreets.org/
4. City of Boston Mayors Commission for Persons with Disabilities Advisory Board
    a. http://www.cityofboston.gov/Disability
5. City of Boston – Public Works Sidewalk Reconstruction Policy
    a. http://www.cityofboston.gov/images_documents/sidewalk%20policy%200114_tcm3-41668.pdf
6. Massachusetts Office On Disability Accessible Parking Requirements
    a. www.mass.gov/anf/docs/mod/hp-parking-regulations-mod.doc
7. MBTA Fixed Route Accessible Transit Stations
    a. http://www.mbta.com/about_the_mbta/accessibility/

Project Information

Project Name:	**Madison Park Village Infill**
Project Address Primary:	**Melnea Cass Boulevard**
Project Address Additional:	**40 Raynor Circle**
Project Contact (name / Title / Company / email / phone):	**Russell Tanner, Director of Real Estate, Madison Park Development Corp.** **russ.tanner@verizon.net, 617-849-6245**

Team Description

Owner / Developer:	**Madison Park Development Corporation**
Architect:	**Elton + Hampton Architects**
Engineer (building systems):	**TBD**
Sustainability / LEED:	**TBD**
Permitting:	**MLF Consulting LLC**
Construction Management:	**TBD**

Project Permitting and Phase

At what phase is the project – at time of this questionnaire?

☑ **PNF / Expanded PNF Submitted**	Draft / Final Project Impact Report Submitted	BRA Board Approved
BRA Design Approved	Under Construction	Construction just completed:

Building Classification and Description

What are the principal Building Uses - select all appropriate uses?

	Residential – One to Three Unit	☑ **Residential - Multi-unit, Four +**	Institutional	Education
	Commercial	Office	Retail	Assembly
	Laboratory / Medical	Manufacturing / Industrial	Mercantile	Storage, Utility and Other
First Floor Uses (List)	**Residential**, *Amenity Space, Accessory Retail Space*			

What is the Construction Type – select most appropriate type?

	☑ **Wood Frame**	Masonry	Steel Frame	Concrete

Describe the building?

Site Area:	**51,295** ***SF***	Building Area:	**89,052** ***SF***
Building Height:	**58/75** ***Ft***	Number of Stories:	**3,4, & 5** ***Flrs***
First Floor Elevation:	**18.5 & 20.7** ***Elev.*** *Final Elevation to be determined during Construction Drawing phase*	Are there below grade spaces:	***Yes*** */ No* **Basement – One (1) Level below grade**

Assessment of Existing Infrastructure for Accessibility:

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

Provide a description of the development neighborhood and identifying characteristics.	The proposed MPV Infill housing is located in the Ruggles/Melnea Cass area of Roxbury, which is an area that is a blend of socio-economic, cultural diversity, housing, university facilities, and commerce/mercantile endeavors. The sites are bounded by Melnea Cass on the north side, and then a series of smaller residential street. The 2a site is approximately .4 acres, site 2b is approximately

	.8 acres, and both are relatively flat. The existing sidewalk along on all streets are in good condition or will be substantial repaired/replaced as part of construction. The Melnea Cass has a line of mature street trees to be preserved, while all the other sidewalks on the smaller residential street have some street trees, and it is the intention of the project to reinforce/add to the street tree line in coordination with municipal funding for this work. There is a bus stand located across Sojourner Truth Place on Melnea Cass just northeast of the 2b site. The urban context that surrounds the site is the Madison Park Village with a mix of two-story wood frame townhouses, attached townhouse over flats, a small church complex, the new Tropical Foods market, a large public school with playing fields, and playgrounds, and several blocks away two (2) mid-rise multi-family buildings. .
List the surrounding ADA compliant MBTA transit lines and the proximity to the development site: Commuter rail, subway, bus, etc.	Ruggles MBTA Station (0.3 - 0.4 miles away – one long block away along Melnea Cass Blvd. • Orange Line Subway - 0.4 miles • Ruggles Station Commuter Rail Line Stop • Dudley Transit Station (0.5 miles) • Bus 1, 8, 14, 15, 19, 23, 28, 41, 45, 46, 66, 170, 171, SL4, SL5
List the surrounding institutions: hospitals, public housing and elderly and disabled housing developments, educational facilities, etc.	**Affordable/Public Housing:** Madison Park Village, Whittier Neighborhood Housing, possible potential new housing on "crescent" site, and others **School:** • Boston Day/Evening Academy; Dudley Street Neighborhood School; Ellis Elementary; Greater Egleston High; Hale Elementary; Haynes Early Education; Hernandez; Higginson Elementary; Mason Elementary; Ellis-Mendell Elementary; Orchard Gardens K-8; Timilty Middle **Public Library:** Boston Public Library - Dudley Square Branch **Community Center:** • Vine Street Community Center; Tobin Community Center; Orchard Gardens Community Center; Yawkey Club of Roxbury **Police:** Area B-2 Roxbury (Dudley); Boston Police Headquarters (Tremont Street) **Fire:** Engine 14, Ladder 4 Dudley Square **Hospitals:** • Boston University Medical Center; Beth Israel Deaconess; Tufts New England Medical Center; Brigham & Women's
Is the proposed development on a priority accessible route to a key public use facility? List the	Site is located about (0.3 miles) from the Ruggles MBTA station that is a hub for urban rail and bus transportation. The sites are located on a transportation Hub that links the site to major Boston public facilities including Northeastern

surrounding: government buildings, libraries, community centers and recreational facilities and other related facilities.	University, new Tropical Foods Market and the Dudley Square government and commercial center.

Surrounding Site Conditions – Existing:

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

Are there sidewalks and pedestrian ramps existing at the development site?	Yes, most of the sidewalk that abuts the project sites on all sides, and the proposed new street include or will include pedestrian ramps.
If yes above, list the existing sidewalk and pedestrian ramp materials and physical condition at the development site.	The existing sidewalk material is concrete with granite curbing. The physical condition of the existing concrete sidewalk and pedestrian ramps is generally good to fair, as there has been some settlement of existing sidewalks. The sidewalks directly abutting the project sites will be repaired or replaced as part of the development project. In reference to other existing sidewalk in the neighborhood, the City of Boston has indicated that the other sidewalks in the Madison Park Village will be repaired or replaced.
Are the sidewalks and pedestrian ramps existing-to-remain? If yes, have the sidewalks and pedestrian ramps been verified as compliant? If yes, please provide surveyors report.	Sidewalk/pedestrian ramps (curb cuts) that exists will remain. There are modifications proposed, including, new driveway entrance for parking on Site 2a, the dis-continuance of a portion of Brooke Marshall Road abutting site 2b, the extension of Brooke Marshall out to Melnea Cass Blvd. and the creation of a new through street at site 2b. The existing sidewalks and pedestrian ramps have been verified as being in compliance at this time with the exception of some sidewalks that have settled as outlined above. The City of Boston has begun the survey process of the streets and sidewalks in the area to address settlement issues, but the audit reports are not available to date.
Is the development site within a historic district? If yes, please identify.	The project site is not located within an historic district.

Surrounding Site Conditions – Proposed

This section identifies the proposed condition of the walkways and pedestrian ramps in and around the

development site. The width of the sidewalk contributes to the degree of comfort and enjoyment of walking along a street. Narrow sidewalks do not support lively pedestrian activity, and may create dangerous conditions that force people to walk in the street. Typically, a five foot wide Pedestrian Zone supports two people walking side by side or two wheelchairs passing each other. An eight foot wide Pedestrian Zone allows two pairs of people to comfortable pass each other, and a ten foot or wider Pedestrian Zone can support high volumes of pedestrians.

Are the proposed sidewalks consistent with the Boston Complete Street Guidelines? See: www.bostoncompletestreets.org	Yes (pending confirmation of existing cross slopes and clearances).
If yes above, choose which Street Type was applied: Downtown Commercial, Downtown Mixed-use, Neighborhood Main, Connector, Residential, Industrial, Shared Street, Parkway, Boulevard.	Melnea Cass Blvd. - Neighborhood Connector; Raynor, Francis Desales, Brooke Marshall, and Sojourner Truth - Residential
What is the total width of the proposed sidewalk? List the widths of the proposed zones: Frontage, Pedestrian and Furnishing Zone.	The current sidewalk width on Melnea Cass Blvd. varies from approximately 7 feet to 9 feet , with an additional dedicated tree line. Most of the residential street sidewalks are 7 feet (including the curb) depending on the location in the project. The residential street sidewalk typically have the tree plantings occupying a portion of the sidewalk, therefore reducing the path of travel in those areas. Existing street furnishing including a narrow bus shelter, and street lights sit within the existing pedestrian zone.
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 paving material for the pedestrian zone is currently and will be poured-in-place concrete. The majority of the public pedestrian zone will reuse the existing concrete sidewalk where possible and is in the City of Boston right-of-way. There will be walkways added on the proposed Brooke Marshall extension, and on the proposed new through street. These new sidewalks will also be poured-in-place concrete and will comply with City of Boston public street standards. There are currently some common walkways and other will be added on both development sites which will also be poured-in-place concrete.
If the pedestrian right-of-way is on private property, will the proponent seek a pedestrian easement with the City of Boston Public Improvement Commission?	There will be an easement sought for a portion of the 2a site for the proposed new parking lot entry curb cut and driveway. Additionally, the street configuration for the site 2b will be significantly changed that will alter the current pedestrian right-of-way on Brooke Marshall, Sojourner Truth Court, and on Melnea Cass Blvd.
Will sidewalk cafes or other furnishings be programmed for the pedestrian right-of-way?	No
If yes above, what are the proposed dimensions of the sidewalk café or	NA

furnishings and what will the right-of-way clearance be?	

Proposed Accessible Parking:

See Massachusetts Architectural Access Board Rules and Regulations 521 CMR Section 23.00 regarding accessible parking requirement counts and the Massachusetts Office of Disability Handicap Parking Regulations.

What is the total number of parking spaces provided at the development site parking lot or garage?	37 spaces
What is the total number of accessible spaces provided at the development site?	3 spaces
Will any on street accessible parking spaces be required? **If yes,** has the proponent contacted the Commission for Persons with Disabilities and City of Boston Transportation Department regarding this need?	No street accessible parking are required for the parking requirements of the proposed building residents.
Where is accessible visitor parking located?	There will be two (One close to each site) on-street accessible space which can be accommodated pending coordination with City departments. This will also function as the accessible visitor parking
Has a drop-off area been identified? **If yes,** will it be accessible?	No drop-off area.
Include a diagram of the accessible routes to and from the accessible parking lot/garage and drop-off areas to the development entry locations. Please include route distances.	See attached drawings Figures AC1 – AC4

Circulation and Accessible Routes:

The primary objective in designing smooth and continuous paths of travel is to accommodate persons of all

abilities that allow for universal access to entryways, common spaces and the visit-ability* of neighbors.

**Visit-ability – Neighbors ability to access and visit with neighbors without architectural barrier limitations*

Provide a diagram of the accessible route connections through the site.	See attached drawings Figures AC1 – AC4 for accessible routes. The site/building 2a will have accessible public and private walkways on all sides that are completely accessible, The 2a building will include two accessible entries into one accessible flat in that building. All other units in building 2a are duplex units and are not accessible or visit-able. The site/building 2b will have, accessible public and private walkways on all sides that are completely accessible, The 2b building will include two accessible entries into the building that will provide and accessible route to all floors and all units in that building. All units in building 2b are flats and are visit-able.
Describe accessibility at each entryway: Flush Condition, Stairs, Ramp Elevator.	For building 2a, there are two entries into the single accessible flat which are flush, with one of these entries integrated into one of the main building entries. The other main building entry is not accessible and includes stairs in the entry. This is done to meet funding requirements that the living units be located three feet above public sidewalks. All the other units, except for the single accessible flat, are duplex (two story) and do not include visit-ability. There is no elevator in this 2a building. For building 2b, the two main entries into the building are flush and integrated fully. There are no ramps proposed for this building. There are several emergency and service entries into the building that include steps and are not accessible. There is an elevator included in the building to provide accessible flush routes to all floors, common areas/facilities, and living units. This will enable access and promote "Visit-ability".
Are the accessible entrance and the standard entrance integrated?	Yes
If no above, what is the reason?	
Will there be a roof deck or outdoor courtyard space? If yes, include diagram of the accessible route.	There are no roof decks. Both sites have courtyards that are completely accessible to all residents and to the general public.
Has an accessible routes way-finding and signage package been developed? If yes, please describe.	The accessible routes way-finding and signage package has not yet been developed, but all future way finding signage will be developed to meet Building Code and Accessibility Board Requirements

Accessible Units: (If applicable)

In order to facilitate access to housing opportunities this section addresses the number of accessible units that

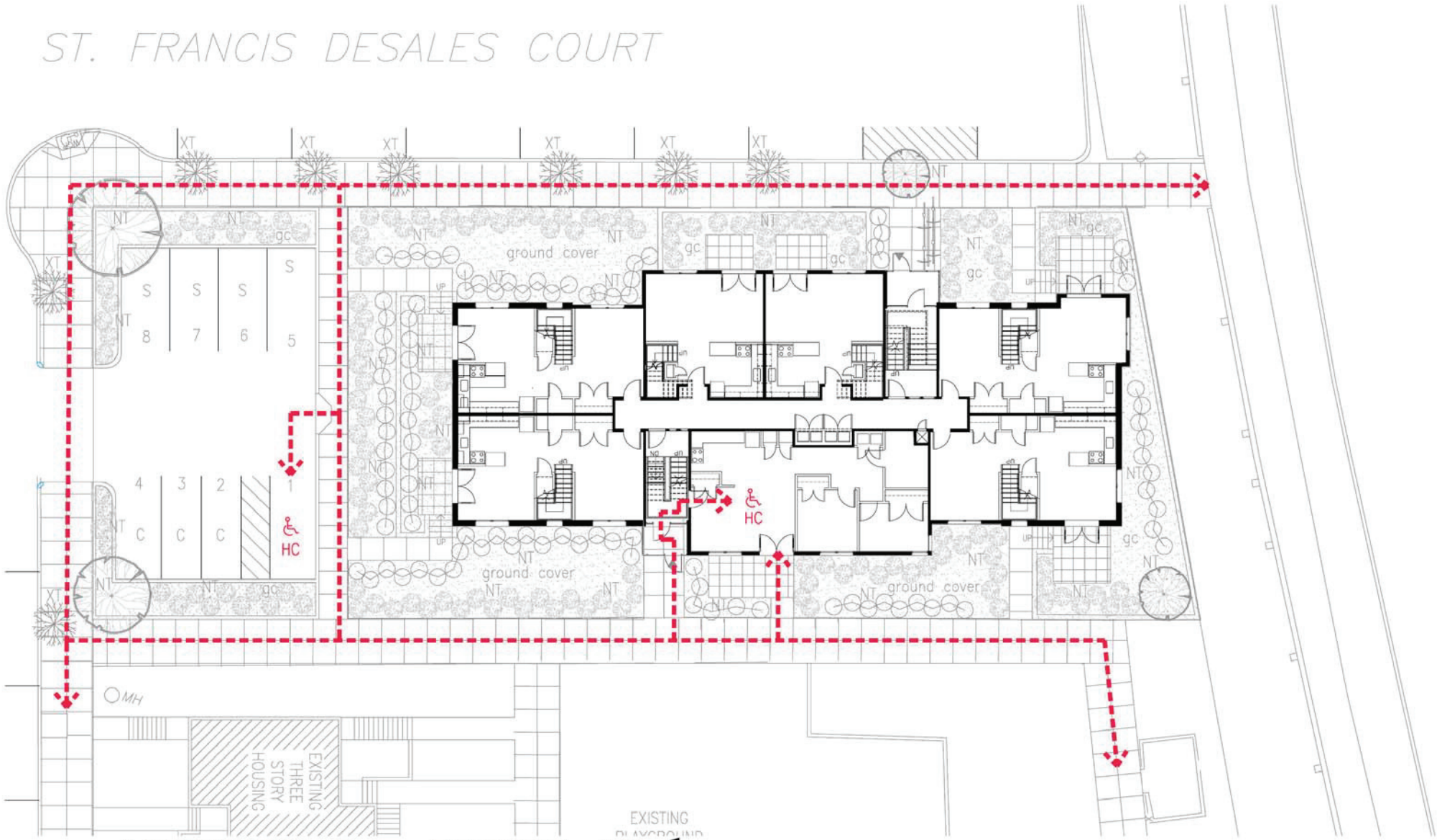
are proposed for the development site that remove barriers to housing choice.

What is the total number of proposed units for the development?	76 units
How many units are for sale; how many are for rent? What is the market value vs. affordable breakdown?	76 affordable rental apartment units
How many accessible units are being proposed?	4 units in the rental apartment building • Three x 2-BRs Units • One x 3-BR Unit The locations will be distributed in the two buildings, See attached drawings AC-1 to AC-4 for locations.
Please provide plan and diagram of the accessible units.	See attached drawing, AC-1 to AC-4
How many accessible units will also be affordable? If none, please describe reason.	All units will be affordable.
Do standard units have architectural barriers that would prevent entry or use of common space for persons with mobility impairments? Example: stairs at entry or step to balcony. **If yes,** please provide reason.	In building 2a, all units are duplex (two story) units and have interior stairs with the unit that is a barrier for accessible use. In building 2b, all units are flats and there are no mobility impairments.
Has the proponent reviewed or presented the proposed plan to the City of Boston Mayor's Commission for Persons with Disabilities Advisory Board?	There has been no meeting with City of Boston Mayor's Commission for Persons with Disabilities Advisory Board to date. There has been a preliminary meeting with Tom Hopkins at the MAAB at which the project was generally outlined.
Did the Advisory Board vote to support this project? **If no,** what recommendations did the Advisory Board give to make this project more accessible?	

Thank you for completing the Accessibility Checklist!

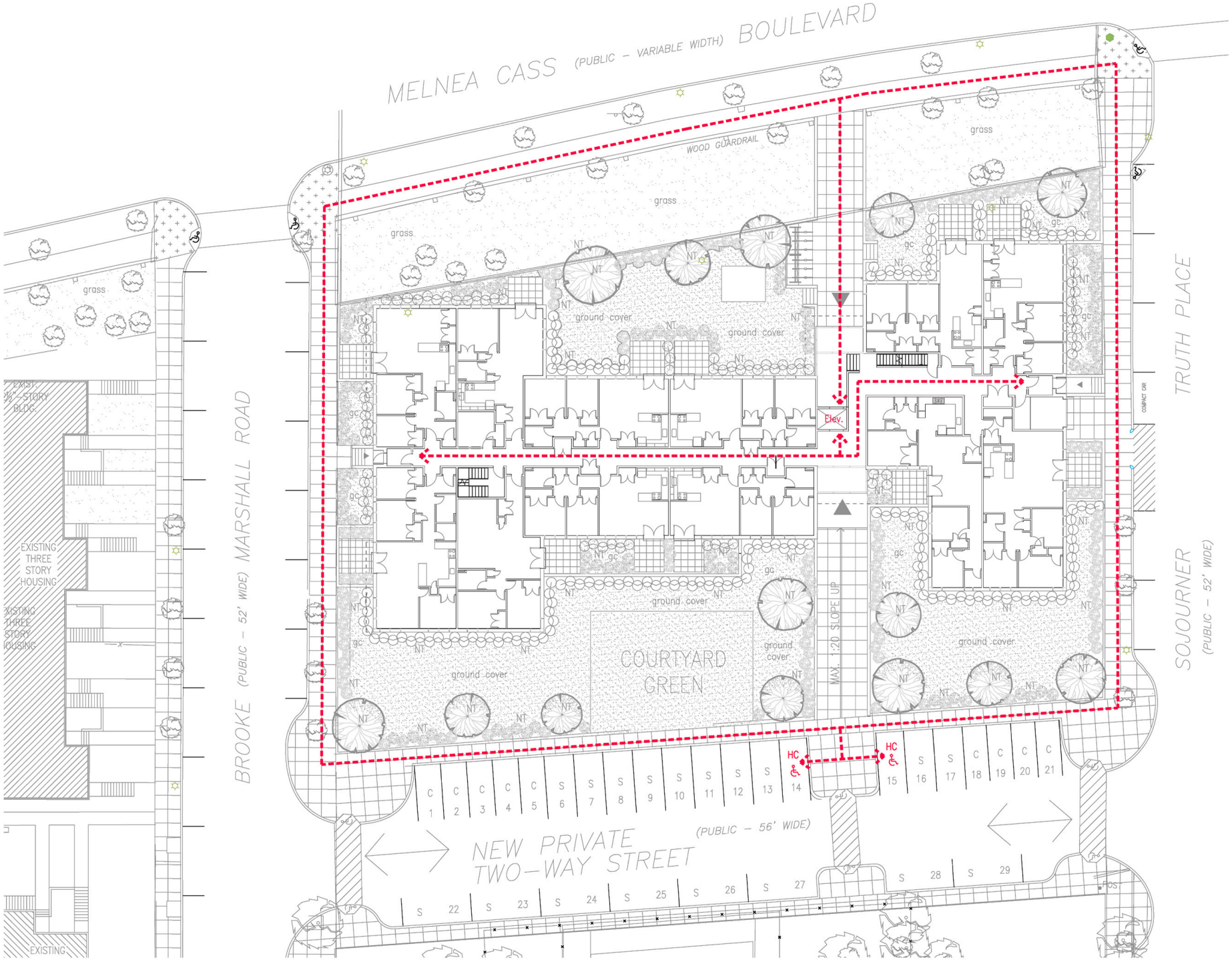
For questions or comments about this checklist or accessibility practices, please contact:

kathryn.quigley@boston.gov | Mayors Commission for Persons with Disabilities

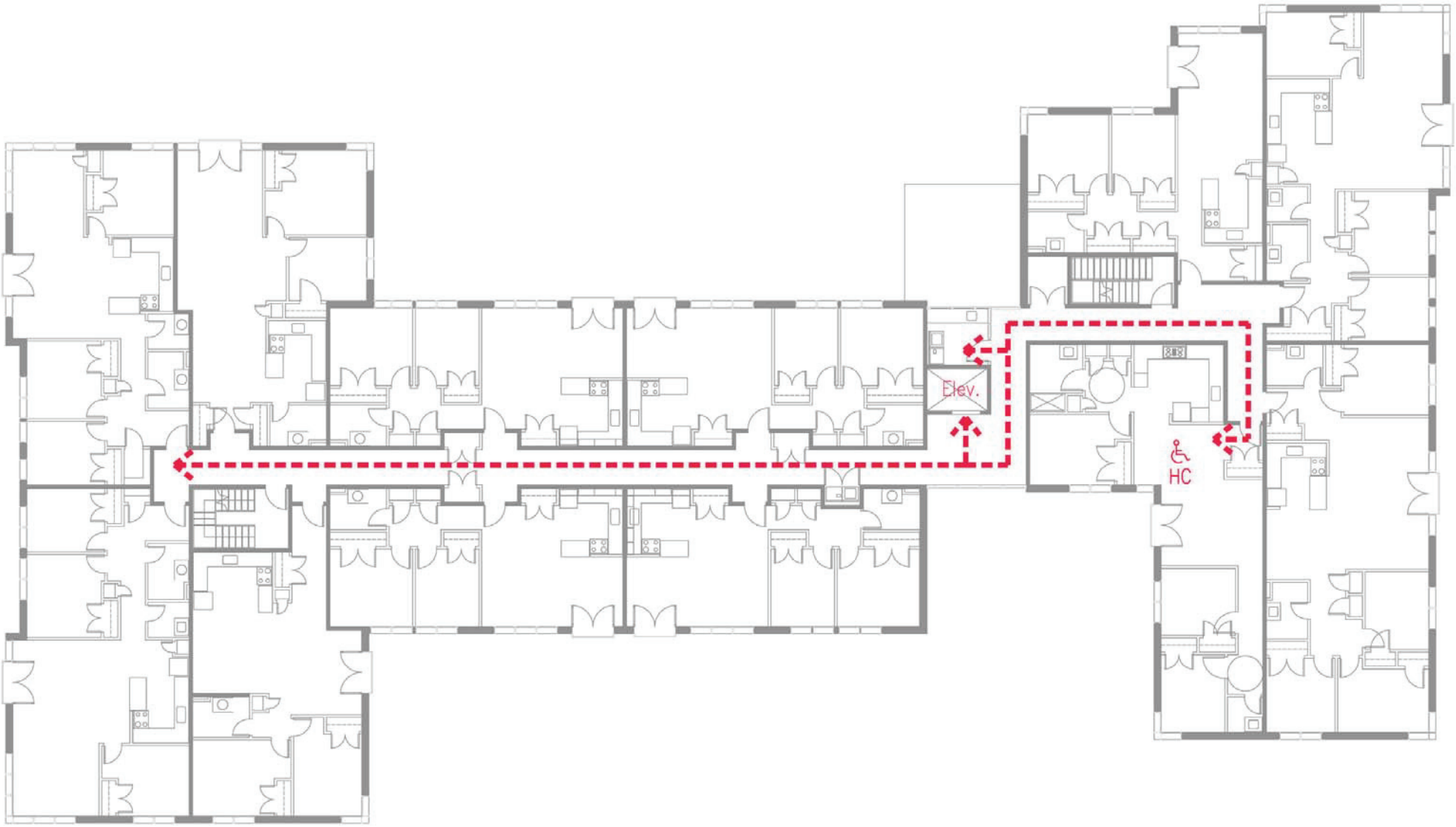


APPENDIX D - FIGURE AC-1

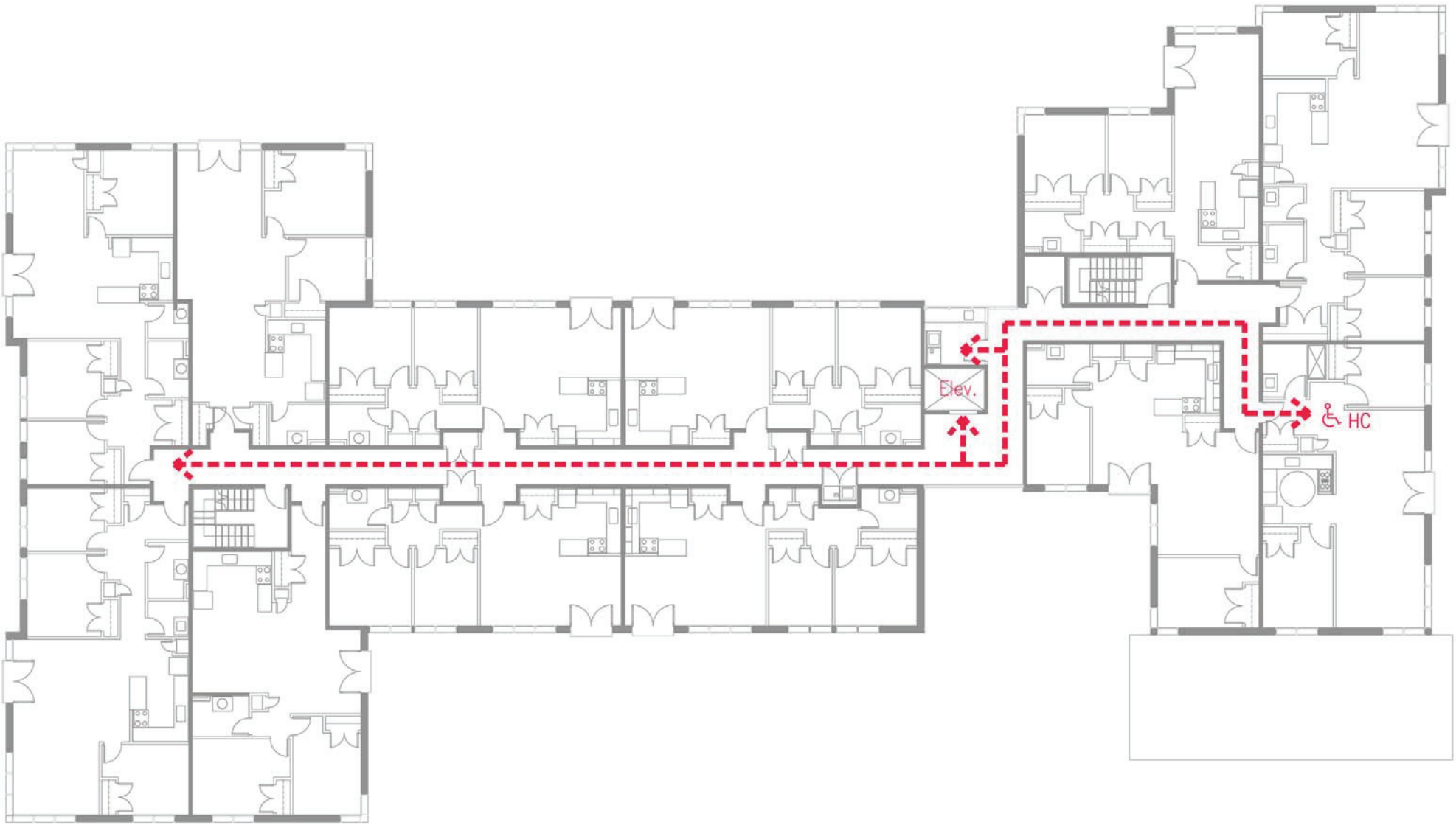
SITE 2A: ACCESSIBILITY ROUTE - SITE & FIRST FLOOR



APPENDIX D - FIGURE AC-2
SITE 2B: ACCESSIBILITY ROUTE - SITE & FIRST FLOOR



APPENDIX D - FIGURE AC-3
SITE 2B: ACCESSIBILITY ROUTE - SECOND & THIRD FLOOR



APPENDIX D - FIGURE AC-4

SITE 2B: ACCESSIBILITY ROUTE - FOURTH & FIFTH FLOOR

June 2, 2015

MLF CONSULTING LLC

ELTON + HAMPTON ARCHITECTS