Bridge Boston Charter School

435 Warren Street, Boston, MA 02119

Application for Article 80 Small Project Review
December 7, 2015

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1. Proponent Information

The Bridge Boston Charter School (BBCS) is a tuition free charter public school for Boston residents that opened in 2011. Its current facilities include leased space at 2 McLellan Street on Blue Hill Avenue and leased space at St. Mark's campus at 18 Samoset Street in Dorchester. The same leadership group behind the very successful Epiphany School, which was founded in Dorchester in 1996, founded BBCS. Today there are approximately 230 students enrolled in pre-Kindergarten through grade 4. In future years, BBCS will add one grade per year until it reaches maturity in 2019 with up to 400 students in pre-Kindergarten through grade 8. Nearly 60% of BBCS students reside in the Dorchester and Roxbury neighborhoods.

BBCS's mission is to serve children who most acutely need a unique full-service combination of both educational and social services in order to reach their full potential. Over 87% of BBCS students qualify for free lunch; 39%students are English Language Learners and 19% have special needs. Many families come to BBCS from surrounding neighborhoods where rates of multigenerational poverty and homelessness are among the highest in Boston. BBCS dedicates full-time staff to pursue vibrant community partnerships that allow it to remove the health and social obstacles that hinder student learning. BBCS students will develop the skills necessary to excel academically in rigorous high schools, reach their individual potential, and view themselves as creators of their own futures. BBCS runs an extended day program, until 5:00pm, at no additional cost to students. Their staff t student ratio is 8:1. In the first year taking the PARCC exam, BCCS students outperformed numerous charter schools and BPS. 65% demonstrated proficiency (scored 4 or 5) on ELA and 74% demonstrated proficiency on math.

The BBCS educational philosophy focuses on:

- A comprehensive, individualized, rigorous academic program that teaches both basic skills and pushes students to develop rich intellectual lives.
- An intentional focus on the elimination of barriers to learning through vibrant community partnerships that allow Bridge Boston Charter School to meet the health and social service needs of its students.
- A deliberate, thoughtful, nurturing community in which each child and adult is known, encouraged, and supported.

BBCS's new site will be its permanent home, allowing it to fulfill a promise to its families and the greater community by serving as a true neighborhood school serving and partnering with the local community – sharing resources, workshops and facilities.

Further information can be found about Bridge Boston Charter School at its website, www.bridgebostoncharterschool.org.

2. Development Team

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3. Project Site

The project site is an approximately 2.35-acre parcel of land located at 435 Warren Street and 244 Townsend Street in the Roxbury neighborhood of Boston. The site contains the former 36,000 square foot Roxbury Comprehensive Healthcare Center and an abandoned and deteriorated residential structure. The site, as shown in Figure 1 below, has street frontage on Warren Street, Townsend Street, and Hazelwood Street.

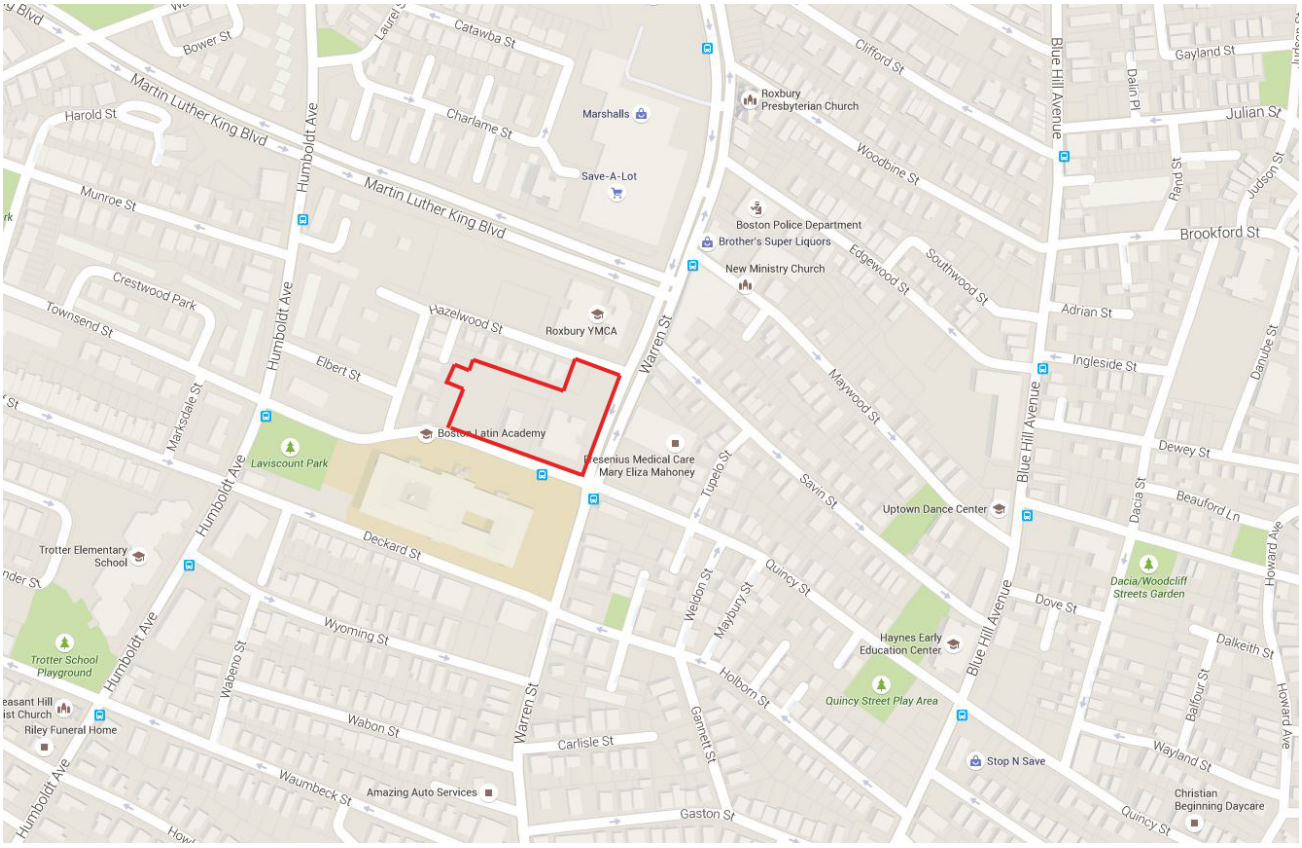


Figure 1

The property was developed as a health center in the 1970's and operated as the Roxbury Comprehensive Health Center until 2012 when it was placed into receivership. A Purchase and Sale Agreement was executed between the proponent and the Receiver-in-Possession, Joseph D. Feaster, in July 2015. The sale will close in conjunction with the start of construction / receipt of building permit, targeted for Spring 2016.

As noted above, there are two existing buildings on the site: a deteriorated residential building, which will be demolished to make room for school additions, and the functionally obsolete health center building, which requires significant renovation as described below. See Figures 2-3 below for an aerial of

the existing project site. Exhibit A includes a current site survey and photographs of existing conditions of the site.

Figure 2

Current Zoning

The property frontage area along Warren Street is located within the Warren Street Boulevard District. The site sits in both the Community Facilities (Warren Street building) and the Multi-family Residential (Townsend Street land) sub-districts. The school is an Allowed use in the Community Facilities sub-district and is a Conditional use in the Multi-family Residential sub-district. The table below describes the dimensional zoning requirements for the two sub-districts.

Warren Street Boulevard District

Requirements	**Multi-Family Residential**	**Community Facilities**
Educational Use – Elementary/Secondary	Conditional	Allowed
Educational Use - Kindergarten	Conditional	Allowed
Max FAR	1.0	2.0
Max Building Height	3 stories	45
Minimum Lot Size	3,000 per building	None

Minimum Usable Open Space (SF per dwelling unit)	400	50
Minimum Lot Width	40	None
Minimum Lot Frontage	40	None
Minimum Front Yard	20	None
Minimum Side Yard	*	None
Minimum Rear Yard	30	20
Maximum Rear Yard	25	
Parking (educational use)	.7/1000 square feet	.7/1000 square feet

*On each side, the side yard shall be at least five (5) feet from a side lot and ten (10) feet from an existing structure on an abutting lot, and the aggregate side yard width shall be not less than fifteen (15) feet. Semi-attached dwellings, Town House buildings and Row House buildings are required to have side yards only on sides that are not attached to another dwelling.

Zoning/Permitting Strategy (see Exhibit B for Zoning Refusal Set)

The project site currently contains four different parcels; the project team is seeking an ALT permit to consolidate the four parcels into one parcel prior to the additions and renovations at the site. An ERT permit will be requested to demolish the former residential building at 244 Townsend Street to build the new gymnasium building.

After the addition, the existing building at 435 Warren Street will contain approximately 39,568 square feet. The new gymnasium building will contain approximately 6,696 square feet for a total building area on the consolidated lot of approximately 46,264 square feet, resulting in an FAR of 0.45.

The project team believes the project will not require any Variances. The only zoning approval required from the Zoning Board of Appeals will be for the Education and a Conditional use within the MFR sub-district.

The residential building at 244 Townsend Street is listed in the Massachusetts Historical Commission's Inventory of Historical and Archeological Assets of the Commonwealth, but is not listed on either the state or national register of historic places. The proposed demolition of this building will be subject to an Article 85 application and Boston Landmarks Commission review.

4. Project Design

Summary

The proposed project comprises significant renovation of the existing 36,000 square foot building, as well as construction of a new small classroom wing addition of approximately 3,000 square feet, and a new stand-alone gymnasium building of up to 6,696 square feet, for a total of approximately 46,000 square feet. The gymnasium may initially be constructed as a smaller, 5,000 square foot structure depending upon cost and budget constraints. Figure 3 below provides a visual representation of the project components on the site.

Figure 3

Design Principles

The project will abide by Design Guidelines for the Roxbury Neighborhood District. Site planning is geared toward enhancing the street frontage and surrounding buildings and spaces. All open spaces and

frontages are designed to enhance pedestrian activity and complement the surrounding area. The Warren Street streetscape will be enhanced by removing the historically unused entrance in the center of the building, but retaining the glass curtain wall. The new addition will be constructed of masonry which compliments the existing structure. Appropriate fencing and plantings will be added around the interior property borders in order to screen and buffer from the existing residential neighbors.

Site Analysis

In analyzing the best location for both the gym and classroom addition from a cost and programmatic perspective, the project team determined the site plan shown in Figure 3 above represents the best lay-out based on the following factors:

- There is a significant amount of rock ledge on site and the placement of the additions took into consideration the high cost and disruption of significant ledge removal;
- Site topography, which slopes steeply in back of Townsend Street lot;
- Ability to maximize use of existing green areas as play space;
- Flow and circulation of the interior spaces in line with the desired program and existing building skeleton;
- Commitment to utilize a substantial portion of the site to accommodate onsite traffic management, thereby removing activity from public streets;
- Preference to preserve the two parking lot configuration, which distributes traffic impact burden on the surrounding neighborhood streets.

Scope of Improvements

The existing building renovation will include all new MEP systems, a new elevator, a complete reconfiguration of interior spaces, cutting in of additional windows (number and type shown on elevations is subject to change as design / cost estimates progress), and a significant investment in the building envelope. See Exhibit C for project renderings and floor plans, as well as the Article 80 Accessibility Checklist.

In addition to re-grading, site work will include new play areas, parking lots, driveways, lighting, fencing, landscaping, and retaining walls. Site drainage will be carefully designed and greatly improved so that the current surface water flow off the land slope into neighboring properties is contained on site. The site plan calls for 49 onsite parking spaces, approximately equal to the existing number of spaces and 15 more than the minimum required by zoning. Significant

investment will be made to create three lanes onsite in order to keep school bus at parental vehicle pick-up and drop-off activity off of city streets.

5. Traffic Plan

BBCS's existing school facilities accommodate an enrollment of 230± students (Pre-K through Grade 4) and Boston Public Schools currently provides BBCS 11 public school buses with supplemental transportation provided by parents and/or relatives. The hours of operation are 8:00 AM – 5:00 PM Monday through Friday. For planning purposes, the traffic plan done by MDM Transportation has assumed that the new project site will be repurposed to accommodate up to 400 students (Pre-k through Grade 8) and 89 staff with approximately 49 marked parking spaces. The project site is currently served by four curb cuts along Townsend Street and one curb cut along Hazelwood Street. The site's primary vehicle access will be provided via two curb cuts along Townsend Street including one enter only driveway, which leads to the dedicated drop off/pick-up area for school buses and parent passenger vehicles. As part of the project, one curb cut along Townsend Street will be eliminated and the existing easternmost curb cut will be retained for delivery purposes. The existing access/egress driveway and parking lot on Hazelwood Street will be retained.

The project's Transportation Impact and Access Study (TIAS) evaluates transportation characteristics of roadways and intersections that provide a primary means of access to the site, and that are likely to sustain a measurable level of traffic impact from the proposed development. Study area intersections include the following:

- Warren Street at Townsend Street – Signalized
- Humboldt Street at Townsend Street – Signalized
- Townsend Street at Site Driveway(s) - Not signalized

Capacity analyses were conducted for each study area intersection to quantify existing and future year traffic operations, both with and without the development, for the weekday morning and weekday evening peak hours. These hours coincide with peak traffic activity of the proposed BBCS project and the adjacent streets. Under future conditions, with and without the project, capacity

analysis results indicate that the study intersections will generally operate at overall LOS D and E during the weekday morning and evening peak hours.

Vehicular trips generated to/from the site are estimated based on field observations at the existing BBCS schools located 2 McLellan Street and 18 Samoset Street in Dorchester, proposed site programming and existing mode-split data provided by BBCS for their existing facilities. Trip generation estimated for the morning peak hour includes approximately 233 vehicle-trips (127 entering and 106 exiting) consisting of 95 parent/guardian drop-off vehicles, 11 school buses and 21 staff vehicles. Trip generation estimated for the evening peak hour includes 220 vehicle-trips (95 entering and 125 exiting) consisting of 84 parent/guardian pick-up vehicles, 11 school buses and 30 staff vehicles. Observations indicate that the majority of the staff arrive prior to the morning peak hour and depart after the evening peak hour.

The project team understands that the location of the project, with close proximity to Boston Latin Academy (BLA), is one in which traffic is already an issue during BLA arrival and dismissal times in the morning and afternoon. The team has heard directly from the community about the traffic concerns on Townsend Street and has witnessed it firsthand. BBCS has developed a transportation management plan, which is designed not to exacerbate current conditions and to minimize offsite impacts. Key elements of the plan include:

Concern	**Solution**
Proximity to Boston Latin Academy – traffic during drop-off and pick-up	**BBCS:** School Hours: 8:00am – 5:00pm; traffic occurs between 7:15 and 8:00am and between 4:30 and 5:15pm **BLA:** School Hours: 7:20am – 1:40pm; traffic occurs between 6:30 and 7:10am and between 1:15 and 2:00pm
Heavy traffic on surrounding streets during drop-off and pick-up times (especially Townsend Street)	Split BBCS traffic between two parking lots / pick-up & drop-off zones; have all activity occur on-site (see Figures 4-6 below)
General traffic concerns from parent cars and	Place at least 3 BBCS staff members outside during

student busses	pick-up and drop-off times to manage activity.
Conflicts with neighborhood residents over parking and traffic	Engage BBCS parent community on a routine basis on best practices for transportation and parking.
Concern	**Solution**
Pedestrian & vehicular safety	Implement access/egress and pedestrian improvements on the project site to enhance safety, such as _____.
Pedestrian & vehicular safety	Consult with the City of Boston Transportation Department to relocate and/or supplement the School Zone signs along Townsend Street and Warren Street.
Pedestrian & vehicular safety; general traffic concerns	Consult with the City of Boston Police Department relative to scheduling a crossing guard at the Warren Street/Townsend Street/Quincy Street intersection during morning arrival and evening dismissal periods.

Figures 4-6 below illustrate drop-off and pick-up plans at the site from 7:15am – 8:00am and 4:30pm – 5:30pm.

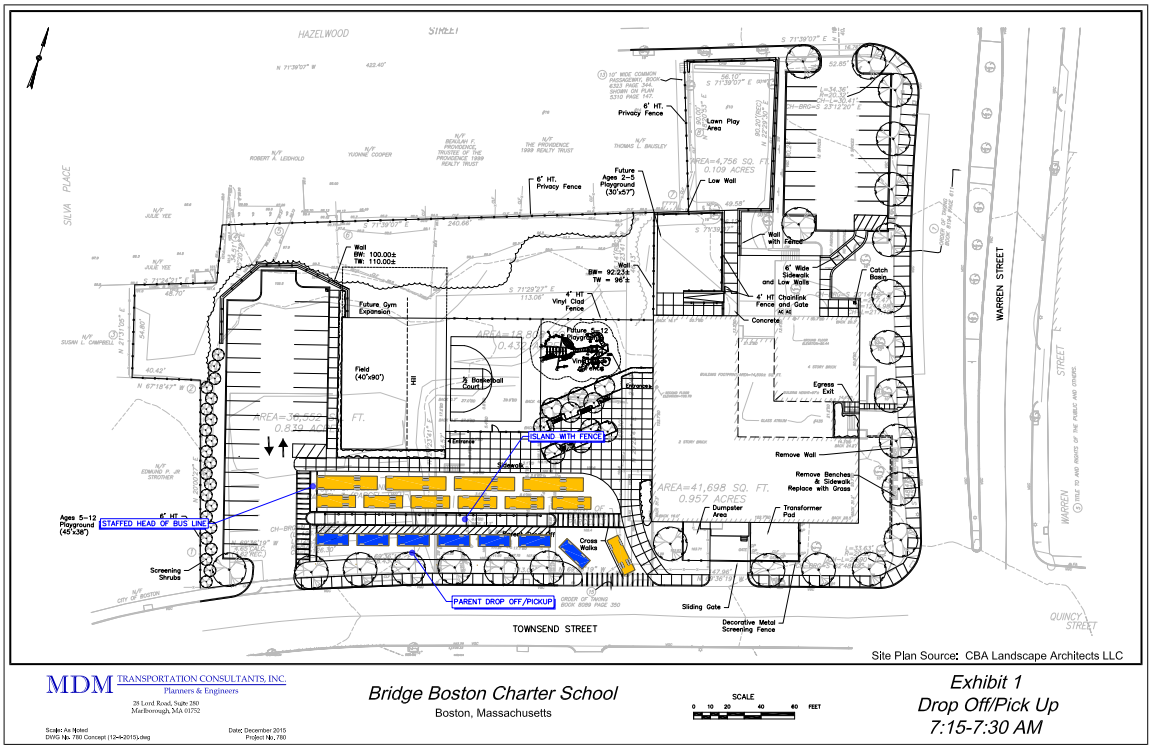


Figure 4

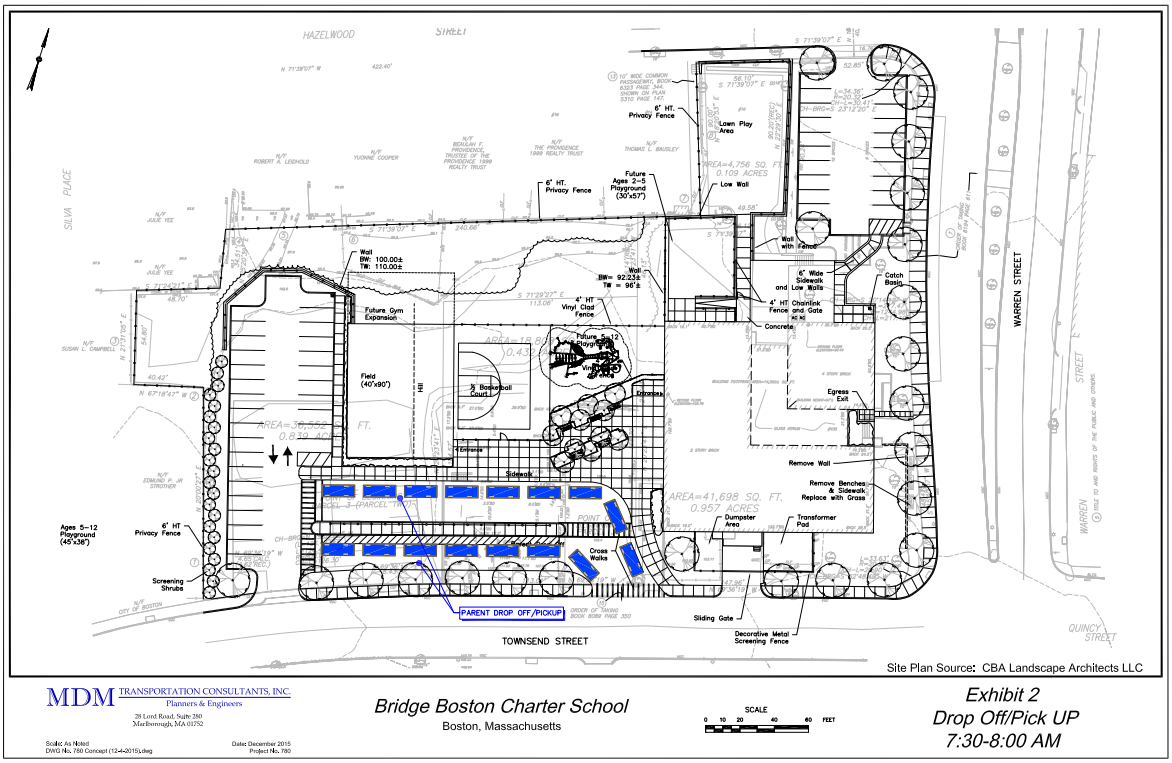


Figure 5

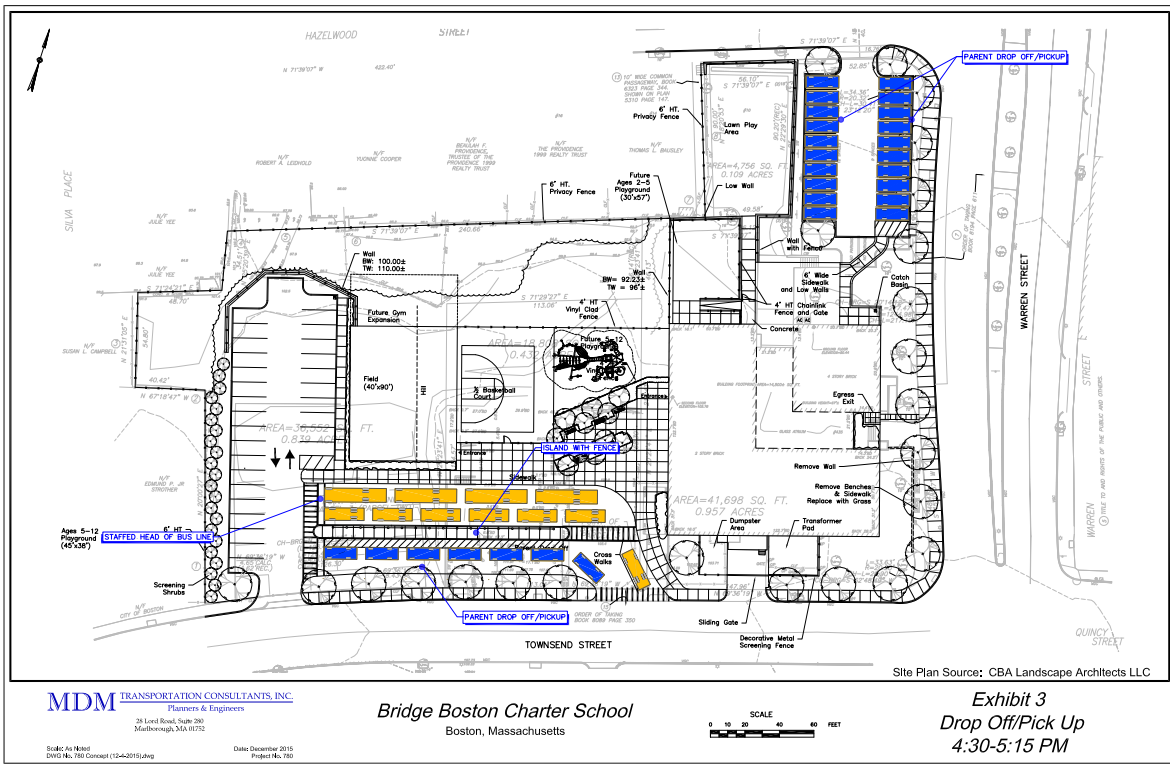


Figure 6

The full traffic plan done by MDM Transportation can be found in Exhibit D.

6. Community Outreach

In addition to several early meetings held in the fall of 2014 when BBCS was first introduced as the proposed buyer of the property, the project team has hosted three recent community meetings:

1. October 11th: Meeting with the Garrison Trotter Neighborhood Association
2. October 14th: Meeting with direct abutters at the YMCA
3. October 21: Meeting with wider neighborhood residents at the Roxcomp building

7. Schedule

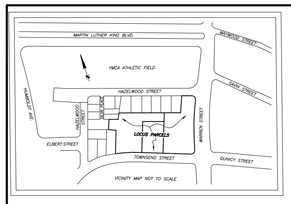
The project schedule targets construction completion in time for school occupancy in August 2017. Key milestones in order to achieve that objective are as follows:

File permitting submissions for Article 80 and 85	December, 2015
Boston Redevelopment Authority and Board of Appeals Votes	February, 2016
Issue Construction Bid Documents	April, 2016
Acquire Property, Receive Building Permit and Commence Construction	May, 2016
Complete Construction and Commence Building Occupancy	July, 2017

8. Project Budget and Financing

Total Project Cost budget is $21.5 million, of which acquisition is $3.5m. Construction is estimated at $15.0m, and financing, soft costs and furnishings at $3.0m.

Financing for the project will come from a $16.5 million tax-exempt bond issued by MassDevelopment and purchased by Century Bank, and $5.0m of equity that has been generated through a capital campaign.



BOUNDARY DESCRIPTION PER COMMITMENT NO. NCS-696329-BOS1 ISSUED BY FIRST AMERICAN TITLE INSURANCE COMPANY HAVING AN EFFECTIVE DATE OF JUNE 19, 2015.

PARCEL TWO

A CERTAIN PARCEL OF VACANT LAND BOUNDED AND DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE PROPOSED NORTH SIDE LINE OF TOWNSEND STREET, SAID POINT BEING N20 DEGREES 23' 41" E NINE AND NINETY-EIGHT HUNDREDTHS (9.98) FEET FROM A POINT ON THE NORTH SIDE LINE OF TOWNSEND STREET, SAID POINT ON THE NORTH SIDE LINE OF TOWNSEND STREET BEING N69 DEGREES- 36' 19" W TWO HUNDRED NINETY-TWO AND SEVENTY-EIGHT HUNDREDTHS (292.78) FEET FROM A SECOND POINT ON THE NORTH SIDE LINE OF TOWNSEND STREET, SAID SECOND POINT ON THE NORTH SIDE LINE OF TOWNSEND STREET, BEING THE POINT OF TANGENCY ON A LINE CURVING TO THE RIGHT WITH A RADIUS OF TEN AND NO HUNDREDTHS (10.00) FEET, A DISTANCE OF SIXTEEN AND NO HUNDREDTHS (16.00) FEET FROM A POINT OF CURVATURE, SAID POINT OF CURVATURE BEING THE INTERSECTION OF THE NORTHERLY SIDE LINE OF SAID TOWNSEND STREET AND THE WEST SIDE LINE OF WARREN STREET;

THENCE RUNNING N 69 DEGREES 36' 19" W BY LAND NOW OR FORMERLY OF THE BOSTON REDEVELOPMENT AUTHORITY (PROPOSED NORTH SIDE LINE OF TOWNSEND STREET) EIGHT AND FORTY-THREE HUNDREDTHS (8.43) FEET TO A POINT OF CURVATURE;

THENCE RUNNING WESTERLY BY LAND NOW OR FORMERLY OF THE BOSTON REDEVELOPMENT AUTHORITY (PROPOSED NORTH SIDE LINE OF TOWNSEND STREET) ON A LINE CURVING TO THE LEFT WITH A RADIUS OF EIGHT HUNDRED AND NO HUNDREDTHS (800.00) FEET A DISTANCE OF ONE HUNDRED TWENTY-SIX AND FORTY-SEVEN HUNDREDTHS (126.47) FEET TO A POINT OF CURVATURE, SAID POINT OF CURVATURE BEING ALSO ON THE NORTH SIDE LINE OF TOWNSEND STREET;

THENCE TURNING AND RUNNING N69 DEGREES 36' 19" W BY THE NORTH SIDE LINE OF TOWNSEND STREET FOUR AND SIXTY-TWO HUNDREDTHS (4.62) FEET TO A POINT, SAID POINT BEING THE SOUTHEAST COMER OF LAND NOW OR FORMERLY OF EDITH MAY SHEPARD AND ALICE MABLE SHEPARD;

THENCE TURNING AND RUNNING N20 DEGREES 00' 27" E BY LAND NOW OR FORMERLY OF EDITH MAY SHEPARD & ALICE MABLE SHEPARD ONE HUNDRED TWENTY-THREE AND FIFTY-HUNDREDTHS (123.50) FEET TO A POINT;

THENCE TURNING AND RUNNING N67 DEGREES 18' 47" W BY LAND NOW OR FORMERLY OF EDITH MAY SHEPARD AND ALICE MABLE SHEPARD FORTY AND FORTY-TWO HUNDREDTHS (40.42) FEET TO A POINT, SAID POINT BEING ON THE NORTH SIDE LINE OF LAND NOW OR FORMERLY OF EDITH MAY SHEPARD AND ALICE MABLE SHEPARD, AND SAID POINT BEING THE SOUTHEAST CORNER OF LAND NOW OR FORMERLY OF CLAUDIA A. DAUSUEL;

THENCE TURNING AND RUNNING N21 DEGREES 31' 05" E BY LAND NOW OR FORMERLY OF CLAUDIA A. DAUSUEL, FIFTY-FOUR AND EIGHTY HUNDREDTHS (54.80) FEET TO A POINT BEING THE NORTHEAST COMER OF LAND NOW OR FORMERLY OF CLAUDIA A. DAUSUEL, AND SAID POINT BEING ON THE SOUTH SIDE LINE OF LAND NOW OR FORMERLY OF MORGAN AND AUNA B. BURDETT;

THENCE TURNING AND RUNNING S71 DEGREES 24' 21" E BY LAND NOW OR FORMERLY OF MORGAN AND AUNA & A. BURDETT, FORTY-EIGHT AND SEVENTY HUNDREDTHS (48.70) FEET TO A POINT.

THENCE TURNING AND RUNNING N25 DEGREES 20' 29" E BY LAND NOW OR FORMERLY OF MORGAN AND AUNA A. A. BURDETT, AND BY LAND NOW OR FORMERLY OF FILICIANO V. ALAGAR AND ELEASE H. ALAGAR, THIRTY-FOUR AND FIFTY-ONE HUNDREDTHS (34.51) FEET TO A POINT, SAID POINT BEING ON THE EAST SIDE LINE OF LAND NOW OR FORMERLY OF FILICIANO V. ALAGAR AND ELEASE H. ALAGAR, AND SAID POINT BEING THE SOUTHWEST COMER OF LAND NOW OR FORMERLY OF THE BOSTON REDEVELOPMENT AUTHORITY;

THENCE TURNING AND RUNNING S71 DEGREES 39' 07" E BY LAND NOW OR FORMERLY OF THE BOSTON REDEVELOPMENT AUTHORITY AND BY LAND NOW OR FORMERLY OF WALTER L. AND VENDA TIDWELL AND BY LAND NOW OR FORMERLY OF JOHN AND SARAH JACKSON, AND BY LAND NOW OR FORMERLY OF MARIE MALE, AND BY LAND NOW OR FORMERLY OF THOMAS L. AND DELORES A. BENSLEY, TWO HUNDRED FORTY AND SIXTY-SIX HUNDREDTHS (240.66) FEET TO A POINT, SAID POINT BEING ON THE SOUTH SIDE LINE OF LAND NOW OR FORMERLY OF THOMAS L. AND DELORES A. BENSLEY, AND SAID POINT BEING THE NORTHWEST COMER OF LAND NOW OR FORMERLY OF THE BOSTON REDEVELOPMENT AUTHORITY;

THENCE TURNING AND RUNNING S20 DEGREES 23' 41" W BY LAND NOW OR FORMERLY OF THE BOSTON REDEVELOPMENT AUTHORITY, FORTY-SIX AND FOURTEEN HUNDREDTHS (46.14) FEET TO A POINT, SAID POINT BEING ON THE WEST SIDE LINE OF LAND NOW OR FORMERLY OF THE BOSTON REDEVELOPMENT AUTHORITY, AND SAID POINT BEING THE NORTHEAST COMER OF LAND NOW OR FORMERLY OF JAMES JACKSON PUTNAM;

THENCE TURNING AND RUNNING N71 DEGREES 29' 27" W BY LAND NOW OR FORMERLY OF JAMES JACKSON PUTNAM, ONE HUNDRED THIRTEEN AND SIX HUNDREDTHS (113.06) FEET TO A POINT;

THENCE TURNING AND RUNNING S20 DEGREES 23' 41" W BY LAND NOW OR FORMERLY OF JAMES JACKSON PUTNAM, ONE HUNDRED SIXTY-FOUR AND FIFTY-SEVEN HUNDREDTHS (164.57) FEET TO THE POINT OF BEGINNING.

ALL BEING SHOWN ON A PLAN OF LAND ENTITLED "PLAN OF LAND IN BOSTON, DELIVERY PARCEL H-7 OF WASHINGTON PARK URBAN RENEWAL AREA, PROJECT NO. MASS. R-24", BY FAY, SPOFFORD & THORNDIKE, INC., ENGINEERS, DATED MARCH 29, 1966.

CONTAINING A NET AREA OF THIRTY-SIX THOUSAND FIVE HUNDRED

SIXTY-TWO (36,562) SQUARE FEET. SQUARE FOOTAGE NOT INSURED.

BOUNDARY DESCRIPTION PER COMMITMENT NO. NCS-696329-BOS1 ISSUED BY FIRST AMERICAN TITLE INSURANCE COMPANY HAVING AN EFFECTIVE DATE OF JUNE 19, 2015.

PARCEL 2 (10 HAZELWOOD STREET, BOSTON MA):

THE LAND IN THAT PART OF BOSTON, SUFFOLK COUNTY, KNOWN AS ROXBURY, KNOWN AS AND NUMBERED 10 HAZELWOOD STREET, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

THE LAND WITH THE BUILDINGS THEREON SITUATED IN THAT PART OF BOSTON CALLED ROXBURY, BEING LOT 6 ON PLAN DATED FEBRUARY 4, 1932, RECORDED IN BOOK 5310, PAGE 147 WITH SUFFOLK REGISTRY OF DEEDS AND BOUNDED AND DESCRIBED AS FOLLOWS:

NORTHERLY BY HAZELWOOD STREET, FORMERLY MUNROE STREET, FIFTY-SIX AND 10/100 (56.10) FEET; EASTERLY BY LAND NOW OR FORMERLY OF SHINE AND LAND OF LEVENSON NINETY AND 20/100 FEET (90.20) FEET;

SOUTHERLY BY LAND NOW OR FORMERLY OF THE BAY STATE CONSTRUCTION COMPANY, INCORPORATED, FORTY- NINE AND 58/100 (49.58) FEET; AND

WESTERLY BY LOT 5 ON SAID PLAN, NINETY (90) FEET. CONTAINING 4,756 SQUARE FEET.

BOUNDARY DESCRIPTION (PER SURVEY)

PARCEL 3

A CERTAIN PARCEL OF LAND SITUATED IN THE CITY OF BOSTON DISTRICT OF ROXBURY, COUNTY OF SUFFOLK IN THE COMMONWEALTH OF MASSACHUSETTS MORE PARTICULARLY DESCRIBED AS FOLLOWS;

COMMENCING AT A STONE BOUND BROKEN AT THE INTERSECTION OF THE NORTHEASTERLY SIDELINE OF TOWNSEND STREET AND THE WESTERLY SIDELINE OF WARREN STREET. THENCE;

RUNNING N 69°36'19" W A DISTANCE OF 147.96 FEET TO THE POINT OF BEGINNING;

THENCE RUNNING N 69°36'19" W ALONG SAID NORTHEASTERLY SIDELINE OF TOWNSEND STREET A DISTANCE OF 113.01 FEET. THENCE;

TURNING AND RUNNING N 20°23'41" E A DISTANCE OF 164.57 FEET BY PARCEL 3 (PARCEL TWO). THENCE;

TURNING AND RUNNING S 71°29'27" E A DISTANCE OF 113.06 FEET BY SAID PARCEL 3 (PARCEL TWO). THENCE;

TURNING AND RUNNING S 20°23'41" W A DISTANCE OF 168.30 FEET BY PARCEL 1, BRA PARCEL I-4 TO THE POINT OF BEGINNING.

PARCEL 3 (PARCEL ONE) HAVING AN AREA OF 18,808 SQUARE FEET.

BOUNDARY DESCRIPTION PER COMMITMENT NO. NCS-696329-BOS1 ISSUED BY FIRST AMERICAN TITLE INSURANCE COMPANY HAVING AN EFFECTIVE DATE OF JUNE 19, 2015.

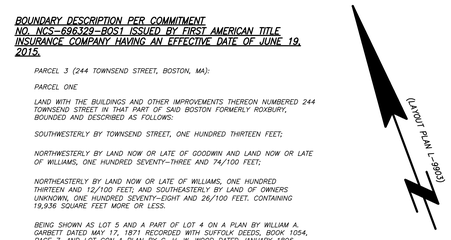
PARCEL 1 (435 WARREN STREET, BOSTON MA):

A CERTAIN PARCEL OF LAND WITH ALL OF THE BUILDINGS AND STRUCTURES NOW OR HEREAFTER STANDING OR PLACED THEREON SITUATED AT 435 WARREN STREET, BOSTON, COUNTY OF SUFFOLK, MASSACHUSETTS AND MORE FULLY DESCRIBED AS FOLLOWS:

THAT CERTAIN PARCEL OF LAND KNOWN AS PARCEL 1-4 (THE "PROPERTY") LOCATED IN THE CITY OF BOSTON, AS SHOWN ON A PLAN ENTITLED: "PLAN OF LAND IN BOSTON, DELIVERY PARCEL 1-4 OF WASHINGTON PARK URBAN RENEWAL AREA PROJECT NO. MASS. R-24" AS PREPARED BY FAY SPOFFORD & THORNDIKE, INC., BOSTON, MASSACHUSETTS, DATED SEPTEMBER 19, 1969 WHICH PLAN IS ATTACHED AS EXHIBIT "A" TO THE LAND DISPOSITION AGREEMENT DATED APRIL 12, 1973 (THE "AGREEMENT"), RECORDED AT BOOK 8620, PAGE 22 OF THE SUFFOLK COUNTY REGISTRY OF DEEDS, TO WHICH PLAN REFERENCE MAY BE HAD FOR A MORE PARTICULAR DESCRIPTION OF SAID PARCEL-4.

LEGEND

- (S) SEWER MANHOLE
- (D) DRAIN MANHOLE
- (E) ELECTRIC MANHOLE
- (W) WATER MANHOLE
- (T) TELEPHONE MANHOLE
- (C) CABLE TV MANHOLE
- (M) MBTA MANHOLE
- (X) STEAM MANHOLE
- MANHOLE
- HYDRANT
- WATER SHUT OFF/WATER GATE
- GAS SHUT OFF/GAS GATE
- BOSTON WATER VALVE
- CATCH BASIN
- ROUND CATCH BASIN
- TRAFFIC CONTROL BOX
- TRAFFIC SIGNAL
- UTILITY POLE
- LIGHT POLE
- ELECTRIC HANDHOLE
- BOLLARD
- AC AIR CONDITIONING UNIT
- MAIL BOX
- SIGN
- AD AREA DRAIN
- BOUND FOUND
- TR TRASH RECEPTACLE
- HP RAMP HANDICAP RAMP
- DECIDUOUS TREE
- CONIFEROUS TREE
- GP GATE POST
- B BOTTOM
- BC BOTTOM OF CURB
- BD BOTTOM DIMENSION
- BFA BUILDING FOOTPRINT AREA
- PB POST
- UP UTILITY POLE W/ LIGHT
- GM GAS METER
- CW CONCRETE WALL
- BH BUILDING HEIGHT
- BIT BITUMINOUS
- BOT= BOTTOM ELEVATION
- BS BOTTOM OF STEPS
- BW BOTTOM OF WALL
- CALC CALCULATED
- CB CONCRETE BOUND
- CC CONCRETE CURB
- CH-BRG CHORD BEARING
- CH-L CHORD LENGTH
- CLF CHAIN LINK FENCE
- CONC CONCRETE
- DH DRILL HOLE
- ENT ENTRANCE
- FFE FINISH FLOOR ELEVATION
- FND FOUND
- I= INVERT ELEVATION
- INACC. INACCESSIBLE
- L= LENGTH
- N/F NOW OR FORMERLY
- NTS NOT TO SCALE
- R= RADIUS OR RIM ELEVATION
- REC RECORD
- RET RETAINING
- SB STONE BOUND
- SQ. FT. SQUARE FEET
- T TOP
- TBM TEMPORARY BENCH MARK
- TC TOP OF CURB
- TW TOP OF WALL
- VGC VERTICAL GRANITE CURB
- WF WROUGHT IRON FENCE
- N.V.P. NO VISIBLE PIPES
- FP FIRE PREVENTION WATER SERVICE
- C CABLE TELEVISION
- D DRAIN
- E ELECTRIC
- G GAS
- OHW OVERHEAD WIRES
- S SEWER
- T TELEPHONE
- W WATER
- X METAL FENCE



NOTES:

1) BENCH MARK INFORMATION: (ELEVATIONS ESTABLISHED FROM GPS OBSERVATION)

   TEMPORARY BENCH MARKS SET:

   TBM-1: FRONT LEFT BOLT ON HYDRANT 2.2' ABOVE SIDEWALK LOCATED AT NORTHWESTERLY SIDE OF WARREN STREET IN FRONT OF LOCUS, AS SHOWN HEREON. ELEVATION=86.92

   TBM-2: FRONT LEFT BOLT ON HYDRANT 2.5' ABOVE SIDEWALK LOCATED AT SOUTHWESTERLY SIDE OF TOWNSEND STREET ACROSS FROM LOCUS, AS SHOWN HEREON. ELEVATION=108.39

   TBM-3: FRONT LEFT BOLT ON HYDRANT 1.4' ABOVE SIDEWALK LOCATED AT THE SOUTHERLY SIDE OF HAZELWOOD STREET IN FRONT OF HOUSE NO.16, AS SHOWN HEREON. ELEVATION=86.53

2) ELEVATIONS REFER TO BOSTON CITY BASE.

3) CONTOUR INTERVAL EQUALS ONE (1) FOOT.

4) BY GRAPHIC PLOTTING ONLY, THE PARCEL SHOWN HEREON LIES WITHIN A ZONE "X" (UNSHADED), AN AREA OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOOD, AS SHOWN ON THE FEDERAL EMERGENCY MANAGEMENT AGENCY (F.E.M.A) FLOOD INSURANCE RATE MAP (F.I.R.M.) FOR SUFFOLK COUNTY, MASSACHUSETTS, MAP NUMBER 25025C0079G, CITY OF BOSTON COMMUNITY NUMBER 250286, PANEL NUMBER 0079, HAVING AN EFFECTIVE DATE OF SEPTEMBER 25, 2009.

5) ZONING INFORMATION AS SHOWN HEREON WAS NOT PROVIDED BY THE TITLE INSURER AS REQUIRED BY ITEM 6 (A OR B) OF TABLE "A" IN THE 2011 ALTA SURVEY REQUIREMENTS.

NOTES CONTINUED:

5) UTILITY INFORMATION SHOWN IS BASED ON BOTH A FIELD SURVEY AND PLANS OF RECORD. THE LOCATIONS OF UNDERGROUND PIPES AND CONDUITS HAVE BEEN DETERMINED FROM THE AFOREMENTIONED RECORD PLANS AND ARE APPROXIMATE ONLY. WE CANNOT ASSUME RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES THAT ARE OMITTED OR INACCURATELY SHOWN ON SAID RECORD PLANS, SINCE SUB-SURFACE UTILITIES CANNOT BE VISIBLY VERIFIED. BEFORE PLANNING FUTURE CONNECTIONS, THE PROPER UTILITY ENGINEERING DEPARTMENT SHOULD BE CONSULTED AND THE ACTUAL LOCATION OF SUB-SURFACE STRUCTURES SHOULD BE DETERMINED IN THE FIELD. CALL, TOLL FREE, THE DIG SAFE CALL CENTER AT 1-888-344-7233 SEVENTY-TWO HOURS PRIOR TO EXCAVATION.

6) THIS DOCUMENT IS AN INSTRUMENT OF SERVICE OF FELDMAN LAND SURVEYORS ISSUED TO OUR CLIENT FOR PURPOSES RELATED DIRECTLY AND SOLELY TO FELDMAN LAND SURVEYORS' SCOPE OF SERVICES UNDER CONTRACT TO OUR CLIENT FOR THIS PROJECT. ANY USE OR REUSE OF THIS DOCUMENT FOR ANY REASON BY ANY PARTY FOR PURPOSES UNRELATED DIRECTLY AND SOLELY TO SAID CONTRACT SHALL BE AT THE USER'S SOLE AND EXCLUSIVE RISK AND LIABILITY, INCLUDING LIABILITY FOR VIOLATION OF COPYRIGHT LAWS, UNLESS WRITTEN CONSENT IS PROVIDED BY FELDMAN LAND SURVEYORS.

7) RECORD TRAFFIC SIGNAL AND STREET LIGHTING INFORMATION NOT AVAILABLE AT THIS TIME.

8) ADDITIONAL RESEARCH ON UTILITY CONNECTIONS TO BE PERFORMED

REFERENCES

SUFFOLK COUNTY REGISTRY OF DEEDS
- *BOOK 6323 PAGE 344*
- *BOOK 8620 PAGE 012*
- *BOOK 8620 PAGE 022*
- *BOOK 10887 PAGE 213*
- *BOOK 20248 PAGE 258*

PLAN-BOOK 1054/007
PLAN-BOOK 2338/424
PLAN-BOOK 5310 PAGE 147
PLAN-BOOK 8089 PAGE 350
PLAN-BOOK 8194 PAGE 611

PLAN ENTITLED "PLAN OF LAND IN BOSTON, DELIVERY PARCEL H-7 OF WASHINGTON PARK, URBAN RENEWAL AREA, PROJECT NO. MASS. R-24" DATED 3/29/1966, PREPARED BY FAY, SPOFFORD & THORNDIKE INC.

PLAN NO. L-9417, L-9418, L-9486, L-9713,
PLAN NO. L-9714, L-9715, L-9716,
PLAN NO. L-9903, L9904. L-10070

TO: FIRST AMERICAN TITLE INSURANCE COMPANY

THIS IS TO CERTIFY THAT THIS PLAN AND THE SURVEY ON WHICH IT IS BASED WERE MADE IN ACCORDANCE WITH THE 2011 MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/ACSM LAND TITLE SURVEYS, JOINTLY ESTABLISHED AND ADOPTED BY ALTA AND NSPS, AND INCLUDES ITEMS 2, 3, 4, 5, 7(A), 7(B)(1), 8, 9, 11(B), 13, 14, 16, 17, 18, 19, AND 21 OF TABLE A THEREOF. THE FIELD WORK WAS COMPLETED ON JULY 29, 2015.

FELDMAN LAND SURVEYORS

I CERTIFY THAT THERE ARE NO GAPS OR GORES BETWEEN THE PARCELS SHOWN HEREON.

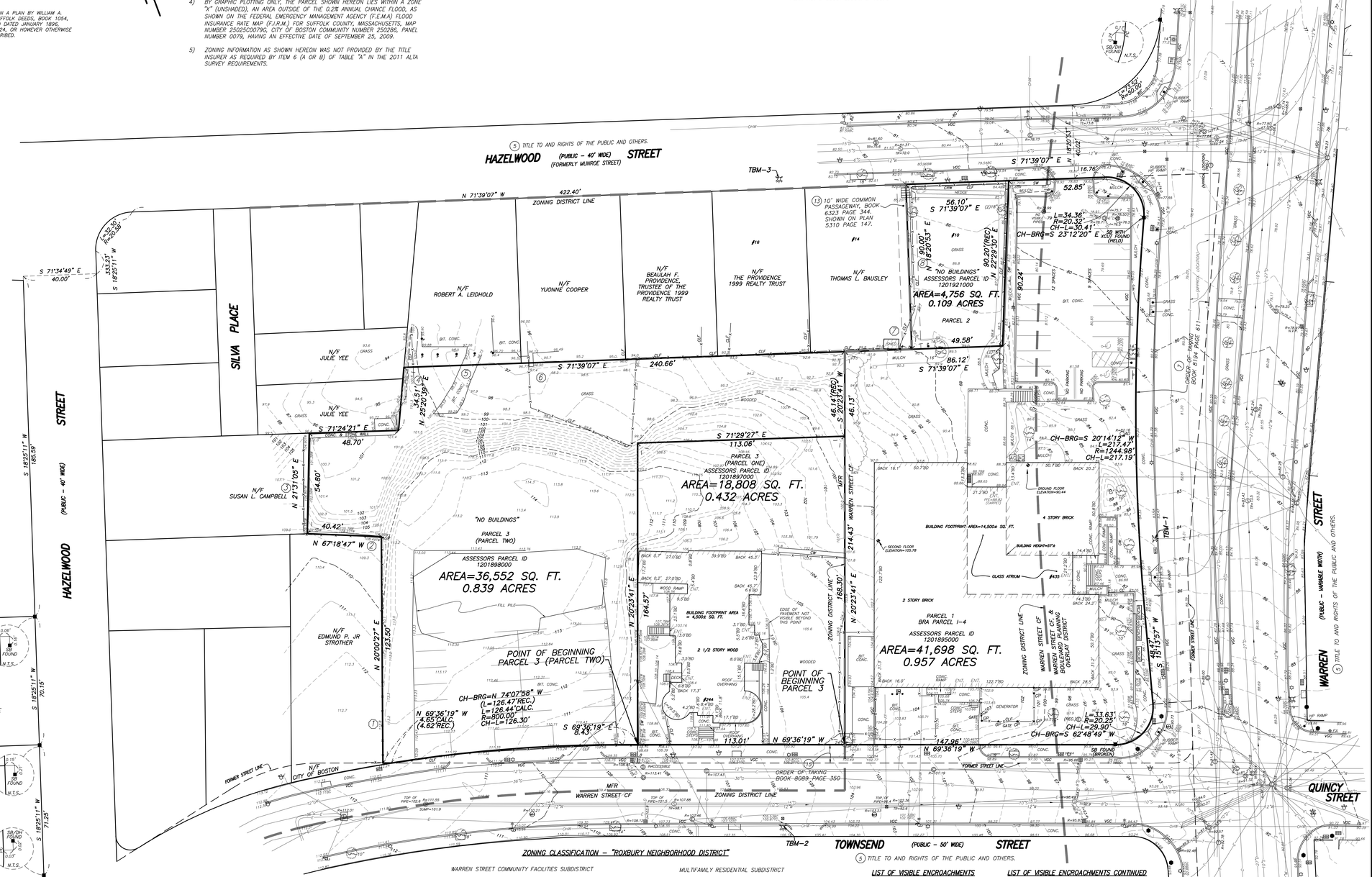
ROBERT G. APPLEGATE, PLS (MA# 28514) *DATE*

PARKING SUMMARY

PARCEL 1 (BRA PARCEL I-4)
REGULAR SPACES - 21
HANDICAP SPACES - 2

PARCEL 3 (PARCEL TWO)
REGULAR SPACES - 25

PARCEL 2 NONE



ZONING CLASSIFICATION - "ROXBURY NEIGHBORHOOD DISTRICT"

WARREN STREET COMMUNITY FACILITIES SUBDISTRICT	
MINIMUM LOT SIZE	NONE
MINIMUM FRONTAGE	NONE
MINIMUM FRONT YARD	NONE*
MINIMUM SIDE YARD	NONE
MINIMUM REAR YARD	20 FEET
MINIMUM USABLE OPEN SPACE	50 SQ.FT./DWELLING
MAXIMUM BUILDING HEIGHT	45 FEET

* SEE SECTION 50-40 OF ARTICLE 50 - ROXBURY NEIGHBORHOOD DISTRICT

MULTIFAMILY RESIDENTIAL SUBDISTRICT

** SEE ARTICLE 50 TABLE F FOR MULTIFAMILY RESIDENTIAL SUBDISTRICT, (MFR) FOR TYPE OF DWELLING AND APPLICABLE DIMENSIONAL REQUIREMENTS.*

LIST OF VISIBLE ENCROACHMENTS

1. LOCUS FENCE CROSSES INTO ABUTTER. OVER 0.14'
2. STONE WALL AND FENCE ENCROACH ON TO ABUTTER. OVER 0.7'
3. STONE WALL AND FENCE ENCROACH ON TO ABUTTER. OVER 3.1'
4. FENCE ENCROACHING ONTO LOCUS 5.9'

LIST OF VISIBLE ENCROACHMENTS CONTINUED

5. BIT.CONC. WAY ENCROACHING ONTO LOCUS
6. FENCE AND BIT.CONC. ENCROACHING ONTO LOCUS.
7. FENCE CROSSES ABUTTER.
8. FENCE INTO 10' WIDE PASSAGEWAY

EXCEPTIONS FROM COVERAGE SCHEDULE B, SECTION ONE, LISTED IN TITLE COMMITMENT NO. NCS-696329-BOS1 ISSUED BY FIRST AMERICAN TITLE INSURANCE COMPANY HAVING AN EFFECTIVE DATE OF JUNE 19, 2015.

5. TITLE TO AND RIGHTS OF THE PUBLIC AND OTHERS ENTITLED THERETO IN AND TO THOSE PORTIONS OF THE INSURED PREMISES LYING WITHIN THE BOUNDS OF ADJACENT STREETS, ROADS, AND WAYS. (AS SHOWN HEREON)

AS TO PARCEL 1:

7. ORDER OF TAKING BY THE PUBLIC IMPROVEMENT COMMISSION OF THE CITY OF BOSTON FOR THE WIDENING, RELOCATION, AND CONSTRUCTION OF WARREN STREET, ROXBURY DISTRICT, FROM DECKARD STREET TO HAZELWOOD STREET DATED MARCH 19, 1968 AND RECORDED IN BOOK 8194, PAGE 611. (AS SHOWN HEREON)
8. TERMS AND PROVISIONS AS SET FORTH IN A DEED FROM BOSTON REDEVELOPMENT AUTHORITY TO ROXBURY COMPREHENSIVE COMMUNITY HEALTH CENTER, INC. DATED APRIL 12, 1973 AND RECORDED IN BOOK 8620, PAGE 12. (NOT SURVEY RELATED)
10. REAL PROPERTY AGREEMENT BY AND BETWEEN ACTION FOR BOSTON COMMUNITY DEVELOPMENT, INC., TRUSTEES OF BOSTON UNIVERSITY, ROXBURY COMPREHENSIVE COMMUNITY HEALTH CENTER, INC. AND THE OFFICE OF ECONOMIC OPPORTUNITY DATED JUNE 29, 1972 AND RECORDED WITH SAID REGISTRY OF DEEDS IN BOOK 8620, PAGE 1, AS IN FORCE AND EFFECT. (NOT SURVEY RELATED)

EXCEPTIONS CONTINUED

10. LAND DISPOSITION AGREEMENT BY AND BETWEEN BOSTON REDEVELOPMENT AUTHORITY AND ROXBURY COMPREHENSIVE COMMUNITY HEALTH CENTER, INC. DATED APRIL 12, 1973 AND RECORDED WITH SAID REGISTRY OF DEEDS IN BOOK 8620, PAGE 22, AFFECTED BY A CERTIFICATE OF COMPLETION BY THE BOSTON REDEVELOPMENT AUTHORITY DATED JULY 31, 1975 AND RECORDED WITH SAID REGISTRY IN BOOK 8804, PAGE 349, AS IN FORCE AND EFFECT. (NOT SURVEY RELATED)
11. REGULATORY AGREEMENT BY AND BETWEEN THE U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT AND ROXBURY COMPREHENSIVE COMMUNITY HEALTH CENTER, INC. DATED APRIL 12, 1973 AND RECORDED WITH SAID REGISTRY IN BOOK 8620, PAGE 85. (NOT SURVEY RELATED)
12. NOTICE OF FEDERAL INTEREST BY THE UNITED STATES DEPARTMENT OF HEALTH AND HUMAN SERVICES DATED SEPTEMBER 14, 1993 AND RECORDED WITH SAID REGISTRY OF DEEDS IN BOOK 18547, PAGE 55. (NOT SURVEY RELATED)

AS TO PARCEL 2:

13. PASSAGEWAY RIGHTS AS SET FORTH IN A DEED FROM GEORGE W. COX AND JUNE H. COX TO HARVEY P. STUBBLEFIELD DATED APRIL 25, 1947 AND RECORDED WITH SAID REGISTRY IN BOOK 6323, PAGE 344, AS SHOWN ON "PLAN OF LAND IN BOSTON ROXBURY, SCALE 30 FEET TO AN INCH, FEB. 4. 1932. S.L. LEFTORTH, CONSULTING SURVEYOR 40 COURT ST. BOSTON," RECORDED WITH SAID REGISTRY IN BOOK 5318, PAGE 147. (AS SHOWN HEREON)

EXCEPTIONS CONTINUED

AS TO PARCEL 3:

14. TERMS AND PROVISIONS OF URBAN RENEWAL PLAN, WASHINGTON PARK URBAN RENEWAL AREA, PROJECT NO. MASS. R-24 DATED JANUARY 14, 1963 BY BOSTON REDEVELOPMENT AUTHORITY RECORDED IN BOOK 7806, PAGE 565, AS IN FORCE AND EFFECT. NOTED FOR INFORMATION: BY ITS OWN TERMS, THE PLAN WOULD APPEAR TO TERMINATE ON FEBRUARY 26, 2003 BUT MAY HAVE BEEN EXTENDED BY OFF RECORD DOCUMENTS. (NOT SURVEY RELATED)
15. ORDER OF TAKING BY THE PUBLIC IMPROVEMENT COMMISSION OF THE CITY OF BOSTON FOR THE WIDENING, RELOCATION, AND CONSTRUCTION OF TOWNSEND STREET, ROXBURY DISTRICT, FROM HUMBOLDT AVENUE TO WARREN STREET DATED DECEMBER 6, 1966 AND RECORDED IN BOOK 8089, PAGE 350. (AS SHOWN HEREON)
16. TERMS AND PROVISIONS OF A DEED FROM BOSTON REDEVELOPMENT AUTHORITY TO JAMES JACKSON PUTNAM CHILDREN'S CENTER DATED MAY 9, 1967 AND RECORDED IN BOOK 8132, PAGE 690, AS AFFECTED BY AUTHORIZATION TO TRANSFER AND AGREEMENT DATED APRIL 26, 1984 AND RECORDED IN BOOK 10887, PAGE 205. (NOT SURVEY RELATED)
17. TERMS AND PROVISIONS OF THE DEED FROM JOHN L. WHITLOCK, TRUSTEE IN BANKRUPTCY OF THE ESTATE OF JAMES JACKSON PUTNAM CHILDREN'S CENTER INC. TO 244 TOWNSEND CORPORATION DATED APRIL26, 1984 AND RECORDED IN BOOK 10887, PAGE 213, AS AUTHORIZED BY ORDER ON SALE OF REAL PROPERTY OF DEBTOR FREE OF LIENS RECORDED IN BOOK 10887, PAGE 203. (NOT SURVEY RELATED)

ISSUED FOR REVIEW 10-13-2015

ALTA LAND TITLE SURVEY
435 WARREN STREET, 10 HAZELWOOD STREET, 244 TOWNSEND STREET & ASSESSORS PARCEL ID 1201898000
BOSTON, (ROXBURY DISTRICT) MASS.

FELDMAN LAND SURVEYORS
112 SHAWMUT AVENUE
BOSTON, MASS. 02118
JULY 29, 2015
PHONE: (617)357-9740
www.feldmansurveyors.com

FELDMAN LAND SURVEYORS

20 0 10 20 40 80

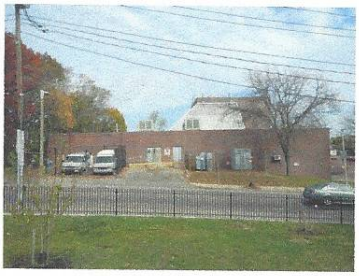
SCALE: 1"=20'

RESEARCH DH	FIELD CHIEF JLF	PROJ MGR SMD	APPROVED	SHEET NO. 1 OF 2
CALC DH/GL	CADD GL	FIELD CHECKED JLF	CRD FILE 14742	JOB NO. 14742A

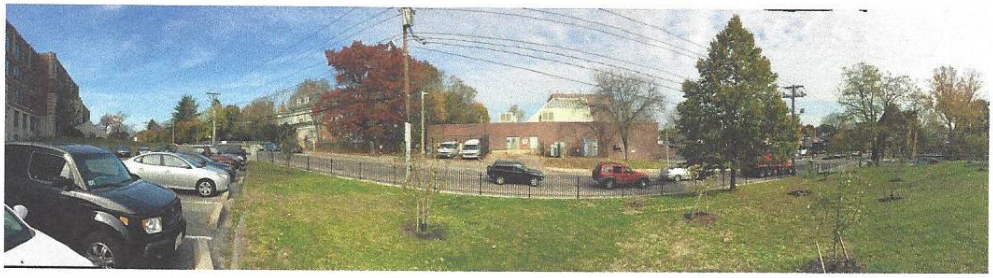
FILENAME: S:\PROJECTS\14700s\14742\14742A\DWG\14742A-ALTA.dwg

Panoramic View from Townsend Street

View of Existing House



View of Existing Building



Panoramic View from Townsend Street

Panoramic View from Warren Street

Front View of Existing Building

Corner View of Existing Building

Corner View of Existing Building

Bridge Boston Charter School
Roxbury, MA
August 17, 2015

EXISTING BUILDING CONDITIONS

REPRESENTING OWNERS FROM CONCEPT TO CLOSEOUT

November 20, 2015

To Whom It May Concern
City of Boston
Inspectional Services Department
Planning and Zoning
1010 Massachusetts Avenue
5th floor
Boston, MA 02119

Project: Bridge Boston Charter School
435 Warren Street, Roxbury

To Whom It May Concern:

We are seeking an ALT permit to 1) consolidate four parcels into one parcel, 435 Warren St. and 2) renovate and add on to the existing building at 435 Warren Street. We are also filing for an ERT permit to demolish an existing building located at 244 Townsend Street and construct a new gymnasium building. All of the aforementioned work will be on the one consolidated lot, 435 Warren St.

The existing building located at 435 Warren St. (1201895000) will receive an addition and fully renovate the existing building for classroom and administrative uses. A new gymnasium and parking will be constructed at the 10 Townsend St lot (1201898000) that is currently paved for parking.

Ex. Parcel ID	**Ex. Address**	**Ex. SF**	**Ex. Acre**	**Zoning Dist.**
1201898000	10 Townsend St.	36,552	0.839	MFR
1201897000	244 Townsend St.	18,808	0.432	MFR
1201895000	435 Warren St.	41,698	0.957	Warren St. CF
1201921000	Unk. Hazelwood St.	4,756	0.109	Warren St. CF
New Parcel ID	**New Address**	**New SF**	**New Acre**	**New Zoning Dist.**
TBD	435 Warren St.	101,814	2.337	TBD

The existing building at 435 Warren St., after its addition, will contain 39,568 +/- SF, the new gym building will contain 6,696 +/- SF, for a total building area on the one consolidated lot of 46,264 resulting in an FAR of 0.45.

The project is seeking relief from the following zoning requirements:

- Educational Use is a conditional use within the MFR district.

The project is currently under BRA Article 80 Small Project Review and we are preparing an Article 85 Boston Landmarks Commission / MHC - Massachusetts Historical Commission submission for the building at 244 Townsend Street.

We fully expect rejection of both the ALT and the ERT applications and we intend to proceed through ZBA Board of Appeals process and continue our project design process with the BRA for their Article 80 Small Project Review.

Thank you for your review and consideration of this project.

Regards,

Matthew Donnelly, R.A.
Senior Project Manager

Enc. A/E Drawings

PINCK & CO
98 Magazine Street
Boston MA 02119
T 617.445.3555
F 617.445.3511
pinck-co.com

Bridge Boston Charter School

Roxbury, Massachusetts

Board of Trustees:

Cheryl Alexander
Michelle Caldeira
Ryan Duffy
Beth Friedman
Steven Godfrey
Beth Kressley Goldstein, President
Marina Hatsopoulos, Clerk
Marjorie Janview, Parent Coucil Liaison
Anne Marcus
Amelia Lloyd McCarthy
Tom Pappas, Treasurer
Ian Reynolds, Vice President
Dr. Michelle Sanchez
James Sperling

Bridge Boston Charter School Administration:

Yully Cha, Executive Director
Jennifer Daly, Principal

Drawing List

SURVEY
Progress Survey

CIVIL DRAWINGS
C1.1 Site Layout and Grading Plan
C2.1 Site Utilities Plan

LANDSCAPE DRAWINGS
L1.0 Landscape Plan

ARCHITECTURAL
A0.2 Code Sheet
A2-1 Floor Plans
A2-2 Floor Plans
A4-1 Elevations

REGISTERED ARCHITECT
LAURA A. WERNICK
No. 8008
CAMBRIDGE
MASS
COMMONWEALTH OF MASSACHUSETTS

Pinck & Co, Inc. / Owner's Project Manager

HMFH Architects, Inc. / Architect

CBA Lanscape Architects, LLC / Landscape Architect

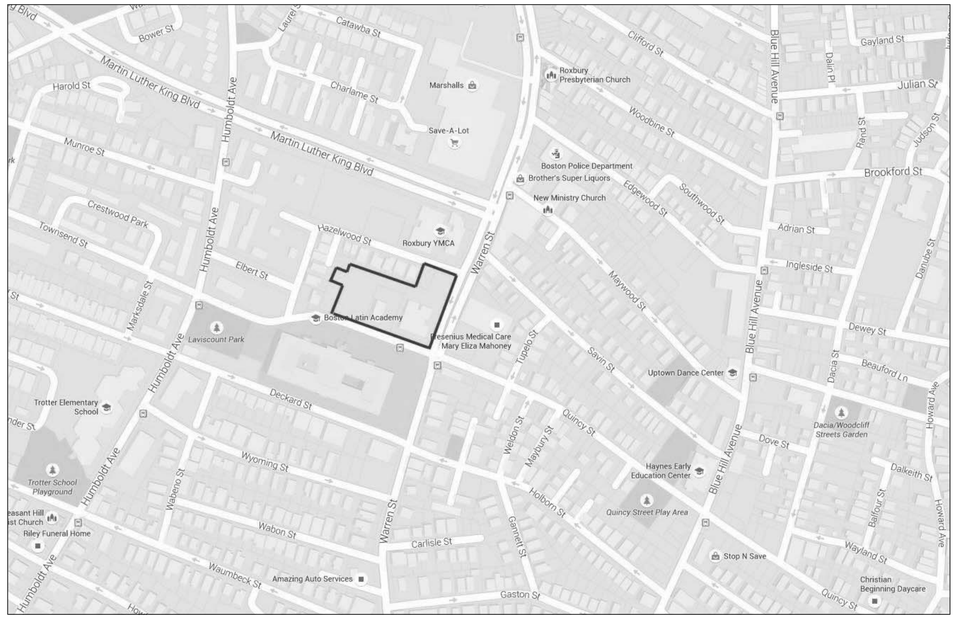
Samiotes Consultants, Inc. / Civil, MEP, FP Engineering

Simpson Gumpertz & Heger / Structural Engineers

Garcia, Galuska & DeSousa Engineers, Inc. / MEP, FP Engineers

PM & C / Cost Estimator

Kalin Associates / Specifications Consultant



LOCUS PLAN

Zoning Review Set

13 November 2015

Bridge Boston Charter School
Roxbury, Massachusetts

SITE LAYOUT AND GRADING PLAN

SCALE: As indicated DRAWN BY: CHECKED BY: AAZ

C1.1

JOB NUMBER SCM 15047.01

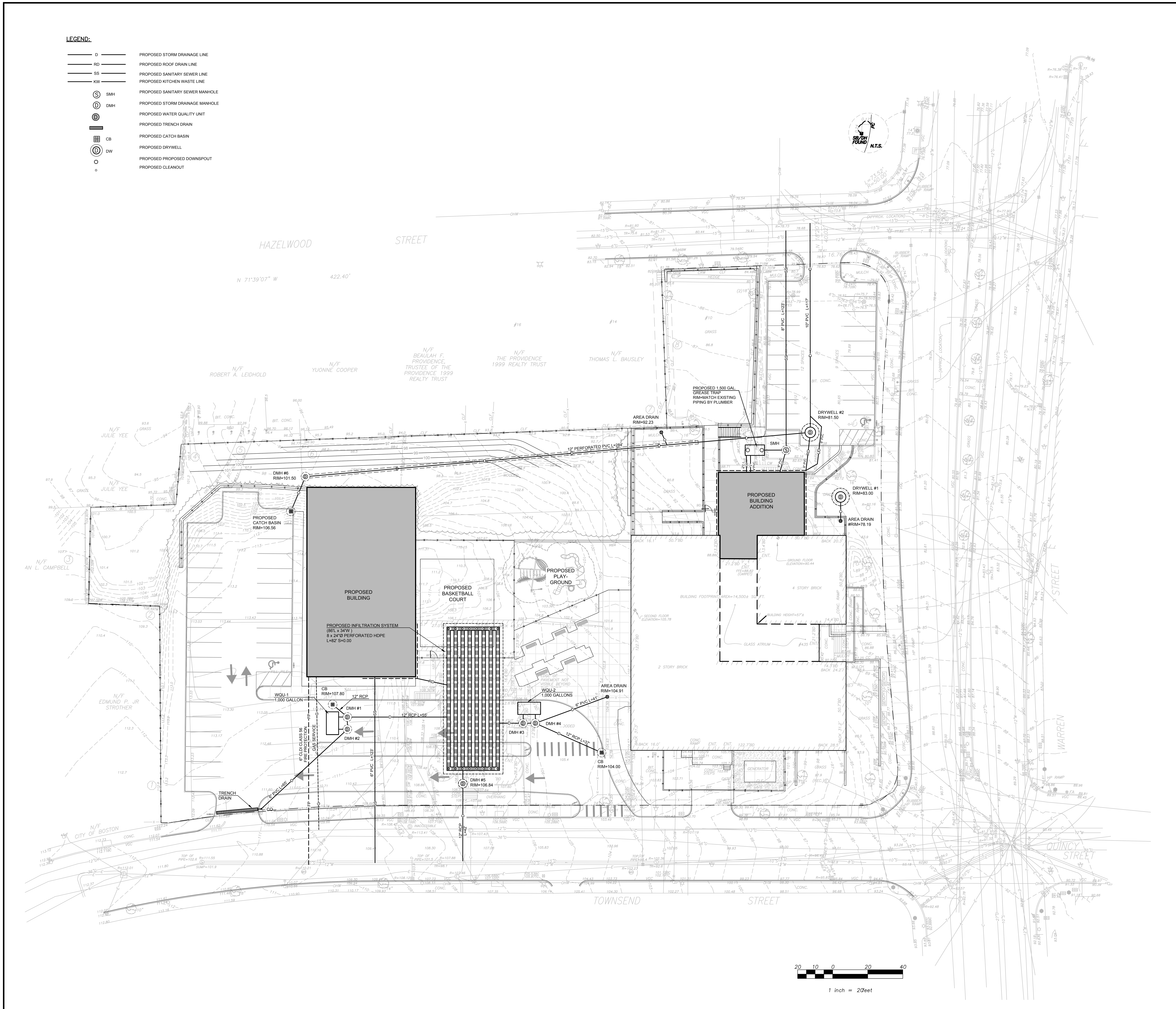
DRAWING NUMBER

REVISIONS NO	DATE	REMARKS	BY

Refusal Set
11/13/15

Samiotes Consultants Inc.
Civil Engineers + Land Surveyors
20 A Street
Framingham, MA 01701
T 508.877.4488
F 508.875.3549
www.samiotes.com

HMFHArchitects, Inc.
130 Bishop Allen Drive
Cambridge, MA 02139
t 617.492.2200
f 617.876.9775
www.HMFH.com
architecture• programming master planning



HMFH Architects, Inc.
130 Bishop Allen Drive
Cambridge, MA 02139
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www.HMFH.com
architecture • programming master planning

Samiotes Consultants Inc.
Civil Engineers + Land Surveyors
20 A Street
Framingham, MA 01701
T 508.877.6688
F 508.877.8349
www.samiotes.com

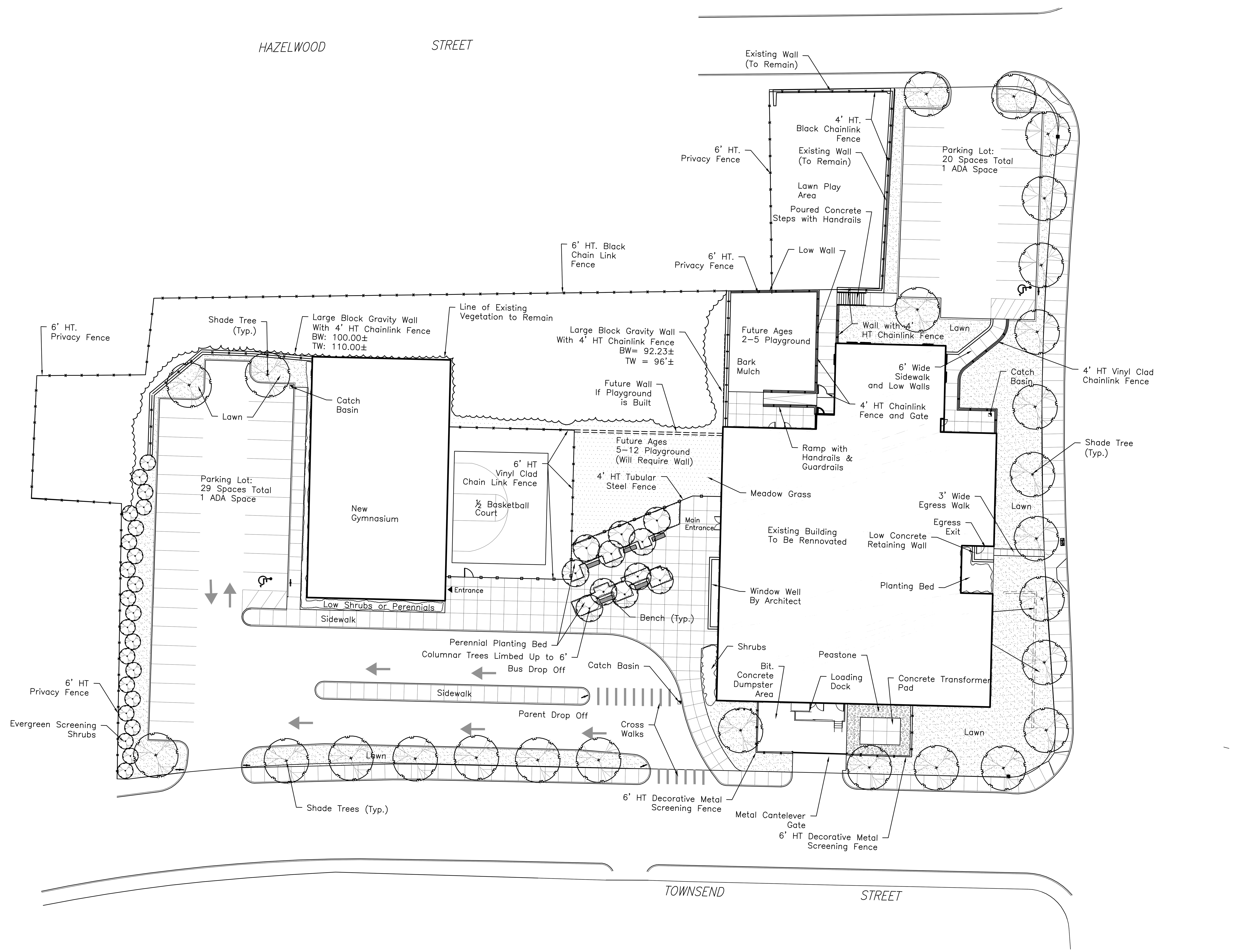
Refusal Set
11/13/15

Bridge Boston Charter School
Roxbury, Massachusetts
SITE UTILITIES PLAN

SCALE: As indicated DRAWN BY: CHECKED BY: AAZ

REVISIONS NO.	DATE	REMARKS	BY

DRAWING NUMBER
C2.1
JOB NUMBER SCI# 15047.01



GENERAL LANDSCAPE NOTES:

1. All walls over 6'-0" are to have drawings reviewed and stamped by a MA Liscensed Structural Engineer.
2. All chainlink fences are to be black vinyl clad.
3. Fences noted as privacy fences are to be black viny clad chain link fences with privacy slats added.
4. Plant species are to be determined at a later date.
5. All driveways and parking areas are to be bituminous concrete, unless otherwise noted.
6. All sidewalks and paths are to be reinforced concrete unless otherwise noted.
7. All curbs are to be precast concrete curbs, except within R.O.W. where curbs are to be granite.
8. All walls unless noted are to be poured in place concrete walls.

HMFH Architects, Inc.

architecture • programming • master planning

CBA Landscape Architects LLC

Refusal Set 11/13/2015

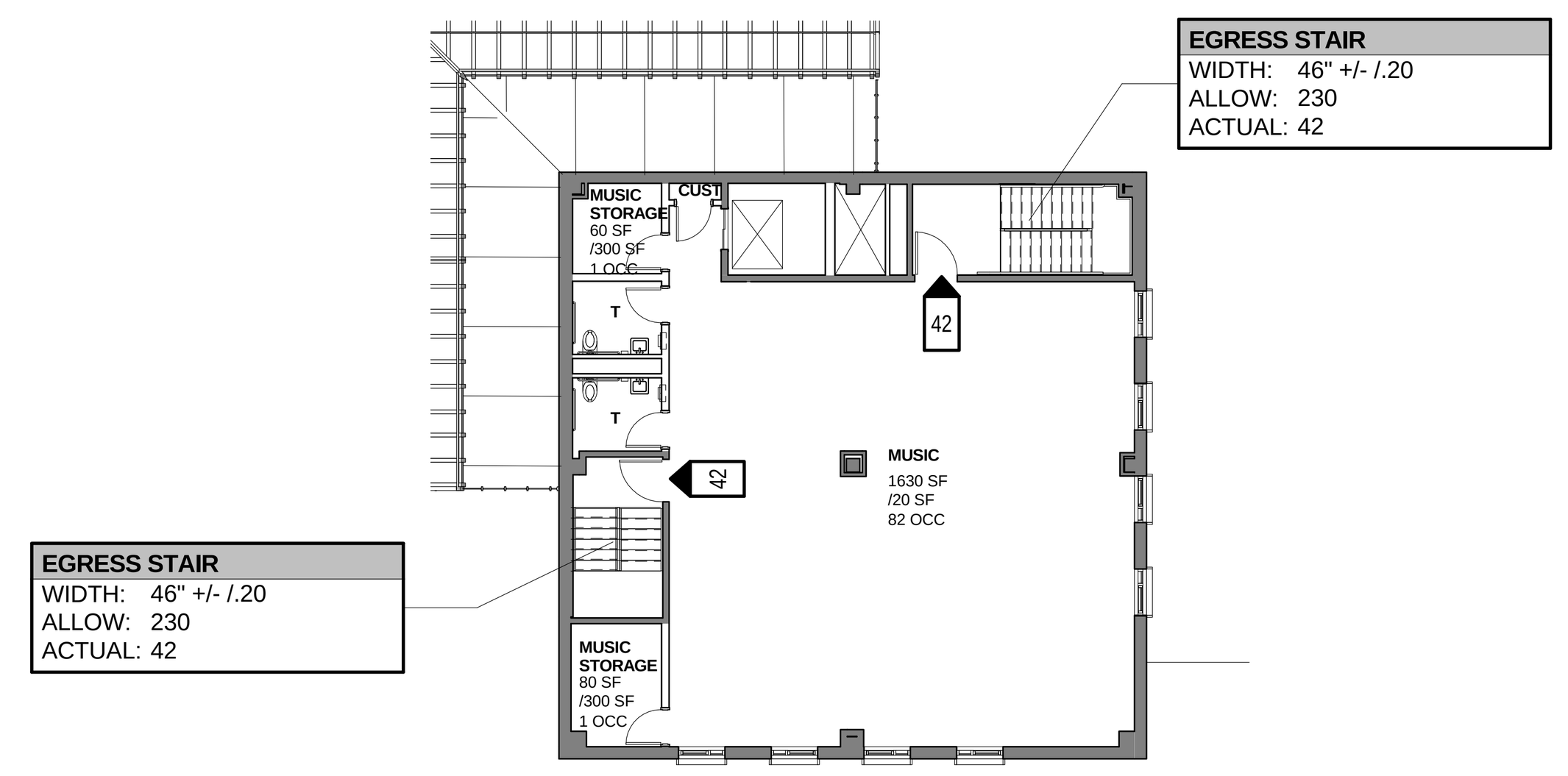
Bridge Boston Charter School
Roxbury, Massachusetts
Landscape Plan

SCALE: 1"=20' DRAWN BY: AJK CHECKED BY: CCB

REVISIONS NO.	DATE	REMARKS	BY

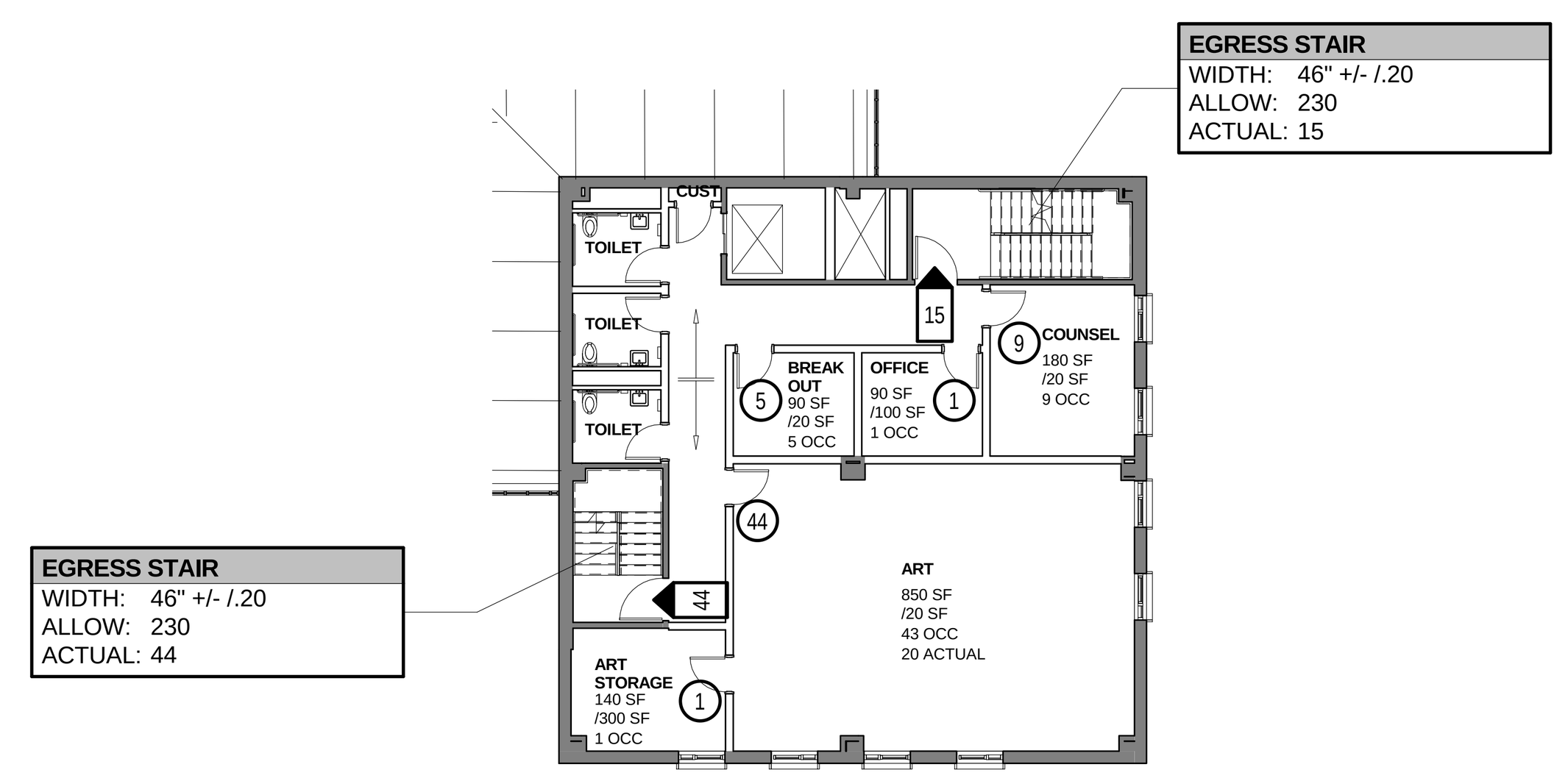
DRAWING NUMBER
L1.0

JOB NUMBER



FOURTH FLOOR PLAN

GROSS AREA	2,235	GSF
OCCUPANT LOAD	84	OCC
EGRESS CAPACITY	460	OCC

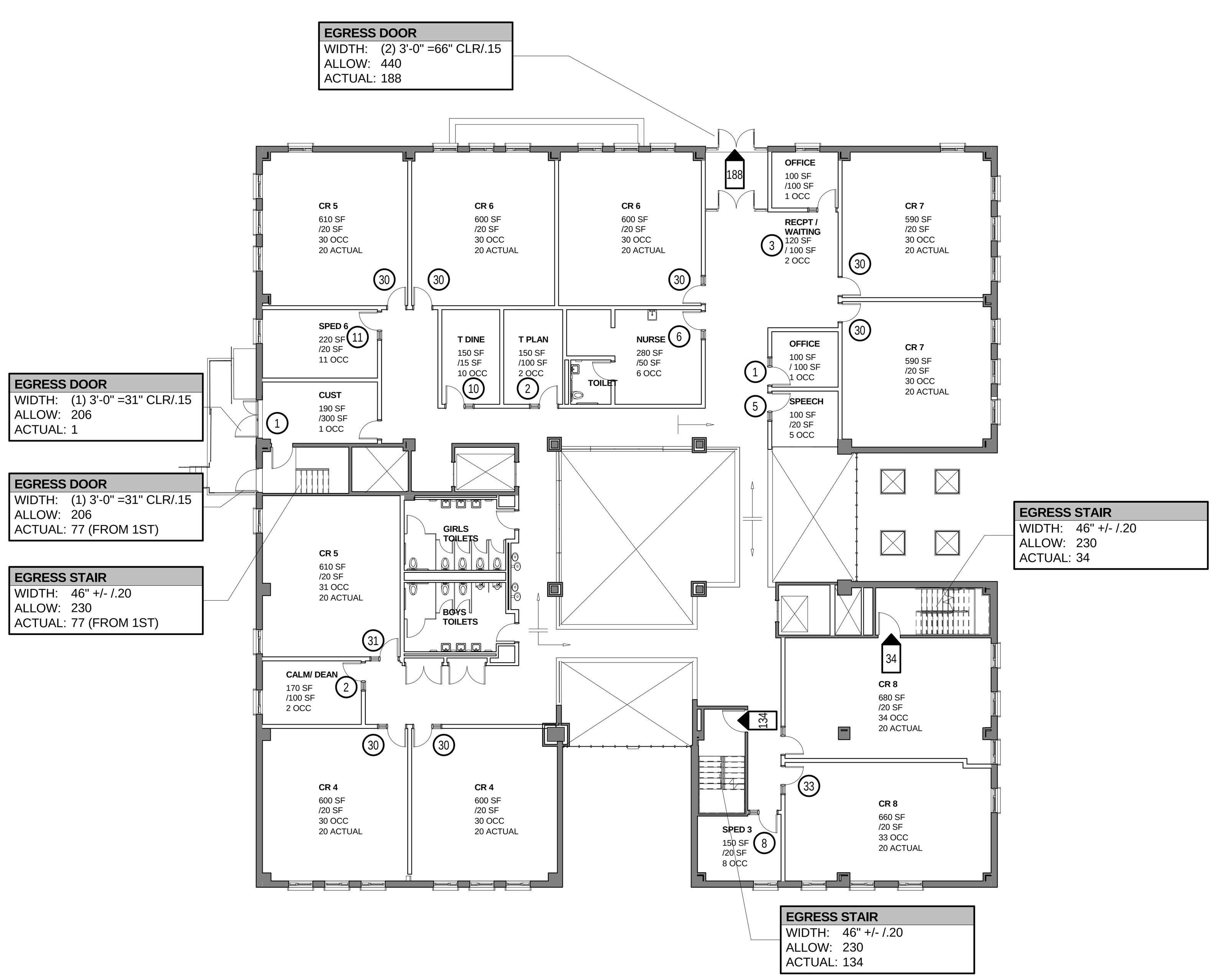


THIRD FLOOR PLAN

GROSS AREA	2,429	GSF
OCCUPANT LOAD	59	OCC
EGRESS CAPACITY	460	OCC

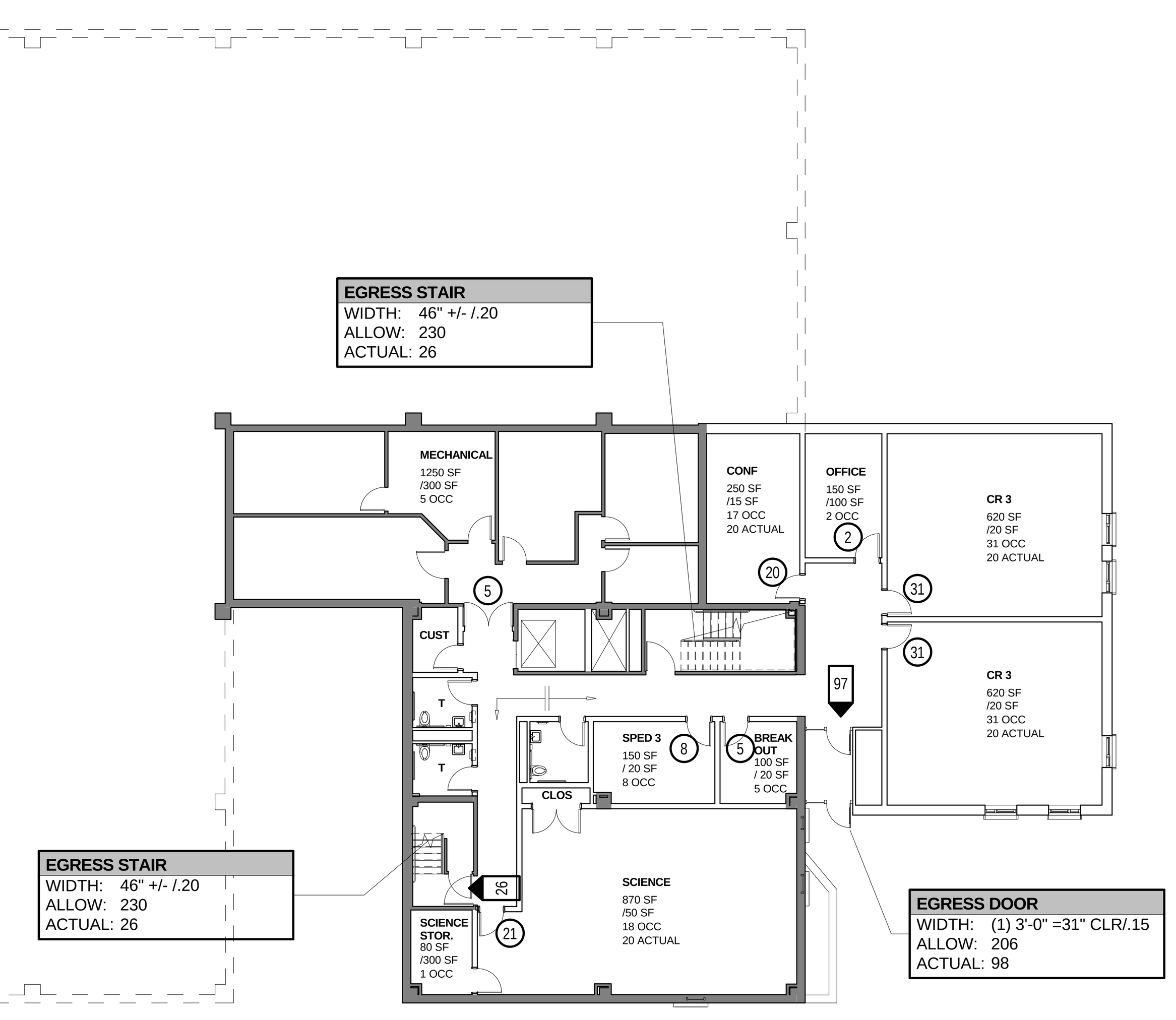
FIRST FLOOR PLAN

GROSS AREA	16,487	GSF
OCCUPANT LOAD	518	OCC
EGRESS CAPACITY	1,294	OCC



SECOND FLOOR PLAN

GROSS AREA	12,306	GSF
OCCUPANT LOAD	323	OCC
EGRESS CAPACITY	1,312	OCC



GROUND FLOOR PLAN

GROSS AREA	6,111	GSF
OCCUPANT LOAD	126	OCC
EGRESS CAPACITY	436	OCC

CODE REVIEW

PROJECT DESCRIPTION

EDUCATIONAL - ELEMENTARY/ MIDDLE SCHOOL GRADES PRE-K THROUGH 8TH
PROJECTED ENROLLMENT: 400 STUDENTS / 90 STAFF

BUILDING CONSTRUCTION:
- FRAME: STEEL FRAME CONSTRUCTION
- FOUNDATION: CAST-IN-PLACE PERIMETER WALL & COLUMN FOOTINGS
- FIRST FLOOR : CONCRETE SLAB ON GRADE
- SECOND FLOOR: COMPOSIT DECK
- ROOF: FLAT METAL DECK
- EXTERIOR WALLS: MASONRY VENEER ON LIGHT GAUGE STEEL STUD BACK-UP SYSTEM WITH CURTAINWALL ASSEMBLIES
- INTERIOR PARTITIONS: GYPSUM WALLBOARD ON METAL STUDS AND CONCRETE MASONRY UNITS

APPLICABLE CODES

2009 INTERNATIONAL BUILDING CODE / MA STATE BUILDING CODE - EIGHTH EDITION

USE & OCCUPANCY (IBC CH. 3)

USE GROUP E (EDUCATIONAL)
WITH ASSEMBLY AREAS - CAFETERIUM AND GYMNASIUM - ARE CONSIDERED ACCESSORY AREAS TO USE GROUP E AND ARE NOT SEPARATE OCCUPANCIES (303.1.4)

TYPE OF CONSTRUCTION (IBC CH. 6)

ALL EXISTING AND NEW CONSTRUCTION TO BE NON-COMBUSTIBLE CONSTRUCTION TYPE II A PROTECTED CONSTRUCTION

GENERAL BUILDING LIMITATIONS (IBC CH. 5)

HEIGHT LIMITATIONS: USE GROUP E - CONSTRUCTION TYPE IIA

TABULAR HEIGHT (IBC TABLE 503)	=	3 STORY	65 FT
SPRINKLER INCREASE (IBC 506.3)	=	1 STORY	20 FT
ALLOWABLE HEIGHT	=	4 STORY	85 FT
ACTUAL HEIGHT	=	4 STORY	xx FT

AREA LIMITATION: USE GROUP E - CONSTRUCTION TYPE IIA

TABULAR AREA (IBC TABLE 503)		=	26,500 SF
STREET FRONTAGE INCREASE (IBC 506.2)		=	6,625 SF
SPRINKLER INCREASE (IBC 506.3)	@ 200%	=	53,000 SF
ALLOWABLE AREA PER FLOOR		=	86,125 SF
ACTUAL AREA - GROUND FLOOR		=	6,111 SF
ACTUAL AREA - FIRST FLOOR		=	16,487 SF
ACTUAL AREA - SECOND FLOOR		=	12,306 SF
ACTUAL AREA - THIRD FLOOR		=	2,429 SF
ACTUAL AREA - FOURTH FLOOR		=	2,235 SF
TOTAL BUILDING AREA		=	39,568 SF

FIRE RESISTANCE RATINGS OF STRUCTURAL ELEMENTS - (IBC TABLE 601)

ENTIRELY PROTECTED BY AN AUTOMATIC FIRE SUPRESSION SYSTEM

	CONSTRUCTION TYPE IIA:	MIN RATING REQ'D
1.	PRIMARY STRUCTURAL FRAME including columns, girders, trussess	1 HR
2.	BEARING WALLS - EXTERIOR - INTERIOR	 1 HR 1 HR
3.	NONBEARING WALLS AND PARTITIONS - EXTERIOR (TABLE 602) with fire separation distance of >10 feet - INTERIOR	 1 HR 0 HR
4.	FLOOR CONSTRUCTION AND SECONDARY MEMBERS (SEE SECTION 202)	1 HR
5.	ROOF CONSTRUCTION AND SECONDARY MEMBERS (SEE SECTION 202)	1 HR

FIRE RESISTANCE RATING OF MEANS OF EGRESS, SHAFTS, & INCIDENTAL ACCESSORY OCCUPANCIES

	CONSTRUCTION TYPE IIA:	MIN RATING REQ'D
1.	CORRIDORS (TABLE 1018.1) - with sprinkler system	 0 HR
2.	EXIT (STAIR) ENCLOSURES (1022.1) - connecting less than 4 stories UNENCLOSED STAIRS (1016.4.1) - with sprinkler system	2 HR 1 HR 0 HR
3.	SHAFT ENCLOSURES - ELEVATORS connecting less than 4 stories (708.4) - OTHER SHAFTS connecting no more than 2 stories (708.2.7.1)	2 HR 1 HR 0 HR
4.	ATRIUMS (404.1) - SMOKE CONTROL IS NOT REQUIRED FOR ATRIUMS THAT CONNECT ONLY 2 STORIES (404.5)	 0 HR
5.	INCIDENTAL OCCUPANCIES (TABLE 508.2.5) - BOILER ROOM - LABORATORIES & VOCATIONAL SHOPS - WASTE COLLECTION ROOMS OVER 100 SF - EMERGENCY ELECTRIC ROOMS (527CMR) - NON-EMERGENCY ELECTRIC ROOMS with sprinkler system	 0 HR smoke partition req'd 0 HR smoke partition req'd 0 HR smoke partition req'd 2 HR 0 HR smoke partition req'd

707.4: Exterior walls of Fire-Rated shafts, exit enclosures, and incidental occupancy separations are NOT required to be rated (except where req'd per fire-separation distance per Table 602)

PENETRATIONS: THROUGH HORIZONTAL ASSEMBLIES NOT REQUIRED TO HAVE A FIRE RESISTANCE RATING:
- Noncombustible penetrating items (pipes, conduits, wire, cable, etc) connecting 3-stories or less are permitted w/out an enclosure provided the annular space is filled with an approved non-combustible material to resist the free passage of smoke and the products of combustion (713.4.2.1).
- Ducts penetrating 2-stories are permitted w/out an enclosure provided the annular space is filled with an approved non-combustible material to resist the free passage of smoke and the products of combustion (716.6.3.1)
- Ducts penetrating 3-stories are permitted w/out enclosures provided the annular space is filled with an approved non-combustible material to resist the free passage of smoke and the products of combustion AND a fire damper is installed in the duct at each floor level (716.6.3.3)

MEANS OF EGRESS (IBC CH. 10)

MAXIMUM FLOOR AREA ALLOWANCES PER OCCUPANT (TABLE 1004.1.2)

FUNCTION OF SPACE		FLOOR AREA in sf/occ.
ASSEMBLY W/O FIXED SEATS		
- CHAIRS ONLY (CONCENTRATED)	=	7 net
- CHAIRS & TABLES (UNCONCENTRATED)	=	15 net
CLASSROOM	=	20 net
SHOPS AND VOCATIONAL AREAS (ART)	=	50 net
KITCHEN	=	200 gross
LIBRARY		
- READING AREA	=	50 net
- STACK AREA	=	100 gross
STAGE & PLATFORM	=	15 net
MECH. & ACCESSORY STORAGE	=	300 gross
OFFICE/BUSINESS	=	100 gross

DESIGN OCCUPANT LOAD & EGRESS UNITS ARE INDICATED ON PLANS OF EACH FLOOR.

EGRESS WIDTH PER OCCUPANT (MA AMMENDMENT TO IBC 2009 - SECTION 1005.1)		
- STAIRWAY	=	.20 / INCH PER PERSON
- DOORS	=	.15 / INCH PER PERSON
- CORRIDORS	=	.15 / INCH PER PERSON
MINIMUM WIDTH OF CORRIDORS (1018.2)		
- FOR OCCUPANT CAPACITY OF 50 OR LESS	=	36"
- FOR OCCUPANT CAPACITY OF 51 TO 99	=	44"
- FOR OCCUPANT CAPACITY GREATER THAN 100	=	72"
MAXIMUM LENGTH OF EXIT ACCESS TRAVEL (TABLE 1016.1, E OCCUPANCY)	=	250 FT with sprinkler system

LENGTH OF DEAD END CORRIDORS (1018.4 EXCEPTION 2) SHALL NOT EXCEED 50 FT WHEN THE BUILDING IS EQUIPPED THROUGOUT WITH AN AUTOMATIC SPRINKLER SYSTEM.

PLUMBING FIXTURE REVIEW

(248 CMR-10.10 TABLE 1)

EDUCATIONAL (ELEMENTARY/ MIDDLE) - GRADES PRE-K THROUGH 8

TOTAL STUDENTS: 400 STUDENTS

200 BOYS

		REQUIRED	ACTUAL
1 WC / 60 BOYS	=	4 WC	9 WC
1 LAV / 60 BOYS	=	4 LAV	9 LAV
1 UR / 60 BOYS	=	4 UR	4 UR

200 GIRLS

		REQUIRED	ACTUAL
1 WC / 30 GIRLS	=	7 WC	13 WC
1 LAV / 60 GIRLS	=	4 LAV	9 LAV

DRINKING FOUNTAINS: 400 STUDENTS

		REQUIRED	ACTUAL
1 DF / 75 STUDENTS	=	6 DF	6 DF

TEACHING STAFF: 90 STAFF (45 MEN AND 45 WOMEN) (not including 5 kitchen staff)

		REQUIRED	ACTUAL
1 WC / 25 MEN	=	2 WC	4 SINGLE USER TOILET ROOM W/ 1 WC & 1 LAV EACH
1 WC / 20 WOMEN	=	3 WC	
1 LAV / 40 PERSONS	=	2 LAV	

KITCHEN STAFF - 5 PERSONS

REQUIRED	ACTUAL
1 UNISEX HANDICAP TOILET FACILITY PER 10.10 (18)(h).5 and (i).3 and (m).3a- Table 1	1 UNISEX HANDICAP TOILET ROOM

SERVICE SINK

REQUIRED	ACTUAL
1 PER FLOOR = 5 SERVICE SINKS	1 PER FLOOR = 5 SERVICE SINKS
1 REQ'D AT CONVENIENT LOCATION FROM KITCHEN (per 105 CMR 590.007/Federal Food Code 5-203.13)	1 LOCATED IN KITCHEN

PUBLIC RESTROOMS FOR GYMNASIUM (583 persons)

		REQUIRED	ACTUAL
292 MEN			
1 WC / 600 MEN	=	1 WC	3 WC
1 LAV / TOILET ROOM			3 LAV
1 URINAL / 200 MEN	=	2 UR	2 URINAL
292 WOMEN			
1 WC / 200 WOMEN	=	2 WC	5 WC
1 LAV / TOILET ROOM			3 LAV

GENERAL NOTES-CODE SHEET

1) CODE SHEET GENERAL NOTES, LEGEND AND ABBREVIATIONS APPLY TO A0 SERIES SHEETS.
2) THIS CODE REVIEW SHEET IS INTENDED TO INDICATE ONLY GENERAL APPLICABLE CODE FOR FIRE-RESISTANCE RATINGS, EGRESS REQUIREMENTS AND ENERGY-CODE REQUIREMENTS.
3) GROSS AREA FOR UPPER FLOORS EXCLUDES THE AREAS THAT ARE DOUBLE HEIGHT SPACES AND FLOOR OPENINGS AT THROUGH- FLOOR MECHANICAL SHAFTS.
4) EGRESS AT EXTERIOR DOORS IS CALCULATED FROM THE FLOOR WITH THE HIGHER OCCUPANCY LOAD.
5) CLEAR EGRESS WIDTH AT STAIRS IS MEASURED FROM THE OUTSIDE FACE OF STAIR STRINGER.

ABBREVIATIONS-CODE SHEET

(SEE SHEET A0.1 FOR ADDITIONAL ABBREVIATION DESIGNATIONS)

EXT = EXTERIOR
GSF = GROSS SQUARE FOOTAGE
NSF = NET SQUARE FEET (USE AREA, EXCLUDES BUILT IN STORAGE AREAS)
OCC = OCCUPANCY
SF = SQUARE FOOTAGE
ci = CONTINUOUS INSULATION

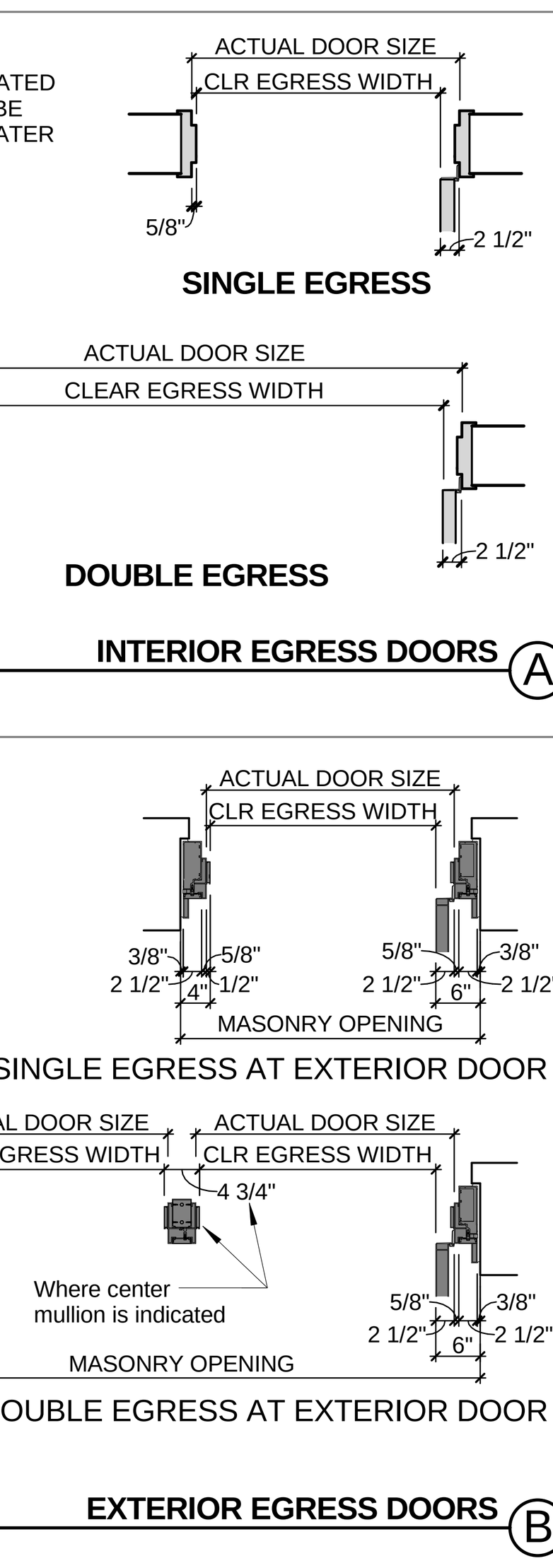
CUST = CUSTODIAN
DF = DRINKING FOUNTAIN
LAV= LAVATORY
MEP = MECHANICAL, ELECTRICAL, PLUMBING
UR = URINAL
WC = WATERCLOSET

LEGEND-CODE SHEET

ONE (1) HOUR ENCLOSED SPACE
TWO (2) HOUR ENCLOSED SPACE
ONE (1) HOUR FIRE BARRIER (Fire Resistance Rated Wall Assembly or Floor Assembly)
TWO (2) HOUR FIRE WALL
SMOKE PARTITION
ROOM OCCUPANCY
COLLECTED EGRESS OCCUPANCY COUNT AT EXIT STAIRS AND DOORS
EGRESS CONVERGENCE: EGRESS OCCUPANT LOAD
EGRESS DIRECTION ARROW

CALCULATION DIAGRAM OF CLEAR WIDTH @ EGRESS DOORS

NOTE: DIMENSIONS INDICATED ARE ASSUMED TO BE EQUAL TO OR GREATER THAN ACTUAL DIMENSIONS



ENERGY CONSERVATION REVIEW

780 CMR CH.13-IECC-2012 INTERN'L BUILDING CODE

CLIMATE ZONE: 5A (REF TABLE 301.1)

BUILDING ENVELOPE REQUIREMENTS - OPAQUE ELEMENT (REF TABLE 502.1.2 & 502.2(1))

	REQUIRED	PROVIDED
ROOFING- ENTIRELY ABOVE DECK	R=25ci	R=XXci
WALLS ABOVE GRADE: METAL FRAME	U=0.064	U=0.XXX
WALLS BELOW GRADE	R=7.5ci	R=XXci
SLAB ON GRADE FLOORS	R=10ci	R=XXci
FLOORS OVER OUTDOOR AIR/MASS	R=10ci	R=XXci
OPAQUE DOORS - SWINGING	U=0.37	U=0.XX
OPAQUE DOORS - ROLL-UP/ SLIDING	U=0.50	U=0.XX

BUILDING ENVELOPE REQUIREMENTS - FENESTRATION (REF TABLE 502.3 & 502.4.2)

CURTAINWALL / STOREFRONT	U=0.42	U=0.XX
WINDOWS & DOORS - METAL	U=0.38	U=0.XX
WINDOWS - OTHER THAN METAL	U=0.45	U=0.XX
ENTRANCE DOORS	U=0.80	U=0.XX
SKYLIGHTS	U=0.45	U=0.XX
SHGC - FENESTRATION	0.40	0.XX
SHGC - SKYLIGHTS	0.40	0.XX

BUILDING ENVELOPE REQUIREMENTS - FENESTRATION AIR INFILTRATION RATES (REF TABLE C402.4.3)

CURTAINWALL/STOREFRONT (tested at 1.57 psf)	0.06 cfm/ft2	
WINDOWS - OPERABLE (tested at 6.24 psf)	0.30 cfm/ft2	0.30 cfm/ft2
WINDOWS - FIXED	0.30 cfm/ft2	0.20 cfm/ft2
ENTRANCE DOORS- SINGLE	1.00 cfm/f2	0.50 cfm/ft2
ENTRANCE DOORS- PAIR	1.00 cfm/f2	1.00 cfm/ft2
SKYLIGHTS (w/ condensatate weepage openings)	0.30 cfm/f2	0.12 cfm/ft2
ROLLING DOORS	1.00 cfm/f2	1.00 cfm/ft2

FAR CALCULATION

Total Area of Existing Building to be Renovated	39,568 SF
Total Area of New Gymnasium	6,696 SF
Total Building Area	46,264 SF
Site Area	101,814 SF
FAR	**0.45**

REVISIONS NO.	DATE	REMARKS	BY

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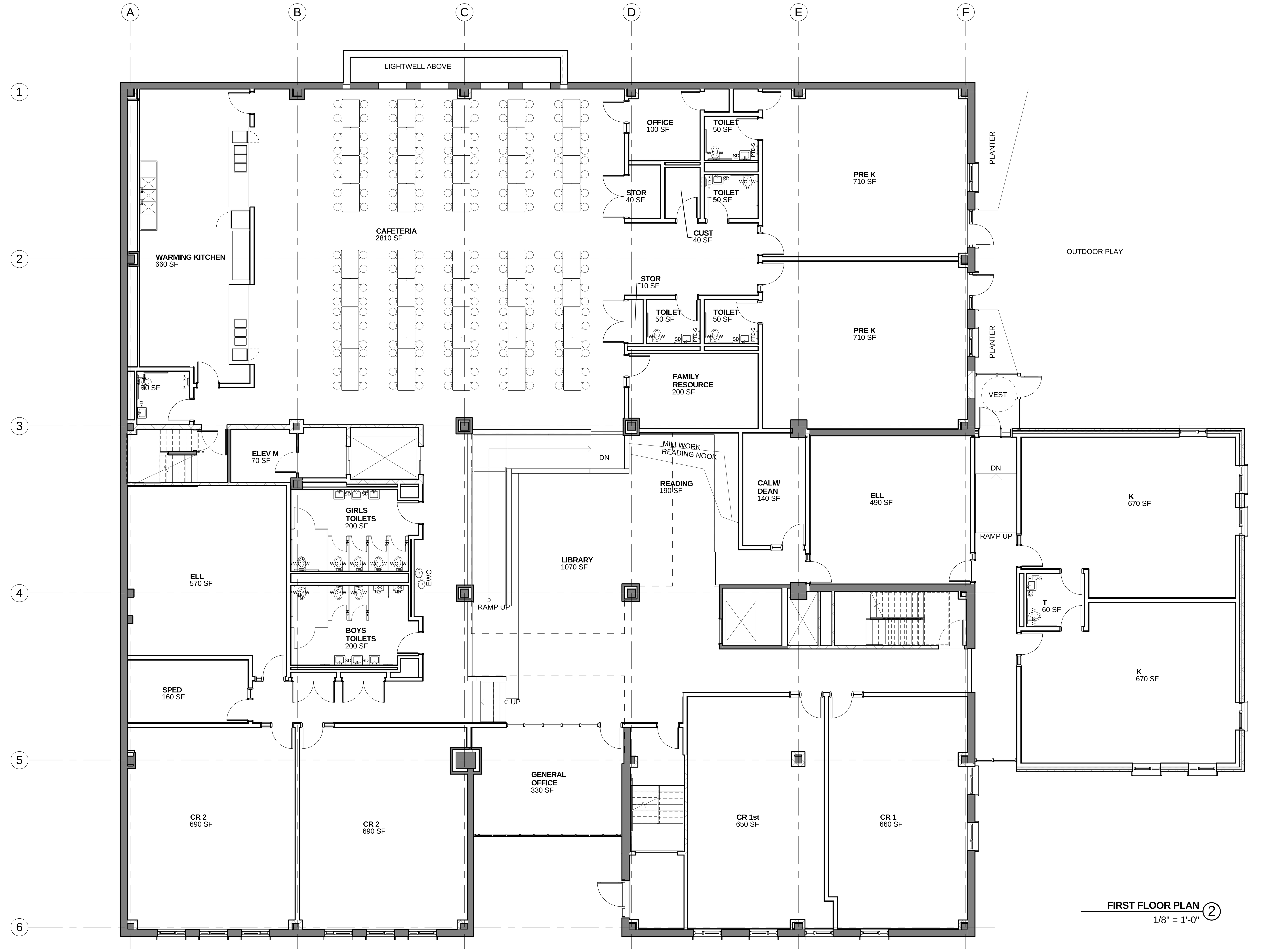
REGISTERED ARCHITECT LAURA A. WERNICK No. 8008 CAMBRIDGE MASS COMMONWEALTH OF MASSACHUSETTS

Zoning Review Set
11/13/2015

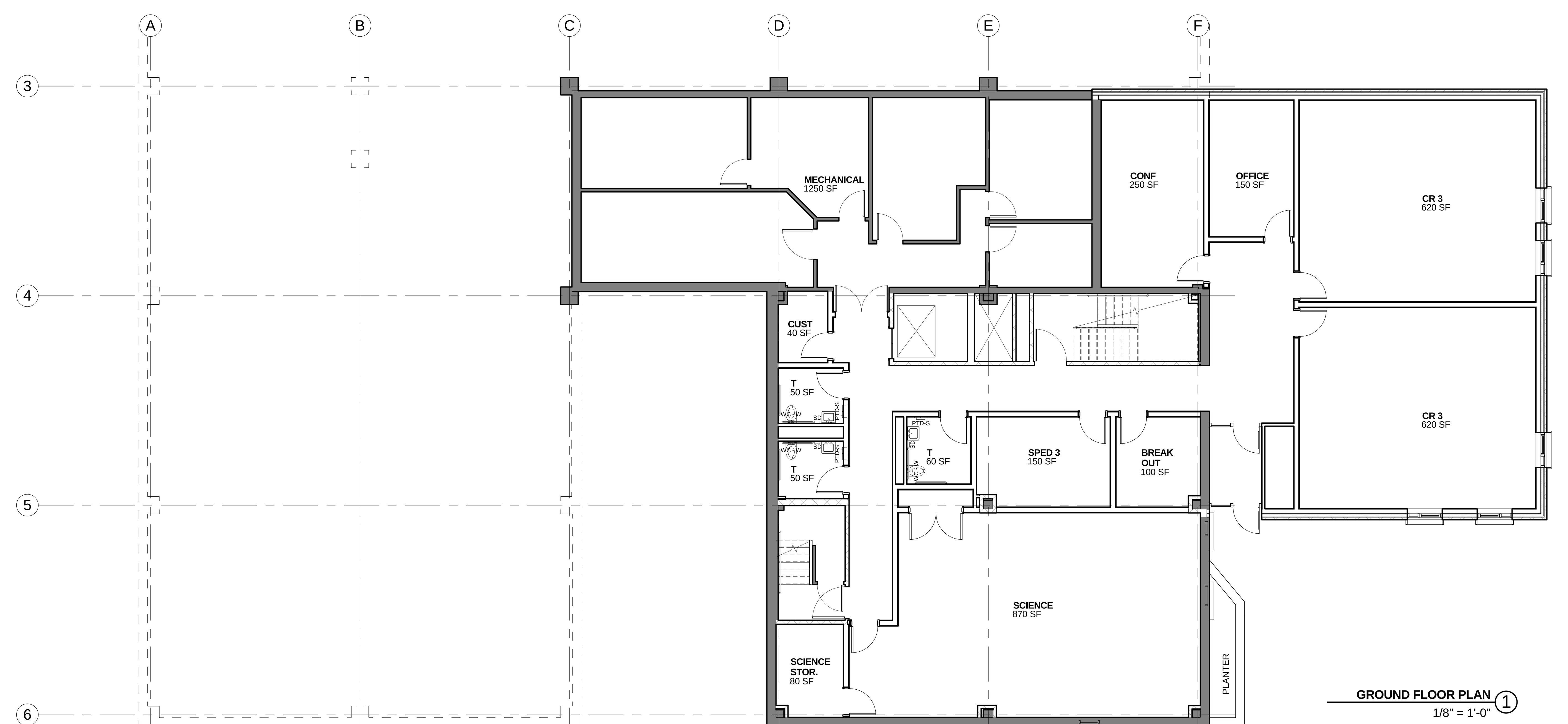
Bridge Boston Charter School
Roxbury, Massachusetts
Code Sheet

SCALE: As indicated DRAWN BY: MaG CHECKED BY: Checker

DRAWING NUMBER
A0.2
JOB NUMBER 413111



FIRST FLOOR PLAN 2
1/8" = 1'-0"



GROUND FLOOR PLAN 1
1/8" = 1'-0"

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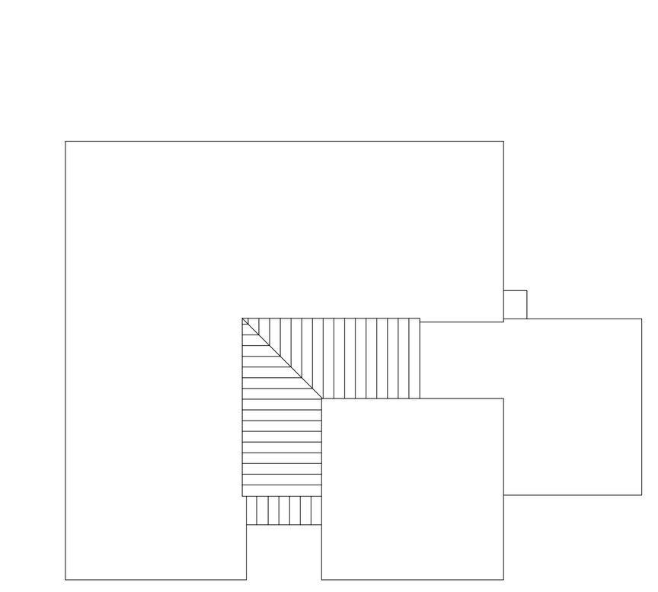
KEYPLAN



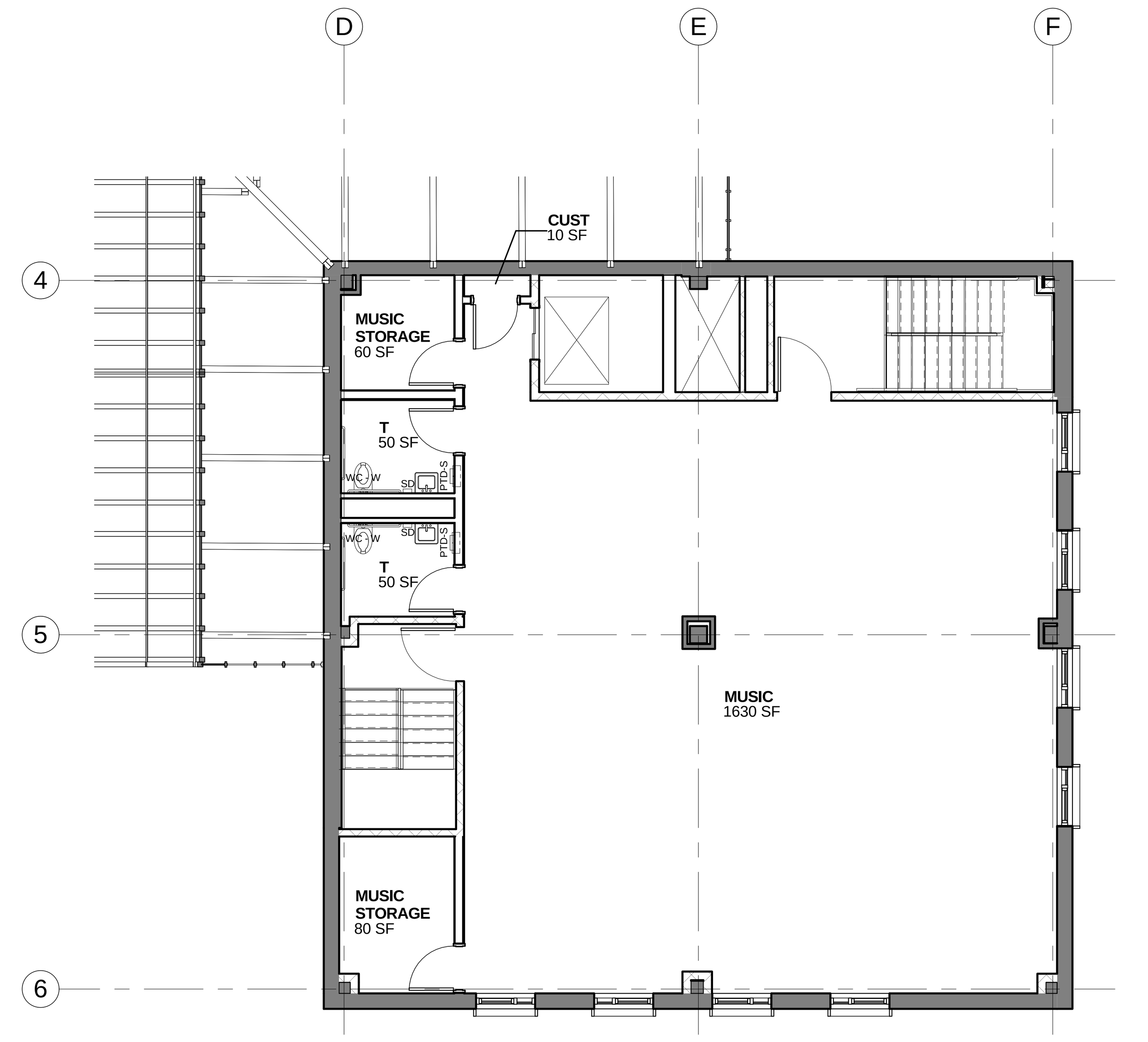
REVISIONS NO.	DATE	REMARKS	BY

Bridge Boston Charter School
Roxbury, Massachusetts
Floor Plans

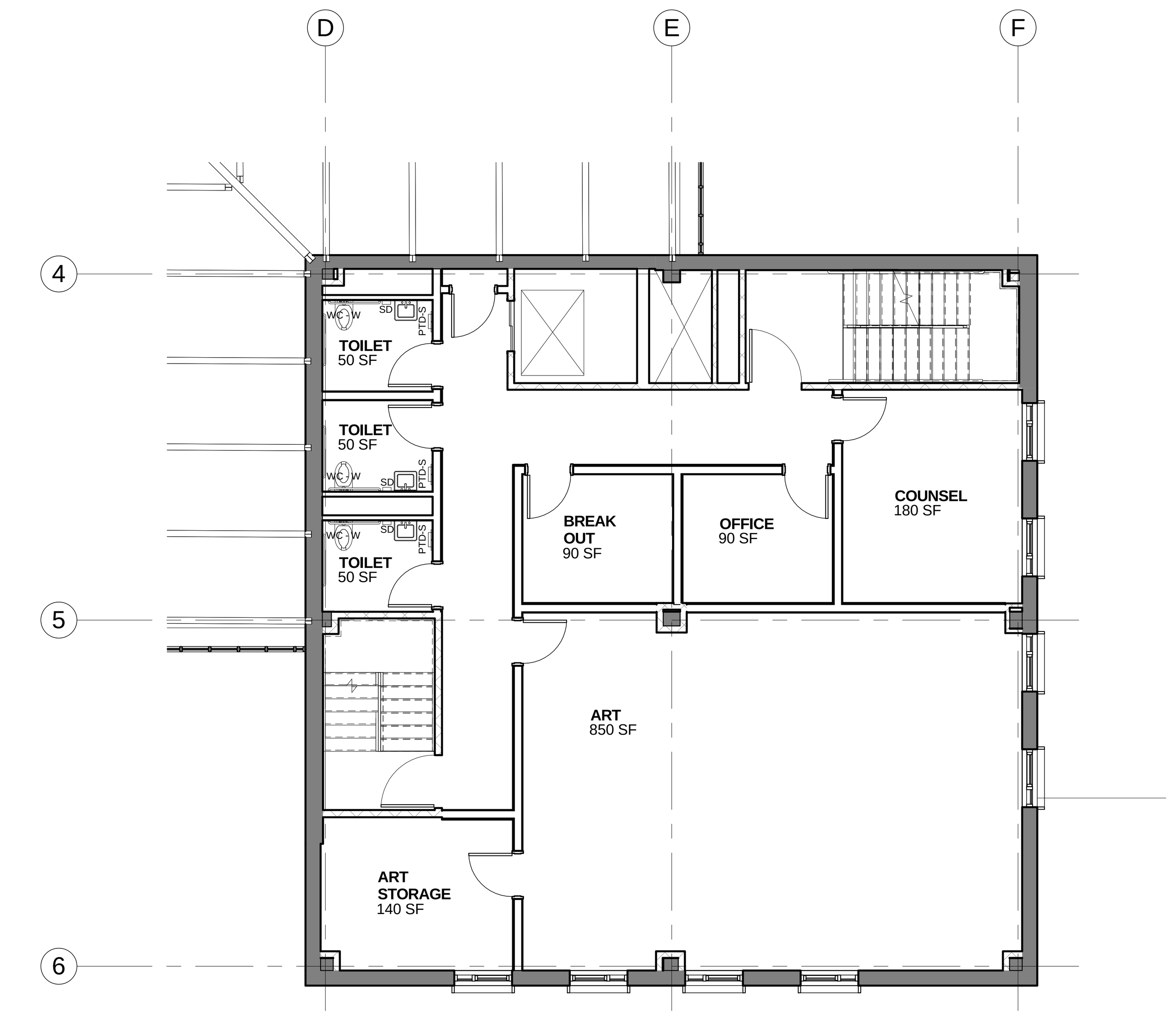
SCALE: 1/8" = 1'-0" DRAWN BY: MaG CHECKED BY: Checker

DRAWING NUMBER
A2-1

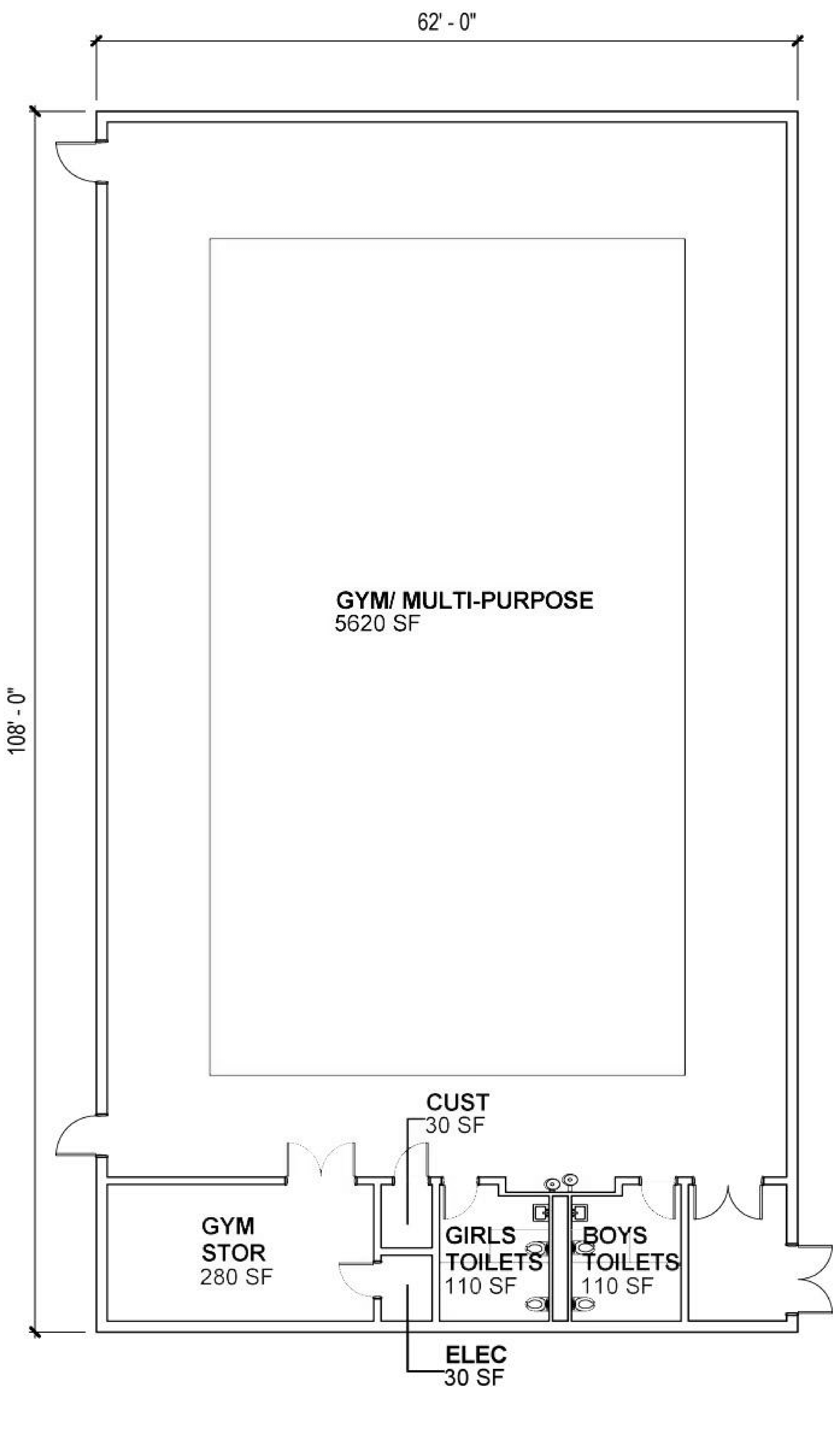
JOB NUMBER 413111



FOURTH FLOOR PLAN 4
1/8" = 1'-0"



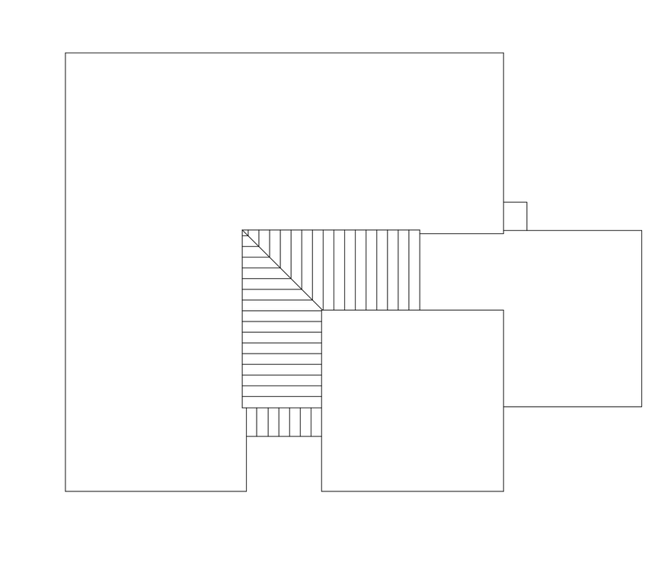
THIRD FLOOR PLAN 3
1/8" = 1'-0"



GYMNASIUM PLAN 5
1/8" = 1'-0"

SECOND FLOOR PLAN 2
1/8" = 1'-0"

KEYPLAN



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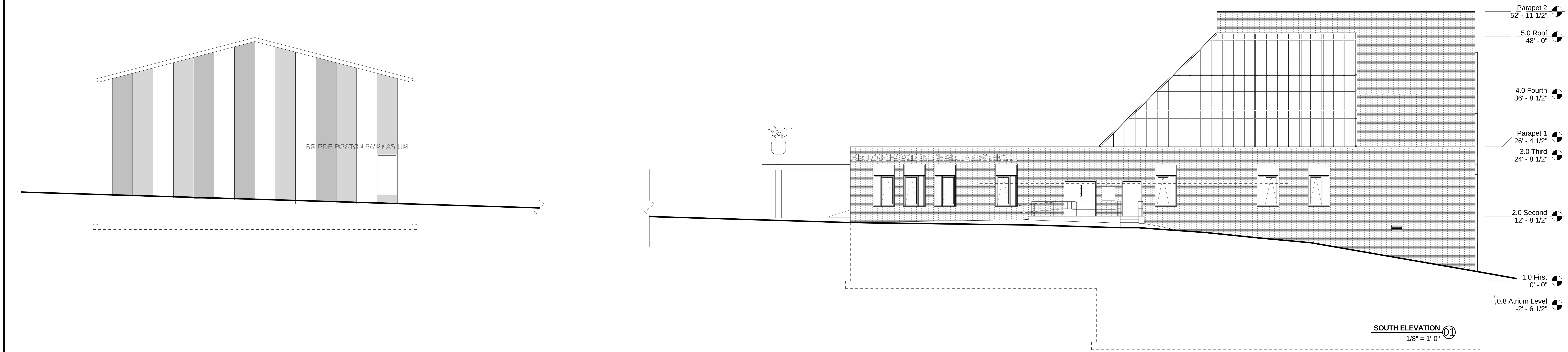
Zoning Review Set
11/13/2015

Bridge Boston Charter School
Roxbury, Massachusetts
Floor Plans

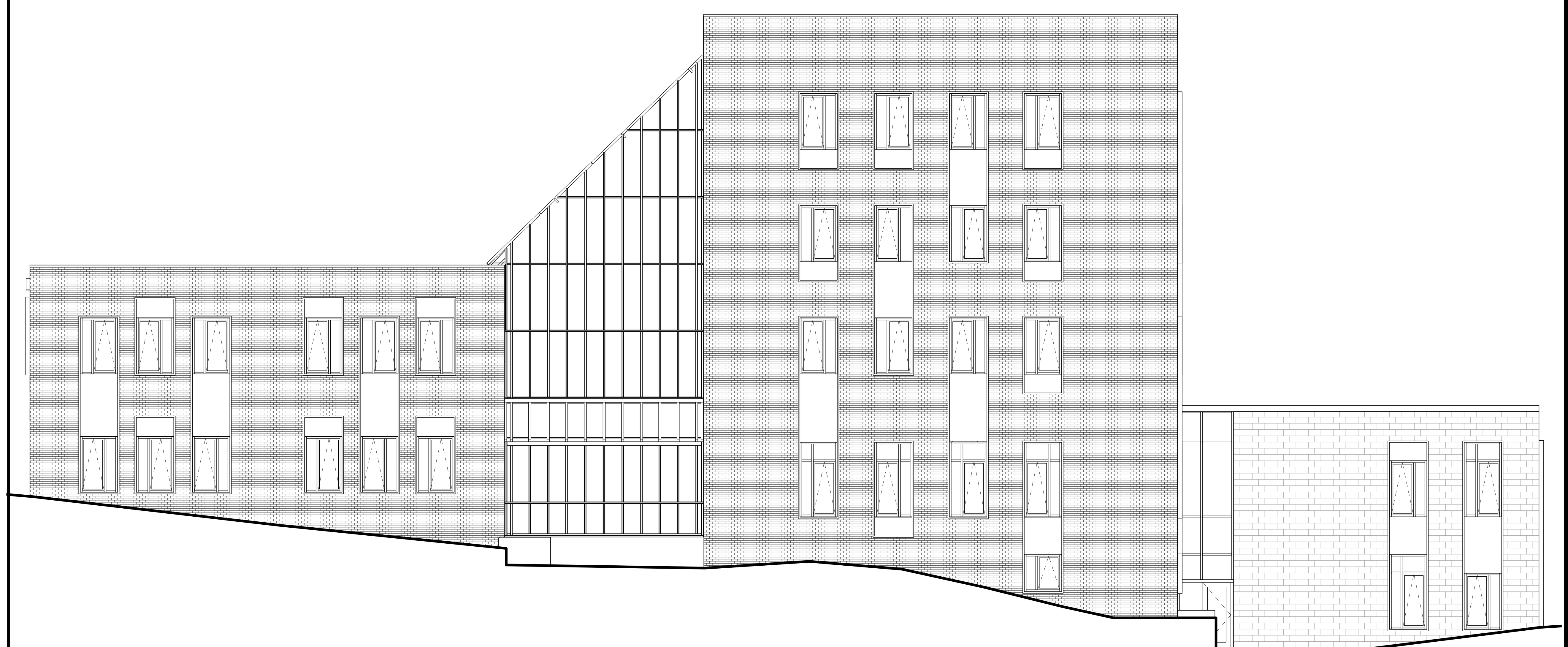
SCALE: 1/8" = 1'-0" DRAWN BY: MaG CHECKED BY: Checker

DRAWING NUMBER
A2-2

JOB NUMBER 413111

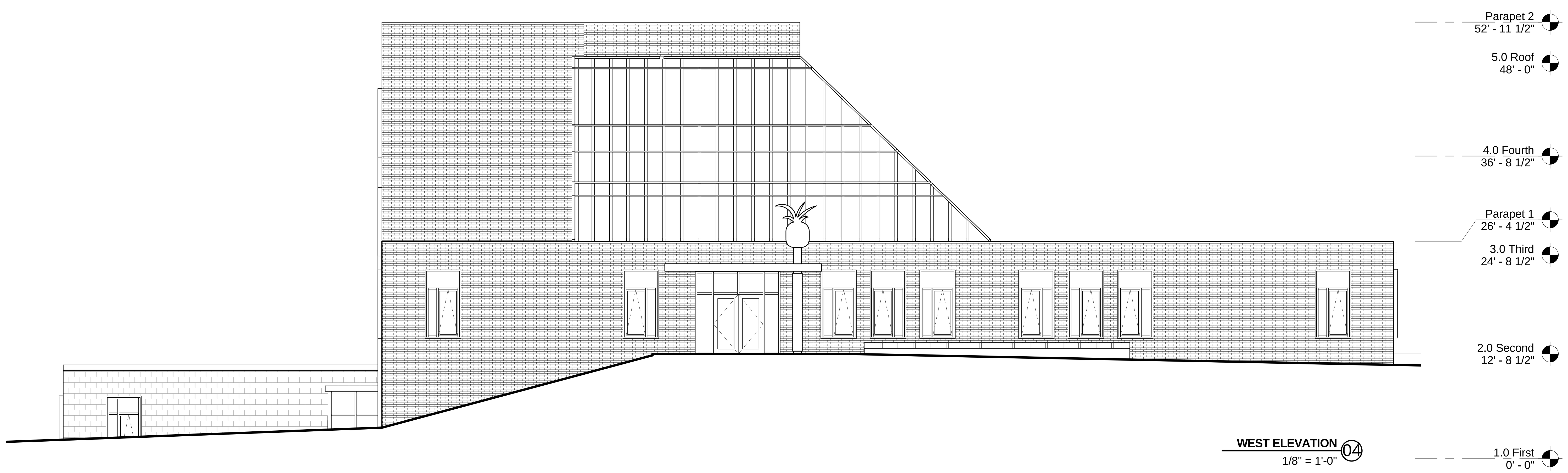


SOUTH ELEVATION 01
1/8" = 1'-0"



EAST ELEVATION 02
1/8" = 1'-0"

NORTH ELEVATION 03
1/8" = 1'-0"



WEST ELEVATION 04
1/8" = 1'-0"

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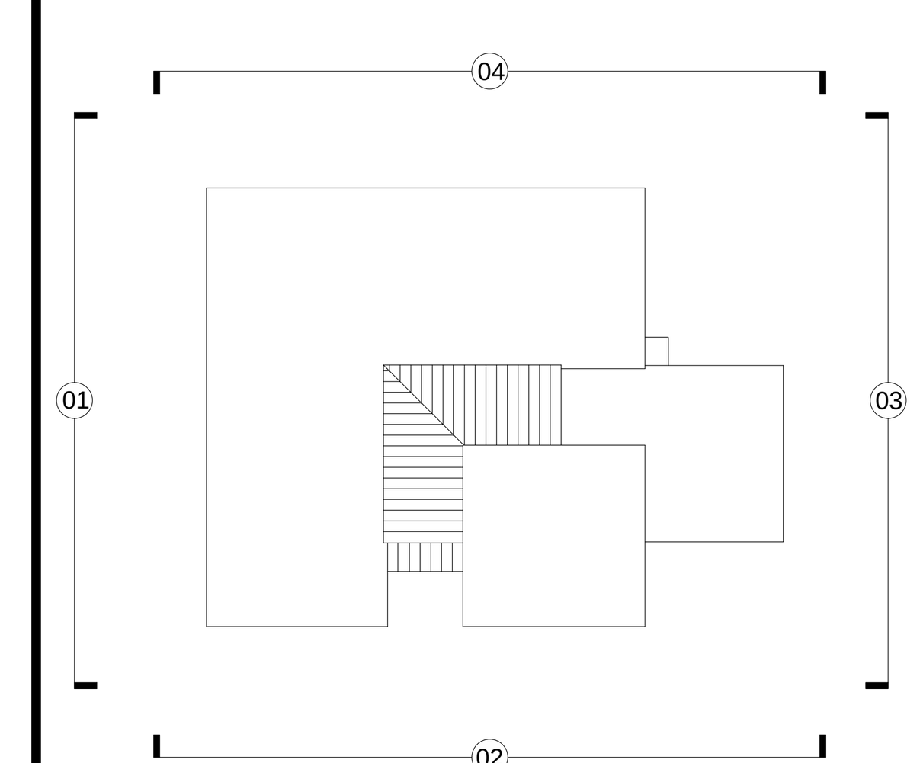
REGISTERED ARCHITECT LAURA A. WERNICK No. 8008 CAMBRIDGE MASS COMMONWEALTH OF MASSACHUSETTS

Zoning Review Set
11/13/2015

KEYPLAN



REVISIONS NO.	DATE	REMARKS	BY

Bridge Boston Charter School
Roxbury, Massachusetts
Elevations

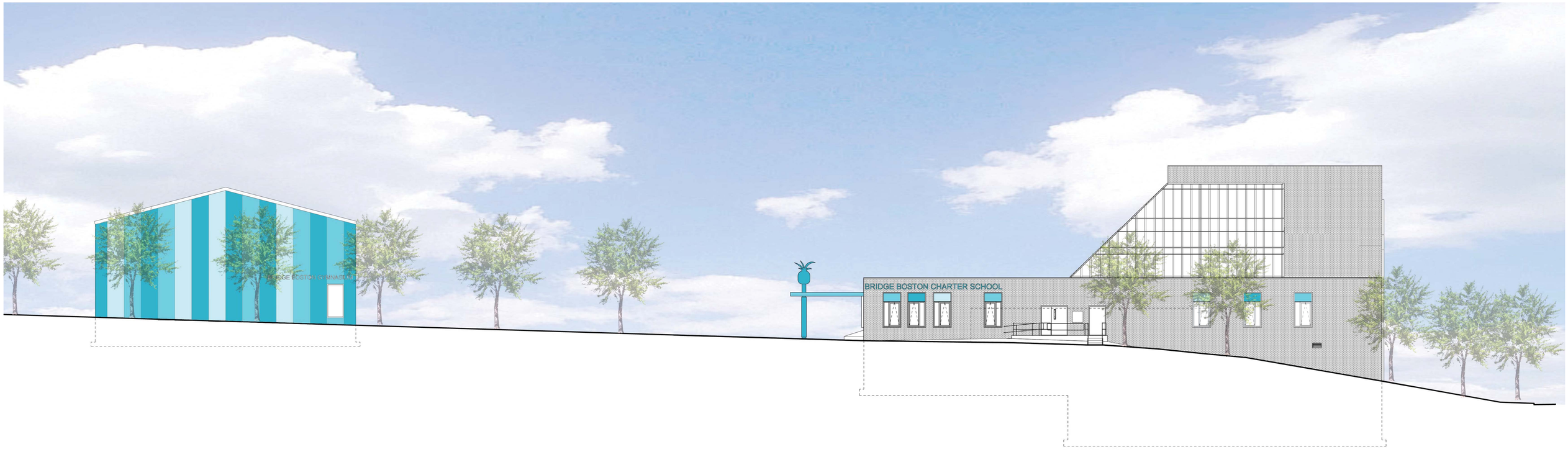
SCALE: 1/8" = 1'-0" DRAWN BY: MaG CHECKED BY: Checker

DRAWING NUMBER
A4-1
JOB NUMBER 413111

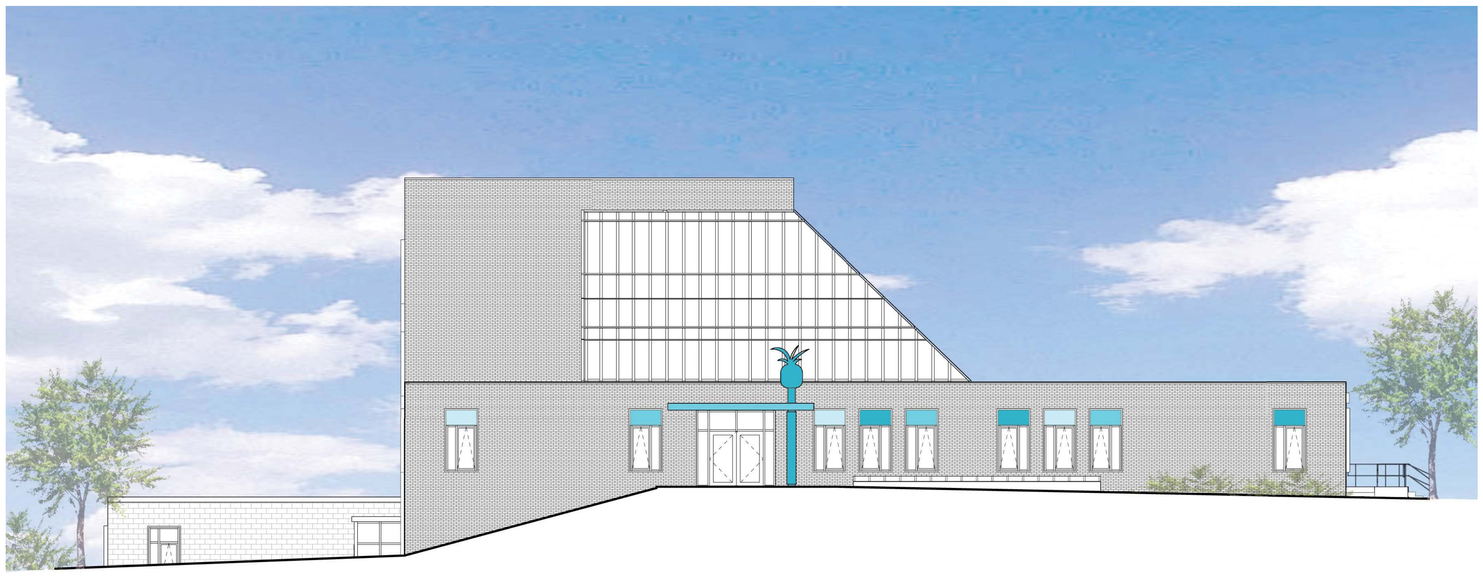
EAST ELEVATION - View from Warren Street

NORTH ELEVATION - View from Hazelwood Street

Bridge Boston Charter School
Roxbury, MA
December, 2015

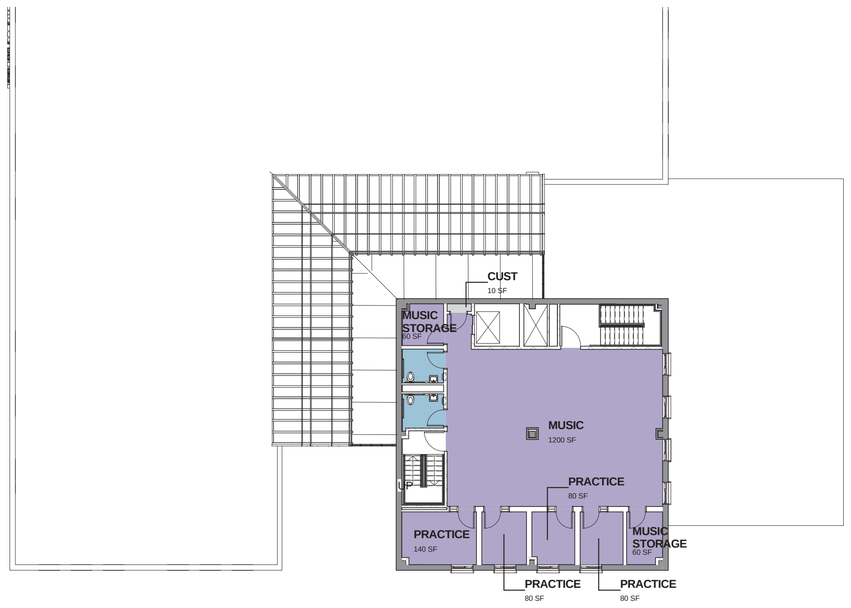


SOUTH ELEVATION - View from Townsend Street



WEST ELEVATION - View from Gym building

Bridge Boston Charter School
Roxbury, MA
December, 2015



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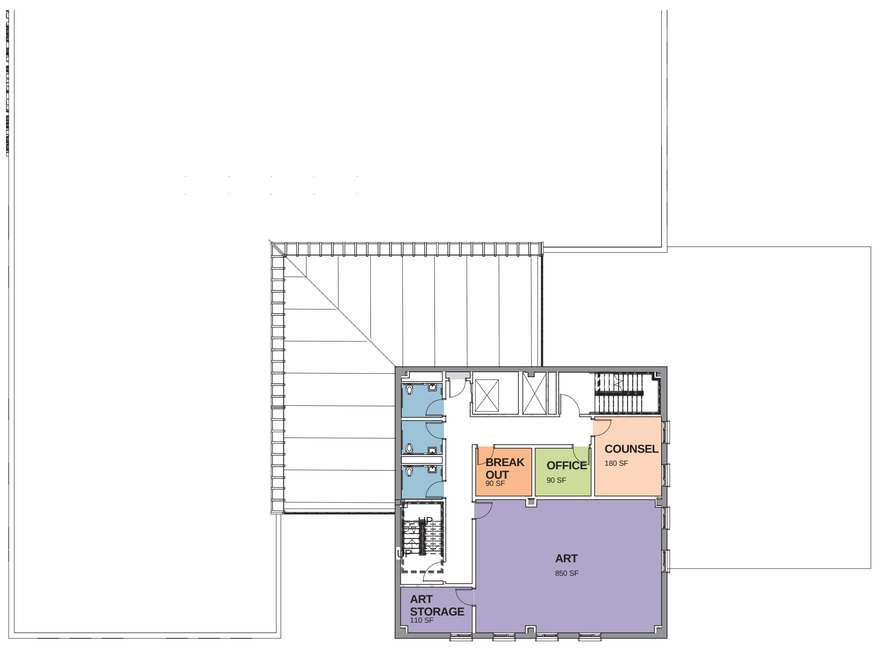

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1

G

Bridge Boston Charter School
Roxbury, MA
December 2015

Floor Plans

TRAFFIC IMPACT AND ACCESS STUDY

PROPOSED BRIDGE BOSTON CHARTER SCHOOL

435 Warren Street
Boston, Massachusetts

Prepared for:
Bridge Boston Foundation
Boston, MA

December 2015

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Traffic Impact and Access Study

PROPOSED BRIDGE BOSTON CHARTER SCHOOL

435 Warren Street
Boston, Massachusetts

Prepared for:
Bridge Boston Foundation
Boston, MA 02119

Prepared by:
MDM Transportation Consultants, Inc.
28 Lord Road, Suite 280
Marlborough, Massachusetts 01752
Phone: (508) 303-0370
Fax: (508) 303-0371

December 2015

MDM

CONTENTS

FIGURES

TABLES

EXECUTIVE SUMMARY

MDM has prepared this Traffic Impact and Access Study (TIAS) for a proposed Bridge Boston Charter School (BBCS) to be located at 435 Warren Street in the Roxbury neighborhood of Boston, Massachusetts. This report documents existing operational characteristics of intersections serving the development site, estimates future year operating characteristics of these intersections independent of the development, estimates development-related trip generation and identifies incremental impacts of site-related traffic.

This TIAS has been prepared in accordance with Executive Office of Energy and Environmental Affairs/Institute of Transportation Engineers (EEA/ITE) guidelines.

E.1 PROJECT DESCRIPTION

The project site is an approximate 2.35-acre parcel of land located in the northwest quadrant of the Warren Street/Townsend Street intersection in Boston, Massachusetts. The Site contains the former 33,000 square foot (sf) Roxbury Comprehensive Healthcare Center and an abandoned residential structure. There are approximately 62 marked parking spaces spread across the upper and lower parking fields. The Site is served by four curb cuts along Townsend Street and one curb cut along Hazelwood Street.

The project involves relocating the BBCS's existing school operations at 2 McLellan Street and 18 Samoset Street in Dorchester to the Site with expansion to Grades 5 through 8. The existing school facilities accommodate an enrollment of 240± students (Pre-K through Grade 4) and the Boston Public School currently provides 11 public school buses with supplemental transportation provided by parents and/or relatives. The core hours of operation are 8:00 AM – 5:00 PM Monday through Friday.

For planning purposes, MDM has assumed that the Warren Street site will be repurposed to accommodate up to 400 students (Pre-k through Grade 8) and 89 staff with approximately 49 marked parking spaces. The site's primary vehicle access will be provided via two curb cuts along Townsend Street including one enter only driveway which leads to the dedicated drop-

off/pick-up area for school buses and parent passenger vehicles. As part of the project, one curb cut along Townsend Street will be eliminated and the existing easternmost curb cut will be retained for delivery purposes. The existing access/egress driveway and parking lot on Hazelwood Street will be retained.

E.2 STUDY AREA

This TIAS evaluates transportation characteristics of roadways and intersections that provide a primary means of access to the site, and that are likely to sustain a measurable level of traffic impact from the proposed development. Study area intersections include the following:

- Warren Street at Townsend Street – Signalized
- Humboldt Street at Townsend Street – Signalized
- Townsend Street at Site Driveway(s) - Unsignalized

E.3 SUMMARY OF ANALYSIS AND FINDINGS

Capacity analyses were conducted for each study area intersection to quantify existing and future year traffic operations with and without the development for the weekday morning and weekday evening peak hours. These hours coincide with peak traffic activity of the proposed charter school development and the adjacent streets. Under future conditions, with and without the project, capacity analysis results indicate that the study intersections will generally operate at overall LOS D and E during the weekday morning and evening peak hours.

Vehicular trips generated to/from the site are estimated based on field observations at the existing BBCS schools located at 2 McLellan Street and 197 Centre Street in Dorchester, proposed site programming and existing mode-split data provided by BBCS for their existing facilities. Trip generation estimated for the morning peak hour includes approximately 233 vehicle-trips (127 entering and 106 exiting) consisting of 95 parent/guardian drop-off vehicles, 11school buses and 21 staff vehicles. Trip generation estimated for the evening peak hour includes approximately 220 vehicle-trips (95 entering and 125 exiting) consisting of 84 parent/guardian pick-up vehicles, 11 school buses and 30 staff vehicles. Observations indicate that the majority of the staff arrive prior to the morning peak hour and depart after the evening peak hour.

Recommendations that support projected traffic increases associated with the proposed development are identified that minimize/offset project-related impacts and address access needs for the Site. Recommended improvements include (a) access-related/pedestrian improvements, and (b) a comprehensive Traffic Management Plan (TMP).

E.4 CONCLUSIONS & RECOMMENDATIONS

The proposed charter school development is expected to have nominal impact on the operation of study area intersections. Proposed access/egress and pedestrian improvements will provide ample capacity to accommodate site-generated trips while also enhancing safety and capacity in the study area. In addition, proposed access/egress along Townsend Street is expected to be designed to accommodate the largest anticipated design vehicle and to ensure that adequate sight lines are provided in accordance with AASHTO criteria based on ambient travel speeds. The adoption of a comprehensive Traffic Management Program (TMP) is recommended to ensure efficient operations of school pick-up/drop-off, parking activity, and student circulation.

It is recommended that BBCS consult with the City of Boston Transportation Department to relocated and/or supplement the School Zone signs along Townsend Street and Warren Street. BBCS should also consult with the City of Boston Police Department relative to scheduling a crossing guard at the Warren Street/Townsend Street/Quincy Street intersection during morning arrival and evening dismissal periods.

1.0 INTRODUCTION

MDM has prepared this Traffic Impact and Access Study (TIAS) for a proposed Bridge Boston Charter School (BBCS) to be located at 435 Warren Street in the Roxbury neighborhood of Boston, Massachusetts. This report documents existing operational and safety-related characteristics of roadways serving the development site, estimates future year operating characteristics of these roadways independent of the development, estimates development-related trip generation and identifies incremental impacts of site-related traffic.

This TIAS has been prepared in accordance with Executive Office of Energy and Environmental Affairs/Institute of Transportation Engineers (EEA/ITE) guidelines.

1.1 PROPOSED DEVELOPMENT

Existing Conditions

The project site is an approximate 2.35-acre parcel of land located in the northwest quadrant of the Warren Street/Townsend Street intersection in Boston, Massachusetts. The Site contains the former 33,000 square foot (sf) Roxbury Comprehensive Healthcare Center and an abandoned residential structure. There are approximately 62 marked parking spaces spread across the upper and lower parking fields. The Site is served by four curb cuts along Townsend Street and one curb cut along Hazelwood Street. The location of the site relative to adjacent roadways is shown in **Figure 1**.

Proposed Plan

The project involves relocating the BBCS's existing school operations at 2 McLellan Street and 18 Samoset Street in Dorchester to the Site with expansion to Grades 5 through 8. The existing school facilities accommodate an enrollment of 240± students (Pre-K through Grade 4) and the Boston Public School currently provides 11 public school buses with supplemental transportation provided by parents and/or relatives. The core hours of operation are 8:00 AM – 5:00 PM Monday through Friday.

Figure 1

Site Location

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Date: October 2015
Dwg No. 780 - TIAS.dwg

For planning purposes, MDM has assumed that the Warren Street site will be repurposed to accommodate up to 400 students (Pre-k through Grade 8) and 89 staff with approximately 49 marked parking spaces. The site's primary vehicle access will be provided via two curb cuts along Townsend Street including one enter only driveway which leads to the dedicated drop-off/pick-up area for school buses and parent passenger vehicles. As part of the project, one curb cut along Townsend Street will be eliminated and the existing easternmost curb cut will be retained for delivery purposes. The existing access/egress driveway and parking lot on Hazelwood Street will be retained. The preliminary site layout plan is shown in **Figure 2**.

1.2 STUDY METHODOLOGY

This transportation impact and access evaluation is conducted in accordance with EEA/ITE guidelines, and consists of several steps. The first step documents existing conditions in the transportation study area, including an inventory of roadway geometry and observed traffic volumes characteristics. Next, future year traffic conditions are forecast that account for other planned area developments, normal area growth, and development-related traffic increases. The third step quantifies operating characteristics of primary study intersections. Specific attention is given to the incremental impacts of the proposed development. Finally, improvements are described that address specific development-related operational needs.

1.3 STUDY AREA

This TIAS evaluates transportation characteristics of roadways and intersections that provide a primary means of access to the site, and that are likely to sustain a measurable level of traffic impact from the proposed development. Study area intersections include the following:

- Warren Street at Townsend Street – Signalized
- Humboldt Street at Townsend Street – Signalized
- Townsend Street at Site Driveway(s) - Unsignalized

Figure 2

Preliminary Site Plan

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Planners & Engineers

Date: October 2015
Dwg No. 780 - TIAS.dwg

2.0 EXISTING CONDITIONS

In order to provide a basis for quantifying the transportation impacts of the development, the existing roadway system and the existing traffic operations of study area roadways were reviewed. This section describes the existing traffic characteristics and operations of roadways and intersections within the study area. Specifically, this section presents an overview of the traffic data collection program, existing traffic volumes, and public transportation facilities serving the area.

2.1 STUDY AREA ROADWAY NETWORK

The study area roadways and intersections are described briefly in this section. A general description of the physical roadway and intersection features is provided. The study area and intersections are depicted in **Figure 1**.

2.1.1 Roadways

Warren Street

Warren Street is classified by the Massachusetts Department of Transportation (MassDOT) as an Urban Minor Arterial roadway under local (City) jurisdiction within the study area. Warren Street is generally a North-South roadway in the project area. In the immediate study area, Warren Street generally provides two lanes of travel with a shared bike lane in each direction. Sidewalks are provided along both sides of the roadway. On-street parking is permitted along both sides of Warren Street except at MBTA bus stop locations. Land use along Warren Street within the project area primarily consists of a mix of residential uses, public uses and commercial uses including the Boston Latin Academy located south of the project site and the Roxbury YMCA and Mall of Roxbury located north of the project site.

Townsend Street

Townsend Street is classified by the Massachusetts Department of Transportation (MassDOT) as an Urban Minor Arterial roadway under local (City) jurisdiction within the study area. Townsend Street is generally an East-West roadway in the project area. In the study area, Townsend Street generally provides one lane of travel in each direction. Sidewalks are provided along both sides of the roadway. On-street parking is permitted along Townsend Street with the exception of the south side of the roadway where parking is prohibited between 1:00 PM and 3:00 PM on school days. Land use along Townsend Street within the project area primarily consists of the Boston Latin Academy (Grades 7 through 12), Laviscount Park and Saint Mark Congregational Church.

Humboldt Avenue

Humboldt Avenue is classified by the Massachusetts Department of Transportation (MassDOT) as an Urban Collector roadway under local (City) jurisdiction within the study area. Humboldt Avenue is generally a North-South roadway in the project area. In the study area, Humboldt Avenue generally provides one lane of travel in both directions. Sidewalks are provided along both sides of the roadway. On-street parking is permitted along Humboldt Avenue except at MBTA bus stop locations. Land use along Humboldt Avenue within the project area primarily consists of resident uses, Laviscount Park, Saint Mark Congregational Church and the Trotter Elementary School.

2.1.2 Intersections

Warren Street at Townsend Street/Quincy Street

Warren Street meets Townsend Street/Quincy Street to form a four-way, signalized intersection. Quincy Street approaches the intersection from the East and provides an exclusive right-turn lane and a shared through/left-turn lane. Townsend Street approaches the intersection from the West and provides a single, general-purpose travel lane, which is used as a two-lane approach during the weekday morning peak hour. The Warren Street northbound approach provides an exclusive left-turn lane, a through lane and a shared through/right-turn lane. The Warren Street southbound approach provides an exclusive left-turn lane and a shared through/right-turn lane. Sidewalks and marked crosswalks are provided at each approaches to the intersection. The existing traffic signal control generally provides four-phase operation with protected/permissive left-turn operation for the Warren Street northbound and southbound approach. An exclusive pedestrian phase adds a fifth phase to the cycle when actuated by pushbuttons located in each quadrant of the intersection. Land use at the intersection consists of a community center, a retail plaza, Boston Latin Academy and the project site.

Humboldt Avenue at Townsend Street

Humboldt Avenue meets Townsend Street to form a four-way, signalized intersection. Townsend Street approaches the intersection from the East and West and provides one travel lane in each direction. Humboldt Avenue approaches the intersection from the North and South; both approaches including one lane in each direction. Sidewalks and marked crosswalks are provided along all approaches to the intersection. The existing traffic signal control generally provides two-phase semi-actuated operation. An exclusive pedestrian phase adds a third phase to the cycle when actuated by pushbuttons located in each quadrant of the intersection. . Land use at the intersection consists of residential buildings, Laviscount Park and Saint Mark Congregational Church.

2.2 EXISTING TRAFFIC VOLUMES

Manual turning movement counts (TMCs) were conducted along study area roadways and intersections in September 2015. Traffic data was collected during the weekday morning (7:00 AM to 9:00 AM) and weekday evening (3:00 PM to 6:00 PM) peak periods to coincide with peak traffic activity of the proposed charter school development and the adjacent streets. Traffic count data is provided in the **Appendix.**

Review of MassDOT permanent count station data indicates that September is an above-average traffic month. In order to provide a conservative analysis, no seasonal adjustment (reduction) of the data was made to the September traffic volume counts. Permanent count station data is provided in the **Appendix**. The resulting existing weekday morning and weekday evening peak-hour traffic volumes for study intersections are depicted in **Figure 3** and **Figure 4**, respectively. Given the close proximity to the Boston Latin Academy School and public transportation services provided along Warren Street, pedestrian traffic activity was also observed. The resulting weekday morning and evening peak hour pedestrian traffic volumes at the study intersections are provided in **Figure 5** and **Figure 6**, respectively.

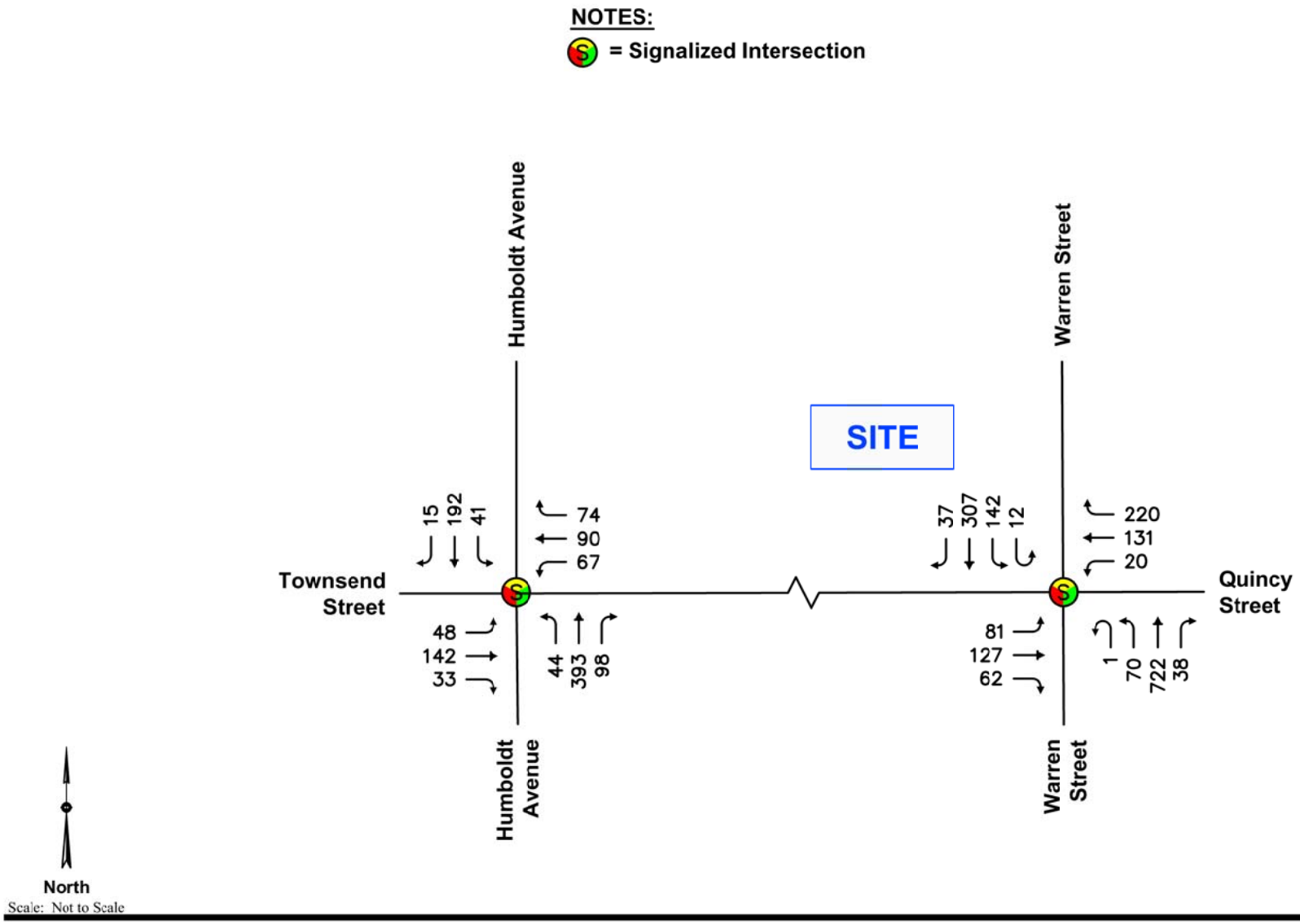

Figure 3

2015 Existing Condition
Weekday Morning Peak Hour
Vehicle Volumes

MDM TRANSPORTATION CONSULTANTS, INC.
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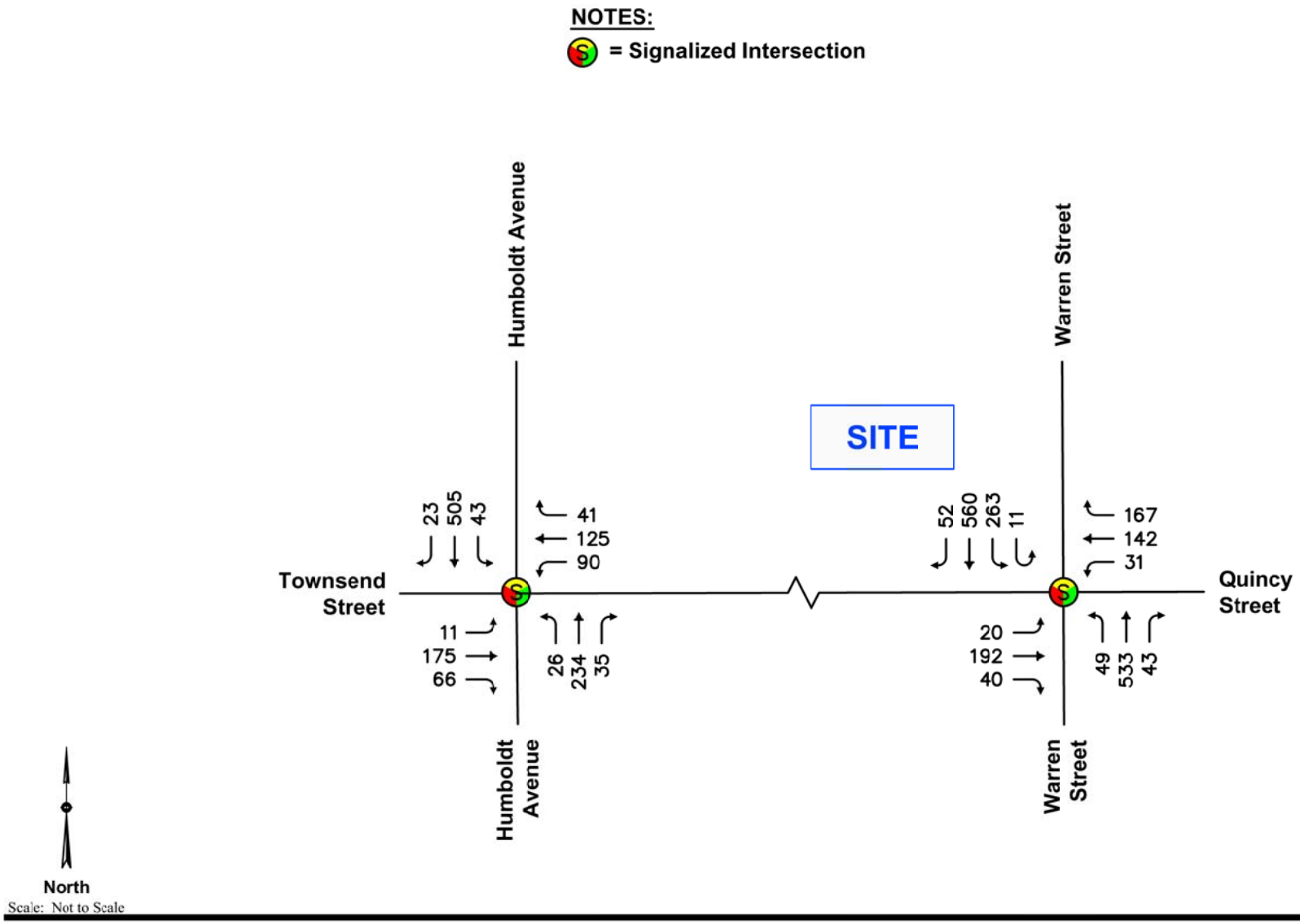

Figure 4

2015 Existing Condition
Weekday Evening Peak Hour
Vehicle Volumes

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Date: October 2015
Dwg No. 780 - TIAS.dwg

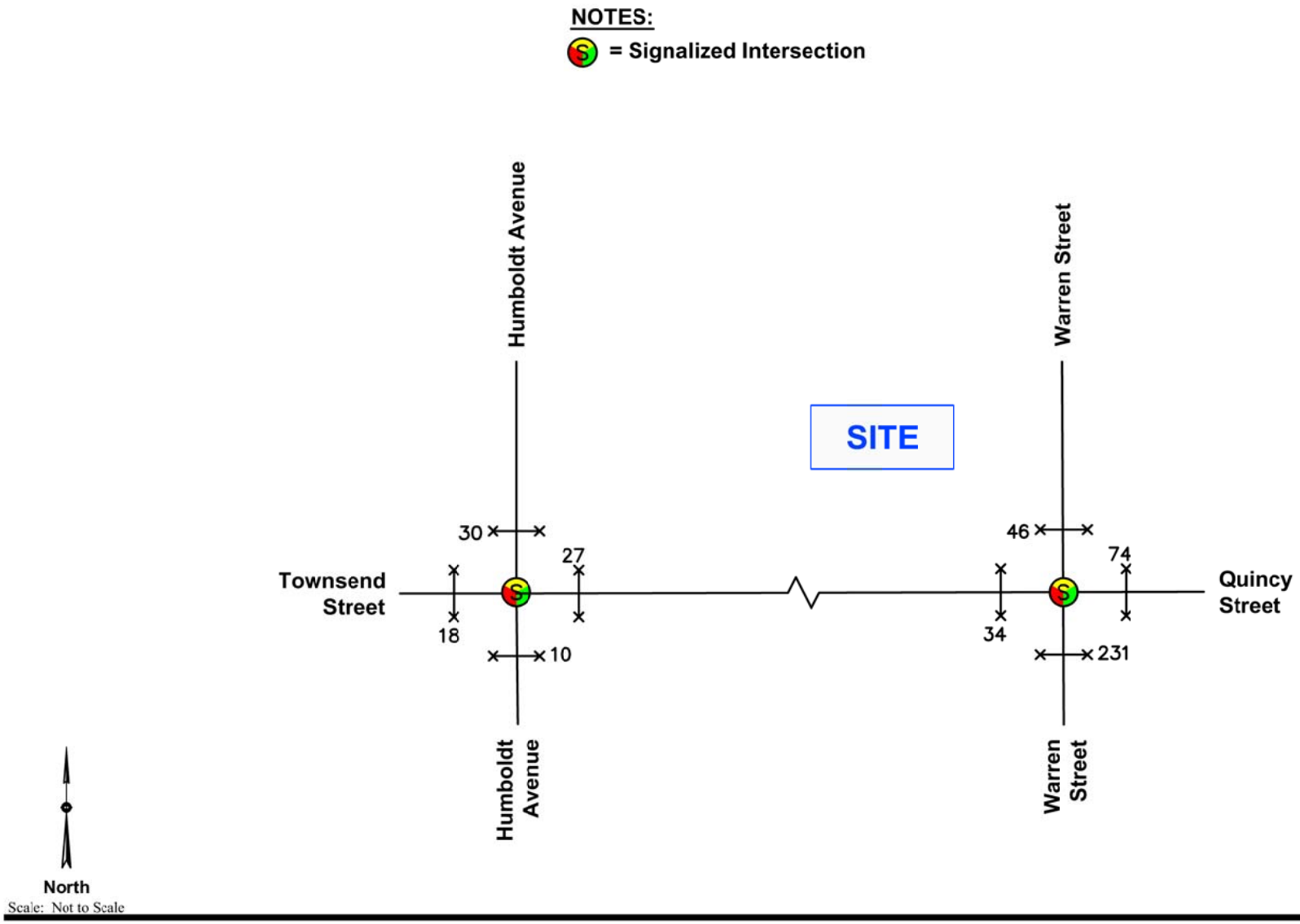

Figure 5

2015 Existing Condition
Weekday Morning Peak Hour
Pedestrian Volumes

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Date: October 2015
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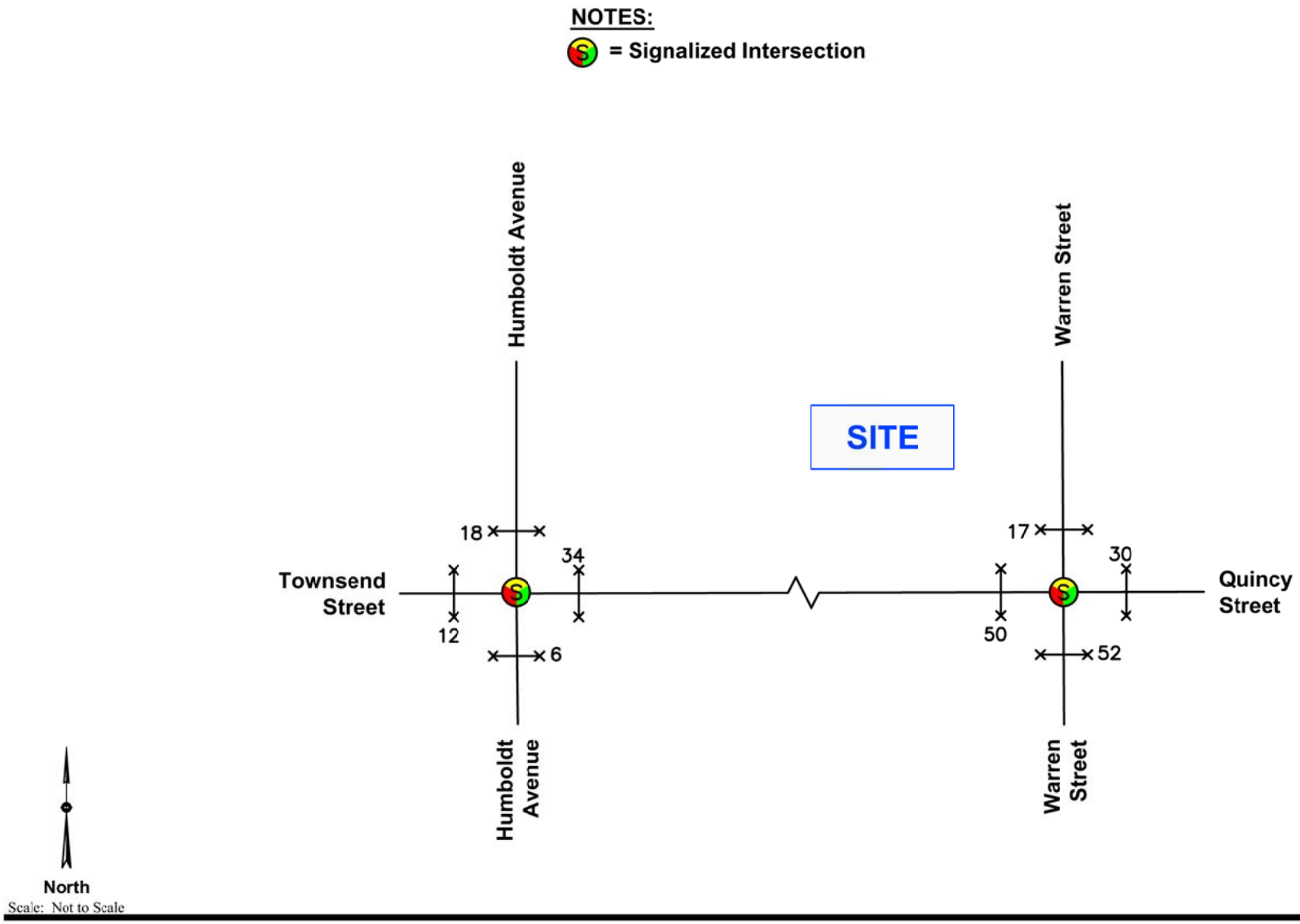

Figure 6

2015 Existing Condition
Weekday Evening Peak Hour
Pedestrian Volumes

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Date: October 2015
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2.3 PUBLIC TRANSPORTATION

The Massachusetts Bay Transportation Authority (MBTA) operates the following public transportation in the site vicinity. Specific local bus and commuter rail/ subway routes are shown in **Figure 7** with schedule information provided in the **Appendix**.

- **Bus Route 14:** This bus route provides service from the Mission Hill area, through Dudley Square, into Roxbury, Mattapan and Roslindale. This bus service generally operates approximately every 30 to 40 minutes on weekdays.

- **Bus Route 19:** This bus route provides service from the Fenway area to Dudley square, through Roxbury and into Dorchester. This bus service generally operates from every 5 minutes to every hour depending on time of day.

- **Bus Route 23:** This bus route provides service from Ruggles Station through Dudley Square, Roxbury, Dorchester, and Dorchester Center ending at Ashmont Station. This subway service generally operates approximately every 5 to 15 minutes on weekdays.

- **Bus Route 28:** This bus route provides service from Ruggles Station through Dudley Square, into Roxbury and by Franklin Park, through Dorchester into Mattapan ending at Mattapan Station. This bus service generally operates approximately every 30 to 60 minutes on weekdays.

- **Bus Route 44:** This bus route provides service from Ruggles Station through Dudley Square into Roxbury, then North up along Route 28 into Eggleston Square ending at Jackson Square Station. This bus service generally operates approximately every 15 to 30 minutes.

The primary access to the above MBTA's bus routes from the site is via bus stops at the corner of Warren Street/Townsend Street and Humboldt Avenue/Townsend Street.

2.4 ON-STREET PARKING

This study provides an inventory of on-street parking restrictions within the general vicinity of the site. The on-street parking predominately includes no parking zones, street sweeping regulated zones, and snow emergency regulated zones. **Figure 8** illustrates an inventory of existing parking restrictions in the study area.

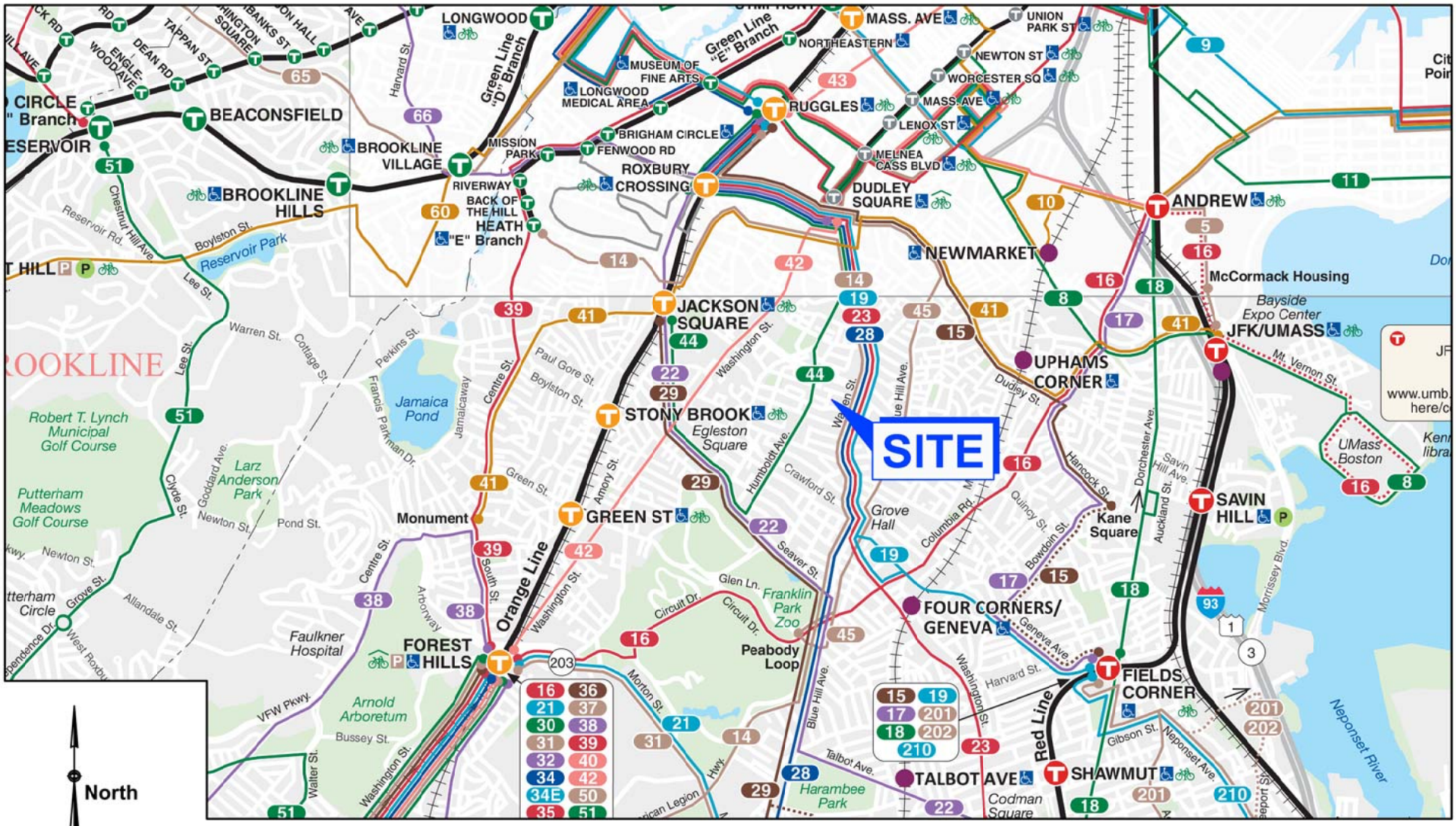

Figure 7

MBTA Public Transportation

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Date: October 2015
Dwg No. 780 - MBTA Public Trans Map.dwg

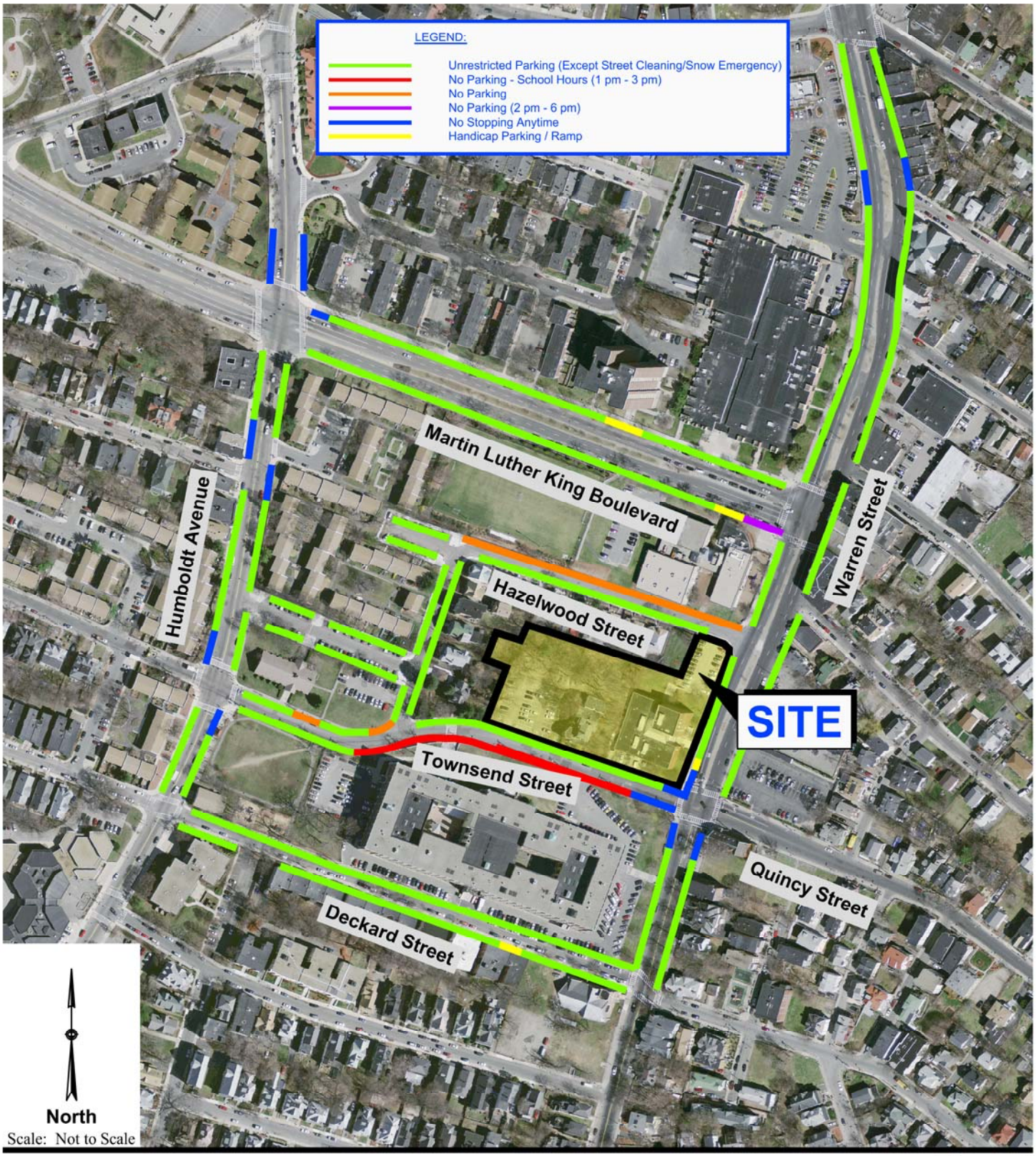

Figure 8

Parking Restrictions

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Date: October 2015
Dwg No. 780 - Parking Availability.dwg

3.0 FUTURE CONDITIONS

Evaluation of the proposed development impacts requires the establishment of a future baseline analysis condition. This section estimates future roadway and traffic conditions with and without the proposed development. To be consistent with EEA/ITE guidelines, a five-year planning horizon was selected.

To determine the incremental impact of new site-generated traffic volumes on the roadway network under future conditions, baseline traffic volumes in the study area were projected to a future year condition. Traffic volumes on the roadway network at that time, in the absence of the development (that is, the No-Build condition), would include existing traffic, new traffic due to general background traffic growth, and traffic related to specific developments by others that are currently under review at the local and/or state level. Consideration of these factors resulted in the development of No-Build traffic volumes. Anticipated site-generated traffic volumes were then superimposed upon these No-Build traffic-flow networks to develop future Build conditions.

The following sections provide an overview of the future No-Build traffic volumes and projected Build traffic volumes.

3.1 BACKGROUND TRAFFIC GROWTH

Background traffic includes demand generated by other planned developments in the area as well as demand increases caused by external factors. External factors are general increases in traffic not attributable to a specific development and are determined using historical data.

3.1.1 Historical Area Growth

Nearby permanent count station data published by MassDOT indicates a negative 0.2 percent per year growth rate. For purposes of this evaluation, a positive 0.5 percent growth rate was used (2.5 percent increase over a 5-year horizon) which is consistent with other area traffic studies. This growth rate is higher than historic rates, and, as such, is also expected to account for any small fluctuation in hourly traffic that may occur from time to time in the study area and traffic associated with smaller developments or vacancies in the area. MassDOT permanent count station data and background growth calculations are provided in the **Appendix.**

3.1.2 Background Development-Related Growth

There are currently two site-specific development projects in area that may increase traffic at the study intersections:

- ***Bartlett Place:*** Bartlett Place is a development in the Roxbury-Dudley Square area located at 2565 Washington Street. The proposed building is 233,490 SF and consists of office, residential, and retail space. Site trip tracings are provided in the **Appendix**.

- ***The Clarion:*** The Clarion is a development in the Roxbury- Dorchester area located at 311 Blue Hill Avenue. The proposed building is 57,971 SF and consists of residential and retail space. Site trip tracings are provided in the **Appendix**.

3.2 NO-BUILD TRAFFIC VOLUMES

Future No-Build traffic volumes are developed by increasing the existing (2015) volumes by approximately 2.5 percent (0.5 percent compounded annually over 5 years) and adding traffic associated with specific background projects. The resulting 2020 No-Build weekday morning and evening peak hour traffic volumes are displayed in **Figure 9** and **Figure 10**, respectively**.**

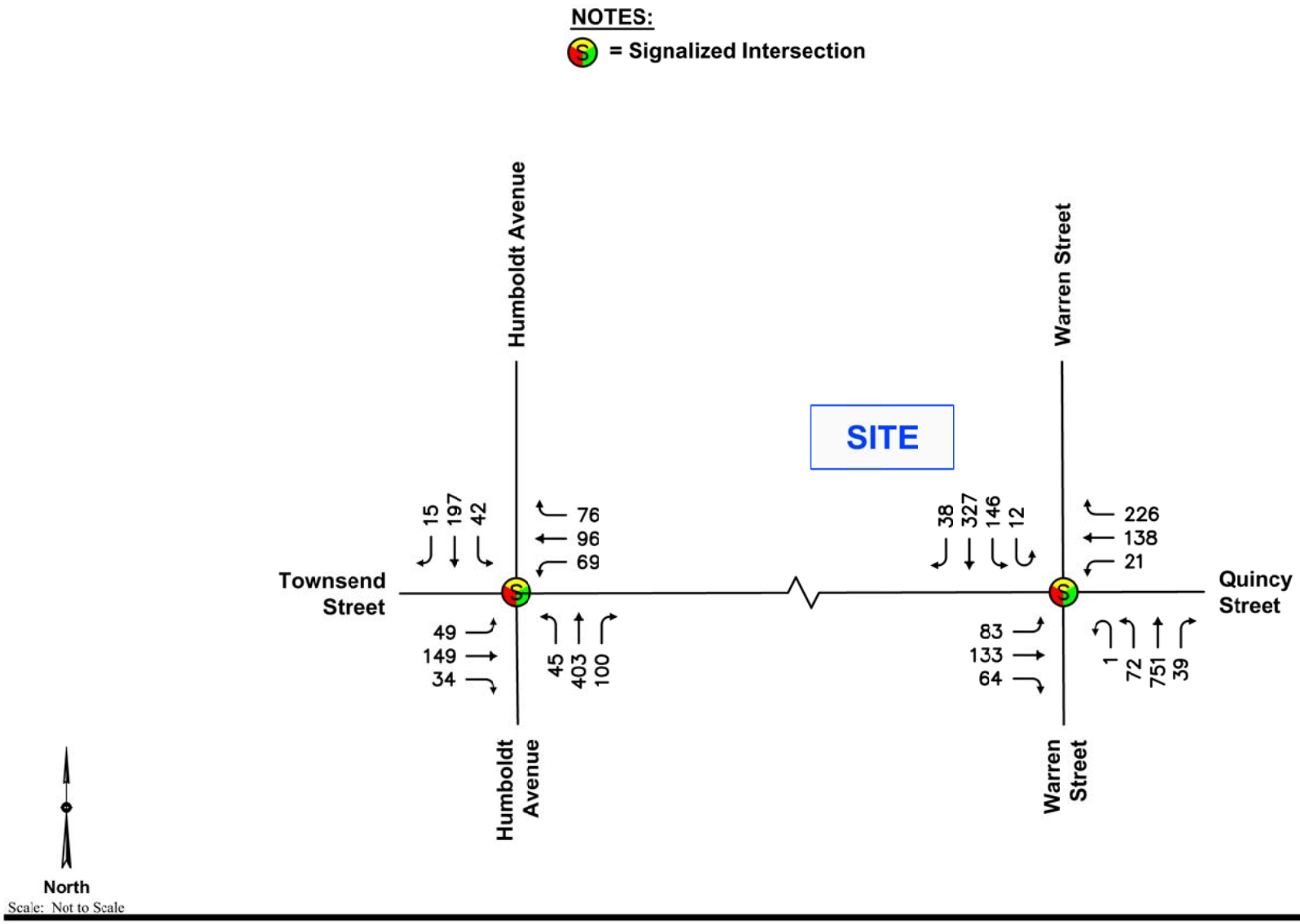

Figure 9

2020 No Build Condition
Weekday Morning Peak Hour
Vehicle Volumes

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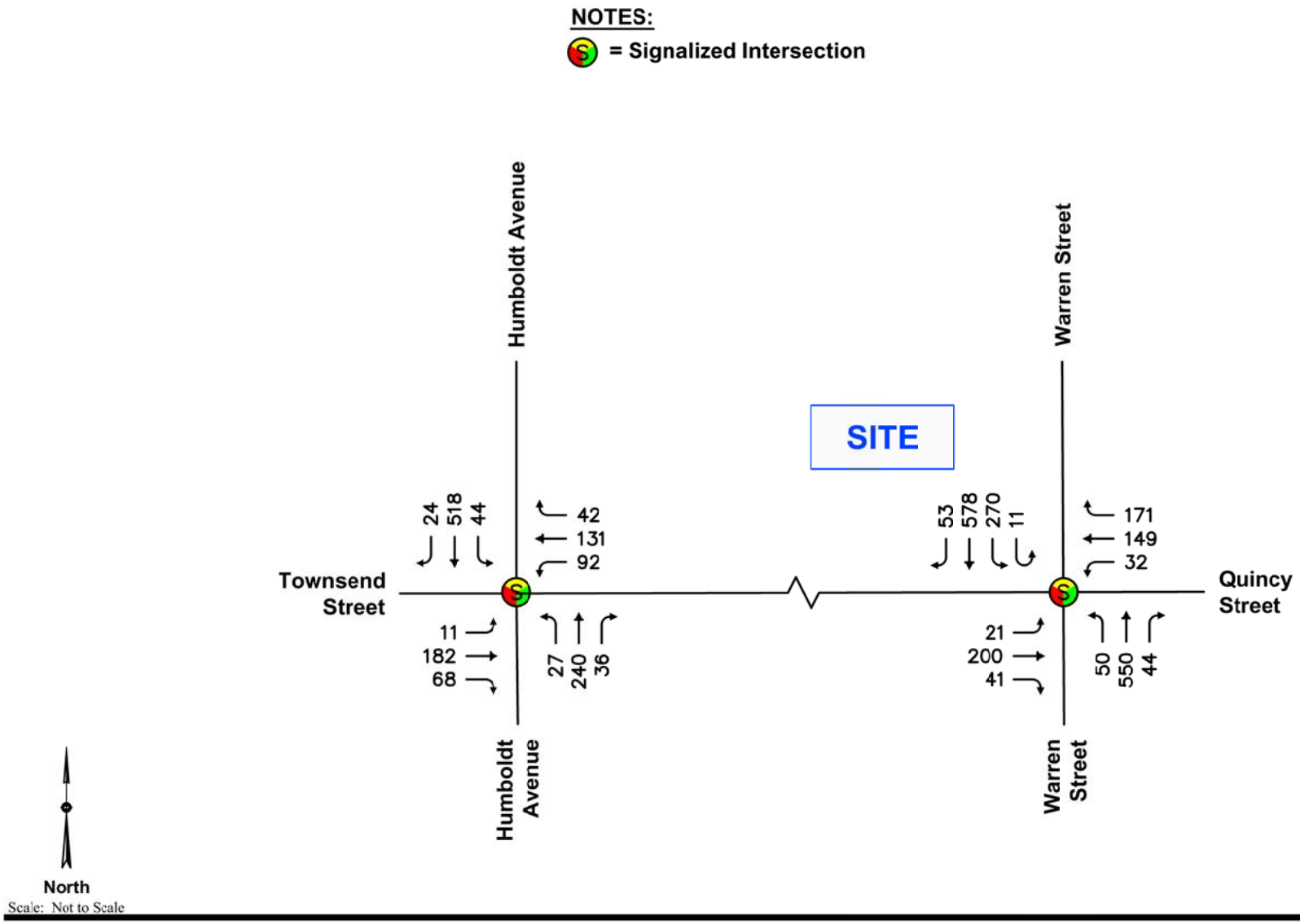

Figure 10

2020 No Build Condition
Weekday Evening Peak Hour
Vehicle Volumes

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3.3 SITE-GENERATED TRAFFIC

Trip generation estimates are derived for the critical school activity periods based on empirical field observations at the existing Bridge Boston schools located at 2 McLellan Street and 197 Centre Street in Boston, MA and projected site programming characteristics provided by Bridge Boston for the proposed charter school facility (Pre- K through 8th Grade). A detailed trip generation summary for the site, based on a projected maximum student enrollment of 400 students and approximately 89 staff members is presented in **Table 1** and includes a breakdown of vehicular trips by staff member, pick-up/drop off (student) and school bus trips. Trip generation methodology is presented in the **Appendices.**

TABLE 1
DETAILED TRIP-GENERATION SUMMARY
PROPOSED BRIDGE BOSTON CHARTER SCHOOL (400 Students)

	Vehicle Trips[1]			
Period	**Staff Auto[2]**	**Student Auto Pick-Up/ Drop-Off[3]**	**Bus**	**Total**
Weekday Morning Peak Hour (7:00 – 8:00 AM):				
Enter	21	95	11	**127**
Exit	0	95	11	**106**
Total	21	190	22	**233**
Weekday Evening Peak Hour (4:30 – 5:30 PM)				
Enter	0	84	11	**95**
Exit	30	84	11	**125**
Total	30	168	22	**220**

[1] Peak hour trip estimates based on anticipated operating characteristics at the proposed Bridge Boston facility including extended arrival and dismissal periods, school bus usage, vehicle occupancy rates and transit use.
[2]Approximately 30% of staff trips occur during the weekday morning peak hour and 42% occur during the evening peak hour.
[3]Based on existing school operations, 90% of student drop-off activity occurs during the weekday morning peak hour and 80% of student pick-up activity occurs during the weekday evening peak hour.

As presented in **Table 1,**

- Trip generation estimated for the morning peak hour includes approximately 233 vehicle-trips (127 entering and 106 exiting) consisting of 95 parent/guardian drop-off vehicles, 11school buses and 21 staff vehicles.

- Trip generation estimated for the evening peak hour includes approximately 220 vehicle-trips (95 entering and 125 exiting) consisting of 84 parent/guardian pick-up vehicles, 11 school buses and 30 staff vehicles.

3.4 TRIP DISTRIBUTION AND ASSIGNMENT

The distribution for projected traffic for the proposed BBCS facility is based on student enrollment residence information for BBCS existing facilities. For analysis purposes, the school bus regional trip distribution patterns are assumed to be similar to the student private vehicle trip distribution patterns. Staff trip distribution patterns are estimated based on the areas existing traffic patterns and routes to the site. The resulting trip distribution for new trips is presented in **Figure 11**. Trip distribution methodology is provided in the **Appendix.**

Development-related trips for the proposed school are assigned to the roadway network using the trip-generation estimates shown in **Table 1** and the distribution patterns presented in **Figure 11**. Development-related trips at each intersection approach for the weekday morning and weekday evening peak hours are quantified in **Figure 12** and **Figure 13.**

3.5 BUILD TRAFFIC VOLUMES

Future Build condition traffic volumes are derived by adding incremental traffic increases for the project to the 2020 No-Build conditions. **Figure 14** and **Figure 15** present the 2020 Build condition traffic-volume networks for the weekday morning and weekday evening peak hours, respectively.

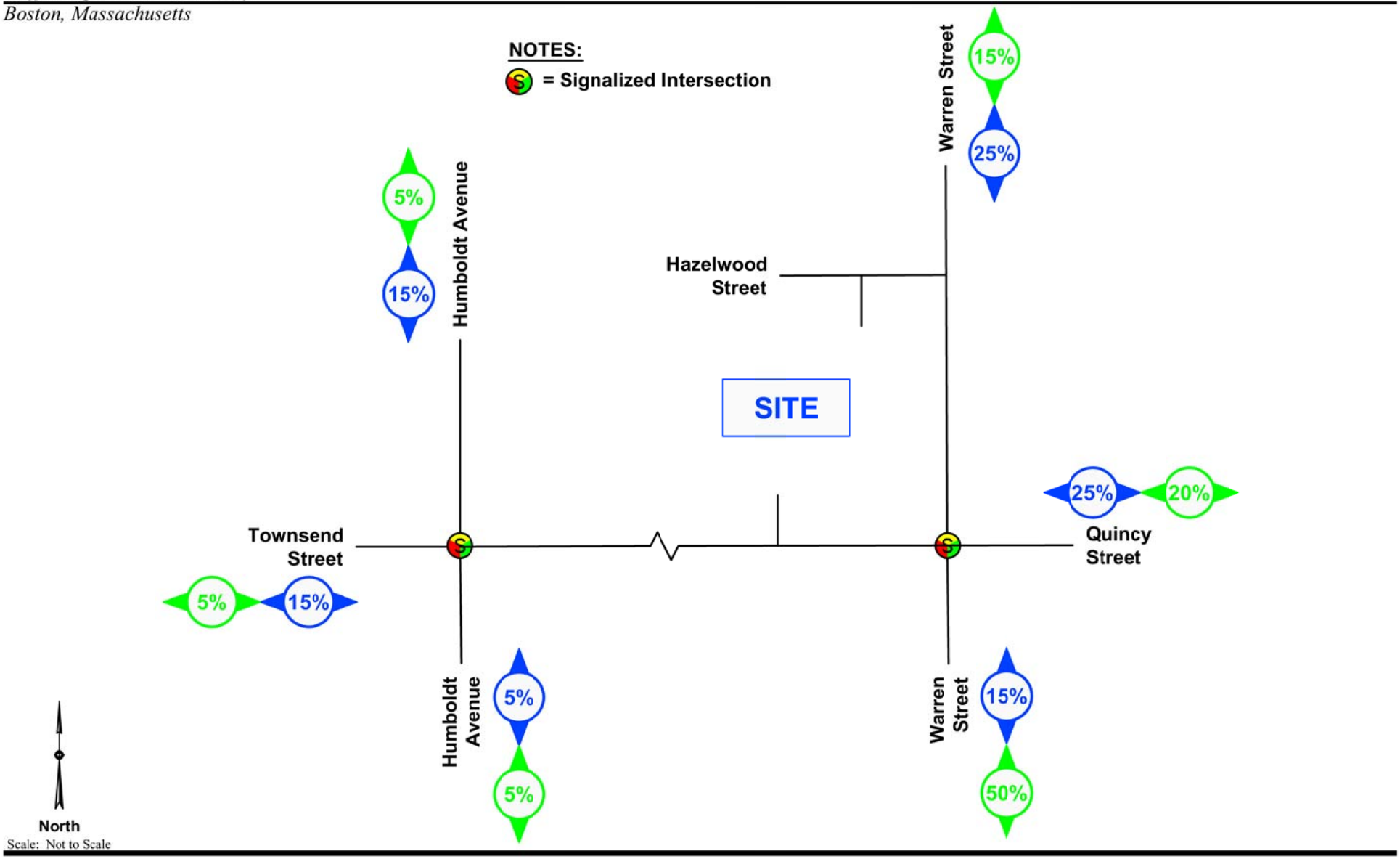

Figure 11

Trip Distribution Pattern

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KEY:
% = Staff Vehicle
% = Student Vehicle

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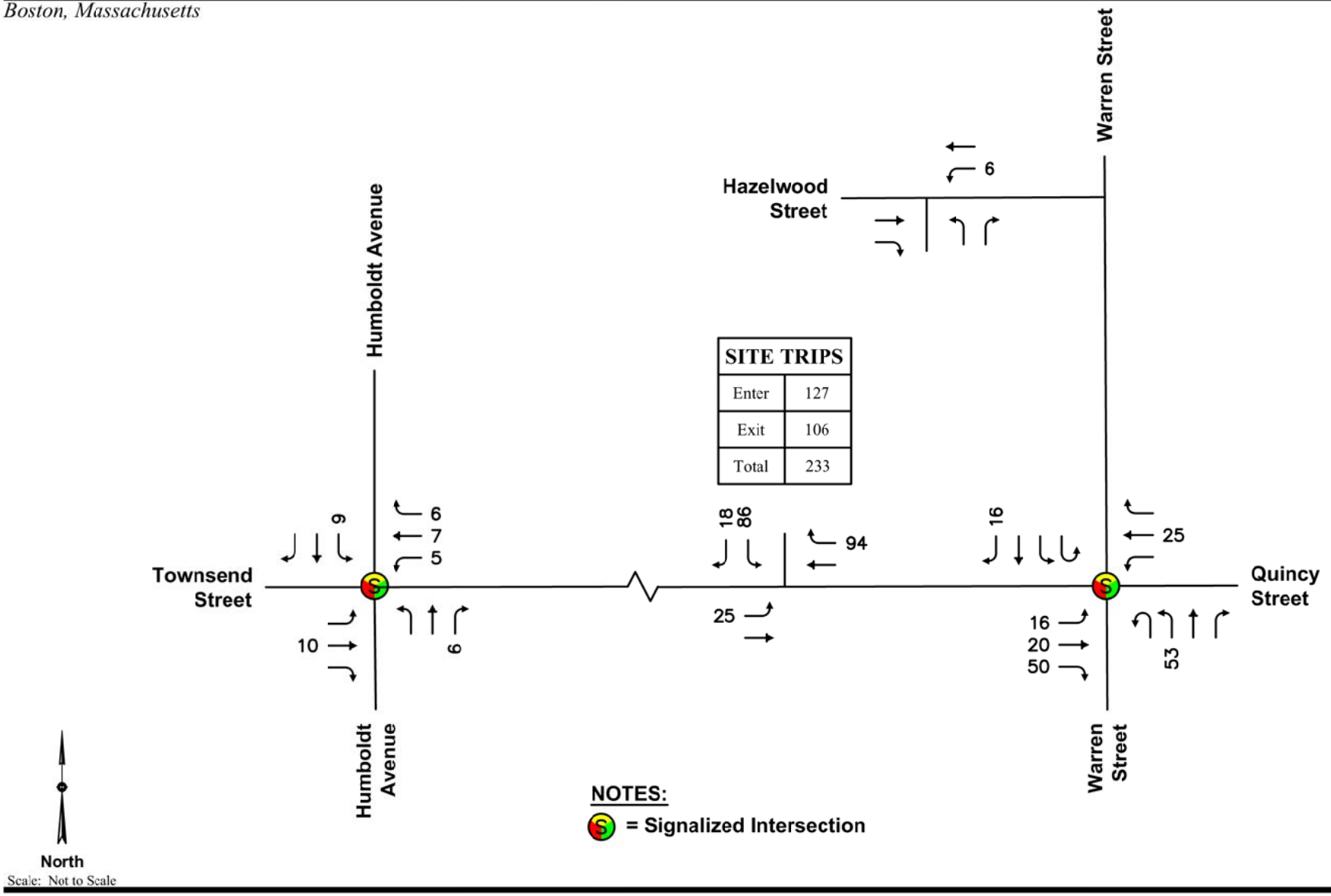

Figure 12

Site Generated Trips
Weekday Morning Peak Hour
(7:00 AM - 8:00 AM)

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Date: October 2015
Dwg No. 780 - TIAS.dwg

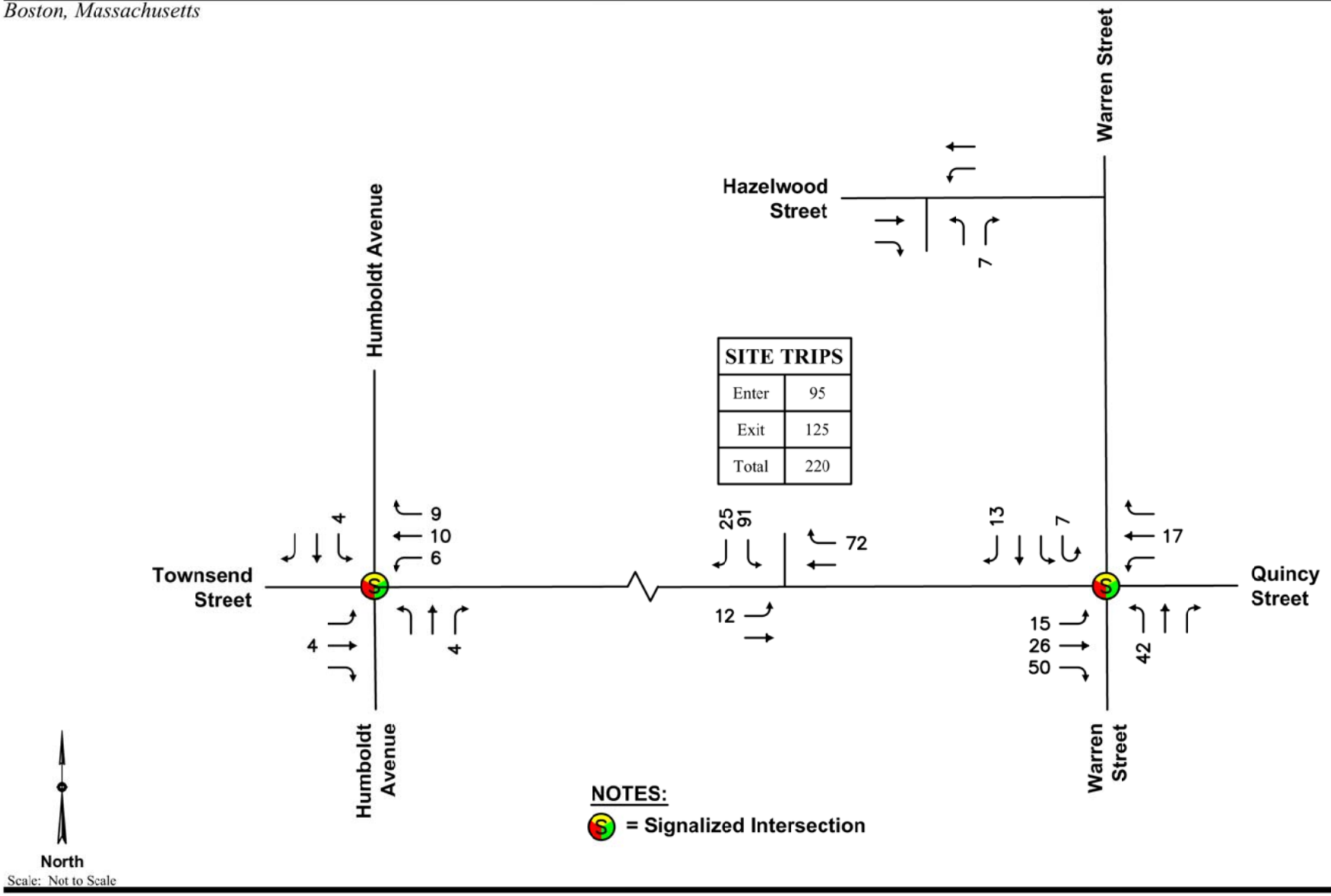

Figure 13

Site Generated Trips
Weekday Evening Peak Hour
(4:30 PM - 5:30 PM)

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Date: October 2015
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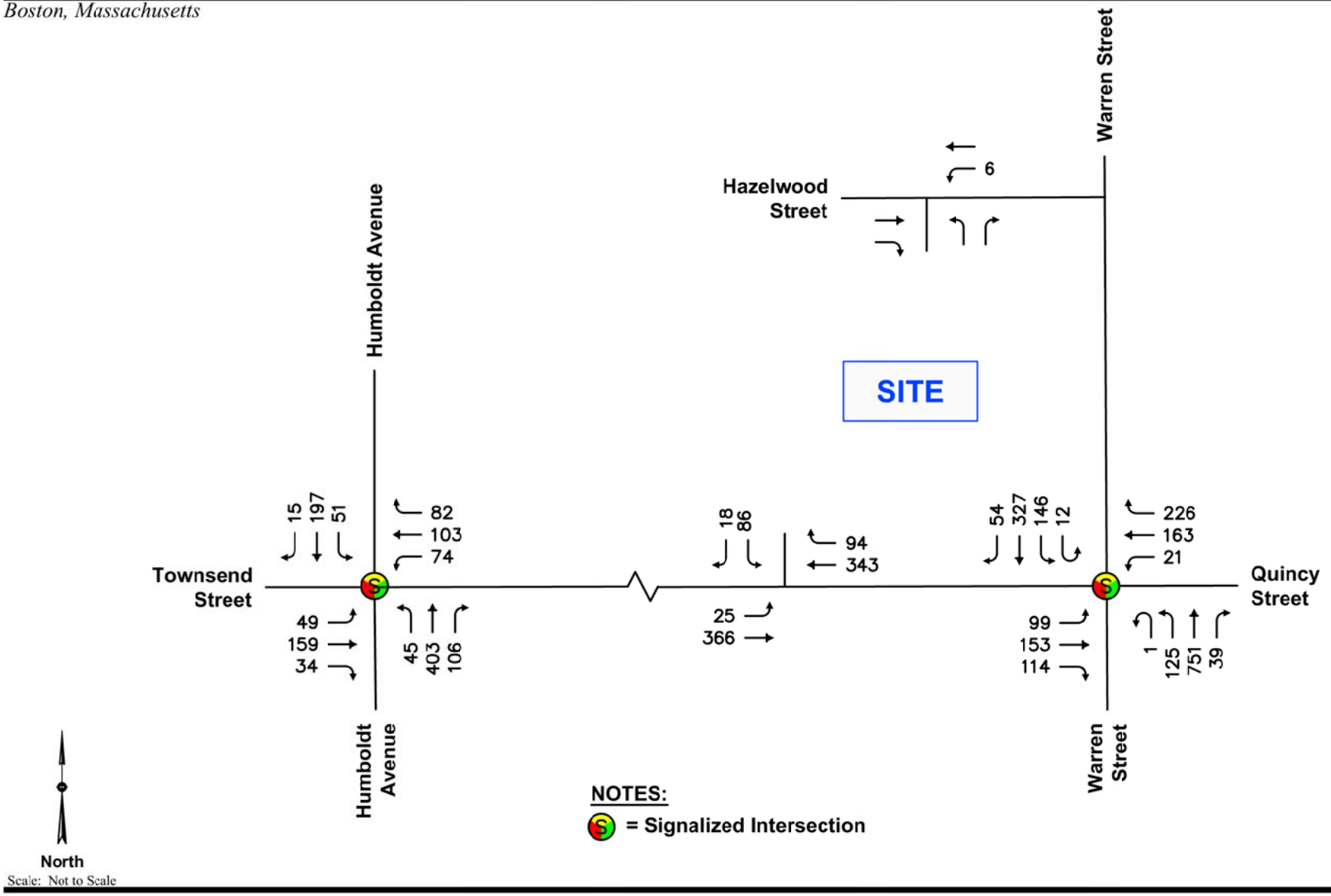

Figure 14

2020 Build Condition
Weekday Morning Peak Hour
Vehicle Volumes

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Date: October 2015
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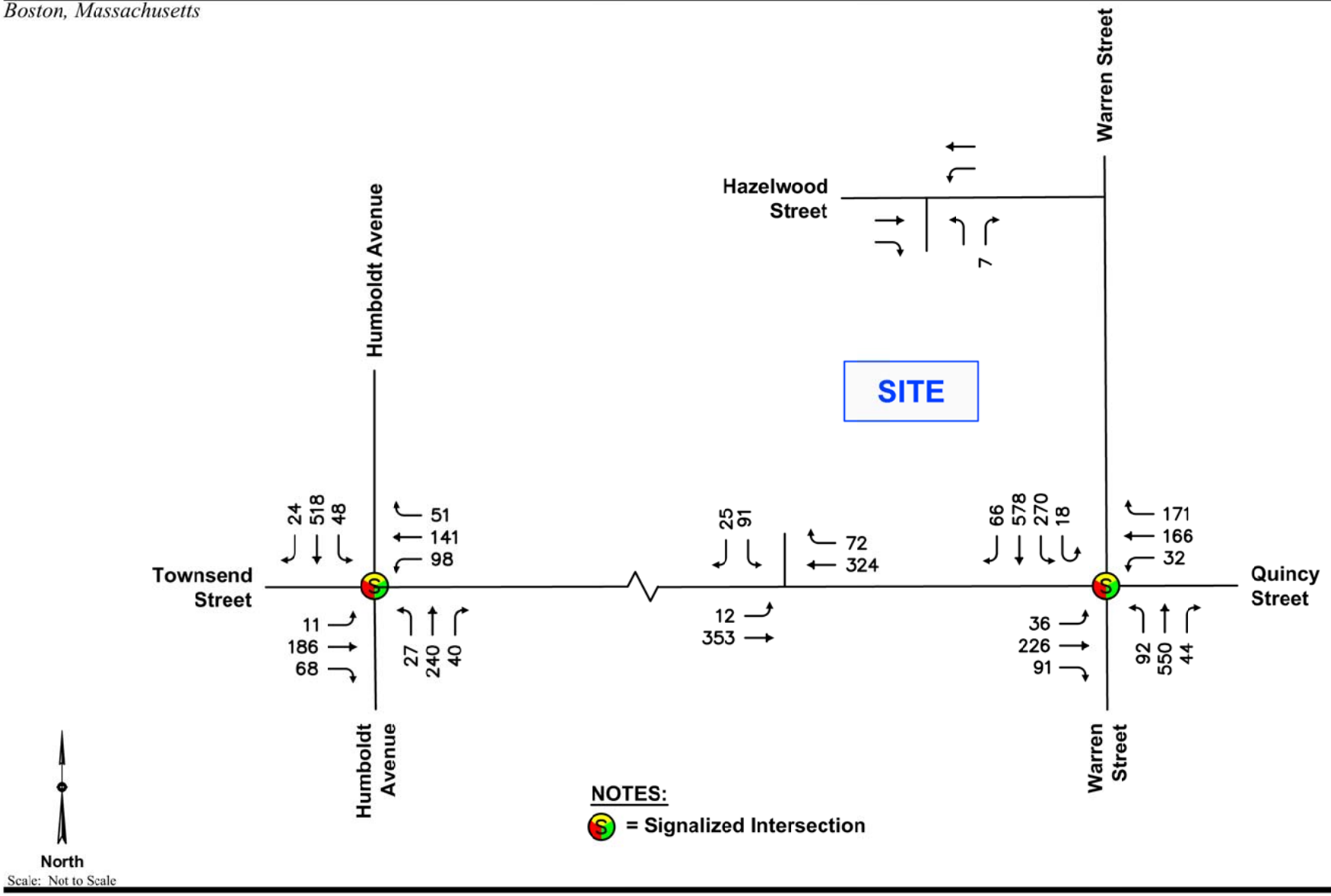

Figure 15

2020 Build Condition
Weekday Evening Peak Hour
Vehicle Volumes

MDM TRANSPORTATION CONSULTANTS, INC.
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Date: October 2015
Dwg No. 780 - TIAS.dwg

4.0 TRAFFIC OPERATIONS ANALYSIS

Intersection capacity analyses are presented in this section for the Existing, No-Build, and Build traffic-volume conditions. Capacity analyses, conducted in accordance with EEA/ITE guidelines, provide an index of how well the roadway facilities serve the traffic demands placed upon them.

4.1 CAPACITY ANALYSIS PROCEDURES

Capacity analysis of intersections is developed using the Synchro® computer software, which implements the methods of the 2010 Highway Capacity Manual (HCM). The resulting analysis presents a level-of-service (LOS) designation for individual intersection movements and (for signalized intersections) for the entire intersection. The LOS is a letter designation that provides a qualitative measure of operating conditions based on several factors including roadway geometry, speeds, ambient traffic volumes, traffic controls, and driver characteristics. Since the LOS of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of LOS, depending on the time of day, day of week, or period of year. A range of six levels of service are defined on the basis of average delay, ranging from LOS A (the least delay) to LOS F (delays greater than 50 seconds for unsignalized movements, and greater than 80 seconds for signalized movements).

The specific control delays and associated LOS designations are presented in the **Appendix**.

4.2 INTERSECTION CAPACITY ANALYSIS RESULTS

LOS analyses were conducted for 2015 Existing, 2020 No-Build, and 2020 Build conditions for the study intersections. The results of the intersection capacity analyses are summarized below.

4.2.1 Level of Service Analysis

Level-of-Service (LOS) analyses were conducted for the Existing, No-Build, and Build conditions for the study intersections. The results of the intersection capacity analyses for the signalized and unsignalized intersections are summarized below in **Table 2** and **Table 3** for the weekday morning and weekday evening peak hours, respectively. Detailed analysis results are presented in the **Appendix**.

TABLE 2
INTERSECTION CAPACITY ANALYSIS RESULTS
WEEKDAY MORNING PEAK HOUR

		2015 Existing			2020 No-Build			2020 Build		
Intersection	**Approach**	**v/c[1]**	**Delay[2]**	**LOS[3]**	**v/c**	**Delay**	**LOS**	**v/c**	**Delay**	**LOS**
Humboldt Avenue	Eastbound	0.94	>80	F	0.99	>80	F	>1.0	>80	F
at Townsend Street	Westbound	0.95	>80	F	>1.0	>80	F	>1.0	>80	F
	Northbound	0.45	7	A	0.46	7	A	0.47	7	A
	Southbound	0.25	6	A	0.25	6	A	0.27	6	A
	OVERALL	**0.95**	**34**	**C**	**>1.0**	**39**	**D**	**>1.0**	**49**	**D**
Warren Street	Eastbound	0.63	46	D	0.64	47	D	0.78	51	D
at Townsend Street/	Westbound	0.68	25	C	0.72	27	C	0.89	39	D
Quincy Street	Northbound	0.63	27	C	0.66	28	C	0.70	30	C
	Southbound	0.60	27	C	0.65	29	C	0.69	34	C
	OVERALL	**0.68**	**30**	**C**	**0.72**	**31**	**C**	**0.89**	**36**	**D**
Site Driveway at	Eastbound	n/a[4]	n/a	n/a	n/a	n/a	n/a	0.02	<5	A
Townsend Street	Southbound	n/a	n/a	n/a	n/a	n/a	n/a	0.31	20	C

[1]Volume-to-capacity ratio
[2]Average control delay per vehicle (in seconds)
[3]Level of service
[4]n/a = not applicable

TABLE 3
INTERSECTION CAPACITY ANALYSIS RESULTS
WEEKDAY EVENING PEAK HOUR

		2015 Existing			2020 No-Build			2020 Build		
Intersection	**Approach**	**v/c[1]**	**Delay[2]**	**LOS[3]**	**v/c**	**Delay**	**LOS**	**v/c**	**Delay**	**LOS**
Humboldt Avenue	Eastbound	0.78	53	D	0.82	56	E	0.83	58	E
at Townsend Street	Westbound	>1.0	>80	F	>1.0	>80	F	>1.0	>80	F
	Northbound	0.23	5	A	0.24	5	A	0.24	5	A
	Southbound	0.47	8	A	0.48	8	A	0.49	8	A
	OVERALL	**>1.0**	**49**	**D**	**>1.0**	**57**	**E**	**>1.0**	**70**	**E**
Warren Street	Eastbound	0.66	44	D	0.66	43	D	0.76	45	D
at Townsend Street/	Westbound	0.83	37	D	0.82	36	D	0.96	51	D
Quincy Street	Northbound	0.44	26	C	0.46	27	C	0.49	28	C
	Southbound	0.74	31	C	0.78	34	C	0.87	42	D
	OVERALL	**0.83**	**32**	**C**	**0.82**	**33**	**C**	**0.96**	**40**	**D**
Site Driveway at	Eastbound	n/a[4]	n/a	n/a	n/a	n/a	n/a	0.01	<5	A
Townsend Street	Southbound	n/a	n/a	n/a	n/a	n/a	n/a	0.31	18	C

[1]Volume-to-capacity ratio
[2]Average control delay per vehicle (in seconds)
[3]Level of service
[4] n/a = not applicable

As shown in **Table 2** and **Table 3:**

- *Humboldt Avenue at Townsend Street.* The signalized Humboldt Avenue at Townsend Street intersection will operate above capacity at overall LOS D or better operations under future No-Build and future Build conditions during the weekday morning peak hours. During weekday evening peak hours the intersection will operate above capacity and at LOS E or better for both future No-Build and future Build conditions. Field observations indicate signal timing optimization may reduce delays on Townsend Street.

- *Warren Street at Townsend Street*. The signalized Warren Street at Townsend Street intersection operates below capacity at overall LOS C or better operations under future No-Build conditions during the weekday morning and weekday evening peak hours. Under future Build conditions, the intersection will continue to operate below capacity and at overall LOS D or better operations during the peak hours.

- *Site Driveway at Townsend Street.* Under future Build conditions the Site Driveway at Townsend Street intersection will operate below capacity in all approaches. In the southbound approach the intersection will operate at LOS C or better for both weekday morning and weekday evening peak hours. In the eastbound approach the intersection will operate at LOS A for both weekday morning and weekday evening peak hours.

In summary, incremental traffic increases at the study intersections due to the proposed development generally result in inconsequential changes in intersection operations compared to No-Build conditions. Therefore, no additional roadway improvements are warranted to accommodate this re-development project.

4.2.2 Vehicle Queue Analysis

Vehicle queue results are presented for the signalized study intersections. These vehicle queues are compared to available storage lengths, which are defined as lengths of exclusive turn lanes or the distance to the nearest major intersection for through lanes. Vehicle queue results from the capacity analysis are summarized in **Tables 4** and **5**. Detailed worksheets of the queuing analysis are provided in the **Appendix**.

TABLE 4
VEHICLE QUEUE ANALYSIS SUMMARY
HUMBOLDT AVENUE AT TOWNSEND STREET

Approach	Storage Length (feet)	2015 Existing Average Queue Length[1]	2015 Existing 95th Percentile Queue Length[1]	2020 No-Build Average Queue Length	2020 No-Build 95th Percentile Queue Length	2020 Build Average Queue Length	2020 Build 95th Percentile Queue Length
Weekday Morning Peak Hour							
Eastbound T/R/L	<1000	153	296	161	313	184	335
Westbound T/R/L	950±	150	297	163	318	202	355
Northbound T/R/L	400±	135	189	140	197	142	199
Southbound T/R/L	675±	53	81	54	83	57	88
Weekday Evening Peak Hour							
Eastbound T/R/L	<1000	149	273	157	292	160	298
Westbound T/R/L	950±	210	372	227	390	262	430
Northbound T/R/L	400±	56	87	58	89	58	90
Southbound T/R/L	675	142	208	148	215	150	219

[1] Average and 95th percentile queue lengths are reported in feet per lane.

TABLE 5
VEHICLE QUEUE ANALYSIS SUMMARY
WARREN STREET AT TOWNSEND STREET

Approach	Storage Length (feet)	2015 Existing Average Queue Length[1]	2015 Existing 95th Percentile Queue Length[1]	2020 No-Build Average Queue Length	2020 No-Build 95th Percentile Queue Length	2020 Build Average Queue Length	2020 Build 95th Percentile Queue Length
Weekday Morning Peak Hour							
Eastbound L	100	50	97	51	100	61	129
Eastbound T/R	950±	105	172	110	179	148	243
Westbound T/L	>1000	96	158	101	167	119	237
Westbound R	200±	0	53	0	53	0	53
Northbound L	150±	25	54	26	55	49	87
Northbound T	550±	215	299	229	314	241	314
Northbound T/R	350±	215	299	229	314	241	314
Southbound U/L	530±	56	110	59	113	63	120
Southbound T/R	575±	177	287	193	309	214	324
Weekday Evening Peak Hour							
Eastbound L	100	11	30	12	31	19	47
Eastbound T/R	950±	139	201	143	208	183	273
Westbound T/L	>1000	112	176	115	183	127	250
Westbound R	200±	0	39	0	40	0	40
Northbound L	150±	17	44	18	44	37	72
Northbound T	550±	166	250	176	258	187	258
Northbound T/R	350±	166	250	176	258	187	258
Southbound U/L	530±	111	207	118	226	132	264
Southbound T/R	575±	397	754	463	784	555	836

[1] Average and 95th percentile queue lengths are reported in feet per lane.

As presented in **Table 4** and **Table 5,** average and 95th percentile vehicle queues at the signalized study intersection are generally contained within available storage area during weekday morning and weekday evening peak hours. The notable exception involves the Warren Street southbound vehicle queue which currently extends through the Martin Luther King Boulevard during the height of the weekday evening peak hour. The proposed charter school is expected to have nominal impact on vehicle queuing at the intersection with average queue length increases of 3 additional vehicle or less during peak hours anticipated.

4.3 SITE ACCESS AND CIRCULATION

Parking and Drop-off/Pick-up Area

The proposed site plan (**Figure 2**) provides for approximately 49 off-street parking spaces and a dedicated off-street school bus and parent pick-up/drop-off area in order to reduce the impact to adjacent street traffic flow. This area accommodates approximately eleven school buses and concurrent loading/unloading of passenger cars. It is expected that the school bus drop-off area will also be made available to parent traffic when bus traffic has cleared the area. In addition, select spaces within the school's Hazelwood Street parking lot will be designated for short-term parking for parents requiring additional time to load or unload. BBCS will review operations annually and will modify the parent drop-off/pick-up process and school policies as necessary, including instituting a vehicle-student identification system and pick-up time restrictions, should parent-vehicle volumes change significantly over time. Accommodations for drop-off and pick-up activity are illustrated in Exhibits 1 through 3 and are provided in the **Appendix**.

AutoTURN Analysis

An AutoTurn® analysis for a standard school bus is provided in the **Appendix** and simulates the vehicle's travel path through the site. As shown, school buses have sufficient paved area to enter the site, travel through the dedicated drop-off/pick-up area and to exit the site.

Recommendations

MDM recommends that BBCS adopt a Traffic Management Plan (TMP) aimed at enhancing school pick-up/drop off operations, parking activity and site circulation including the elements noted in the following section. Site access and circulation improvements as outlined in section *5.0 Recommendations and Conclusions* have been incorporated into the preliminary site plan to facilitate safe and efficient pedestrian and vehicle operations at the site.

5.0 RECOMMENDATIONS AND CONCLUSIONS

Recommendations that support the proposed development are identified that minimize/offset project-related traffic impacts and address access needs for the Site. Recommendations include (a) access-related/pedestrian improvements, and (b) a comprehensive TMP plan.

5.1 RECOMMENDATIONS

MDM recommends access-related improvements aimed at enhancing traffic operations and/or travel safety including the following:

- Driveway alignment, widths and curb radii should be designed to achieve (a) approximate perpendicular orientation with Townsend Street; (b) total minimum width of 24 feet; and (c) minimum 15 foot curb radii or as required depending on final driveway width to accommodate standard school bus turning requirements.

- Sidewalks and ADA compliant ramps are recommended to connect the site and adjacent sidewalk system to accommodate and promote pedestrian activity. The site plan envisions a system of sidewalks connections to the parking areas, building entranceways and existing sidewalk system along Townsend Street and Warren Street.

- A STOP sign (R1-1) and STOP line pavement marking are recommended on the western driveway approach to Townsend Street. The signs and pavement markings shall be compliant with the Manual on Uniform Traffic Control Devices (MUTCD).

- New plantings (e.g., shrubs, bushes) and structures (e.g., walls, fences, signs) should be maintained at a height of 24-inches or less within the sight triangles in vicinity of the Site driveway intersections with Townsend Street.

- Consider relocating and/or providing supplemental School Zone signage along Townsend Street and Warren Street in consultation with BTD.

- Submit a request to the Boston Police Department District B-2 Community Service Division for a Crossing Guard to assist students crossing the Warren Street/Townsend Street/Quincy Street intersection.

MDM recommends a Traffic Management Program (TMP) to ensure efficient operations of school pick-up/drop-off, parking activity and student circulation. Key aspects of the TMP should include the following:

- *Parking and Pick-Up/Drop-Off Operations*

    - The parent pick-up/drop-off area should be actively monitored by staff to direct parents to open spaces in the pick-up/drop-off line and to discourage vehicles from stopping in undesignated areas on-site and along Hazelwood Street. It is recommended that parents not be allowed to exit their vehicles while in the active drop-off/ pick-up line.

    - Staff members should be available to direct students to/from the school building entrances and the drop-off/pick-up areas as required.

    - Passenger vehicle processing time should be enhanced by concurrent loading/unloading of students as needed.

    - School bus pick-up/drop-off should take place within the dedicated bus loading and unloading area.

    - Pedestrian crossings at the adjacent Warren Street/Townsend Street/Quincy Street intersection should be monitored by a crossing guard during student arrival and dismissal periods.

    - Deliveries and trash removal should take place outside of school arrival and dismissal periods.

- *Designated Parking Areas*

    - Mark and designate short-term/visitor parking spaces in the school's Hazelwood Street parking lot as required.

    - All parking spaces should be actively managed to avoid conflicts during peak drop-off/pick-up periods.

- *Transportation Demand Management Measures*

    - Designate a Transportation Coordinator to oversee transportation issues, to provide up-to-date transit information to faculty and students, to direct staff responsible for managing student drop-off/pick-up operations and, if necessary, to adjust the school's transportation policies and procedures.

    - Coordinate with the Boston Public Schools (BPS) to ensure no overlap between scheduled BLA and BBCS bus traffic.

    - Schedule BBCS special events around BLA events in order to limit traffic congestion within the Townsend Street/Hazelwood Street neighborhood.

    - Provide on-site accommodations for bicyclists (e.g., storage racks, shower facilities, etc.) to encourage bicycle use by students and staff.

5.2 CONCLUSIONS

The proposed charter school development is expected to have nominal impact on the operation of study area intersections. Proposed access/egress and pedestrian improvements will provide ample capacity to accommodate site-generated trips while also enhancing safety and capacity in the study area. In addition, proposed access/egress along Townsend Street is expected to be designed to accommodate the largest anticipated design vehicle and to ensure that adequate sight lines are provided in accordance with AASHTO criteria based on ambient travel speeds. The adoption of a comprehensive Traffic Management Program (TMP) is recommended to ensure efficient operations of school pick-up/drop-off, parking activity, and student circulation.

It is recommended that BBCS consult with the City of Boston Transportation Department to relocated and/or supplement the School Zone signs along Townsend Street and Warren Street. BBCS should also consult with the City of Boston Police Department relative to scheduling a crossing guard at the Warren Street/Townsend Street/Quincy Street intersection during morning arrival and evening dismissal periods.

Appendices

- Traffic Volume Data
- Seasonal Data
- Public Transportation Information
- BTD Traffic Signal Plans
- Background Growth
- Trip Generation/Distribution Calculations
- Intersection Capacity Analyses
- Drop-off/Pick-up Plan Exhibit 1, 2 & 3
- AutoTURN® Analyses

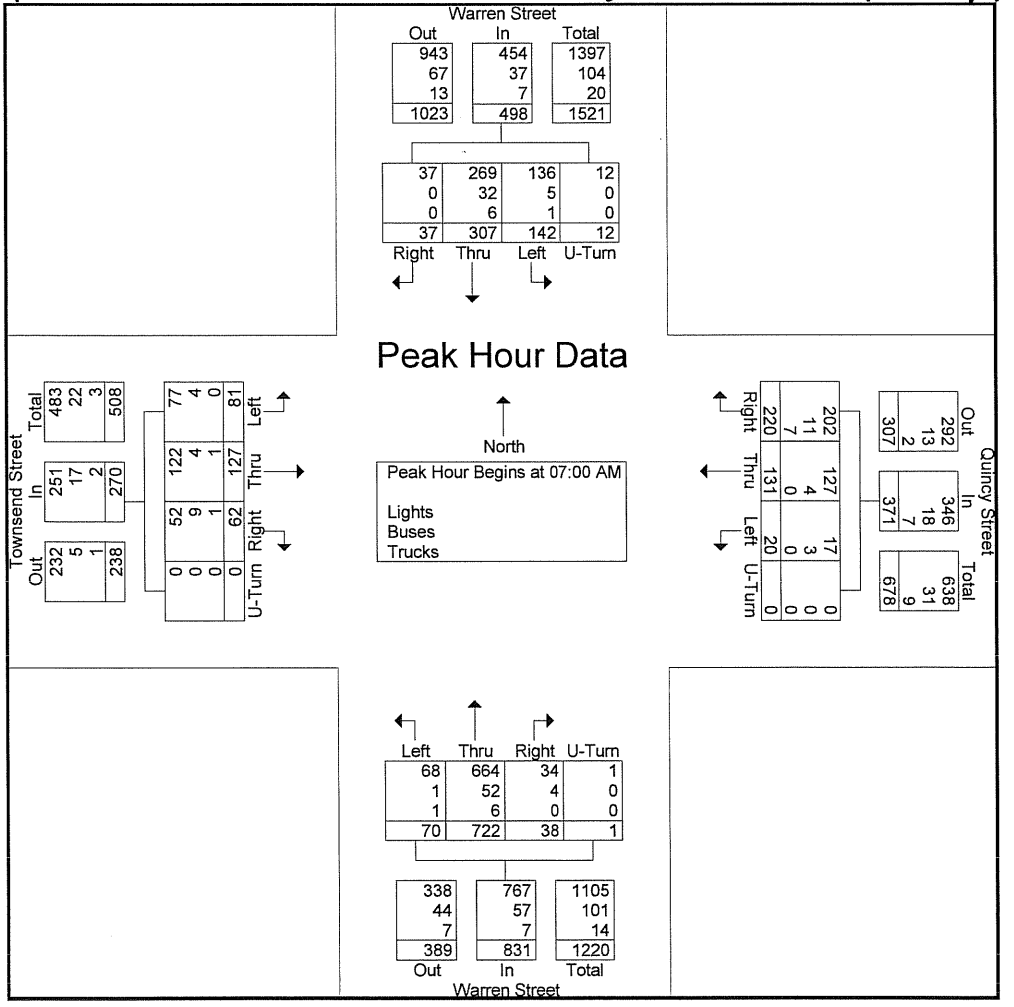
□ Traffic Volume Data

MDM Transportation Consultants, Inc.

28 Lord Road, Suite 280
Marlborough, MA

File Name : 780_Boston_(Bridge_Boston)_258375_09-17-2015 (2)
Site Code : 780
Start Date : 9/17/2015
Page No : 3

	Warren Street From North					Quincy Street From East					Warren Street From South					Townsend Street From West					
Start Time	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 06:30 AM to 12:30 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	**22**	69	34	4	129	**61**	**41**	4	0	**106**	11	147	**39**	0	197	20	**35**	**32**	0	**87**	**519**
07:15 AM	7	**91**	34	**6**	**138**	43	31	**6**	0	80	**13**	151	11	**1**	176	**24**	29	24	0	77	471
07:30 AM	3	71	**39**	1	114	57	26	5	0	88	9	**219**	9	0	**237**	10	33	18	0	61	500
07:45 AM	5	76	35	1	117	59	33	5	0	97	5	205	11	0	221	8	30	7	0	45	480
Total Volume	37	307	142	12	498	220	131	20	0	371	38	722	70	1	831	62	127	81	0	270	1970
% App. Total	7.4	61.6	28.5	2.4		59.3	35.3	5.4	0		4.6	86.9	8.4	0.1		23	47	30	0		
PHF	.420	.843	.910	.500	.902	.902	.799	.833	.000	.875	.731	.824	.449	.250	.877	.646	.907	.633	.000	.776	.949
Lights	37	269	136	12	454	202	127	17	0	346	34	664	68	1	767	52	122	77	0	251	1818
% Lights	100	87.6	95.8	100	91.2	91.8	96.9	85.0	0	93.3	89.5	92.0	97.1	100	92.3	83.9	96.1	95.1	0	93.0	92.3
Buses	0	32	5	0	37	11	4	3	0	18	4	52	1	0	57	9	4	4	0	17	129
% Buses	0	10.4	3.5	0	7.4	5.0	3.1	15.0	0	4.9	10.5	7.2	1.4	0	6.9	14.5	3.1	4.9	0	6.3	6.5
Trucks	0	6	1	0	7	7	0	0	0	7	0	6	1	0	7	1	1	0	0	2	23
% Trucks	0	2.0	0.7	0	1.4	3.2	0	0	0	1.9	0	0.8	1.4	0	0.8	1.6	0.8	0	0	0.7	1.2
% HV	0	12.4	4.2	0		8.2	3.1	15	0		10.5	8	2.8	0		16.1	3.9	4.9	0		



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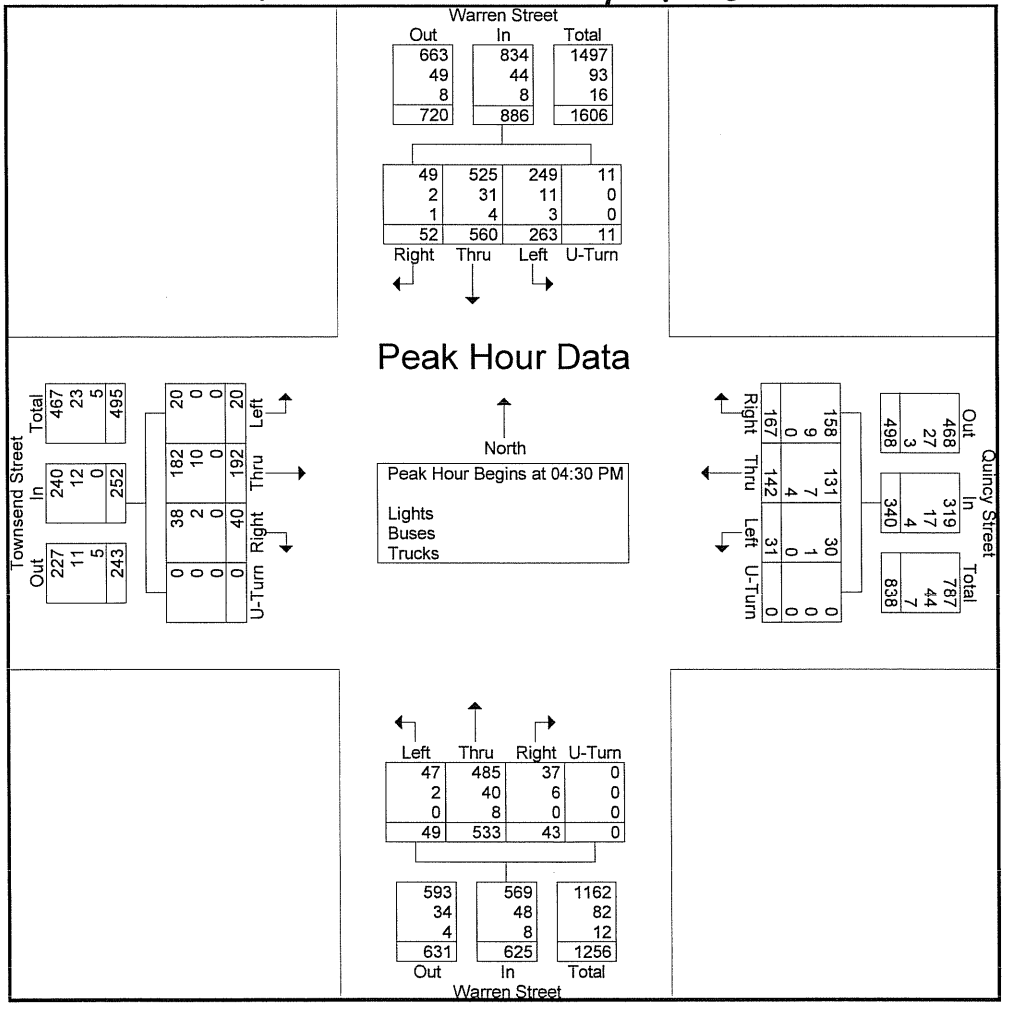
28 Lord Road, Suite 280
Marlborough, MA

File Name : 780_Boston_(Bridge_Boston)_258375_09-17-2015 (2)
Site Code : 780
Start Date : 9/17/2015
Page No : 4

Start Time	Warren Street From North					Quincy Street From East					Warren Street From South					Townsend Street From West					
	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Right	Thru	Left	U-Turn	App. Total	Int. Total
Peak Hour Analysis From 04:30 PM to 05:15 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 PM																					
04:30 PM	16	125	**78**	**4**	223	36	**41**	7	0	84	11	**153**	15	0	**179**	10	47	5	0	62	**548**
04:45 PM	**17**	131	68	3	219	39	32	4	0	75	**12**	123	8	0	143	**12**	41	5	0	58	495
05:00 PM	8	148	57	2	215	**51**	36	**13**	0	**100**	9	131	10	0	150	7	**57**	**6**	0	**70**	535
05:15 PM	11	**156**	60	2	**229**	41	33	7	0	81	11	126	**16**	0	153	11	47	4	0	62	525
Total Volume	52	560	263	11	886	167	142	31	0	340	43	533	49	0	625	40	192	20	0	252	2103
% App. Total	5.9	63.2	29.7	1.2		49.1	41.8	9.1	0		6.9	85.3	7.8	0		15.9	76.2	7.9	0		
PHF	.765	.897	.843	.688	.967	.819	.866	.596	.000	.850	.896	.871	.766	.000	.873	.833	.842	.833	.000	.900	.959
Lights	49	525	249	11	834	158	131	30	0	319	37	485	47	0	569	38	182	20	0	240	1962
% Lights	94.2	93.8	94.7	100	94.1	94.6	92.3	96.8	0	93.8	86.0	91.0	95.9	0	91.0	95.0	94.8	100	0	95.2	93.3
Buses	2	31	11	0	44	9	7	1	0	17	6	40	2	0	48	2	10	0	0	12	121
% Buses	3.8	5.5	4.2	0	5.0	5.4	4.9	3.2	0	5.0	14.0	7.5	4.1	0	7.7	5.0	5.2	0	0	4.8	5.8
Trucks	1	4	3	0	8	0	4	0	0	4	0	8	0	0	8	0	0	0	0	0	20
% Trucks	1.9	0.7	1.1	0	0.9	0	2.8	0	0	1.2	0	1.5	0	0	1.3	0	0	0	0	0	1.0
% HV	5.7	6.2	5.3	0		5.4	7.7	3.2	0		14	9	4.1	0		5	5.2	0	0		



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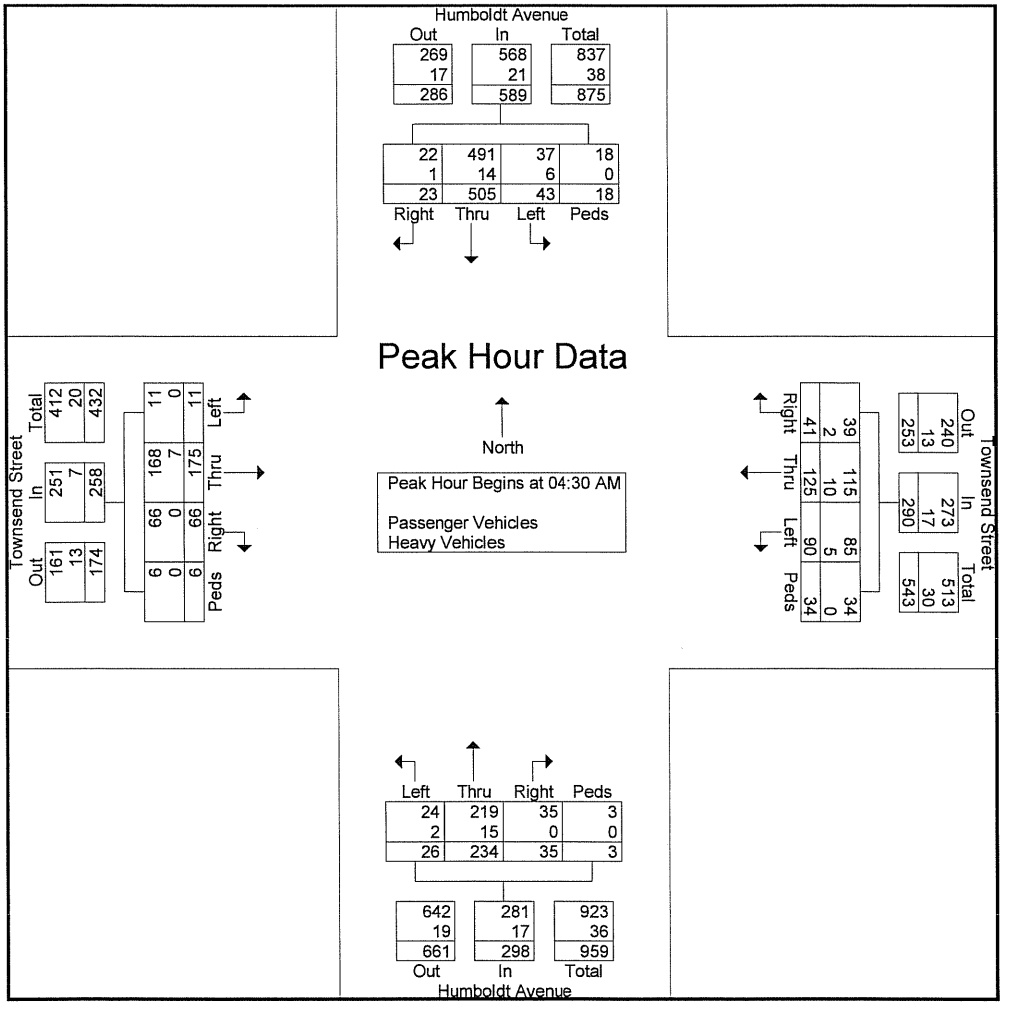
28 Lord Road, Suite 280
Marlborough, MA

N/S: Humboldt Avenue
E/W: Townsend Street
Boston, MA

File Name : 780 humboldt at townsend 430-530 pm
Site Code : 780
Start Date : 9/17/2015
Page No : 2

	Humboldt Avenue From North					Townsend Street From East					Humboldt Avenue From South					Townsend Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 04:30 AM to 05:15 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 04:30 AM																					
04:30 AM	6	**139**	9	1	155	7	**38**	22	8	**75**	**10**	55	**8**	0	73	**20**	39	**4**	**3**	66	369
04:45 AM	**9**	111	**13**	1	134	**16**	31	23	3	73	10	56	7	1	74	10	43	2	1	56	337
05:00 AM	6	121	12	4	143	7	26	**24**	**12**	69	7	56	5	**2**	70	18	**49**	4	0	**71**	353
05:15 AM	2	134	9	**12**	**157**	11	30	21	11	73	8	**67**	6	0	**81**	18	44	1	2	65	**376**
Total Volume	23	505	43	18	589	41	125	90	34	290	35	234	26	3	298	66	175	11	6	258	1435
% App. Total	3.9	85.7	7.3	3.1		14.1	43.1	31	11.7		11.7	78.5	8.7	1		25.6	67.8	4.3	2.3		
PHF	.639	.908	.827	.375	.938	.641	.822	.938	.708	.967	.875	.873	.813	.375	.920	.825	.893	.688	.500	.908	.954
Passenger Vehicles	22	491	37	18	568	39	115	85	34	273	35	219	24	3	281	66	168	11	6	251	1373
% Passenger Vehicles																					
Heavy Vehicles	1	14	6	0	21	2	10	5	0	17	0	15	2	0	17	0	7	0	0	7	62
% Heavy Vehicles	4.3	2.8	14.0	0	3.6	4.9	8.0	5.6	0	5.9	0	6.4	7.7	0	5.7	0	4.0	0	0	2.7	4.3



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28 Lord Road, Suite 280
Marlborough, MA

N/S: Humboldt Avenue
E/W: Townsend Street
Boston, MA

File Name : 780 humboldt at townsend 430-530 pm
Site Code : 780
Start Date : 9/17/2015
Page No : 1

Groups Printed- Passenger Vehicles - Heavy Vehicles

	Humboldt Avenue From North					Townsend Street From East					Humboldt Avenue From South					Townsend Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
04:30 AM	6	139	9	1	155	7	38	22	8	75	10	55	8	0	73	20	39	4	3	66	369
04:45 AM	9	111	13	1	134	16	31	23	3	73	10	56	7	1	74	10	43	2	1	56	337
Total	15	250	22	2	289	23	69	45	11	148	20	111	15	1	147	30	82	6	4	122	706
05:00 AM	6	121	12	4	143	7	26	24	12	69	7	56	5	2	70	18	49	4	0	71	353
05:15 AM	2	134	9	12	157	11	30	21	11	73	8	67	6	0	81	18	44	1	2	65	376
Grand Total	23	505	43	18	589	41	125	90	34	290	35	234	26	3	298	66	175	11	6	258	1435
Apprch %	3.9	85.7	7.3	3.1		14.1	43.1	31	11.7		11.7	78.5	8.7	1		25.6	67.8	4.3	2.3		
Total %	1.6	35.2	3	1.3	41	2.9	8.7	6.3	2.4	20.2	2.4	16.3	1.8	0.2	20.8	4.6	12.2	0.8	0.4	18	
Passenger Vehicles	22	491	37	18	568	39	115	85	34	273	35	219	24	3	281	66	168	11	6	251	1373
% Passenger Vehicles																					
Heavy Vehicles	1	14	6	0	21	2	10	5	0	17	0	15	2	0	17	0	7	0	0	7	62
% Heavy Vehicles	4.3	2.8	14	0	3.6	4.9	8	5.6	0	5.9	0	6.4	7.7	0	5.7	0	4	0	0	2.7	4.3

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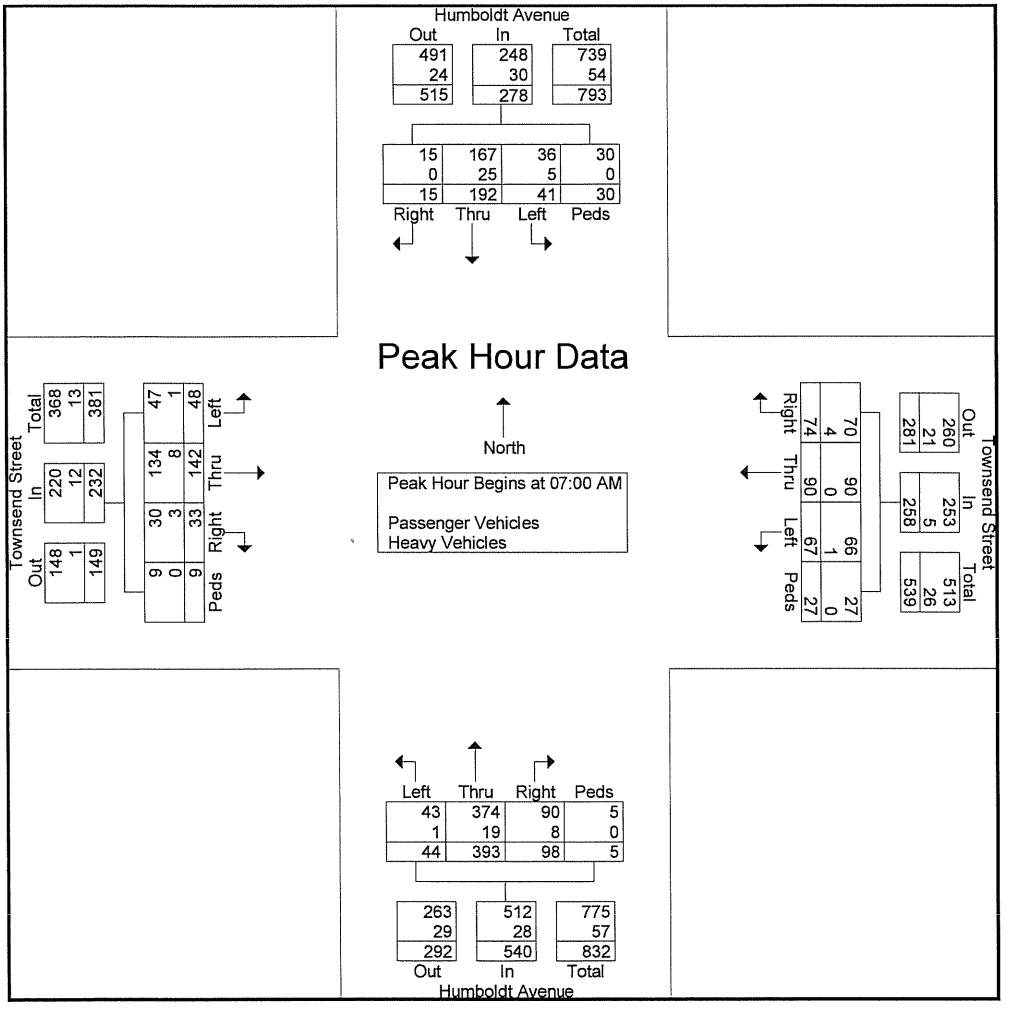
28 Lord Road, Suite 280
Marlborough, MA

N/S: Humboldt Avenue
E/W: Townsend Street
Boston, MA

File Name : 780 humboldt at townsend 7-8 am
Site Code : 780
Start Date : 9/17/2015

	Humboldt Avenue From North					Townsend Street From East					Humboldt Avenue From South					Townsend Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
Peak Hour Analysis From 07:00 AM to 07:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 07:00 AM																					
07:00 AM	**8**	53	**26**	6	**93**	**32**	19	21	6	**78**	**41**	70	10	**2**	123	10	**41**	10	2	**63**	357
07:15 AM	3	**59**	6	**19**	87	22	**24**	**22**	7	75	27	**113**	**14**	1	**155**	3	30	**20**	2	55	**372**
07:30 AM	2	38	3	3	46	8	23	8	**8**	47	22	111	11	1	145	**12**	37	11	0	60	298
07:45 AM	2	42	6	2	52	12	24	16	6	58	8	99	9	1	117	8	34	7	**5**	54	281
Total Volume	15	192	41	30	278	74	90	67	27	258	98	393	44	5	540	33	142	48	9	232	1308
% App. Total	5.4	69.1	14.7	10.8		28.7	34.9	26	10.5		18.1	72.8	8.1	0.9		14.2	61.2	20.7	3.9		
PHF	.469	.814	.394	.395	.747	.578	.938	.761	.844	.827	.598	.869	.786	.625	.871	.688	.866	.600	.450	.921	.879
Passenger Vehicles	15	167	36	30	248	70	90	66	27	253	90	374	43	5	512	30	134	47	9	220	1233
% Passenger Vehicles																					
Heavy Vehicles	0	25	5	0	30	4	0	1	0	5	8	19	1	0	28	3	8	1	0	12	75
% Heavy Vehicles	0	13.0	12.2	0	10.8	5.4	0	1.5	0	1.9	8.2	4.8	2.3	0	5.2	9.1	5.6	2.1	0	5.2	5.7



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28 Lord Road, Suite 280
Marlborough, MA

N/S: Humboldt Avenue
E/W: Townsend Street
Boston, MA

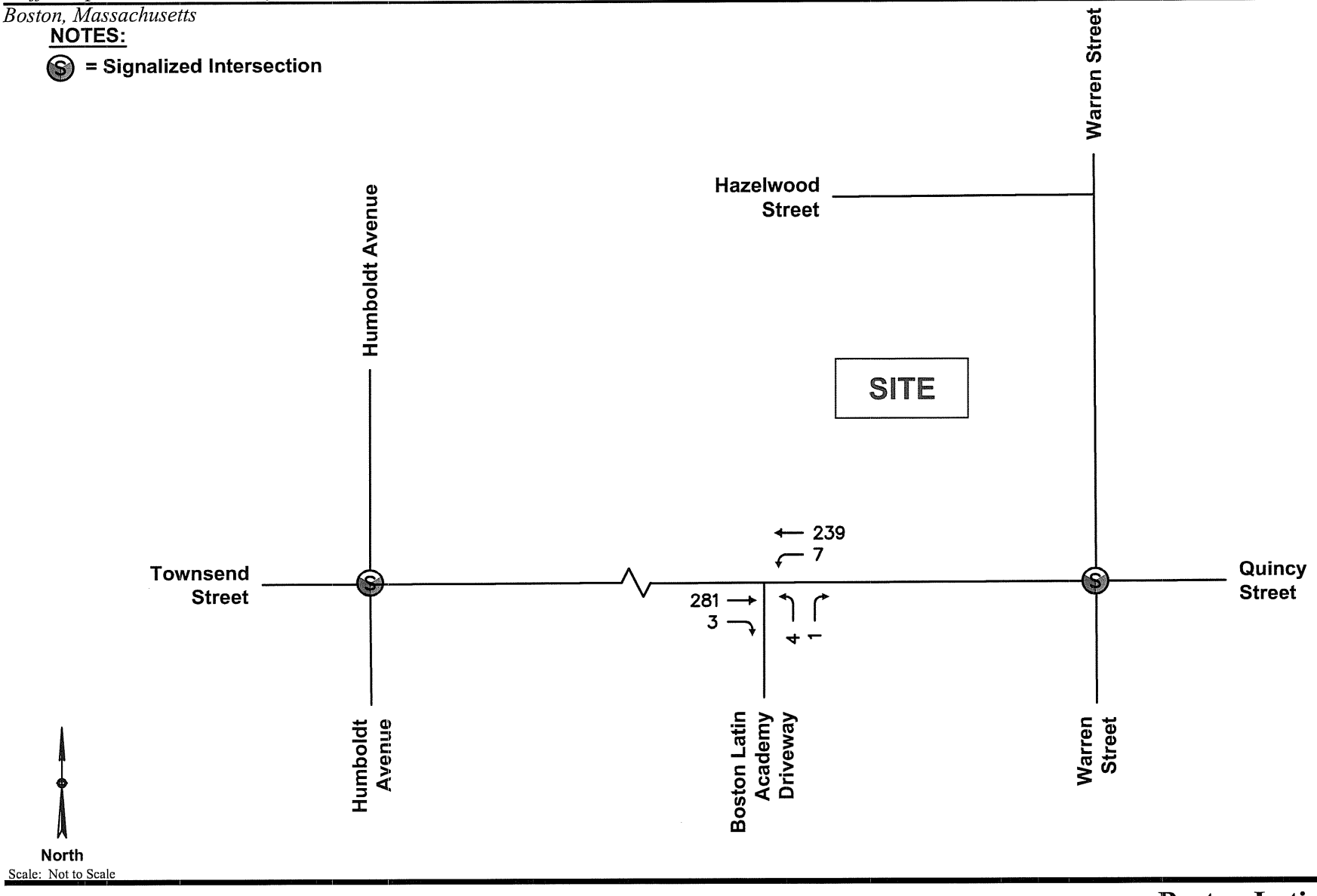
File Name : 780 humboldt at townsend 7-8 am
Site Code : 780
Start Date : 9/17/2015
Page No : 1

Groups Printed- Passenger Vehicles - Heavy Vehicles

	Humboldt Avenue From North					Townsend Street From East					Humboldt Avenue From South					Townsend Street From West					
Start Time	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Int. Total
07:00 AM	8	53	26	6	93	32	19	21	6	78	41	70	10	2	123	10	41	10	2	63	357
07:15 AM	3	59	6	19	87	22	24	22	7	75	27	113	14	1	155	3	30	20	2	55	372
07:30 AM	2	38	3	3	46	8	23	8	8	47	22	111	11	1	145	12	37	11	0	60	298
07:45 AM	2	42	6	2	52	12	24	16	6	58	8	99	9	1	117	8	34	7	5	54	281
Total	15	192	41	30	278	74	90	67	27	258	98	393	44	5	540	33	142	48	9	232	1308
Grand Total	15	192	41	30	278	74	90	67	27	258	98	393	44	5	540	33	142	48	9	232	1308
Apprch %	5.4	69.1	14.7	10.8		28.7	34.9	26	10.5		18.1	72.8	8.1	0.9		14.2	61.2	20.7	3.9		
Total %	1.1	14.7	3.1	2.3	21.3	5.7	6.9	5.1	2.1	19.7	7.5	30	3.4	0.4	41.3	2.5	10.9	3.7	0.7	17.7	
Passenger Vehicles	15	167	36	30	248	70	90	66	27	253	90	374	43	5	512	30	134	47	9	220	1233
% Passenger Vehicles																					
Heavy Vehicles	0	25	5	0	30	4	0	1	0	5	8	19	1	0	28	3	8	1	0	12	75
% Heavy Vehicles	0	13	12.2	0	10.8	5.4	0	1.5	0	1.9	8.2	4.8	2.3	0	5.2	9.1	5.6	2.1	0	5.2	5.7

NOTES:

Ⓢ = Signalized Intersection



Scale: Not to Scale

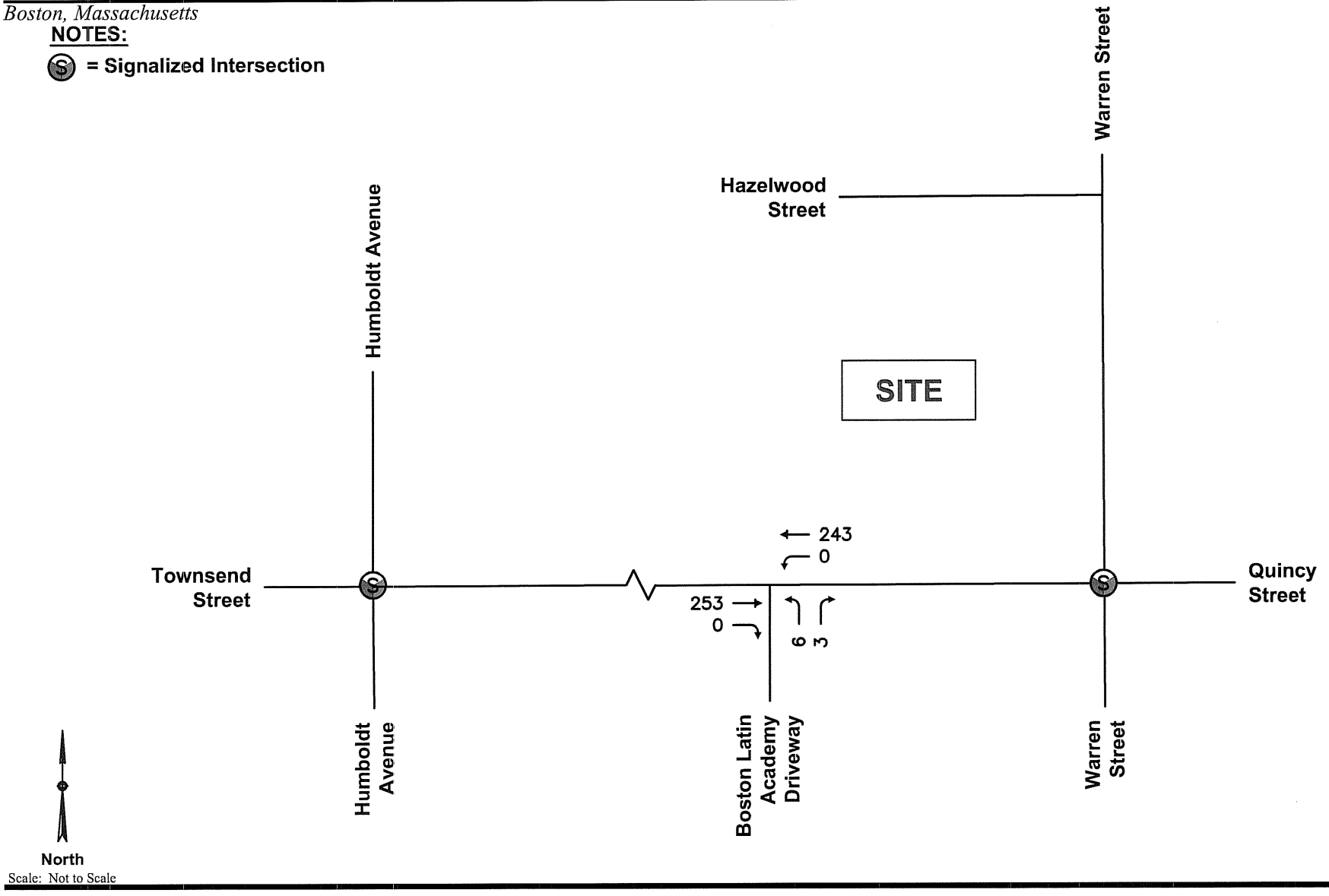
MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Boston Latin Academy
2015 Existing Baseline Conditions
Weekday Morning Peak Hour
Vehicle Volumes

Date: October 2015
Dwg No. 780 - TIAS.dwg

NOTES:

Ⓢ = Signalized Intersection



MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers

Boston Latin Academy
2015 Existing Baseline Conditions
Weekday Evening Peak Hour
Vehicle Volumes

Date: October 2015
Dwg No. 780 - TIAS.dwg

□ Seasonal Data

SECTION I - CONTINUOUS COUNTING STATION MONTHLY AVERAGE DAILY TRAFFIC

STATION 691 - QUINCY - RTE.I-93 - NORTH OF RTE.28

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	September Adjustment to Year
09	173,000	175,000	177,697	194,334	196,834	199,477	196,208	194,125	190,885	186,291	176,509	174,000	186,197	0.98
	-2%	0%	4%	-1%	-1%	0%	-1%	-1%	0%	1%	3%	4%	1%	
11	167,126	175,019	190,197	192,089	194,127	197,487	194,151	190,914	192,702	189,561	186,958	*187,438*	188,147	0.98
	1%	5%	0%	1%	0%	-1%	-1%	2%	-1%	-2%	0%	-3%	0%	
12	169,602	184,324	189,819	193,864	194,599	195,224	191,887	195,288	190,420	185,580	186,167	*182,504*	188,273	0.99
	6%	-3%	-3%	-3%	-1%	0%	0%	1%	1%	2%	-1%	-3%	0%	
13	179,376	178,566	184,676	188,415	192,495	194,852	191,244	*197,178*	192,661	189,852	184,753	177,157	187,602	0.97
												Growth	0.08%	0.98

STATION 703 - ABINGTON - RTE.123 - AT THE BROCKTON C.L.

YR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR	
05	11,765	13,137	13,345	13,910	13,694	14,536	13,543	13,701	13,854	13,505	13,683	*13,585*	13,522	0.98
	7%	-1%	3%	-1%	1%	-2%	-5%	-3%	-1%	2%	0%	1%	0%	
06	12,635	13,053	13,787	13,800	13,829	14,197	12,875	13,252	13,744	13,804	13,637	*13,677*	13,524	0.98
	1%	1%	-2%	-1%	0%	-3%	3%	2%	-1%	-1%	-3%	-7%	-1%	
07	12,725	13,219	13,457	13,626	13,808	13,831	13,234	*13,490*	13,544	13,620	13,289	12,763	13,384	0.99
	-2%	-2%	-2%	0%	-3%	-3%	-2%	-5%	1%	1%	-2%	2%	-1%	
08	12,431	12,909	13,144	13,662	13,430	13,479	13,027	*12,806*	13,646	13,740	13,012	13,034	13,193	0.97
	-1%	2%	1%	1%	-1%	3%	3%	3%	3%	0%	1%	2%	1%	
09	12,251	13,199	13,301	13,860	13,231	13,817	13,354	*13,212*	14,037	13,712	13,161	13,327	13,372	0.95
	1%	0%	2%	1%	6%	0%	0%	2%	-1%	1%	1%	-3%	1%	
10	12,356	13,142	13,629	13,942	14,001	13,859	13,299	13,442	13,874	13,868	13,350	*12,989*	13,479	0.97
	-5%	-4%	-2%	-3%	-3%	-2%	-2%	-3%	-1%	-1%	0%	3%	-2%	
11	11,690	12,662	13,410	13,515	13,585	13,612	12,975	*13,016*	13,668	13,685	13,377	13,350	13,212	0.97
	6%	4%	0%	0%	-2%	-1%	-6%	0%	1%	0%	0%	0%	0%	
12	12,382	13,150	13,430	13,546	13,366	13,534	12,225	*13,018*	13,740	13,653	13,399	13,378	13,235	0.96
	-1%	-6%	-3%	0%	0%	0%	5%	0%	-1%	0%	-1%	-1%	-1%	
13	12,301	12,335	13,001	13,557	13,321	13,558	12,876	*13,055*	13,640	13,635	13,199	13,188	13,139	0.96
												Growth	-0.35%	0.97

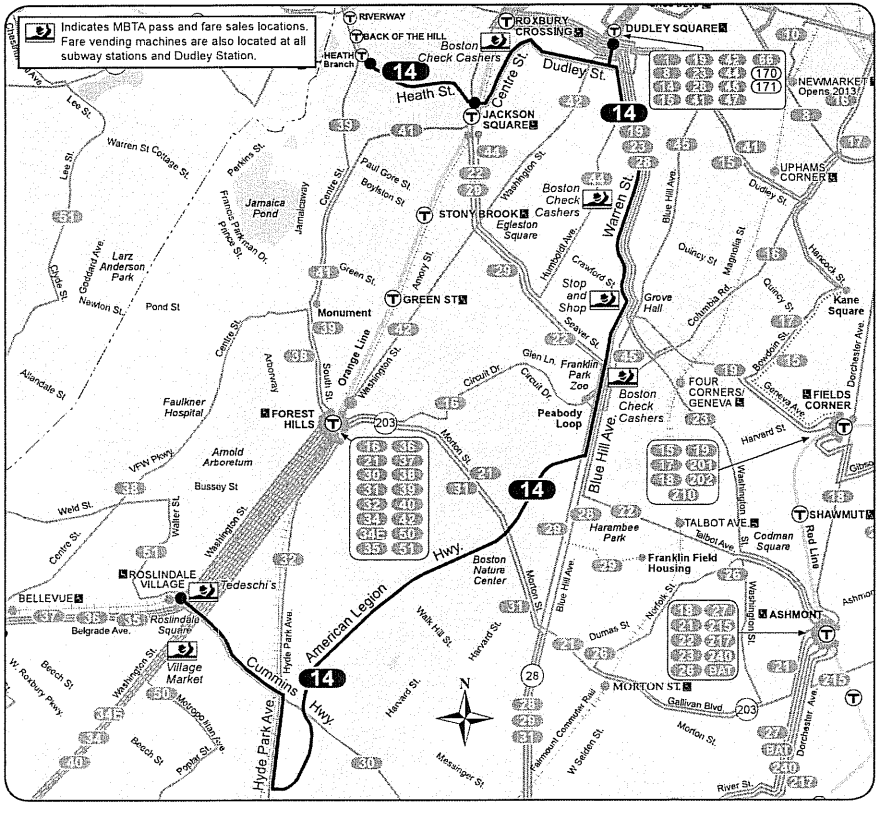
Average Adjusment Factor **0.97**

Average Yearly Growth Calculated -0.2%
Yearly Growth Factor Used **0.5%**

ITALICS = ESTIMATED DATA
MADT

□ Public Transportation Information

Route 14 Roslindale Square - Heath Street Station



14

Summer June 27, 2015 - September 4, 2015

Roslindale Square-Heath Street Station

Serving

- American Legion Highway
- Boston Police District 2
- Dudley Station
- Green Line
- Grove Hall
- Jackson Square
- Needham Commuter Rail
- Orange Line
- Roxbury District Courthouse

Massachusetts Bay Transportation Authority

massDOT Massachusetts Department of Transportation

Information 617-222-3200 • 1-800-392-6100
(TTY) 617-222-5146 • www.mbta.com

14 Weekday

Inbound				Outbound			
Leave Roslindale Square	Arrive Dudley Station	Arrive Jackson Square Station	Arrive Heath Street	Leave Heath Street	Arrive Jackson Square Station	Lv/Arrive Dudley Station	Arrive Roslindale Square
6:00A	6:26A	6:33A	6:39A	.....	.....	5:57A	6:16A
6:38	7:12	7:21	7:27	6:15A	6:23A	6:28	7:00
7:16	7:49	7:55	8:02	6:55	7:07	7:14	7:45
7:54	8:28	8:34	8:41	7:33	7:45	7:52	8:22
8:32	9:06	9:12	9:19	8:11	8:24	8:33	9:00
9:10	9:44	9:50	9:57	8:53	9:06	9:15	9:42
10:13	10:44	10:54	10:59	9:33	9:46	9:55	10:22
11:16	11:50	11:54	11:59	10:11	10:24	10:33	11:00
				11:14	11:19	11:27	12:01P
12:19P	12:54P	12:58P	1:03P	12:17P	12:22P	12:30P	1:01P
1:22	1:58	2:04	2:11	1:20	1:32	1:46	2:17
2:07	2:43	2:49	2:56	2:23	2:37	2:51	3:22
2:52	3:28	3:34	3:42	3:08	3:22	3:34	4:13
3:37	4:15	4:21	4:29	3:53	4:06	4:15	4:54
4:22	5:00	5:06	5:14	4:38	4:51	5:00	5:37
5:07	5:43	5:49	5:56	5:23	5:34	5:43	6:15
5:52	6:26	6:32	6:38	6:08	6:19	6:31	7:01
6:37	7:07	7:13	7:19	6:53	7:04	7:16	7:46
7:22	7:49	.....	.....	7:38	7:55	7:58	.....

Fare	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	$1.60	$1.60	$2.10	$2.10
CharlieTicket	$2.10	$2.10	$2.65	$4.75
Cash-on-Board	$2.10	$4.20	$2.65	$4.75
Student CharliCard*	$0.80	$0.80	$1.05	$1.05
Senior/TAP CharliCard**	$0.80	$0.80	$1.05	$1.05

VALID PASSES: LinkPass ($75/mo.); Monthly Local Bus ($50/mo.); *StudentPass ($26.00/Month for 5-Day validity Mon-Fri or 7-Day validity on all days); **Senior/TAP Pass ($29/mo.); and express bus, commuter rail, and boat passes.
FREE FARES: Children 11 and under ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.
* Requires Student CharlieCard, available to students through participating middle schools and high schools.
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

14 Saturday

Inbound				Outbound			
Leave Roslindale Square	Lv/Arrive Dudley Station	Arrive Jackson Square Station	Arrive Heath Street	Leave Heath Street	Arrive Jackson Square Station	Arrive Dudley Station	Arrive Roslindale Square
.....	6:45A	6:49A	6:55A	7:00A	7:05A	7:10A	.....
.....	7:15	7:19	7:25	7:30	7:35	7:40	.....
.....	7:45	7:49	7:55	8:00	8:05	8:10	.....
.....	8:15	8:19	8:25	8:30	8:35	8:42	.....
.....	8:45	8:49	8:55	9:05	9:10	9:17	9:46A
8:50A	9:16	9:22	9:26	9:40	9:45	9:52	10:20
9:25	9:51	9:57	10:02	10:15	10:20	10:27	10:55
9:55	10:27	10:33	10:39	10:50	10:55	11:02	11:36
10:30	11:02	11:08	11:14	11:25	11:31	11:37	12:11P
11:10	11:42	11:48	11:55				
11:45	12:18P	12:24P	12:31P				
				12:00N	12:06P	12:12P	12:46P
12:20P	12:52P	12:58P	1:05P	12:35P	12:41	12:47	1:21
12:55	1:28	1:34	1:41	1:10	1:16	1:22	1:56
1:30	2:03	2:09	2:16	1:45	1:51	1:57	2:29
2:05	2:37	2:41	2:48	2:20	2:26	2:34	3:06
2:40	3:12	3:16	3:23	2:55	3:01	3:09	3:40
3:15	3:47	3:51	3:58	3:30	3:36	3:45	4:17
3:50	4:22	4:26	4:33	4:05	4:11	4:20	4:52
4:25	4:57	5:02	5:08	4:40	4:46	4:55	5:27
5:00	5:29	5:35	5:41	5:15	5:21	5:30	5:59
5:35	6:04	6:10	6:16	5:50	5:56	6:05	6:35
6:10	6:39	6:44	6:50	6:25	6:31	6:37	7:06
6:45	7:12	7:17	7:23	7:00	7:05	7:11	7:40

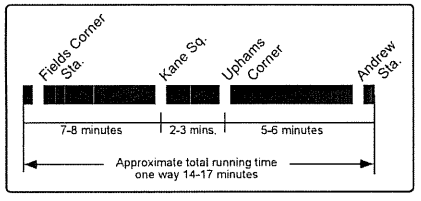
No service on Sunday

All buses are accessible to persons with disabilities

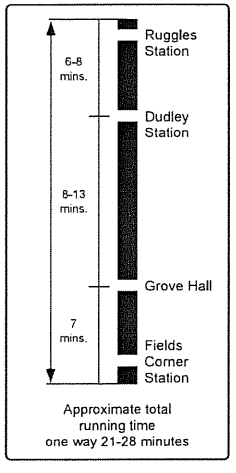
Route 14
Roslindale Square-Heath Street Station

Summer 2015 Holidays
July 4: see Sunday September 7: see Sunday

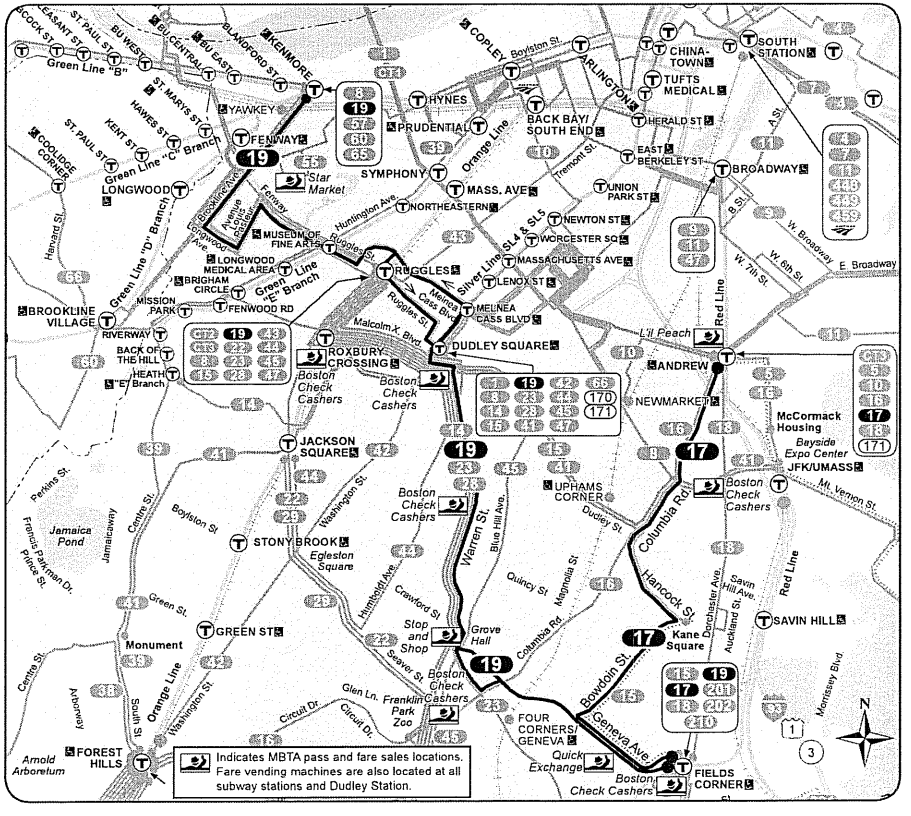
Route 17



Route 19



Route 17 Fields Corner Station - Andrew Station
Route 19 Fields Corner Station - Kenmore Station or Ruggles Station



17•19

Summer June 27, 2015 - September 4, 2015

17 Fields Corner-Andrew Station

19 Fields Corner-Kenmore Station or Ruggles Station

Serving

- Roxbury District Courthouse
- Roxbury Library
- Uphams Corner
- Police District 2
- Red Line
- Orange Line
- Green Line
- Fairmount Commuter Rail

Massachusetts Bay Transportation Authority

massDOT Massachusetts Department of Transportation

Information 617-222-3200 • 1-800-392-6100
(TTY) 617-222-5146 • www.mbta.com

19 Weekday

Inbound				Outbound			
Leave Fields Corner	Arrive Grove Hall	Arrive Ruggles Station	Arrive Kenmore Station	Leave Kenmore Station	Arrive Ruggles Station	Arrive Grove Hall	Arrive Fields Corner
6:08A	6:15A	6:30A	6:44A	.....	6:10A	6:22A	6:30A
6:22	6:29	6:44	6:58	.....	6:30	6:46	6:55
6:36	6:45	7:00	7:17	6:47A	7:01	7:18	7:31
6:50	6:59	7:17	7:35	7:03	7:17	7:34	7:47
7:04	7:14	7:33	7:52	7:17	7:32	7:50	8:03
7:18	7:28	7:48	8:05	7:31	7:49	8:07	8:18
7:32	7:43	8:02	8:18	7:45	8:03	8:19	8:30
7:46	7:57	8:16	8:32	7:59	8:14	8:30	8:41
8:00	8:10	8:29	8:45	8:13	8:28	8:44	8:55
8:14	8:24	8:43	8:59	8:27	8:42	8:58	9:09
8:28	8:38	8:57	9:14	8:41	8:56	9:13	9:24
8:42	8:53	9:10	.....	8:55	9:09	9:26	9:37
8:56	9:07	9:24	.....	9:09	9:23	9:40	9:51
9:15	9:26	9:40	.....	.....	10:15	10:34	10:44
9:45	9:54	10:08	.....	.....	11:15	11:33	11:43
10:45	10:54	11:08	.....				
11:45	11:54	12:08P	.....	.....	12:15P	12:33P	12:43P
				.....	1:15	1:31	1:43
12:45P	12:54P	1:09P	.....	.....	2:15	2:33	2:45
1:45	1:56	2:14	.....	2:18P	2:39	3:06	3:20
2:20	2:31	2:48	3:04P	2:40	3:01	3:28	3:42
2:50	3:01	3:18	3:33	3:06	3:27	3:54	4:08
3:30	3:40	3:57	4:14	3:28	3:49	4:14	4:27
3:55	4:07	4:27	4:45	3:58	4:18	4:43	4:56
4:25	4:35	4:54	5:12	4:27	4:47	5:12	5:26
4:50	5:00	5:19	5:37	4:54	5:14	5:39	5:53
5:15	5:25	5:44	6:01	5:21	5:41	6:05	6:18
5:45	5:55	6:10	6:25	5:48	6:05	6:29	6:39
6:10	6:19	6:34	6:49	6:13	6:27	6:45	6:55
6:50	6:57	7:08	.....	6:41	6:53	7:11	7:21
				.....	7:20	7:38	7:47

No Route 19 service on weekends

NOTE: For weekday, evening and all day Saturday and Sunday Service between Ruggles Station, Dudley Station, Geneva Avenue and Fields Corner Station refer to Route 15.

Route 19 Fields Corner Station- Kenmore Station or Ruggles Station

17 Weekday

Inbound			Outbound		
Leave Fields Corner	Arrive Uphams Corner	Arrive Andrew Station	Leave Andrew Station	Arrive Uphams Corner	Arrive Fields Corner
5:12A	5:21A	5:28A	4:55A	4:58A	5:05A
5:30	5:39	5:46	5:13	5:16	5:23
5:48	5:57	6:04	5:31	5:34	5:41
6:06	6:15	6:22	5:49	5:52	5:59
6:24	6:35	6:45	6:07	6:10	6:17
6:38	6:50	7:00	6:25	6:28	6:37
6:52	7:04	7:14	6:39	6:44	6:55
7:06	7:18	7:28	6:53	6:58	7:09
7:20	7:33	7:45	7:07	7:12	7:23
7:34	7:46	7:58	7:21	7:26	7:37
7:48	8:00	8:12	7:35	7:40	7:51
8:02	8:14	8:26	7:50	7:55	8:06
8:21	8:32	8:41	8:09	8:14	8:25
8:40	8:52	9:01	8:28	8:33	8:44
9:00	9:12	9:21	8:47	8:52	9:03
9:25	9:37	9:46	9:06	9:11	9:22
9:50	10:02	10:11	9:25	9:30	9:41
10:15	10:27	10:36	9:50	9:55	10:06
10:40	10:52	11:01	10:15	10:20	10:31
11:05	11:17	11:26	10:40	10:45	10:56
11:30	11:42	11:51	11:05	11:10	11:21
11:55	12:07P	12:16P	11:30	11:36	11:49
			11:55	12:01P	12:14P
12:20P	12:34P	12:43P	12:20P	12:26P	12:39P
12:45	12:59	1:08	12:45	12:51	1:04
1:10	1:24	1:33	1:10	1:16	1:29
1:35	1:49	1:58	1:35	1:41	1:54
1:55	2:06	2:16	1:50	1:56	2:09
2:07	2:18	2:28	2:10	2:16	2:29
2:23	2:34	2:44	2:23	2:29	2:42
2:38	2:49	2:59	2:37	2:45	2:58
2:52	3:04	3:12	2:51	2:59	3:12
3:06	3:20	3:28	3:05	3:13	3:26
3:20	3:34	3:42	3:19	3:27	3:40
3:34	3:48	3:56	3:33	3:41	3:54
3:48	4:02	4:10	3:47	3:55	4:08
4:02	4:16	4:24	4:01	4:09	4:22
4:16	4:30	4:38	4:15	4:23	4:36
4:30	4:44	4:52	4:29	4:37	4:50
4:44	4:58	5:06	4:43	4:51	5:04
4:58	5:12	5:20	4:57	5:05	5:18
5:12	5:26	5:34	5:11	5:19	5:32
5:26	5:38	5:47	5:25	5:32	5:45
5:40	5:52	6:01	5:39	5:46	5:59
6:00	6:10	6:17	5:53	6:00	6:13
6:50	7:00	7:07	6:05	6:12	6:25
7:40	7:50	7:57	6:25	6:32	6:45
8:25	8:32	8:39	7:15	7:20	7:32
9:15	9:22	9:29	8:05	8:09	8:19
10:00	10:07	10:14	8:50	8:54	9:04
			9:35	9:39	9:48

17 Saturday

Inbound			Outbound		
Leave Fields Corner	Arrive Uphams Corner	Arrive Andrew Station	Leave Andrew Station	Arrive Uphams Corner	Arrive Fields Corner
5:04A	5:08A	5:15A	5:24A	5:27A	5:33A
5:40	5:46	5:53	6:00	6:03	6:09
6:15	6:21	6:28	6:30	6:33	6:39
6:45	6:51	6:58	7:00	7:03	7:11
7:20	7:26	7:32	7:25	7:28	7:36
7:50	7:57	8:04	7:50	7:53	8:01
8:10	8:17	8:24	8:10	8:13	8:21
8:30	8:37	8:44	8:30	8:33	8:41
8:50	8:57	9:06	8:50	8:53	9:01
9:10	9:20	9:28	9:10	9:13	9:21
9:35	9:45	9:53	9:35	9:39	9:49
10:00	10:10	10:18	10:00	10:04	10:14
10:25	10:35	10:43	10:25	10:29	10:39
10:50	11:00	11:08	10:50	10:54	11:04
11:15	11:25	11:33	11:15	11:20	11:30
11:40	11:50	11:58	11:40	11:45	11:55
12:05P	12:15P	12:23P	12:05P	12:10P	12:20P
12:30	12:40	12:48	12:30	12:35	12:45
12:55	1:05	1:15	12:55	1:00	1:10
1:20	1:30	1:40	1:20	1:25	1:35
1:45	1:55	2:03	1:45	1:51	2:01
2:10	2:19	2:27	2:10	2:16	2:26
2:35	2:44	2:52	2:35	2:41	2:51
3:00	3:09	3:17	3:00	3:06	3:16
3:25	3:34	3:41	3:25	3:31	3:41
3:50	3:59	4:06	3:50	3:56	4:06
4:15	4:24	4:31	4:15	4:21	4:31
4:40	4:49	4:56	4:40	4:45	4:56
5:05	5:14	5:21	5:05	5:10	5:21
5:30	5:39	5:47	5:30	5:35	5:46
5:55	6:04	6:12	5:55	6:00	6:11
6:20	6:29	6:36	6:20	6:25	6:34
6:45	6:52	6:59	6:45	6:49	6:58
7:10	7:17	7:24	7:10	7:14	7:23
7:30	7:37	7:44	7:30	7:34	7:43
7:50	7:57	8:04	8:10	8:14	8:23
8:30	8:37	8:44	8:50	8:54	9:01
9:10	9:17	9:24	9:30	9:34	9:41
9:50	9:57	10:04			

Route 17 Fields Corner Station- Andrew Station

17 Sunday

Inbound			Outbound		
Leave Fields Corner	Arrive Uphams Corner	Arrive Andrew Station	Leave Andrew Station	Arrive Uphams Corner	Arrive Fields Corner
9:10A	9:17A	9:24A	8:50A	8:54A	9:01A
9:50	9:57	10:04	9:30	9:34	9:41
10:30	10:38	10:44	10:10	10:14	10:22
11:10	11:18	11:24	10:50	10:54	11:03
11:50	11:58	12:05P	11:30	11:34	11:43
12:30P	12:38P	12:45P	12:10P	12:14P	12:23P
1:10	1:18	1:26	12:50	12:54	1:03
1:50	1:58	2:06	1:30	1:34	1:43
2:30	2:39	2:46	2:10	2:14	2:23
3:10	3:18	3:25	2:50	2:54	3:04
3:50	3:58	4:05	3:30	3:34	3:43
4:30	4:37	4:44	4:10	4:14	4:23
5:10	5:17	5:24	4:50	4:54	5:03
5:50	5:57	6:04	5:30	5:34	5:43
6:30	6:38	6:45	6:10	6:14	6:23
7:10	7:18	7:25	6:50	6:54	7:03

NOTE: For early morning and late evening service between Fields Corner Station and Uphams Corner refer to Route 15.

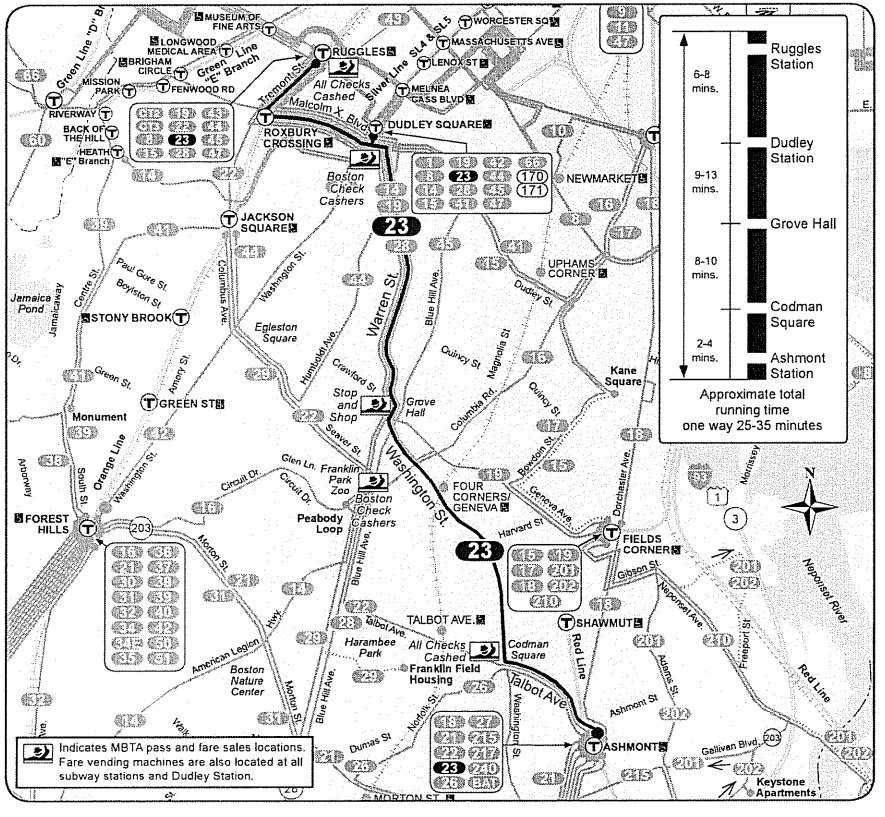
All buses are accessible to persons with disabilities

Fare	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	$1.60	$1.60	$2.10	$2.10
CharlieTicket	$2.10	$2.10	$2.65	$4.75
Cash-on-Board	$2.10	$4.20	$2.65	$4.75
Student CharliCard*	$0.80	$0.80	$1.05	$1.05
Senior/TAP CharliCard**	$0.80	$0.80	$1.05	$1.05

VALID PASSES: LinkPass ($75/mo.); Monthly Local Bus ($50/mo.); *StudentPass ($26.00/Month for 5-Day validity Mon-Fri or 7-Day validity on all days); **Senior/TAP Pass ($29/mo.); and express bus, commuter rail, and boat passes.
FREE FARES: Children 11 and under ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.
* Requires Student CharlieCard, available to students through participating middle schools and high schools.
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

Summer 2015 Holidays
July 4: see Sunday September 7: see Sunday

Route 23 Ashmont Station - Ruggles Station



schedule change

23

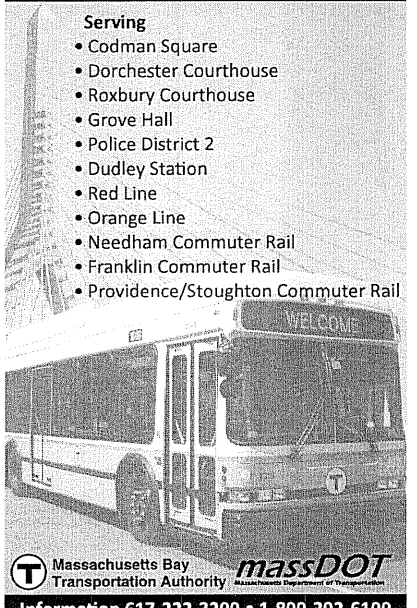
Summer June 27, 2015 - September 4, 2015

Ashmont Station- Ruggles Station

via Washington Street

Serving

- Codman Square
- Dorchester Courthouse
- Roxbury Courthouse
- Grove Hall
- Police District 2
- Dudley Station
- Red Line
- Orange Line
- Needham Commuter Rail
- Franklin Commuter Rail
- Providence/Stoughton Commuter Rail



Massachusetts Bay Transportation Authority

massDOT

Information 617-222-3200 • 1-800-392-6100
(TTY) 617-222-5146 • www.mbta.com

23 Weekday

Inbound			Outbound		
Leave Ashmont Station	Arrive Four Corners	Arrive Ruggles Station	Leave Ruggles Station	Arrive Four Corners	Arrive Ashmont Station
5:09A	5:14A	5:29A	4:55A	5:09A	5:15A
5:20	5:25	5:40	5:15	5:29	5:35
5:32	5:37	5:52	5:35	5:49	5:55
5:43	5:48	6:04	5:49	6:06	6:14
5:55	6:00	6:20	6:01	6:20	6:28
6:05	6:11	6:31	6:07	6:26	6:33
6:11	6:17	6:39	6:12	6:31	6:38
6:16	6:22	6:45	6:18	6:38	6:45
6:22	6:28	6:54	6:24	6:46	6:53
6:30	6:37	7:04	6:30	6:53	7:00
6:32	6:38	.....	6:38	7:01	7:08
6:38	6:45	7:12	*Every*	*8 Mins.*	*Until*
Every	*8 Mins.*	*Until*	8:54	9:17	9:24
9:02	9:09	9:36	9:04	9:27	9:34
9:13	9:20	9:47	9:16	9:39	9:47
9:24	9:31	9:58	*Every*	*12 Mins.*	*or Less*
Every	*12 Mins.*	*or Less*	10:38	11:03	11:11
11:43	11:51	**12:16P**	10:49	11:14	11:22
11:54	**12:02P**	**12:27**	10:59	11:24	11:32
			11:09	11:34	11:42
12:06P	**12:14P**	**12:39P**	11:20	11:45	11:53
Every	***12 Mins.***	***or Less***	11:31	11:56	**12:04P**
2:05	**2:13**	**2:38**	11:42	**12:07P**	**12:15**
2:15	**2:23**	**2:48**	11:53	**12:18**	**12:26**
Every	***10 Mins.***	***Until***			
4:15	4:23	4:51	**12:04P**	**12:29P**	**12:38P**
4:23	4:31	4:59	***Every***	***12 Mins.***	***or Less***
4:31	4:39	5:07	**1:26**	**1:58**	**2:07**
4:39	4:47	5:15	**1:36**	**2:08**	**2:17**
4:47	4:55	5:23	**1:45**	**2:17**	**2:26**
4:55	5:03	5:31	**1:54**	**2:26**	**2:35**
5:03	5:11	5:37	**2:02**	**2:34**	**2:43**
Every	***8 Mins.***	***Until***	***Every***	***10 Mins.***	***Until***
7:03	7:10	7:31	**3:52**	**4:31**	**4:44**
7:13	7:20	7:41	**4:00**	**4:37**	**4:50**
7:26	7:33	7:54	***Every***	***8 Mins.***	***or Less***
7:39	7:46	8:06	**6:47**	**7:12**	**7:20**
7:52	7:59	8:18	**6:56**	**7:21**	**7:29**
8:05	8:11	8:30	**7:06**	**7:31**	**7:39**
Every	***15 Mins.***	***Until***	**7:19**	**7:44**	**7:52**
9:50	**9:56**	10:14	**7:31**	**7:56**	**8:04**
10:07	**10:12**	**10:30**	**7:44**	**8:09**	**8:17**
10:24	**10:29**	**10:47**	**7:56**	**8:21**	**8:29**
10:41	**10:46**	**11:04**	**8:11**	**8:34**	**8:41**
11:00	**11:05**	**11:23**	***Every***	***15 Mins.***	***Until***
11:20	**11:25**	**11:41**	**9:56**	**10:16**	**10:23**
11:40	**11:44**	12:00M	**10:13**	**10:33**	**10:40**
12:00M	12:04A	12:20A	**10:30**	**10:50**	**10:57**
12:17A	12:21	12:37	**10:47**	**11:07**	**11:14**
12:39	12:43	12:59	**11:05**	**11:25**	**11:32**
w 1:06	1:10	1:26	***Every***	***20 Mins.***	***Until***
x 1:30	1:34	1:50	12:45A	1:00A	1:06A
x 1:55	1:59	2:15	w 1:05	1:20	1:26
xz 2:20	2:24	2:40	x 1:30	1:45	1:51
			x 1:55	2:10	2:16
			xz 2:20	2:35	2:41

23 Saturday

Inbound			Outbound		
Leave Ashmont Station	Arrive Four Corners	Arrive Ruggles Station	Leave Ruggles Station	Arrive Four Corners	Arrive Ashmont Station
4:55A	4:59A	5:12A	4:40A	4:54A	4:58A
Every	*15 Mins.*	*Until*	5:10	5:24	5:28
8:40	8:47	9:06	*Every*	*15 Mins.*	*Until*
8:54	9:01	9:20	7:40	7:58	8:06
9:08	9:15	9:35	7:54	8:12	8:20
9:22	9:29	9:52	8:08	8:26	8:35
9:36	9:43	10:06	8:22	8:42	8:50
9:50	9:57	10:20	8:36	8:56	9:04
10:00	10:07	10:30	8:50	9:10	9:18
Every	*10 Mins.*	*Until*	9:04	9:24	9:32
11:50	11:57	**12:20P**	9:18	9:38	9:47
			9:32	9:54	10:03
12:00N	**12:07P**	**12:30P**	9:46	10:08	10:17
Every	***10 Mins.***	***Until***	10:00	10:22	10:31
2:40	**2:47**	**3:10**	10:12	10:34	10:43
2:52	**2:59**	**3:22**	*Every*	*10 Mins.*	*Until*
3:04	**3:11**	**3:34**	11:52	**12:17P**	**12:27P**
Every	***12 Mins.***	***Until***			
7:04	**7:11**	**7:31**	**12:02P**	**12:27P**	**12:37P**
7:16	**7:23**	**7:43**	***Every***	***10 Mins.***	***Until***
7:28	**7:35**	**7:55**	**3:12**	**3:37**	**3:45**
7:40	**7:47**	**8:07**	**3:24**	**3:49**	**3:57**
7:57	**8:04**	**8:24**	**3:36**	**4:01**	**4:09**
8:14	**8:21**	**8:41**	**3:48**	**4:13**	**4:21**
8:31	**8:38**	**8:58**	***Every***	***12 Mins.***	***Until***
8:48	**8:55**	**9:15**	**8:00**	**8:21**	**8:27**
9:05	**9:11**	**9:31**	**8:15**	**8:36**	**8:42**
9:22	**9:28**	**9:48**	**8:32**	**8:53**	**8:59**
9:39	**9:45**	**10:05**	**8:49**	**9:10**	**9:16**
9:56	**10:02**	**10:22**	**9:06**	**9:27**	**9:33**
10:13	**10:19**	**10:39**	**9:23**	**9:44**	**9:50**
10:30	**10:36**	**10:56**	**9:40**	**10:01**	**10:07**
Every	***20 Mins.***	***Until***	**10:00**	**10:21**	**10:27**
11:50	**11:55**	12:10A	***Every***	***20 Mins.***	***Until***
12:15A	12:20A	12:35	12:00M	12:18A	12:24A
12:40	12:45	1:00	12:20A	12:35	12:41
1:06	1:11	1:26	12:40	12:55	1:01
x 1:30	1:35	1:50	1:02	1:17	1:23
x 1:55	2:00	2:15	x 1:30	1:45	1:51
xz 2:20	2:25	2:40	x 1:55	2:10	2:16
			xz 2:20	2:35	2:41

w - Waits for last train to arrive at station. Sunday through Thursday only. Friday & Saturday leaves at scheduled time.

x - Late night service operates Friday & Saturday only. On July 4 late night service trips will operate.

z - Waits for last train to arrive at station on Friday & Saturday only.

All buses are accessible to persons with disabilities

23 Sunday

Inbound			Outbound		
Leave Ashmont Station	Arrive Four Corners	Arrive Ruggles Station	Leave Ruggles Station	Arrive Four Corners	Arrive Ashmont Station
5:40A	5:44A	6:00A	5:50	6:06	6:12
Every	*20 Mins.*	*Until*	6:10	6:26	6:32
9:00	9:05	9:24	6:30	6:46	6:52
9:18	9:23	9:42	6:50	7:07	7:14
9:36	9:41	10:00	7:10	7:27	7:34
9:54	9:59	10:18	7:30	7:47	7:54
10:12	10:17	10:37	*Every*	*18 Mins.*	*Until*
Every	*18 Mins.*	*Until*	11:42	**12:02P**	**12:11P**
11:42	11:49	**12:10P**			
			12:00P	**12:20P**	**12:29P**
12:00N	**12:07P**	**12:28P**	***Every***	***18 Mins.***	***Until***
Every	***18 Mins.***	***Until***	**3:00**	**3:24**	**3:33**
3:00	**3:06**	**3:27**	**3:18**	**3:42**	**3:51**
3:18	**3:24**	**3:45**	***Every***	***16 Mins.***	***Until***
3:36	**3:42**	**4:03**	**7:50**	**8:11**	**8:18**
3:52	**3:58**	**4:19**	**8:10**	**8:30**	**8:37**
4:08	**4:14**	**4:35**	**8:30**	**8:50**	**8:57**
4:24	**4:30**	**4:50**	**8:50**	**9:10**	**9:17**
Every	***16 Mins.***	***Until***	**9:10**	**9:30**	**9:36**
8:24	**8:28**	**8:47**	**9:30**	**9:48**	**9:54**
8:43	**8:47**	**9:06**	**9:50**	**10:08**	**10:14**
9:03	**9:07**	**9:26**	**10:10**	**10:28**	**10:34**
9:23	**9:27**	**9:46**	**10:30**	**10:48**	**10:54**
9:43	**9:47**	**10:06**	**10:50**	**11:08**	**11:14**
10:03	**10:07**	**10:26**	**11:10**	**11:28**	**11:34**
Every	***20 Mins.***	***Until***	**11:30**	**11:48**	**11:54**
12:03A	12:07A	12:22A	**11:50**	12:08A	12:14A
12:23	12:27	12:42	12:15A	12:32	12:37
12:43	12:47	1:02	12:40	12:54	12:59
w 1:06	1:10	1:25	w 1:02	1:16	1:21

Fare	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	$1.60	$1.60	$2.10	$2.10
CharlieTicket	$2.10	$2.10	$2.65	$4.75
Cash-on-Board	$2.10	$4.20	$2.65	$4.75
Student CharlieCard*	$0.80	$0.80	$1.05	$1.05
Senior/TAP CharlieCard**	$0.80	$0.80	$1.05	$1.05

VALID PASSES: LinkPass ($75/mo.); Monthly Local Bus ($50/mo.); *StudentPass ($26.00/Month for 5-Day validity Mon-Fri or 7-Day validity on all days); **Senior/TAP Pass ($29/mo.); and express bus, commuter rail, and boat passes.

FREE FARES: Children 11 and under ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.

* Requires Student CharlieCard, available to students through participating middle schools and high schools.

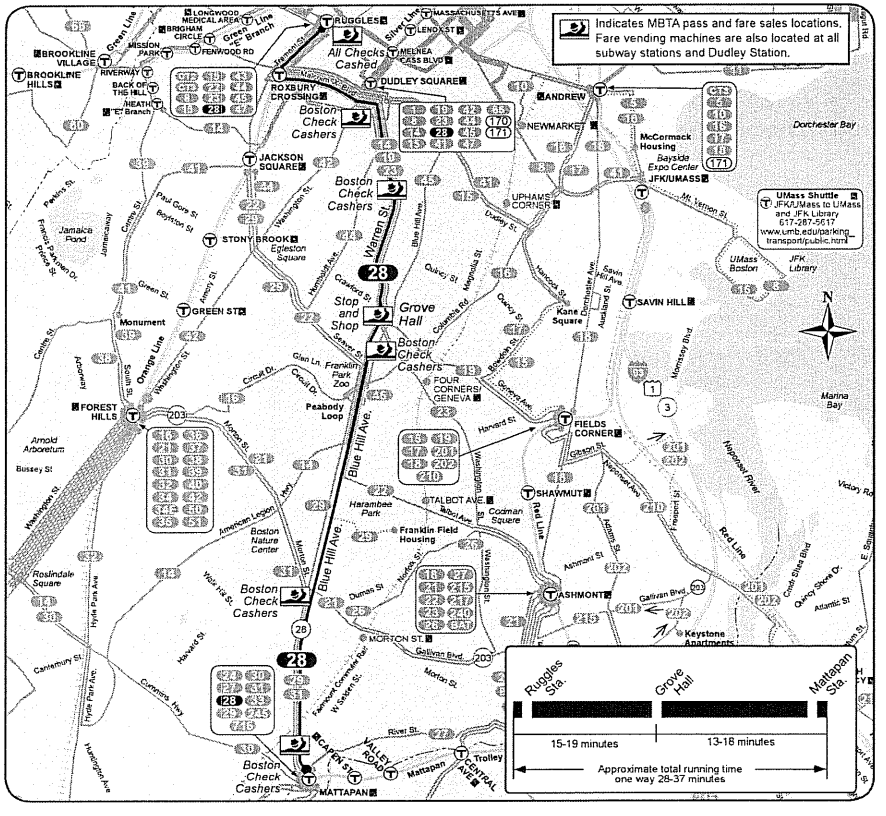
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

Summer 2015 Holidays

July 4: see Sunday. Also, see x - note.

September 7: see Sunday

Route 28 Mattapan Station - Ruggles Station



schedule change

28

Summer June 27, 2015 - September 4, 2015

Mattapan Station- Ruggles Station

Serving

- Dudley Station
- Roxbury District Courthouse
- Grove Hall
- Franklin Park Zoo
- Franklin Field
- Orange Line
- Mattapan High Speed Line
- Needham Commuter Rail
- Franklin Commuter Rail
- Attleboro/Stoughton Commuter Rail

Massachusetts Bay Transportation Authority

massDOT

Information 617-222-3200 • 1-800-392-6100
(TTY) 617-222-5146 • www.mbta.com

28 Weekday

Inbound				Outbound			
Leave Mattapan Station	Arrive Franklin Park	Arrive Dudley Station	Arrive Ruggles Station	Leave Ruggles Station	Lv/Arrive Dudley Station	Arrive Franklin Park	Arrive Mattapan Station
3:20A	3:25A	a 3:30A	.....	.....	b 5:24A	.....	5:52A
3:59	4:05	a 4:12	.....	5:43	5:47	5:57	6:14
b 4:28	.....	4:55	.....	6:01	6:07	6:19	6:37
4:40	4:50	4:58	.....	6:19	6:25	6:37	6:55
5:08	5:19	5:29	5:33	6:37	6:43	6:55	7:13
5:26	5:37	5:47	5:51	6:50	6:56	7:08	7:26
5:44	5:55	6:05	6:15	7:00	7:06	7:18	7:36
6:02	6:16	6:27	6:37	7:07	7:13	7:25	7:43
6:09	6:23	6:34	6:44	*Every*	*8 Minutes*		*or Less*
Every	*8 Minutes*		*or Less*	9:07	9:13	9:25	9:43
9:10	9:25	9:37	9:45	9:15	9:21	9:33	9:51
9:20	9:35	9:47	9:55	9:22	9:28	9:40	9:58
9:29	9:44	9:56	10:04	9:30	9:36	9:48	10:06
9:39	9:54	10:06	10:14	9:37	9:43	9:55	10:13
9:48	10:03	10:15	10:23	9:47	9:53	10:05	10:23
9:58	10:13	10:25	10:33	9:57	10:03	10:15	10:34
10:08	10:23	10:35	10:43	10:07	10:13	10:25	10:44
10:19	10:34	10:46	10:54	10:16	10:22	10:36	10:55
10:29	10:44	10:56	11:06	10:25	10:31	10:48	11:07
10:40	10:55	11:08	11:18	10:34	10:40	10:57	11:16
10:50	11:04	11:17	11:27	10:44	10:50	11:07	11:26
11:01	11:16	11:29	11:39	10:54	11:00	11:17	11:36
11:13	11:28	11:41	11:51	11:05	11:11	11:28	11:47
11:25	11:40	11:53	**12:03P**	11:16	11:22	11:39	11:58
11:37	11:52	**12:05P**	**12:15**	11:27	11:33	11:50	**12:09P**
11:49	**12:04P**	**12:17**	**12:27**	11:38	11:44	**12:01P**	**12:21**
11:59	**12:14**	**12:27**	**12:37**	11:50	11:56	**12:14**	**12:34**
12:09P	**12:24P**	**12:37P**	**12:47P**	**12:02P**	**12:10P**	**12:28P**	**12:48P**
12:19	**12:34**	**12:47**	**12:57**	**12:14**	**12:22**	**12:40**	**1:00**
Every	*9 Minutes*		*Until*	**12:26**	**12:34**	**12:52**	**1:12**
6:19	**6:32**	**6:46**	**6:51**	**12:37**	**12:45**	**1:03**	**1:23**
6:28	**6:41**	**6:55**	**7:00**	**12:47**	**12:55**	**1:13**	**1:33**
6:38	**6:52**	**7:01**	**7:10**	**12:57**	**1:05**	**1:23**	**1:43**
6:50	**7:04**	**7:13**	**7:22**	*Every*	*9 Minutes*		*or Less*
7:02	**7:16**	**7:25**	**7:34**	**7:03**	**7:10**	**7:25**	**7:44**
7:14	**7:28**	**7:37**	**7:46**	**7:15**	**7:22**	**7:37**	**7:56**
7:26	**7:40**	**7:49**	**7:58**	**7:27**	**7:34**	**7:49**	**8:06**
7:38	**7:52**	**8:02**	**8:10**	**7:39**	**7:46**	**8:01**	**8:17**
7:50	**8:03**	**8:12**	**8:20**	**7:51**	**7:58**	**8:11**	**8:27**
8:03	**8:13**	**8:22**	**8:30**	**8:03**	**8:09**	**8:22**	**8:38**
8:16	**8:26**	**8:35**	**8:43**	**8:16**	**8:22**	**8:35**	**8:51**
8:30	**8:40**	**8:49**	**8:57**	**8:29**	**8:35**	**8:48**	**9:04**
8:45	**8:55**	**9:04**	**9:12**	**8:42**	**8:48**	**9:01**	**9:17**
9:00	**9:10**	**9:19**	**9:27**	**9:00**	**9:06**	**9:19**	**9:35**
Every	*20 Minutes*		*Until*	*Every*	*20 Minutes*		*Until*
12:00M	12:10A	12:17A	12:23A	12:00M	12:04A	12:14A	12:26
12:20A	12:30	12:37	12:43	12:20A	12:24	12:34	12:46
12:40	12:50	12:57	1:03	12:40	12:44	12:54	1:06
w 1:17	1:27	1:34	1:40	w 1:00	1:04	1:14	1:26
x 1:40	1:48	1:56	2:00	x 1:20	1:24	1:34	1:46
xd 2:00	2:07	2:14	.....	x 1:45	1:49	1:59	2:11
xd 2:20	2:27	2:34	.....	xz 2:10	2:14	2:24	2:36

28 Saturday

Inbound				Outbound			
Leave Mattapan Station	Arrive Franklin Park	Lv/Arrive Dudley Station	Arrive Ruggles Station	Leave Ruggles Station	Arrive Dudley Station	Arrive Franklin Park	Arrive Mattapan Station
3:20A	3:27A	a 3:33A	.....	4:45A	4:49A	4:55A	5:05A
3:59	4:06	a 4:12	.....	5:07	5:11	5:17	5:27
b 4:28	.....	4:58	.....	.....	b 5:19	.....	5:41
4:45	4:54	5:03	.....	5:42	5:46	5:52	6:04
5:12	5:19	5:27	5:31A	6:00	6:05	6:14	6:26
5:37	5:47	5:56	6:00	*Every*	*15 Minutes*		*Until*
6:00	6:10	6:19	6:23	7:15	7:20	7:29	7:45
Every	*15 Minutes*		*Until*	7:25	7:30	7:41	7:57
7:15	7:27	7:38	7:44	7:35	7:42	7:53	8:09
7:30	7:42	7:53	7:59	7:45	7:52	8:03	8:19
7:40	7:52	8:03	8:09	7:55	8:02	8:13	8:29
7:50	8:02	8:13	8:19	8:06	8:13	8:24	8:40
8:00	8:12	8:23	8:29	*Every*	*11 Minutes*		*Until*
Every	*11 Minutes*		*Until*	11:57	**12:05P**	**12:18P**	**12:37P**
11:51	**12:06P**	**12:20P**	**12:25P**	**12:08P**	**12:16P**	**12:29P**	**12:48P**
12:02P	**12:17P**	**12:31P**	**12:36P**	*Every*	*11 Minutes*		*Until*
Every	*11 Minutes*		*Until*	**5:49**	**5:57**	**6:11**	**6:29**
5:54	**6:09**	**6:21**	**6:27**	**6:02**	**6:10**	**6:24**	**6:42**
6:07	**6:22**	**6:34**	**6:40**	**6:15**	**6:23**	**6:37**	**6:55**
6:20	**6:35**	**6:47**	**6:53**	**6:28**	**6:36**	**6:50**	**7:09**
6:33	**6:48**	**7:02**	**7:07**	**6:41**	**6:49**	**7:03**	**7:20**
6:46	**7:01**	**7:13**	**7:18**	**6:54**	**7:01**	**7:14**	**7:31**
6:59	**7:12**	**7:24**	**7:29**	**7:07**	**7:14**	**7:27**	**7:44**
7:12	**7:25**	**7:37**	**7:42**	**7:20**	**7:27**	**7:40**	**7:57**
7:25	**7:38**	**7:50**	**7:55**	**7:33**	**7:40**	**7:53**	**8:10**
7:38	**7:51**	**8:03**	**8:08**	**7:46**	**7:53**	**8:06**	**8:23**
7:51	**8:04**	**8:16**	**8:21**	**7:59**	**8:06**	**8:19**	**8:34**
8:08	**8:21**	**8:33**	**8:38**	**8:16**	**8:23**	**8:36**	**8:53**
Every	*17 Minutes*		*Until*	*Every*	*17 Minutes*		*Until*
12:06A	12:16A	12:24A	12:29A	**11:57**	12:03A	12:14A	12:27
12:23	12:33	12:41	12:46	12:14A	12:20	12:31	12:44
12:40	12:50	12:58	1:03	12:31	12:37	12:48	1:01
12:57	1:07	1:15	1:20	12:47	12:53	1:04	1:17
1:17	1:27	1:35	1:40	1:00	1:06	1:17	1:30
x 1:40	1:50	1:58	2:03	x 1:20	1:26	1:37	1:50
xd 2:00	2:08	2:17	.....	x 1:45	1:51	2:02	2:15
xd 2:20	2:28	2:37	.....	xz 2:10	2:16	2:27	2:40

Weekday & Saturday note: For additional service between Mattapan and Ruggles Station via Seaver Street after 8:10 pm refer to the Route 29 schedule card.

a - Connects to service to Andrew Station and Logan Airport
b - To/from downtown Boston via River St., Ashmont, and Fields Corner
d - To Dudley Station only.
w - Waits for last train to arrive at station. Sunday through Thursday only. Friday & Saturday leaves at scheduled time.
x - Late night service operates Friday & Saturday only. On July 4 late night service trips will operate.
z - Waits for last train to arrive at station on Friday & Saturday only.

Summer 2015 Holidays
July 4: See Sunday. Also, see x- note.
September 7: See Sunday

28 Sunday

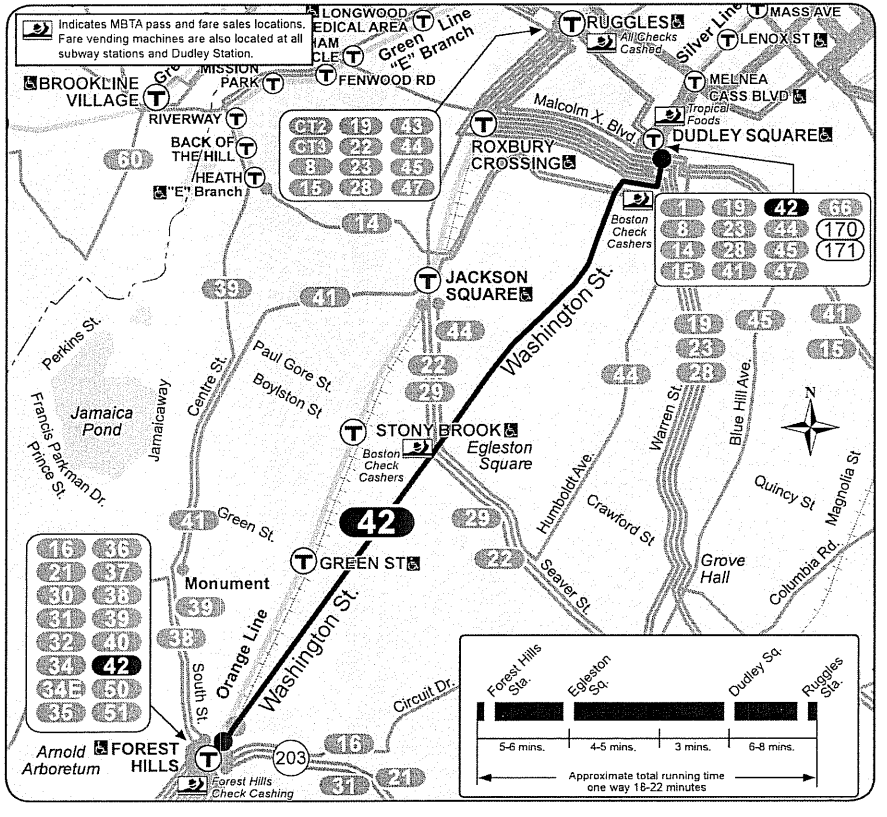
Inbound				Outbound			
Leave Mattapan Station	Arrive Franklin Park	Arrive Dudley Station	Arrive Ruggles Station	Leave Ruggles Station	Arrive Dudley Station	Arrive Franklin Park	Arrive Mattapan Station
3:20A	3:26A	a 3:33A	.....	6:10A	6:15A	6:24A	6:38A
3:59	4:05	a 4:12	.....	6:35	6:40	6:50	7:04
4:45	4:51	4:58	.....	7:00	7:05	7:15	7:29
b 5:21	.....	5:48	.....	7:20	7:25	7:35	7:49
5:39	5:49	6:00	6:03	*Every*	*15 Minutes*		*Until*
6:04	6:14	6:25	6:28	9:50	9:57	10:09	10:26
6:29	6:39	6:50	6:53	10:04	10:11	10:23	10:40
6:54	7:04	7:15	7:18	10:18	10:25	10:39	10:55
7:14	7:24	7:35	7:38	10:31	10:38	10:51	11:07
7:34	7:44	7:55	7:58	10:45	10:52	11:05	11:21
7:54	8:05	8:16	8:22	10:58	11:05	11:18	11:34
8:09	8:21	8:32	8:38	11:11	11:18	11:31	11:47
Every	*15 Minutes*		*Until*	11:24	11:31	11:44	**12:00N**
9:54	10:09	10:23	10:28	11:37	11:44	11:57	**12:13P**
10:07	10:22	10:36	10:41	11:50	11:57	**12:10P**	**12:26**
10:21	10:36	10:50	10:55				
10:35	10:50	11:04	11:09	**12:03P**	**12:10P**	**12:23P**	**12:39P**
10:48	11:04	11:16	11:21	**12:16**	**12:23**	**12:36**	**12:52**
11:02	11:17	11:29	11:34	**12:29**	**12:36**	**12:49**	**1:05**
11:15	11:30	11:42	11:47	**12:42**	**12:49**	**1:02**	**1:18**
11:29	11:44	11:56	**12:01P**	**12:55**	**1:02**	**1:15**	**1:31**
11:42	11:57	**12:09P**	**12:14**	**1:08**	**1:15**	**1:28**	**1:46**
11:56	**12:11P**	**12:23**	**12:28**	*Every*	*14 Minutes*		*Until*
				6:58	**7:05**	**7:17**	**7:33**
12:09P	**12:24P**	**12:41P**	**12:45P**	**7:13**	**7:20**	**7:32**	**7:48**
Every	*14 Minutes*		*Until*	**7:28**	**7:35**	**7:47**	**8:03**
7:37	**7:49**	**8:00**	**8:05**	**7:44**	**7:51**	**8:03**	**8:19**
7:53	**8:05**	**8:16**	**8:21**	**8:00**	**8:07**	**8:19**	**8:36**
8:09	**8:21**	**8:32**	**8:37**	**8:16**	**8:23**	**8:34**	**8:50**
8:26	**8:38**	**8:49**	**8:54**	**8:32**	**8:38**	**8:49**	**9:05**
8:43	**8:55**	**9:06**	**9:11**	**8:49**	**8:55**	**9:06**	**9:22**
9:00	**9:12**	**9:23**	**9:28**	**9:06**	**9:12**	**9:23**	**9:39**
9:17	**9:29**	**9:39**	**9:44**	**9:23**	**9:29**	**9:40**	**9:56**
9:34	**9:44**	**9:54**	**9:59**	**9:40**	**9:46**	**9:57**	**10:11**
9:51	**10:01**	**10:11**	**10:16**	**9:57**	**10:03**	**10:13**	**10:26**
10:08	**10:18**	**10:28**	**10:33**	**10:14**	**10:20**	**10:30**	**10:43**
Every	*17 Minutes*		*Until*	*Every*	*17 Minutes*		*Until*
11:50	**11:58**	12:06A	12:10A	**11:39**	**11:45**	**11:55**	12:07A
12:07A	12:15A	12:23	12:27	**11:56**	12:02A	12:10A	12:22
12:24	12:32	12:40	12:44	12:13A	12:18	12:26	12:38
12:41	12:49	12:57	1:01	12:30	12:35	12:43	12:55
12:58	1:06	1:14	1:18	12:47	12:52	1:00	1:12
w 1:17	1:25	1:33	1:37	w 1:00	1:05	1:13	1:25

All buses are accessible to persons with disabilities

Fare	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	$1.60	$1.60	$2.10	$2.10
CharlieTicket	$2.10	$2.10	$2.65	$4.75
Cash-on-Board	$2.10	$4.20	$2.65	$4.75
Student CharlieCard*	$0.80	$0.80	$1.05	$1.05
Senior/TAP CharlieCard**	$0.80	$0.80	$1.05	$1.05

VALID PASSES: LinkPass ($75/mo.); Monthly Local Bus ($50/mo.); *StudentPass ($26.00/Month for 5-Day validity Mon-Fri or 7-Day validity on all days); **Senior/TAP Pass ($29/mo.); and express bus, commuter rail, and boat passes.
FREE FARES: Children 11 and under ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.
* Requires Student CharlieCard, available to students through participating middle schools and high schools.
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

Route 42 Forest Hills Station - Dudley Station



schedule change

42

Summer June 27, 2015 - September 4, 2015

Forest Hills Station- Dudley Station

Serving

- Egleston Square
- Dudley Square
- Boston English High School
- Orange Line
- Needham Commuter Rail

Massachusetts Bay Transportation Authority

massDOT

Information 617-222-3200 • 1-800-392-6100
(TTY) 617-222-5146 • www.mbta.com

42 Weekday

Inbound			Outbound		
Leave Forest Hills Lower Busway	Arrive Egleston Square	Arrive Dudley Station	Leave Dudley Station	Arrive Egleston Square	Arrive Forest Hills Station
5:00A	5:04A	5:09A	5:15A	5:18A	5:23A
5:15	5:19	5:24	5:30	5:33	5:38
5:30	5:34	5:39	5:45	5:48	5:53
5:45	5:49	5:54	6:00	6:05	6:12
6:00	6:06	6:12	6:15	6:20	6:27
6:15	6:21	6:27	6:30	6:35	6:42
6:30	6:37	6:44	6:45	6:50	6:57
6:45	6:52	6:59	7:00	7:05	7:12
7:00	7:10	7:19	7:15	7:20	7:27
7:15	7:25	7:34	7:30	7:36	7:44
7:30	7:40	7:49	7:45	7:51	7:59
7:45	7:55	8:04	8:00	8:06	8:14
8:00	8:10	8:19	8:15	8:21	8:29
8:15	8:25	8:34	8:30	8:36	8:44
8:30	8:40	8:49	8:45	8:51	8:59
8:45	8:55	9:04	9:00	9:06	9:14
9:00	9:10	9:19	9:20	9:26	9:34
9:18	9:28	9:36	9:40	9:46	9:54
9:39	9:47	9:55	10:00	10:06	10:14
10:00	10:08	10:16	*Every*	*20 Mins.*	*Until*
10:20	10:28	10:36	11:00	11:05	11:13
10:40	10:48	10:56	11:20	11:25	11:33
11:00	11:08	11:16	11:40	11:45	11:53
11:20	11:28	11:36			
11:40	11:48	11:56	12:00N	12:05P	12:13P
			12:20P	12:25	12:33
12:00N	12:08P	12:16P	12:40	12:45	12:53
Every	*20 Mins.*	*Until*	1:00	1:05	1:13
1:00	1:08	1:16	1:20	1:25	1:33
1:20	1:28	1:36	1:40	1:45	1:53
1:40	1:48	1:56	2:05	2:12	2:21
2:05	2:13	2:21	2:30	2:37	2:46
2:30	2:41	2:50	2:55	3:02	3:11
2:55	3:04	3:14	3:20	3:27	3:37
3:15	3:25	3:35	3:45	3:53	4:04
3:44	3:54	4:04	4:12	4:20	4:31
4:10	4:20	4:30	4:37	4:45	4:56
4:35	4:45	4:55	5:02	5:10	5:21
5:00	5:10	5:20	5:27	5:35	5:46
5:25	5:35	5:45	5:52	6:00	6:11
5:50	6:00	6:08	6:15	6:23	6:33
6:15	6:24	6:32	6:35	6:40	6:49
6:35	6:44	6:52	6:55	7:00	7:09
7:10	7:17	7:23	7:30	7:35	7:42
7:45	7:52	7:58	7:50	7:55	8:01
8:25	8:32	8:38	8:10	8:14	8:20
9:00	9:07	9:13	8:45	8:49	8:55
9:30	9:35	9:40	9:15	9:19	9:25
10:00	10:05	10:10	9:45	9:49	9:55
10:30	10:35	10:40	10:15	10:18	10:24
11:00	11:05	11:10	10:45	10:48	10:54
11:30	11:35	11:40	11:15	11:18	11:24
12:00M	12:05A	12:10A	11:45	11:48	11:54
12:30A	12:35	12:40	12:15A	12:18A	12:24A
			12:45	12:48	12:54

42 Saturday

Inbound			Outbound		
Leave Forest Hills Lower Busway	Arrive Egleston Square	Arrive Dudley Station	Leave Dudley Station	Arrive Egleston Square	Arrive Forest Hills Station
5:15A	5:19A	5:24A	5:31A	5:34A	5:39A
5:45	5:49	5:54	6:01	6:04	6:09
6:15	6:19	6:24	6:31	6:34	6:39
6:45	6:49	6:54	7:01	7:04	7:09
7:15	7:19	7:24	7:31	7:35	7:41
7:45	7:49	7:54	8:01	8:05	8:11
8:15	8:21	8:28	8:31	8:35	8:41
8:45	8:51	8:58	9:01	9:05	9:11
9:03	9:09	9:16	9:21	9:25	9:31
9:21	9:27	9:33	9:40	9:44	9:50
9:39	9:46	9:52	9:58	10:03	10:09
9:57	10:04	10:10	10:16	10:21	10:27
10:15	10:22	10:28	10:34	10:39	10:45
10:33	10:40	10:46	10:52	10:57	11:03
10:51	10:58	11:05	11:10	11:15	11:21
11:09	11:17	11:24	11:28	11:33	11:39
11:27	11:35	11:42	11:48	11:53	11:59
11:47	11:55	12:02P			
			12:08P	12:13P	12:21P
12:07P	12:16P	12:23P	12:28	12:33	12:41
12:27	12:36	12:43	12:48	12:53	1:01
12:47	12:56	1:03	1:08	1:13	1:21
1:07	1:16	1:23	1:28	1:33	1:41
1:27	1:36	1:43	1:48	1:53	2:01
1:47	1:56	2:03	2:08	2:13	2:21
2:07	2:16	2:23	2:28	2:33	2:41
2:27	2:36	2:43	2:48	2:53	3:01
2:47	2:56	3:03	3:08	3:13	3:21
3:07	3:16	3:23	3:28	3:33	3:41
3:27	3:36	3:43	3:48	3:53	4:01
3:47	3:56	4:02	4:08	4:13	4:21
4:07	4:15	4:21	4:28	4:33	4:41
4:27	4:35	4:41	4:48	4:53	5:01
4:47	4:55	5:01	5:08	5:13	5:21
5:07	5:15	5:21	5:28	5:33	5:41
5:27	5:35	5:41	5:48	5:53	6:01
5:47	5:55	6:01	6:08	6:13	6:20
6:05	6:13	6:19	6:26	6:31	6:38
6:23	6:31	6:38	6:44	6:49	6:56
6:41	6:47	6:54	7:02	7:06	7:12
6:59	7:05	7:12	7:20	7:24	7:30
7:17	7:23	7:30	7:38	7:42	7:48
7:35	7:41	7:48	7:56	8:00	8:06
7:53	7:59	8:06	8:14	8:18	8:24
8:11	8:17	8:24	8:32	8:36	8:42
8:29	8:34	8:40	8:50	8:54	9:00
8:47	8:52	8:58	9:08	9:12	9:18
9:05	9:10	9:16	9:27	9:31	9:37
9:40	9:45	9:51	9:59	10:03	10:09
10:15	10:20	10:26	10:31	10:35	10:41
10:50	10:55	11:01	11:05	11:08	11:14
11:25	11:30	11:36	11:40	11:43	11:49
12:00M	12:05A	12:11A	12:15A	12:18A	12:24A

42 Sunday

Inbound			Outbound		
Leave Forest Hills Lower Busway	Arrive Egleston Square	Arrive Dudley Station	Leave Dudley Station	Arrive Egleston Square	Arrive Forest Hills Station
6:00A	6:04A	6:10A	6:15A	6:20A	6:24A
6:45	6:49	6:55	7:00	7:05	7:09
7:30	7:34	7:40	7:45	7:50	7:54
8:15	8:19	8:25	8:30	8:35	8:39
9:00	9:06	9:12	9:15	9:21	9:26
9:50	9:56	10:02	10:05	10:11	10:16
10:40	10:46	10:52	10:55	11:01	11:07
11:30	11:36	11:42	11:45	11:51	11:57
12:20P	12:27P	12:34P	12:40P	12:47P	12:54P
1:10	1:17	1:24	1:30	1:37	1:44
2:00	2:07	2:14	2:20	2:27	2:34
2:50	2:57	3:04	3:10	3:17	3:24
3:40	3:47	3:54	4:00	4:07	4:14
4:30	4:36	4:43	4:50	4:57	5:04
5:20	5:26	5:33	5:40	5:47	5:53
6:10	6:16	6:23	6:30	6:37	6:43
7:00	7:06	7:13	7:20	7:27	7:33
7:50	7:56	8:02	8:05	8:10	8:17
8:40	8:46	8:52	8:55	9:00	9:05
9:30	9:35	9:41	9:45	9:50	9:55
10:20	10:25	10:31	10:35	10:40	10:45
11:10	11:15	11:21	11:25	11:30	11:35
12:00M	12:05A	12:11A	12:20A	12:24A	12:28A

Route 42
Forest Hills Station-
Dudley or Ruggles Station

All buses are accessible to persons with disabilities

Fare	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	$1.60	$1.60	$2.10	$2.10
CharlieTicket	$2.10	$2.10	$2.65	$4.75
Cash-on-Board	$2.10	$4.20	$2.65	$4.75
Student CharliCard*	$0.80	$0.80	$1.05	$1.05
Senior/TAP CharliCard**	$0.80	$0.80	$1.05	$1.05

VALID PASSES: LinkPass ($75/mo.); Monthly Local Bus ($50/mo.); *StudentPass ($26.00/Month for 5-Day validity Mon-Fri or 7-Day validity on all days); **Senior/TAP Pass ($29/mo.); and express bus, commuter rail, and boat passes.

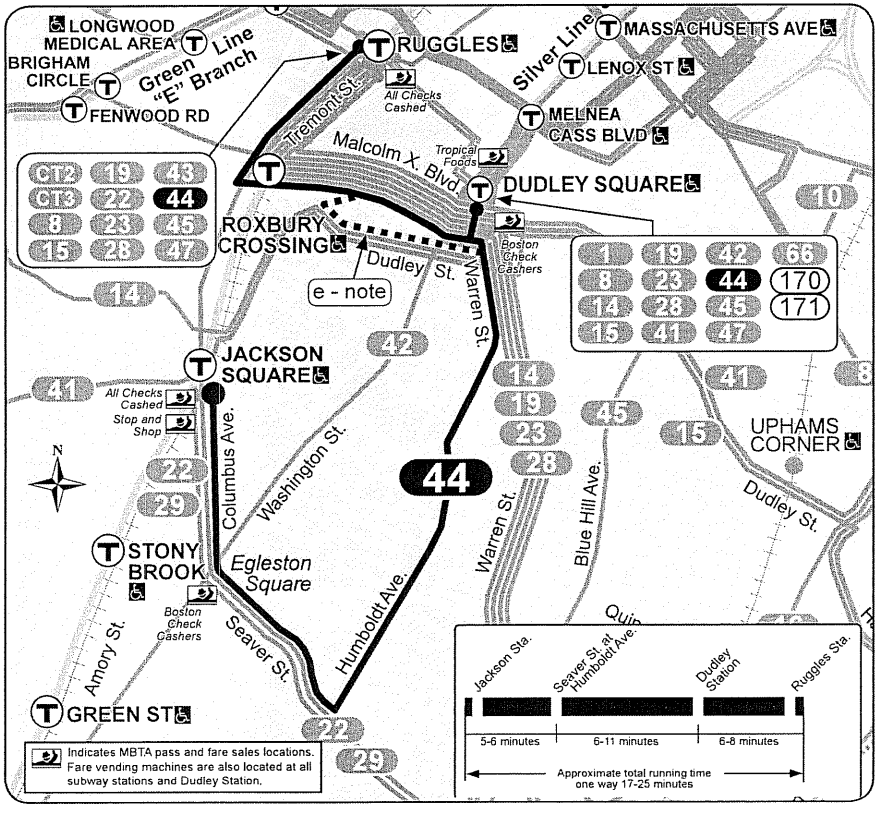
FREE FARES: Children 11 and under ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.

* Requires Student CharlieCard, available to students through participating middle schools and high schools.

** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

Summer 2015 Holidays
July 4: see Sunday **September 7: see Sunday**

Route 44 Jackson Square Station - Ruggles Station



44

Summer June 27, 2015 - September 4, 2015

Jackson Square Station-Ruggles Station

Serving

- Egleston Square
- Roxbury Library
- Roxbury District Courthouse
- Boston Police District 2
- Eliot Square
- Orange Line
- Needham Commuter Rail
- Franklin Commuter Rail
- Providence/Stoughton Commuter Rail

Massachusetts Bay Transportation Authority

massDOT

Information 617-222-3200 • 1-800-392-6100
(TTY) 617-222-5146 • www.mbta.com

44 Weekday

Inbound			Outbound		
Leave Jackson Square Station	Arrive Seaver & Humboldt Avenue	Arrive Ruggles Station	Leave Ruggles Station	Arrive Seaver & Humboldt Avenue	Arrive Jackson Square Station
5:10A	5:13A	5:26A	5:29A	5:40A	5:45A
5:35	5:38	5:51	5:54	6:08	6:14
5:57	6:02	6:17	6:21	6:36	6:42
6:14	6:19	6:34	6:41	6:56	7:04
6:28	6:33	6:48	7:01	7:18	7:26
6:42	6:47	7:06	7:15	7:32	7:40
6:56	7:01	7:26	7:29	7:46	7:54
7:10	7:15	7:36	7:43	8:00	8:08
Every	*12 Mins.*	*Until*	*Every*	*12 Mins.*	*Until*
7:58	8:04	8:22	8:31	8:48	8:56
8:11	8:17	8:35	8:44	9:01	9:09
8:24	8:30	8:48	8:57	9:14	9:22
8:37	8:43	9:01	9:10	9:27	9:35
8:50	8:56	9:14	9:22	9:39	9:47
9:06	9:12	9:30	9:38	9:55	10:03
9:22	9:28	9:46	10:03	10:20	10:28
9:38	9:44	10:03	10:28	10:45	10:53
9:52	9:58	10:14	10:53	11:10	11:18
10:08	10:14	10:30	11:18	11:35	11:42
10:33	10:39	10:55	11:43	12:01P	12:08P
10:58	11:04	11:20			
11:23	11:29	11:46	12:08P	12:26P	12:33P
11:48	11:55	12:12P	12:33	12:51	12:58
			1:00	1:18	1:25
12:13P	12:20P	12:37P	1:28	1:49	1:56
12:38	12:45	1:02	2:01	2:23	2:30
1:06	1:13	1:30	2:16	2:38	2:45
1:33	1:40	1:57	2:31	2:53	3:00
2:01	2:09	2:28	2:46	3:08	3:15
2:36	2:44	3:03	3:04	3:26	3:33
2:51	2:59	3:18	3:22	3:46	3:54
3:06	3:14	3:33	3:40	4:04	4:12
3:21	3:29	3:48	3:58	4:22	4:30
3:39	3:47	4:06	4:12	4:36	4:44
3:57	4:05	4:24	4:26	4:50	4:58
4:15	4:23	4:42	4:40	5:04	5:12
4:33	4:41	5:00	4:54	5:18	5:26
4:47	4:55	5:14	5:08	5:32	5:40
5:01	5:09	5:28	5:22	5:46	5:54
5:15	5:23	5:42	5:36	6:00	6:06
5:29	5:37	5:56	5:50	6:12	6:18
5:43	5:51	6:10	6:00	6:21	6:27
5:57	6:05	6:24	6:15	6:36	6:42
6:12	6:20	6:37	6:30	6:51	6:57
6:27	6:35	6:50	6:45	7:05	7:11
6:42	6:49	7:04	7:00	7:17	7:23
6:57	7:04	7:19	7:10	7:27	7:33
7:12	7:19	7:34	7:40	7:57	8:03
7:39	7:46	8:00	e 8:15	8:32	8:38
Every	*30 Mins.*	*Until*	*Every*	*30 Mins.*	*Until*
11:39	11:42	11:54	e 12:15A	12:28A	12:32
12:07A	12:10A	12:22A	ew 12:57	1:10	1:14
12:37	12:40	12:52			

44 Saturday

Inbound			Outbound		
Leave Jackson Square Station	Arrive Seaver & Humboldt Avenue	Arrive Ruggles Station	Leave Ruggles Station	Arrive Seaver & Humboldt Avenue	Arrive Jackson Square Station
5:25A	5:28A	5:40A	5:35A	5:47A	5:52A
5:55	5:58	6:10	6:05	6:17	6:22
6:25	6:28	6:40	6:35	6:47	6:52
6:55	6:58	7:11	7:05	7:17	7:22
7:25	7:29	7:42	7:35	7:49	7:55
7:56	8:00	8:15	8:05	8:19	8:25
8:26	8:30	8:45	8:35	8:49	8:55
8:56	9:00	9:15	9:00	9:15	9:22
9:11	9:15	9:31	9:19	9:34	9:41
9:29	9:35	9:51	9:37	9:52	9:59
9:47	9:53	10:09	9:55	10:12	10:18
10:05	10:11	10:27	10:13	10:30	10:36
10:23	10:29	10:45	10:31	10:48	10:54
10:41	10:47	11:03	10:49	11:06	11:12
10:59	11:05	11:21	11:07	11:24	11:29
11:17	11:23	11:39	11:25	11:45	11:49
11:35	11:41	11:57	11:43	12:03P	12:07P
11:53	11:59	12:15P			
			12:01P	12:21P	12:25P
12:11P	12:17P	12:33P	12:19	12:39	12:43
12:30	12:36	12:52	12:38	12:58	1:04
Every	*20 Mins.*	*Until*	12:57	1:16	1:22
4:30	4:36	4:52	*Every*	*20 Mins.*	*Until*
4:50	4:56	5:12	4:57	5:14	5:19
5:10	5:16	5:32	5:17	5:34	5:39
5:29	5:35	5:51	5:37	5:54	5:59
5:48	5:54	6:08	5:57	6:14	6:19
6:06	6:11	6:24	6:14	6:31	6:36
6:23	6:28	6:41	6:31	6:48	6:53
6:40	6:45	6:58	6:48	7:05	7:10
6:57	7:02	7:15	7:05	7:22	7:27
7:30	7:35	7:48	7:35	7:52	7:57
8:00	8:05	8:18	8:10	8:27	8:32
8:35	8:40	8:53	8:45	9:00	9:05
9:10	9:15	9:28	9:20	9:35	9:40
9:45	9:50	10:03	9:55	10:10	10:15
10:20	10:25	10:38	10:30	10:45	10:50
10:55	11:00	11:13	11:05	11:20	11:25
11:30	11:35	11:48	11:40	11:55	12:00M
12:05A	12:09A	12:20A	12:15A	12:28A	12:33A
12:40	12:44	12:55	12:58	1:11	1:16

e - Via John Eliot Square.
w - Waits for last train to arrive at Ruggles station. Monday through Thursday only. Friday & Saturday leaves at scheduled time.

All buses are accessible to persons with disabilities

44 Sunday

Inbound			Outbound		
Leave Jackson Square Station	Arrive Seaver & Humboldt Avenue	Arrive Ruggles Station	Leave Ruggles Station	Arrive Seaver & Humboldt Avenue	Arrive Jackson Square Station
6:15A	6:19A	6:31A	6:35A	6:47A	6:52A
7:00	7:04	7:16	7:20	7:32	7:37
7:45	7:49	8:01	8:05	8:19	8:24
8:30	8:34	8:46	8:50	9:04	9:09
9:15	9:20	9:34	9:35	9:49	9:54
10:00	10:05	10:19	10:25	10:40	10:45
10:50	10:55	11:09	11:15	11:31	11:36
11:40	11:45	11:59			
			12:05P	12:21P	12:27P
12:30P	12:35P	12:49P	1:00	1:16	1:22
1:30	1:35	1:49	2:00	2:16	2:22
2:30	2:36	2:51	3:00	3:17	3:24
3:30	3:36	3:51	4:00	4:17	4:24
4:30	4:35	4:51	5:00	5:16	5:23
5:25	5:30	5:44	5:50	6:06	6:13
6:15	6:20	6:34	6:35	6:51	6:58
7:00	7:05	7:19	7:20	7:36	7:43
7:45	7:50	8:03	8:05	8:20	8:26
8:30	8:34	8:46	8:50	9:05	9:11
9:15	9:19	9:31	9:35	9:48	9:54
10:00	10:04	10:16	10:20	10:33	10:39
10:45	10:49	11:01	11:05	11:18	11:24
11:30	11:33	11:44	11:50	12:03A	12:09A
12:15A	12:18A	12:29A	12:35A	12:47	12:50

WEEKEND NOTE:
All outbound trips service John Eliot Square

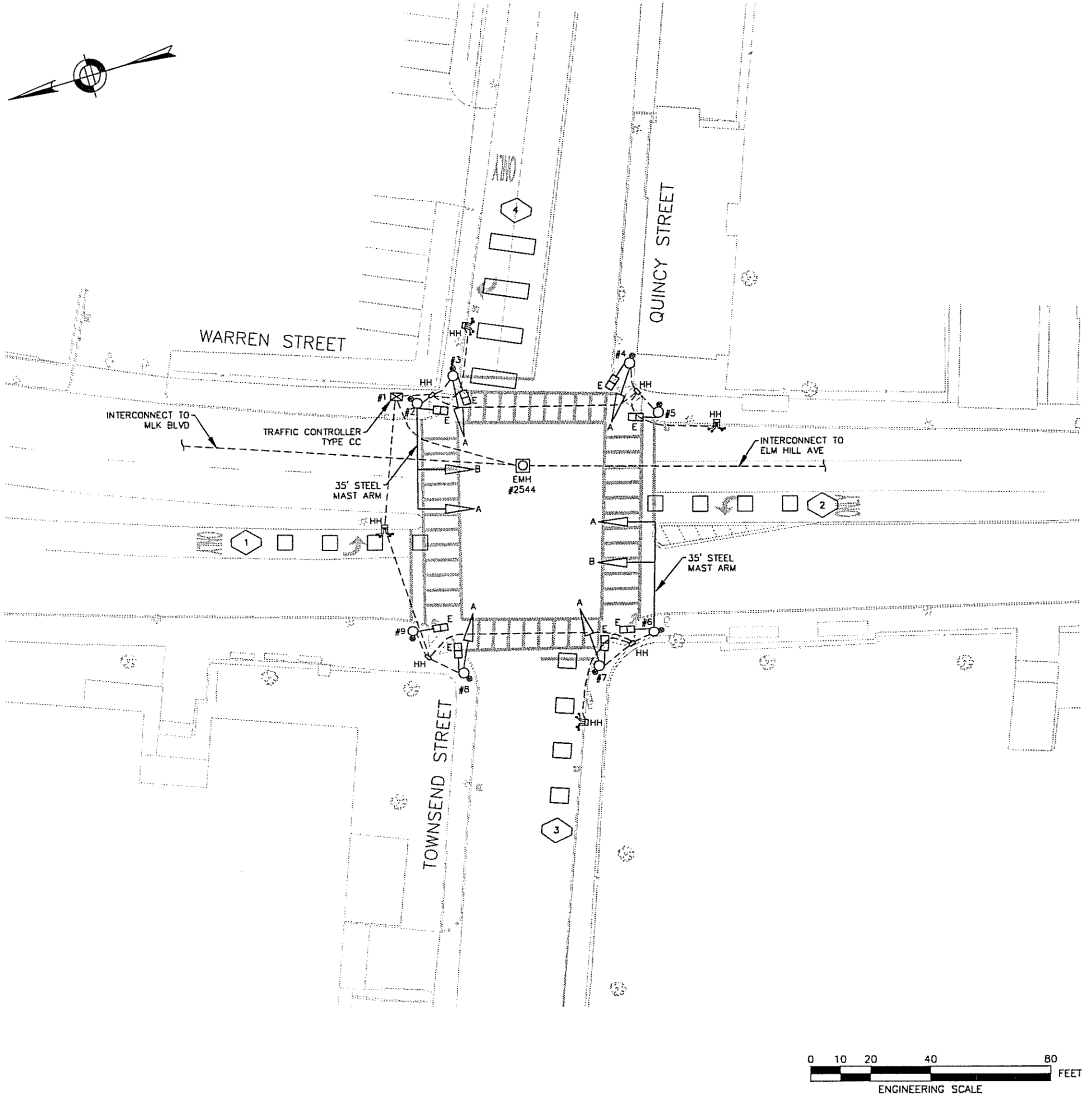
Fare	Local Bus	Bus + Bus	Rapid Transit	Bus + Rapid Transit
CharlieCard	$1.60	$1.60	$2.10	$2.10
CharlieTicket	$2.10	$2.10	$2.65	$4.75
Cash-on-Board	$2.10	$4.20	$2.65	$4.75
Student CharliCard*	$0.80	$0.80	$1.05	$1.05
Senior/TAP CharliCard**	$0.80	$0.80	$1.05	$1.05

VALID PASSES: LinkPass ($75/mo.); Monthly Local Bus ($50/mo.); *StudentPass ($26.00/Month for 5-Day validity Mon-Fri or 7-Day validity on all days); **Senior/TAP Pass ($29/mo.); and express bus, commuter rail, and boat passes.
FREE FARES: Children 11 and under ride free when accompanied by an adult; Blind Access CharlieCard holders ride free and if using a guide, the guide rides free.
* Requires Student CharlieCard, available to students through participating middle schools and high schools.
** Requires Senior/TAP CharlieCard, available to Medicare cardholders, seniors 65+, and persons with disabilities.

Summer 2015 Holidays
July 4: see Sunday September 7: see Sunday

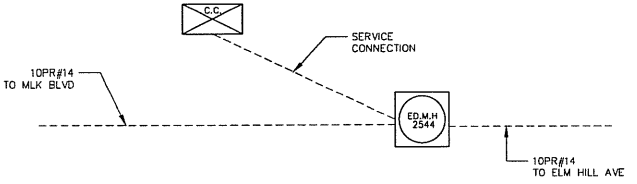
Route 44
Jackson Square Station-Ruggles Station

□ BTD Traffic Signal Plans



0 10 20 40 80 FEET

ENGINEERING SCALE

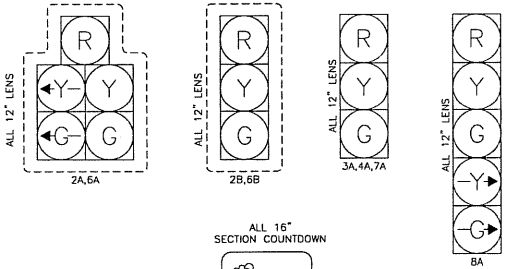


INTERCONNECT DIAGRAM

N.T.S.

SIGNAL DISPLAY

PER BTD SPECIFICATIONS



ALL 16" SECTION COUNTDOWN

2E,3E,4E,5E
6E,7E,8E,9E

BOSTON TRANSPORTATION DEPARTMENT

DRAWN BY J. MONACELLI
CHECKED BY W. ALEMAN
APPROVED BY D. BURGESS

CITY OF BOSTON TRANSPORTATION DEPARTMENT
ENGINEERING DIVISION
TRAFFIC SIGNAL PLAN

WARREN STREET @ TOWNSEND STREET / QUINCY STREET

INTERSECTION NO. 0526

INVENTORY DATE: 12/30/2013
DISTRICT: ROXBURY

DRAWING NO. SP-0526
SHEET 1 OF 3

DRAWING PREPARED BY BOSTON TRANSPORTATION DEPARTMENT

BTD - INT_0526_SP_123013.DWG Dec 29, 2014 5:21 PM

TIMING AND SEQUENCE CHART

(APPROX.) WARREN STREET / TOWNSEND ST. / QUINCY ST.

STREET/DIRECTION/DISPLAY	ø1			ø2			ø3			ø4			ø5			ø6			FLASHING OPERATION
	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	GRN	CL	CL	
WARREN ST/NB/2B	R	R	R	G	Y	R	R	R	R	R	R	R	R	R	R	R	R	R	FY
WARREN ST/NB/2A	R	R	R	G	Y	R	R	R	R	R	R	R	R/GL	R/YL	R	R	R	R	FY
WARREN ST/SB/6B	R	R	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	FY
WARREN ST/SB/6A	R/GL	R/YL	R	R	R	R	R	R	R	R	R	R	R	R	R	G	Y	R	FY
QUINCY ST/WB/7A	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	FR
QUINCY ST/WB/8A	R/GR	R/YR	R	R	R	R	R	R	R	G	Y	R	R	R	R	R/GR	R/YR	R	FR
TOWNSEND ST/EB/3A,4A	R	R	R	R	R	R	R	R	R	G	Y	R	R	R	R	R	R	R	FR
CROSSWALK/E-W/3E,4E,7E,8E	DW	DW	DW	DW	DW	DW	W	FDW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OFF
CROSSWALK/N-S/2E,5E,6E,9E	DW	DW	DW	DW	DW	DW	W	FDW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	OFF

INTERVALS (SECONDS)	ø1			ø2			ø3			ø4			ø5			ø6		
MINIMUM GREEN	6			10						8			6			10		
VEHICLE EXTENSION	2			2						2			2			2		
MAXIMUM 1 GREEN	20			40						30			20			40		
MAXIMUM 2 GREEN	20			40						30			20			40		
YELLOW CLEARANCE		3			3						3			3			3	
RED CLEARANCE			1			1						1			1			1
WALK INTERVAL							10											
PED. CLEARANCE								13	4									
MEMORY	NON-LOCK			–			NON-LOCK			NON-LOCK			NON-LOCK			–		
RECALL	OFF			MAX			OFF			OFF			OFF			MAX		

PROGRAM/COORDINATION

CYCLE NO.	PATTERN	CYCLE LENGTH	OFFSET (SEC.)	PHASE SPLITS IN SECONDS ø1	ø2	ø3	ø4	ø5	ø6	HOURS OF OPERATION
1	–	90	0	10	29	27	24	10	29	ALL OTHER TIMES
2	–	100	0	11	38	27	24	11	38	M-F, 6:00 AM – 10:00 AM
3	–	100	0	16	28	27	29	16	28	M-F, 3:00 PM – 7:00 PM
COORDINATED OPERATION										EVERYDAY
PROGRAMMED FLASH										3:00AM – 6:00AM

LOOP DETECTOR DATA

IDENT.	QTY.	SIZE	SPLICE	TURNS	MODE	ø CALL	ø EXT.	CHNL.
1	4	E	S/P	3	PRES.	1	1	1
2	4	E	S/P	3	PRES.	5	5	2
3	4	E	S/P	3	PRES.	4	4	3
4	4	E	S/P	3	PRES.	4	4	4

S/P = SERIES/PARALLEL
E = EXISTING

CLEARANCES

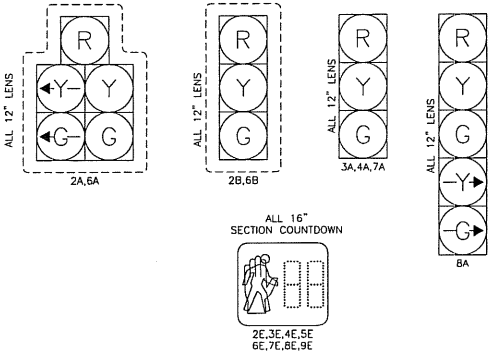
FROM \ TO	G	R	–	DW
G	G	Y	–	–
R/GR	–	R/YR	–	–
R/GL	R/YL	R/YL	–	–
W	–	–	–	FDW

TECHNICAL NOTES

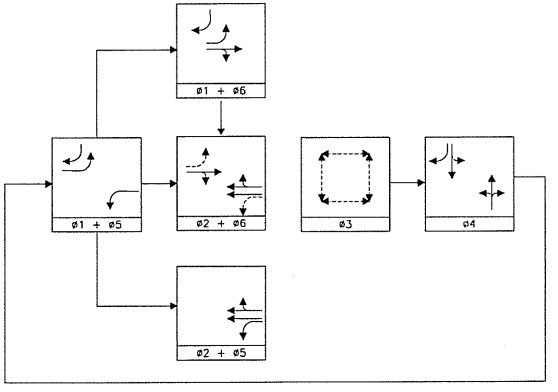
1. ø3 SUBJECT TO PUSHBUTTON ACTUATION ONLY.
2. ø1 & ø5; ø1 & ø6; ø2 & ø5; ø2 & ø6 MAY TIME CONCURRENTLY.

SIGNAL DISPLAY

PER BTD SPECIFICATIONS



PHASING DIAGRAM



BTD
BOSTON TRANSPORTATION DEPARTMENT

DRAWN BY J. MONACELLI
CHECKED BY W. ALEMAN
APPROVED BY D. BURGESS

CITY OF BOSTON TRANSPORTATION DEPARTMENT
ENGINEERING DIVISION
TIMING AND SEQUENCE PLAN

WARREN STREET@
TOWNSEND STREET/QUINCY STREET

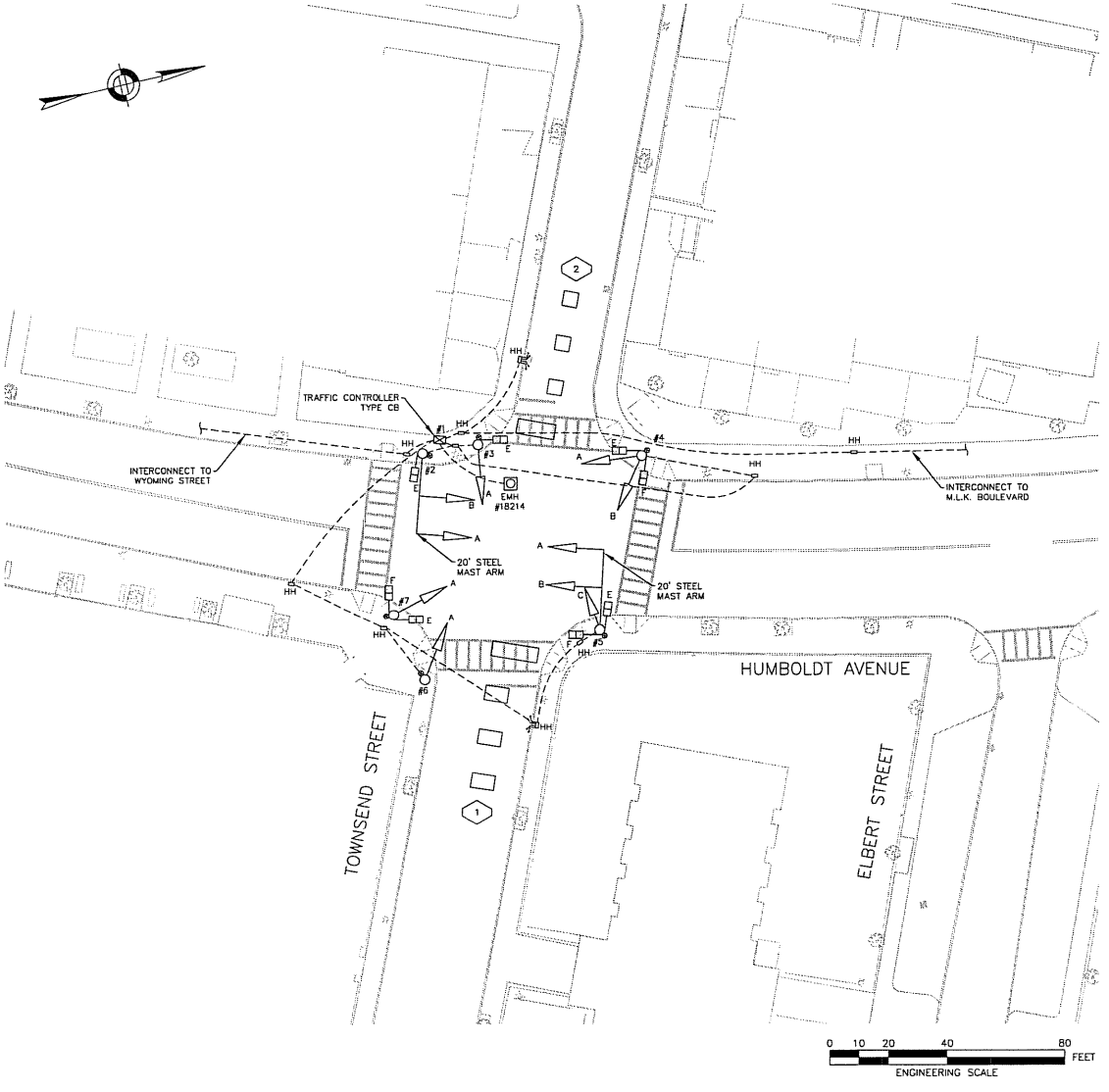
INTERSECTION NO. 0526

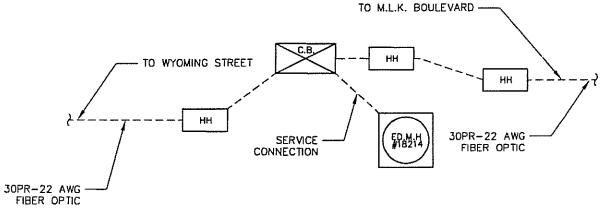
INVENTORY DATE: 12/30/2013
DISTRICT: ROXBURY

DRAWING NO. SS-0526
SHEET 2 OF 3

DRAWING PREPARED BY BOSTON TRANSPORTATION DEPARTMENT

BTD - INT_0526_SS_123013.DWG Jan 5, 2015 11:46 AM



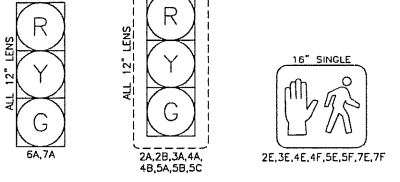


INTERCONNECT DIAGRAM

N.T.S.

SIGNAL DISPLAY

PER BTD SPECIFICATIONS



BTD
BOSTON TRANSPORTATION DEPARTMENT

DRAWN BY J. ARNOTT
CHECKED BY P. VASILIOU
APPROVED BY R. EMERY

CITY OF BOSTON TRANSPORTATION DEPARTMENT
ENGINEERING DIVISION
TRAFFIC SIGNAL PLAN

HUMBOLDT AVENUE @ TOWNSEND STREET

INTERSECTION NO. 0556

INVENTORY DATE: 09/12/2013
DISTRICT: ROXBURY

DRAWING NO. SP-0556
SHEET 1 OF 3

DRAWING PREPARED BY JACOBS ENGINEERING

Nitsch - INT_0556_SP_091213.dwg Jun 9, 2014 3:59 PM

TIMING AND SEQUENCE CHART

(APPROX.) HUMBOLDT AVENUE / TOWNSEND STREET

STREET/DIRECTION/DISPLAY	ø1 GRN	ø1 CL	ø1 CL	ø2 GRN	ø2 CL	ø2 CL	ø3 GRN	ø3 CL	ø3 CL									FLASHING OPERATION
HUMBOLDT AVE/NB/4A,5A,5B	G	Y	R	R	R	R	R	R	R									FY
HUMBOLDT AVE/SB/2A,2B,7A	G	Y	R	R	R	R	R	R	R									FY
TOWNSEND ST/EB/5C,6A	R	R	R	R	R	R	G	Y	R									FR
TOWNSEND ST/WB/3A,4B	R	R	R	R	R	R	G	Y	R									FR
CROSSWALK/N-S/3E,4E,5F,7E	DW	DW	DW	W	FDW	DW	DW	DW	DW									OFF
CROSSWALK/E-W/2E,4F,5E,7F	DW	DW	DW	W	FDW	DW	DW	DW	DW									OFF

INTERVALS (SECONDS)	ø1	ø2	ø3						
MINIMUM GREEN	15		8						
VEHICLE EXTENSION	2		3						
MAXIMUM 1 GREEN	25		15						
MAXIMUM 2 GREEN	35		22						
YELLOW CLEARANCE	4		4						
RED CLEARANCE	1	4	1						
WALK INTERVAL		10							
PED. CLEARANCE		6							
MEMORY	NON-LOCK	NON-LOCK	NON-LOCK						
RECALL	MIN	–	MIN						

PROGRAMMED FLASH — EMERGENCY ONLY

LOOP DETECTOR DATA

IDENT.	QTY.	SIZE	SPLICE	TURNS	MODE	øCALL	øEXT.	CHNL.
(1)	4	E	E	E	PRES.	3	3	1
(2)	4	E	E	E	PRES.	3	3	2

S/P = SERIES/PARALLEL
E = EXISTING

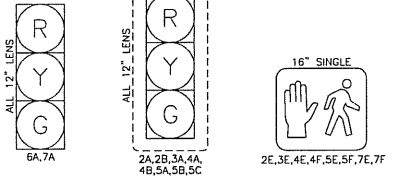
CLEARANCES

FROM \ TO	G	R	W	DW
G	G	Y	–	–
W	–	–	W	FDW

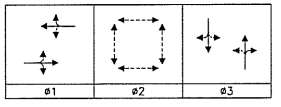
TECHNICAL NOTES

SIGNAL DISPLAY

PER BTD SPECIFICATIONS



PHASING DIAGRAM



BTD BOSTON TRANSPORTATION DEPARTMENT

DRAWN BY J. ARNOTT
CHECKED BY P. VASILIOU
APPROVED BY R. EMERY

CITY OF BOSTON TRANSPORTATION DEPARTMENT
ENGINEERING DIVISION
TIMING AND SEQUENCE PLAN

HUMBOLDT AVENUE @ TOWNSEND STREET

INTERSECTION NO. 0556

INVENTORY DATE: 09/12/2013
DISTRICT: ROXBURY

DRAWING NO. SS-0556
SHEET 2 OF 3

DRAWING PREPARED BY JACOBS

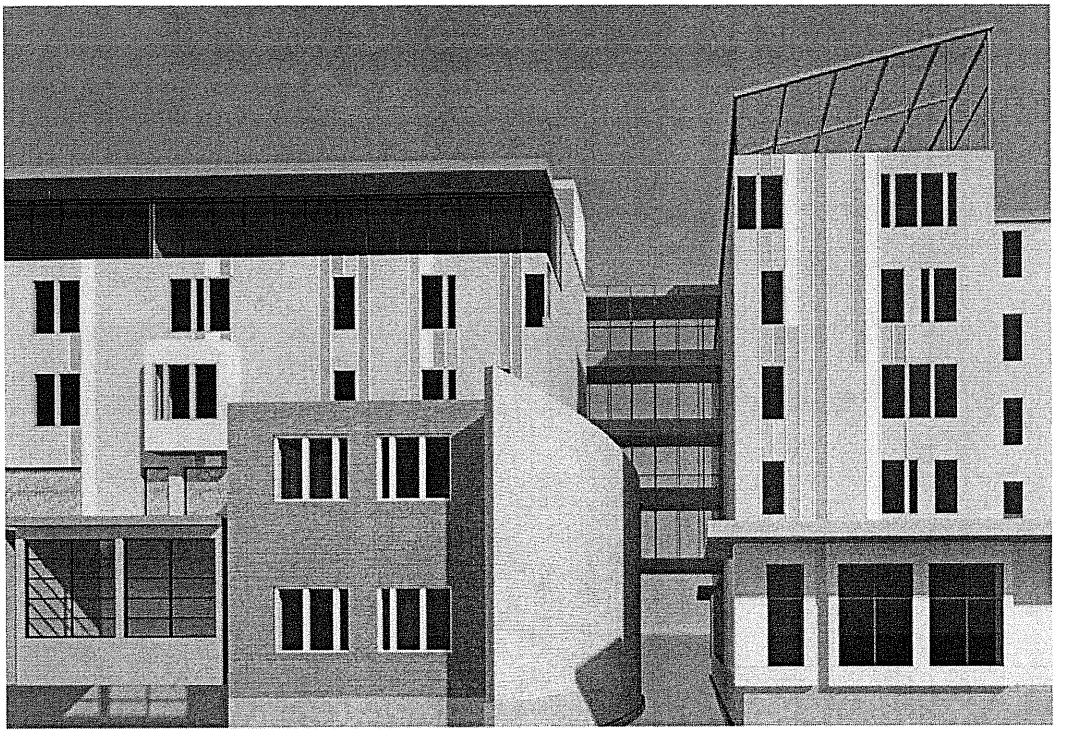
Nitsch - INT_0556_SS_091213.dwg Jun 9, 2014 4:00 PM

□ Background Growth

Expanded Project Notification Form

Submitted Pursuant to Article 80 of the Boston Zoning Code

Bartlett Place



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

Submitted by:
Bartlett Place Land Inc.
c/o Nuestra Comunidad Development Corporation
56 Warren Street, Suite 200
Boston, MA 02119

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Michael Washington Architects
Howard/Stein-Hudson Associates, Inc.
Goulston & Storrs, LLP
Develllis Zrein, Inc.
Weston & Sampson

March 1, 2013

Epsilon
ASSOCIATES INC.

3.3.3.1 Site Access and Circulation

Vehicular access for the full build out will add three additional curb cuts to the Project Site. An additional driveway is provided on Guild Street west of the parking garage access.Two additional driveways on will be added on Bartlett Street accessing the residences, all west of the existing First Phase driveway.

All loading, trash pick-up, and move-in/move-out activities will occur on-site from the surface parking lot.

3.3.3.2 Trip Generation and Mode Split

For the full build out, trip generation for the proposed additional land uses was derived from the Institute of Transportation Engineers' (ITE) publication *Trip Generation* 9th edition, using the *LUC 230 – Residential Condominiums/Townhouse*

Table 3-12 Trip Generation Summary, Full Build-out

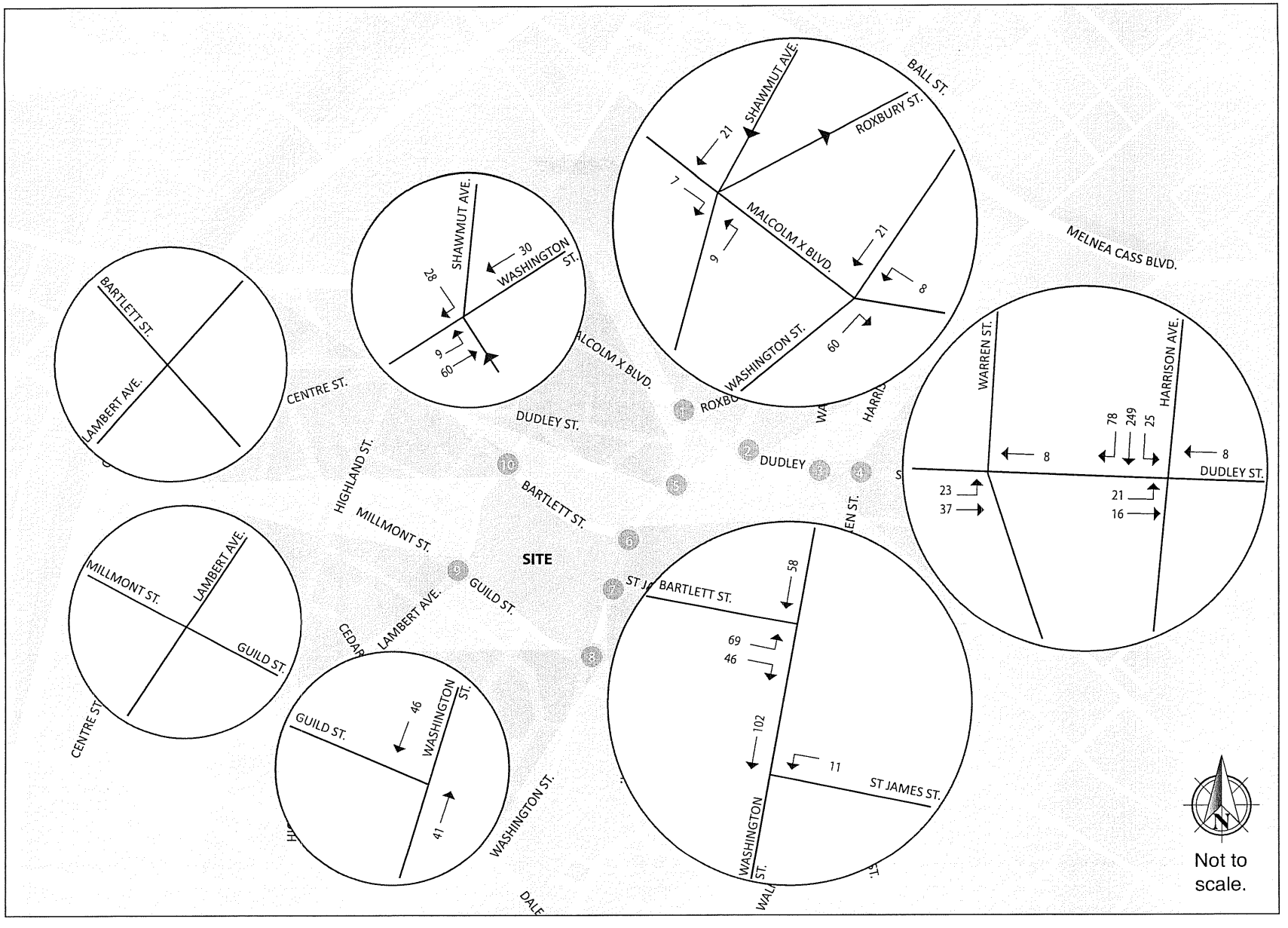
	Direction	Transit Trips	Walk/Bike Trips	Auto Trips
Daily	In	366	595	1,046
	Out	366	595	1,046
	Total	732	1,190	2,092
a.m. Peak Hour	In	50	67	112
	Out	93	91	121
	Total	143	158	233
p.m. Peak Hour	In	62	63	83
	Out	39	52	86
	Total	101	115	169

3.3.3.3 Trip Distribution

Vehicular trip distribution for the new residential land uses was conducted based on the U.S. census bureau data, same as the First Phase. Residential land use distributions for the Project are shown in Figure 3-14.

3.3.3.4 Build Conditions Traffic Operations

The Full Build-out project-generated trips for the a.m. and p.m. peak hours are shown in Figure 3-21 and Figure 3-22, respectively. The capacity analysis for the Full Build-out Condition, which was conducted using the methodology described for Existing, No-Build, and First Phase Conditions is summarized in in Table 3-13 and Table 3-14. The 2022 Full Build-out project generated trips and morning and evening peak hour traffic volumes are presented in Figure 3-21 through Figure 3-24.

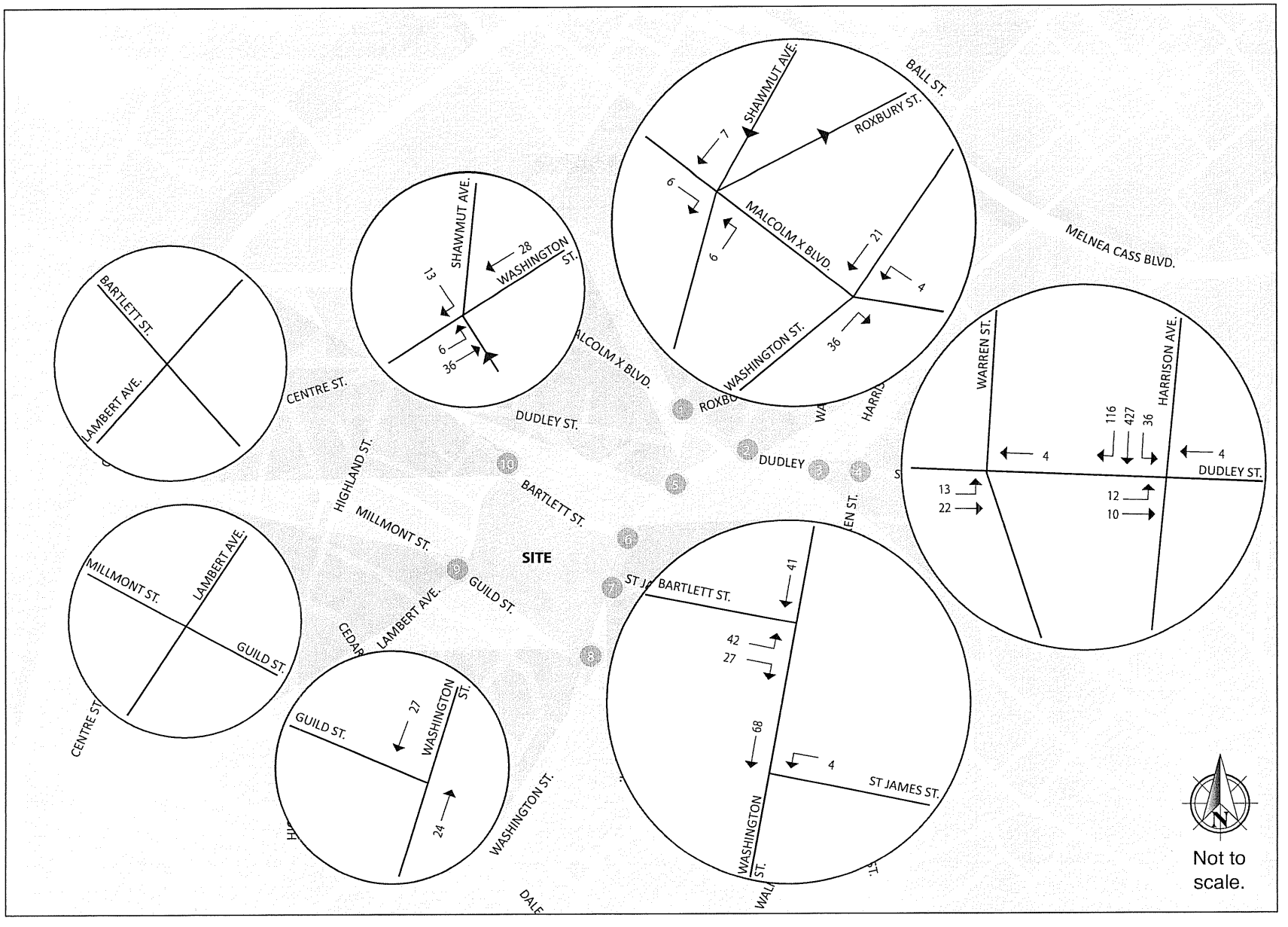


Bartlett Place Boston, Massachusetts

Figure 3-21

Howard/Stein-Hudson Associates, Inc.
CREATIVE SOLUTIONS • EFFECTIVE PARTNERING ®

Full Build-out Condition (2022) Project Genereated Trips, a.m. Peak Hour



Bartlett Place Boston, Massachusetts

Figure 3-22

Howard/Stein-Hudson Associates, Inc.
CREATIVE SOLUTIONS • EFFECTIVE PARTNERING

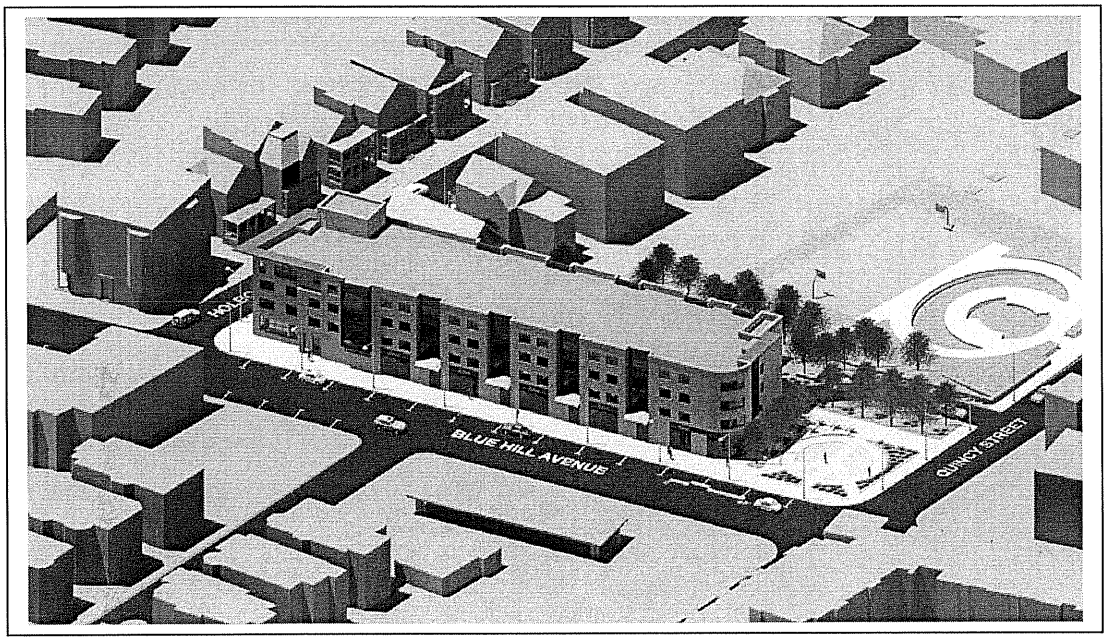
Full Build-out Condition (2022) Project Genereated Trips, p.m. Peak Hour

Project Notification Form

Submitted Pursuant to Article 80 of the Boston Zoning Code

THE CLARION

DORCHESTER, MASSACHUSETTS



Submitted to:

BOSTON REDEVELOPMENT AUTHORITY
One City Hall Square
Boston, MA 02201

Submitted by:

THE COMMUNITY BUILDERS, LLC

Prepared by:

STULL AND LEE, INC.
Thomas Maistros, AIA

In Association with:

MCCLURG TRAFFIC
ANDREW MCCLURG, AICP CTP

March 6, 2015

Table 2-8 Comparison of Driveway Alternatives

	PRO	CON
Quincy St.	• Most direct access with least neighborhood impact	• Westbound lefts off Quincy St. • Difficult turns out of driveway
Blue Hill Ave.	• Avoids interaction with Haynes	• New exit onto Blue Hill Ave. • pedestrians crossing drive • northbound lefts off Blue Hill Ave.
Holborn St.	• Avoids interaction with Haynes	• Generates traffic onto Holborn St. • Costs parking spaces • making east end two-way needs City approval • Enforcement • If two-way not instituted, residents will have to exit via Warren St.

Vehicular Traffic Impacts. The Clarion project will generate traffic from both its residential and commercial components. The residential traffic will approach and depart the project site via the driveway on Quincy St. Traffic generated by the retail and office components will be somewhat more diffused, since on-site parking will not be provided. For purposes of this analysis, it is assumed that vehicles driven by employees and customers of the commercial components will be parked along Blue Hill Ave. between Quincy and Holborn Streets. See the Mitigation section below for a discussion of commercial parking opportunities.

Table 2-9 shows the resulting numbers of trips generated by the project, inbound and outbound, in the AM and PM peak hours.

Table 2-9 Calculated Project Trip Generation

Land Use	Daily	AM	AM In	AM Out	PM	PM In	PM Out	Sat	Sat In	Sat Out
Mid-Rise Apartment	*160*	*11*	*4*	*8*	*15*	*9*	*6*	*13*	*6*	*7*
Residential Condo/Townhouse	*12*	*1*	*0*	*1*	*1*	*1*	*0*	*1*	*0*	*1*
Total residential	*171*	*12*	*4*	*9*	*16*	*9*	*7*	*14*	*6*	*8*
x auto share: 57%	**98**	**7**	**2**	**5**	**9**	**5**	**4**	**8**	**4**	**4**
Specialty Retail Center	*222*	*34*	*16*	*18*	*14*	*6*	*8*	*24*	*11*	*13*
x 'other' share: 53%	**117**	**18**	**9**	**9**	**7**	**3**	**4**	**13**	**6**	**7**
General Office	*11*	*2*	*1*	*0*	*1*	*0*	*1*	*2*	*1*	*1*
x work share: 59%	**7**	**1**	**1**	**0**	**1**	**0**	**1**	**1**	**0**	**0**
Grand Total	**222**	**26**	**12**	**14**	**17**	**9**	**8**	**22**	**10**	**11**

Figure 2-16 shows the projected trips generated by the Clarion in the AM and PM peak hours, based on the trip generation, mode split, trip distribution and trip assignment analysis shown in the Methodology section above. The assignment of trips around the site takes into account that residential traffic will enter and exit via the Quincy St. driveway; trips generated by the retail and office space are assigned to the proposed parking lane on Blue Hill Ave. See the Parking and Mitigation and Potential Improvements sections, below.

Figure 2-16 Peak-Hour Trips Generated by the Clarion Project, AM/PM/Sat

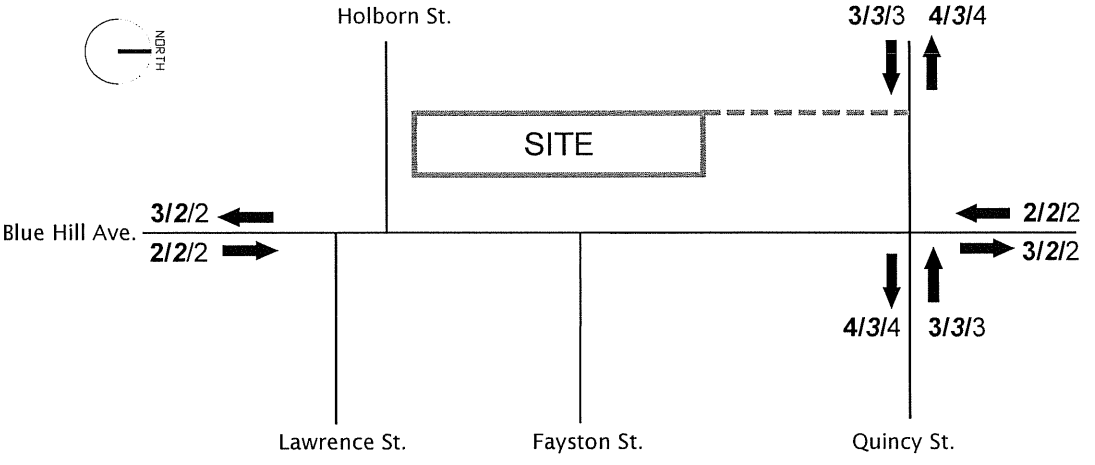


Table 2-10 shows the results of capacity analysis at the study intersections under the Build Scenario.

Table 2-10 Build-Scenario Peak-Hour Delay and Level of Service

		AM Peak Hour		PM Peak Hour		Saturday Peak Hour	
	Intersection	**Delay**	**LOS**	**Delay**	**LOS**	**Delay**	**LOS**
Sig.	**Blue Hill Ave./Quincy St.**	**24.6**	**C**	**30.2**	**C**	**28.0**	**C**
	Northbound	22.6	C	18.3	B	23.9	C
	Southbound	14.3	B	24.6	C	32.0	C
	Eastbound	34.1	C	42.6	D	28.7	C
	Westbound	35.1	C	50.4	D	27.6	C
Unsig.	**Blue Hill Ave./Fayston St.**						
	Westbound	41.0	E	75.2	F	180.0	F
Unsig.	**Blue Hill Ave./Holborn St./Lawrence St.**						
	Northbound	1.3	A	0.3	A	0.8	A
	Southbound	3.2	A	3.6	A	2.6	A

Comparison of Tables 2-6 and 2-10 shows that the difference between the existing scenario and the build scenario (which takes into account the impact of both the Clarion and Quincy Commons projects) is negligible. Calculated increase in delay is in most cases in the fractions of a second.

□ Trip Generation/Distribution Calculations

Trip Generation Summary - Proposed Bridge Boston Charter School

	Bridge Boston Faculty & Staff			Bridge Boston Proposed Enrollment	
Administrative Staff	12	13%	PreK-8	400	100%
Full Time Teaching Staff	36	40%			0%
Part Time Teaching Staff	7	8%			0%
Other staff (Potentially)	34	38%	Total	400	100%
Total	89	100%			

Morning Peak Hour - Calculations (Students Only)

Grade	Cars	Students*	VOR	Busses	Bused Students	VOR	MBTA/Walk	Total Student Vehicle Trips	Total Enrollment
Student Trips	95	109	1.15	11	192	17.45	87	212	-

* Deducted 10% for arrival after AM Peak hour

Evening Peak Hour - Calculations (Students Only)

Grade	Cars	Students**	VOR	Busses	Bused Students	VOR	MBTA/Walk	Total Student Vehicle Trips	Total Enrollment
Student Trips	84	97	1.15	11	192	17.45	87	190	-

** Deducted 20% for arrival prior to PM Peak hour

Morning Travel Mode - Students			
# Students			Estimated #
MBTA/Walk	Car	School Bus	School Busses
87	121	192	11
22%	30%	48%	

Afternoon Travel Mode - Students			
# Students			Estimated #
MBTA/Walk	Car	School Bus	School Busses
87	121	192	11
22%	30%	48%	

# Proposed Students	400				
# Staff/Faculty On-Site	89				
		Students			Vehicle
Morning Peak Hour (7:00-8:00 AM)	Staff*	Vehicle	Bus	Total	Trips/Student
In	21	95	11	127	0.32
Out	0	95	11	106	0.27
Total	21	190	22	233	0.58

*Reflects 1.25 VOR for staff

		Students			Vehicle
Evening Peak Hour (4:30-5:30 PM)	Staff*	Vehicle	Bus	Total	Trips/Student
In	0	84	11	95	0.24
Out	30	84	11	125	0.31
Total	30	168	22	220	0.55

*School start time is at 8:00 AM; student arrival begins at approximately 7:00 AM with 77% parent cars arriving after 7:30 AM
*Based on observations at the Bridge Boston school, 30% of the staff arrives during the morning peak hour (7:00 AM - 8:00 AM)
*Based on observations at the Bridge Boston schools, 42% of the staff depart during the evening peak hour (4:30 PM - 5:30 PM)
*Student and staff dismisal occurs between 3:30 and 5:30 PM.
VOR for students and VOR for staff obtained from observations conducted at the Bridge Boston School in September 2015
* Use 1.25 VOR for staff (conservative)

BBCS
Trip Distribution

Origin Zip Code	Area	% of Population	Warren Street (From North)		Warren Street (From South)		Townsend Street (From West)		Quincy Street (From East)		Humboldt Avenue (From North)		Humboldt Avenue (From South)	
02121	Dorchester	17.4%		0%	75%	13%		0%	25%	4%		0%		0%
02124	Dorchester	16.6%		0%	75%	12%		0%	25%	4%		0%		0%
02136	Hyde Park	12.8%		0%	100%	13%		0%		0%		0%		0%
02119	Roxbury	11.1%	25%	3%	25%	3%	5%	1%	25%	3%	10%	1%	10%	1%
02126	Mattapan	8.1%		0%	100%	8%		0%		0%		0%		0%
02122	Dorchester	6.0%		0%	25%	1%		0%	75%	4%		0%		0%
02125	Dorchester	5.5%		0%		0%		0%	100%	6%		0%		0%
02131	Roslindale	5.5%		0%	25%	1%	75%	4%		0%		0%		0%
02130	Jamaica Plain	2.6%		0%		0%	100%	3%		0%		0%		0%
02120	Mission Hill	2.6%	25%	1%		0%	25%	1%		0%	50%	1%		0%
02127	South Boston	2.6%		0%		0%		0%	100%	3%		0%		0%
02118	South end	2.1%	100%	2%		0%		0%		0%		0%		0%
02140	Cambridge	0.9%		0%		0%		0%		0%	100%	1%		0%
02128	East Boston	0.9%	100%	1%		0%		0%		0%		0%		0%
02115	Fenway	0.9%	25%	0%		0%		0%		0%	75%	1%		0%
02351	Abington	0.4%		0%	100%	0%		0%		0%		0%		0%
02116	Back Bay	0.4%	25%	0%		0%		0%		0%	75%	0%		0%
02135	Brighton	0.4%		0%		0%	25%	0%		0%	75%	0%		0%
02446	Brookline	0.4%		0%		0%	25%	0%		0%	75%	0%		0%
02129	Charlestown	0.4%	100%	0%		0%		0%		0%		0%		0%
02215	Fenway	0.4%	25%	0%		0%		0%		0%	75%	0%		0%
-		0%		0%		0%		0%		0%		0%		0%
	Total	100%		9%		53%		8%		24%		5%		1%

□ Intersection Capacity Analysis

LEVEL OF SERVICE METHODOLOGY

Capacity analysis of intersections is developed using the Synchro® computer software, which implements the methods of the 2010 Highway Capacity Manual (HCM). The resulting analysis presents a level-of-service (LOS) designation for individual intersection movements and (for signalized intersections) for the entire intersection. The LOS is a letter designation that provides a qualitative measure of operating conditions based on several factors including roadway geometry, speeds, ambient traffic volumes, traffic controls, and driver characteristics. Since the LOS of a traffic facility is a function of the traffic flows placed upon it, such a facility may operate at a wide range of LOS, depending on the time of day, day of week, or period of year. A range of six levels of service are defined on the basis of average delay, ranging from LOS A (the least delay) to LOS F (delays greater than 50 seconds for unsignalized movements, and greater than 80 seconds for signalized movements).

Signalized Intersection Performance Measures

The six LOS designations for signalized intersections may be described as follows:

- *LOS A* describes operations with low control delay; most vehicles do not stop at all.
- *LOS B* describes operations with relatively low control delay. However, more vehicles stop than LOS A.
- *LOS C* describes operations with higher control delays. Individual cycle failures may begin to appear. The number of vehicles stopping is significant at this level, although many still pass through the intersection without stopping.
- *LOS D* describes operations with control delay in the range where the influence of congestion becomes more noticeable. Many vehicles stop and individual cycle failures are noticeable.
- *LOS E* describes operations with high control delay values. Individual cycle failures are frequent occurrences.
- *LOS F* describes operations with high control delay values that often occur with over-saturation. Poor progression and long cycle lengths may also be major contributing causes to such delay levels.

The LOS for signalized intersections are calculated using the operational analysis methodology of the 2010 *Highway Capacity Manual*.[1] This method assesses the effects of signal type, timing, phasing, and progression; vehicle mix; and geometrics on delay. LOS designations are based on the criterion of control or signal delay per vehicle. Control or signal delay is a measure of driver discomfort, frustration, and fuel consumption, and includes initial deceleration delay approaching the traffic signal, queue move-up time, stopped delay and final acceleration delay. **Table A1** summarizes the relationship between LOS and control delay. The tabulated control delay criterion may be applied in assigning LOS designations to individual lane groups, to individual intersection approaches, or to entire intersections.

Table A1
LEVEL-OF-SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS[1]

Level of Service	Control (Signal) Delay per Vehicle (Seconds)
A	≤10.0
B	10.1 to 20.0
C	20.1 to 35.0
D	35.1 to 55.0
E	55.1 to 80.0
F	>80.0

[1]Source: *Highway Capacity Manual 2010;* Transportation Research Board; Washington, DC; 2010.

[1]*Highway Capacity Manual* 2010; Transportation Research Board; Washington, DC; 2010.

Unsignalized Intersection Performance Measures

The six LOS designations for unsignalized intersections may be described as follows:

- *LOS A* represents a condition with little or no control delay to minor street traffic.
- *LOS B* represents a condition with short control delays to minor street traffic.
- *LOS C* represents a condition with average control delays to minor street traffic.
- *LOS D* represents a condition with long control delays to minor street traffic.
- *LOS E* represents operating conditions at or near capacity level, with very long control delays to minor street traffic.
- *LOS F* represents a condition where minor street demand volume exceeds capacity of an approach lane, with extreme control delays resulting.

The LOS designations of unsignalized intersections are determined by application of a procedure described in the 2010 *Highway Capacity Manual.*[2] LOS is measured in terms of average control delay. Mathematically, control delay is a function of the capacity and degree of saturation of the lane group and/or approach under study and is a quantification of motorist delay associated with traffic control devices such as traffic signals and STOP signs. Control delay includes the effects of initial deceleration delay approaching a STOP sign, stopped delay, queue move-up time, and final acceleration delay from a stopped condition. Definitions for LOS at unsignalized intersections are also given in the *Highway Capacity Manual 2010*. **Table A2** summarizes the relationship between LOS and average control delay.

Table A2
LEVEL-OF-SERVICE CRITERIA FOR UNSIGNALIZED INTERSECTIONS[1]

Average Control Delay (seconds per vehicle)	Level of Service	
	v/c ≤ 1	v/c > 1
≤ 10.0	A	F
10.1 to 15.0	B	F
15.1 to 25.0	C	F
25.1 to 35.0	D	F
35.1 to 50.0	E	F
>50.0	F	F

[1]Source: *Highway Capacity Manual 2010,* Transportation Research Board; Washington, DC; 2010.

[2] ibid

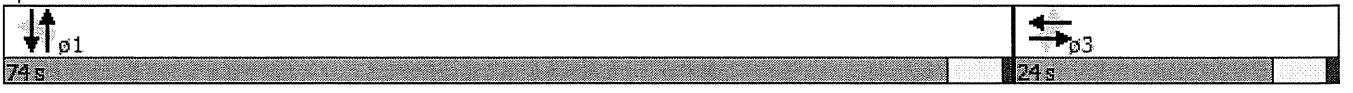
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	48	142	33	67	90	74	44	393	98	41	192	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	16	12	12	16	12	12	16	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.980			0.957			0.975			0.992	
Flt Protected		0.989			0.986			0.996			0.992	
Satd. Flow (prot)	0	1744	0	0	1988	0	0	1986	0	0	1891	0
Flt Permitted		0.773			0.659			0.953			0.855	
Satd. Flow (perm)	0	1363	0	0	1329	0	0	1900	0	0	1630	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			22			28			8	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		200			1000			200			200	
Travel Time (s)		4.5			22.7			4.5			4.5	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	2%	6%	9%	2%	0%	5%	2%	5%	8%	12%	13%	0%
Adj. Flow (vph)	55	161	38	76	102	84	50	447	111	47	218	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	254	0	0	262	0	0	608	0	0	282	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)		16			16			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Minimum Split (s)	13.0	13.0		13.0	13.0		20.0	20.0		20.0	20.0	
Total Split (s)	24.0	24.0		24.0	24.0		74.0	74.0		74.0	74.0	
Total Split (%)	24.5%	24.5%		24.5%	24.5%		75.5%	75.5%		75.5%	75.5%	
Maximum Green (s)	19.0	19.0		19.0	19.0		69.0	69.0		69.0	69.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		19.0			19.0			69.0			69.0	
Actuated g/C Ratio		0.19			0.19			0.70			0.70	
v/c Ratio		0.94			0.95			0.45			0.25	
Control Delay		81.1			81.1			7.2			5.6	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		81.1			81.1			7.2			5.6	
LOS		F			F			A			A	
Approach Delay		81.1			81.1			7.2			5.6	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			A			A	
Queue Length 50th (ft)		153			150			135			53	
Queue Length 95th (ft)		#296			#297			189			81	
Internal Link Dist (ft)		120			920			120			120	
Turn Bay Length (ft)												
Base Capacity (vph)		270			275			1346			1150	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.94			0.95			0.45			0.25	

Intersection Summary

Area Type: Other
Cycle Length: 98
Actuated Cycle Length: 98
Offset: 0 (0%), Referenced to phase 2: and 6:, Start of Green
Natural Cycle: 40
Control Type: Pretimed
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 34.0 Intersection LOS: C
Intersection Capacity Utilization 61.2% ICU Level of Service B
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Humboldt Avenue & Townsend Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	81	127	62	20	131	220	72	722	38	12	142	307
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	12	12	12	12	12	12	12	12	12	12
Storage Length (ft)	100		0	0		150	125		100		0	
Storage Lanes	1		0	0		1	1		0		1	
Taper Length (ft)	25			25			25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt		0.951				0.850		0.992				0.984
Flt Protected	0.950				0.993		0.950				0.950	
Satd. Flow (prot)	1948	1898	0	0	1804	1495	1752	3311	0	0	1741	1689
Flt Permitted	0.482				0.825		0.406				0.206	
Satd. Flow (perm)	988	1898	0	0	1499	1495	749	3311	0	0	378	1689
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)		22				232		6				7
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1000			500			200				200
Travel Time (s)		22.7			11.4			4.5				4.5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	4%	16%	15%	3%	8%	3%	8%	11%	0%	4%	12%
Adj. Flow (vph)	85	134	65	21	138	232	76	760	40	13	149	323
Shared Lane Traffic (%)												
Lane Group Flow (vph)	85	199	0	0	159	232	76	800	0	0	162	362
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	R NA	Left	Left
Median Width(ft)		16			16			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	9	15	
Number of Detectors	1	2		1	2	1	1	2		1	1	2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Left	Thru
Leading Detector (ft)	20	100		20	100	20	20	100		20	20	100
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	20	6
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	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	Perm	NA		Perm	NA	pt+ov	pm+pt	NA		pm+pt	pm+pt	NA
Protected Phases		4			4	4 1!	5	2		1!	1	6

Lane Group	SBR	ø3
Lane Configurations		
Volume (vph)	37	
Ideal Flow (vphpl)	1900	
Lane Width (ft)	10	
Storage Length (ft)	100	
Storage Lanes	0	
Taper Length (ft)		
Lane Util. Factor	1.00	
Frt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor	0.95	
Heavy Vehicles (%)	0%	
Adj. Flow (vph)	39	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.09	
Turning Speed (mph)	9	
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases		3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Permitted Phases	4			4			2			6!	6	
Detector Phase	4	4		4	4	4 1	5	2		1	1	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		6.0	10.0		6.0	6.0	10.0
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	14.0		10.0	10.0	14.0
Total Split (s)	24.0	24.0		24.0	24.0		11.0	38.0		11.0	11.0	38.0
Total Split (%)	24.0%	24.0%		24.0%	24.0%		11.0%	38.0%		11.0%	11.0%	38.0%
Maximum Green (s)	20.0	20.0		20.0	20.0		7.0	34.0		7.0	7.0	34.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lag		Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	None	C-Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	15.7	15.7			15.7	26.7	45.1	38.3			46.2	40.6
Actuated g/C Ratio	0.16	0.16			0.16	0.27	0.45	0.38			0.46	0.41
v/c Ratio	0.55	0.63			0.68	0.41	0.19	0.63			0.60	0.53
Control Delay	51.5	43.4			53.8	5.8	16.1	28.4			26.7	27.5
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	51.5	43.4			53.8	5.8	16.1	28.4			26.7	27.5
LOS	D	D			D	A	B	C			C	C
Approach Delay		45.8			25.3			27.4				27.3
Approach LOS		D			C			C				C
90th %ile Green (s)	20.0	20.0		20.0	20.0		7.0	34.0		7.0	7.0	34.0
90th %ile Term Code	Max	Max		Max	Max		Max	Coord		Max	Max	Coord
70th %ile Green (s)	19.5	19.5		19.5	19.5		7.0	34.5		7.0	7.0	34.5
70th %ile Term Code	Gap	Gap		Gap	Gap		Max	Coord		Max	Max	Coord
50th %ile Green (s)	16.5	16.5		16.5	16.5		7.0	37.5		7.0	7.0	37.5
50th %ile Term Code	Gap	Gap		Gap	Gap		Max	Coord		Max	Max	Coord
30th %ile Green (s)	13.3	13.3		13.3	13.3		6.8	40.7		7.0	7.0	40.9
30th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord		Max	Max	Coord
10th %ile Green (s)	9.0	9.0		9.0	9.0		0.0	45.0		7.0	7.0	56.0
10th %ile Term Code	Gap	Gap		Gap	Gap		Skip	Coord		Max	Max	Coord
Queue Length 50th (ft)	50	105			96	0	25	215			56	177
Queue Length 95th (ft)	97	172			158	53	54	299			#110	287
Internal Link Dist (ft)		920			420			120				120
Turn Bay Length (ft)	100					150	125					
Base Capacity (vph)	197	397			299	558	409	1273			270	689
Starvation Cap Reductn	0	0			0	0	0	0			0	0
Spillback Cap Reductn	0	0			0	0	0	0			0	0
Storage Cap Reductn	0	0			0	0	0	0			0	0
Reduced v/c Ratio	0.43	0.50			0.53	0.42	0.19	0.63			0.60	0.53

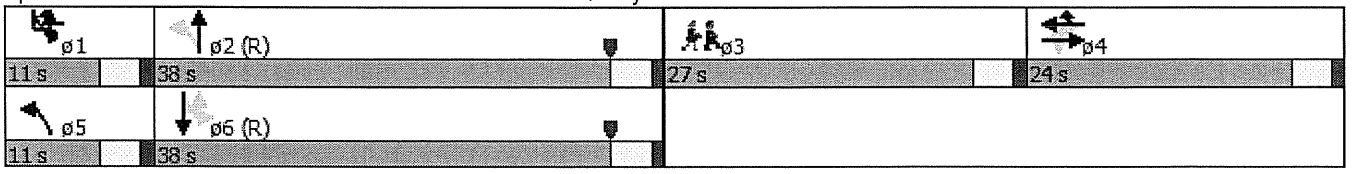
Intersection Summary

Lane Group	SBR	ø3
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)		23.0
Minimum Split (s)		27.0
Total Split (s)		27.0
Total Split (%)		27%
Maximum Green (s)		23.0
Yellow Time (s)		3.0
All-Red Time (s)		1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		Lead
Lead-Lag Optimize?		Yes
Vehicle Extension (s)		3.0
Recall Mode		None
Walk Time (s)		5.0
Flash Dont Walk (s)		11.0
Pedestrian Calls (#/hr)		150
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
90th %ile Green (s)		23.0
90th %ile Term Code		Max
70th %ile Green (s)		23.0
70th %ile Term Code		Max
50th %ile Green (s)		23.0
50th %ile Term Code		Max
30th %ile Green (s)		23.0
30th %ile Term Code		Max
10th %ile Green (s)		23.0
10th %ile Term Code		Max
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.68
Intersection Signal Delay: 29.5 Intersection LOS: C
Intersection Capacity Utilization 67.1% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
! Phase conflict between lane groups.

Splits and Phases: 2: Warren Street & Townsend Street/Quincy Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	49	149	34	69	96	76	45	403	100	42	197	15
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	16	12	12	16	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.980			0.957			0.975			0.992	
Flt Protected		0.990			0.986			0.996			0.992	
Satd. Flow (prot)	0	1746	0	0	1989	0	0	1986	0	0	1891	0
Flt Permitted		0.765			0.648			0.952			0.851	
Satd. Flow (perm)	0	1349	0	0	1307	0	0	1898	0	0	1622	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			21			28			8	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		200			1000			200			200	
Travel Time (s)		4.5			22.7			4.5			4.5	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	2%	6%	9%	2%	0%	5%	2%	5%	8%	12%	13%	0%
Adj. Flow (vph)	56	169	39	78	109	86	51	458	114	48	224	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	264	0	0	273	0	0	623	0	0	289	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)		16			16			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Minimum Split (s)	13.0	13.0		13.0	13.0		20.0	20.0		20.0	20.0	
Total Split (s)	24.0	24.0		24.0	24.0		74.0	74.0		74.0	74.0	
Total Split (%)	24.5%	24.5%		24.5%	24.5%		75.5%	75.5%		75.5%	75.5%	
Maximum Green (s)	19.0	19.0		19.0	19.0		69.0	69.0		69.0	69.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		19.0			19.0			69.0			69.0	
Actuated g/C Ratio		0.19			0.19			0.70			0.70	
v/c Ratio		0.99			1.01			0.46			0.25	
Control Delay		92.5			95.8			7.4			5.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		92.5			95.8			7.4			5.7	
LOS		F			F			A			A	
Approach Delay		92.5			95.8			7.4			5.7	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			A			A	
Queue Length 50th (ft)		161			~163			140			54	
Queue Length 95th (ft)		#313			#318			197			83	
Internal Link Dist (ft)		120			920			120			120	
Turn Bay Length (ft)												
Base Capacity (vph)		267			270			1344			1144	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.99			1.01			0.46			0.25	

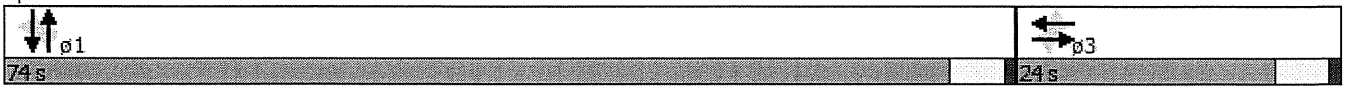
Intersection Summary

Area Type: Other
Cycle Length: 98
Actuated Cycle Length: 98
Offset: 0 (0%), Referenced to phase 2: and 6:, Start of Green
Natural Cycle: 40
Control Type: Pretimed
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 39.2 Intersection LOS: D
Intersection Capacity Utilization 62.9% ICU Level of Service B
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Humboldt Avenue & Townsend Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	83	133	64	21	138	226	73	751	39	12	146	327
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	12	12	12	12	12	12	12	12	12	12
Storage Length (ft)	100		0	0		150	125		100		0	
Storage Lanes	1		0	0		1	1		0		1	
Taper Length (ft)	25			25			25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt		0.951				0.850		0.993				0.984
Flt Protected	0.950				0.993		0.950				0.950	
Satd. Flow (prot)	1948	1898	0	0	1804	1495	1752	3315	0	0	1741	1688
Flt Permitted	0.465				0.801		0.379				0.190	
Satd. Flow (perm)	954	1898	0	0	1455	1495	699	3315	0	0	348	1688
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)		22				238		6				6
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1000			500			200				200
Travel Time (s)		22.7			11.4			4.5				4.5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	4%	16%	15%	3%	8%	3%	8%	11%	0%	4%	12%
Adj. Flow (vph)	87	140	67	22	145	238	77	791	41	13	154	344
Shared Lane Traffic (%)												
Lane Group Flow (vph)	87	207	0	0	167	238	77	832	0	0	167	384
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	R NA	Left	Left
Median Width(ft)		16			16			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	9	15	
Number of Detectors	1	2		1	2	1	1	2		1	1	2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Left	Thru
Leading Detector (ft)	20	100		20	100	20	20	100		20	20	100
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	20	6
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	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	Perm	NA		Perm	NA	pt+ov	pm+pt	NA		pm+pt	pm+pt	NA
Protected Phases		4			4	4 1!	5	2		1!	1	6

Lane Group	SBR	ø3
Lane Configurations		
Volume (vph)	38	
Ideal Flow (vphpl)	1900	
Lane Width (ft)	10	
Storage Length (ft)	100	
Storage Lanes	0	
Taper Length (ft)		
Lane Util. Factor	1.00	
Frt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor	0.95	
Heavy Vehicles (%)	0%	
Adj. Flow (vph)	40	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.09	
Turning Speed (mph)	9	
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases		3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Permitted Phases	4			4			2			6!	6	
Detector Phase	4	4		4	4	4 1	5	2		1	1	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		6.0	10.0		6.0	6.0	10.0
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	14.0		10.0	10.0	14.0
Total Split (s)	24.0	24.0		24.0	24.0		11.0	38.0		11.0	11.0	38.0
Total Split (%)	24.0%	24.0%		24.0%	24.0%		11.0%	38.0%		11.0%	11.0%	38.0%
Maximum Green (s)	20.0	20.0		20.0	20.0		7.0	34.0		7.0	7.0	34.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lag		Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	None	C-Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	16.0	16.0			16.0	27.0	44.8	38.0			45.8	40.2
Actuated g/C Ratio	0.16	0.16			0.16	0.27	0.45	0.38			0.46	0.40
v/c Ratio	0.57	0.64			0.72	0.41	0.20	0.66			0.65	0.56
Control Delay	52.8	43.8			56.7	5.8	16.4	29.4			30.1	28.8
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	52.8	43.8			56.7	5.8	16.4	29.4			30.1	28.8
LOS	D	D			E	A	B	C			C	C
Approach Delay		46.5			26.8			28.3				29.2
Approach LOS		D			C			C				C
90th %ile Green (s)	20.0	20.0		20.0	20.0		7.0	34.0		7.0	7.0	34.0
90th %ile Term Code	Max	Max		Max	Max		Max	Coord		Max	Max	Coord
70th %ile Green (s)	20.0	20.0		20.0	20.0		7.0	34.0		7.0	7.0	34.0
70th %ile Term Code	Max	Max		Max	Max		Max	Coord		Max	Max	Coord
50th %ile Green (s)	16.9	16.9		16.9	16.9		7.0	37.1		7.0	7.0	37.1
50th %ile Term Code	Gap	Gap		Gap	Gap		Max	Coord		Max	Max	Coord
30th %ile Green (s)	13.7	13.7		13.7	13.7		6.9	40.3		7.0	7.0	40.4
30th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord		Max	Max	Coord
10th %ile Green (s)	9.3	9.3		9.3	9.3		0.0	44.7		7.0	7.0	55.7
10th %ile Term Code	Gap	Gap		Gap	Gap		Skip	Coord		Max	Max	Coord
Queue Length 50th (ft)	51	110			101	0	26	229			59	193
Queue Length 95th (ft)	100	179			167	53	55	314			#113	309
Internal Link Dist (ft)		920			420			120				120
Turn Bay Length (ft)	100					150	125					
Base Capacity (vph)	190	397			291	574	388	1264			257	682
Starvation Cap Reductn	0	0			0	0	0	0			0	0
Spillback Cap Reductn	0	0			0	0	0	0			0	0
Storage Cap Reductn	0	0			0	0	0	0			0	0
Reduced v/c Ratio	0.46	0.52			0.57	0.41	0.20	0.66			0.65	0.56

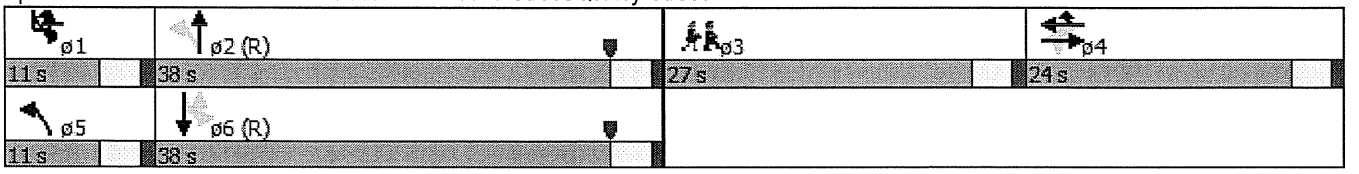
Intersection Summary

Lane Group	SBR	ø3
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)		23.0
Minimum Split (s)		27.0
Total Split (s)		27.0
Total Split (%)		27%
Maximum Green (s)		23.0
Yellow Time (s)		3.0
All-Red Time (s)		1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		Lead
Lead-Lag Optimize?		Yes
Vehicle Extension (s)		3.0
Recall Mode		None
Walk Time (s)		5.0
Flash Dont Walk (s)		11.0
Pedestrian Calls (#/hr)		150
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
90th %ile Green (s)		23.0
90th %ile Term Code		Max
70th %ile Green (s)		23.0
70th %ile Term Code		Max
50th %ile Green (s)		23.0
50th %ile Term Code		Max
30th %ile Green (s)		23.0
30th %ile Term Code		Max
10th %ile Green (s)		23.0
10th %ile Term Code		Max
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection
Natural Cycle: 75
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.72
Intersection Signal Delay: 30.7 Intersection LOS: C
Intersection Capacity Utilization 69.0% ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
! Phase conflict between lane groups.

Splits and Phases: 2: Warren Street & Townsend Street/Quincy Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	49	159	34	74	103	82	45	403	106	51	197	15
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	16	12	12	16	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.981			0.957			0.974			0.992	
Flt Protected		0.990			0.986			0.996			0.990	
Satd. Flow (prot)	0	1747	0	0	1989	0	0	1983	0	0	1887	0
Flt Permitted		0.757			0.629			0.952			0.820	
Satd. Flow (perm)	0	1336	0	0	1269	0	0	1896	0	0	1563	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		7			21			29			7	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		200			520			200			200	
Travel Time (s)		4.5			11.8			4.5			4.5	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	2%	6%	9%	2%	0%	5%	2%	5%	8%	12%	13%	0%
Adj. Flow (vph)	56	181	39	84	117	93	51	458	120	58	224	17
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	276	0	0	294	0	0	629	0	0	299	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			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Minimum Split (s)	13.0	13.0		13.0	13.0		20.0	20.0		20.0	20.0	
Total Split (s)	24.0	24.0		24.0	24.0		74.0	74.0		74.0	74.0	
Total Split (%)	24.5%	24.5%		24.5%	24.5%		75.5%	75.5%		75.5%	75.5%	
Maximum Green (s)	19.0	19.0		19.0	19.0		69.0	69.0		69.0	69.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		19.0			19.0			69.0			69.0	
Actuated g/C Ratio		0.19			0.19			0.70			0.70	
v/c Ratio		1.05			1.12			0.47			0.27	
Control Delay		107.1			128.2			7.4			5.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		107.1			128.2			7.4			5.9	
LOS		F			F			A			A	
Approach Delay		107.1			128.2			7.4			5.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		F			F			A			A	
Queue Length 50th (ft)		~184			~202			142			57	
Queue Length 95th (ft)		#335			#355			199			88	
Internal Link Dist (ft)		120			440			120			120	
Turn Bay Length (ft)												
Base Capacity (vph)		264			262			1343			1102	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		1.05			1.12			0.47			0.27	

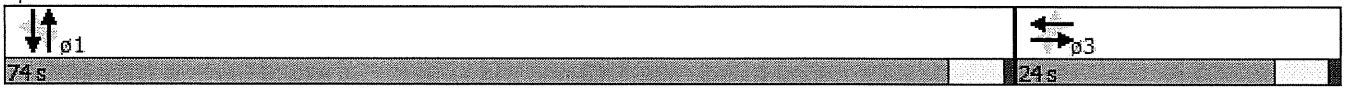
Intersection Summary

Area Type: Other
Cycle Length: 98
Actuated Cycle Length: 98
Offset: 0 (0%), Referenced to phase 2: and 6:, Start of Green
Natural Cycle: 40
Control Type: Pretimed
Maximum v/c Ratio: 1.12
Intersection Signal Delay: 49.2 Intersection LOS: D
Intersection Capacity Utilization 64.3% ICU Level of Service C
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Humboldt Avenue & Townsend Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	99	153	114	21	163	226	126	751	39	12	146	327
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	12	12	12	12	12	12	12	12	12	12
Storage Length (ft)	100		0	0		150	125		100		0	
Storage Lanes	1		0	0		1	1		0		1	
Taper Length (ft)	25			25			25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt		0.936				0.850		0.993				0.979
Flt Protected	0.950				0.994		0.950				0.950	
Satd. Flow (prot)	1948	1847	0	0	1810	1495	1752	3315	0	0	1741	1686
Flt Permitted	0.429				0.661		0.317				0.181	
Satd. Flow (perm)	880	1847	0	0	1203	1495	585	3315	0	0	332	1686
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)		34				238		6				9
Link Speed (mph)		30			30			30				30
Link Distance (ft)		480			500			200				200
Travel Time (s)		10.9			11.4			4.5				4.5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	5%	4%	16%	15%	3%	8%	3%	8%	11%	0%	4%	12%
Adj. Flow (vph)	104	161	120	22	172	238	133	791	41	13	154	344
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	281	0	0	194	238	133	832	0	0	167	401
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	R NA	Left	Left
Median Width(ft)		16			16			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	9	15	
Number of Detectors	1	2		1	2	1	1	2		1	1	2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Left	Thru
Leading Detector (ft)	20	100		20	100	20	20	100		20	20	100
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	20	6
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	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	Perm	NA		Perm	NA	pt+ov	pm+pt	NA		pm+pt	pm+pt	NA
Protected Phases		4			4	4 1!	5	2		1!	1	6

Lane Group	SBR	ø3
Lane Configurations		
Volume (vph)	54	
Ideal Flow (vphpl)	1900	
Lane Width (ft)	10	
Storage Length (ft)	100	
Storage Lanes	0	
Taper Length (ft)		
Lane Util. Factor	1.00	
Frt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor	0.95	
Heavy Vehicles (%)	0%	
Adj. Flow (vph)	57	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.09	
Turning Speed (mph)	9	
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases		3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Permitted Phases	4			4			2			6!	6	
Detector Phase	4	4		4	4	4 1	5	2		1	1	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		6.0	10.0		6.0	6.0	10.0
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	14.0		10.0	10.0	14.0
Total Split (s)	24.0	24.0		24.0	24.0		11.0	38.0		11.0	11.0	38.0
Total Split (%)	24.0%	24.0%		24.0%	24.0%		11.0%	38.0%		11.0%	11.0%	38.0%
Maximum Green (s)	20.0	20.0		20.0	20.0		7.0	34.0		7.0	7.0	34.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lag		Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	None	C-Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	18.1	18.1			18.1	29.1	42.8	35.9			42.9	35.9
Actuated g/C Ratio	0.18	0.18			0.18	0.29	0.43	0.36			0.43	0.36
v/c Ratio	0.65	0.78			0.89	0.39	0.40	0.70			0.69	0.66
Control Delay	57.4	49.2			79.0	5.6	20.2	31.5			34.3	33.1
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	57.4	49.2			79.0	5.6	20.2	31.5			34.3	33.1
LOS	E	D			E	A	C	C			C	C
Approach Delay		51.4			38.5			30.0				33.5
Approach LOS		D			D			C				C
90th %ile Green (s)	20.0	20.0		20.0	20.0		7.0	34.0		7.0	7.0	34.0
90th %ile Term Code	Max	Max		Max	Max		Max	Coord		Max	Max	Coord
70th %ile Green (s)	20.0	20.0		20.0	20.0		7.0	34.0		7.0	7.0	34.0
70th %ile Term Code	Max	Max		Max	Max		Max	Coord		Max	Max	Coord
50th %ile Green (s)	20.0	20.0		20.0	20.0		7.0	34.0		7.0	7.0	34.0
50th %ile Term Code	Max	Max		Max	Max		Max	Coord		Max	Max	Coord
30th %ile Green (s)	18.4	18.4		18.4	18.4		7.0	35.6		7.0	7.0	35.6
30th %ile Term Code	Gap	Gap		Gap	Gap		Max	Coord		Max	Max	Coord
10th %ile Green (s)	12.2	12.2		12.2	12.2		6.7	41.8		7.0	7.0	42.1
10th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord		Max	Max	Coord
Queue Length 50th (ft)	61	148			119	0	49	241			63	214
Queue Length 95th (ft)	#129	#243			#237	53	87	314			#120	324
Internal Link Dist (ft)		400			420			120				120
Turn Bay Length (ft)	100					150	125					
Base Capacity (vph)	176	396			240	597	332	1193			241	612
Starvation Cap Reductn	0	0			0	0	0	0			0	0
Spillback Cap Reductn	0	0			0	0	0	0			0	0
Storage Cap Reductn	0	0			0	0	0	0			0	0
Reduced v/c Ratio	0.59	0.71			0.81	0.40	0.40	0.70			0.69	0.66

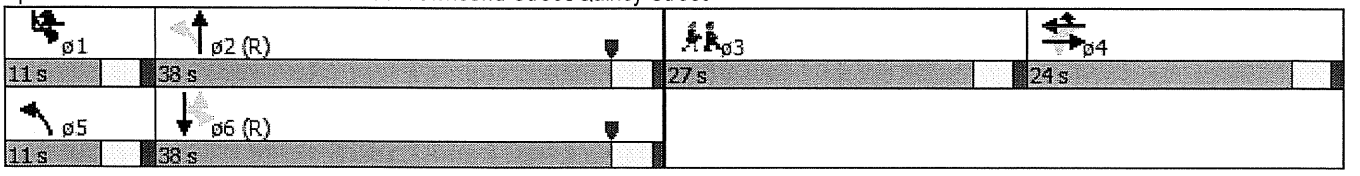
Intersection Summary

Lane Group	SBR	ø3
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)		23.0
Minimum Split (s)		27.0
Total Split (s)		27.0
Total Split (%)		27%
Maximum Green (s)		23.0
Yellow Time (s)		3.0
All-Red Time (s)		1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		Lead
Lead-Lag Optimize?		Yes
Vehicle Extension (s)		3.0
Recall Mode		None
Walk Time (s)		5.0
Flash Dont Walk (s)		11.0
Pedestrian Calls (#/hr)		150
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
90th %ile Green (s)		23.0
90th %ile Term Code		Max
70th %ile Green (s)		23.0
70th %ile Term Code		Max
50th %ile Green (s)		23.0
50th %ile Term Code		Max
30th %ile Green (s)		23.0
30th %ile Term Code		Max
10th %ile Green (s)		23.0
10th %ile Term Code		Max
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection
Natural Cycle: 80
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 35.9 Intersection LOS: D
Intersection Capacity Utilization 73.1% ICU Level of Service D
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
! Phase conflict between lane groups.

Splits and Phases: 2: Warren Street & Townsend Street/Quincy Street



Intersection

Int Delay, s/veh 2.4

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	25	366	343	94	86	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	26	385	361	99	91	19

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	460	0	-	0	849	411
Stage 1	-	-	-	-	411	-
Stage 2	-	-	-	-	438	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1101	-	-	-	331	641
Stage 1	-	-	-	-	669	-
Stage 2	-	-	-	-	651	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1101	-	-	-	321	641
Mov Cap-2 Maneuver	-	-	-	-	321	-
Stage 1	-	-	-	-	669	-
Stage 2	-	-	-	-	631	-

Approach	EB	WB	SB
HCM Control Delay, s	0.5	0	19.8
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1101	-	-	-	351
HCM Lane V/C Ratio	0.024	-	-	-	0.312
HCM Control Delay (s)	8.3	0	-	-	19.8
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	175	66	90	125	41	26	234	35	43	505	23
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	16	12	12	16	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.965			0.978			0.984			0.995	
Flt Protected		0.998			0.983			0.996			0.996	
Satd. Flow (prot)	0	1717	0	0	2040	0	0	2008	0	0	1898	0
Flt Permitted		0.976			0.511			0.931			0.956	
Satd. Flow (perm)	0	1679	0	0	1060	0	0	1877	0	0	1822	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			9			17			5	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		200			1000			200			200	
Travel Time (s)		4.5			22.7			4.5			4.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	6%	9%	2%	0%	5%	2%	5%	8%	12%	13%	0%
Adj. Flow (vph)	12	184	69	95	132	43	27	246	37	45	532	24
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	265	0	0	270	0	0	310	0	0	601	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)		16			16			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Minimum Split (s)	13.0	13.0		13.0	13.0		20.0	20.0		20.0	20.0	
Total Split (s)	24.0	24.0		24.0	24.0		74.0	74.0		74.0	74.0	
Total Split (%)	24.5%	24.5%		24.5%	24.5%		75.5%	75.5%		75.5%	75.5%	
Maximum Green (s)	19.0	19.0		19.0	19.0		69.0	69.0		69.0	69.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		19.0			19.0			69.0			69.0	
Actuated g/C Ratio		0.19			0.19			0.70			0.70	
v/c Ratio		0.78			1.27			0.23			0.47	
Control Delay		52.9			188.6			5.3			7.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		52.9			188.6			5.3			7.8	
LOS		D			F			A			A	
Approach Delay		52.9			188.6			5.3			7.8	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		D			F			A			A	
Queue Length 50th (ft)		149			~210			56			142	
Queue Length 95th (ft)		#273			#372			87			208	
Internal Link Dist (ft)		120			920			120			120	
Turn Bay Length (ft)												
Base Capacity (vph)		338			212			1326			1284	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.78			1.27			0.23			0.47	

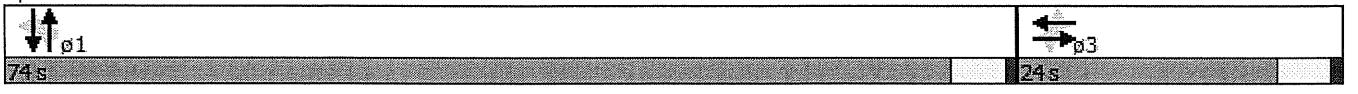
Intersection Summary

Area Type: Other
Cycle Length: 98
Actuated Cycle Length: 98
Offset: 0 (0%), Referenced to phase 2: and 6:, Start of Green
Natural Cycle: 40
Control Type: Pretimed
Maximum v/c Ratio: 1.27
Intersection Signal Delay: 49.3 Intersection LOS: D
Intersection Capacity Utilization 78.7% ICU Level of Service D
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Humboldt Avenue & Townsend Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	20	192	40	31	142	167	49	533	43	11	263	560
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	12	12	12	12	12	12	12	12	12	12
Storage Length (ft)	100		0	0		150	125		100		0	
Storage Lanes	1		0	0		1	1		0		1	
Taper Length (ft)	25			25			25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt		0.974				0.850		0.989				0.987
Flt Protected	0.950				0.991		0.950				0.950	
Satd. Flow (prot)	2046	1997	0	0	1758	1538	1736	3264	0	0	1722	1769
Flt Permitted	0.461				0.680		0.217				0.303	
Satd. Flow (perm)	993	1997	0	0	1206	1538	396	3264	0	0	549	1769
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)		10				174		8				4
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1000			500			200				200
Travel Time (s)		22.7			11.4			4.5				4.5
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	5%	5%	3%	8%	5%	4%	9%	14%	0%	5%	6%
Adj. Flow (vph)	21	200	42	32	148	174	51	555	45	11	274	583
Shared Lane Traffic (%)												
Lane Group Flow (vph)	21	242	0	0	180	174	51	600	0	0	285	637
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	R NA	Left	Left
Median Width(ft)		16			16			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	9	15	
Number of Detectors	1	2		1	2	1	1	2		1	1	2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Left	Thru
Leading Detector (ft)	20	100		20	100	20	20	100		20	20	100
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	20	6
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	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	Perm	NA		Perm	NA	pt+ov	pm+pt	NA		pm+pt	pm+pt	NA
Protected Phases		4			4	4 1!	5	2		1!	1	6

Lane Group	SBR	ø3
Lane Configurations		
Volume (vph)	52	
Ideal Flow (vphpl)	1900	
Lane Width (ft)	10	
Storage Length (ft)	100	
Storage Lanes	0	
Taper Length (ft)		
Lane Util. Factor	1.00	
Frt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor	0.96	
Heavy Vehicles (%)	6%	
Adj. Flow (vph)	54	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.09	
Turning Speed (mph)	9	
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases		3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Permitted Phases	4			4			2			6!	6	
Detector Phase	4	4		4	4	4 1	5	2		1	1	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		6.0	10.0		6.0	6.0	10.0
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	14.0		10.0	10.0	14.0
Total Split (s)	29.0	29.0		29.0	29.0		16.0	28.0		16.0	16.0	28.0
Total Split (%)	29.0%	29.0%		29.0%	29.0%		16.0%	28.0%		16.0%	16.0%	28.0%
Maximum Green (s)	25.0	25.0		25.0	25.0		12.0	24.0		12.0	12.0	24.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lag		Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	None	C-Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	18.0	18.0			18.0	34.0	49.0	41.8			57.5	48.5
Actuated g/C Ratio	0.18	0.18			0.18	0.34	0.49	0.42			0.58	0.48
v/c Ratio	0.12	0.66			0.83	0.27	0.18	0.44			0.62	0.74
Control Delay	33.0	44.4			67.9	4.2	17.3	26.4			23.8	34.7
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	33.0	44.4			67.9	4.2	17.3	26.4			23.8	34.7
LOS	C	D			E	A	B	C			C	C
Approach Delay		43.5			36.6			25.7				31.3
Approach LOS		D			D			C				C
90th %ile Green (s)	25.0	25.0		25.0	25.0		9.4	24.0		12.0	12.0	26.6
90th %ile Term Code	Max	Max		Max	Max		Gap	Coord		Max	Max	Coord
70th %ile Green (s)	21.0	21.0		21.0	21.0		7.9	28.0		12.0	12.0	32.1
70th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord		Max	Max	Coord
50th %ile Green (s)	17.8	17.8		17.8	17.8		7.0	31.2		12.0	12.0	36.2
50th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord		Max	Max	Coord
30th %ile Green (s)	15.4	15.4		15.4	15.4		6.0	60.6		12.0	12.0	66.6
30th %ile Term Code	Gap	Gap		Gap	Gap		Min	Coord		Max	Max	Coord
10th %ile Green (s)	11.0	11.0		11.0	11.0		0.0	65.0		12.0	12.0	81.0
10th %ile Term Code	Gap	Gap		Gap	Gap		Skip	Coord		Max	Max	Coord
Queue Length 50th (ft)	11	139			112	0	17	166			111	397
Queue Length 95th (ft)	30	201			176	39	44	250			#207	#754
Internal Link Dist (ft)		920			420			120				120
Turn Bay Length (ft)	100					150	125					
Base Capacity (vph)	248	506			301	638	373	1367			456	859
Starvation Cap Reductn	0	0			0	0	0	0			0	0
Spillback Cap Reductn	0	0			0	0	0	0			0	0
Storage Cap Reductn	0	0			0	0	0	0			0	0
Reduced v/c Ratio	0.08	0.48			0.60	0.27	0.14	0.44			0.63	0.74

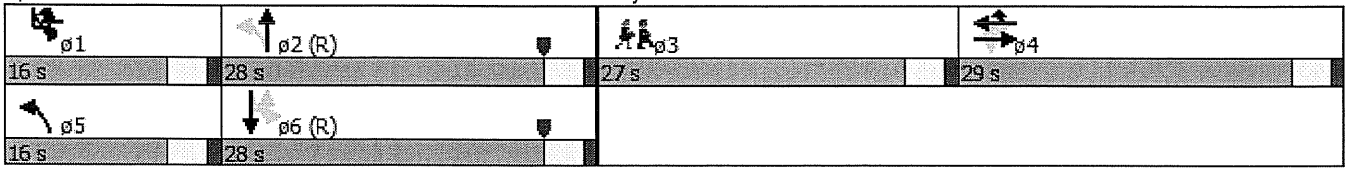
Intersection Summary

Lane Group	SBR	ø3
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)		23.0
Minimum Split (s)		27.0
Total Split (s)		27.0
Total Split (%)		27%
Maximum Green (s)		23.0
Yellow Time (s)		3.0
All-Red Time (s)		1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		Lead
Lead-Lag Optimize?		Yes
Vehicle Extension (s)		3.0
Recall Mode		None
Walk Time (s)		5.0
Flash Dont Walk (s)		11.0
Pedestrian Calls (#/hr)		50
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
90th %ile Green (s)		23.0
90th %ile Term Code		Max
70th %ile Green (s)		23.0
70th %ile Term Code		Max
50th %ile Green (s)		23.0
50th %ile Term Code		Max
30th %ile Green (s)		0.0
30th %ile Term Code		Skip
10th %ile Green (s)		0.0
10th %ile Term Code		Skip
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 32.0 Intersection LOS: C
Intersection Capacity Utilization 72.7% ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
! Phase conflict between lane groups.

Splits and Phases: 2: Warren Street & Townsend Street/Quincy Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	182	68	92	131	42	27	240	36	44	518	24
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	16	12	12	16	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.965			0.979			0.984			0.995	
Flt Protected		0.998			0.983			0.996			0.996	
Satd. Flow (prot)	0	1716	0	0	2042	0	0	2008	0	0	1899	0
Flt Permitted		0.975			0.492			0.928			0.955	
Satd. Flow (perm)	0	1677	0	0	1022	0	0	1871	0	0	1820	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			9			17			5	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		200			1000			200			200	
Travel Time (s)		4.5			22.7			4.5			4.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	6%	9%	2%	0%	5%	2%	5%	8%	12%	13%	0%
Adj. Flow (vph)	12	192	72	97	138	44	28	253	38	46	545	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	276	0	0	279	0	0	319	0	0	616	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)		16			16			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Minimum Split (s)	13.0	13.0		13.0	13.0		20.0	20.0		20.0	20.0	
Total Split (s)	24.0	24.0		24.0	24.0		74.0	74.0		74.0	74.0	
Total Split (%)	24.5%	24.5%		24.5%	24.5%		75.5%	75.5%		75.5%	75.5%	
Maximum Green (s)	19.0	19.0		19.0	19.0		69.0	69.0		69.0	69.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		19.0			19.0			69.0			69.0	
Actuated g/C Ratio		0.19			0.19			0.70			0.70	
v/c Ratio		0.82			1.36			0.24			0.48	
Control Delay		56.1			223.1			5.4			7.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		56.1			223.1			5.4			7.9	
LOS		E			F			A			A	
Approach Delay		56.1			223.1			5.4			7.9	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			F			A			A	
Queue Length 50th (ft)		157			~227			58			148	
Queue Length 95th (ft)		#292			#390			89			215	
Internal Link Dist (ft)		120			920			120			120	
Turn Bay Length (ft)												
Base Capacity (vph)		338			205			1322			1282	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.82			1.36			0.24			0.48	

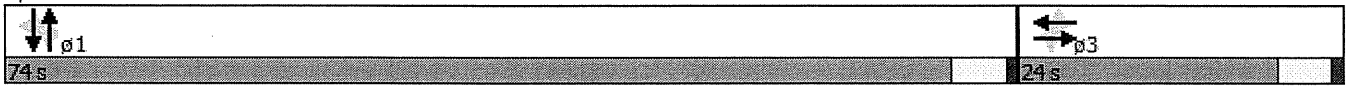
Intersection Summary

Area Type: Other
Cycle Length: 98
Actuated Cycle Length: 98
Offset: 0 (0%), Referenced to phase 2: and 6:, Start of Green
Natural Cycle: 45
Control Type: Pretimed
Maximum v/c Ratio: 1.36
Intersection Signal Delay: 56.6 Intersection LOS: E
Intersection Capacity Utilization 80.6% ICU Level of Service D
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Humboldt Avenue & Townsend Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	21	200	41	31	149	171	50	550	44	11	270	578
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	12	12	12	12	12	12	12	12	12	12
Storage Length (ft)	100		0	0		150	125		100		0	
Storage Lanes	1		0	0		1	1		0		1	
Taper Length (ft)	25			25			25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt		0.974				0.850		0.989				0.987
Flt Protected	0.950				0.992		0.950				0.950	
Satd. Flow (prot)	2046	1997	0	0	1759	1538	1736	3264	0	0	1722	1769
Flt Permitted	0.454				0.685		0.189				0.289	
Satd. Flow (perm)	978	1997	0	0	1215	1538	345	3264	0	0	524	1769
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)		10				178		8				4
Link Speed (mph)		30			30			30				30
Link Distance (ft)		1000			500			200				200
Travel Time (s)		22.7			11.4			4.5				4.5
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	5%	5%	3%	8%	5%	4%	9%	14%	0%	5%	6%
Adj. Flow (vph)	22	208	43	32	155	178	52	573	46	11	281	602
Shared Lane Traffic (%)												
Lane Group Flow (vph)	22	251	0	0	187	178	52	619	0	0	292	657
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	R NA	Left	Left
Median Width(ft)		16			16			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	9	15	
Number of Detectors	1	2		1	2	1	1	2		1	1	2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Left	Thru
Leading Detector (ft)	20	100		20	100	20	20	100		20	20	100
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	20	6
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	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	Perm	NA		Perm	NA	pt+ov	pm+pt	NA		pm+pt	pm+pt	NA
Protected Phases		4			4	4 1!	5	2		1!	1	6

Lane Group	SBR	ø3
Lane Configurations		
Volume (vph)	53	
Ideal Flow (vphpl)	1900	
Lane Width (ft)	10	
Storage Length (ft)	100	
Storage Lanes	0	
Taper Length (ft)		
Lane Util. Factor	1.00	
Frt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor	0.96	
Heavy Vehicles (%)	6%	
Adj. Flow (vph)	55	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.09	
Turning Speed (mph)	9	
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases		3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Permitted Phases	4			4			2			6!	6	
Detector Phase	4	4		4	4	4 1	5	2		1	1	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		6.0	10.0		6.0	6.0	10.0
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	14.0		10.0	10.0	14.0
Total Split (s)	29.0	29.0		29.0	29.0		16.0	28.0		16.0	16.0	28.0
Total Split (%)	29.0%	29.0%		29.0%	29.0%		16.0%	28.0%		16.0%	16.0%	28.0%
Maximum Green (s)	25.0	25.0		25.0	25.0		12.0	24.0		12.0	12.0	24.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lag		Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	None	C-Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	18.7	18.7			18.7	34.7	48.4	41.1			56.8	47.8
Actuated g/C Ratio	0.19	0.19			0.19	0.35	0.48	0.41			0.57	0.48
v/c Ratio	0.12	0.66			0.82	0.27	0.19	0.46			0.66	0.78
Control Delay	32.6	43.9			66.1	4.1	18.0	27.3			25.9	36.9
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	32.6	43.9			66.1	4.1	18.0	27.3			25.9	36.9
LOS	C	D			E	A	B	C			C	D
Approach Delay		43.0			35.9			26.5				33.5
Approach LOS		D			D			C				C
90th %ile Green (s)	25.0	25.0		25.0	25.0		9.4	24.0		12.0	12.0	26.6
90th %ile Term Code	Max	Max		Max	Max		Gap	Coord		Max	Max	Coord
70th %ile Green (s)	22.3	22.3		22.3	22.3		8.0	26.7		12.0	12.0	30.7
70th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord		Max	Max	Coord
50th %ile Green (s)	19.1	19.1		19.1	19.1		7.1	29.9		12.0	12.0	34.8
50th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord		Max	Max	Coord
30th %ile Green (s)	15.8	15.8		15.8	15.8		6.0	60.2		12.0	12.0	66.2
30th %ile Term Code	Gap	Gap		Gap	Gap		Min	Coord		Max	Max	Coord
10th %ile Green (s)	11.3	11.3		11.3	11.3		0.0	64.7		12.0	12.0	80.7
10th %ile Term Code	Gap	Gap		Gap	Gap		Skip	Coord		Max	Max	Coord
Queue Length 50th (ft)	12	143			115	0	18	176			118	~463
Queue Length 95th (ft)	31	208			183	40	44	258			#226	#784
Internal Link Dist (ft)		920			420			120				120
Turn Bay Length (ft)	100					150	125					
Base Capacity (vph)	244	506			303	646	350	1346			441	847
Starvation Cap Reductn	0	0			0	0	0	0			0	0
Spillback Cap Reductn	0	0			0	0	0	0			0	0
Storage Cap Reductn	0	0			0	0	0	0			0	0
Reduced v/c Ratio	0.09	0.50			0.62	0.28	0.15	0.46			0.66	0.78

Intersection Summary

Lane Group	SBR	ø3
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)		23.0
Minimum Split (s)		27.0
Total Split (s)		27.0
Total Split (%)		27%
Maximum Green (s)		23.0
Yellow Time (s)		3.0
All-Red Time (s)		1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		Lead
Lead-Lag Optimize?		Yes
Vehicle Extension (s)		3.0
Recall Mode		None
Walk Time (s)		5.0
Flash Dont Walk (s)		11.0
Pedestrian Calls (#/hr)		50
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
90th %ile Green (s)		23.0
90th %ile Term Code		Max
70th %ile Green (s)		23.0
70th %ile Term Code		Max
50th %ile Green (s)		23.0
50th %ile Term Code		Max
30th %ile Green (s)		0.0
30th %ile Term Code		Skip
10th %ile Green (s)		0.0
10th %ile Term Code		Skip
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

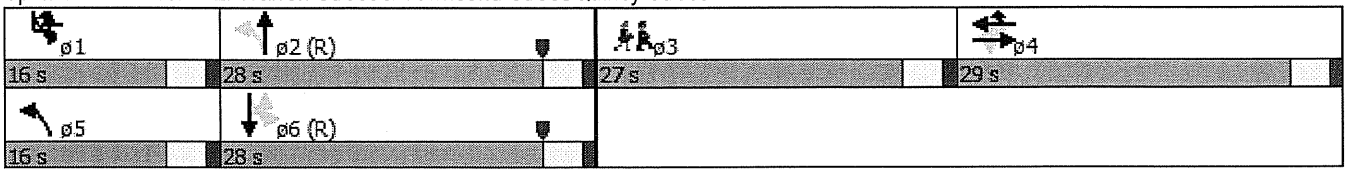
Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection
Natural Cycle: 90
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 33.0 Intersection LOS: C
Intersection Capacity Utilization 74.5% ICU Level of Service D
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

! Phase conflict between lane groups.

Splits and Phases: 2: Warren Street & Townsend Street/Quincy Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	186	68	98	141	51	27	240	40	48	518	24
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	16	12	12	16	12
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.965			0.976			0.982			0.995	
Flt Protected		0.998			0.983			0.996			0.996	
Satd. Flow (prot)	0	1717	0	0	2034	0	0	2003	0	0	1899	0
Flt Permitted		0.971			0.491			0.929			0.949	
Satd. Flow (perm)	0	1670	0	0	1016	0	0	1869	0	0	1809	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			10			19			5	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		200			520			200			200	
Travel Time (s)		4.5			11.8			4.5			4.5	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	2%	6%	9%	2%	0%	5%	2%	5%	8%	12%	13%	0%
Adj. Flow (vph)	12	196	72	103	148	54	28	253	42	51	545	25
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	280	0	0	305	0	0	323	0	0	621	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			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		3			3			1			1	
Permitted Phases	3			3			1			1		
Minimum Split (s)	13.0	13.0		13.0	13.0		20.0	20.0		20.0	20.0	
Total Split (s)	24.0	24.0		24.0	24.0		74.0	74.0		74.0	74.0	
Total Split (%)	24.5%	24.5%		24.5%	24.5%		75.5%	75.5%		75.5%	75.5%	
Maximum Green (s)	19.0	19.0		19.0	19.0		69.0	69.0		69.0	69.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		5.0			5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Act Effct Green (s)		19.0			19.0			69.0			69.0	
Actuated g/C Ratio		0.19			0.19			0.70			0.70	
v/c Ratio		0.83			1.49			0.24			0.49	
Control Delay		58.0			274.0			5.4			8.0	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		58.0			274.0			5.4			8.0	
LOS		E			F			A			A	
Approach Delay		58.0			274.0			5.4			8.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Approach LOS		E			F			A			A	
Queue Length 50th (ft)		160			~262			58			150	
Queue Length 95th (ft)		#298			#430			90			219	
Internal Link Dist (ft)		120			440			120			120	
Turn Bay Length (ft)												
Base Capacity (vph)		336			205			1321			1275	
Starvation Cap Reductn		0			0			0			0	
Spillback Cap Reductn		0			0			0			0	
Storage Cap Reductn		0			0			0			0	
Reduced v/c Ratio		0.83			1.49			0.24			0.49	

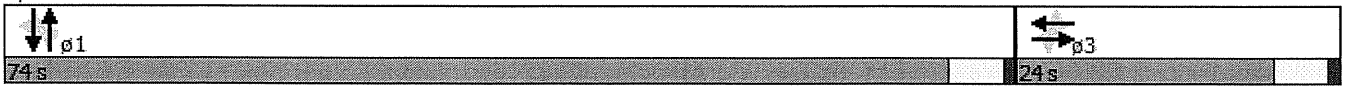
Intersection Summary

Area Type: Other
Cycle Length: 98
Actuated Cycle Length: 98
Offset: 0 (0%), Referenced to phase 2: and 6:, Start of Green
Natural Cycle: 50
Control Type: Pretimed
Maximum v/c Ratio: 1.49
Intersection Signal Delay: 69.7 Intersection LOS: E
Intersection Capacity Utilization 83.4% ICU Level of Service E
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Humboldt Avenue & Townsend Street



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (vph)	36	226	91	32	166	171	92	550	44	18	270	578
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	16	16	12	12	12	12	12	12	12	12	12	12
Storage Length (ft)	100		0	0		150	125		100		0	
Storage Lanes	1		0	0		1	1		0		1	
Taper Length (ft)	25			25			25				25	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	1.00	1.00	1.00
Frt		0.957				0.850		0.989				0.985
Flt Protected	0.950				0.992		0.950				0.950	
Satd. Flow (prot)	2046	1963	0	0	1758	1538	1736	3264	0	0	1724	1766
Flt Permitted	0.447				0.567		0.117				0.275	
Satd. Flow (perm)	963	1963	0	0	1005	1538	214	3264	0	0	499	1766
Right Turn on Red			Yes			Yes			Yes			
Satd. Flow (RTOR)		19				178		8				5
Link Speed (mph)		30			30			30				30
Link Distance (ft)		480			500			200				200
Travel Time (s)		10.9			11.4			4.5				4.5
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	5%	5%	3%	8%	5%	4%	9%	14%	0%	5%	6%
Adj. Flow (vph)	38	235	95	33	173	178	96	573	46	19	281	602
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	330	0	0	206	178	96	619	0	0	300	671
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	R NA	Left	Left
Median Width(ft)		16			16			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	0.85	0.85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	9	15	
Number of Detectors	1	2		1	2	1	1	2		1	1	2
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Left	Thru
Leading Detector (ft)	20	100		20	100	20	20	100		20	20	100
Trailing Detector (ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Position(ft)	0	0		0	0	0	0	0		0	0	0
Detector 1 Size(ft)	20	6		20	6	20	20	6		20	20	6
Detector 1 Type	Cl+Ex	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	0.0
Detector 1 Queue (s)	0.0	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	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	Perm	NA		Perm	NA	pt+ov	pm+pt	NA		pm+pt	pm+pt	NA
Protected Phases		4			4	4 1!	5	2		1!	1	6

Lane Group	SBR	ø3
Lane Configurations		
Volume (vph)	66	
Ideal Flow (vphpl)	1900	
Lane Width (ft)	10	
Storage Length (ft)	100	
Storage Lanes	0	
Taper Length (ft)		
Lane Util. Factor	1.00	
Frt		
Flt Protected		
Satd. Flow (prot)	0	
Flt Permitted		
Satd. Flow (perm)	0	
Right Turn on Red	Yes	
Satd. Flow (RTOR)		
Link Speed (mph)		
Link Distance (ft)		
Travel Time (s)		
Peak Hour Factor	0.96	
Heavy Vehicles (%)	6%	
Adj. Flow (vph)	69	
Shared Lane Traffic (%)		
Lane Group Flow (vph)	0	
Enter Blocked Intersection	No	
Lane Alignment	Right	
Median Width(ft)		
Link Offset(ft)		
Crosswalk Width(ft)		
Two way Left Turn Lane		
Headway Factor	1.09	
Turning Speed (mph)	9	
Number of Detectors		
Detector Template		
Leading Detector (ft)		
Trailing Detector (ft)		
Detector 1 Position(ft)		
Detector 1 Size(ft)		
Detector 1 Type		
Detector 1 Channel		
Detector 1 Extend (s)		
Detector 1 Queue (s)		
Detector 1 Delay (s)		
Detector 2 Position(ft)		
Detector 2 Size(ft)		
Detector 2 Type		
Detector 2 Channel		
Detector 2 Extend (s)		
Turn Type		
Protected Phases		3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Permitted Phases	4			4			2			6!	6	
Detector Phase	4	4		4	4	4 1	5	2		1	1	6
Switch Phase												
Minimum Initial (s)	8.0	8.0		8.0	8.0		6.0	10.0		6.0	6.0	10.0
Minimum Split (s)	12.0	12.0		12.0	12.0		10.0	14.0		10.0	10.0	14.0
Total Split (s)	29.0	29.0		29.0	29.0		16.0	28.0		16.0	16.0	28.0
Total Split (%)	29.0%	29.0%		29.0%	29.0%		16.0%	28.0%		16.0%	16.0%	28.0%
Maximum Green (s)	25.0	25.0		25.0	25.0		12.0	24.0		12.0	12.0	24.0
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0			0.0		0.0	0.0			0.0	0.0
Total Lost Time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lead/Lag	Lag	Lag		Lag	Lag		Lead	Lag		Lead	Lead	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Recall Mode	None	None		None	None		None	C-Max		None	None	C-Max
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	21.3	21.3			21.3	37.3	47.2	38.5			53.1	43.8
Actuated g/C Ratio	0.21	0.21			0.21	0.37	0.47	0.38			0.53	0.44
v/c Ratio	0.19	0.76			0.96	0.26	0.41	0.49			0.73	0.87
Control Delay	32.8	46.3			92.3	3.9	22.2	29.2			31.6	45.9
Queue Delay	0.0	0.0			0.0	0.0	0.0	0.0			0.0	0.0
Total Delay	32.8	46.3			92.3	3.9	22.2	29.2			31.6	45.9
LOS	C	D			F	A	C	C			C	D
Approach Delay		44.9			51.4			28.3				41.5
Approach LOS		D			D			C				D
90th %ile Green (s)	25.0	25.0		25.0	25.0		12.0	24.0		12.0	12.0	24.0
90th %ile Term Code	Max	Max		Max	Max		Max	Coord		Max	Max	Coord
70th %ile Green (s)	25.0	25.0		25.0	25.0		10.2	24.0		12.0	12.0	25.8
70th %ile Term Code	Max	Max		Max	Max		Gap	Coord		Max	Max	Coord
50th %ile Green (s)	23.3	23.3		23.3	23.3		8.9	25.7		12.0	12.0	28.8
50th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord		Max	Max	Coord
30th %ile Green (s)	19.1	19.1		19.1	19.1		6.5	56.9		12.0	12.0	62.4
30th %ile Term Code	Gap	Gap		Gap	Gap		Gap	Coord		Max	Max	Coord
10th %ile Green (s)	14.1	14.1		14.1	14.1		0.0	61.9		12.0	12.0	77.9
10th %ile Term Code	Gap	Gap		Gap	Gap		Skip	Coord		Max	Max	Coord
Queue Length 50th (ft)	19	183			127	0	37	187			132	~555
Queue Length 95th (ft)	47	273			#250	40	72	258			#264	#836
Internal Link Dist (ft)		400			420			120				120
Turn Bay Length (ft)	100					150	125					
Base Capacity (vph)	240	505			251	679	290	1261			411	775
Starvation Cap Reductn	0	0			0	0	0	0			0	0
Spillback Cap Reductn	0	0			0	0	0	0			0	0
Storage Cap Reductn	0	0			0	0	0	0			0	0
Reduced v/c Ratio	0.16	0.65			0.82	0.26	0.33	0.49			0.73	0.87

Intersection Summary

Lane Group	SBR	ø3
Permitted Phases		
Detector Phase		
Switch Phase		
Minimum Initial (s)		23.0
Minimum Split (s)		27.0
Total Split (s)		27.0
Total Split (%)		27%
Maximum Green (s)		23.0
Yellow Time (s)		3.0
All-Red Time (s)		1.0
Lost Time Adjust (s)		
Total Lost Time (s)		
Lead/Lag		Lead
Lead-Lag Optimize?		Yes
Vehicle Extension (s)		3.0
Recall Mode		None
Walk Time (s)		5.0
Flash Dont Walk (s)		11.0
Pedestrian Calls (#/hr)		50
Act Effct Green (s)		
Actuated g/C Ratio		
v/c Ratio		
Control Delay		
Queue Delay		
Total Delay		
LOS		
Approach Delay		
Approach LOS		
90th %ile Green (s)		23.0
90th %ile Term Code		Max
70th %ile Green (s)		23.0
70th %ile Term Code		Max
50th %ile Green (s)		23.0
50th %ile Term Code		Max
30th %ile Green (s)		0.0
30th %ile Term Code		Skip
10th %ile Green (s)		0.0
10th %ile Term Code		Skip
Queue Length 50th (ft)		
Queue Length 95th (ft)		
Internal Link Dist (ft)		
Turn Bay Length (ft)		
Base Capacity (vph)		
Starvation Cap Reductn		
Spillback Cap Reductn		
Storage Cap Reductn		
Reduced v/c Ratio		

Intersection Summary

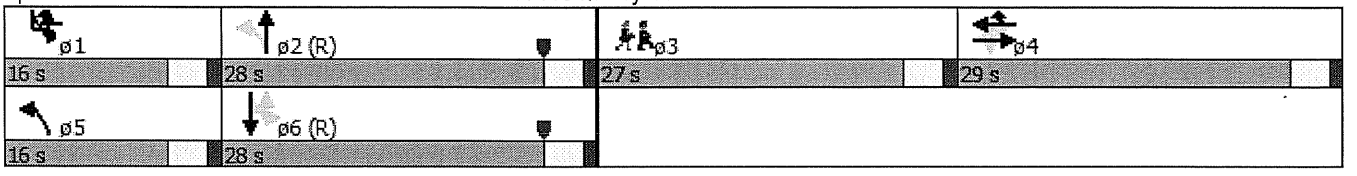
Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow, Master Intersection
Natural Cycle: 110
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.96
Intersection Signal Delay: 39.7 Intersection LOS: D
Intersection Capacity Utilization 80.8% ICU Level of Service D
Analysis Period (min) 15

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

! Phase conflict between lane groups.

Splits and Phases: 2: Warren Street & Townsend Street/Quincy Street



Intersection	
Int Delay, s/veh	2.5

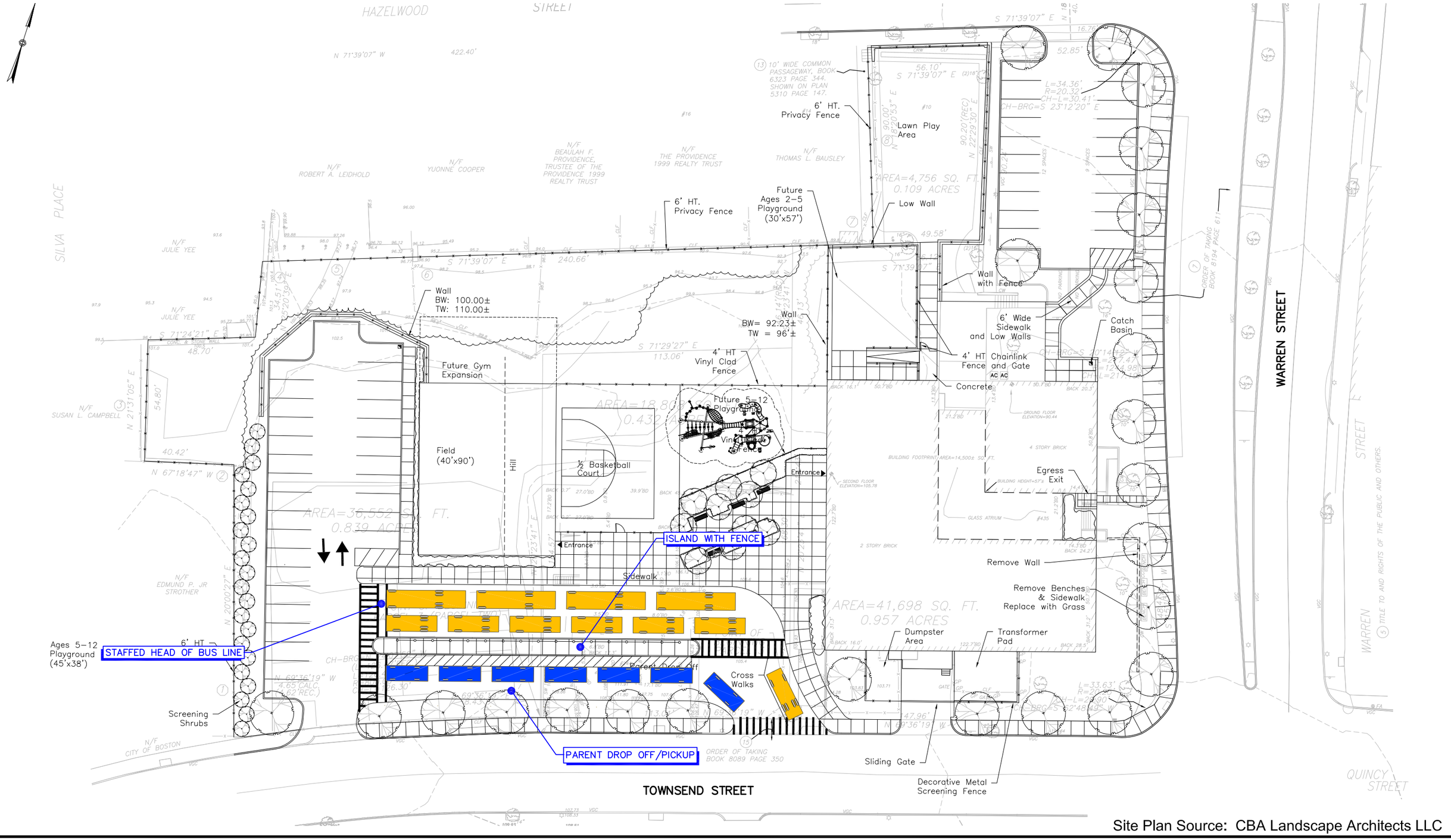
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Vol, veh/h	12	353	324	72	91	25
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	95	95	95	95	95	95
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	13	372	341	76	96	26

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	417	0	-	0	776	379
Stage 1	-	-	-	-	379	-
Stage 2	-	-	-	-	397	-
Critical Hdwy	4.12	-	-	-	6.42	6.22
Critical Hdwy Stg 1	-	-	-	-	5.42	-
Critical Hdwy Stg 2	-	-	-	-	5.42	-
Follow-up Hdwy	2.218	-	-	-	3.518	3.318
Pot Cap-1 Maneuver	1142	-	-	-	366	668
Stage 1	-	-	-	-	692	-
Stage 2	-	-	-	-	679	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1142	-	-	-	361	668
Mov Cap-2 Maneuver	-	-	-	-	361	-
Stage 1	-	-	-	-	692	-
Stage 2	-	-	-	-	669	-

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	17.9
HCM LOS			C

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1142	-	-	-	401
HCM Lane V/C Ratio	0.011	-	-	-	0.305
HCM Control Delay (s)	8.2	0	-	-	17.9
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0	-	-	-	1.3

□ Drop-off/Pick-up Plan Exhibit 1, 2 & 3



MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers
28 Lord Road, Suite 280
Marlborough, MA 01752

Bridge Boston Charter School

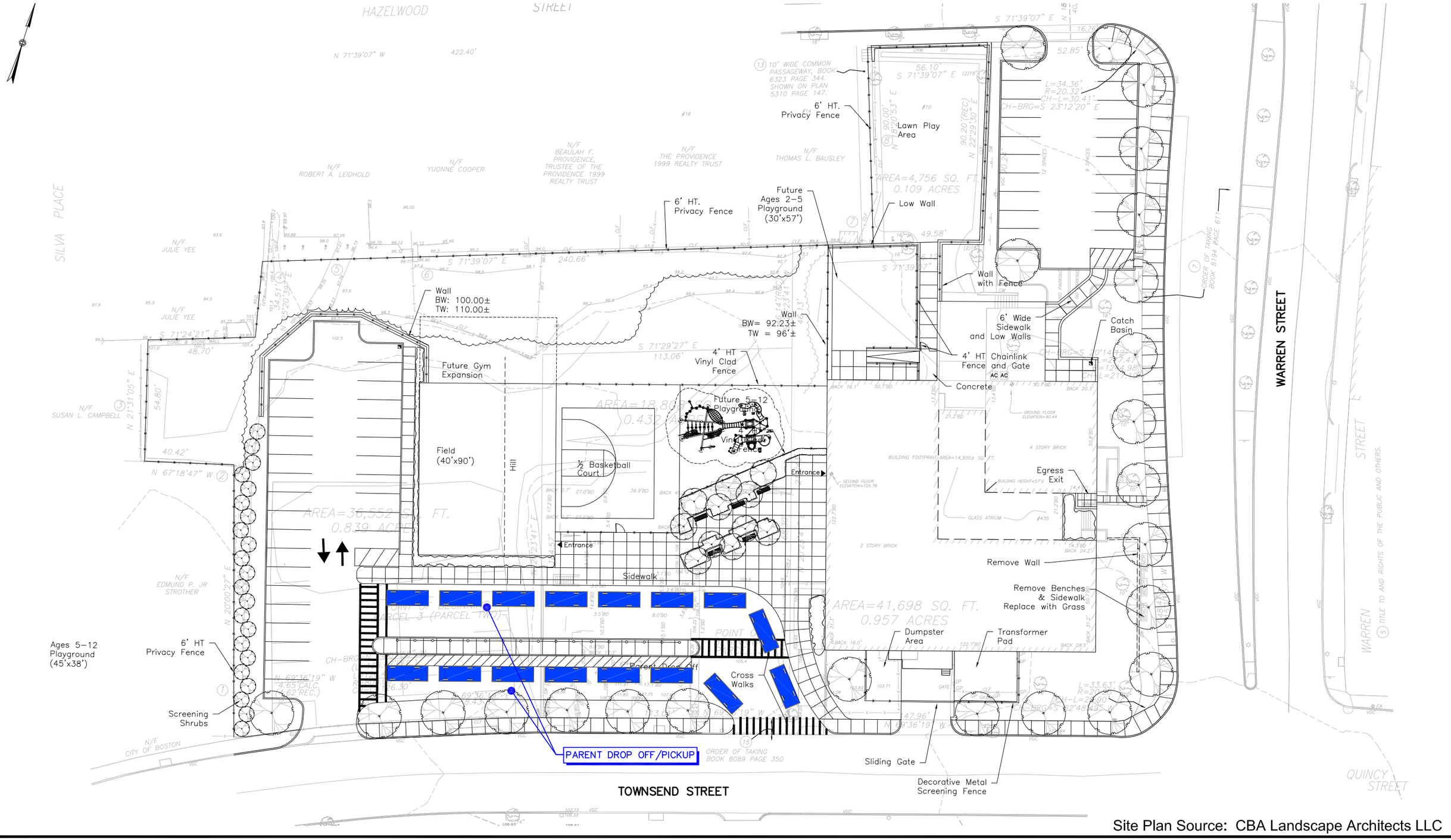
Boston, Massachusetts

SCALE
0 10 20 40 60 FEET

Exhibit 1
Drop Off/Pick Up
7:15-7:30 AM

Scale: As Noted
DWG No. 780 Concept (12-4-2015).dwg

Date: December 2015
Project No. 780



Site Plan Source: CBA Landscape Architects LLC

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers
28 Lord Road, Suite 280
Marlborough, MA 01752

Bridge Boston Charter School

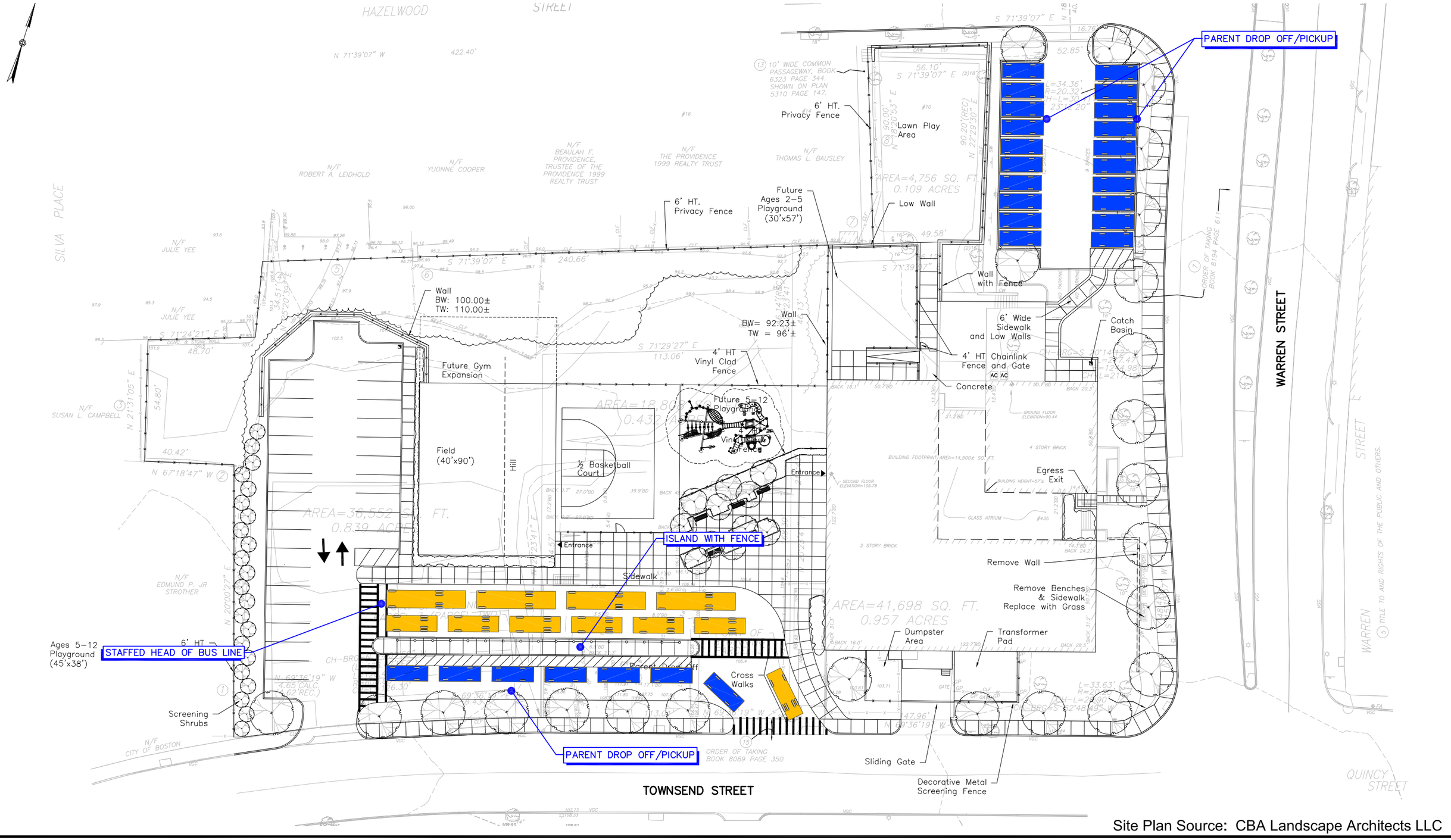
Boston, Massachusetts

SCALE
0 10 20 40 60 FEET

Exhibit 2
Drop Off/Pick UP
7:30-8:00 AM

Scale: As Noted
DWG No. 780 Concept (12-4-2015).dwg

Date: December 2015
Project No. 780



Site Plan Source: CBA Landscape Architects LLC

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers
28 Lord Road, Suite 280
Marlborough, MA 01752

Bridge Boston Charter School

Boston, Massachusetts

SCALE
0 10 20 40 60 FEET

Exhibit 3
Drop Off/Pick Up
4:30-5:15 PM

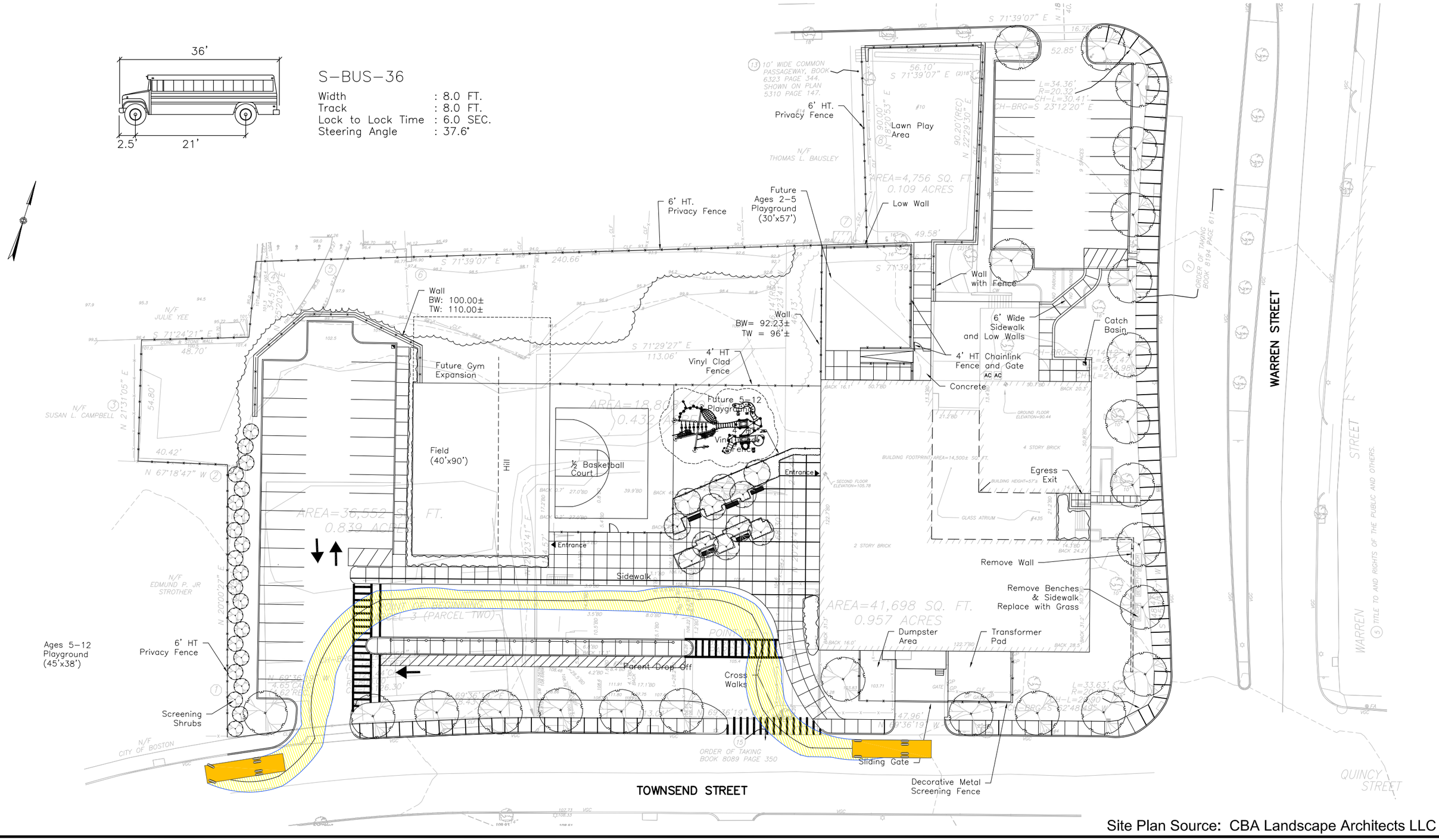
Scale: As Noted
DWG No. 780 Concept (12-4-2015).dwg

Date: December 2015
Project No. 780

□ AutoTURN® Analyses

S–BUS–36

Width	: 8.0 FT.
Track	: 8.0 FT.
Lock to Lock Time	: 6.0 SEC.
Steering Angle	: 37.6°



Site Plan Source: CBA Landscape Architects LLC

MDM TRANSPORTATION CONSULTANTS, INC.
Planners & Engineers
28 Lord Road, Suite 280
Marlborough, MA 01752

Bridge Boston Charter School

Boston, Massachusetts

SCALE
0 10 20 40 60 FEET

Autoturn Analysis School Bus

Scale: As Noted
DWG No. 780 Concept (10-21-2015).dwg

Date: October 2015
Project No. 780