

**CAPACITY  
ANALYSIS  
REPORT**

**DECEMBER 2023**



# CAPACITY ANALYSIS



## DEFINING CAPACITY

Capacity analysis provides a clear understanding of how many students a school building can support if each student is provided with sufficient net square feet, determined using industry and state standards, in each space that is deemed capacity generating. The methodology for defining capacity generating spaces and calculating the number of students that may occupy them and the resulting student capacity of a school building is described in detail in the methodology section of this report.

In grades PreK through 6, the grade-based homeroom classrooms are considered capacity generating, while specialty classrooms and other spaces are not. In grades 7 and 8, the four core subject rooms (language arts, social studies, math, and science) typically serve as homerooms and are considered capacity generating. For grades 9 through 12, classes are scheduled in spaces in a more complex way to increase space utilization and allow for more variety in the course offerings. Because of this, capacity generating spaces are not limited to the four core subjects and can vary widely from school to school.

To ensure consistency among schools for the purposes of this evaluation, DLR Group assigned capacity to the same spaces that are used in the Massachusetts School Building Authority (MSBA) Space Summary Template to determine the number of classrooms needed to

serve the planned enrollment. For grades 9 through 12 this includes all general classrooms, science labs, visual arts classrooms, and Career and Technical Education (CTE) classrooms. Additionally, sub-separate, often referred to as self-contained, classrooms were counted as capacity generating for all grades because those students are not currently guaranteed a seat in a general education classroom. Methodology for determining capacity in the future may change as BPS expands inclusive education across all schools. The existing capacity of the school buildings would be understated if sub-separate classrooms were excluded. The quantity and type of capacity generating spaces was determined through school walkthroughs and plan diagrams.

The student capacity of a school building is calculated by determining which spaces in it are capacity generating, dividing the net square feet of each capacity generating space by a net square feet per student standard for the specific use of each space, and totaling the capacity of all the capacity generating spaces.

### ELLISON-PARKS EEC SCHOOL SAMPLE CALCULATION

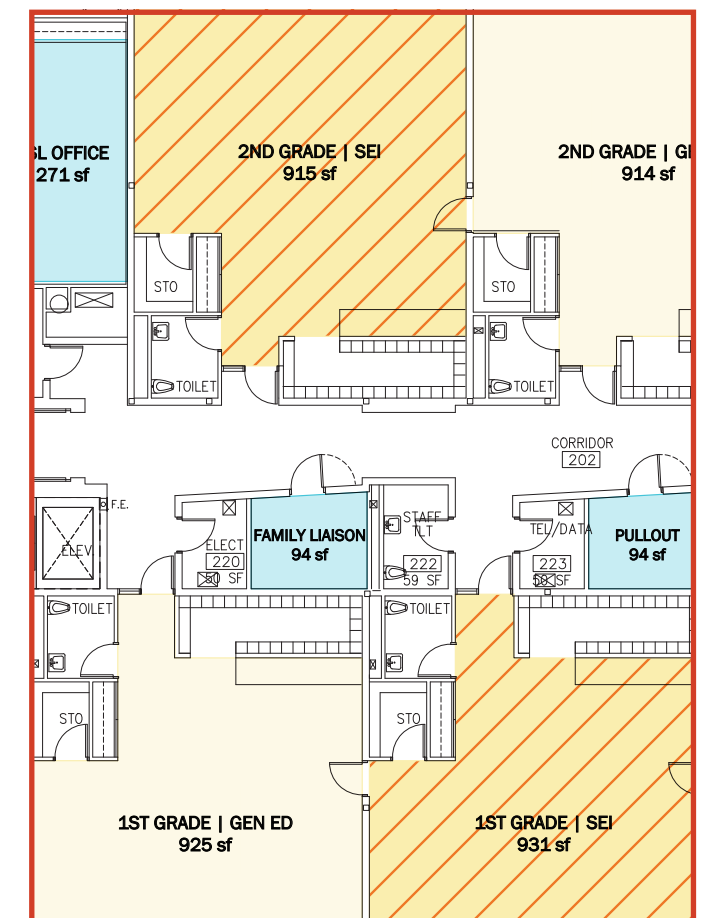
ROOM NAME	ROOM TYPE	AREA	SF PER STUDENT	BPS MAX CLASS SIZE
1ST GRADE   GEN ED	GEN ED	925	39	22

$$\frac{\text{Room Area}}{\text{SF/Student Standard}} = \frac{925 \text{ SF}}{39 \text{ SF/Student}} = 22 \text{ Students}$$

Standards for the maximum number of students per class and the minimum square feet deemed adequate for each student in different types of capacity generating spaces vary among districts and states. This Study used the MSBA minimum recommendations for space sizes. When the number of students in a

school building exceeds the capacity calculation for the building, learning environments are compromised. Therefore, it is not appropriate to determine the capacity of a school building by totaling the number of students enrolled in a school or by simply counting the number of classrooms without also determining the net square feet available for each student in its capacity generating spaces.

Calculating the capacity of each BPS buildings using the consistent methodology described above, and in more detail in the following section, and comparing it to enrollment at each school building provides a clear picture of which buildings in the district are under or over capacity based on current programming and use.



## EVALUATING CAPACITY

Net area per student standards for capacity generating spaces vary according to how the space is used. Space uses were identified by DLR Group team members during walkthroughs of 117 school buildings between November 2022 and February 2023. The uses shown in this analysis are based on how each space was being used when the team walked through the building. The use of some spaces was based on the information provided by school staff accompanying DLR Group team members on their walkthroughs at each school and may not be consistent across all schools.

As noted previously, the student capacity of each school is calculated by dividing the net square foot area of each capacity generating space by a net square feet area per student standard based on the use of the space. The square feet per student standards used in this Study approved by BPS were derived from the MSBA Space Summary Template applicable at the time the evaluation was conducted. Maximum class sizes were provided by BPS, so even if a room was large enough to accommodate more students based on the applied net square foot per student calculation, the capacity of that space was capped at the maximum class size allowed for that classroom use.

Net square foot (NSF) per student standards for each space type were determined by dividing the minimum recommended square foot area of program spaces by the ideal occupancy provided in the MSBA Space Summary Template. For instance, in the MSBA Space Summary Template, the minimum recommended area for a high

school general classroom is 825 NSF and the number of students per classroom used in the Template are 23; therefore, the NSF per student in a minimally sized classroom is 825 NSF divided by 23, which equals 36 NSF per student for that space type.

### SAMPLE NSF CALCULATION

$$\frac{\text{HS Minimum Room Area}}{\text{Students in Classroom}} = \frac{825 \text{ NSF}}{23 \text{ Students}} = 36 \text{ NSF/Student}$$

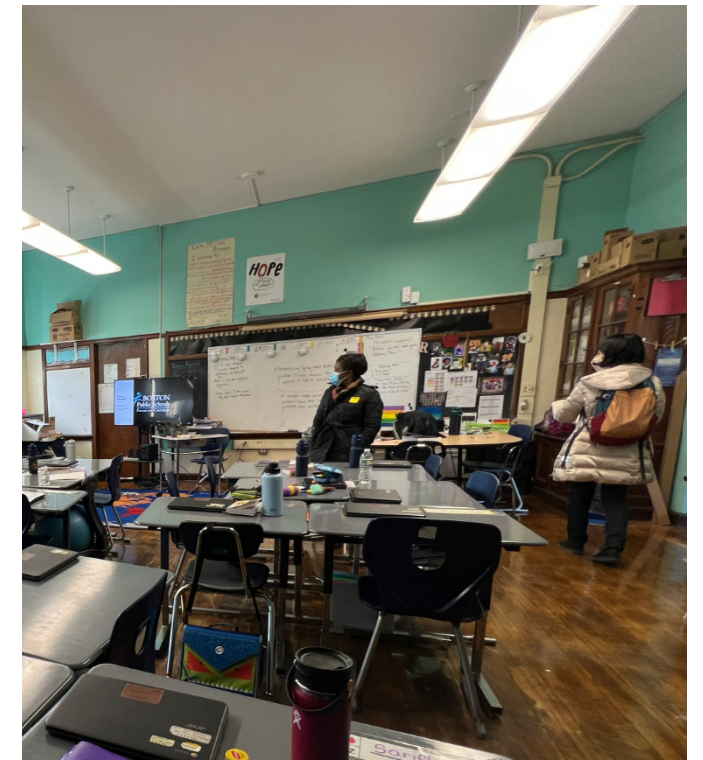
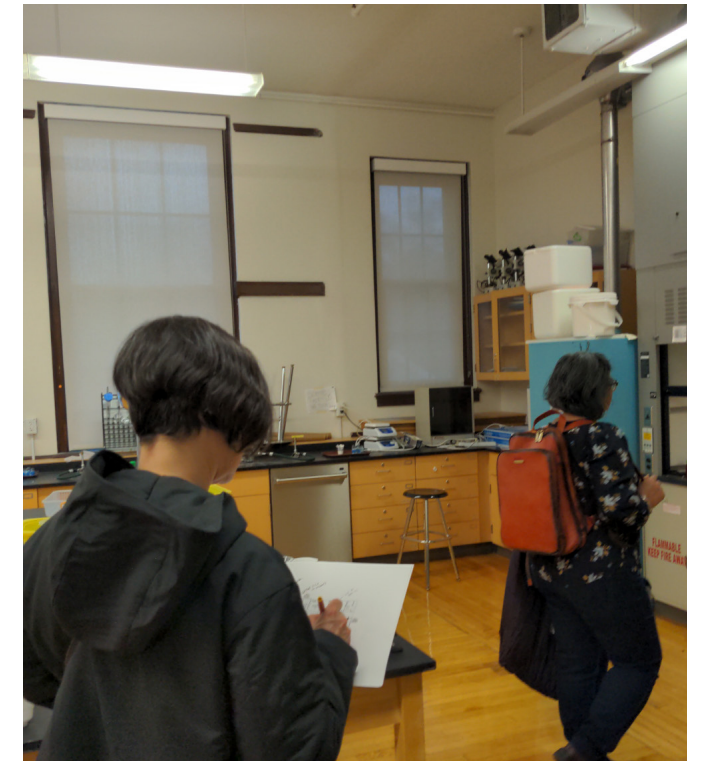
The area of existing spaces was approximated using building plans provided by the City of Boston Public Facilities Department (PFD). DLR Group did not conduct fieldwork to confirm the accuracy of the building plans provided. DLR Group documented minor room changes with dimensions approximated based on existing building features.

Capacity generating spaces are dependent on the grade designation of the schools. In elementary schools serving grades PreK through 6, classrooms used for homeroom are considered capacity generating. Rooms used for arts, physical education or support are not considered capacity generating. For middle schools serving grades 5, 6, 7 and 8, rooms used for one or more core subjects (language arts, social studies, math, science) are considered capacity generating. Rooms used for programs such as arts, physical education, or support are not considered capacity generating. In secondary schools serving grades 9 through 12 rooms for core subjects, science labs, art, and vocational/technology spaces are all considered capacity generating. Rooms used for student support, physical education, music, drama, and

dance are not considered capacity generating. Buildings used for adult education were evaluated using the same standards as secondary schools.

Sub-separate classrooms across all grade levels were considered capacity generating for the purposes of calculating existing capacity in this Study. Their student capacity was calculated according to the specific strand or use. Resource classrooms and small group rooms used for pull-out and other support services were not counted as capacity generating. Wherever a specific specialized services strand was not identified, factors for the Applied Behavior Analysis strand (ABA) factors were applied as a conservative measure for capacity.

Sub-separate classrooms are not usually considered capacity generating. In the MSBA Space Standards Template about 8% of the student population is provided with sub-separate classrooms, and typically each of those students would also be provided with a seat in a general education classroom. Consequently, MSBA does not consider sub-separate classrooms to be capacity generating. BPS currently provides a larger percentage of its students with sub-separate classrooms than MSBA standards. As BPS implements its Inclusive Education Plan, some sub-separate classrooms will become inclusive general education classrooms. Consequently, this analysis includes the capacity generated by sub-separate classrooms to give a more accurate representation of future building capacity when students are provided with an inclusive learning experience to the greatest extent possible.



**ELEMENTARY SCHOOL**

TYPE OF TEACHING SPACE/USE	CLASS TYPE	CURRENT MSBA SF/STUDENT	BPS MAX CLASS SIZE (STUDENTS)
Kindergarten	K0-K1	61	20
	K2		22
Typical Classroom 1st-2nd	General Education	39	22
	Inclusion		22
	SEI/Dual Language		20
	ESL		22
Typical Classroom 3rd-6th	General Education	39	25
	Inclusion		23
	SEI/Dual Language		20
	ESL		25
Special Education	ABA K0-K1	75	9
	ABA K2-K12		10
	EI (Emotional Impairment)		10
	Intellectual Impairment		12
	Severe Multiple Disabilities		6
	Multiple Disabilities		8
	Hearing		6
	Specific Learning Disabilities		12

**MIDDLE SCHOOL**

TYPE OF TEACHING SPACE/USE	CLASS TYPE	CURRENT MSBA SF/STUDENT	BPS MAX-CLASS SIZE (STUDENTS)
Typical Classroom 6th-8th (7th-8th in some districts)	General Education	37	28
	Inclusion		25
	SEI/Dual Language		20
Science for 5th-6th	General Education	45	28
	Inclusion		25
	SEI/Dual Language		20
Science Labs 6th-8th (25% if 4 classroom teams; 50% if 2 classroom teams)	General Education	60	28
	Inclusion		25
	SEI/Dual Language		20
ESL Classroom	ESL	45	25
	SLIFE		15
Special Education	ABA K2-12	71	10
	EI (Emotional Impairment)		10
	Intellectual Impairment		12
	Severe Multiple Disabilities		6
	Multiple Disabilities		8
	Hearing		6
	Specific Learning Disabilities		12

**HIGH SCHOOL AND ADULT EDUCATION**

TYPE OF TEACHING SPACE/USE	CLASS TYPE	CURRENT MSBA SF/STUDENT	BPS MAX CLASS SIZE (STUDENTS)
Typical Classroom	General Education	36	31
	Inclusion		28
	SEI/Dual Language		20
	ESL		22
	SLIFE		15
Science Labs	General Education	60	31
Special Education	ABA K2-12	71	10
	EI (Emotional Impairment)		10
	Intellectual Impairment		12
	Severe Multiple Disabilities		6
	Multiple Disabilities		7
	Hearing		6
	Specific Learning Disabilities		12
Business Education	General Education	60	28
Computer/Keyboarding Labs	General Education	60	28
Art	General Education	52	28
Votech/Industrial Arts - light	Early Education and Care	100	15
Votech/Industrial Arts - medium	Woodworking, Metal Working, Electronics, Culinary Arts, Apparel Development (Fashion)	120	15
Votech - Heavy/ Agriculture	Agriculture, Automotive, Construction, Cosmetology	185	15

Each use type was assigned a net square feet area per student calculated from the MSBA Space Summary Template space sizes, as well as a maximum number of students per classroom per BPS guidelines and collective bargaining agreements. These tables show the resulting square foot areas per student and maximum number of students per classroom for each grade level group.

**CAPACITY ANALYSIS EXCEPTIONS**

Capacity was not calculated for the Kennedy Academy for Health Careers which serves grades 11 and 12 due to lack of documentation of the new location for this program. Uses were determined during DLR Group's walkthrough of the building, but calculations based on square footage were not performed. Capacity was not calculated for a small number of BPS buildings due to lack of documentation and/or inability to conduct building walkthroughs.

Capacity calculations were also not included in this analysis for recently completed buildings and buildings at which new construction or major renovations were in design or were under construction. These schools include Boston Arts Academy, William E. Carter School, Dearborn STEM Academy, Josiah Quincy Upper School, and Madison Park Technical Vocational High School.

## CAPACITY SNAPSHOT: DISTRICT

Current capacity across the district ranges widely. Secondary schools serving grades 7 through 12 and elementary schools serving grades K through 8 tend to be in buildings with higher capacity, while school buildings with lower capacity are mostly home to elementary schools serving grades PreK through 6 or specialized schools serving all grades. School buildings across Boston neighborhoods generally have a similar range of building capacities, except for Roslindale, Hyde Park, and West Roxbury, where school capacity is mostly under 450 students per school. Around 50% of the school buildings in the district have a capacity of less than 300 students; half of these schools serve elementary grades. Early Learning Centers (ELCs) generally have lower capacity due to the age of the students. Three ELCs have a capacity of more than 200 students though most serve between 100 and 200 students.

spaces in a school building that were being used as classrooms at the time of the walkthrough by DLR Group staff, regardless of the area of the classroom. Undersized spaces that were being used as classrooms may be identified from the capacity calculations described in the previous section.

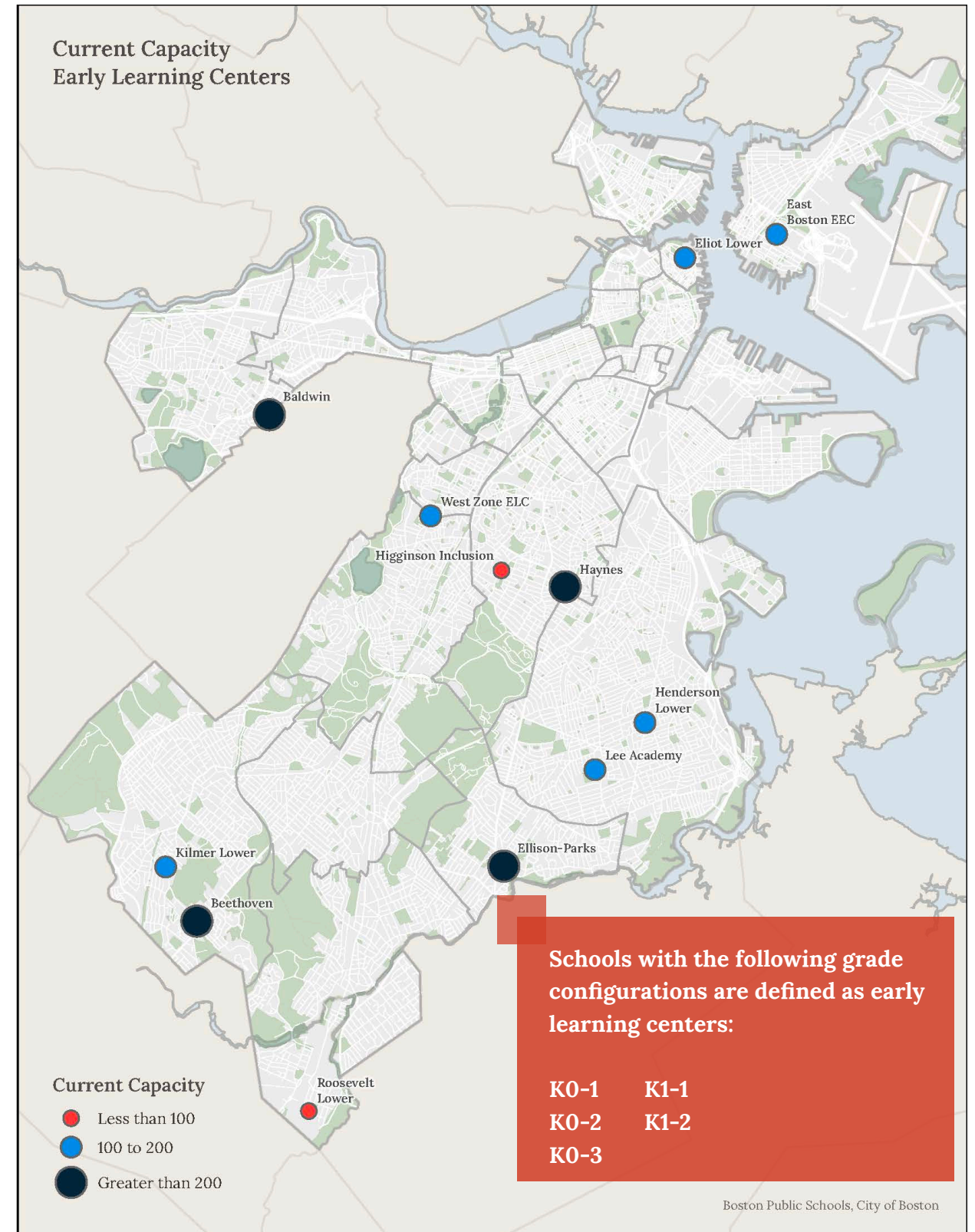
The smallest model programs developed by DLR Group as part of this School Design Study require at least 18 capacity generating classrooms for an elementary school without pre-kindergarten to serve a minimum of 316 students in grades K through 6, and at least 59 capacity generating classrooms for a secondary school to serve a minimum of 1,150 students in grades 7 through 12.

Within the district, 52 schools currently meet the model space summary classroom count, 46 of which are primary schools. Only 5 out of 30 secondary schools meet the model space summary of 59 capacity generating classrooms; this is less than 20% of all secondary schools in the district. These schools are Boston Latin School, Boston Latin Academy, East Boston High School, TechBoston Academy, and English High School. Most of the regions within the school district lack a secondary school that meets the model space summary number of capacity generating classrooms.

Early Learning Centers were not included in the classroom count analysis above. The current buildings housing these programs have between 6 and 13 classrooms, and therefore all fall below the 18-classroom elementary school model, which may be acceptable given the age of the students served.

## SCHOOL CLASSROOM COUNT

Although the area of classrooms was the main consideration for the capacity calculations in this analysis, classroom counts offer a way to measure how the current buildings may be used in the shorter term. Though the classroom counts do not address MSBA square foot per standard standards, they do identify the number of



EARLY LEARNING CENTERS			EARLY LEARNING CENTERS			EARLY LEARNING CENTERS		
School	Calculated Capacity	# of Capacity Generating Classrooms	School	Calculated Capacity	# of Capacity Generating Classrooms	School	Calculated Capacity	# of Capacity Generating Classrooms
Baldwin Early Learning Pilot Academy	246	12	Ellison-Parks Early Education School	227	12	Kilmer K-8 School (K-3)	170	13
Beethoven Elementary School	237	8	Haynes Early Education Center	212	12	Lee Academy	167	12
East Boston Early Education Center	180	12	Henderson K-12 Inclusion School (K0-1)	160	10	Roosevelt K-8 School (K1-1)	94	6
Eliot K-8 Innovation School (K0-1)	168	13	Higginson Inclusion K0-2 School	96	10	West Zone Early Learning Center	124	7

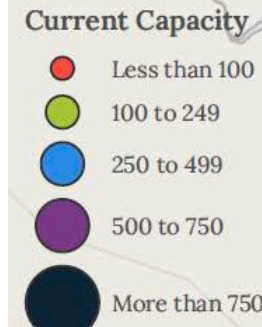
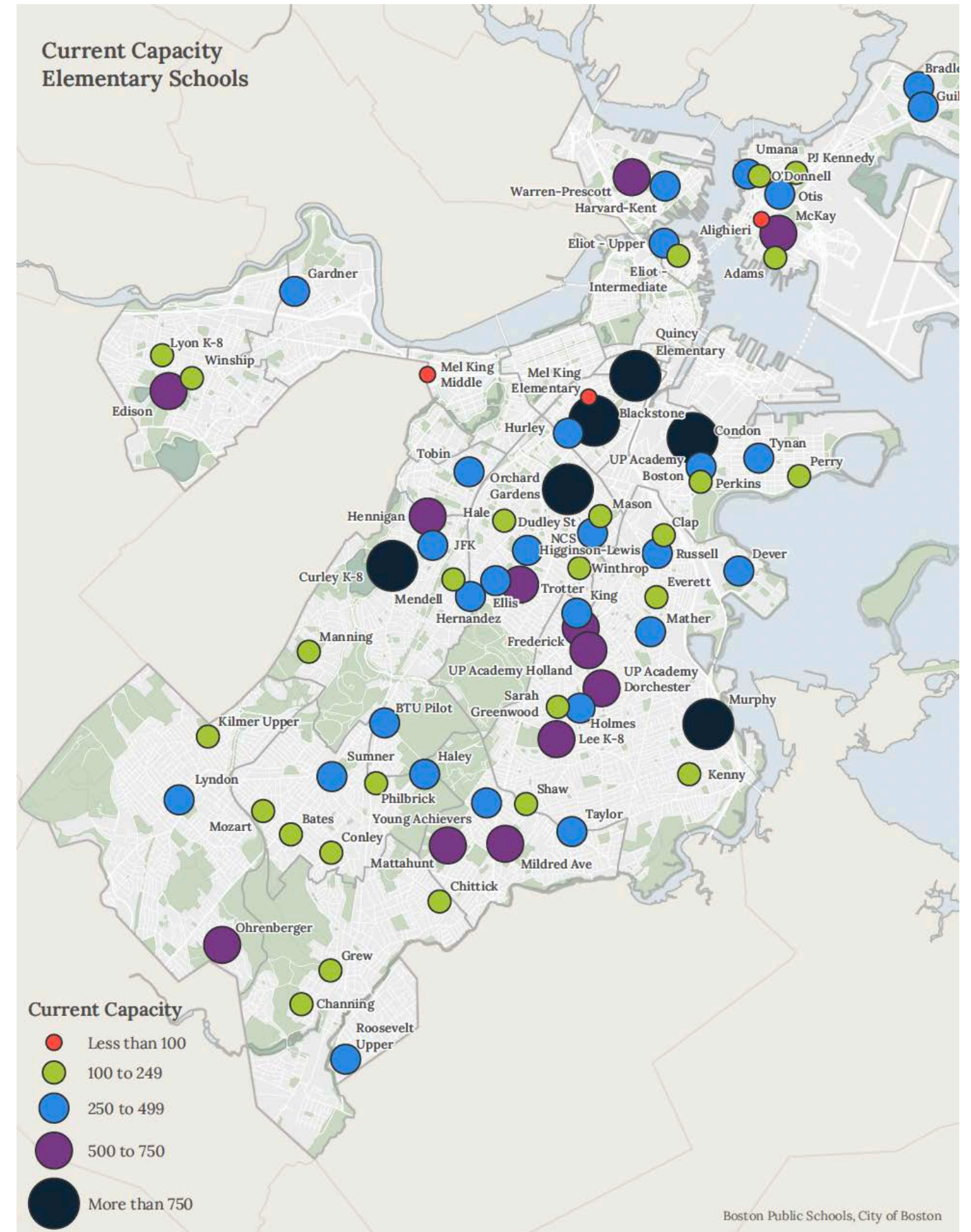
ELEMENTARY SCHOOLS

School	Capacity	# of Capacity Generating Classrooms	School	Capacity	# of Capacity Generating Classrooms	School	Capacity	# of Capacity Generating Classrooms
Adams Elementary School	236	19	Harvard-Kent Elementary School	450	28	Murphy K-8 School	928	52
Alighieri Dante Montessori School	80	6	Hennigan K-8 School	587	36	O'Donnell Elementary School	174	14
Bates Elementary School	164	14	Hernandez K-8 School	398	20	Ohrenberger School (3-8)	540	65
Blackstone Elementary School	803	46	Higginson-Lewis 3-8 School	316	18	Orchard Gardens K-8 School	944	49
Boston Teachers Union K-8 Pilot	282	16	Holmes Elementary School	329	19	Otis Elementary School	333	35
Bradley Elementary School	297	16	Hurley K-8 School	408	18	Perkins Elementary School	204	12
Channing Elementary School	207	14	Kennedy John F Elementary School	403	24	Perry Elementary School	169	14
Chittick Elementary School	248	19	Kennedy Patrick J Elementary School	186	13	Philbrick Elementary School	101	8
Clap Elementary School	187	9	Kenny Elementary School	193	20	Quincy Elementary School	785	45
Condon K-8 School	913	48	Kilmer K-8 School	187	11	Roosevelt K-8 School (2-8)	260	14
Conley Elementary School	160	12	King School	437	34	Russell Elementary School	415	18
Curley K-8 School	780	59	Lee K-8 School	651	39	Shaw Elementary School	219	12
Dever Elementary School	424	23	Lyndon K-8 School	418	31	Sumner Elementary School	390	27
Dudley Street Neighborhood School	266	15	Lyon K-8 School	108	7	Taylor Elementary School	397	28
Edison K-8 School	741	48	Manning Elementary School	174	9	Tobin K-8 School	405	23
Eliot K-8 Innovation School - Intermediate	243	16	Mario Umana Academy	492	37	Trotter Elementary School	577	51
Eliot K-8 Innovation School - Upper	329	18	Mason Elementary School	215	14	Tynan Elementary School	297	21
Ellis Elementary School	377	28	Mather Elementary School	430	32	UP Academy Boston	380	24
Everett Elementary School	249	16	Mattahunt Elementary School	668	40	UP Academy Dorchester	743	37
Frederick Pilot Middle School	652	38	McKay K-8 School	614	36	UP Academy Holland	627	35
Gardner Pilot Academy	414	22	Mel King Academy - Elementary	70	20	Warren-Prescott K-8 School	539	61
Greenwood Sarah K-8 School	228	24	Mel King Academy - Middle	44	6	Winship Elementary School	159	17
Grew Elementary School	238	13	Mendell Elementary School	185	14	Winthrop Elementary School	206	15
Guild Elementary School	280	18	Mildred Avenue K-8 School	734	41	Young Achievers K-8 School	470	37
Hale Elementary School	142	9	Mozart Elementary School	130	10			
Haley Pilot School	398	23						

Schools with the following grade configurations are defined as elementary schools:

- K0-4
- K1-5
- K2-6
- 2-4
- 4-8
- K0-5
- K1-6
- K2-8
- 2-8
- 5-8
- K0-6
- K1-8
- 3-8
- 6-8
- K0-8

Schools up to grade 8 are included as primary schools because they include a majority of grades associated with elementary schools. MSBA Guidelines for middle schools are similar for both elementary and middle schools; schools with middle school sections were scored to reflect the MSBA Space Summary Template and Science/STEM Guidelines where needed.



SECONDARY SCHOOLS

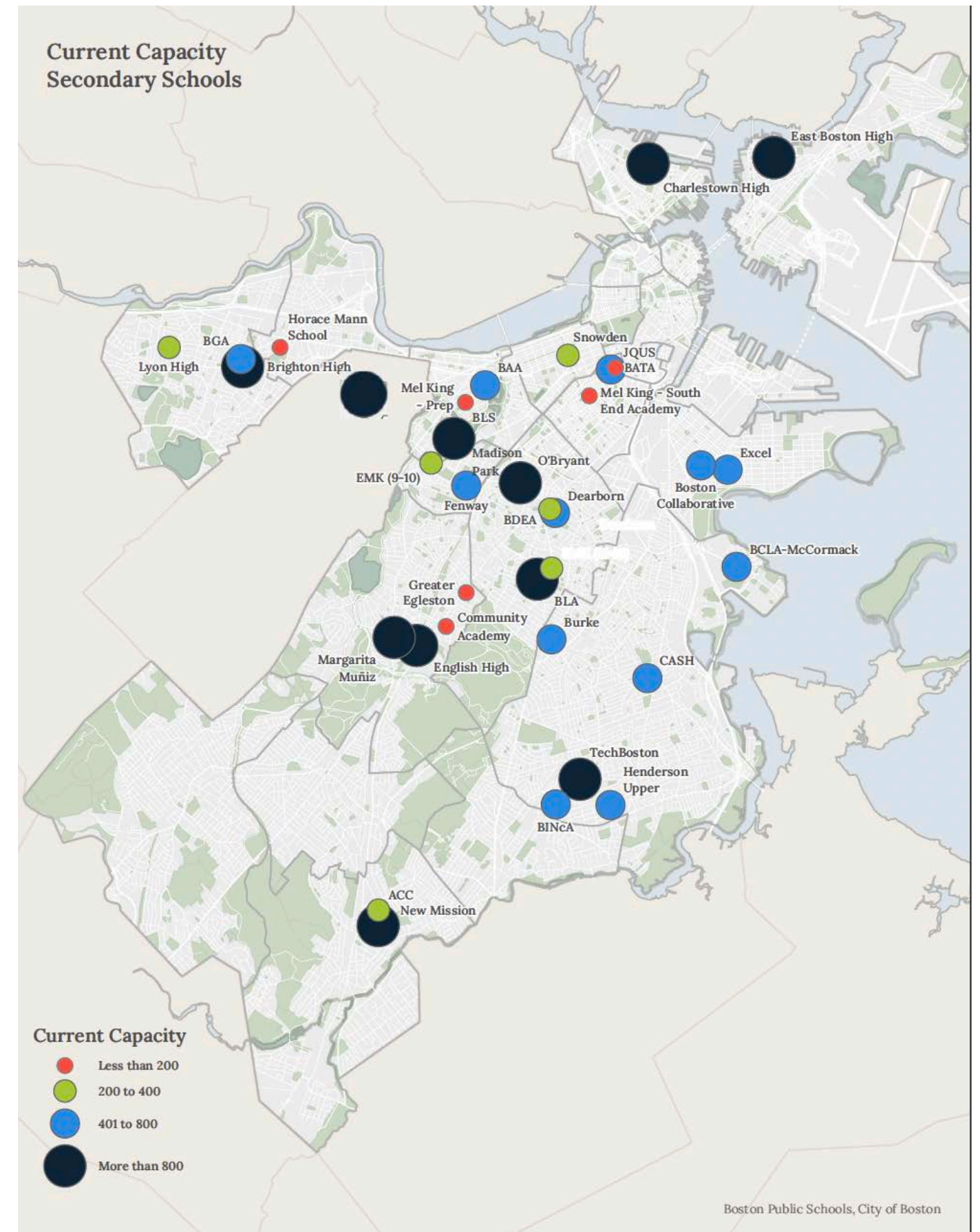
School	Capacity	# of Capacity Generating Classrooms
Another Course to College	392	19
Boston Adult Technical Academy	117	13
Boston Collaborative High School	126	7
Boston Community Leadership Academy-McCormack	556	35
Boston Day and Evening Academy	240	21
Boston Green Academy	546	38
Boston International High School / Newcomers Academy	618	35
Boston Latin Academy	1645	83
Boston Latin School	2154	108
Brighton High School	1095	57
Burke High School	688	43
Charlestown High School	1046	55
Community Academy	154	8
Community Academy of Science and Health	692	35
East Boston High School	1234	65
English High School	965	61

School	Capacity	# of Capacity Generating Classrooms
Excel High School	644	43
Fenway High School	408	30
Greater Egleston High School	166	14
Henderson K-12 Inclusion School Upper	640	38
Horace Mann School for the Deaf Hard of Hearing	194	35
Kennedy Academy for Health Careers (11-12)	N/A	15
Kennedy Academy for Health Careers (9-10)	227	12
Lyon High School	307	15
Margarita Muniz Academy	808	38
Mel King Academy - Prep	40	10
Mel King South End Academy	166	20
New Mission High School	822	48
O'Bryant School of Mathematics & Science	N/A	N/A
Snowden International High School	227	16
TechBoston Academy	1037	66

Though schools serving grades PreK through 12 encompass the elementary school grades (PreK-8), they are grouped with secondary schools to evaluate CTE or applied learning spaces in the MSBA Space Summary Template and Science/STEM Guidelines for upper grades. Similarly, scores also reflect other requirements for lower grades that may not be required for upper grades.

Schools with the following grade configurations are defined as secondary schools:

- K0-12    9-10
- 6-12     9-12
- 7-10     11-12
- 7-12



**SNAPSHOT: MODEL SPACE SUMMARY**

Model Space Summaries for Elementary Schools (PreK-6) and Secondary Schools (7-12) were developed as part of this School Design Study. Their capacities were defined as follows:

- Elementary School (PreK-6) Small: 356 students**
- Elementary School (PreK-6) Large: 712 students**
- Secondary School (7-12) Medium: 1,150 students**
- Secondary School (7-12) Large: 1,650 students**

To understand how the current building configurations fit the model space summary capacity of the same grade configuration, the current calculated capacity was compared to the model capacities. For each grade configuration, the schools were classified as follows:

**Elementary Schools:**

- **356 and under: Low Capacity**  
*(Note: without K0/K1 capacity would be 316)*
- **356-712: Medium Capacity**
- **712 and above: Large Capacity**

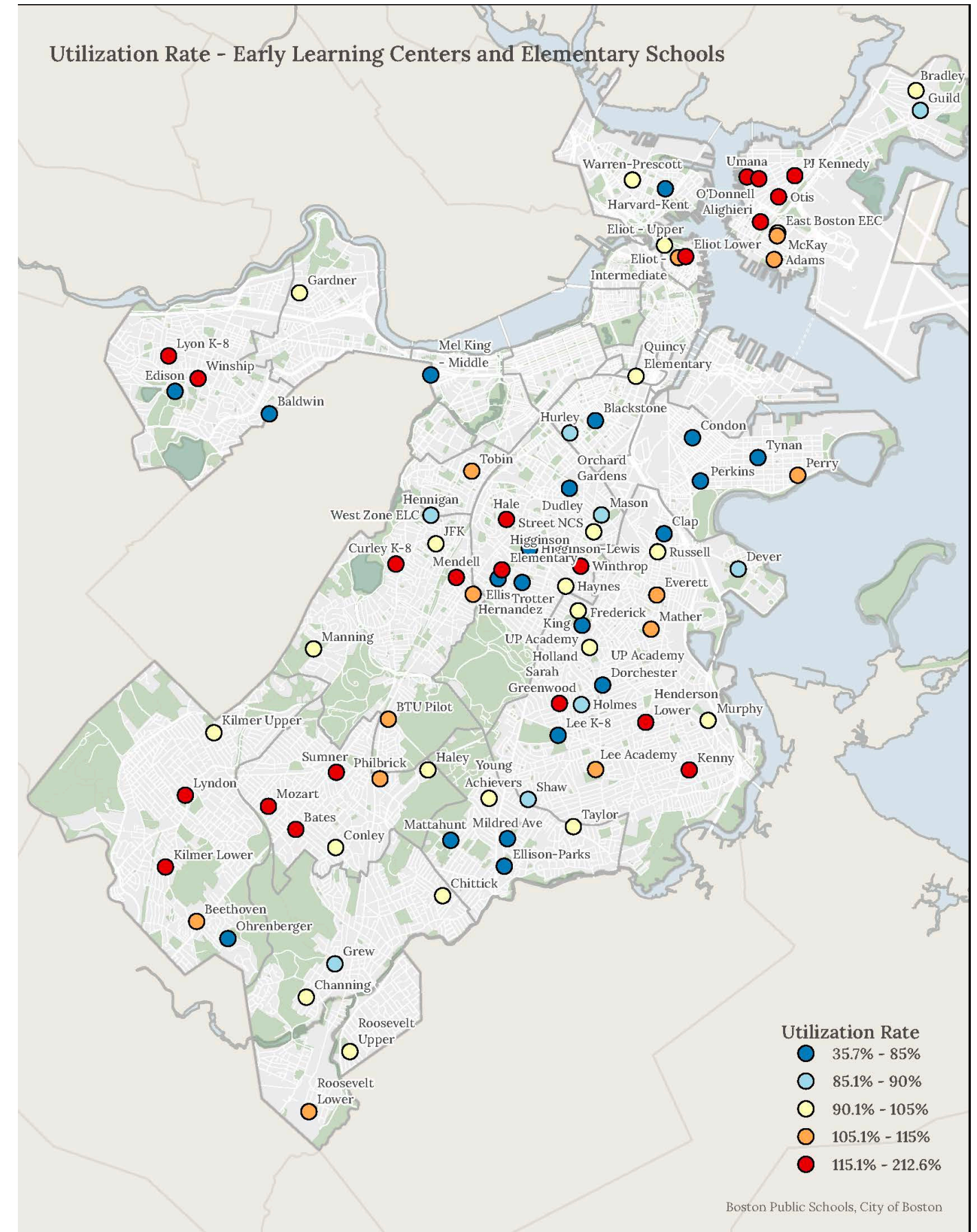
**Secondary Schools**

- **650 and under\*: Low Capacity**
- **650-1150: Medium Capacity**
- **1150-and above: Large Capacity**

Based on this, 47 out of 117 schools are meeting Acceptable Capacity, 12 of which are at the Large Capacity for the model programs. Of the schools meeting Preferred Capacity, 9 are elementary schools and 3 are secondary schools.

Around 60% of school buildings in the district are classified as Low Capacity when compared to the building models. The percentage of schools with capacities lower than the building model is similar in both elementary + EECs and secondary schools throughout the district, with about half of the schools in each category classified as Low Capacity.

*\*A smaller capacity count of 650 students was included for secondary schools in the following calculations. A building model was not developed for this capacity but given that most existing buildings in the district hold smaller student populations, this number was included as a baseline for analyzing existing programs.*





### CAPACITY SNAPSHOT: UTILIZATION

The calculated capacity for each school was compared to the enrollment for the 2021-2022 school year to calculate utilization rates throughout the district. These numbers were then compared to the following measures to identify schools that were in the preferred, acceptable, or not ideal range of utilization:

- Preferred: 90-104% Utilization**
- Acceptable: 85-89%**
- OR 105-114% Utilization**
- Not Ideal: <84% OR >115% Utilization**

School capacity is ideal when it is close to full capacity without over enrollment, or above 90% for both primary and secondary schools. The above utilization rates allow for flexibility to account for population and scheduling changes as necessary for each school. A school that is over or under-enrolled by more than 15% is not ideal as it can lead to limited access to resources for students, overspending for the district, and an overall decrease in the quality of the student experience.

At the time of this Study, 1 EEC, 19 elementary schools, and 4 secondary schools were in the Preferred utilization range.

A similar split is observed in the Acceptable range between 2 EECs, 18 elementary and 3 secondary schools

Most schools in the district fall in the Not Ideal utilization range, with under and over enrollment being about equal among them. 9 schools in the district have 70% or less utilization. Over utilization was observed at 27 schools.

In general, a school being over capacity is due to insufficient sizes of classrooms in that building as compared to the standard sizes used to calculate capacity. These classrooms have a normal number of students assigned to rooms that are 60% or less than the square footage recommended by the MSBA in their Space Summary Template; therefore, the calculated capacity is much less than the enrollment. In renovation projects, it is recommended that classrooms are "right-sized" as much as possible to be aligned with the Building Models, which are within the range of MSBA recommended room sizes.

See the Educational Specifications for more information on the Building Models.

