Addendum

Demographics Utilizing a Racial, Ethnic, and Neighborhood Lens

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Executive Summary

The Addendum complements and builds on the November 2, 2016, report, BuildBPS Demographics Report for the Facilities Master Plan (BuildBPS Demographics), by utilizing a racial, ethnic, and geographic (i.e., neighborhood) lens in the presentation and analysis of population and school data. This Addendum is an extension of the BuildBPS Demographics report, not a reiteration of said report and its enrollment projections or patterns. The BuildBPS Demographics report focuses on enrollment projections and trends for the City of Boston; this Addendum incorporates detailed racial, ethnic, and neighborhood data.[1] The latter is important because it helps to identify information relevant to inclusive planning and equitable decision-making related to future enrollment trends and patterns.

Based on census data and population projections, as well as spatial analyses, this Addendum highlights findings that can have implications for decision-making regarding enrollment trends, capacity planning, programming, and needs assessment / resource distribution across the City. Generally, broader findings touch upon population, age structure, neighborhood characteristics, and population projections and capture rates. These include the following:

Population

- Boston's overall population continues to reflect increasingly growing racial and ethnic diversity
- Latinos and Blacks, and Asians are growing at a faster rate than Non-Latino Whites, both relative to the overall population, but especially among school-age youth.
- Growing racial and ethnic diversity (in terms of Blacks, Latinos, and Asians) is not taking place across the city uniformly, but rather is concentrated in some neighborhoods areas.

Age Structure

- Growth is occurring for both older and younger segments of the population, the former at a faster rate than the latter. For Blacks and Latinos, however, it is the younger age groups (17 years and younger) that are growing fastest.
- Black and Latino children under 18 years of age will continue to represent the dominant proportion of persons in younger age groups in Boston.
- Growth of youth populations (0-17 years) is increasing in predominantly Black and Latino neighborhoods.

Neighborhood Characteristics

- Children and youth are not distributed evenly in terms of race and ethnicity across neighborhoods. Black and Latino children will continue to reflect patterns of residential concentration along neighborhood boundaries.
- The majority (59.2%) of all students enrolled in Boston Public Schools live in just four neighborhoods: Roxbury, Dorchester, East Boston, and Mattapan. By neighborhood, 9,870 students (17.5% of the entire BPS enrollment) live in Roxbury, 11,821 (20.9%) live in Dorchester, 6,507 (11.5%) live in East Boston, and 5,282 (9.3%) live in Mattapan.

Population Projections, Enrollment, and Capture Rate.

- Population projections reflect racial and neighborhood dynamics in Boston, and should be considered in planning and decision-making.

1. BuildBPS Demographics did include some limited data and information about neighborhoods, as well as race and ethnicity, but these areas were not treated as significant dimensions of the report.

- Changes in overall grade enrollment over a period of time may reflect racial and ethnic differences at various grade levels; exploring this further can help in understanding particular enrollment patterns and trends.

- BuildBPS Demographics states that the "district's capture rate has averaged 52.8%" (p. 29). Further, "BPS kindergarten enrollment as a percentage of eligible students (capture rate) has been declining since 2012." Capture rates may be very different by neighborhood, and, therefore, may not show declines for certain areas. Using a racial, ethnic, and geographic (i.e., neighborhood) lens points to capture rates that are different for various groups, as well as for particular locations within the City. For example, there are some neighborhood areas that are primarily Black and Latino with significantly high capture rates (see Map 21 and Map 22).

More specific findings presented throughout this Addendum include the following:

- Data about age structure and projected age structure can be differentiated by race and ethnicity; this means that growth patterns will be different for communities of color, compared to Non-Latino Whites.

- The BuildBPS Demographics report showed grade-enrollment changes in the aggregate; however, overall growth rate or changes in the number of K-12 student-enrollment projections can vary by race, ethnicity, and location. In other words, while the aggregate level may be stable in terms of all students, it might increase considerably for Latino and Black students. BuildBPS Demographics showed significant enrollment decline in the middle-school grades, but did not report this decline by race and ethnicity.

- Based on the data presented in the BuildBPS Demographics report, the "proportion of K-12 students enrolled in BPS has been declining over time." This does not, however, negate that Latino and Black children are growing in terms of both overall numbers and as a proportion of all children in the City's overall population.

- Race and ethnicity, and location (i.e., neighborhood areas) are strongly associated in Boston. This Addendum expands the information in the BuildBPS Demographics report by showing how Latinos, Blacks, and Asians are "distributed" across neighborhood areas.

- Capture rates are important in understanding enrollment patterns, but actual rates can be different across the City and by neighborhood areas.

- Demographic characteristics, such as birth rates and fertility, children living in households, and average household size, reflect major differences by race and ethnicity. For example, in 2010, 70% of all Black and Latino households reported the presence of at least one person under 18 years of age, compared to only 21% of all Non-Latino White households. The 2010–2014 American Community Survey 5 Year Estimates (abbreviated henceforth as "2010–2014 ACS")[2] reiterates this finding, and shows further that Latino and Black households with children are concentrated in certain neighborhood areas.

2. The 2010–2014 ACS is based on information collected from yearly surveys between January 1, 2010, and December 31, 2014; the 5 Year Estimates represent an average of the yearly surveys, and not an actual cumulative count. The Census Bureau describes the ACS as "a national survey that uses continuous measurement methods. In this survey, a series of monthly samples produce annual estimates for the same small areas (census tracts and block groups) formerly surveyed via the decennial census long-form sample…ACS samples about 3.54 million addresses each year." Further, "the ACS 3-year estimates have been discontinued. The 2005–2007, 2006–2008, 2007–2009, 2008–2010, 2009–2011, 2010–2012 and 2011–2013 ACS 3-year estimates will remain available to data users, but no new 3-year estimates will be produced. Every community in the nation will continue to receive a detailed statistical portrait of its social, economic, housing and demographic characteristics through 1-year and 5-year ACS products." See: http://www.census.gov/programs-surveys/acs/methodology.html

The Addendum is organized by the following sections:

- Introduction and Methodology
- Total Population
- Age Structure; Fertility and Birth Rates; Households with Children; and
- Average HH Size
- Population Projections by Race, Ethnicity, and Neighborhoods
- Grade Enrollment and Capture Rates
- Conclusion: Adding Race, Ethnicity, and Neighborhoods to BuildBPS Demographics

Introduction and Methodology

This Addendum adds racial, ethnic, and geographic (i.e., neighborhood) data and perspective to the *BuildBPS* Demographics report, providing greater insight regarding overall enrollment changes and implications for decision-making. The presentation of solely aggregate data can hide racial and ethnic differences in the overall population, and thereby negatively impact planning and future decision-making related to enrollment patterns for Boston and its neighborhoods.

This Addendum begins with a presentation focusing on the total population, and population growth since 2010 by race and ethnicity. Next, Boston's age structure by race and ethnicity is presented based on the 2010 census and 2010–2014 ACS. The Addendum includes other census data that suggests differing population growth rates by race and ethnicity, including fertility rates and the number and proportion of children under 18 years by household. The appendices include maps that illustrate some of the data in the Addendum.

The Addendum utilizes census data (2010 decennial, 2010–2014 ACS, Public Use Microdata Sample – PUMS 2014) to provide racial and ethnic dimensions to the above report.[3] The research also includes analysis of U.S. census-based population projections in terms of age, race, ethnicity and neighborhood characteristics that may be relevant to BPS enrollment planning as presented in the above report. To facilitate a greater understanding of how population changes and projections might impact enrollment planning, a series of thematic maps were composed to show spatial dimensions of the population projections at census tract levels and for the 16 planning districts utilized by the Boston Planning and Development Agency and The Boston Public Schools (See Appendix 1). In this report and consistent with the city's 26 neighborhoods, South Dorchester and North Dorchester are treated as one neighborhood, Dorchester.[4] This Addendum only includes information about Blacks, Latinos, Asians, and Non-Latino Whites; these groups comprise 96.8% of all BPS students.[5] There are other racial and ethnic groups in Boston, but they are reported at much lower numbers in the overall population and the BPS student body. It should be noted, furthermore, that the three communities of color discussed in the Addendum do not represent monolithic entities. The Black community, for example, includes various ethnicities, as noted in some reports.[6] The Latino community also includes a range of ancestries that may reflect different experiences on a range of demographic, economic, and educational variables.[7] This is also the case with regard to the Asian community. In fact, there is rapidly increasing ethnic diversification in Boston's Latino, Black, and Asian communities. It is possible to obtain additional data regarding the age structure of ancestries and ethnic origins in these communities through Public Use Microdata Samples (PUMS), but this is beyond the Addendum's scope.

GIS software was utilized to compose a series of maps to show how population projections for 2021 "look" in terms of the City's neighborhood geography. The maps listed below serve to show geographic patterns in the distribution of children and youth in Boston by race and ethnicity. Maps #2 to #19 also include the location of all Boston Public Schools (as of December 2016). [8]

MAPS

[3] The author utilized extrapolations for census tracts reported by Geolytics; the actual methodology used by this demographic projection company can be found on their website (titled, "Methodology – Population, Housing, and Income Estimates"; accessed: November 12, 2016). These projections begin with 2010 Redistricting Block Level data. It should be noted that population projections for census tracts has a long history; see, Robert Schmitt, "Methodology for Projecting the Population of Census Tracts" Journal of American Institute of Planners (1954); also, Stanley K. Smith and Mohammed Shahidullah, "An Evaluation of Population Projection Errors for Census Tracts" Journal of American Statistical Association (1995); for an actual example and illustration of a step by step application of census tract population projection, see, "Population Growth Estimates by Census Tracts 2000–2007" Tallahassee-Leon County Planning Department (2008); also see, David Swanson, "Forecasting the Population of Census Tracts by Age and Sex: the Hamilton-Perry Method in Action" Population Research in Policy Review (2010); for population projections at the state, county, and city level, See, Methodology for Boston's Population Projections 2016, Boston Redevelopment Authority Research Division (September 2016) for discussion and analysis of population projections for Boston; also see Vintage 2015 Population Projections for information about population projections for state and counties, UMass Donahue Institute (March 2015).

[4] When examining neighborhood population characteristics and changes in Boston, census tracts should be utilized, if possible; there are significant differences in population characteristics within the City's neighborhoods and zip codes that can be captured at the tract or block group level; see: J. Jennings, "Measuring neighborhood distress: a tool for place-based urban revitalization strategies" Community Development (2012).

[5] Based on data provided by BPS regarding race, ethnicity and enrollment the Massachusetts Department of Elementary and Secondary Education reported that in 2015–2016, Hispanic/Latino students comprised 41.5% of all students; African American students comprised 32.4%; White students, 14.2%; Asian students 8.7%; Multi-race, non-Hispanic students, 2.8%; Native American students, 0.3%; and Native Hawaiian and Pacific Islander students, 0.2%; see, http://profiles.doe.mass.edu/

Appendix 1 is a BPS-generated map showing all public (i.e., non-charter) schools in Boston by location and name. As noted earlier, BPDA identifies 26 neighborhoods within Boston's 16 planning districts (17, if Harbor Islands are included), as shown in Appendix 2. However, for purposes of discussion and analysis, South and North Dorchester is considered one neighborhood. There are two reasons for using the planning districts in this report: The first is that the data and information in the BuildBPS Demographics report and related BPS reports are based on the planning districts as neighborhoods; the second reason, more technical, is that census tracts are not completely contiguous across the boundaries of the 26 neighborhoods. Overlapping census tracts can impact what can be concluded about any given neighborhood areas, especially as it pertains to population projections. A map of the 26 neighborhoods, along with location of Boston Public Schools buildings, is provided in Appendix 2.

Some caveats are to be noted in the presentation of the data in this Addendum. One is that data reported in the ACS are annual surveys and, therefore, reflect some variability, versus actual counts in the decennial census. The data reported in the ACS have margins of error (MOEs) to indicate the variability in the numbers reported. For this reason, it is preferable to use multi-year surveys (2010–2014 ACS 5 Year Estimates), rather than single-year estimates (2014 ACS), since a larger sample produces a smaller MOE.[9] Generally, it is also discouraged to make definitive comparisons between the 2010 decennial official count of the population with subsequent ACS surveys of the population. Therefore, caution is in order regarding interpretation of comparisons. This is also the case with population projections, most useful in providing what future reasonable "ballpark" population figures might look like.[10]

Another caveat is that, in presenting information and data about race, Whites can be counted as a race, and, in turn, their count can include Latinos, an ethnic group. In this report, unless otherwise indicated, Whites are only counted in terms of those who are NOT Latino. This provides a more accurate description of racial and ethnic changes in Boston, as well as population growth rates. In the next section, for example, Table 1 shows the total population by race at 333,033 for Whites. However, if Latinos are not included, then the actual count of Whites drops 12.8% to 290,312 in 2010.

Total Population

The following tables are based on the 2010 decennial population counting of 617,594 persons, and the 2010–2014 ACS 5 Year Estimate of 639, 594 persons.

[6] See a recent report by J. Jennings, et al., Blacks in Massachusetts: Comparative Demographic, Social and Economic Experiences with Whites, Latinos, and Asians, Prepared for the Trotter Institute, University of Massachusetts, Boston and the John D. O'Bryant Institute, Northeastern University (December 2015).

[7] See, M. Uriarte, J. Jennings, and J. Douglas, The Silent Crisis-Including Latinos and Why It Matters: Representation in the City Governments of Boston, Chelsea, and Somerville, Massachusetts, Prepared for the Greater Boston Latino Network, Boston, Massachusetts (2014).

[8] Appendix 1 shows the names and location of public schools as published by BPS (accessed at: www.bostonpublicschools.org)

[9] For example, the MOE for the total population reported in the 2010–2014 ACS 5 Year Estimate is approximately +/- 2,875 persons; this means that there is a 90% confidence level that the actual population is within this range.

[10] For this reason, the forewarning in the "Boston Public Schools Demographics Report is an important one: "The District is strongly encouraged to continue revisiting these projections on an annual basis and to update them to reflect current trends and data" (p.33).

Table 1

Total Population by Race 2010 – City of Boston

	617,594	% Distribution
White alone	333,033*	54%
Black or African American alone	150,437	24%
American Indian and Alaska Native alone	2,399	0%
Asian alone	55,235	9%
Native Hawaiian and Other Pacific Islander alone	265	0%
Some Other Race alone	51,893	8%
Two or More Races	24,332	4%
Total Population by Latino or Non-Latino	**617,594**	
Not Hispanic or Latino	509,677	83%
Hispanic or Latino	107,917	17%

*The 2010 census count was 290,312 persons for Non-Latino Whites.

Table 2 shows the population by race as reported in the 2010–2014 ACS. When Non-Latino Whites are counted, there is a more accurate portrayal of population changes in Boston since 2010, as shown in Table 3 reporting population growth.

Table 2

Total Population by Race, City of Boston

	639,594	% Distribution
White alone	340,859	50.9%
Black or African American alone	160,342	23.9%
American Indian and Alaska Native alone	2,515	0.4%
Asian alone	58,545	8.7%
Native Hawaiian and Other Pacific Islander alone	68	0.0%
Some Other Race alone	47,341	7.1%
Two or More Races	29,924	4.5%
Total Population by Latino or Non-Latino	**639,594**	
Not Hispanic or Latino	522,080	81.6%
Hispanic or Latino	117,514	18.4%

Source: 2010–2014 ACS

Table 3

Population by Race and Ethnicity, 2010–2014 ACS

	2010	2010-2015 ACS	% Growth since 2010
Whites, Not Latino	329,312	294,432	1.4%
Blacks	150,437	160,342	6.2%
Asians	55,235	58,545	5.7%
Latinos	107,917	117,514	8.2%

% Growth Since 2010, blacks, Latinos, Asians and Non-Latino Whites

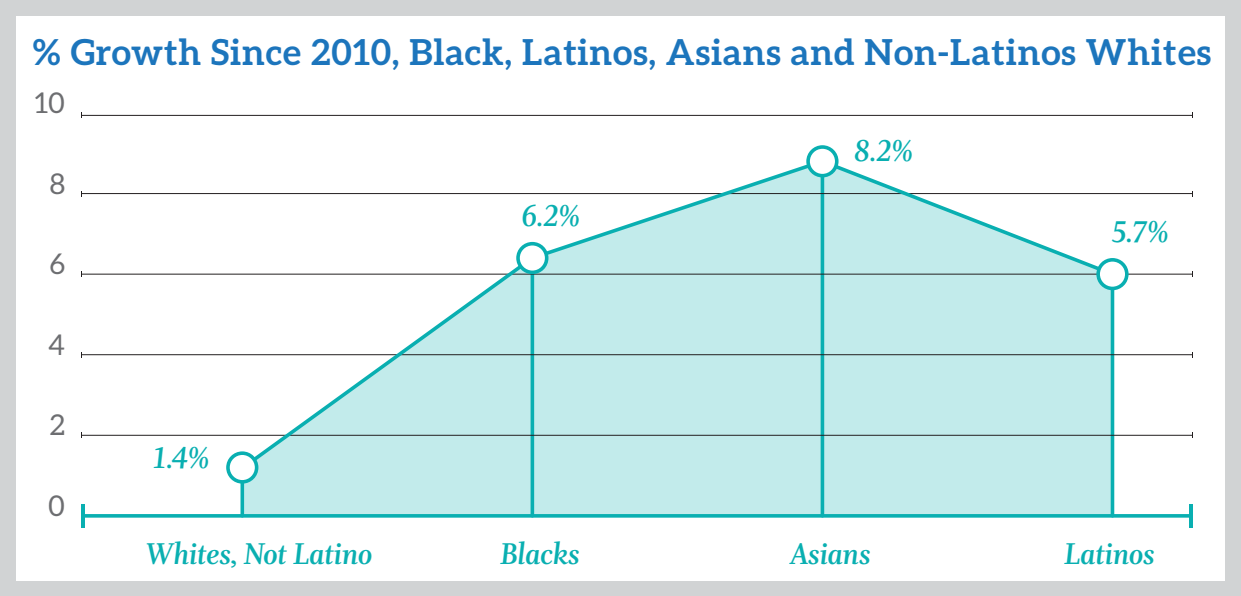


Table 3 and the chart above, based on the 2010–2014 ACS, suggest that, among the racial and ethnic groups discussed in this report, communities of color are growing significantly faster than Non-Latino Whites (1.4%). Since 2010, Latinos have grown by 8.2%; Blacks, 6.2%; and Asians, 5.7%.

Age Structure

Showing the age structure only for the total population can obscure significant racial and ethnic differences, and growth rates for different racial and ethnic groups. For example, see "Appendix B Percent in Change of Population" in the *BuildBPS* report; it states that the "Under 5" category represented 5.2% of all ages in 2010. The figure for Blacks under 5 is actually 6.7%; for Latinos, it is even higher (8.7%). The following table illustrates this point and shows that age distribution varies by racial and ethnic groups.

In addition to varying age distribution by race and ethnicity, this table indicates that, in 2010, Blacks and Latino children represented an overwhelming proportion of younger persons (under 18 years). For example, only counting the four groups shown in this table, Black and Latino children represented 62.4% of all children under 5 years of age, and 72.2% of all children among these groups who were 5 to 17 years of age.

The latter scenario is also reflected in the following 2010–2014 ACS table, whereby Black and Latino children represented 59% of all children under 5 years of age. The proportion jumps for the 5–17-year segment, wherein Blacks and Latinos comprised 72%.

Table 4:

Total Population 2010[11]

				Black	% Black	Latino	% Latino	Asian	% Asian	White (Not Latino)	% White
Total				***150,437***		***107,917***		***55,235***		***290,312***	
Under 5 years	31,301	31,301	5.2%	10,107	6.7%	9,416	8.7%	2,055	3.7%	9,725	3.3%
5 to 9 years	26,823	26,823	4.3%	10,205	6.8%	8,365	7.8%	1,888	3.4%	5,770	2.0%
10 to 14 years	26,523	26,523	4.3%	10,837	7.2%	8,110	7.5%	1,932	3.5%	5,118	1.8%
15 to 17 years	17,944	17,944	2.9%	7,573	5.0%	5,318	4.9%	1,343	2.4%	3,310	1.1%
18 and 19 years	31,882	31,882	5.2%	6,012	4.0%	5,152	4.8%	3,646	6.6%	16,111	5.5%
20 years	19,242	19,242	3.1%	3,029	2.0%	2,794	2.6%	2,056	3.7%	10,882	3.7%
21 years	17,649	17,649	2.9%	2,775	1.8%	2,520	2.3%	1,913	3.5%	9,904	3.4%
22 to 24 years	51,238	51,238	8.3%	7,917	5.3%	7,027	6.5%	5,311	9.6%	29,677	10.2%
25 to 29 years	74,691	74,691	12.1%	11,104	7.4%	10,472	9.7%	7,766	14.1%	43,441	15.0%
30 to 34 years	53,393	53,393	8.6%	9,708	6.5%	9,372	8.7%	5,061	9.2%	28,047	9.7%
35 to 39 years	40,656	40,656	6.6%	9,417	6.3%	7,872	7.3%	3,922	7.1%	18,554	6.4%
40 to 44 years	36,685	36,685	5.9%	10,052	6.7%	7,170	6.6%	2,949	5.3%	15,736	5.4%
45 to 49 years	35,990	35,990	5.8%	10,786	7.2%	6,451	6.0%	2,812	5.1%	15,267	5.3%
50 to 54 years	34,170	34,170	5.5%	10,123	6.7%	5,337	4.9%	2,549	4.6%	15,538	5.4%
55 to 59 years	30,218	30,218	4.9%	8,482	5.6%	4,051	3.8%	2,474	4.5%	14,681	5.1%
60 and 61 years	11,251	11,251	1.8%	3,067	2.0%	1,399	1.3%	960	1.7%	5,662	2.0%
62 to 64 years	14,582	14,582	2.4%	4,047	2.7%	1,696	1.6%	1,035	1.9%	7,634	2.6%
65 and 66 years	8,186	8,186	1.3%	2,347	1.6%	863	0.8%	636	1.2%	4,236	1.5%
67 to 69 years	10,495	10,495	1.7%	2,939	2.0%	1,086	1.0%	901	1.6%	5,495	1.9%
70 to 74 years	14,229	14,229	2.3%	3,770	2.5%	1,426	1.3%	1,414	2.6%	7,406	2.6%
75 to 79 years	11,150	11,150	1.8%	2,628	1.7%	989	0.9%	1,186	2.1%	6,188	2.1%
80 to 84 years	9,117	9,117	1.5%	1,880	1.2%	593	0.5%	772	1.4%	5,725	2.0%
85 years and over	9,060	9,060	1.5%	1,632	1.1%	438	0.4%	654	1.2%	6,205	2.1%

[11] 617,594 is Boston's total population in 2010; the total number of persons for all Blacks, Latinos, Asians and Non-Latino Whites is 603,901, or 98% of all racial and ethnic groups in Boston's total population.

Table 5:

Age Structure by Blacks, Latinos, Asians and Whites, 2010–2014 ACS

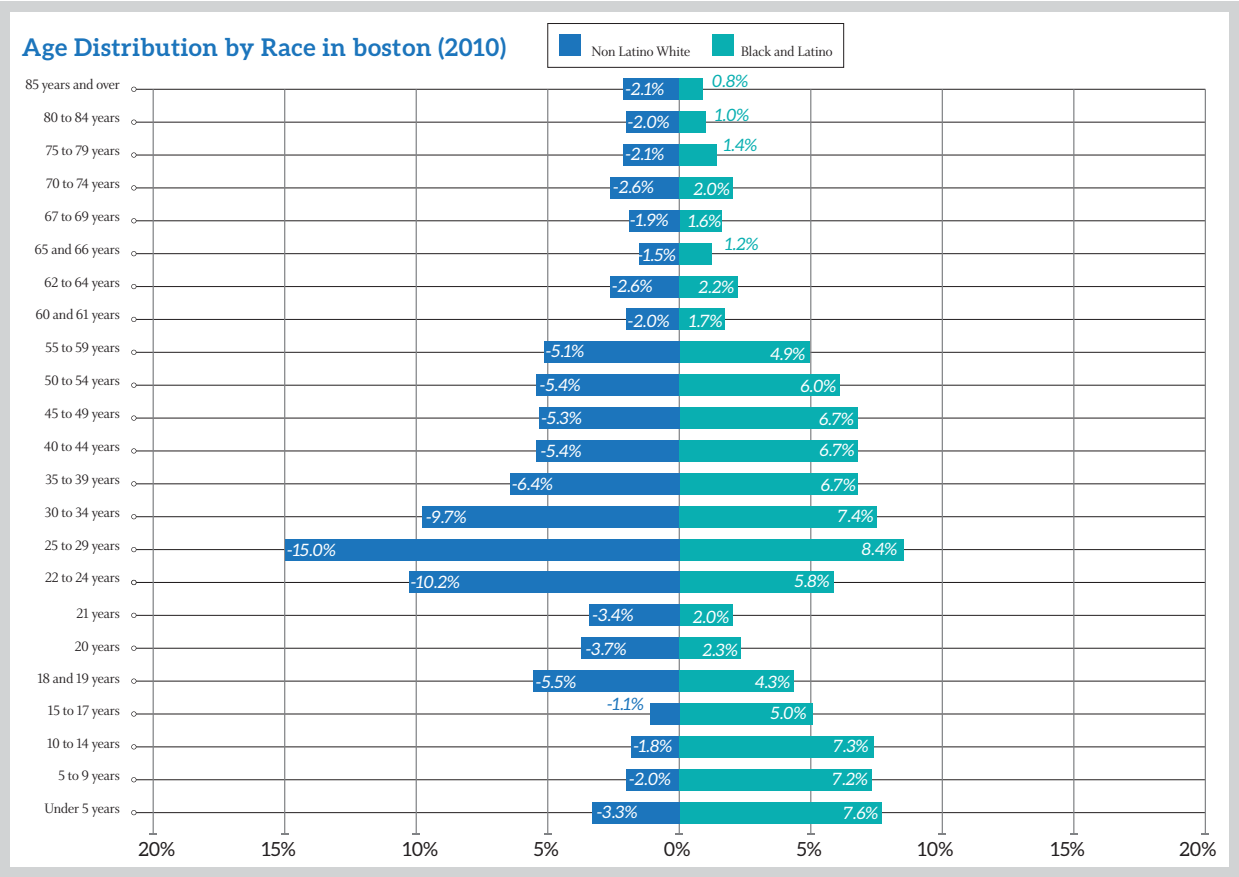
		Black	% Black	Latino	% Latino	Asian	% Asian	White (Not Latino)	% White
Total		160,342		117,514		58,545		294,432	
Under 5 years	33,398	10,377	6.5%	9,459	8.0%	2,196	3.8%	11,366	3.9%
5 to 9 years	27,869	10,990	6.9%	8,538	7.3%	1,910	3.3%	6,431	2.2%
10 to 14 years	26,845	11,012	6.9%	8,678	7.4%	1,900	3.2%	5,255	1.8%
15 to 17 years	17,635	7,373	4.6%	5,469	4.7%	1,550	2.6%	3,243	1.1%
18 and 19 years	30,831	5,429	3.4%	5,507	4.7%	3,568	6.1%	16,327	5.5%
20 to 24 years	78,909	15,430	9.6%	13,640	11.6%	8,945	15.3%	40,894	13.9%
25 to 29 years	80,987	13,317	8.3%	11,269	9.6%	8,140	13.9%	48,261	16.4%
30 to 34 years	57,531	10,610	6.6%	10,041	8.5%	5,665	9.7%	31,215	10.6%
35 to 44 years	78,827	20,176	12.6%	16,227	13.8%	7,654	13.1%	34,770	11.8%
45 to 54 years	71,461	21,347	13.3%	13,325	11.3%	5,981	10.2%	30,808	10.5%
55 to 64 years	60,699	17,481	10.9%	8,735	7.4%	5,082	8.7%	29,401	10.0%
65 to 74 years	35,409	10,055	6.3%	4,094	3.5%	3,028	5.2%	18,232	6.2%
75 to 84 years	20,500	4,801	3.0%	1,811	1.5%	2,029	3.5%	11,859	4.0%
85 years and over	9,932	1,944	1.2%	721	0.6%	897	1.5%	6,370	2.2%

The two tables demonstrate that children under 5 years of age, for the four groups shown, showed a change from 31,303 persons in 2010 to 33,398 in the 2010–2014 ACS, or approximately 6.7%.

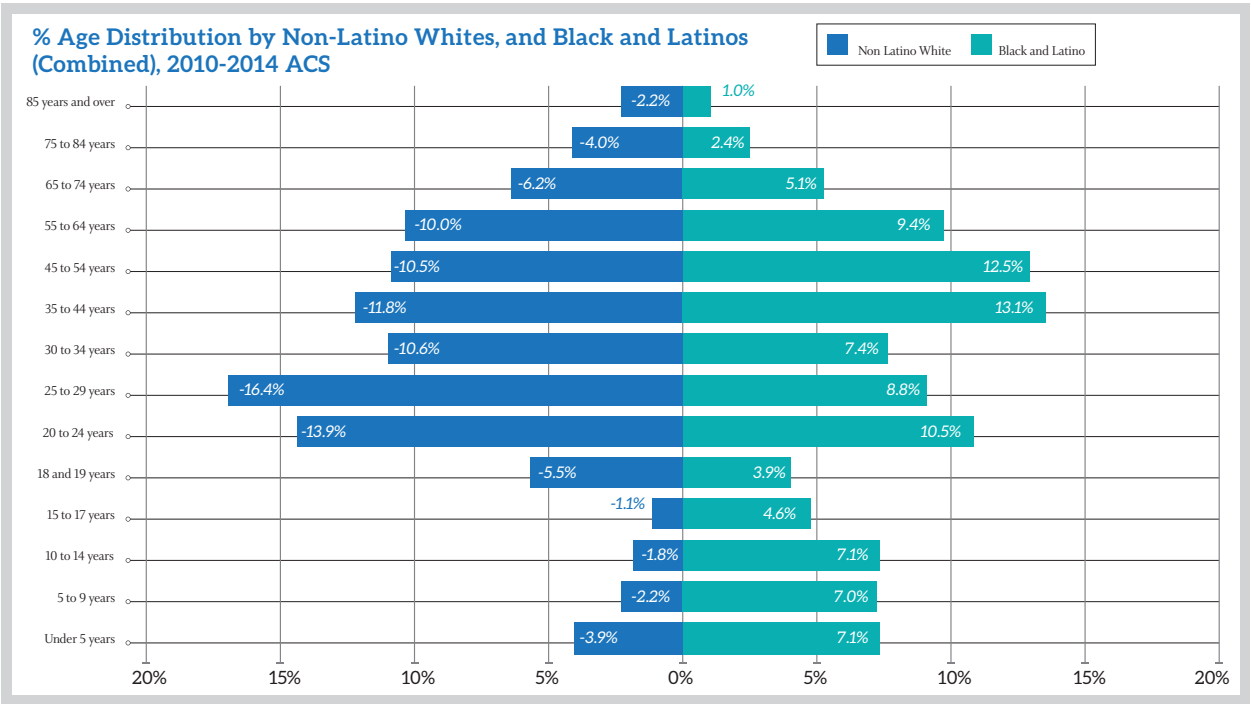
In 2010, there were 101,072 persons under 18 years of age for these four groups; 69% of all these children were Black and Latino. This total was reported at 105,747 in the 2010–2014 ACS, or an increase of 4.6%, of which 68% were represented by Black and Latino children.

The next two population pyramids visually show the different age structures of the population between non-Hispanic Whites on one side, and Black and Latinos (combined), in the 2010 decennial census and the 2010–2014 ACS. In both instances, the cohorts for Latino and Black children and youth are larger proportionately than for Non-Latino Whites. The 2010 pyramid, for example, shows that 7.6% of all Black and Latino persons were under 5 years of age, compared to a figure of 3.3% of all Non-Latino Whites. Additionally, 27.1% of all Black and Latino persons in Boston were under 18 years of age, compared to 8.2% of all Non-Latino Whites who were under 18 years of age.

The 2010–2014 ACS population pyramid shows that 25.8% of all Black and Latino persons were under 18 years of age, compared to 9.0% for Non-Latino Whites.



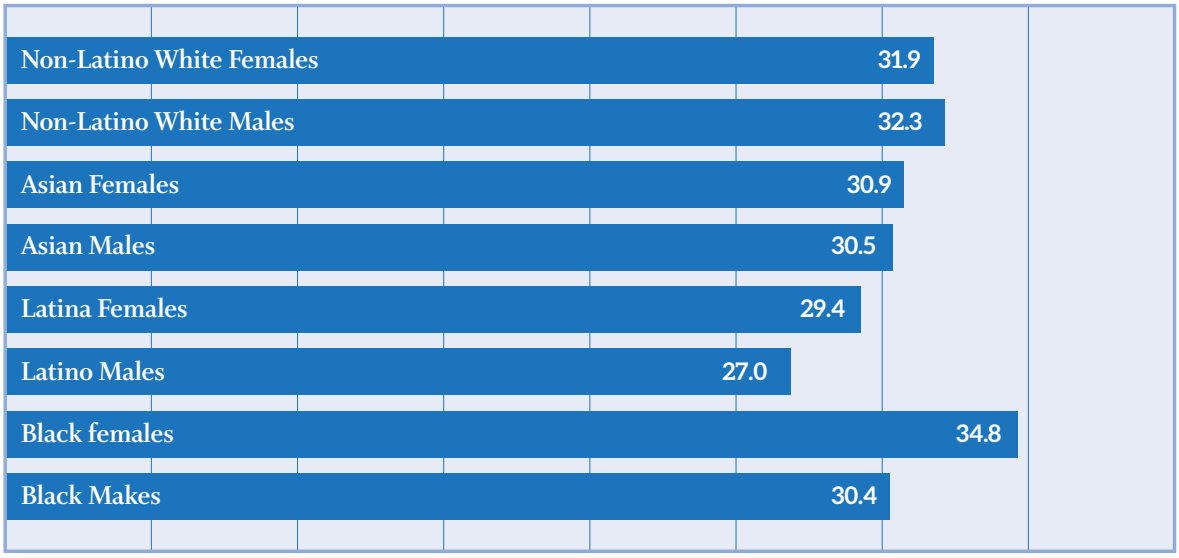
Note: a minus (-) sign for Non-Latino Whites only indicates that the proportions are being shown on the left side of the 0% on the horizontal axis.



Note: a minus (-) sign for Non-Latino Whites only indicates that the proportions are being shown on the left side of the 0% on the horizontal axis.

Another way to illustrate population-group differences in terms of how young or old they are, and something that can portend future growth patterns, is median age. Comparing median ages (i.e., the age at which half the population is greater, and half is lower than the median age) also points toward a much younger population for Latinos, especially, and Blacks. For instance, according to the 2010–2014 ACS, half of all Latino males were under 27 years of age; the figure for Latina women was 29.4 years. While Black women tended to be among the oldest in terms of median age at 34.8 years, half of all Black males were under 30.4 years of age.

Median Age by Sex, Race and Ethnicity



This information points toward two developments already discussed: continuing faster population growth of Latinos and Blacks into future years, and an increasing possibility that these two groups will continue to increase their proportion of all persons who are living in Boston.

Fertility and Birth Rates, Households with Children, and Average Household Size

Fertility rates have a major impact on the configuration of future population growth rates and trends by race and ethnicity.[12] The *BuildBPS* Advisory Committee Report correctly notes that "…fewer children are being born in Boston" when comparing 1990, 2000, and 2010 decennial counts. This should not, however, minimize the weight that higher fertility rates for Latinas and Black women can have on the City's overall population and future growth. There are significant fertility and birth rate differences among the four groups, which will point to varying growth patterns and trends. The Boston Public Health Commission has forewarned about overlooking differences in fertility by race and ethnicity.[13]

The next table shows the fertility rates for women residing in Boston who gave birth as reported in 2010–2014 ACS.[14]

Table 7:

Women 15 to 50 Years who had a birth in the last 12 months, by Race and Ethnicity

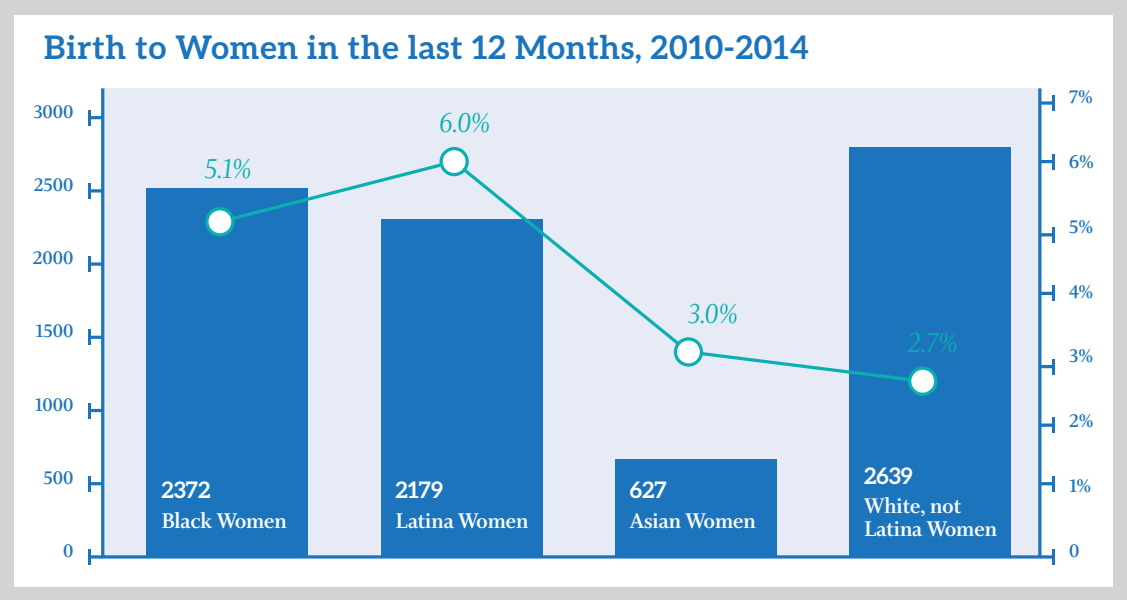
	# of births	% of all births
Black Women	2,372	5.1%
Latina Women	2,179	6.0%
Asian Women	627	3.0%
White, not Latina Women	2,639	2.7%

[12] See, Thayer Watkins, The Cohort Survival Projection Method, Department of Economics, San Jose State University; accessed at: http://www.sjsu.edu/faculty/watkins/cohort.htm

[13] In Health of Boston 2014 – 2015, published by the Boston Public Health Commission - Research and Evaluation Office, for example, this point was illustrated for the period 2008 – 2012: "In 2012, there were 44.5 births per 1,000 female Boston residents, ages 15-44. There was no significant change in the Boston birth rate between 2008 and 2012. There was an increase in the birth rate among Latino women and a decrease in the birth rate among White women from 2008 to 2012. In 2012, the rate of births to Black (64.7), Latino (66.3) and Asian (38.8) women was higher compared to White women (33.3)." p. 160

[14] Fertility rates were not reported in the 2000 or 2010 decennial census.

The chart below shows this same information graphically.



The next table shows the number of persons in households who are under 18 years of age by race and ethnicity, and as counted in the 2010 decennial census. It indicates, again, that the Black and Latino populations in Boston are younger and represent higher proportions of young people. When looking at all households among the four groups in Boston, 70% of Black and Latino households reported the presence of children under 18 years of age, compared to only 21% of all Non-Latino White households.

Table 9:

Population in Families by Under 18 Years, 2010

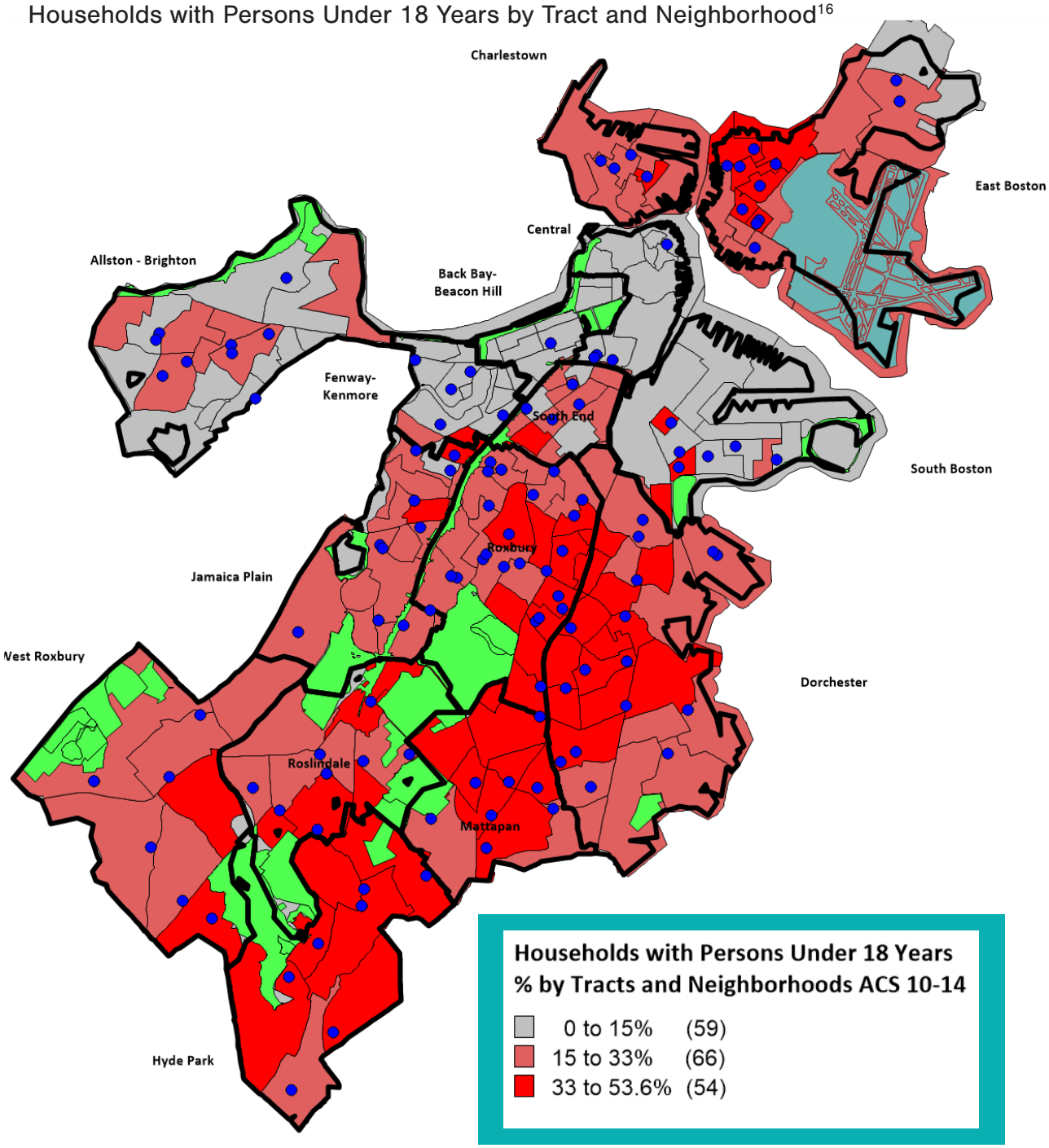
	Black	% Black	Latino	% Latino	Asian	% Asian	White	% White
	114,065		*79,095*		*31,864*		*125,364*	
Under 18 years	37,754	33%	29,103	37%	7,146	22%	25,711	21%
18 years and over	76,311	67%	49,992	63%	24,718	78%	99,653	79%

When census tracts with this same information for the 2010–2014 ACS are thematically geocoded, it becomes apparent that households with children under 18 years of age are concentrated in areas of Boston that are predominantly Black and Latino. The following map shows that those census tracts with the highest proportions of households with at least one child who is under 18 years are mostly found in East Boston, Mattapan, Dorchester, Roxbury, and Hyde Park. Some of the areas in Map 1, showing the highest percentages of households with persons under 18 years, are also those that are projected to have the largest families (Map 2: Average Household Size) and families with the most children aged 0 to 17 years (Map 3) by 2021.[15]

[15] Note: the green areas in the maps represent select open spaces and parks; Logan Airport is also shown, in East Boston.

Map 1:

Households with Persons Under 18 Years by Tract and Neighborhood[16]

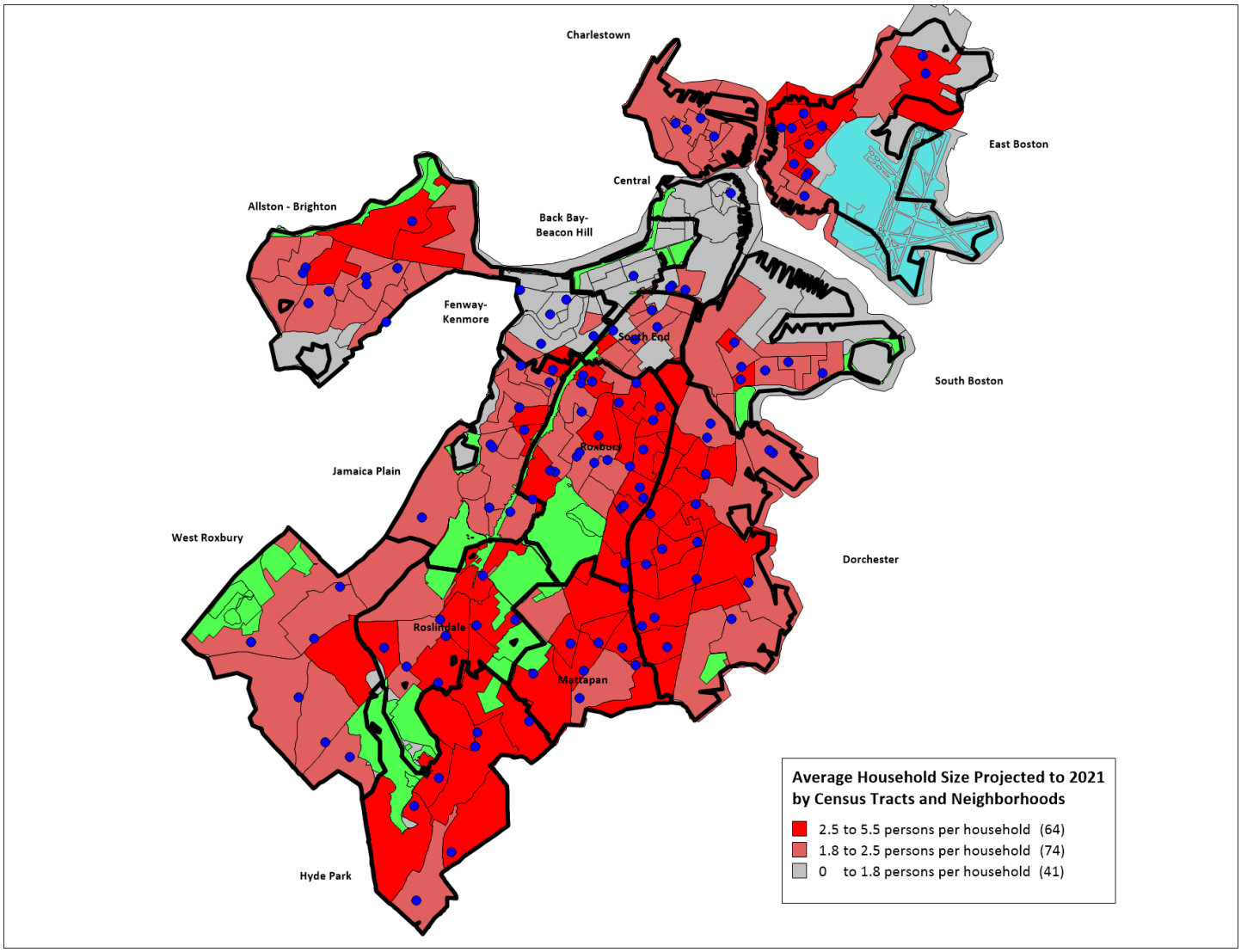


[16] A "natural breaks" methodology was used to determine which value categories to use in composing maps. This approach, generated by GIS software (MapInfo Version 15.2 and Pcensus Version 11.0) assures that the values in the categories as close to the average of the category as possible. This means that the selected ranges reflect the average for data values that are relatively close together. According to MapInfo this methodology was first described an article by Jenks and Caspall, "Error on Choropleth Maps: Definition, Measurement, Reduction" Annals of American Geographers (June 1971).

Map 2 shows that larger families (i.e., those with an average household size greater than 2.5 persons)[17] are projected to reside and be concentrated in neighborhoods like Hyde Park, Mattapan, Dorchester, Roxbury, and East Boston. Other neighborhoods will also have census tracts with relatively large family sizes, but not as extensive as those just cited.

Map 2:

Average Household Size Projected to 2021

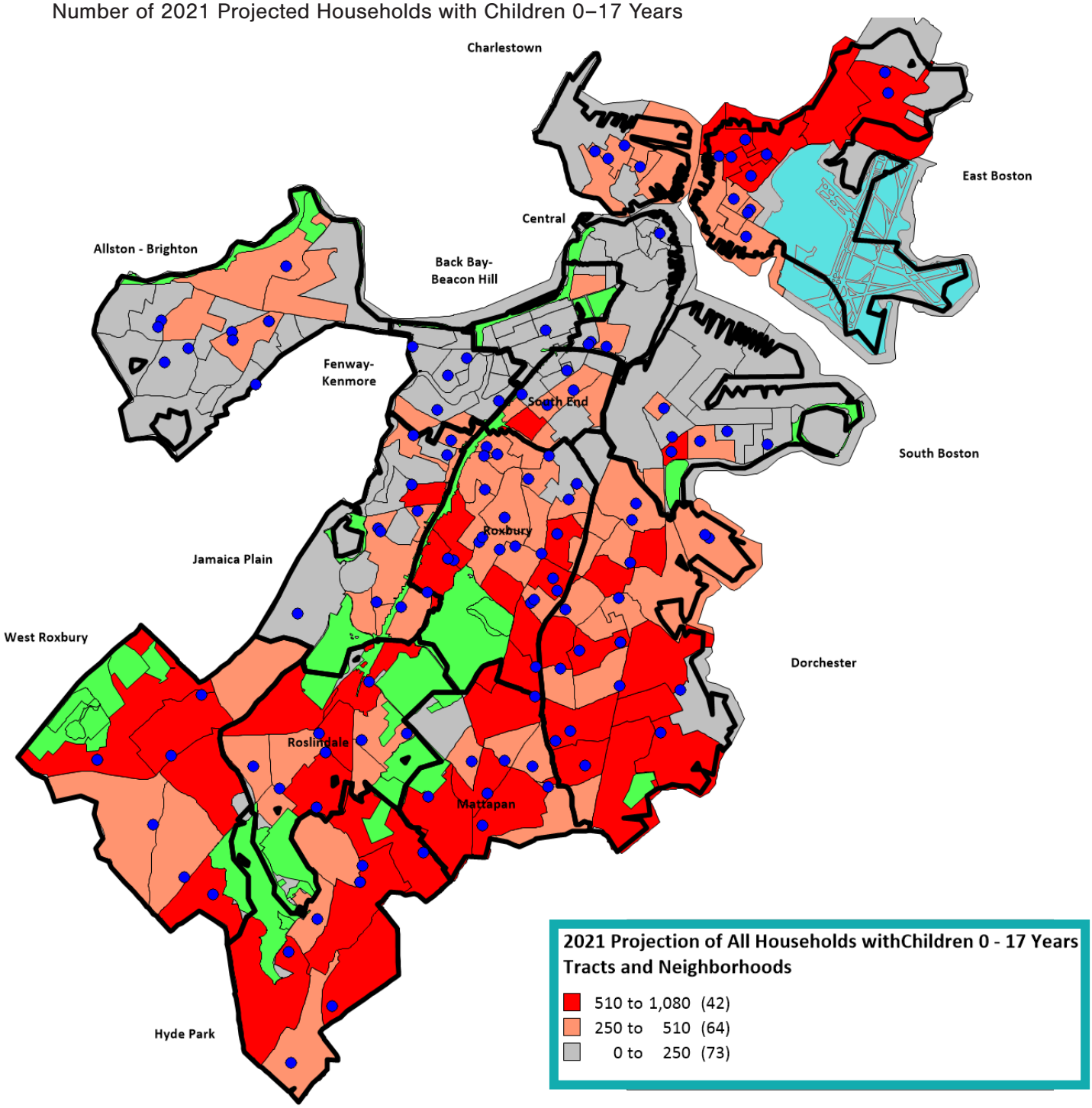


[17] According to the 2010 – 2014 ACS the Average Household Size for Boston is 2.36 persons per household.

Map 3 shows how the number of 2021 projected households with children aged 0–17 years are distributed throughout Boston's neighborhoods and census tracts. While some neighborhood areas will have a relatively low number of households with children 17 years and under, other parts of the City will have larger numbers, ranging from 500 to more than 1,000 projected households.

Map 3:

Number of 2021 Projected Households with Children 0–17 Years



Population Projections by Race, Ethnicity and Neighborhoods[18]

The geocoding and analysis of population projections for 2021 by census tracts and neighborhoods includes all children aged 0–4 years.[19] The age categories used to project by race and ethnicity (Black, Latino, Asian, and Non-Latino White) and by tracts and neighborhoods include: under 5 years of age; 5 to 9 years of age; 10 to 14 years of age; and 15 to 19 years of age. The maps pertaining to this section (Appendix 3) also show the location of BPS schools (blue dots).

Population projections for 2021 and by census tracts for Boston yield a total population of approximately 738,000 persons, within the range reported by the Boston Redevelopment Authority for 2030 of 723,500 persons and the Donahue Institute of 752,000 for 2030. The latter two projections are citywide; the population projections for 2021 used here report projections at the census tract level in Boston. This produces some differences with information reported in the BuildBPS Demographics Advisory Committee Report (November 2, 2016). For instance, the latter states that "…growth is occurring among older segments of the population, not among younger segments." However, there is still some growth of younger groups when 2021 population projections are compared to the 2010 decennial census and the 2010–2014 ACS.

Generally, there will be a significant number of children living in Boston based on the population projections for 2021 by census tracts. According to the 2010 decennial census, there were 103,710 children aged 17 years and under living in Boston, or 16.8% of the total population of 617,594 persons. The 2021 population projections show that there will be approximately 738,868 persons living in Boston, of which 148,606 (or approximately 20%) will be children aged 17 years and under.[20] As important, however, there are key differences among children by race, ethnicity, and where they happen to live, and these factors can have varying impacts on potential and future enrollment trends and projections. The latter is reflected in Maps 4 through 21 in Appendix 3.

The maps show that:

1) Certain neighborhood areas hold a considerable proportion of very young children the City. In terms of the number of projected children who are aged 0–4 years, Map 4 shows that the majority will reside in parts of Roxbury, Dorchester, Mattapan, Hyde Park, East Boston, and to a lesser extent, Allston-Brighton.

2) Another finding emerging from the maps and data in Appendix 3 is that the distribution of children by race and ethnicity, based on population projections, is also associated with geography in Boston. Maps 5 through 8 show that parts of Boston, and certain neighborhoods in particular, will claim the largest proportion of Black children in these age categories. These include Hyde Park, Mattapan, Dorchester, Roxbury. Black children will continue to be concentrated in these neighborhood areas for at least the next several years.

3) While slightly more "spread out" than Black children, the majority and concentration of Latino children will reside in Hyde Park, Mattapan, Roslindale, Roxbury, South End, East Boston, and parts of Dorchester (see Maps 9 through 12).

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[18] Population estimates represent how demographers determine the size of the current population; population projections represent how they believe the population will grow and look like, over a period of time. For the most part, projections are categorized within five year periods, beginning with 0–5 years. Projections are noted separately for males and females due to differences in survival rates and fertility; for purposes of presentation I combined male and female values in generating the maps, and in summarizing some of the raw data in Appendices 2; 3; 4; 5; and 6.

[19] According to Population Projections published by the Census (www.census.gov; January 23, 2014): "Population projections are typically based on an estimated population consistent with the most recent decennial census and are produced using the cohort-component method…Projections illustrate possible courses of population change based on assumptions about future births, deaths, net international migration, and domestic migration…Estimates are for the past and present, while projections are based on assumptions about future demographic trends." See, "2014 National Population Projections: Summary Tables." Population projections specifically for census tracts projected for Boston to 2021 were exported from GeoLytics, Inc., Branchburg, NJ Estimates Professional 2016/2021, and produced in 2016.

[20] The 2000 decennial census for Boston reported 115,874 children, or 19.7% of a total population of 589,141 persons.

4) These population projections indicate that Asian children will be concentrated in parts of Allston-Brighton, Charlestown, Central (which includes Chinatown), South End, Jamaica Plain, and parts of Dorchester. Other parts of Boston are not projected to have relatively high numbers of Asian children (see Maps 13 through 16).

5) Non-Latino White children are projected to be concentrated in West Roxbury, South Boston, Back Bay – Beacon Hill, Fenway – Kenmore, and parts of Allston-Brighton, Charlestown, Jamaica Plain, and parts of Dorchester. Very low numbers of Non-Latino White children are projected to be living in parts of Hyde Park, Mattapan, Roxbury, and parts of Dorchester (see Maps 17 through 20).

Grade Enrollment and Capture Rate

The BuildBPS Demographics report provides the following Exhibit 4, to state that, between 2006 and 2016, the "proportion of K-12 students enrolled in BPS has been declining over time." The decline is only 1.9% over this period, though, and some years during this period reflected little change, when using 2006–2007 as the base year. In fact, some grade levels indicated an increase during this period (see K2; Grades 1, 2, 3, 4, and 12).

Exhibit 4

In-District and Out-of-District Enrollment SY15-16 (as of mid-December 2015)

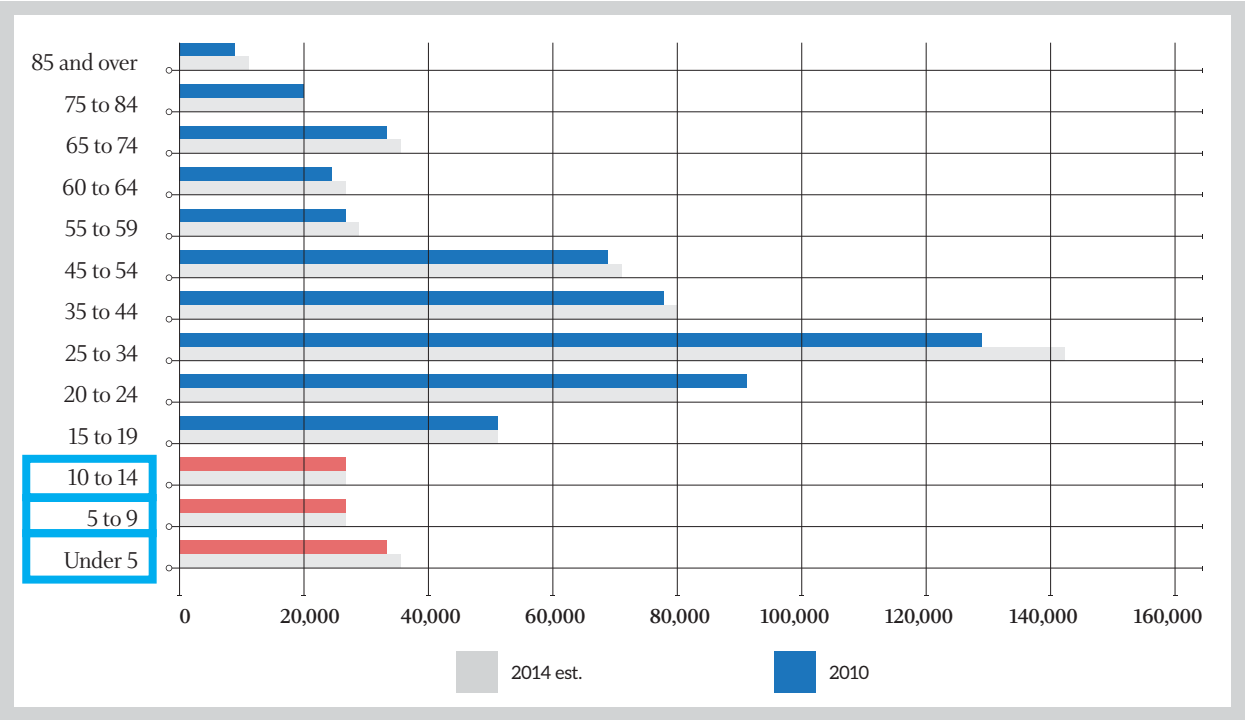
In-District Enrollment by	K0	K1	K2	01	02	03	04	05	06	07	08	09	10	11	12	Grand Total
Allston-Brighton	42	128	179	214	182	186	165	150	165	196	151	251	191	163	185	2,548
Back Bay/BH	2	10	19	17	14	18	13	11	9	14	14	10	8	13	8	180
Central Bos	10	35	94	101	85	79	61	65	58	64	51	56	56	65	57	937
Charlestown	7	51	144	152	149	141	118	101	114	108	106	110	99	95	97	1,592
Dorchester	86	504	803	887	922	894	894	742	740	772	782	947	917	911	1,020	11,821
East Boston	59	252	511	548	552	587	491	420	396	379	365	587	484	450	426	6,507
Fenway/Kenmore	5	13	30	45	42	43	27	23	23	19	28	28	31	27	16	400
Hyde Park	31	163	221	267	244	240	253	191	195	202	217	284	281	308	347	3,444
Jamaica Plain	20	140	223	254	221	228	218	186	179	179	188	198	201	212	235	2,882
Mattapan	51	197	347	419	405	396	350	335	328	345	336	469	413	415	476	5,282
Roslindale	32	178	252	295	294	292	258	207	204	247	214	275	260	289	308	3,605
Roxbury	77	431	745	784	867	799	774	591	595	639	620	772	719	688	769	9,870
South Boston	11	104	122	173	168	169	144	130	126	136	133	154	154	128	145	1,997
South End	22	77	189	172	214	223	193	169	161	197	160	208	192	182	207	2,566
West Roxbury	16	169	240	202	226	209	170	174	130	177	157	215	180	186	199	2,650
Other	3	3	3	9	17	21	18	14	14	16	14	20	30	24	33	239
In-District Total	474	2,455	4,122	4,539	4,602	4,525	4,147	3,509	3,437	3,690	3,536	4,584	4,216	4,156	4,528	56,520

The BuildBPS Advisory Committee Report also states that "population growth is largest in areas that don't impact K-12 growth." However, Exhibit 2 below shows that, while not growing at the rate of 25-to-34-year-olds, the under 5 and 5-to-9-year-old segments continue to grow. Moreover, it might also show growth for youth 15 to 17 years of age, but the latter is not shown.

Findings: Population by Age

2. Population growth is largst in areas that don't impact K=12 growth.

Exhibit 2: Population Age Structure



Jennings Highlighted

Growing or declining enrollment is not uniform across all grade levels. For instance, note the following table showing enrollment changes based on the numbers reported by grade levels:

2006–2016 Enrollment Changes for All Grades

K2	6.6%
Grade 1:	8.9%
Grade 2:	14.8%
Grade 3:	12.7%
Grade 4:	8.4%
Grade 5:	8.3%
Grade 6:	-7.1%
Grade 7:	**-11.7%***
Grade 8:	**-17.4%**
Grade 9:	**-19.2%**
Grade 10:	-7.9%
Grade 11:	-5.1%
Grade 12:	+8.8%
K2-12:	-1.9%

Jennings Highlighted

Enrollment changes differ significantly across grade levels. It seems that grades 7 to 9 contributed greatly to lower enrollment patterns between 2006 and 2016. What explains this statistical finding? Who are the families and children leaving during these grade years? Are they Non-Latino White families residing in certain parts of the City? Does decline reflect any racial or ethnic differences among those leaving? Why do a significant proportion of families leave during these years? Do families who leave the BPS system during the middle-school years return? Are charter schools having an impact on these enrollment patterns by grade level? Possible explanations could be the expansion of private school grades and capacity, or out-migration of students and families to other communities. These questions have not been addressed fully and should be explored further.

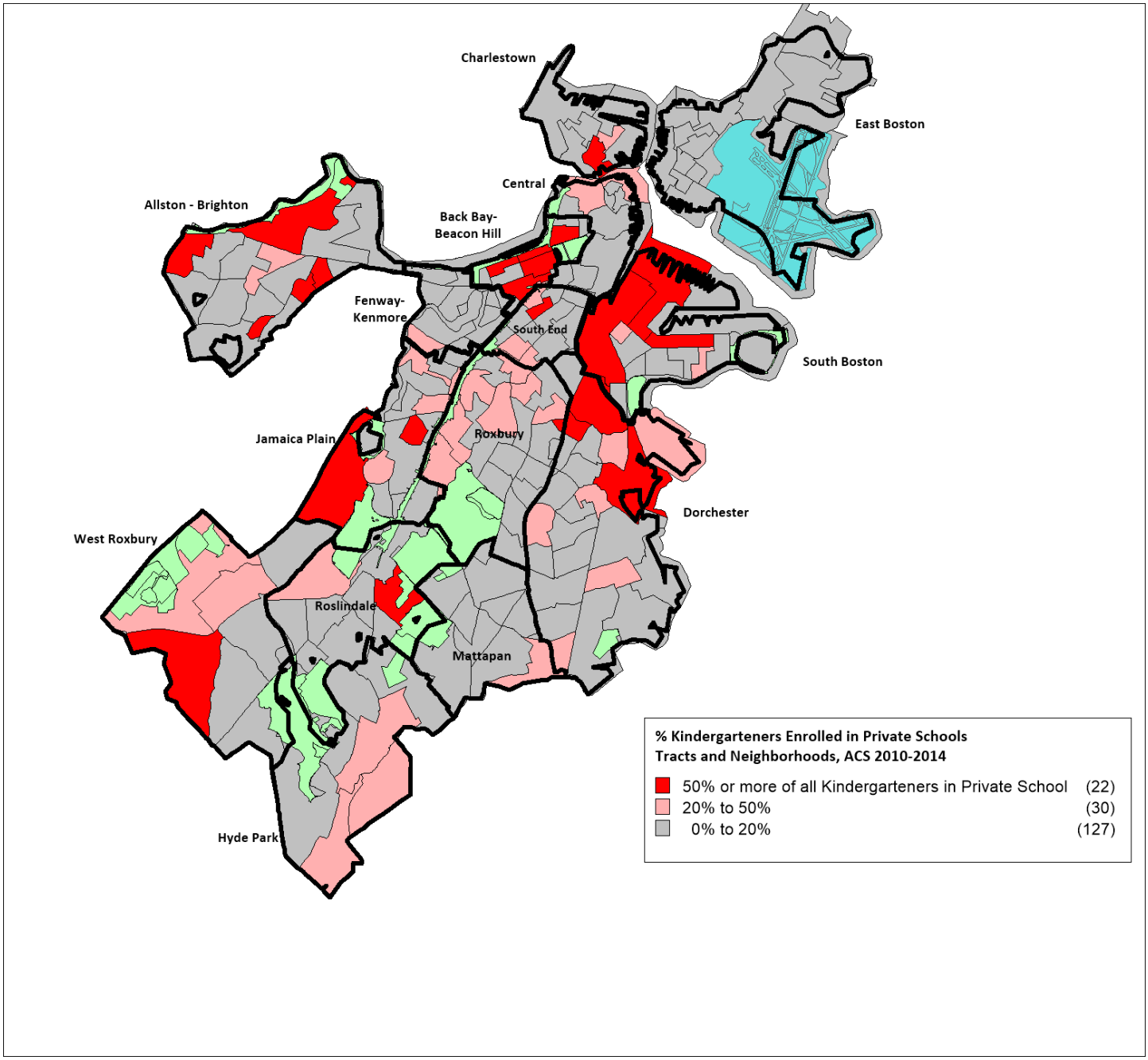
Another enrollment-based discussion focuses on "capture rates." The BuildBPS Demographics report states that the "district's capture rate has averaged 52.8%" (p. 29). A district-wide capture rate, however, hides differing capture rates by neighborhoods, and as a result, probably also by race and ethnicity. Some neighborhoods reflect a much higher proportion of children attending private or parochial schools at earlier ages, resulting in a lower capture rate. But the capture rate for neighborhoods like Mattapan, Roxbury, East Boston, and others are much higher than other neighborhoods in Boston.

The next two maps (Map 21 and Map 22) help to illustrate this observation. The first shows that there were 22 census tracts where half or more of all children enrolled in kindergarten were attending a private school, and 127 tracts showing that a relatively small proportion of kindergarten children were in private schools. Clearly, though, these census tracts are based in certain planning districts and neighborhood areas.[21] The former are located in a few neighborhoods that happen to be where most Non-Latino White children reside. Map 22, showing the proportion of children in grades 1 to 4 who are enrolled in private schools and where they reside, also suggests that capture rates vary by neighborhood areas.

[21] According to the ACS 2014 Subject Definitions, "Private schools are defined as schools supported and controlled primarily by religious organizations or other private groups". Public schools are "any school or college controlled and supported primarily by a local, county, state, or federal government" (p.118)

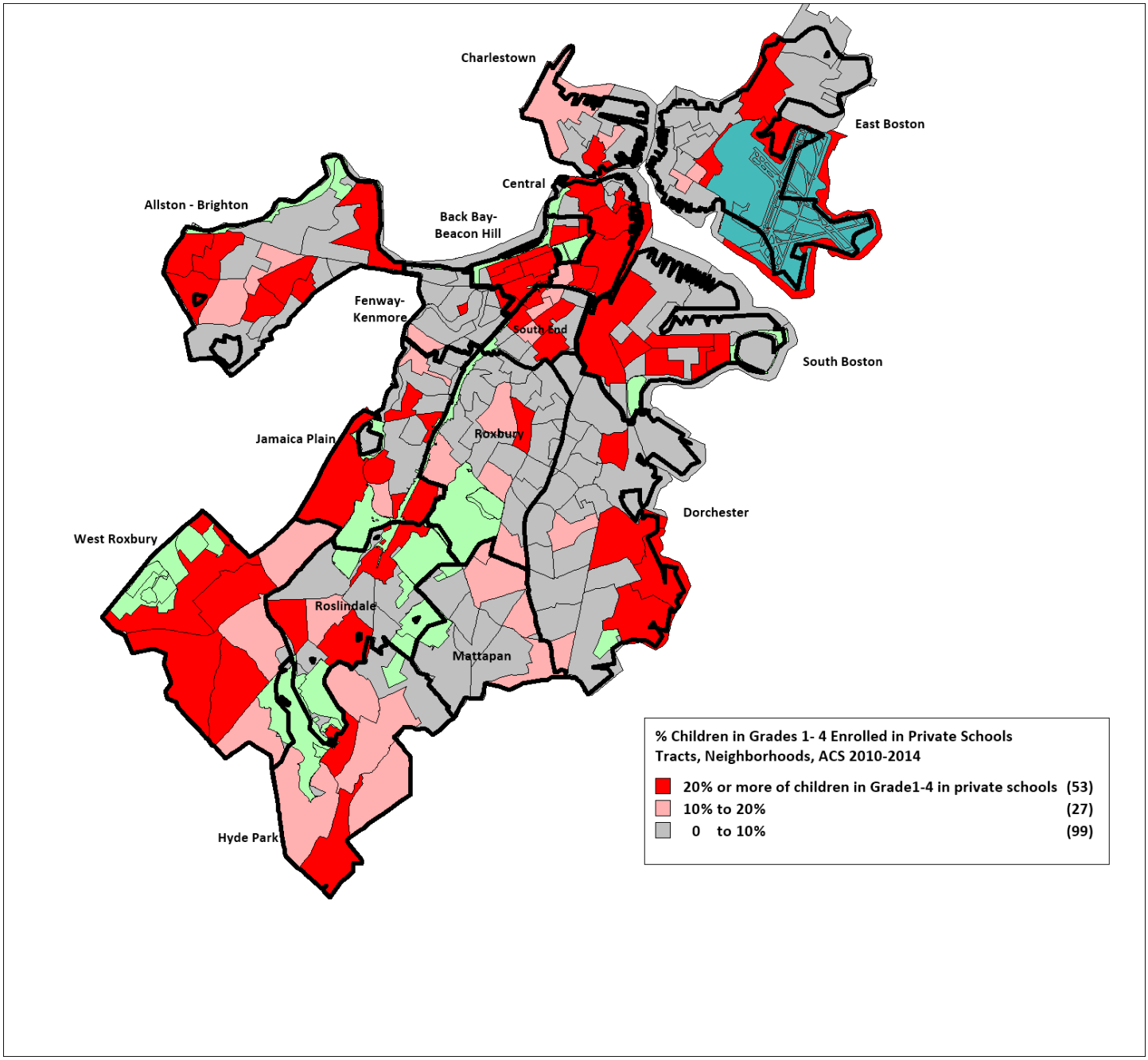
Map 21:

% All Kindergarteners Enrolled in Private Schools by Tracts and Neighborhoods



Map 22:

% All Grades 1–4 Enrolled in Private Schools by Tracts and Neighborhoods

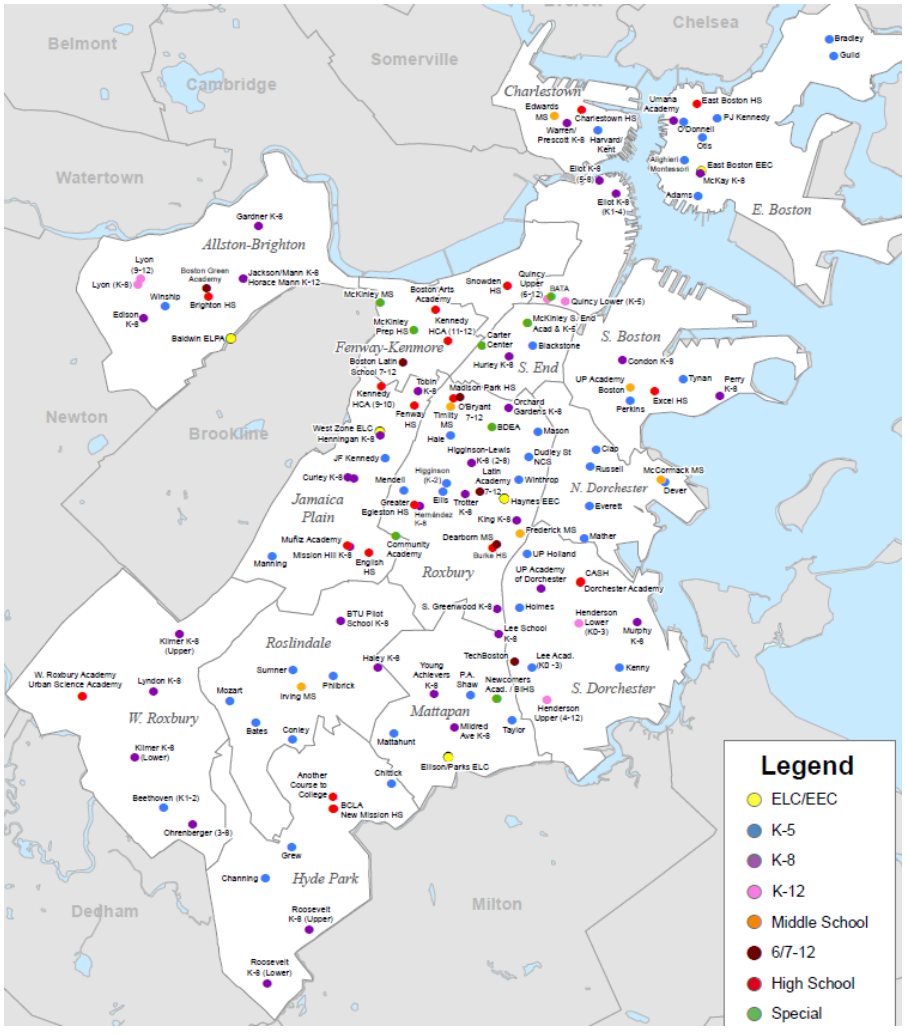


Conclusion: Adding Race, Ethnicity, and Neighborhood Info to *BuildBPS* Demographics

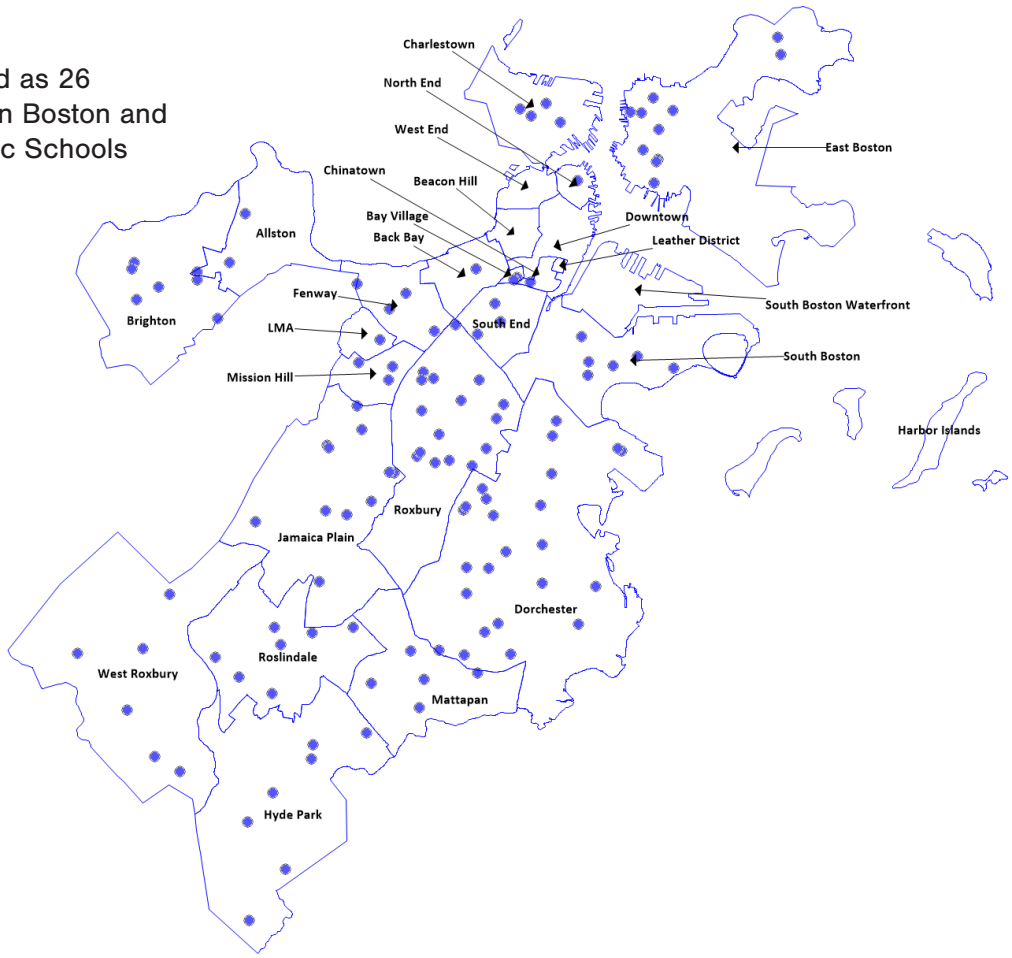
This Addendum helps to expand some of the enrollment analysis and conclusions in the BuildBPS Demographics report by examining racial, ethnic, and spatial dimensions pertaining to Boston. It presents data and raises questions that are critical for ensuring comprehensive and equitable decision-making related to current and future enrollment patterns. The findings can represent a framework, or even a guidepost, as planning and decision-making is undertaken. In terms of current and future planning, this report points to the importance of not overlooking or minimizing race, ethnicity, and geography when examining and assessing issues and challenges. More specifically, there should be an acknowledgement that not all children or groups are the same in terms of demographic characteristics, and there should be more emphasis on investigating enrollment patterns and trends by grades, as well as by different groups of children and students.

This kind of framework can be utilized to more adequately assess the potential impacts of planning related to enrollment trends on children and families. It can also help to build trust and improve the quality of public deliberation in ways that will benefit all Boston Public Schools students, regardless of race or ethnicity, or where they happen to live.

Appendix 1: BPS Map of All Schools (accessed at: www.bostonpublicschools.org)



Appendix 2:
Areas Designated as 26 Neighborhoods in Boston and Location of Public Schools

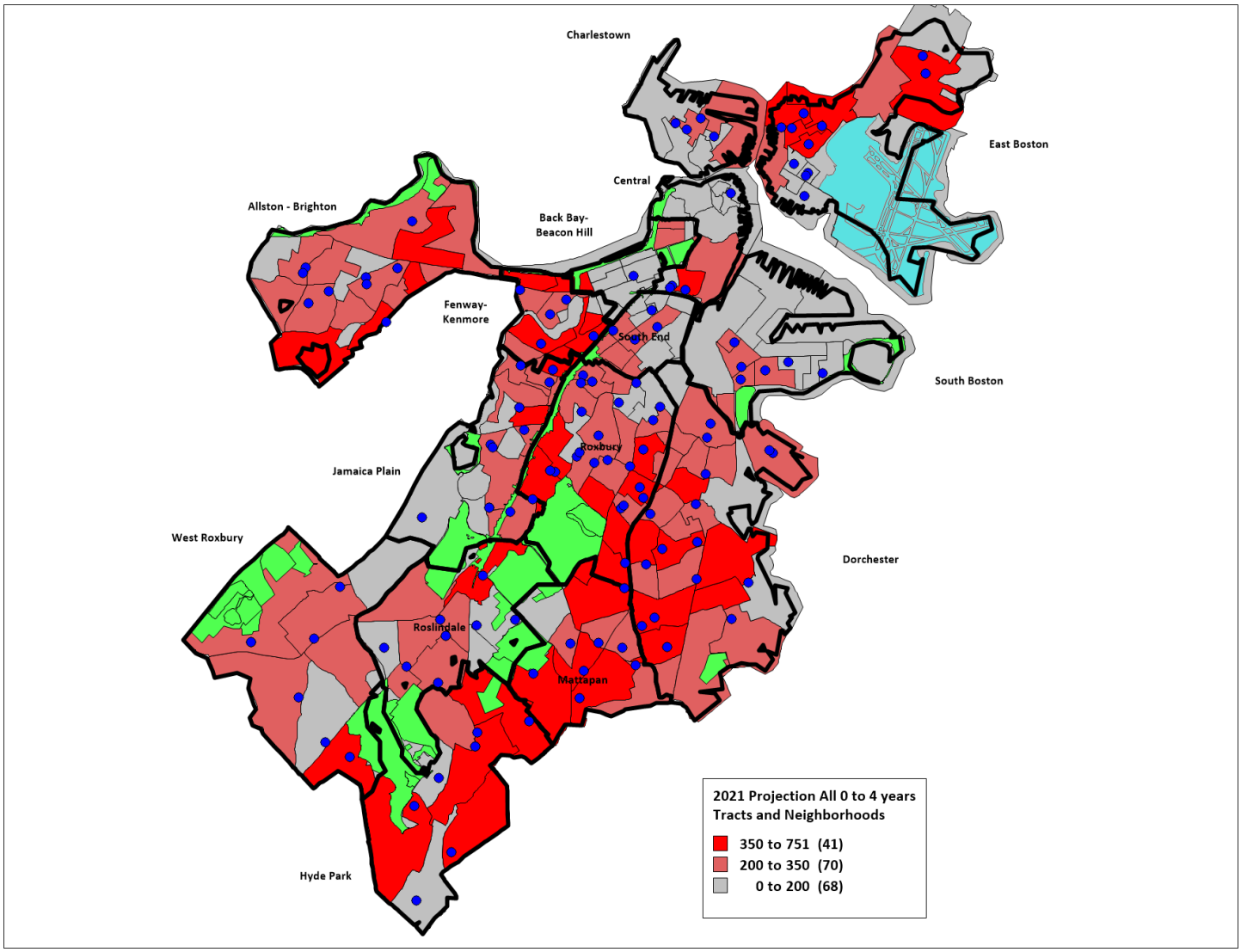


Appendix 3: Maps 4–20 Population Projections by Age, Race, Ethnicity and Neighborhoods

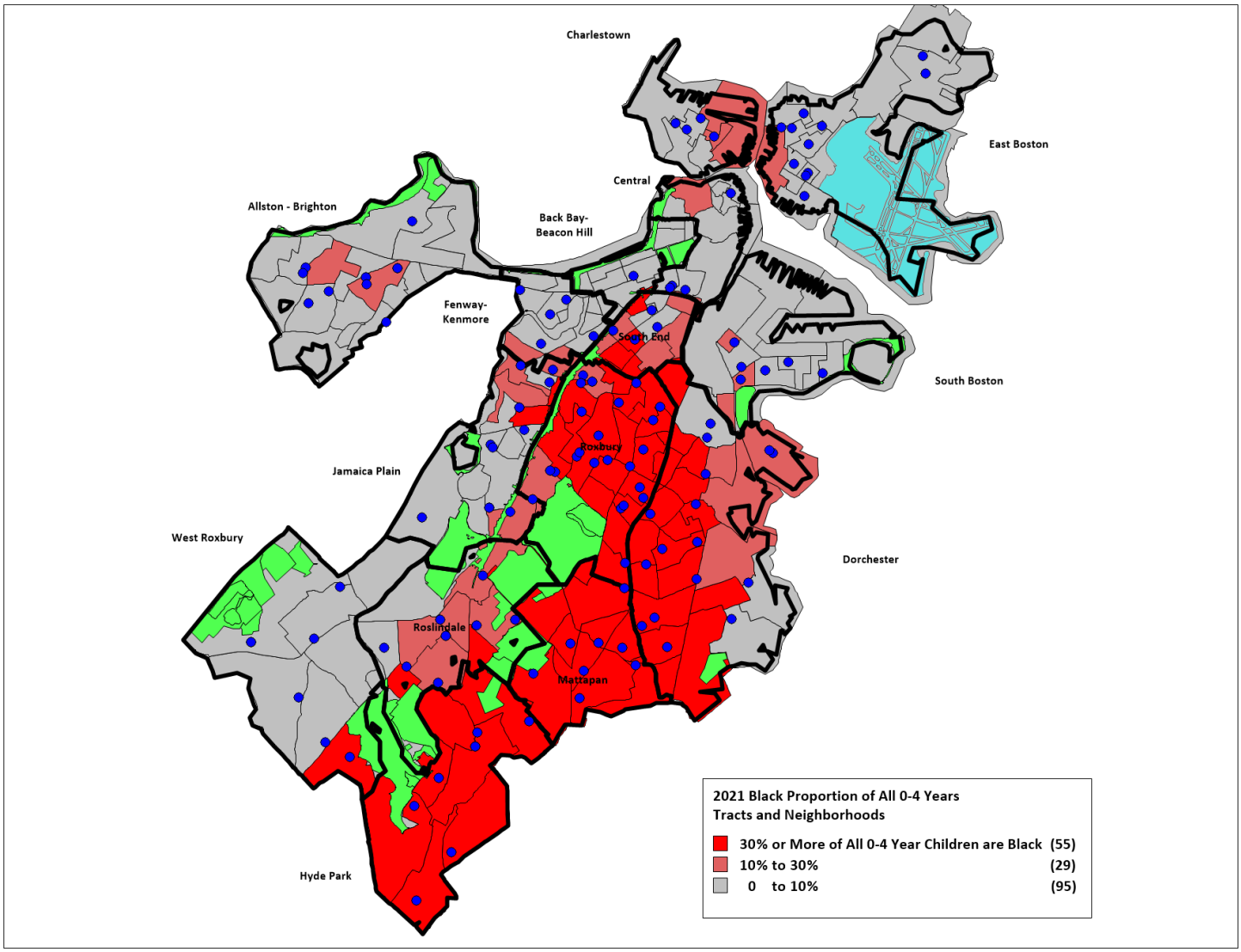
Map 4: 2021 Population Projection for All Children, 0–4 Years
Map 5: 2021 Black Proportion of All 0–4 Years by Tracts and Neighborhoods
Map 6: 2021 Black Proportion of All 5–9 Years by Tracts and Neighborhoods
Map 7: 2021 Black Proportion of All 10–14 Years by Tracts and Neighborhoods
Map 8: 2021 Black Proportion of All 15–19 Years by Tracts and Neighborhoods
Map 9: 2021 Latino Proportion of All 0–4 Years by Tracts and Neighborhoods
Map 10: 2021 Latino Proportion of All 5–9 Years by Tracts and Neighborhoods
Map 11: 2021 Latino Proportion of All 10–14 Years by Tracts and Neighborhoods
Map 12: 2021 Latino Proportion of All 15–19 Years by Tracts and Neighborhoods
Map 13: 2021 Asian Proportion of All 0–4 Years by Tracts and Neighborhoods
Map 14: 2021 Asian Proportion of All 5–9 Years by Tracts and Neighborhoods
Map 15: 2021 Asian Proportion of All 10–14 Years by Tracts and Neighborhoods
Map 16: 2021 Asian Proportion of All 15–19 Years by Tracts and Neighborhoods
Map 17: 2021 White (not Latino) Projection of All 0–4 Years by Tracts and Neighborhoods
Map 18: 2021 White (not Latino) Projection of All 5–9 Years by Tracts and Neighborhoods
Map 19: 2021 White (not Latino) Projection of All 10–14 Years by Tracts and Neighborhoods
Map 20: 2021 White (not Latino) Projection of All 15–19 Years by Tracts and Neighborhoods

Map 4:

2021 Projection All 0–4 Years by Tracts and Neighborhoods

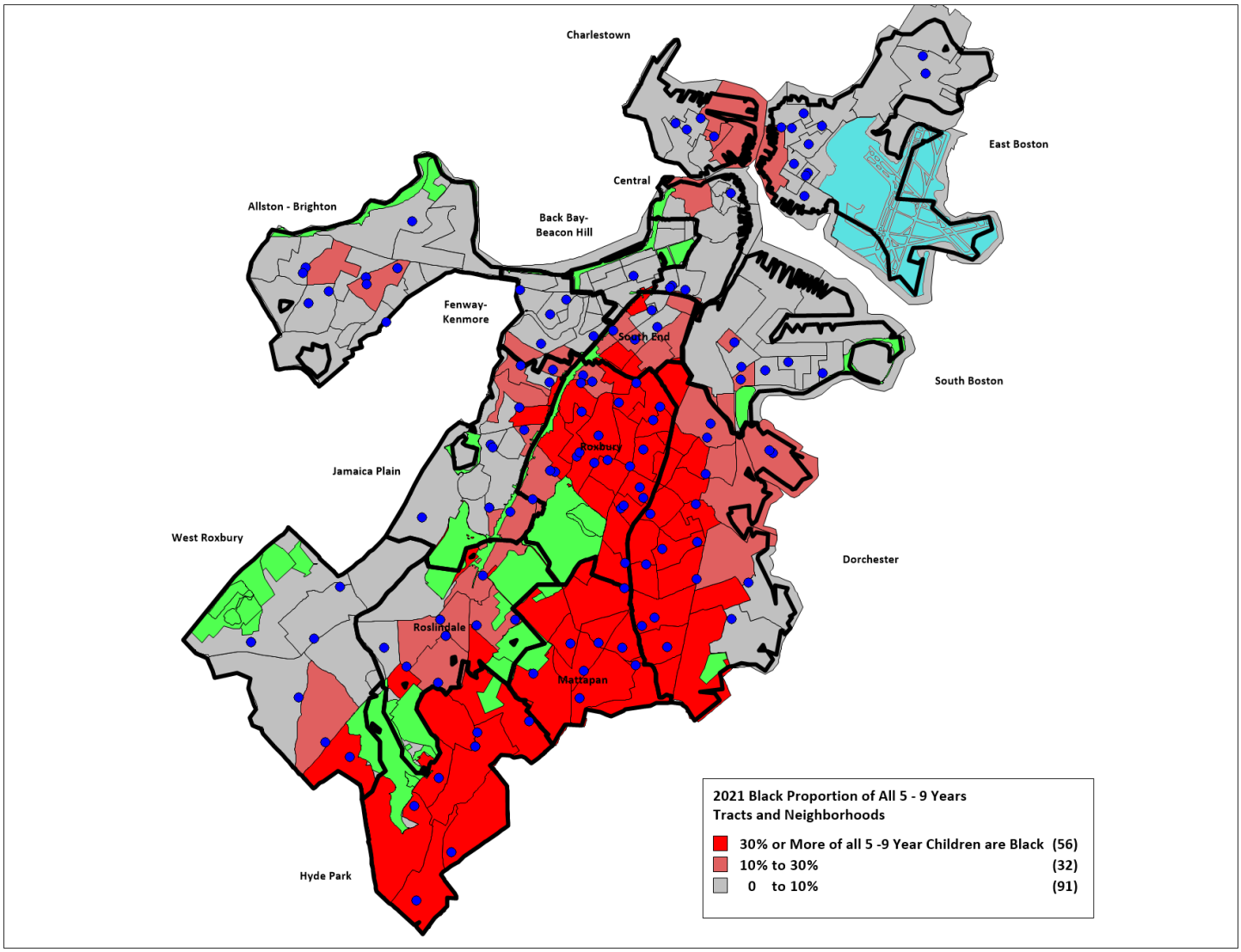


Map 5:
2021 Projection of All Black 0–4 Years

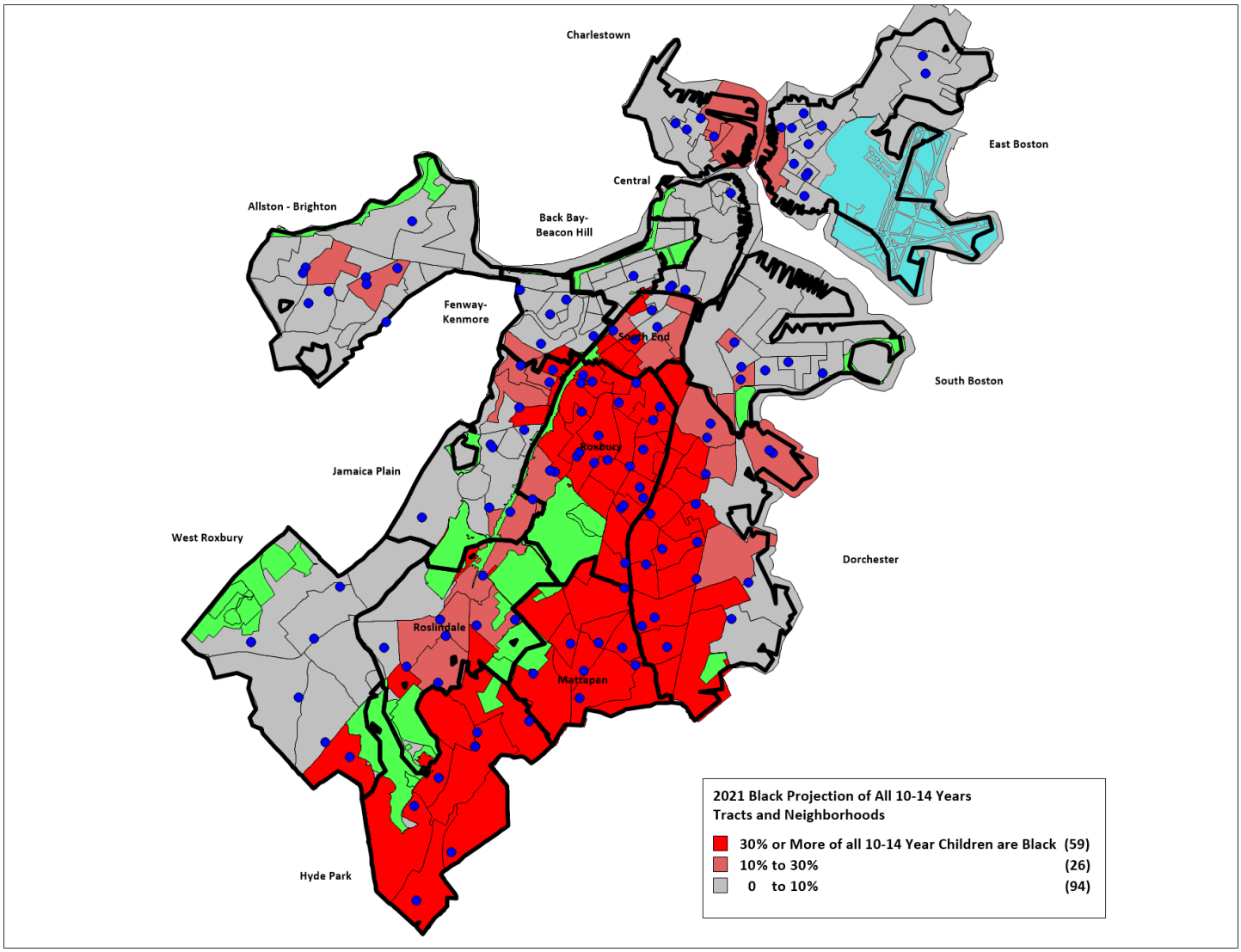


Map 6:

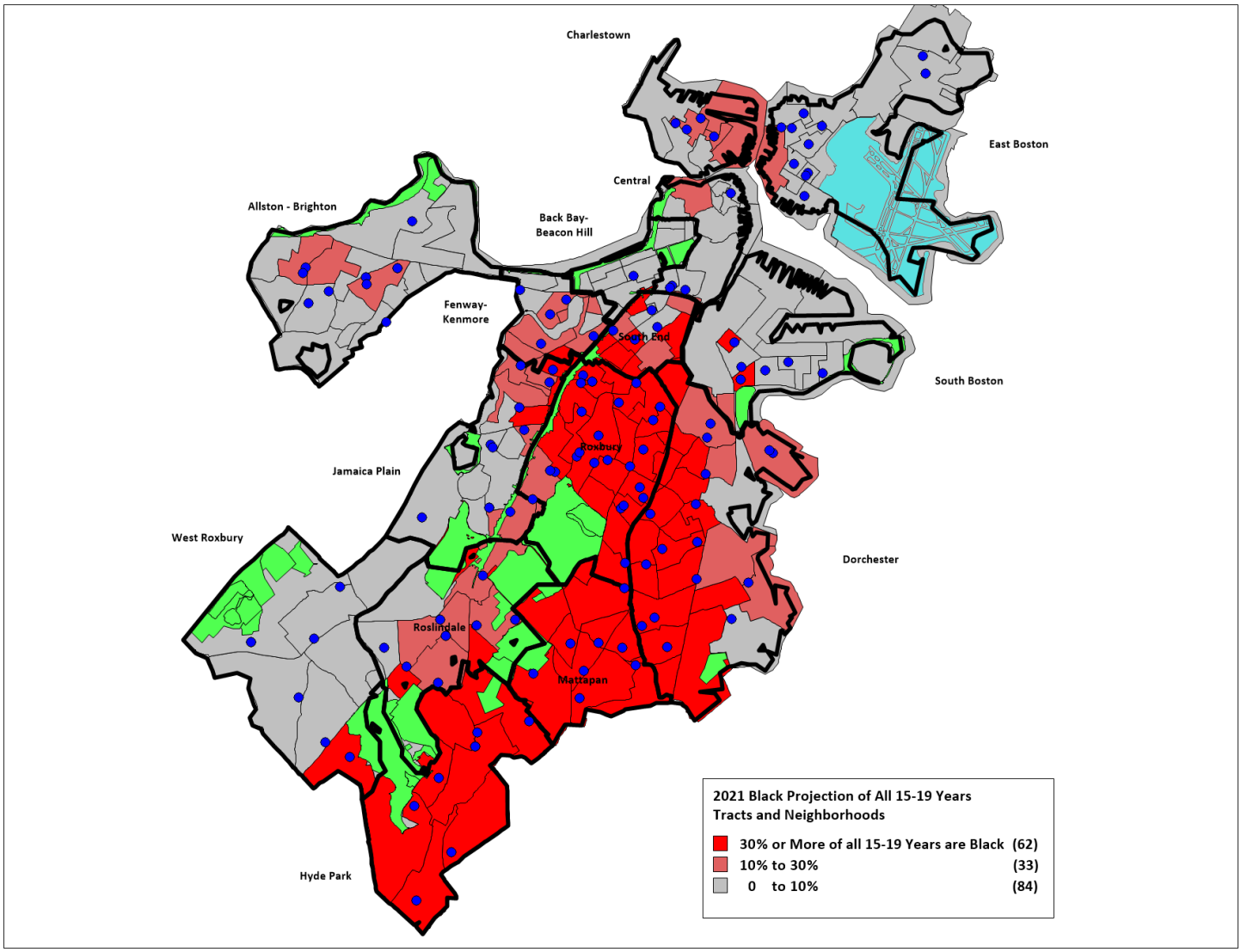
2021 Projection of All Black 5–9 Years



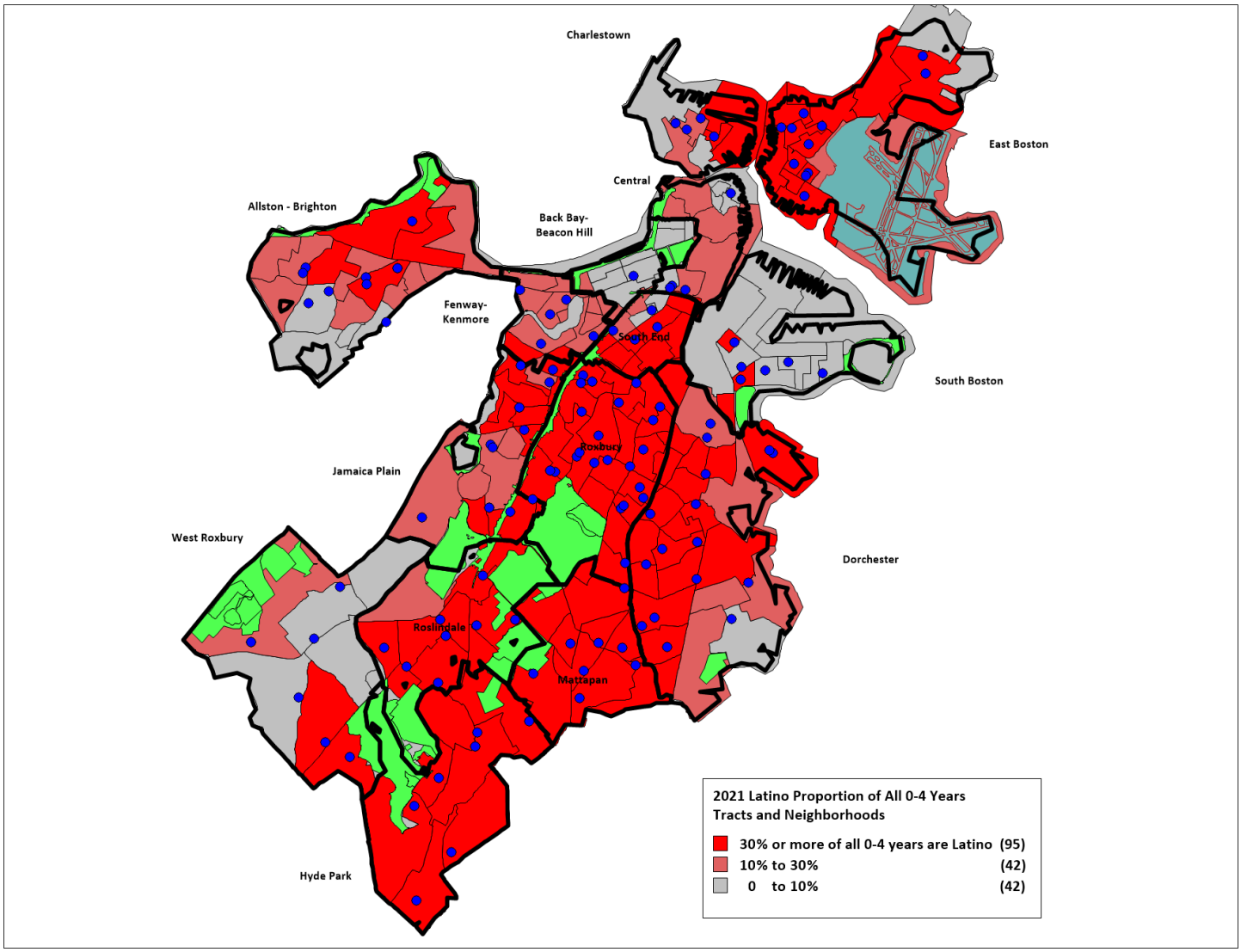
Map 7:
2021 Projection of All Black 10–14 Years



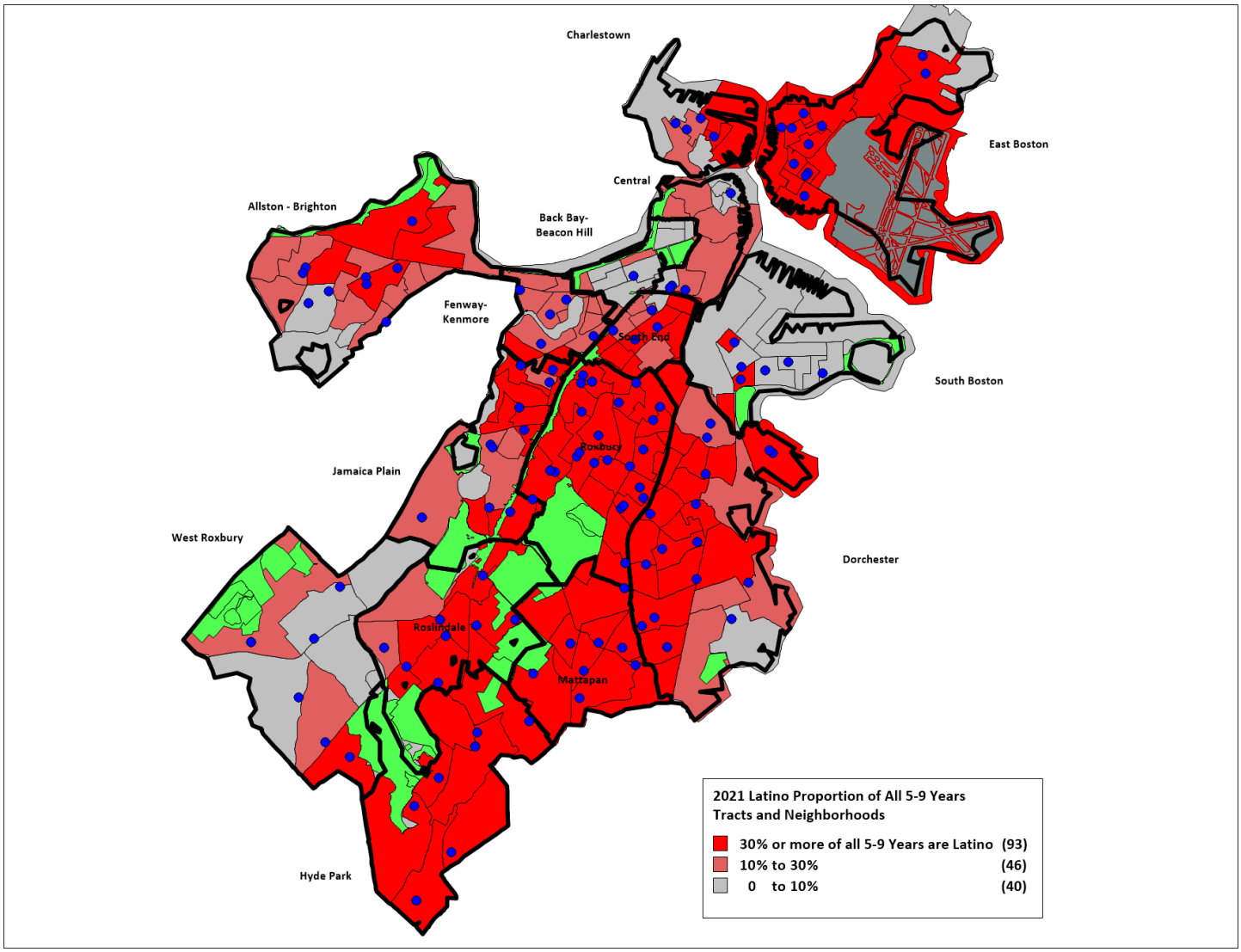
Map 8:
2021 Projection of All Blacks 15–19 Years



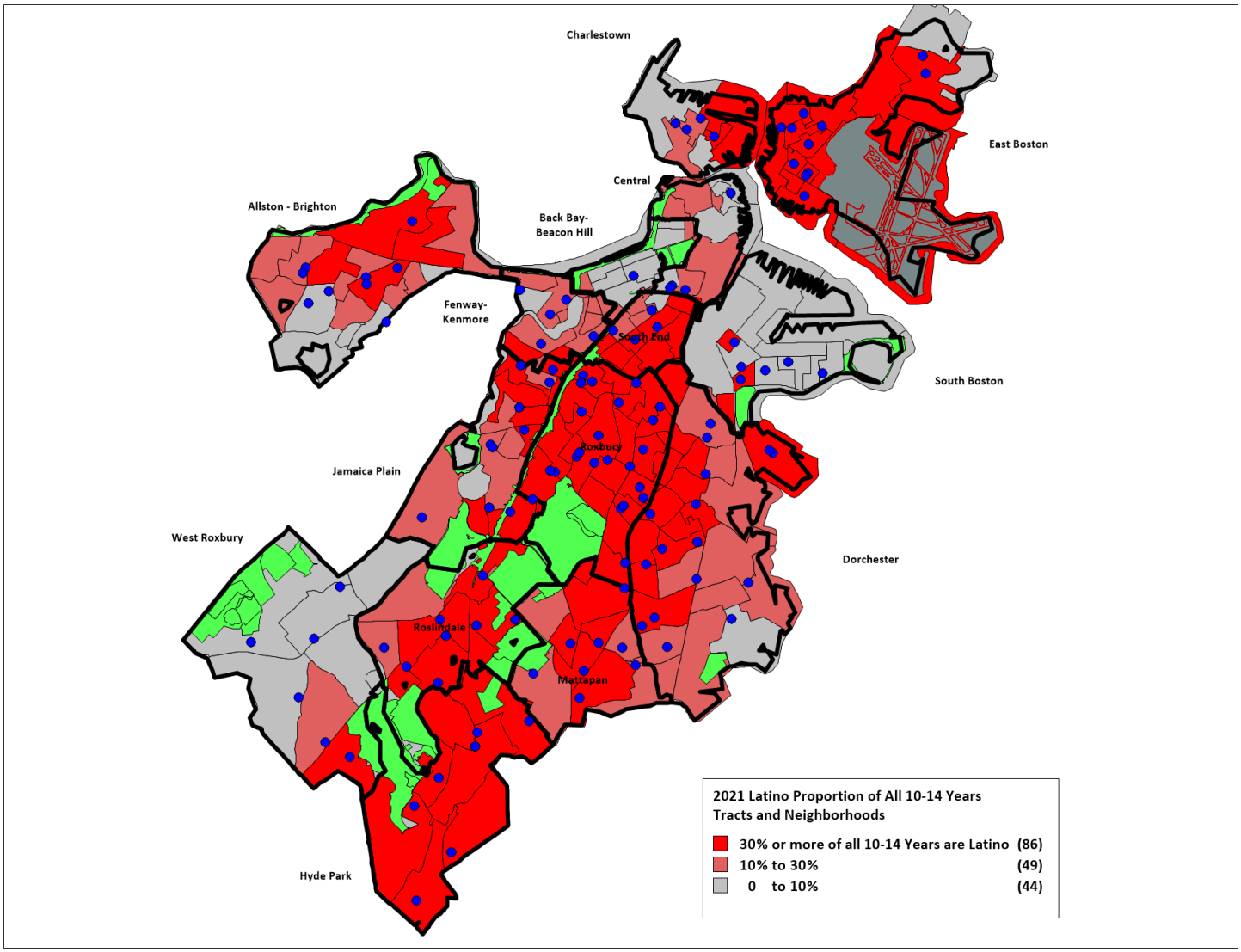
Map 9:
2021 Proportion of All Latinos 0–4 Years



Map 10:
2021 Proportion of All Latinos 5–9 Years

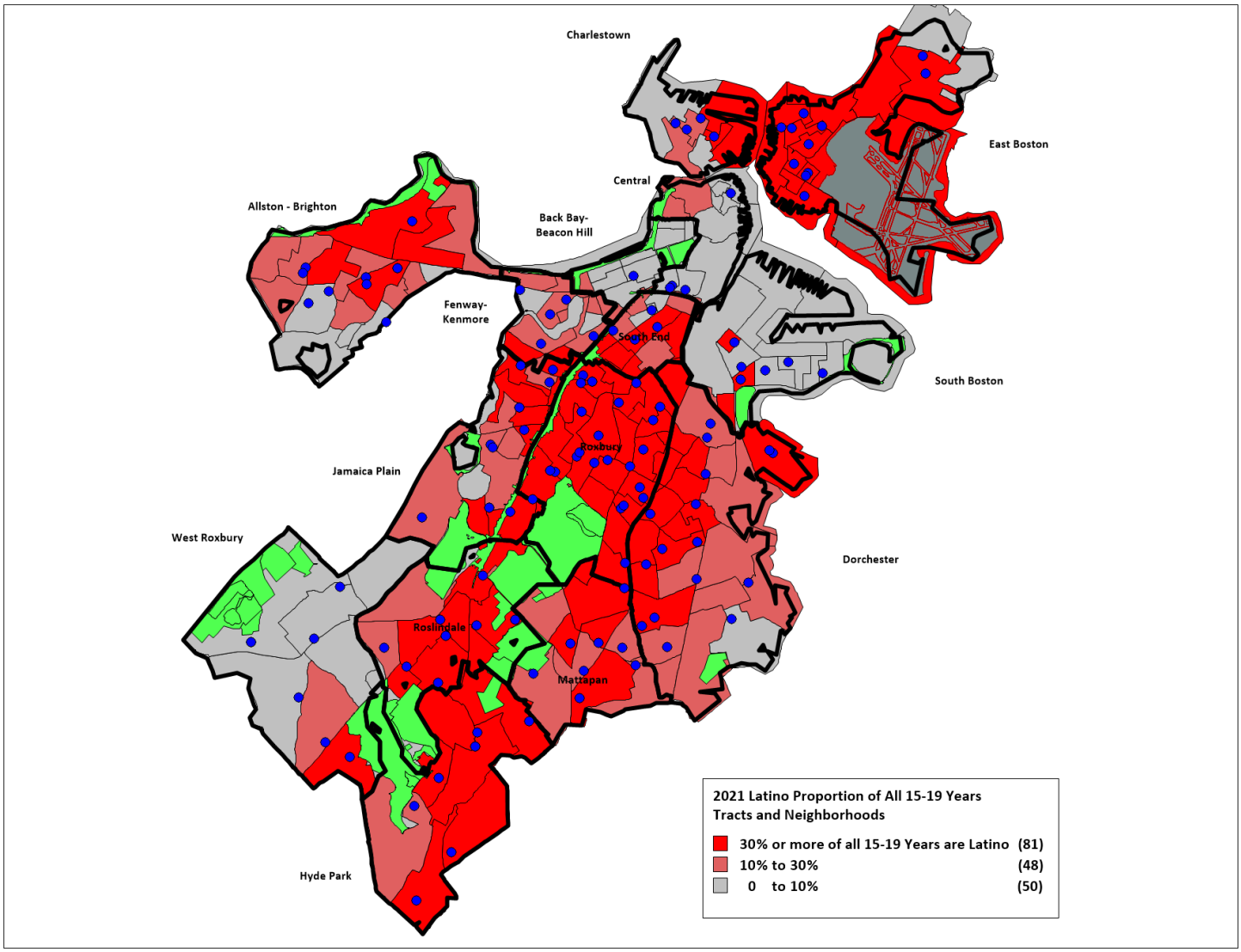


Map 11:
2021 Proportion of All Latinos, 10–14 Years

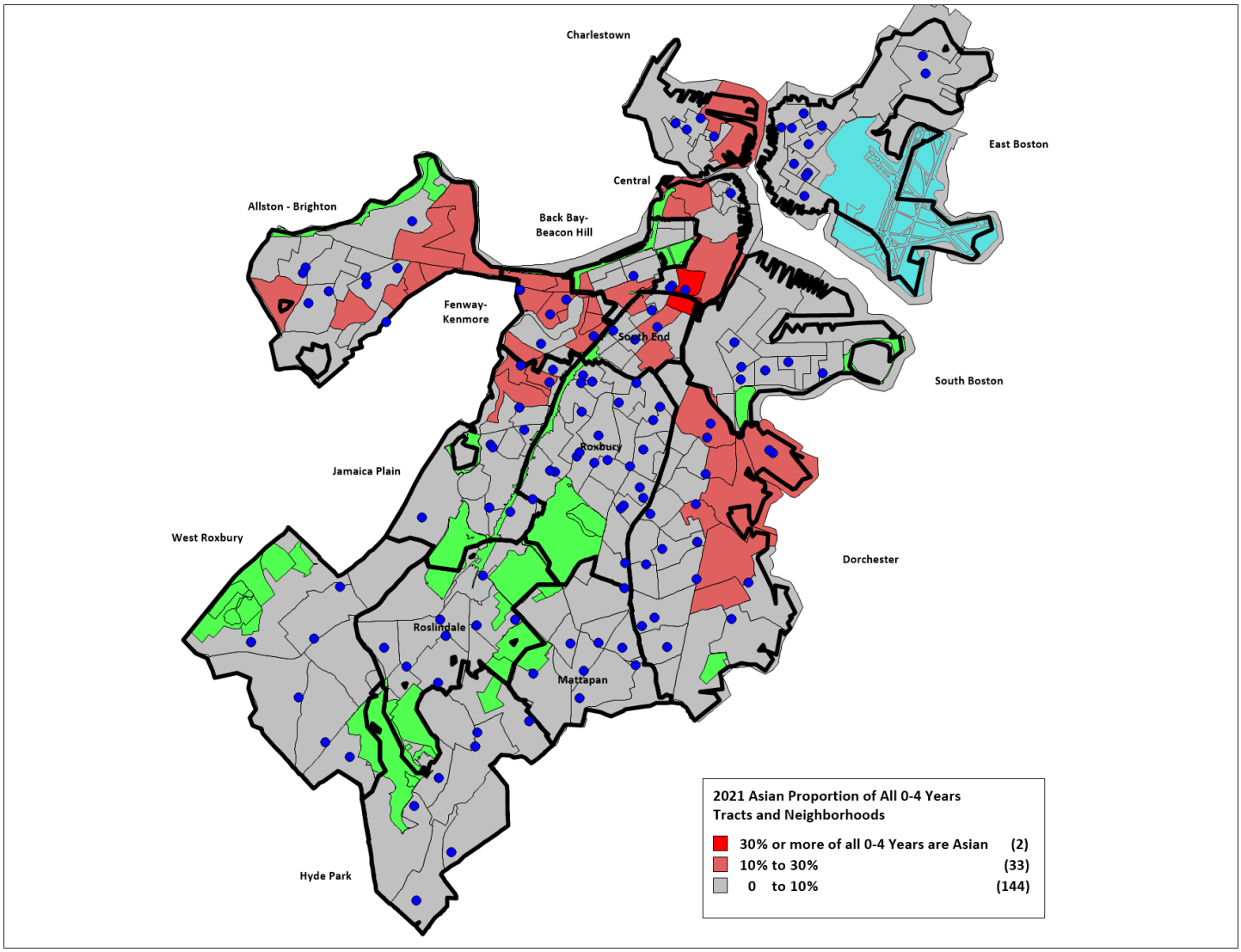


Map 12:

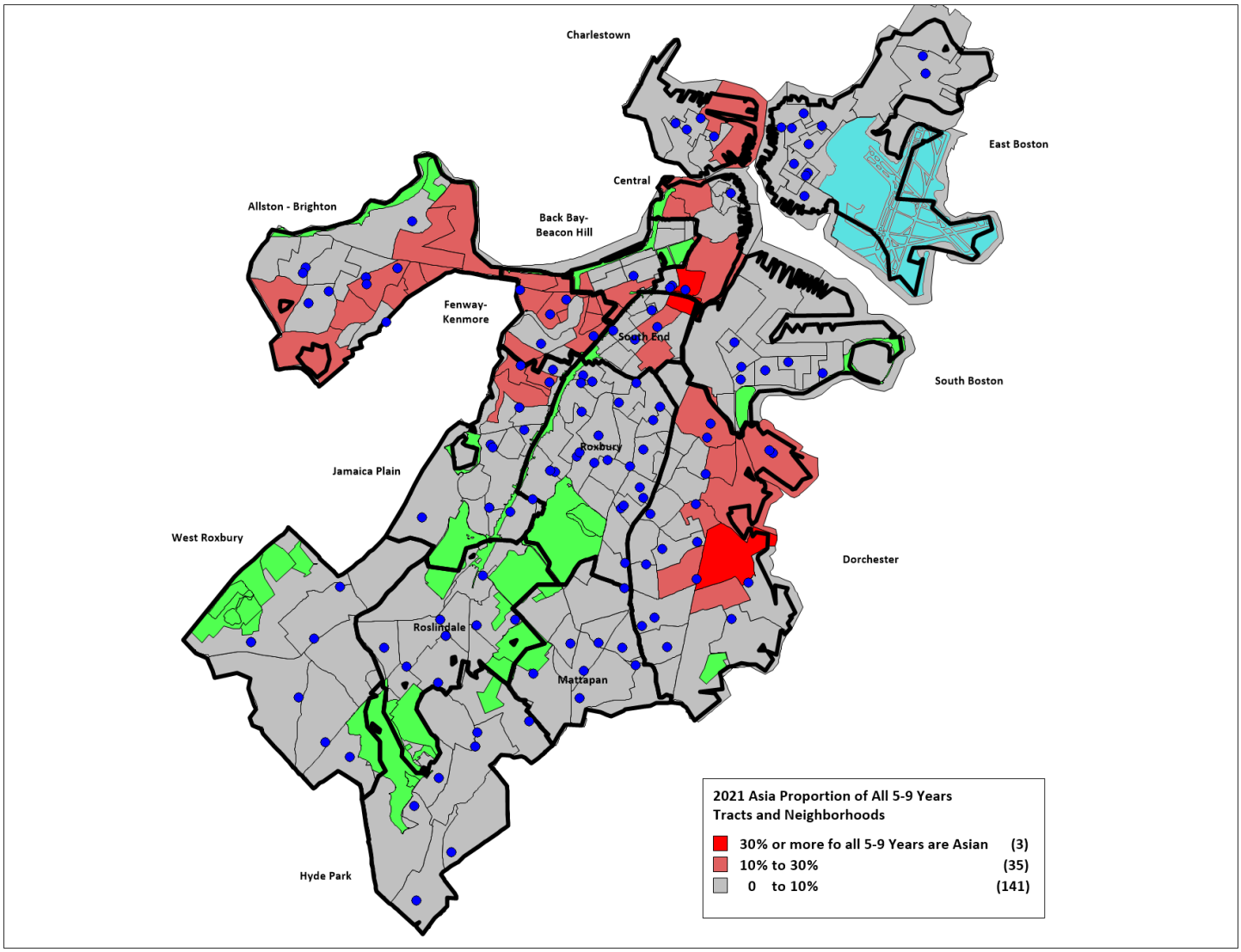
2021 Proportion of All Latinos, 15–19 Years



Map 13:
2021 Proportion of All Asians, 0–4 Years

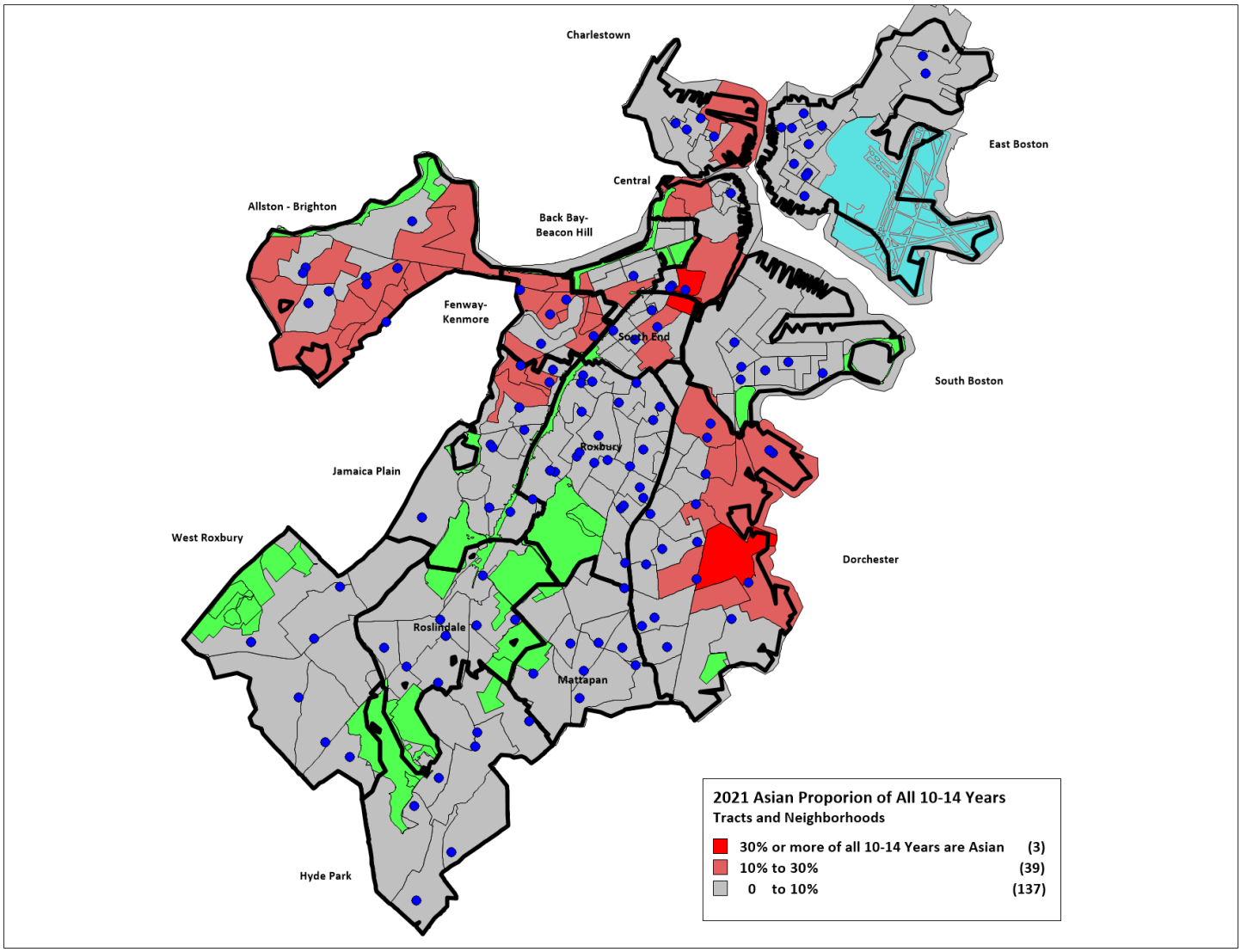


Map 14:
2021 Proportion of All Asians, 5–9 Years

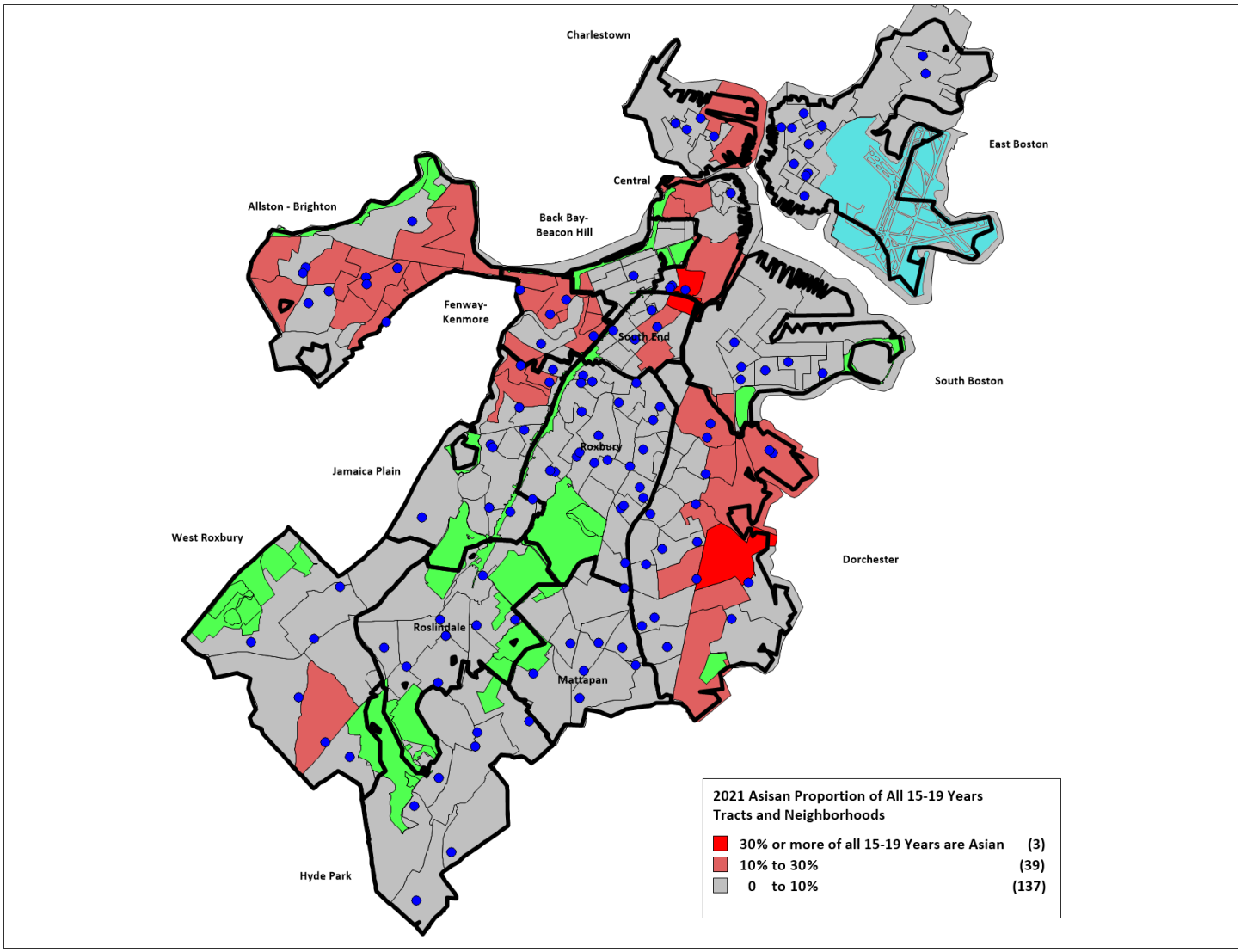


Map 15:

2021 Proportion of All Asians, 10–14 Years

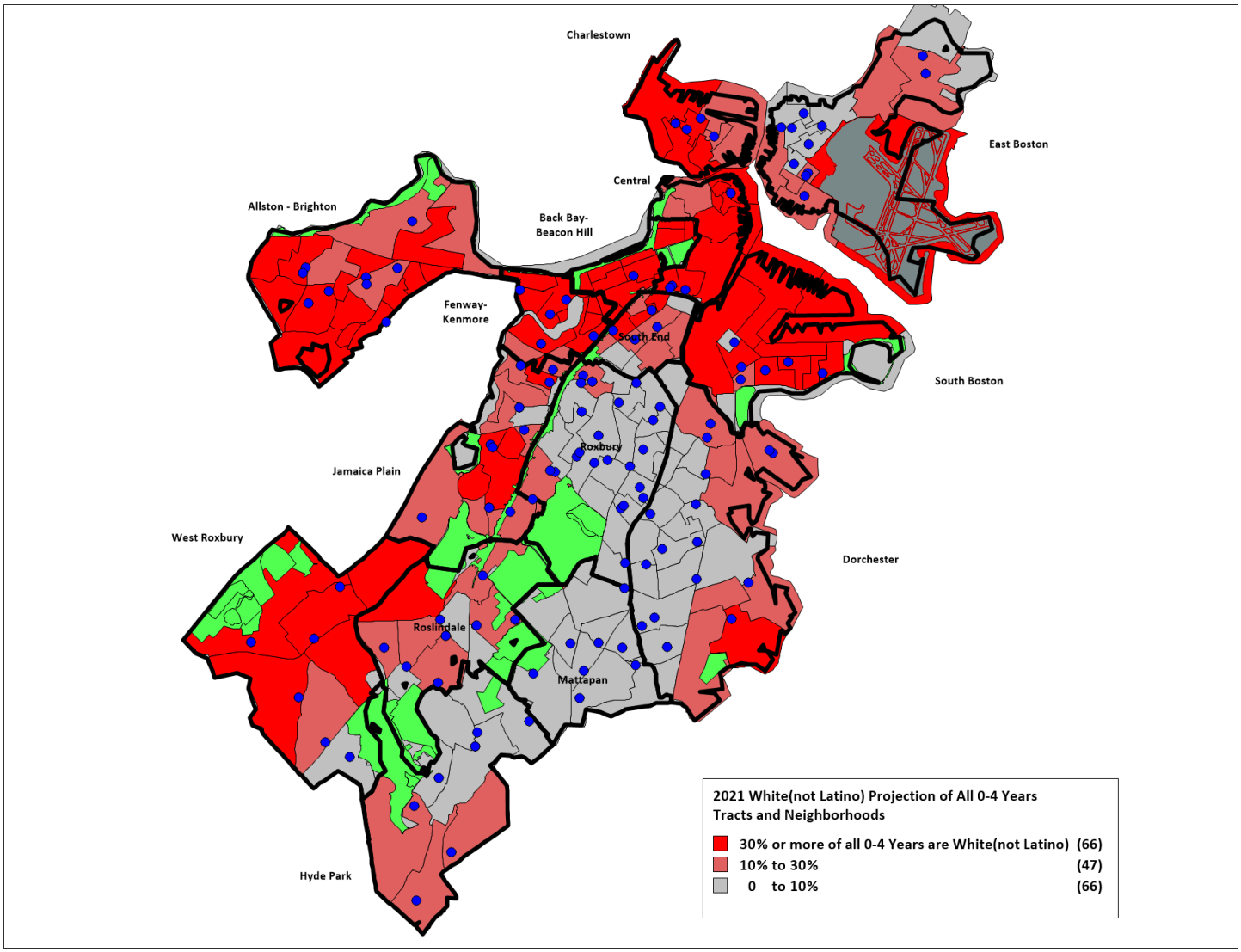


Map 16:
2021 Proportion of All Asians, 15–19 Years



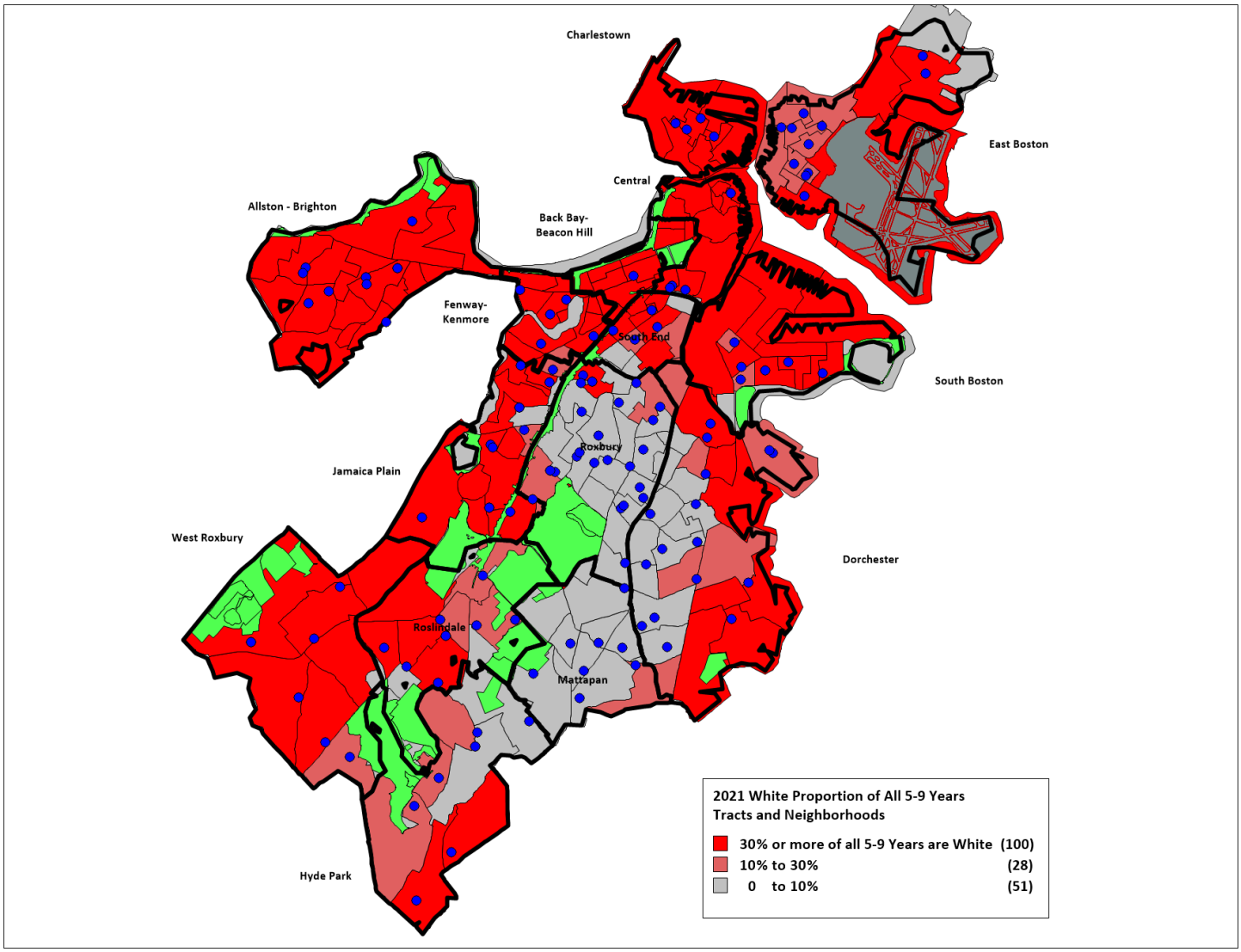
Map 17:

2021 Proportion of All Non-Latino Whites, 0–4 Years



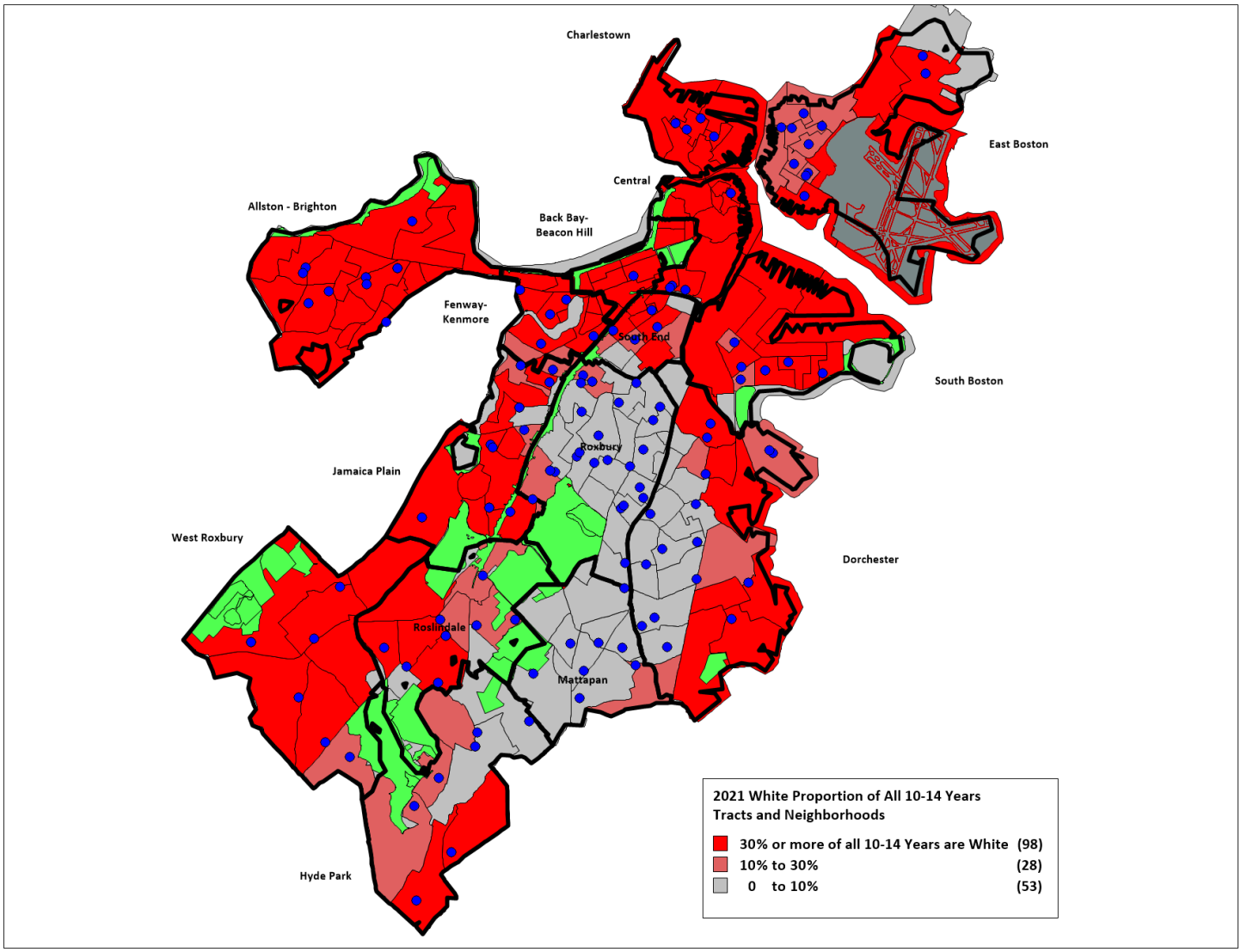
Map 18:

2021 Proportion of All Non-Latino Whites, 5–9 Years



Map 19:

2021 Proportion of All Non-Latino Whites, 10–14 Years



Map 20:

2021 Proportion of All Non-Latino Whites, 15–19 Years