BEDFORD PUBLIC SCHOOLS

RESEARCH PROJECT REPORT

Enrollment Demographics in Bedford, MA

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1 Property types in Bedford

The data on Bedford land parcel usage (tables 1-3) were taken from the landowner mail extract which included street addresses with LUCs (land-use code) under the Massachusetts property classification system. Bedford is and was a town of primarily single family homes, however, other types of housing bear significant weight on school enrollment statistics. On a macro level, new developments in Bedford have moved away from mostly single families with portion of two families, to mostly single family developments with a portion of condominium units. Another change of note is the addition of 6 large apartment complexes built in Newton. Although these properties are listed as a single property, some of these properties have units for as many as fifty families. This could potentially have a significant effect on school enrollment, so it is important to be aware of these developments. However, Bedford is still characterized by its sizable majority of single family homes. It is unclear if the positive trend in condominiums is negatively correlated with the construction of new two family homes. Regardless, these two trends are not unique to Bedford, as this is common in many suburban towns in Massachusetts.

Note that in table 1, there are a number of properties acccounted for which did have associated construction dates not accounted for in tables 2 and 3.

Table 1: All Bedford Properties

| Property Types	Number of Properties	Percentage
Single Family	3465	79.858
Condominium	633	14.589
Two-Family	186	4.287
Three-Family	6	0.139
Apartment with <8 Units	2	0.047
Apartment with >8 Units	7	0.162
Mixed Use - Mostly Residential	11	0.254
Mixed Use - Mostly Commercial	12	0.277
Multiple Houses on Single Parcel	17	0.392
TOTAL PROPERTIES	4339	100

Table 2: Pre-2000 Bedford Properties

Property Types	Number of Properties	Percentage
Single Family	3003	82.162
Condominium	429	11.738
Two-Family	178	4.871
Three-Family	6	0.165
Apartment with < 8 Units	2	0.055
Apartment with > 8 Units	1	0.028
Mixed Use - Mostly Residential	11	0.301
Mixed Use - Mostly Commercial	12	0.329
Multiple Houses on Single Parcel	13	0.356
TOTAL PROPERTIES	3655	100

Table 3: Post-2000 Bedford Properties

Property Types	Number of Properties	Percentage
Single Family	431	67.875
Condominium	187	29.449
Two-Family	8	1.26
Three-Family	0	0
Apartment with <8 Units	0	0
Apartment with >8 Units	6	0.945
Mixed Use - Mostly Residential	0	0
Mixed Use - Mostly Commercial	0	0
Multiple Houses on Single Parcel	3	0.473
TOTAL PROPERTIES	635	100

# 2 Overall Population Changes in Bedford

Census data taken in 1990, 2000, and 2010 provides a breakdown by age and sex of the changes in population in Bedford. Demographic groups to be noted children, of both sexes, from ages 0 to 18, as well as women aged 18-50. An interesting trend to look into would be the change in population of 18-50 year old females versus the change in fertility and birth rates in Bedford. Another group to potentially discount are females 20-24, of which a large percentage spend more than half the year at residential institutions of higher education and contribute less to Bedford's brith rate than other 18-50 year old women. One trend easily observed from the population pyramid charts is the decrease of both males and females in their 20s. Today, the average age for an American to have a child is around 27 years old, while in 1980, it was closer to 23. Perhaps because many people move to Bedford to start a family, the change of the average age of young families moving to Bedford is similar to the change in the national average. This trend could be responsible for the decrease of people ages 20-30 living in Bedford over the past 30 years.

Bedford 2000 Census Age Sex Pyramid

Age	Male	Female

Bedford 2010 Census Age Sex Pyramid
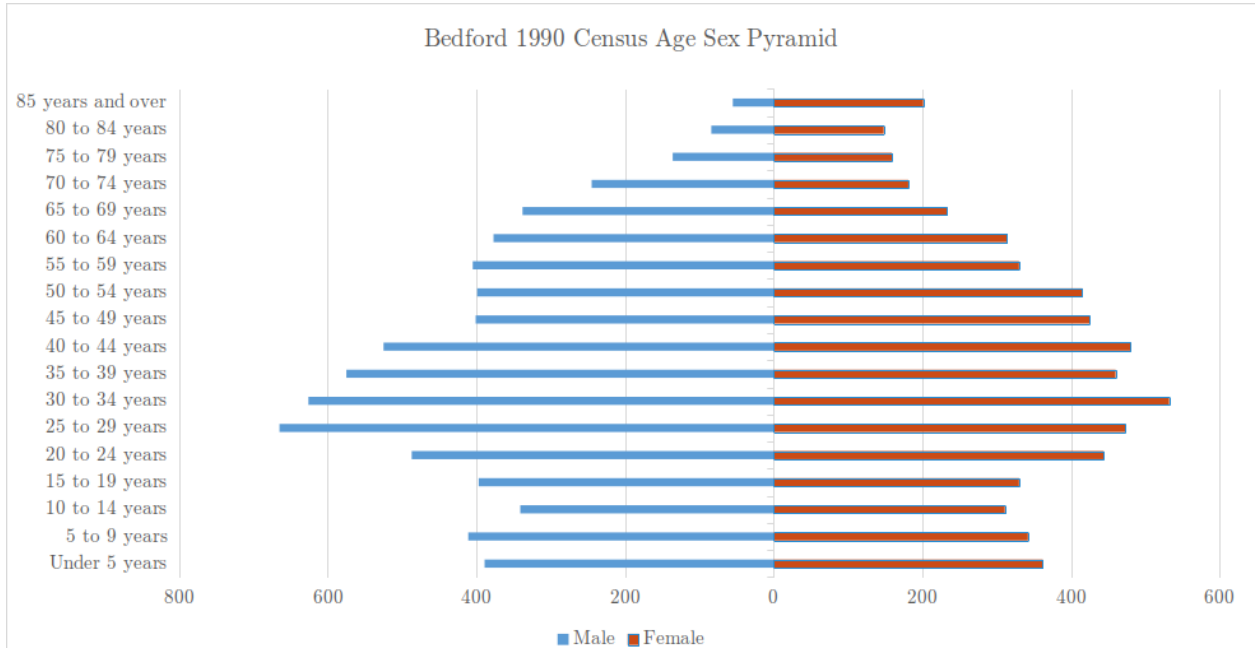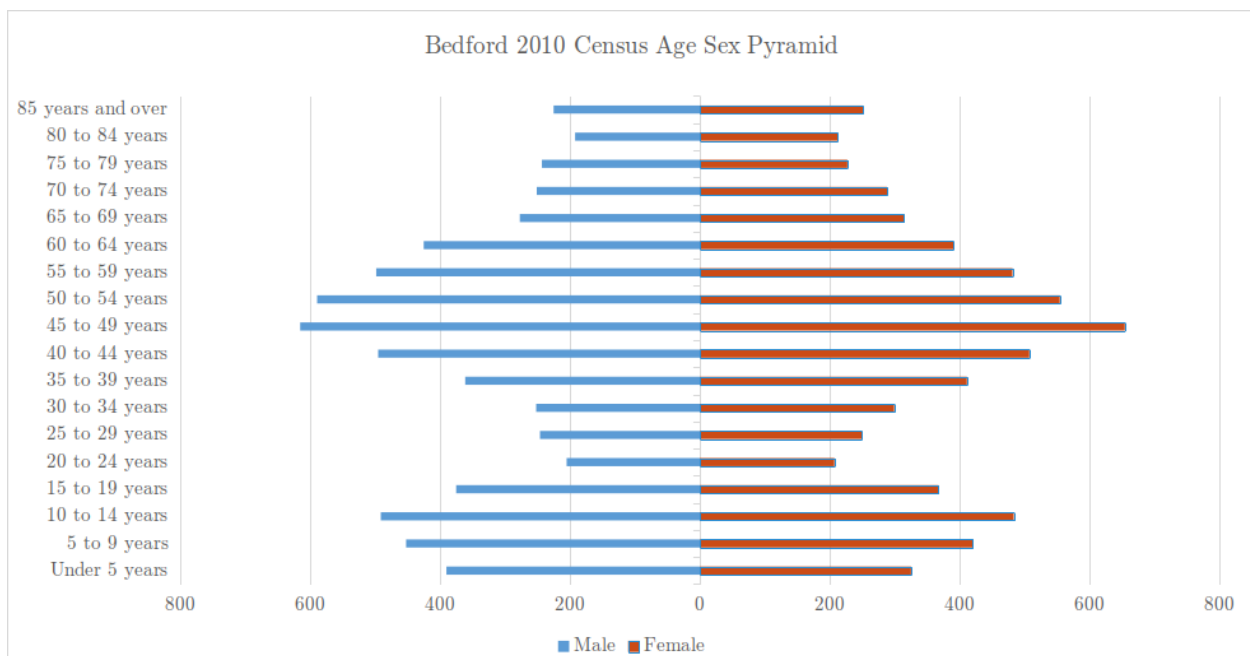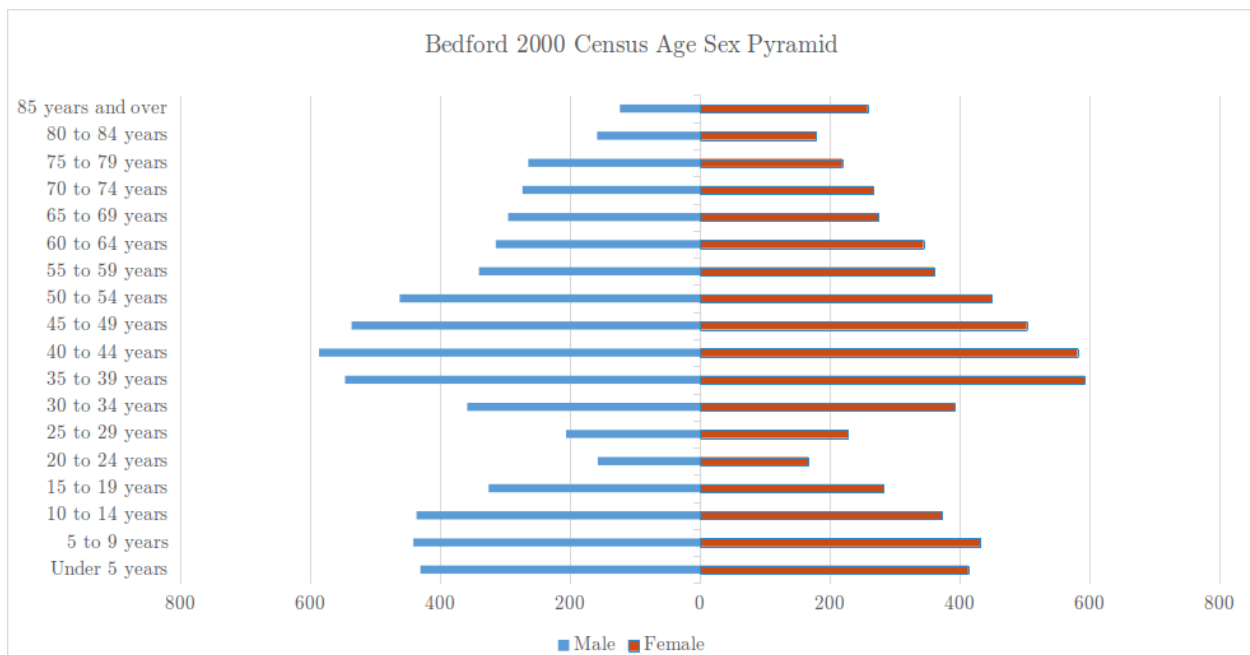
3 Overall Population Changes in Hanscom AFB

The population of Hanscom Air Force Base has decreased significantly between the 2000 and 2010 census. This is likely due to changes in military policy and deployment and not because of typical migration or regional trends. It should be noted that children at Hanscom AFB only attend Bedford High School and attend other districts' school systems for primary education.

Hanscom 2000 Census Age Sex Pyramid

Hanscom 2010 Census Age Sex Pyramid
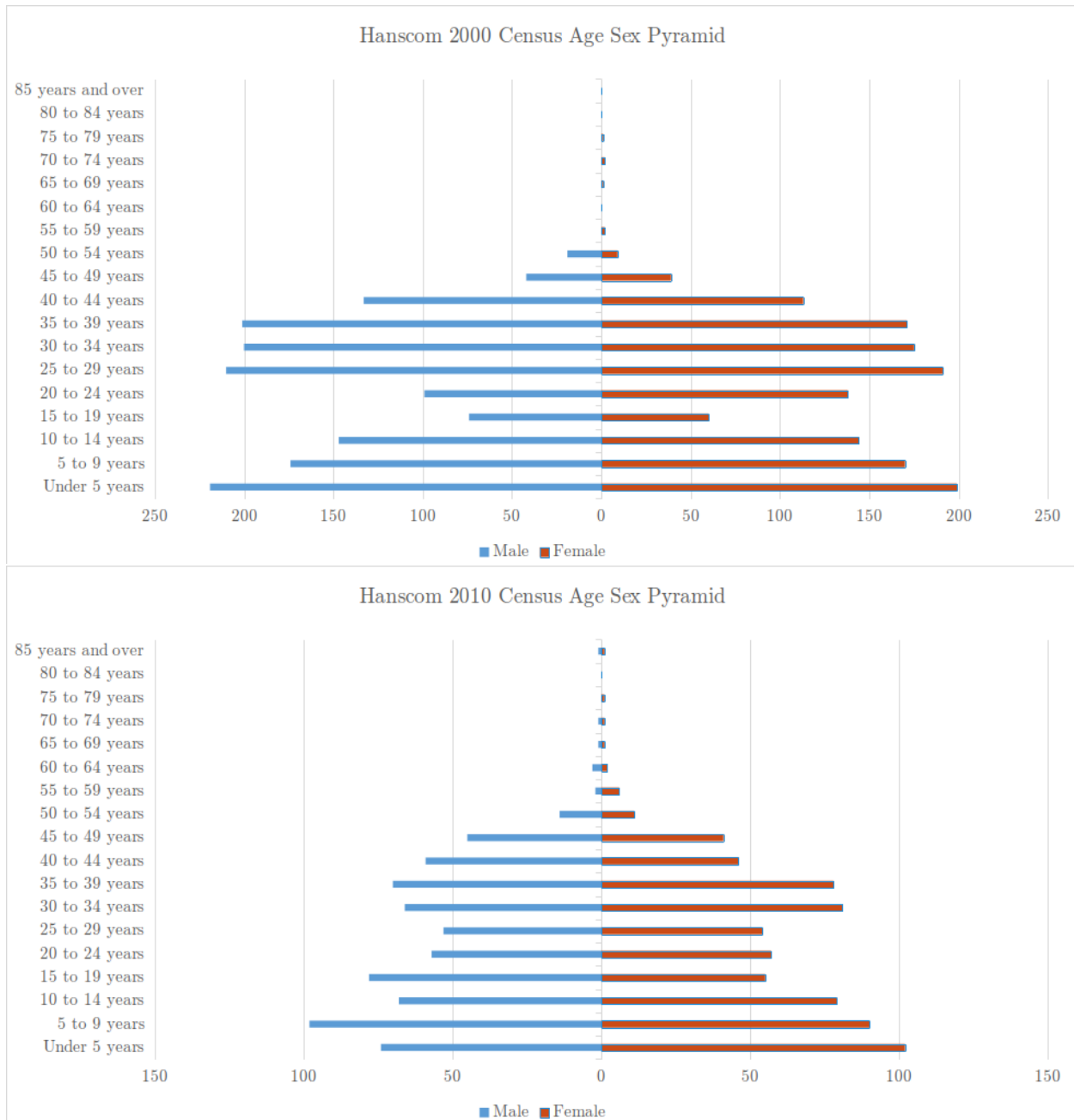
4 Projections Based on Historical Enrollment

We can perform a simple 5 year cohort survival rate projection by applying the 5 year cohort survival rate the successive class years. This is not a useful prediction for Kindergarten, as Kindergarten class sizes vary unexpectedly each year. Therefore, we have assumed Kindergarten will maintain its current enrollment over the next few years. This projection predicts a mild growth over the next 3 years spread fairly evenly across grade levels. Grades 10-12 have seen a few years of steadily decline in enrollment so this projection expects that trend to continue; however, every other class of students has a positive 5 year survival rate.

Table 4: Historical Class Sizes

Year	PRE K	K	1	2	3	4	5	6	7	8	9	10	11	12	K-12
2008-09	33	143	160	181	186	185	176	200	182	195	213	193	170	203	2387
2009-10	30	189	153	166	186	185	193	176	196	186	221	197	189	162	2399
2010-11	12	148	196	142	170	183	181	190	183	195	197	218	186	182	2371
2011-12	20	157	166	190	147	174	180	199	189	186	236	197	215	187	2423
2012-13	34	157	166	168	204	152	180	181	199	195	223	245	186	224	2480
2013-14	34	202	171	169	173	206	154	183	180	199	231	211	238	188	2505
2014-15	32	186	202	179	164	174	202	145	177	180	230	220	204	227	2490
2015-16	31	190	199	198	183	171	180	201	154	175	221	226	207	205	2510
2016-17	28	192	200	206	202	182	182	191	207	158	226	206	222	205	2579
2017-18	42	197	199	202	211	203	195	182	191	213	179	210	210	218	2610
2018-19	39	191	211	197	202	212	205	197	178	191	242	188	202	203	2619
2019-20	45	183	198	217	197	202	213	202	210	181	228	236	183	194	2644
Survival	-	-	1.05	1.01	1.01	1.01	1.04	1.01	1.03	1.01	1.15	0.97	0.98	0.98	1.01

Table 5: PROJECTIONS

Year	PRE K	K	1	2	3	4	5	6	7	8	9	10	11	12	K-12
2020-21	-	183	193	200	220	199	209	215	207	213	209	222	230	179	2680
2021-22	-	183	203	201	223	201	217	217	213	215	241	216	225	176	2732
2022-23	-	183	214	203	226	203	225	220	219	218	278	211	219	173	279

5 Accuracy of 2005 Projection

From these charts we can see the comparison between a projection made in 2005 with actual historical class sizes. The 2005 projection was produced by the Merrimack Education Center in Chelmsford, MA. They analysis was based on cohort survival methods as well as a study on birth rates. However, they projected that the overall enrollment would stay the same or slowly but steadily decrease. Actual Bedford enollment figures show that the population of Bedford Public Schools increased over that time period. By 2015, the enrollment was more than 8 percent greater than the projections.

6 Heatmap of Enrollment in Bedford

In the following map of Bedford, the darker blue areas correspond to a higher density of students while the whiter areas to a lower density. The colored dots show the location of large apartment complexes in Bedford.
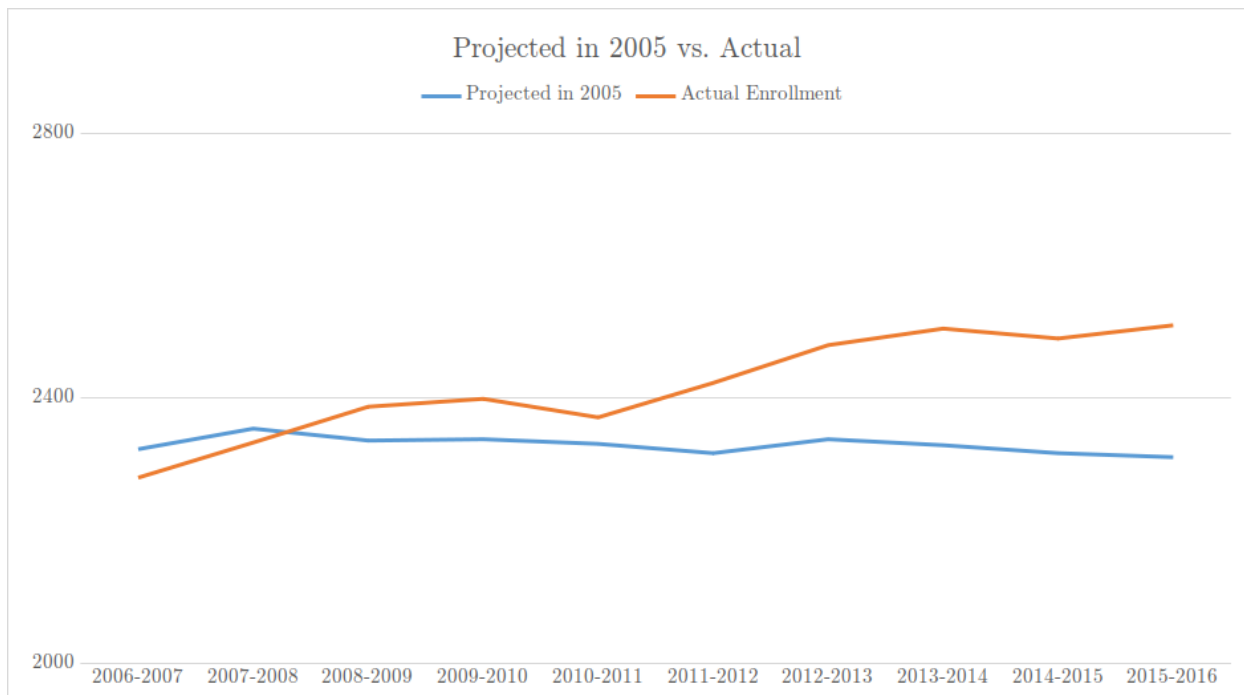
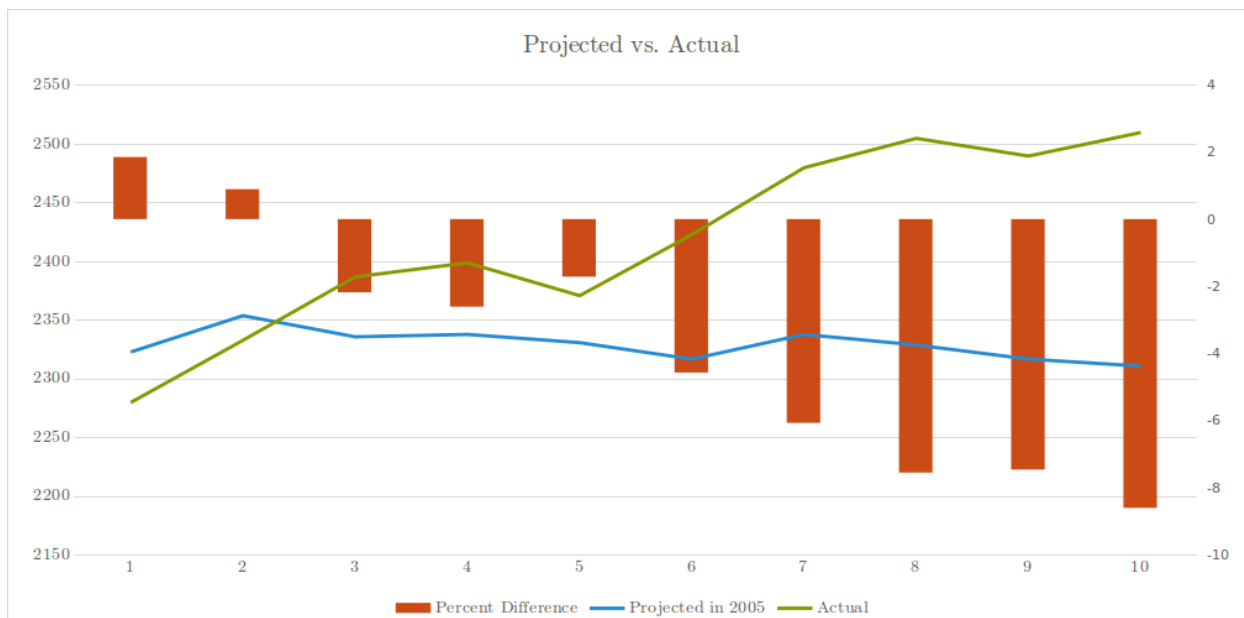Figure 1: Historical Accuracy Comparison

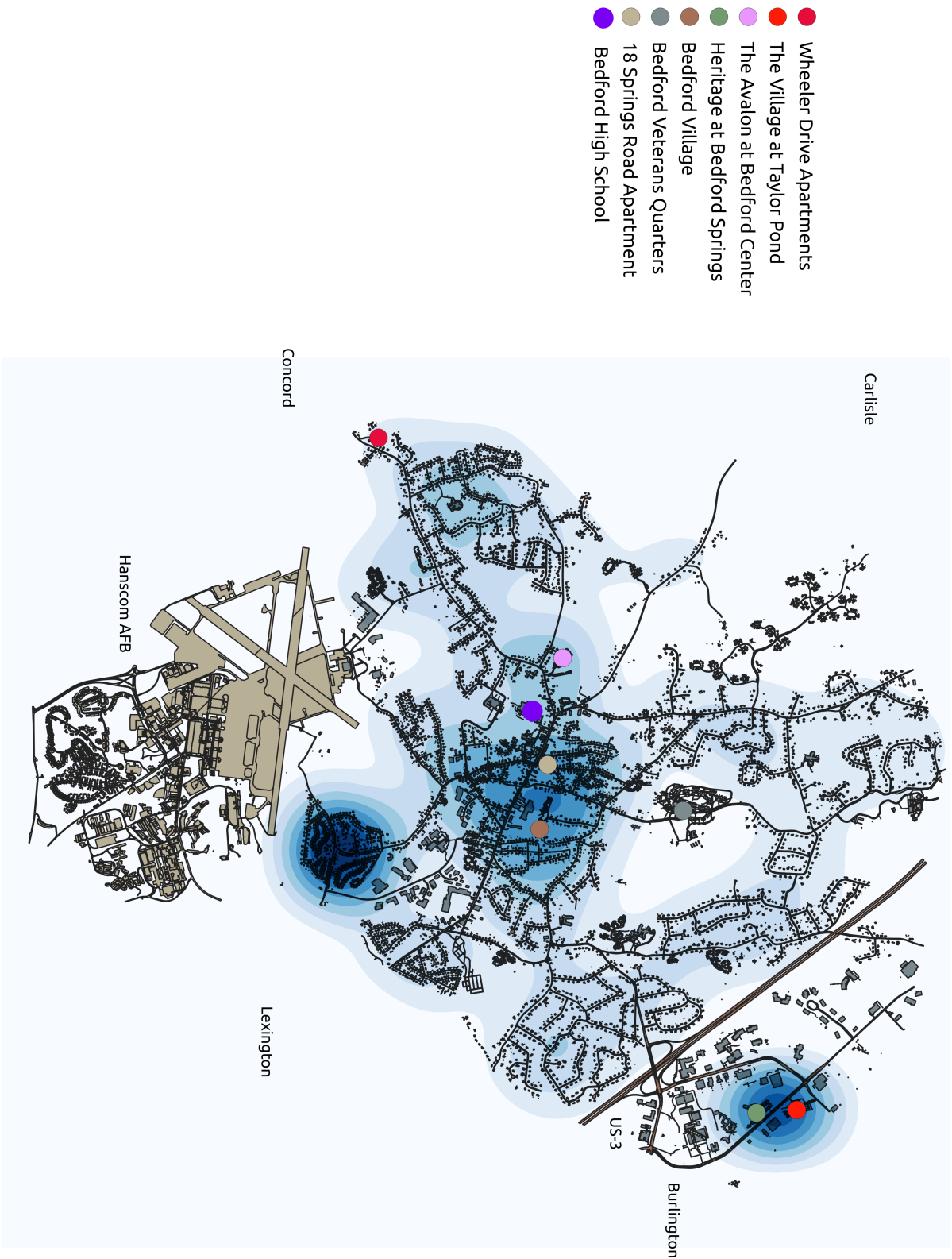Figure 2: Historical Accuracy Comparison with Percentages

Figure 3: Bedford, MA