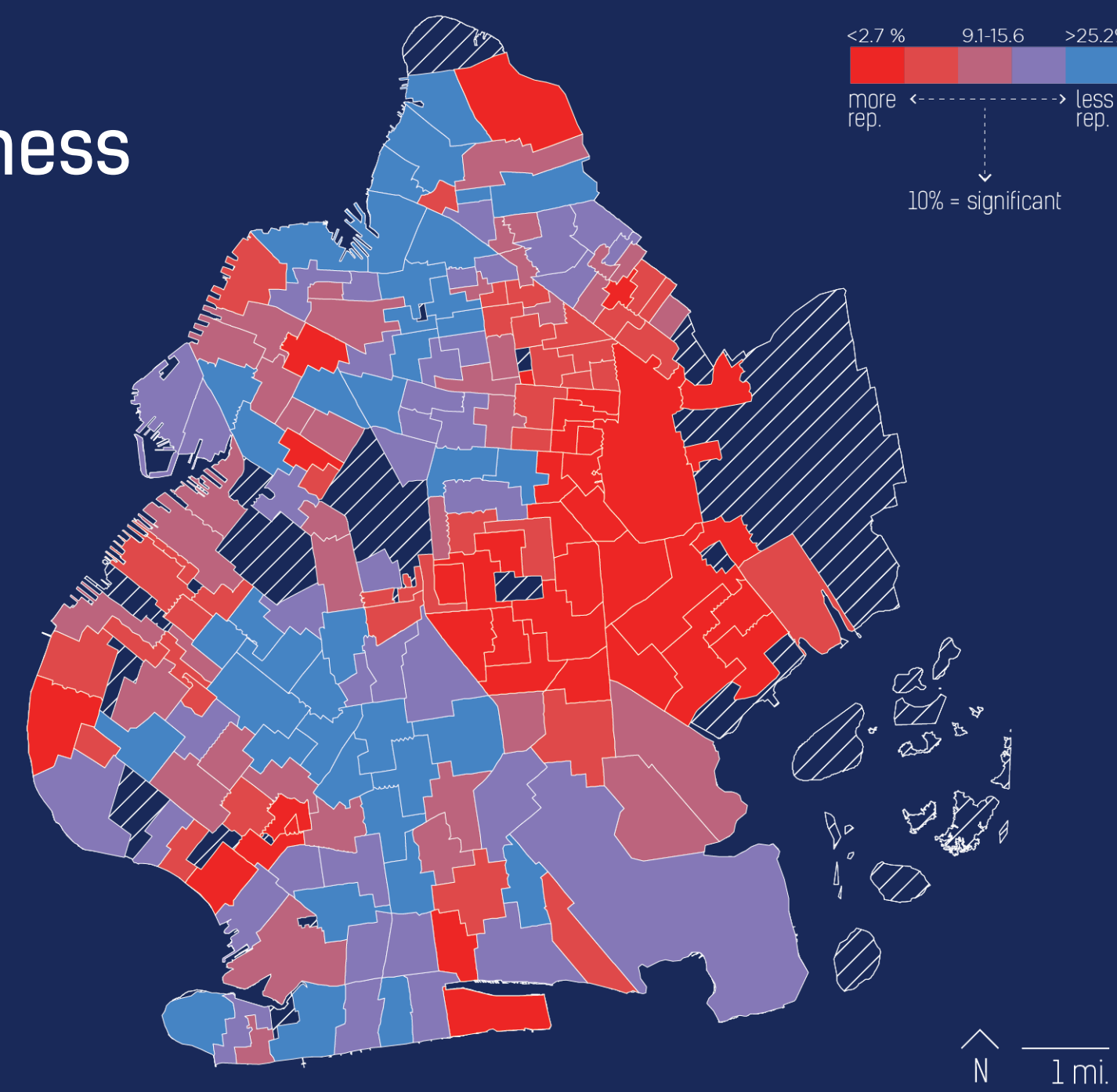# BROOKLYN'S BUILT ENVIRONMENT OF SCHOOL SEGREGATION

Informed by existing bodies of work on the subjects of livability and school segregation, this research explores the relationship between residential desirability and racial segregation within Brooklyn's public school system.

RESEARCH QUESTION

? Do features in the built environment which lend themselves to residential desirability affect school segregation measures?

SOCIODEMOGRAPHIC INDICATORS

racial representativeness

| <2.7 % | 9.1-15.6 | >25.2% |
| more rep. | ←---→ | less rep. |

10% = significant
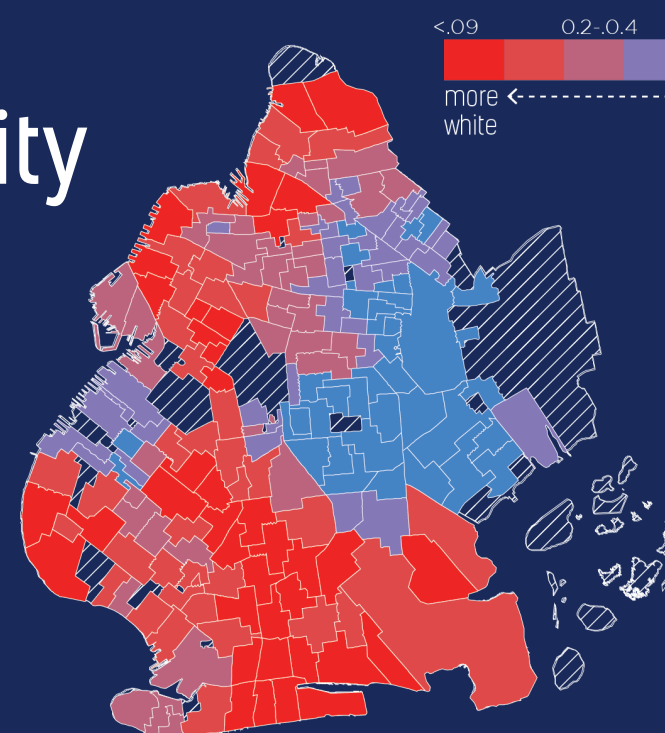
In order to gain a better understanding of the factors that may contribute to the racial representativeness of public schools within Brooklyn, we aimed to measure the influence of the built environment upon racial demographics within public school zone boundaries. Six specific amenities were analyzed, and access to each amenity was measured with a 3/4 mile walking radius. School zone boundaries received scores to rate their level of access, and these maps were prepared to be used as inputs for regression analyses. Racial diversity per public school zone was also determined based on the percentage of the population that is categorized as white.
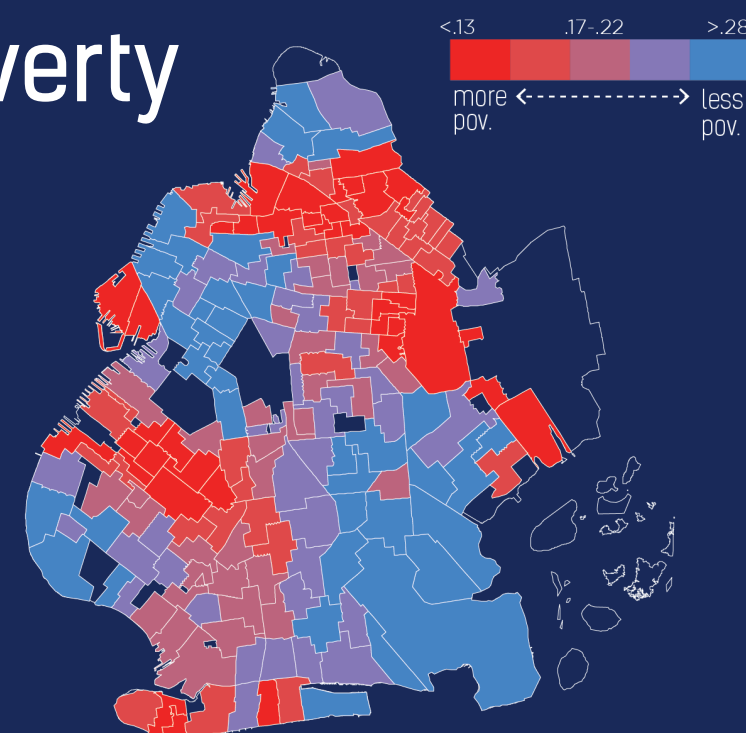
To explore this relationship further, we incorporated socioeconomic factors within our analysis. Using 5-year Census estimates from 2018, a map was produced approximating the percentage of the population living in poverty within each school zone boundary.
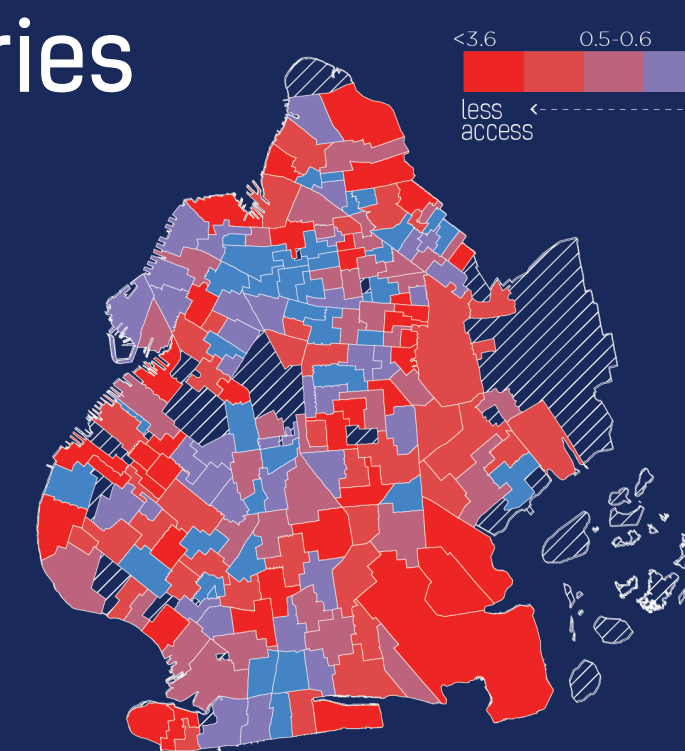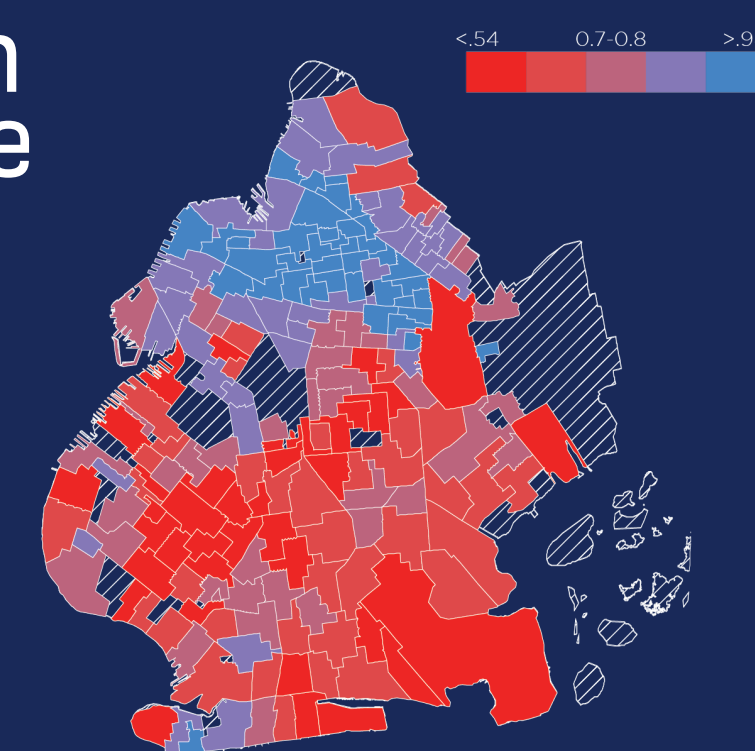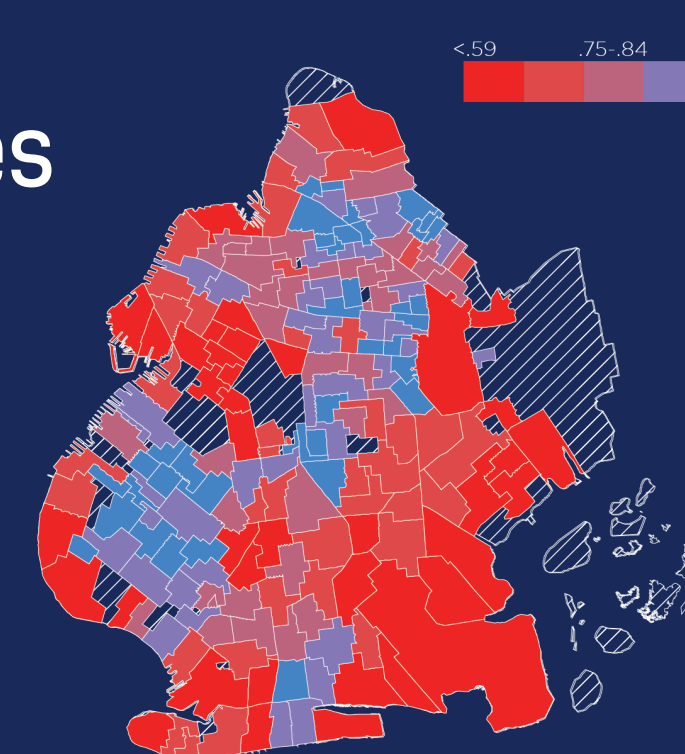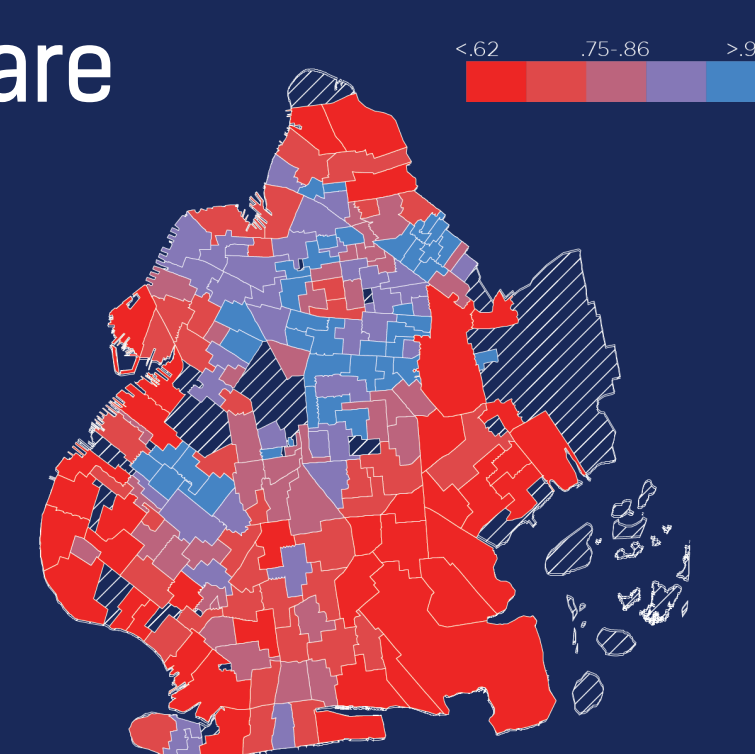
racial diversity

| <.09 | 0.2-0.4 | >0.6 |
| more white | ←---→ | less white |

poverty

| <.13 | 1.7-2.2 | >2.8 |
| more pov. | ←---→ | less pov. |

BUILT ENVIRONMENT INDICATORS

libraries

| <.6 | 0.5-0.6 | >7.3 |
| less access | ←---→ | more access |

green space

| <.54 | 0.7-0.8 | >.98 |

food stores

| <.59 | 75-84 | >95 |

daycare

| <.62 | 75-86 | >96 |

bus stops

| <.66 | 0.7-0.9 | >97 |

subway stops

| <.56 | 0.6-0.7 | >.85 |
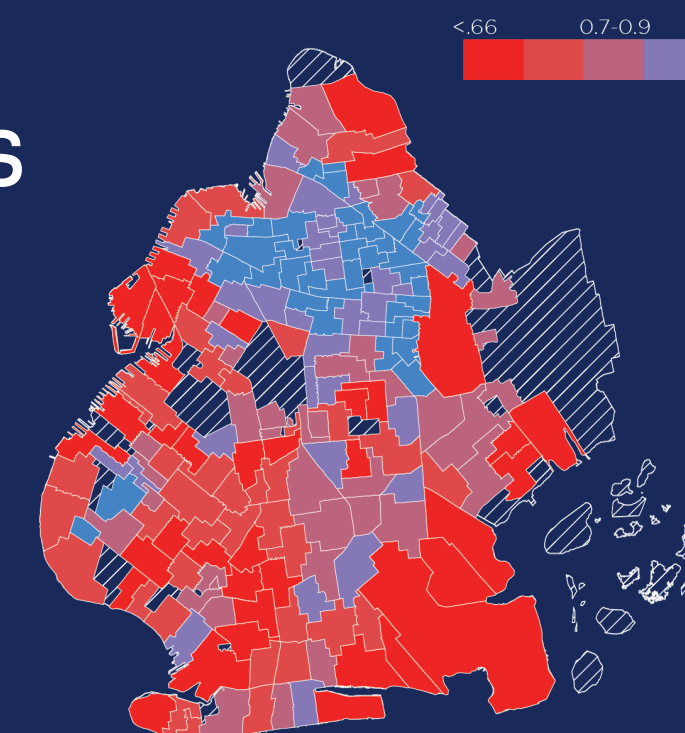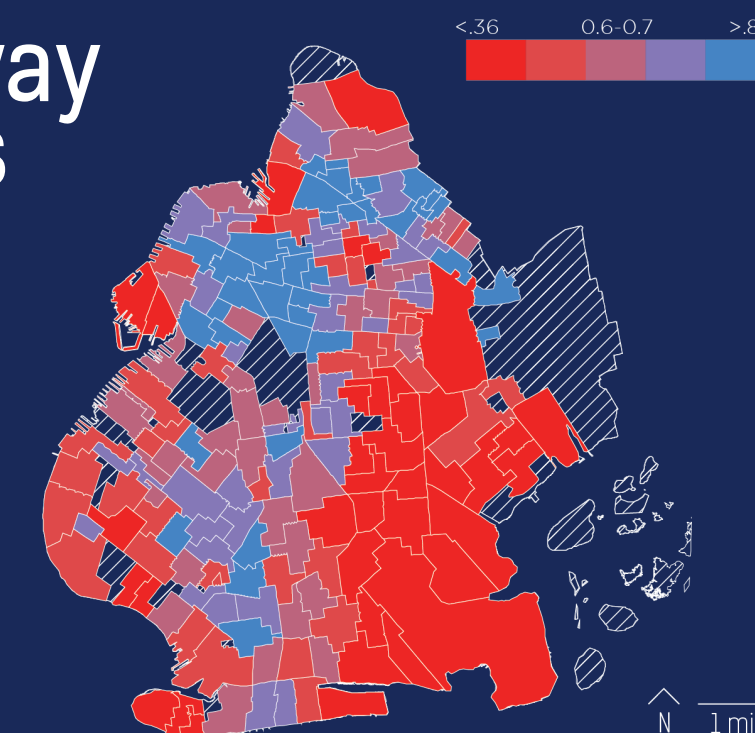
FINDINGS

non-white residuals

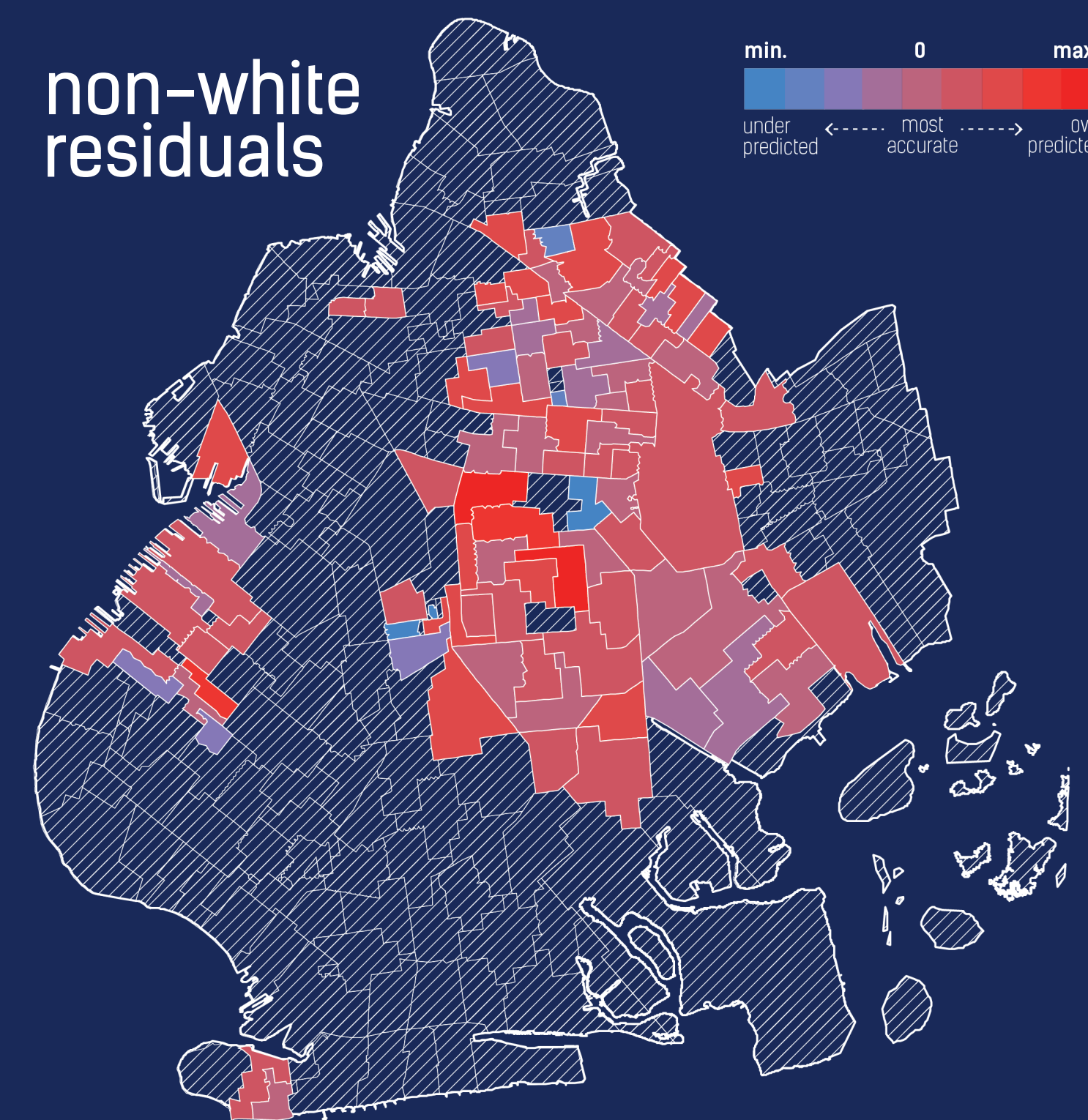| min. | 0 | max. |
| under predicted | most accurate | over predicted |

Through regression analysis, two models were created to explore potential correlations between racial representativeness, the built environment, and sociodemographic indicators. One model was used to analyze public school zones that are majority non-white, while another analyzed zones that are majority white. Significant correlations were identified through ordinary least squares non-spatial regressions, then applied to geographically weighted regressions. Both models were used to estimate which of the inputs correlate with racial representativeness within public school zone boundaries.

For the majority non-white public school zones, regression analysis revealed the most significant correlations to exist with access to green space and percentage white per school zone. A non-spatial OLS model produced an **R2-adjusted value of 0.87** and high statistical significance for both regressors. Including green space and percent white in a geographically weighted regression (GWR) produced an **R2-adjusted of 0.92**, indicating an even stronger model when the geographic proximity of elements is taken into account. The map on the upper left displays the residuals produced by a GWR model. While the residuals are consistently low, they skew positive, indicating that the model has a tendency to over-predict racial representativeness.

white residuals

| min. | 0 | max. |
| under predicted | most accurate | over predicted |
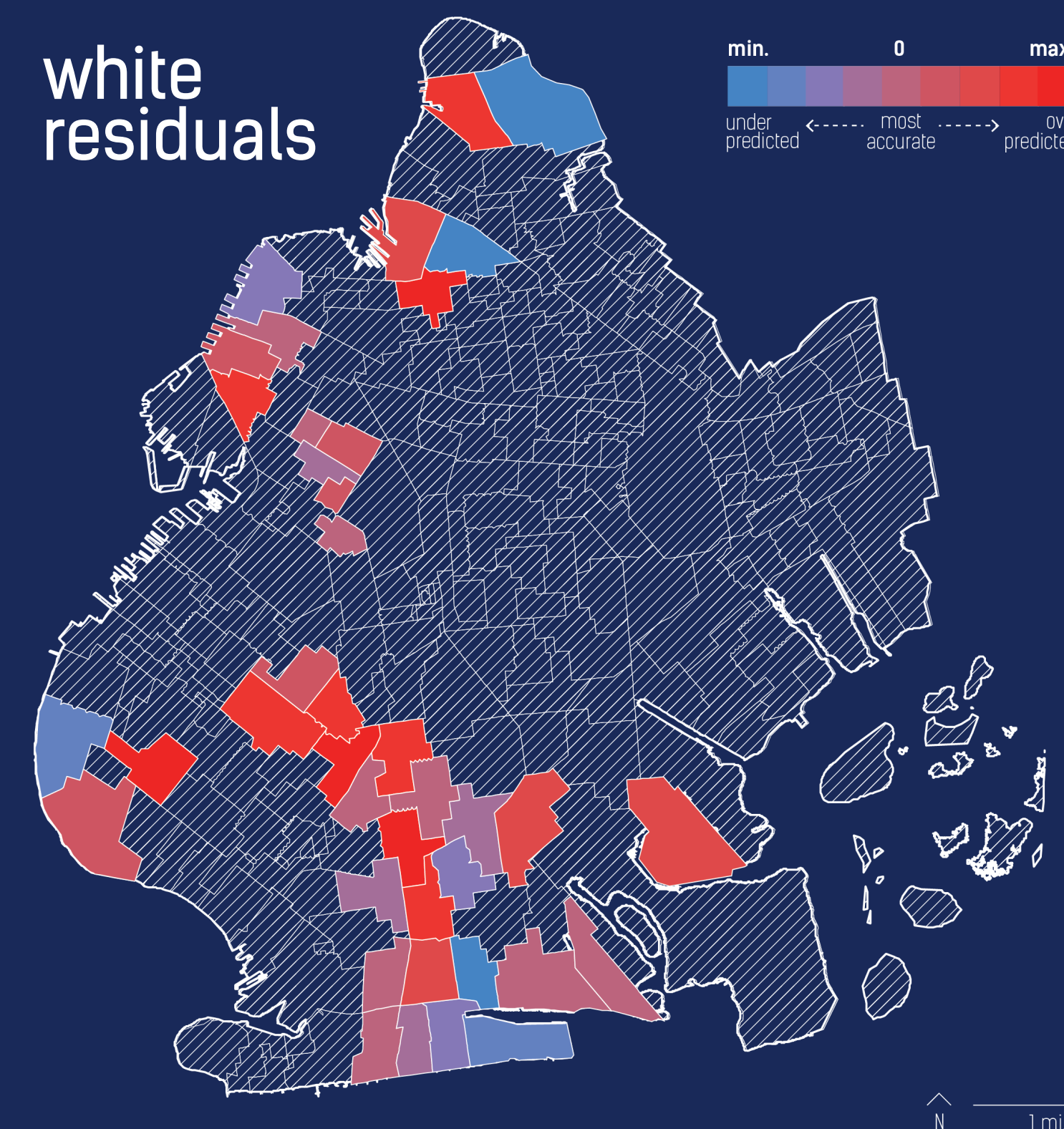
For majority white public school zones, the most accurate correlation was found between access to green space and poverty measures. A non-spatial OLS model produced an **R2-adjusted value of 0.73** and high statistical significance for both regressors. Including green space and percent poverty in a GWR did not considerably improve the model's performance, though also produce an **R2-adjusted of 0.73**. The map on the lower left displays the residuals produced by a GWR model. The residuals are consistently low, although they range higher and lower than those of the non-white school zone model, indicating a less significant fit.

Further analysis on built environment and socio-demographic factors could improve these models and better explain discrepancies between the demographics of public schools and their school zones. Continued research could also test these models in other areas of the city and country. Yet, from this preliminary research, we can conclude that access to green space in a school zone contributes significantly to the racial representativeness of public schools in Brooklyn.

PROJECT TEAM: REBECCA COOK, ANDREA PARTENIO, HELEN PIERSON, & TOLA ONIYANGI