

Title Page: Project Final Report

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Abstract:

Our primary goal of this project was to help the Greenbelt Reparation Committee, which is working to explore and address historical and ongoing racial disparities within the city of Greenbelt, Maryland. Throughout this project, our team has been instructed to visualize the demographic changes across the neighborhoods over time using the geographic information system (GIS) technology. The initial goal of the project was to gather the census data, clean it, and use it to create maps to demonstrate the demographic trends over the past several decades. However, the project scope later changed to other East and West Side neighborhoods, including Franklin Park. This was overall an unique experience for our team to work on this project to see how the reparation committee was formed to address historical injustices and offer better ways to understand the neighborhood changes, such as the population, race, income, education, and taking all of this into consideration to develop effective and equitable policy solutions.

Our client, Bob Rand, a representative of the Greenbelt Reparation Committee and has been our main point of contact, and another commission member, Reema Bjorkland, has attended our prearranged project meetings to provide us directions and feedback, and additional inputs on the project scope. For instance, one of the nuggets that changed our project happened when our client asked us to build a web portal. This wasn't part of the original plan, but the idea is to have a website where people in the Greenbelt community can check in and see how the project is going. The goal is to keep things transparent and easy to follow, especially for those who want to stay informed about the progress of the Reparations Commission's work.

All of our team members contributed significantly to the success of this project. From the start, we divided our responsibilities and took the lead on different tasks to help the project move forward smoothly. Khoa Do and Ruchir Kasineni took the lead on setting up the GIS software and developing the initial mapping visualizations, as well as updating the project scope and deliverables based on feedback. Elise Ferguson served as the main point of contact for the client and was in charge of communication and meeting coordination. Emmanuel Ephraim was responsible for collecting and cleaning the census and education data we needed for the maps. Fariha Prapti acted as our team liaison and document manager, helping with internal planning and keeping communication organized. This clear division of responsibilities helped us stay on track and work effectively as a team.

Methods:

To achieve the goals of the Greenbelt Reparations Project, our team decided to analyze and visualize changes in the population and racial demographics of two neighborhoods: Franklin Park and GHI in Greenbelt, Maryland. We used data in 2020, 2010, 2000, and 1990 and

downloaded shapefiles for each census year from the NHGIS website. To best accurately link geographic areas to the neighborhoods, we decided to use block IDs. We collected demographic summaries to calculate total neighborhood populations and the percentage representation of each racial or ethnic group for each neighborhood. After that, we imported the data to ArcGIS and joined it with the cleaned shapefiles and developed interactive maps featuring visual symbology. This approach allowed us to make clear and consistent comparisons across the different census years. We exported the web layers into ArcGIS Map Viewer to create pie chart, demographic information in pop-ups to clearly illustrate demographic shifts over time.

Throughout the project, we had two major challenges, especially dealing with incomplete data from NHGIS. The first challenge was the changes in geographic boundaries every 10 years. To accurately represent the data, we had to use the specific shape file for that year. The second challenge was in the 1990 shapefile, there were two GISJOIN codes that appeared in the shapefile but were excluded from the demographic summary tables. After doing some research, we finally learned that the 1990 demographic table excluded blocks with 0 population and 0 housing units, which could be any public spaces like parks or rivers (IPUMS Forum, 2025). We still included these blocks in our maps to ensure geographic accuracy and entered 0 in these areas. Finally, we developed a website to display our maps for easier access.

Descriptions of your deliverables/findings:

Our team analyzed demographic changes in two Greenbelt neighborhoods – Franklin Park and GHI – from 1990 to 2020 to support the Reparations Committee's work. These neighborhoods represent different development types in Greenbelt, with Franklin Park being an apartment complex on the east side and GHI a cooperative housing community in the west.

A significant challenge was defining precise neighborhood boundaries that could be tracked across census years, as census geography changes every decade. We solved this by using census blocks – the smallest geographic unit available – to accurately define our neighborhoods. This required identifying specific blocks within census tracts that corresponded to our target neighborhoods for each census period.

Our primary deliverable is a series of interactive GIS maps created in ArcGIS that visualize demographic changes in both neighborhoods. These maps show how racial composition has shifted over time, with interactive features that display detailed population statistics when clicking on specific areas. The maps include pie charts showing racial composition and pop-up windows with precise numbers and percentages.

These maps reveal contrasting demographic patterns between neighborhoods. Franklin Park showed a dramatic transformation, transitioning from a mixed population with significant white representation in 1990 to a predominantly African American community by 2020. In contrast, GHI maintained relatively stable demographics, with a predominantly white population and only

gradual diversification. This difference between neighborhoods provides important context for understanding how historical housing policies may have shaped community development.

Technical obstacles included managing the 1990 census data, where blocks with zero population were excluded from demographic tables, requiring additional research and workarounds. Similarly, changing census boundaries required us to carefully select appropriate shapefiles for each census year.

To make our findings accessible, we developed a website that integrates all interactive maps in one navigable interface, serving as both a research tool and educational resource for committee members and the public.

Recommendations:

Our first recommendation is to deepen the data analysis by adding more detailed timelines and neighborhood attributes. We suggest including census data from 1980 and 2025 projections to see longer trends and possible future shifts. Adding variables like income level, home ownership rates, and age groups will give a fuller picture of how Franklin Park and GHI change over time. To do this, the team could download those additional shapefiles from IPUMS NHGIS and join them in ArcGIS just like before. It would also help to build an interactive time-slider on the website so users can move between decades smoothly. We recommend improving the map symbology by using consistent color palettes and clear legends, which makes patterns easier for people to spot. Finally, the code behind these maps could be organized into modular scripts so future students or partners can update the analysis without starting over.

Our second recommendation focuses on engaging the community and sharing findings more broadly. First, conduct one or two rounds of interviews or small focus groups with current residents and descendants of Greenbelt's original settlers. Their feedback can guide which visuals and data stories matter most to people who live here. Next, develop a simple user guide or tutorial video that walks viewers through the website's features, so everyone from high-school students to local officials can explore the maps on their own. You might also host a public workshop or webinar to introduce the project and gather questions in real time. Finally, consider partnering with the Greenbelt Reparations Committee to integrate these maps into their educational events and reports. This ongoing collaboration will help ensure the data remains accurate, relevant, and driven by the community's needs.

Conclusions:

Our work on the Greenbelt Reparations Project has revealed valuable insights into how neighborhoods have evolved demographically over four decades. The contrast between Franklin Park's transformation and GHI's relative stability tells an important story about housing patterns within a single municipality. These findings provide the Reparations Committee with concrete evidence of how different neighborhoods have experienced vastly different demographic trajectories, which may reflect underlying disparities in housing policy, economic opportunity, and community development.

Through our research, we've demonstrated that neighborhood-level analysis provides much richer insights than city-wide statistics alone. By focusing on specific neighborhoods and using census block data, we've been able to pinpoint demographic patterns that would be obscured in broader analyses. This approach allows the committee to understand not just that Greenbelt has changed over time, but exactly how and where those changes have occurred.

We recommend expanding this research to include additional neighborhoods throughout Greenbelt for a more comprehensive understanding of demographic patterns. We also believe that incorporating variables beyond race – such as income levels, property values, and homeownership rates – would provide a more holistic picture of disparities over time.

The technical challenges we faced, particularly around changing census boundaries and inconsistent data availability, suggest that future work would benefit from a more systematic approach to addressing these issues. Additionally, the apparent reversal of diversity trends in GHI between 2010-2020 warrants further investigation.

The interactive maps and website we've developed serve as both analytical tools and educational resources. By making complex demographic data accessible, we hope to foster broader community involvement in conversations about Greenbelt's history and future.

In closing, this project contributes to the Greenbelt Reparations Committee's work by providing data-driven insights into historical patterns of demographic change. The contrasting stories of Franklin Park and GHI illustrate how neighborhoods within the same city can experience dramatically different trajectories, potentially reflecting the impact of historical policies. We hope these findings will support informed recommendations for addressing historical injustices and building a more equitable community.

Deliverables: Don't forget to include the deliverables as an attachment to your overall report (and links within the report, as applicable). For example, if you have a website wireframe,

include links to a github preview or wireframing screenshots. If you have a database, include schema diagrams and (if possible), a backup database file.

Include/link all deliverables (see guidelines) in the final report.

References

IPUMS Forum. (2025, Jan 22). *Block-level tables from 1990 missing uninhabited blocks* [Online forum post]. IPUMS User Forum. <https://forum.ipums.org/t/block-level-tables-from-1990-missing-uninhabited-blocks/6301>