Thesis Project Portfolio

Reston Site Redevelopment Project

(Technical Report)

The Effects of Green Building Certifications on Low Income Communities

(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science

University of Virginia • Charlottesville, Virginia

In Fulfillment of the Requirements for the Degree

Bachelor of Science, School of Engineering

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Table of Contents

Sociotechnical Synthesis

Development of land is how we create new offices where people can work and more apartments for people to live. In order to guide this development to be more environmentally friendly in a measurable and comparable way, green building certifications were developed. Without close inspection, these two items would seem to have a net positive effect on society. The benefits would be more jobs locations and homes that are green, but what about the negative impacts? Would these developments actually decrease the environmental impact of a parcel? Who would have access to the developments? What does a "successful" development look like? How does the developer community perpetuate its metrics for success? In my theses, I answer these questions and more as I explore the world of land development.

My technical research topic and my STS research topic both look at redevelopment, however they differ in that they come at development from very different angles. My technical capstone project was done from the perspectives of developer, designer, and general contractor. The goal of the project was to design what was deemed a successful development project. One of the requirements for my technical research project actually was in direct contrast to the perspective of my STS research topic. The perspective of my STS research topic was critical of redevelopment, particularly when green certifications, such as LEED, were concerned. Even though both of my theses look at green land development, they view it through very different vantage points.

The goal of my technical capstone group was to design a land development project that would be financially profitable and have a LEED certification on a portion of a parcel of land neighboring a new metro station in Reston, VA, a suburb of Washington DC. The parcel of land

originally had 2 small office buildings on it and the main assumptions for the project was that the maximum floor-to-area ratio (FAR) had been increased significantly, thus allowing for a more densely developed parcel. We designed a development with three residential towers on top of a parking garage and retail with a silver LEED rating, two office towers on top of another parking garage and retail with a gold LEED rating, and some pop-up retail which was designed for a gold LEED rating.

In contrast, my STS thesis investigated the effect of green building certifications on low income communities. Unfortunately, much of the research lead me to the conclusion that green building certifications, particularly without extensive community outreach, lead to green gentrification, which has numerous negative impacts on low income communities from economic problems to health issues.

Towards the end of my capstone project, I was dismayed to realize that in order to plan a financially successful development, the average unit rent for the apartment buildings would have to be about three times the minimum wage monthly salary for Virginia. In the future more research could be done on how to make financially successful, green developments that are accessible to more socioeconomic classes.