

**Thesis Portfolio**

**Un-fantastic Plastics: An end-of-life analysis of the University of  
Virginia's Solid Waste Management System**  
(Technical Report)

**The Challenges of Single-Use Plastic Bans on  
Historically Marginalized U.S. Communities**  
(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science  
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## **Sociotechnical Synthesis**

The technical project was completed in collaboration with four other Civil Engineering students under the supervision of two advisors. Because of Virginia's recent single-use plastic ban, our project focused on the waste streams at the University of Virginia and the efficacy of landfill alternatives. Alongside Facilities Management and UVA Sustainability, we developed a comparative analysis of these alternatives while adhering to the goals of the university. The first phase of the project focused on analyzing the solid waste management system used prior to the COVID-19 pandemic and the SUP ban. In the second phase of the project, we analyzed the post-ban trends and developed a model for possible system configurations that would meet the relevant goals held by UVA.

The research project that I chose for my STS paper focused on how single-use plastic bans affect historically marginalized communities in the United States. The research focused primarily on how the sustainability movement as a whole reinforces ableism and discriminates against people based on their socioeconomic status. The paper will address both issues that arise for such groups, and potential solutions to mitigate the negative implications that bans will have. For this analysis, the SCOT framework in STS will be used to better understand the ethical implications of such bans on marginalized groups.

The primary link between the technical and STS projects is the ban on single-use plastics (SUPs). While the technical project focuses specifically on the UVA community and the STS paper looks at the implications on the United States as a whole, both are predicated on the impacts that SUP bans have on their respective communities. The technical project takes an analytical approach in comparing landfilled plastic waste to the alternatives that arise when SUPs are no longer viable for the University. Conversely, the STS paper takes a far more human and

ethics-based approach to understand how the bans influence specific communities, focusing less on the environmental impacts that plastic waste has. However, both address potential solutions to their respective issues and communities, taking a holistic approach to understanding environmental issues.

In working conjunctively on these projects, I was exposed to the issue of SUP bans from many angles. I approached the project believing that such bans were an infallible solution to an evasive issue in the United States. However, both projects allowed me to see the reality of such situations. For the University community specifically, it was enlightening to understand how alternatives to landfilling such as recycling and composting are not always without their own consequences. In doing research for the STS paper, I was struck by the backlash against the current environmental movement and grew to understand the arguments in favor of keeping certain single-use plastics for the benefit of overlooked communities. Ultimately, I found that these two projects allowed for significant growth in my understanding of environmentalism and justice and opened my eyes to the realities of many of the resulting circumstances of SUP bans.