**Thesis Project Portfolio**

# Old Ivy Road Mixed-Use Development

(Technical Report)

# Building Our Communities Better - How Housing Can Be Sustainable

(STS Research Paper)

An Undergraduate Thesis

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## Executive Summary

As the world's population surges towards unprecedented levels, the demand for sustainable and affordable housing becomes increasingly urgent. In response to this pressing need, my technical research report, *The Old Ivy Road Mixed-Use Development*, delves into the design of a mixed-used residential development with commercial spaces. In response to the housing shortage in Albemarle County, it provides residents across all income levels with a community that caters to their needs and provides a model for sustainable urban development. Simultaneously, my STS (Science, Technology, and Society) research paper explores the complex interplay between technical solutions and socio-cultural dynamics in the realm of housing development. It presents the problem at hand and seeks to answer the question, *"How can the design and implementation of a new residential development promote environmental sustainability, community integration, and affordability while meeting regulatory requirements?"*. The connection between these two projects lies in their shared objective of addressing the multifaceted challenges of housing instability through interdisciplinary approaches and perspectives.

In my technical research report, my group's design challenge involved creating a mixed-use residential and commercial development on a 35.8-acre parcel along Old Ivy Road, aiming to accommodate 250 to 300 housing units alongside two commercial buildings and necessary amenities. Design objectives encompassed green infrastructure integration, traffic planning, stormwater management, and construction planning. In response to Albemarle County's pressing need for affordable and sustainable housing, our project aimed to align with their definition of affordability while addressing rising home prices and rental rates. However,

community concerns regarding safety, traffic congestion, and potential gentrification have emerged, emphasizing the need for careful planning and community engagement. Despite these challenges, it's anticipated that such developments will alleviate housing costs and enhance accessibility, underscoring the importance of ongoing public dialogue and stakeholder involvement.

Throughout the design process, our team navigated a range of complex decisions, balancing regulatory constraints with opportunities for creative problem-solving. Iterations in the design were driven by new information from our industry mentors and internal team discussions. One crucial decision early on was to implement a roundabout near the site entrance for safety and efficiency, reducing crash points and traffic congestion. Addressing the affordable housing shortage in Charlottesville and Albemarle, our project not only increases housing supply but also incorporates community amenities and green transportation options to enhance livability. By fulfilling housing requirements while addressing community concerns, such as traffic management and environmental preservation, our project demonstrates a thoughtful approach to mixed-use development. Through careful coordination and community engagement, we ensured accessibility and inclusivity, meeting the needs of diverse socioeconomic groups and contributing to a sustainable future for the area.

My STS research report aims to investigate sustainable urban development, particularly focusing on affordable housing, amidst the projected global urban population increase. The central question explores how to design and implement residential developments that promote environmental sustainability, community integration, and affordability while meeting regulatory standards. Through case studies, including a proposed mixed-use residential development in Albemarle County, Virginia, the report aims to showcase how the Science, Technology, and

Society (STS) framework of Actor-Network Theory (ANT) can guide the design and implementation process by understanding and integrating diverse stakeholders' interests. By examining international, national, and local perspectives and utilizing ANT's principles of translation to align goals with stakeholder interests, the research seeks to propose strategies for creating sustainable, integrated, and affordable communities. Through a comprehensive review of literature and case studies, the report aims to advocate for a holistic approach to residential development that enhances the quality of life for inhabitants.

This report delves into how new residential developments can balance environmental sustainability, community integration, affordability, and regulatory compliance. Through a comprehensive literature review and examination of a local case study, the research provides insights into proposed solutions. Globally, the study highlights the importance of sustainability in affordable housing initiatives, as evidenced by various strategies such as zoning reform and housing subsidies. In China, key sustainability performance indicators (KSPIs) offer a framework for integrating sustainability into housing projects. Similarly, in the United States, a multifaceted approach involving zoning reforms, land value taxes, and housing subsidies is explored to address affordability issues. Locally, Albemarle County's housing initiatives exemplify collaborative efforts to overcome regulatory barriers and promote inclusive housing development. Through the lens of Actor-Network Theory (ANT), the study reveals the complex network of actors and policies shaping housing development, emphasizing the need for collaborative approaches. The conclusion underscores the need for innovative solutions and ongoing monitoring to address the affordable housing crisis effectively. Ultimately, the study advocates for collective efforts to create inclusive, sustainable communities where all residents have access to safe, affordable housing.