

Exhibit D – Research Project Requirement Template

The Infrastructure-Perception Gap: Examining the Role of Transportation Infrastructure in Mediating Safety Perceptions for Active Travel

Recipient/Grant (Contract) Number: The University of Texas at Austin/Grant # 69A3552344815 and 69A3552348320

Center Name: National Center for Understanding Future Travel Behavior and Demand (TBD)

Research Priority: Improving Mobility of People and Goods

Principal Investigator(s): Rounaq Basu (PI); Subhrajit Guhathakurta (Co-PI)

Project Partners: City of Atlanta Department of Transportation; Propel ATL

Research Project Funding: \$125,358

Project Start and End Date: 8/1/2026 - 8/31/2027

Project Description: While extensive research demonstrates that perceived safety influences active travel behavior, the relationship between safety perceptions and transportation infrastructure characteristics remains inadequately understood. Traditional safety studies rely primarily on crash data, which often fails to align with how travelers perceive safe environments. This research addresses a critical gap by investigating how transportation infrastructure mediates safety perceptions among active travelers and subsequently affects their travel behavior and route choices. The study poses three key questions: (1) How does transportation infrastructure shape safety perceptions of people walking, biking, and rolling? (2) How, and to what extent, does infrastructure affect travelers' mode and route choice decisions? (3) Do more complete streets enhance safety perceptions and actual travel safety? It builds on the team's existing computer vision analyses of streetscape factors and travel behavior studies across Atlanta, Berlin, Boston, and Chicago, to develop person-centric measures of perceived safety. The approach leverages established databases and tools for characterizing transportation infrastructure and built environments, along with discrete choice models representing travel behavior decisions. Unlike previous studies that included safety-related variables without isolating perceived safety measures, this research will explicitly examine the relative importance of transportation infrastructure versus broader built environment factors. The findings will inform targeted infrastructure investments to enhance safety perceptions and promote active transportation, contributing to more effective complete streets design and implementation strategies.

US DOT Priorities: The proposed project focuses on advancing one of the core priorities of US DOT - safety for all road users. We aim to contribute to this goal by improving our understanding of travel behavior within the context of technological, cultural, demographic, and environmental concerns. Specifically, this project seeks to better understand active travel behavior and how perceptions of safety are shaped by transportation infrastructure and the built environment. This project also advances innovative approaches in data collection, modeling, and analytic tool development through the lens of user needs, which are important aspects of US DOT's mission.

Outputs: We anticipate the creation of annotated active travel network datasets with safety perception scores that can be used for route planning, along with the public release of a navigation tool that can provide decision support through tailored recommendations on the safest routes, as opposed to the shortest routes, based on the user-centric perceived safety score that we plan on creating for each link in the network. We also intend to release our validated algorithms through GitHub so that they can be repurposed for calculating potential safety perception scores in new study areas. We aim to publish two research articles in peer-reviewed journals and share our findings more broadly through presentations at city and transportation departments for transferring knowledge about safety perceptions of active travel and the role of complete

streets. We will also share our findings in a more practitioner-friendly manner through a storymap-like format on a publicly accessible website. We plan to engage our civic and community partners in Atlanta throughout this project to both seek input as well as share our findings so they can take the next step forward in terms of implementation.

Outcomes/Impacts: We expect several broader outcomes from this project including (1) better alignment of transportation infrastructure to concerns about pedestrian safety; (2) increasing appeal of active travel; (3) better knowledge of where complete streets will be needed; (4) better planning to leverage the commercial potential of areas with high pedestrian and bicycle traffic; and (5) better management of transportation infrastructure to avoid conflicts across different transportation modes and improve safety for all road users. We anticipate our findings will inform the upcoming Comprehensive Transportation Plan for the City of Atlanta.

We expect our research will generate new knowledge to induce more active travel, help reduce pedestrian-vehicle and bicycle-vehicle crashes, increase the appeal of complete streets, and make active travel more sustainable and safer. Our estimation of the impact of transportation infrastructure on safety perceptions can inform investment decisions and guide better cost-benefit analyses of different types of transportation infrastructure projects. Moreover, this project can improve transportation planning and design practice through the development and application of a framework that integrates both objectively observed safety outcomes (such as crashes) with subjectively perceived safety.

Final Research Report: A URL link to the final report will be provided upon completion of the project.