

Project Groundwork

Advancing the technical understanding and financial feasibility of underground municipal utility corridors for the combined distribution of electricity and broadband internet.

The Biden administration has pledged over a trillion dollars in federal support to repair and improve American infrastructure. Large infrastructure projects present a unique opportunity to evaluate existing infrastructure and better prepare our communities for growing challenges: extreme weather events, a rapidly-electrifying energy system, new mobility networks, and a societal requirement for high-speed internet access.

High-density cities have been undergrounding electric and telecommunication infrastructure for over a century to enhance reliability, but the greater per capita cost of undergrounding in less dense areas has resulted in a patchwork grid of vulnerable above-ground wires. The advancement of physical and digital tools for construction and network operation, along with rapidly changing energy demands, necessitate an update to the cost-benefit models for underground network construction. Our research will help communities and utilities assess new construction, maintenance, and ownership models for building resilient 21st-century electric and broadband networks.

Project Groundwork examines the costs and benefits of a set of innovative strategies for undergrounding utility lines in non high-density cities. These strategies include:

- Sharing utility infrastructure between electricity and broadband.
- Shifting underground utility infrastructure out of the road and into the public right-of-way.
- Laying cable on existing surfaces and covering with cycling paths.
- Micro-trenching, horizontal drilling, and innovative wireless technologies to connect the network to individual homes and businesses.

The research team will construct a model that optimizes construction of new utility corridors on the basis of estimated cost and projected benefits, including enhanced reliability of electric service and access to broadband. The team will then use this model to analyze investment scenarios based on mapping data from towns and cities across the US.

Initial research efforts are focused on supporting the municipal utilities that provide service to roughly 2,000 communities and 50 million Americans across the country. Municipal utilities operate with distinct regulatory, operational, and financial advantages to lead the way on grid modernization and broadband deployment.

Project Groundwork has received an initial research grant of \$123,198 from the American Public Power Association (APPA) through their Demonstration of Energy & Efficiency Developments (DEED) grant program. The grant funding was made possible thanks to the partnership and support of the Massachusetts Municipal Wholesale Electric Corporation (MMWEC) and their 20 member utilities who served as the official grant applicant.

The research team is a collaboration between Groundwork Data, a sponsored non-profit public infrastructure research entity, and the University of Massachusetts Amherst Energy Transition Institute (ETI). Groundwork Data is led by Mike Bloomberg, Urban Technology Researcher for the Jacobs Institute at Cornell Tech. The ETI team is led by Executive Director Anna Goldstein, and Professors Jay Taneja and Jimi Oke, along with a team of graduate students.