

**UNification for Underground resilience Measures**  
**Midtown East, Manhattan & Sunset Park, Brooklyn (NYC)**

American Association of Geographers 2022 Annual Meeting

**THE COMPLEX GEOGRAPHY OF UNDERGROUND INFRASTRUCTURES:  
IMPLICATIONS FOR COLLABORATIVE PUBLIC SERVICES**

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Research Partners

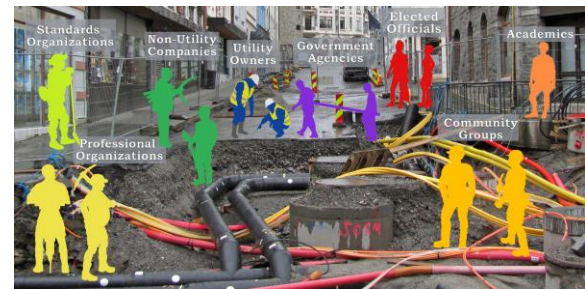


New York University

Civic Partners



Broad Community Engagement



UNUM project,  
P. Gmelch



Electric and wastewater  
infrastructure, NYC

**Problem Identification**

- Underground and above ground infrastructures are interconnected, exacerbating single failure points
- Natural hazards impact the underground

**Project Goals**

- Investigate and quantify benefits of systemwide, integrated underground utility data
- Employ a natural hazards focus and context to identify single points of failure and improve resilience
- Develop community engagement and collaboration: 45 stakeholders, 2 contrasting communities, 183,000 residents
- Assemble two pilot data sets to prepare study sites against natural disasters
- Promote scalability and transferability to other areas

**Research and Community Areas of Inquiry**

- What are the risk factors for underground infrastructure failures, how do these failures propagate among systems and how can they be mitigated?
- To what extent does data change over time and what are the relevant cycles and scales of those changes?
- What are the communities' impediments to effective, long-term, and scalable data sharing?

**Stage 1 Achievements.** Identification of and meetings with a wide range of stakeholders with considerable interest in the project and its success; data sharing agreements covering water, sewer, electric, gas, telecommunications, etc., and beginning to overcome hesitancy towards sharing underground asset data

**Stage 2 Priorities, Selected Results, and Outputs**

- Developing a framework for community driven process for engagement and collaborations with utility companies, city agencies, and our consultants to align utility data with the Model for Underground Data Definition and Integration (MUDDI) for infrastructure, environment and community elements
- Obtaining feedback from all stakeholders to assess broader uses of this methodology for disaster planning and emergency management in New York City including focus groups and surveys
- Designing a roadmap for city-level implementation of a subsurface data model to build resilience for natural hazards through community and New York University collaboration
- Creating data sharing agreements that incorporate security protocols
- Employing multiple methods involving GIS, Digital Twin, artistic visualizations, MUDDI model; drawing from federal, state and local resources, such as Building Information Management, Critical Infrastructure Response Information System, and others
- Developing and implementing education and training for data mapping and building collaborations
- Promoting scalability and transferability of results

**Sources:** The UNUM project and its presentations; see <https://wp.nyu.edu/unum/>