



Roadway.2—A Work in Progress

A Town+Gown Symposia Event

New York Public Library Branch @ 455 Fifth Avenue

February 12, 2013 (8:30 a.m. to 10:30 a.m.)

Background. This event represents the beginning of the second action research cycle originating with a 2010-2011 Town+Gown project that explored how the City might incorporate long-term life cycle cost and full cost/benefit analyses to evaluate proposed environmentally sustainable roadway projects. One year ago,¹ a conversation about technical and political aspects of life cycle and cost-benefit analyses in public capital programs morphed into a collectively-experienced introduction to the “on the ground” reality of New York City streets. Practices under the roadway and related policies, involving a complex set of relationships among the City, as owner of the streets on behalf of the public, and the private and public utilities operating beneath those streets, emerged as an area for further research because they appeared to be directly connected to an apparently dysfunctional data environment.

In other words, the perception that the City’s roadway infrastructure rarely approaches its technical useful life period for a variety of unresolved reasons, including the volume of cuts made into the roadway on behalf of all the utilities, has rendered the collection of certain life cycle cost data beside the point. As the conversation last February focused on

the impact of utility cuts and technical design solutions heretofore deemed infeasible, “next steps” pointed, first, to understanding the nature of the regulatory environment in which the private utilities operate and, second, the geospatial characteristics of intrusions into roadway infrastructure.

The Law of Regulated Utilities. Beginning last summer and continuing into the fall semester, Tierrence Charles, Michael Brantl, Lior Sapir and Alexander Goldman, all from Brooklyn Law School, have worked on legal aspects of the research question entitled *Investigations into Designing the “Below-the-Roadway” Relationship of Public Owners/Utilities and Private Utilities*. They specifically focused on the extent to which the relationships among the private utilities and the City with respect to the roadway are governed by state law and/or public utility regulatory commission law and the extent to which they are governed by local law and/or agreement by the parties. In addition, they focused on how these laws work and their historical development.

A compendium of their work² contains Charles’s general overview of the law of private utility regulation linked to the evolution of economic theories over time and Brantl’s overview of New York State law governing gas, electricity and telephone commodities from invention to the present.

¹ See http://www.nyc.gov/html/ddc/downloads/pdf/town_and_gown/1.%20CURRENT_PROGRAM/6.%20PRECIS_3.pdf for a copy of the 2/22/12 précis document ; February 22, 2012

² Available with the release of *Building Ideas, Volume 4*, next year.

Brantl’s overview along with Sapir’s index of public roadway law permitted them to generate a chronological chart, included in the compendium, of three private utility commodities and developments in roadway law, showing their evolution and relationships in “real” time across commodity type.

In order to identify and explore the maximum number of inter-related issues, Sapir and Alexander responded to a hypothetical fact pattern that attempted to flush out the operational and financial impacts that adopting a multi-purpose utility corridor design under the roadway³ would have on a fictional horizontally-integrated private utility, with telecomm (not cable⁴), gas and electric commodities, each separately regulated at the federal and state levels of government.

The hypothetical analyses reveal aspects of the problem of recursive collective action, which has been described as a problem created by “aggregating multiple individually rational decisions into collectively self-defeating or event self-worsening outcomes” [which can be solved by] the presence of a collective agent empowered to act on behalf of all parties to optimize joint outcomes.”⁵ Systemic elements that either create or exacerbate the conditions for recursive collective action under the City’s roadways include:

- multiple commodities and provider entities individually operating within the same constrained physical subterranean spaces:
 - commodities have different physical characteristics and technological histories
 - provider entities’ operations within the City are often a component of larger multi-jurisdictional operations
 - provider entities have different legal relationships and histories with the City
 - all provider entities have little experience of collaboration with each other, each focusing on applicable state and federal regulatory agencies as required and with the City pursuant to each entity’s set of operative legal documents
- multiple regulation at all levels of government—federal, state and local—of each set of commodity and provider entities
 - high level of regulatory complexity
 - unexamined local level impacts of recent federal deregulation initiatives

³ The multi-purpose utility corridor, a civil engineering design solution, has been the topic of work in the past by NYU/Poly’s Civil Engineering Department over the years.

⁴ Goldman provided, as a supplement to the hypothetical analyses for the telecomm commodity, a memorandum focusing on cable.

⁵ Robert C. Hockett, *It Takes a Village: Municipal Condemnation Proceedings and Public/Private Partnerships for Mortgage Loan Modification, Value Preservation and Economic Recovery*, Cornell Law School, Legal Studies Research Paper Series, No. 12-12 (<http://ssrn.com/abstract=2038029>), p. 2.

The City’s current roadway paradigm consists of public ownership of the roadway itself, from the road surface on through to the dirt beneath, in trust for use by the public, with multiple subsurface public uses (mass transit and water and sewer facilities) and multiple private uses that are publicly regulated at federal and state levels due to the public purposes involved and also regulated at the

local level via various contract instruments.⁶ Focusing on this recursive collective action problem through the lens of public policy analysis, the City's current roadway paradigm creates negative externalities that can be translated quantitatively into costs that cannot be otherwise avoided. Some of these unavoidable costs, such as repeated roadway repairs and roadway reconstruction projects that cannot approach their technical useful lives, are financed at the municipal level by taxpayers. Other unavoidable costs, such as repeated repairs to and expansion of private utility infrastructure (both of which require digging into and repairing the roadway) and protecting existing utility infrastructure during the City's roadway reconstruction projects, are financed by the same people or entities, this time as utility ratepayers.⁷

Other Projects in Queue. There are several related Town+Gown projects in progress that focus on other aspects of the roadway:

- Columbia/GSAPP. A graduate spatial information design class will be mapping utility permit data to show the intensity of utility cuts across the City and over time, creating an ability to consider policy, practice and design options based on intensity of activity and location.
- Manhattan College/Business School. Prof. Patrick Jeffers, who presented his project at the February 22, 2012 symposium event, continues work with DOT, the Port Authority and DDC to identify methodologies that would facilitate rigorous life cycle cost analyses of

roadway projects, with an ability to use other data to compensate for the absence of actual life cycle cost data, and permit useful comparison of roadway design options during the capital planning stage.

- University of Buffalo/Planning. A graduate student, who interned at DDC during the summer, will continue her "bottom up" life cycle cost analysis of two sustainable roadway designs—bioswales and permeable pavement gutters.
- Manhattan College/Business School and Lemoyne College. The fuzzy-rule case-based reasoning project that began as a result of the April 25, 2012 symposium event will focus on the City's capital road program as the case study to analyze the application of this methodology to the City's capital planning and budgeting process.

Chart of Initially Identified Options for the Symposium Conversation. During the course of the research projects summarized above, various operational and design options have surfaced as ways to resolve aspects of the recursive collective action problem of the City's roadways. The chart below outlining these options will be the subject of conversation for the purposes of identifying future areas for research in the next academic year.

⁶ These would be franchises, which are a stylized form of contract, as well as regular contracts.

⁷ The baseline recursive collective action dysfunction that exists within current roadway policy and practice will, in some areas of the City, become clearer as the latest civic discourse, infrastructure resiliency, begins to focus on technical solutions.

Chart for Discussion Purposes

Strategy	Issues to Consider for Evaluative Analysis
<i>Protocols</i>	
Defined utility lane protocol (past practice revived as unimplemented Lower Manhattan Utility Raceway concept)	<ul style="list-style-type: none"> • <i>Comprehensiveness of solution/relation to geospatial incidence</i> • <i>Technical feasibility—initial and ongoing</i> • <i>Implementation</i> <ul style="list-style-type: none"> ○ <i>Operations/administration</i> <ul style="list-style-type: none"> ▪ <i>coordination within city and among city and utilities</i> ▪ <i>enforcement</i> ○ <i>Costs</i> <ul style="list-style-type: none"> ▪ <i>life cycle cost and cost benefit analyses (avoidable costs)</i> ▪ <i>public-private infrastructure finance issues</i>
Moratorium period for utility work (emergencies excepted) after road reconstruction	<i>See above</i>
Mandated cut and repair methodologies	<i>See above</i>
Franchises and contracts ⁸	<i>See above</i>
<i>Design/Technology</i>	
Multi-purpose utility corridors	<i>See above</i>
Parametric solid modeling (building information modeling) for horizontal structures	<i>See above</i>
Pre-cast pavement slabs	<i>See above</i>
Utilities in sidewalks	<i>See above</i>

⁸ Impact of federal regulations (federal pre-emption) makes local contracts between regulated entity and municipality a feasible mechanism to resolve some operational issues under the roadway; historical practice at the City has been varied.