

Town + Gown Building Ideas

5

Volume 5

2013-2014 | Systemic Action Research in the Built Environment

Building Ideas

Volume 5

**Systemic Action
Research in the
Built Environment**

**Academic Year
2013-2014**

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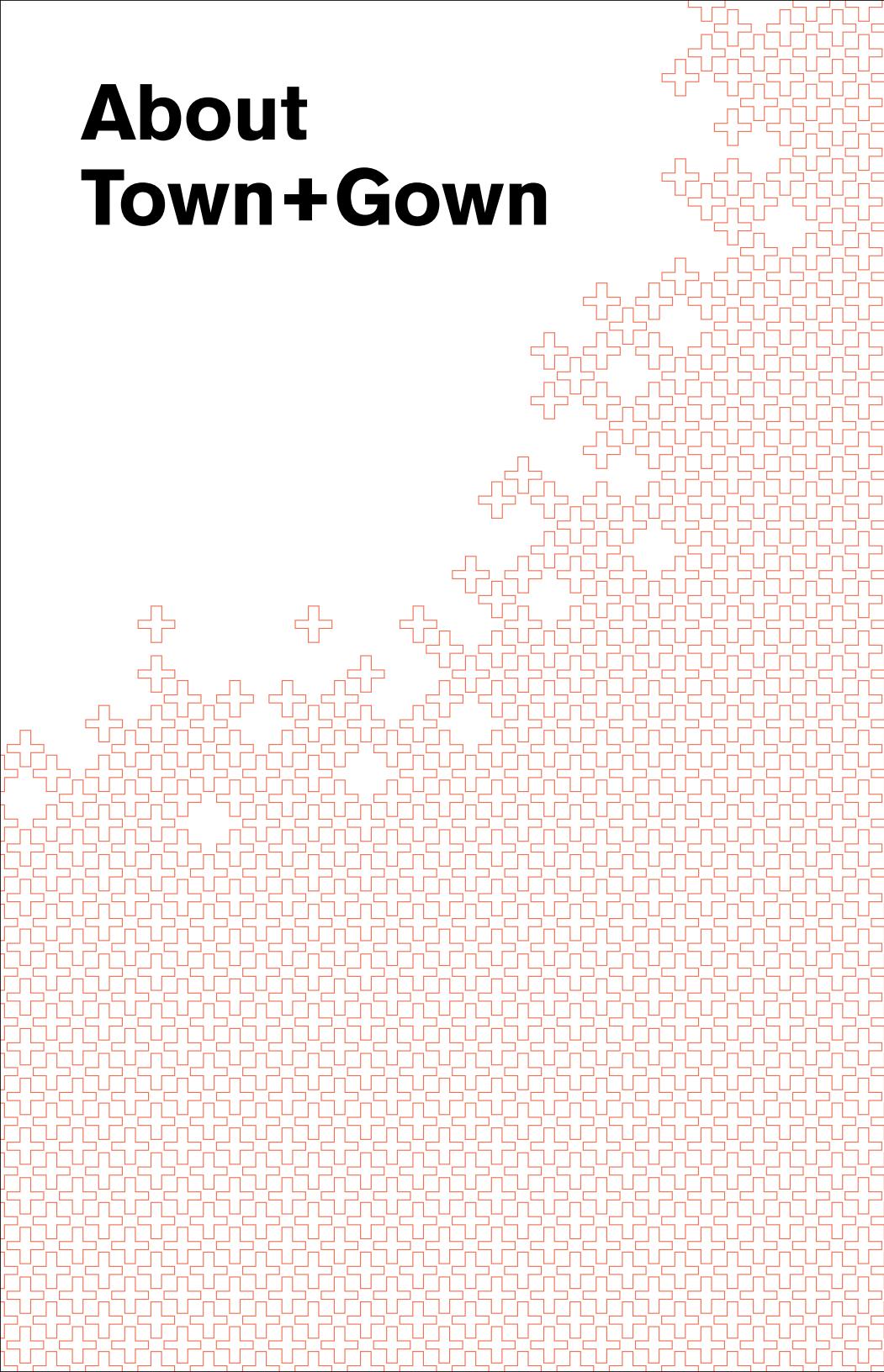
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About Town+Gown



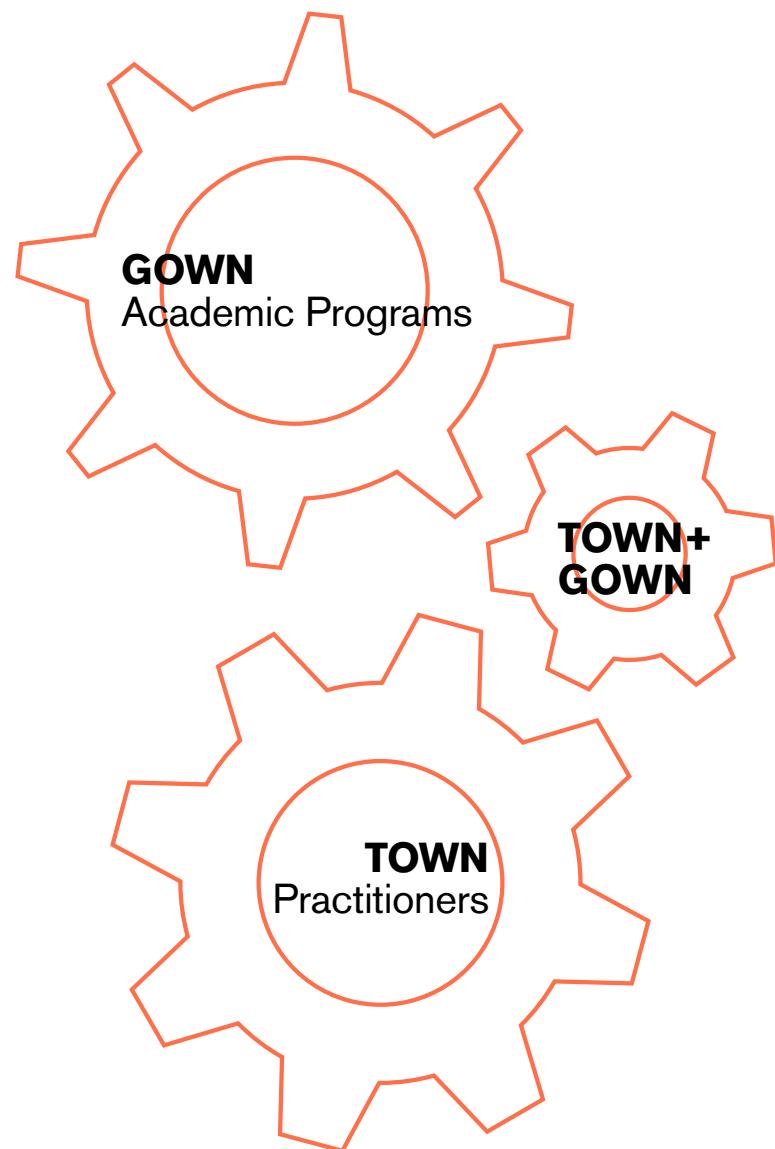
Town+Gown is a systemic action research platform linking academics and practitioners to increase applied built environment research across disciplines and sectors. As new and previously unresolved built environment issues become apparent, so too the unmet need for applied research to increase common understanding. Town+Gown scales long-standing structural hurdles—low levels of investment, low levels of public sponsorship, especially at the local government level, inadequate linkages between research and application and fragmentation in both industry and academia—that have made increasing applied research difficult. The city's inter-related physical and governance setting serves as a laboratory for applied research in the built environment, which is a complex and dynamic social system with "wicked problem" characteristics that are further complicated by issues of geographical and temporal scale. Thus, built environment research requires active attention to context and multiple modes of inquiry, research methodologies and types of academic-practitioner collaborations, all operating within a "interacting open system" and "over an extended—virtually an unbounded—period of time."¹ Systemic action research, a form of cooperative inquiry involving both practitioner and academic as equal partners in knowledge creation, addresses the continual need to integrate research within the broader context and provides a "learning architecture"

¹Horst W. J. Rittel and Melvin M. Webber, "Dilemmas in a General Theory of Planning", *Policy Sciences*, 4 (1973), pp. 155-169.

in which system stakeholders can bring about changes in practice and policy based on research results.²

The Town+Gown Research Agenda is one mechanism to engage academics and practitioners on applied research and encompasses a non-linear process, with multiple perspectives, research methodologies and types of academic-practitioner collaborations. The purpose of generating research results, within a broad, open and cyclical process, is to increase the common knowledge base and support systemic change over time. At the end of each academic year, Town+Gown abstracts the results of all completed projects in this annual review, *Building Ideas*, which is disseminated within the Town+Gown community, setting the stage for reflection among participants and future action based on research. Following the release of *Building Ideas*, the annual symposia series provides a space for Town+Gown members to explore the topics raised by completed projects so that they may collectively use research results to inform future changes in policy and practice. The action research methodology facilitates change through “the use of small working groups around

participants’ practice—what action learning practitioners call ‘action learning sets’—with repeated cycles of action-reflection.”³

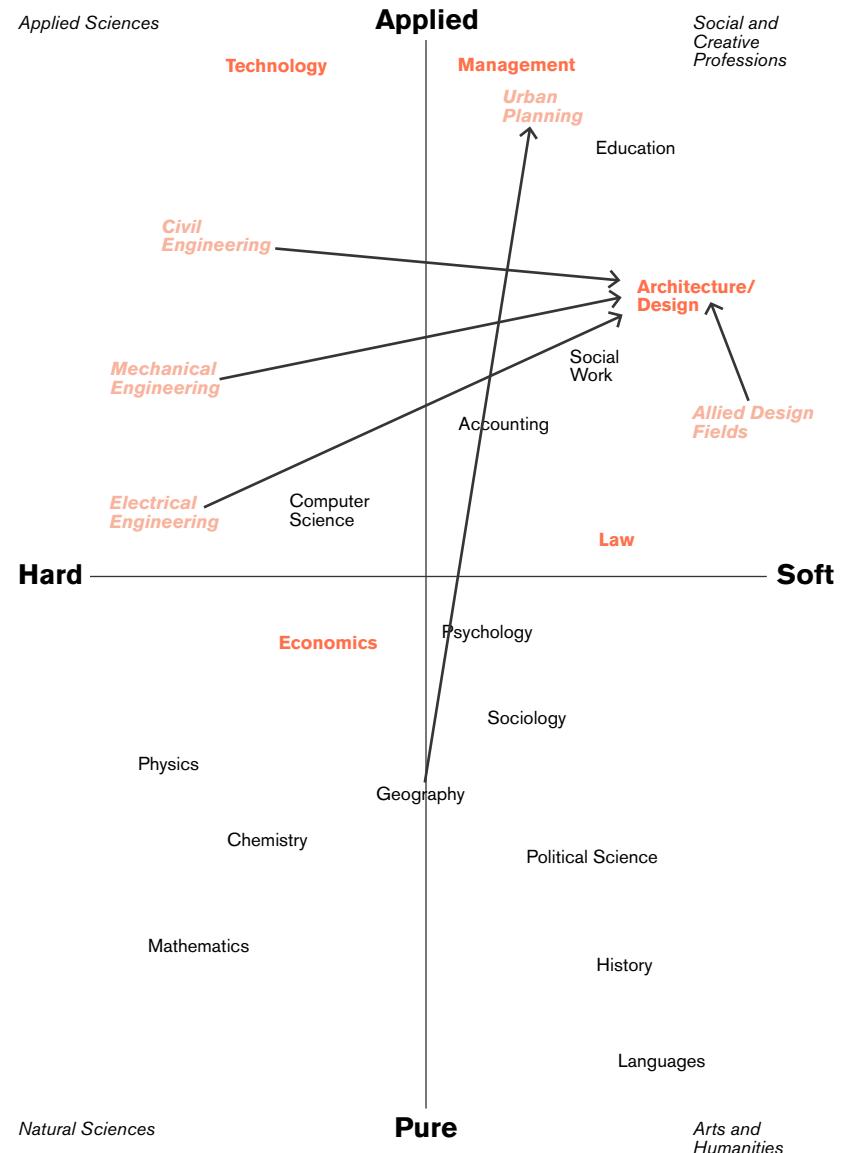


²Danny Burns, *Systemic Action Research: A Strategy for Whole System Change* (Bristol: 2007), p. 1.

³Sonia Ospina, Waad El Hadidy and Amparo Hofmann-Pinilla, “Cooperative Inquiry for Learning and Connectedness,” *Action Learning: Research and Practice*, July 2008, 5:2 (Taylor & Francis), pp. 131-147; online reprint, Rider 6-A, https://upcommons.upc.edu/bitstream/handle/2099/5810/I8_pap_Hofmann-Pinilla.pdf, accessed 04-11-17 @ 12:28 p.m.

At the end of its fifth year of operation, Town+Gown has hosted or captured a total of 93 completed projects with 31 practitioner partners and 35 academic programs and departments and has developed and hosted three series of symposium events, consisting of 13 separate events, using completed research projects as the foundation for open-ended conversations among Town+Gown members. This Volume 5 of Building Ideas represents the capstone of Town+Gown's 2013-2014 academic year. See the Town+Gown website at www1.nyc.gov/site/ddc/about/town-gown.page.

This Volume 5 returns to an earlier format that was organized along the lines of the six disciplines—Management, Geography, Economics, Law, Technology and Design—that Town+Gown uses to explore the recognized inter-disciplinary Built Environment field. Proceedings from symposium events are recorded separately in Volume 5.



Biglan Disciplinary Model from Paul Chynoweth, The Built Environment Interdiscipline: A Theoretical Model for Decision Makers in Research and Teaching, Proceedings of the CIB Working Commission (W098) Building Education and Research Conference, Kowloon Sangri-La Hotel, Hong Kong, April 10-13, 2006, Rider 9-A, [http://usir.salford.ac.uk/12453/2/Interdiscipline\(SS-2009\).pdf](http://usir.salford.ac.uk/12453/2/Interdiscipline(SS-2009).pdf), accessed 04-11-17 @ 12:08 p.m.

Town+Gown Index of Abbreviations

Gown

BLS/Clinic—Brooklyn Law School/
Corporate and Real Estate Clinic
CCNY/Sustainability—
The City University of New York/
Sustainability in the Urban Environment
Columbia/Earth Observatory—
Columbia University/
Earth Institute/
Lamont-Doherty Earth Observatory
Columbia/SIPA—
Columbia University/
School of International and Public Affairs
Fordham/Business—
Fordham University/
Gabelli School of Business
New School/Parsons—
The New School/
Parsons the New School for Design

New School/Milano—
The New School/
Milano School of International Affairs,
Management, and Urban Policy
NYU/CUSP—New York University/Center for Urban Science and Progress
NYU/Furman—New York University/
Furman Center for Real Estate and Urban Policy
NYU/Poly—New York University/
Polytechnic Institute
NYU/Tandon—New York University/
Tandon School of Engineering
NYU/Wagner—New York University/
Wagner School of Public Service

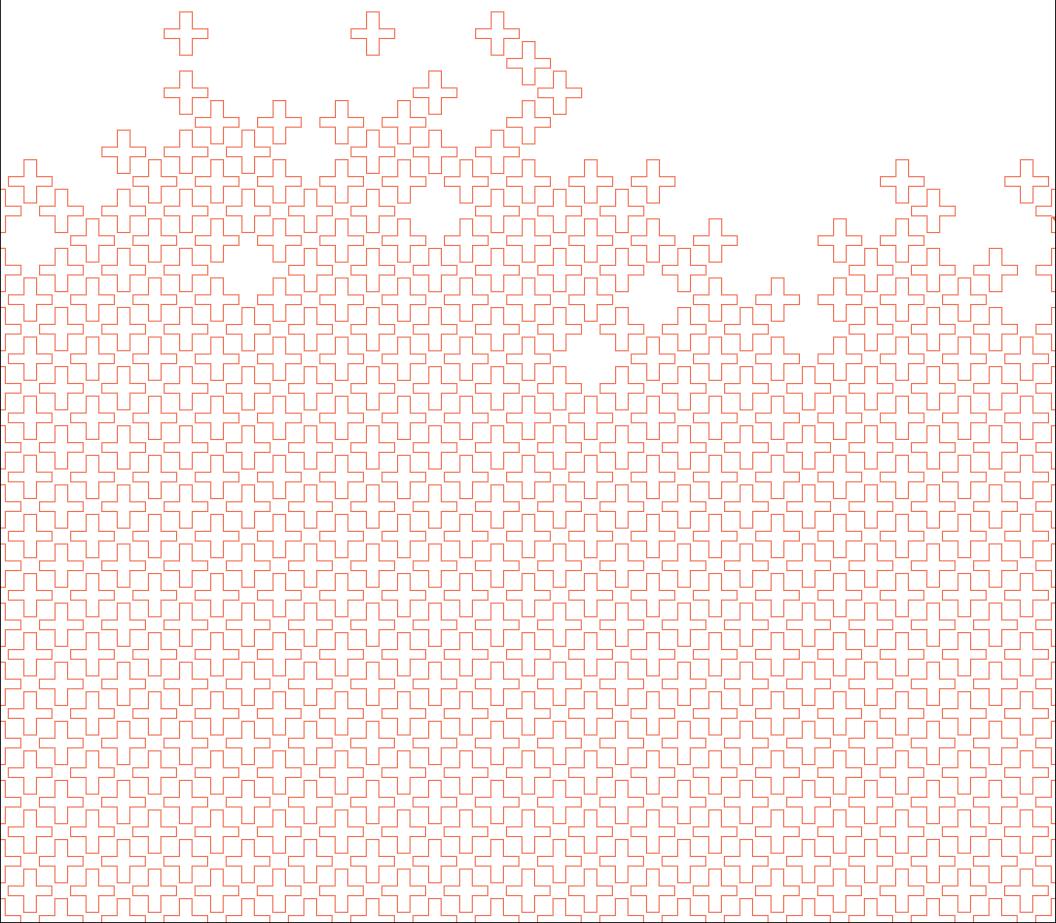
Gown (cont.)

Pratt/Architecture—
Pratt Institute/School of Architecture
Pratt/Communications Design—Pratt Institute/School of Design/
Communications Design
Pratt/Graduate Center—
Pratt Graduate Center for Planning and the Environment
St. John's—St. John's University
University of Buffalo/Planning—University of Buffalo/School of Architecture and Planning

Town

AIGA/NY—American Institute of Graphic Arts/New York Chapter
Amplifier—Amplifier Project
CB 14—Brooklyn Community Board 14
MGMT—MGMT. design
MOEC—Mayor's Office of Environmental Coordination
NYC DCP—New York City Department of City Planning
NYC DDC—New York City Department of Design and Construction
NYC DEP—New York City Department of Environmental Protection
NYC DOT—New York City Department of Transportation
NYC OMB—New York City Mayor's Office of Management and Budget
NYC Ops—New York City Mayor's Office of Operations
NYC Parks—New York City Department of Parks and Recreation

Dissemination: Abstracts of Completed Projects



Town+Gown disseminates research results, via *Building Ideas*, as one way to foster ongoing discussions. Many completed projects have served as the focus of collaborative symposia and other events that bring academics and practitioners together to focus on the results of research with an eye to future research and potential action. Since Town+Gown functions as a clearing house for applied research in the Built Environment, the abstracts contained in *Building Ideas* volumes serve as resources for practitioners and academics, reducing the need to re-invent the research wheel each time a project focusing on recurring systemic issues arises. *Building Ideas* presents the work of academic programs to a wider audience of built environment practitioners and showcases the work of academic researchers outside the academic sphere.

MAN- AGE- MENT

The projects that follow under Management primarily focus on the built environment from the perspectives of its archetypal participants—owner, designer, constructor and financier. A critical objective for participants is to align their various interests in budget, schedule, safety and quality to make individual projects successful, in a context where information asymmetries continually change. Practitioners adapt to changes “on the ground” and changes in materials, building methods and information technology by using an evolving menu of service delivery methodologies and various management theories, techniques and tools, not dissimilar to those found in other industries or sectors. Research projects involving public projects also include separate analytical issues related to the public planning, budgeting and financing processes.

DATA DRIVEN INFLUENCE: PUTTING DOLLARS TO WORK AT THE COMMUNITY BOARD LEVEL

Objective: Two cross-disciplinary public policy and communication design teams were tasked with developing a design-based systems approach to (1) to leverage a community board's annual budget functions so that quantitative and qualitative service delivery data it collects could help inform its budget requests up the line to its service agencies and (2) provide a methodology and designed resources for

Town CB 14

Gown New School/
Milano and Parsons

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the community board to educate its constituents on interacting effectively with "City Hall" from the neighborhood level. CB 14 assesses district needs from data gathered through service delivery requests made by community residents throughout the year, which consist of a mix of quantitative and qualitative data. Community residents may also call 311 for the same or similar requests, which aggregated data is expressed entirely in a quantitative manner, which is reported directly to service agencies' and impacts their own budget requests. This newer digital mechanism relates in some ways to the older community board mechanism, but the two separately generated data sets have become detached from each other. In addition, while 311 has become widely-known, due in part to the City's centralized approach to operating and publicizing it, the existence and functions of community boards, with formal budget responsibilities, have become relatively less known, even within their communities.

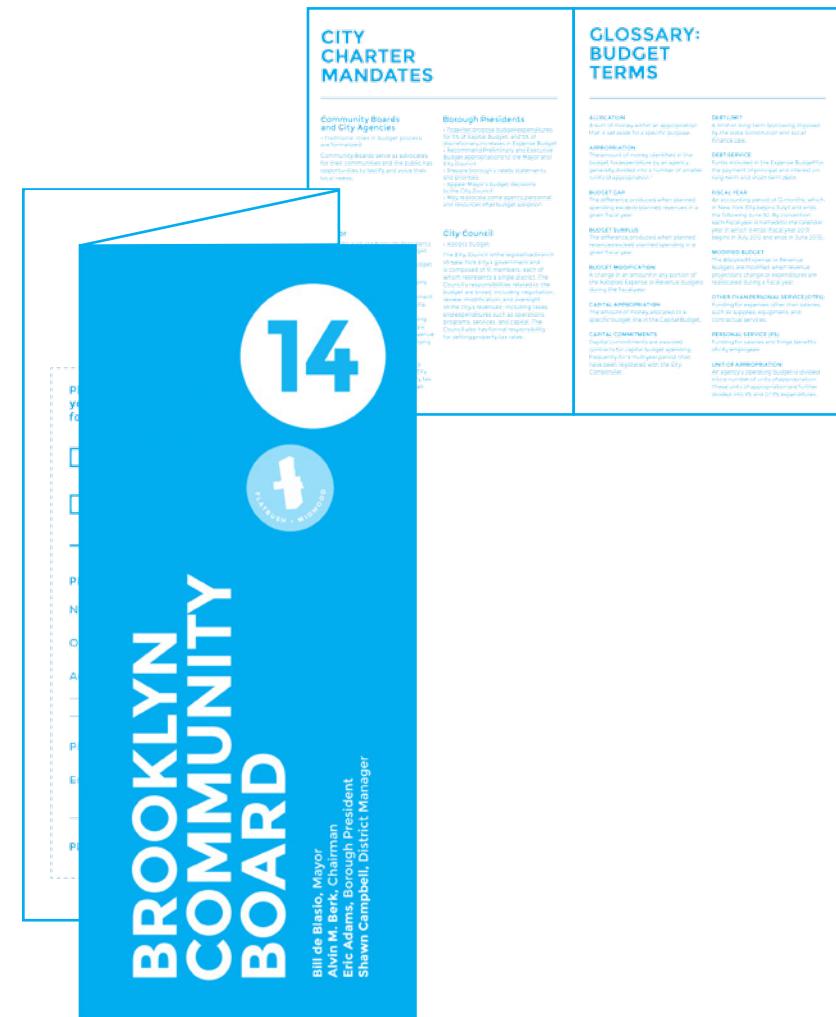
Methodology: The policy team members first conducted a literature review focusing in particular on best practices for managing open data, tools for community engagement, technology platforms and data trend analysis; performed a comparative analysis of the budget documents of all 59 community boards to identify common challenges and practices; and, developed and fielded a survey of community board district managers to obtain a comprehensive sense of how community boards can use qualitative data for budgeting and resident engagement. The design team members performed a design case study, considering elements such as hierarchy, scaling and sustainability, as the foundation for creating

efficient and effective community engagement and outreach materials for CB 14, inspired by The Center for Urban Pedagogy's Making Policy Public program, which uses the "poster" to articulate complex public policy issues in an accessible manner.

Findings: The teams recommended a series of solutions related to three identified key issues: data analysis, presentation and community engagement. The solutions acknowledged that open data cannot replace residents' mixed service delivery-derived data and sought to leverage the power of analysis to bridge the gap between purely quantitative 311 data and the mixed service delivery data and present resulting analyses more effectively within a citywide process. The team recommended reorganizing analytical tools in use and adding certain online web application elements to facilitate broader analysis of community issues and generate greater insight into them for citywide purposes. The presentation solutions facilitated communication of analytical results in a more visual way. The team also redesigned CB14's annual community district needs statement, which represents the "kick off" to the City's budget process, to graphs and tables showing potential correlations identified by the online mapping software applications. The community engagement solutions built on the enhanced data analysis capacity and presentation tools to develop template documents that visually enhance the way CB 14 can tell the story of the role it plays in the budget process and better engage with its district residents.

Next Steps: The solutions tools and techniques identified by the teams to support more robust

analysis were open source and free, permitting CB 14 to showcase district needs and trends and increase the persuasiveness of its budget process documents. CB 14 can use the designed case study document templates in its communications with its district residents. Broader application and use of these tools among the other 58 community boards would require citywide efforts.



LIFE CYCLE COST ANALYSIS AND GREEN INFRASTRUCTURE IN NEW YORK CITY

Objective: Earlier Town+Gown projects attempting to develop feasible life cycle cost benefit models ran into impediments largely due to the unavailability of cost data at the time. The first project focused on modeling NYC DOT's sustainable roadway design program, and the second project focused on modeling bioswales and permeable pavement gutters, two types of green infrastructure "add-ons" to standard roadway reconstruction projects. As both NYC DEP, with its 2010 Green Infrastructure Plan, and NYC DOT, with its sustainable roadway program, began to pilot and experiment with these "green infrastructure" elements, rudimentary cost and

performance data began to become available, providing the necessary conditions to demonstrate the feasibility of developing *and using* a life cycle cost benefit analysis model during the City's capital budget planning and adoption processes.

Methodology: Eshleman designed the model in the Excel program to be both simple and accessible. He incorporated standard capital asset life cycle methodology and theory into the model in order to permit capital planners and budget analysts to conduct cost effectiveness analysis in a way that would capture discounted initial and life cycle costs and physical performance. The costs included operations and maintenance costs and replacement costs of various project options, while the physical performance metrics included water capture under several rainfall scenarios. Eshleman used data from NYC DDC, NYC DOT and NYC DEP where available and comparable data from elsewhere as proxies.

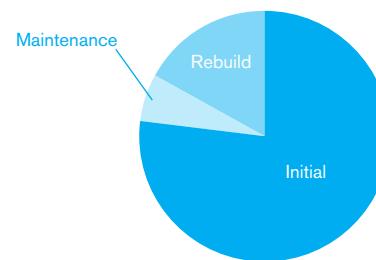
Findings: Eshleman demonstrated that the model permitted a cost effectiveness analysis, for a one-inch rainfall event, of a bioswale project in Brooklyn and a permeable pavement project in Queens. The initial use of the model suggested that the permeable pavement installation may be more cost efficient over its useful life than the bioswale when it comes to capturing water during major storms. The point of this initial use of the model, however, was not to conclude that the City should shift its policies in any particular direction, but to establish the feasibility of developing and using such a model in the City's annual capital planning and budgeting processes.

Next Steps: This most recent life cycle cost benefit modeling project to which actual cost data was applied in an initial test run, points to the feasibility of City agencies using life cycle modeling in capital planning and budgeting, certainly for green infrastructure, but also for all the elements of the roadway. Eshleman's model was not able to include all the benefits accruing from these types of features nor was it possible to test the range of rain events that are likely to occur in the context of climate change. However, were City line and oversight agencies to collaborate and begin using this type of model for capital planning and budgeting purposes, they could adapt it to include other benefits and expand the range of rainfall volumes and speed of runoff.

Total Cost:

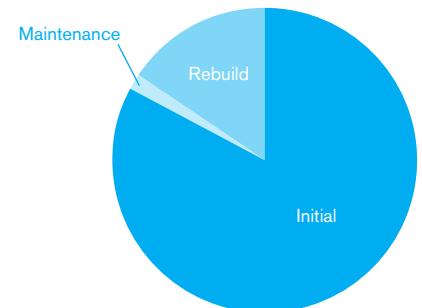
Bioswale

Pricier maintenance,
cheaper construction



Permeable Pavement

Pricier construction,
cheaper maintenance

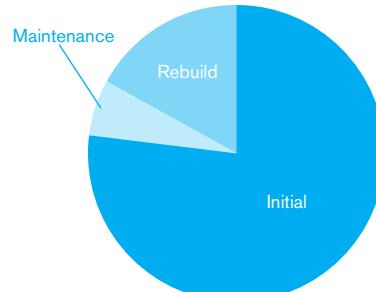


	Initial	Maintenance	Rebuild	Total
Bioswale:	\$36,500	\$2,870	\$7,941	\$47,311
Pavement:	\$58,027	\$1,106	\$10,773	\$69,906

Cost Effectiveness:

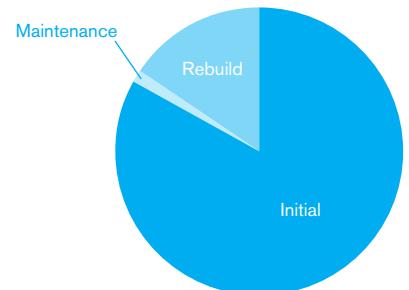
Bioswale

Pricier maintenance,
cheaper construction



Permeable Pavement

Pricier construction,
cheaper maintenance



	Initial	Maintenance	Rebuild	Total
Bioswale:	\$365	\$29	\$79	\$473
Pavement:	\$309	\$6	\$57	\$373

IMPROVING CAPITAL PROJECT MANAGEMENT IN NEW YORK CITY

Objective: Leading up to the online posting of the City's NYC Capital Projects Dashboard at the end of 2013, the capital agencies engaged in a data collection effort to support the Dashboard. The Dashboard provides a periodic general overview of active capital projects (infrastructure and information technology) budgeted to cost \$25 million or more, with graphic representations of projects by themes and a summary status of projects by schedule and cost variance. For its covered projects, the Dashboard provides a centralized source of information on the City's capital projects and a comparison of these projects,

Town NYC Ops

Gown Fordham/
Business

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Wenbo Dou
Shuwen Liu

using standardized metrics across agencies in order to improve transparency and accountability of project management, and track project information over time to inform citywide policy on the budgeting and management of capital projects. Early operations of the Dashboard provided an opportunity for the application of standard data analytic techniques to explore the aggregated data set collected before the initial release of the Dashboard to identify issues as a foundation for future analyses.

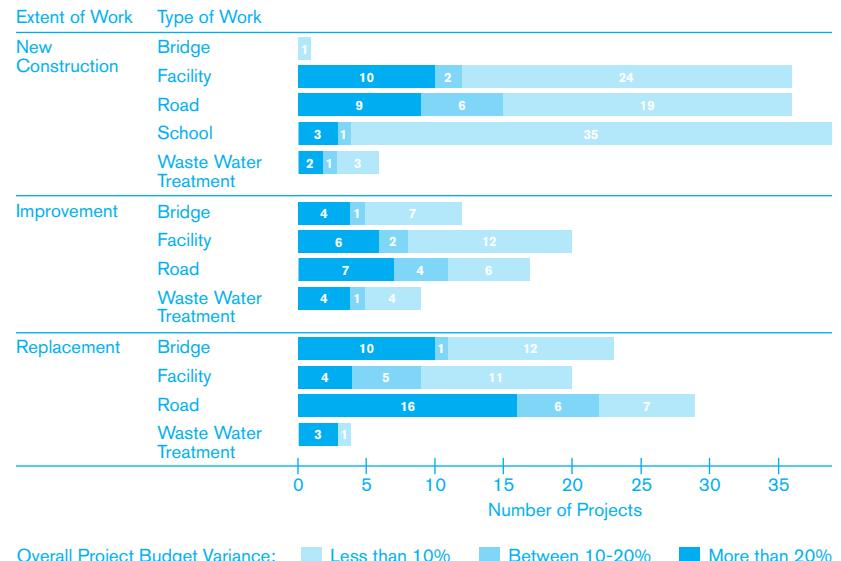
Methodology: The standard data analytic techniques applied by the research team consisted of performing descriptive and predictive analytics and text mining, as a foundation for various analyses to identify trends and characteristics of the projects along different variables and to identify areas within currently tracked data for future research. After cleaning the data, the team identified dependent and independent variables, they created category variables to use in the descriptive analysis, focusing on the extent of work (new construction, improvements and replacement/reconstruction) and type of work (road, bridge, school, wastewater treatment facility and facility). As part of the descriptive analytics, the team created a budget/schedule matrix applying three categories for schedule and budget performance (on/under 10%, 10%-20% and over 20%) to metrics such as extent of work, project type and managing agency. Using these matrices, the team applied various techniques, including statistical analyses, to reveal insights, not to provide predictive value. The team drilled down the descriptive analytics further by the use of scatter plots and bubble charts, project phase analysis

(creating a variable of phase duration % change) and budget category analysis to identify additional issues. Since the data set included explanations of budget and schedule variance, the team was able to perform text analytics techniques to further explore the data and identify issues, generating three conceptual categories of reasons for variance (scope/design change, condition change and budget/cost mismatch).

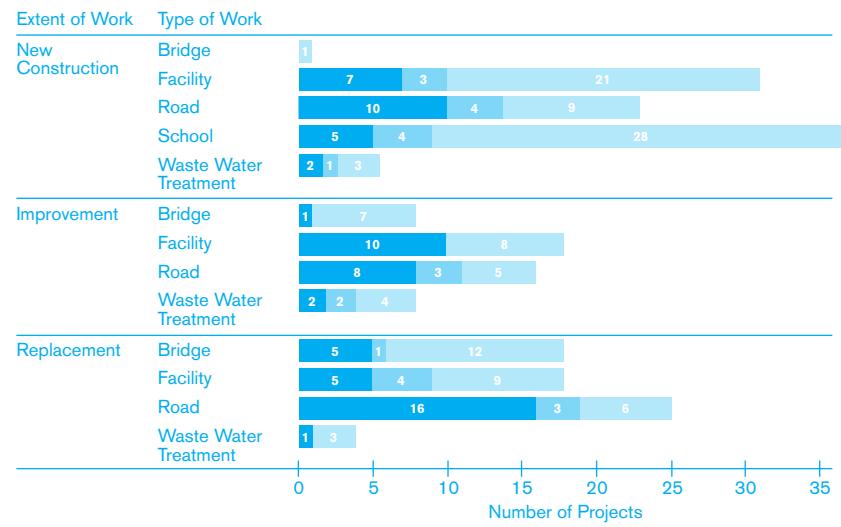
Findings: The actual findings revealed by analyzing the time-limited data set were less important than the conceptual findings that gave rise to ideas for future research. The team was able to identify relationships between increases in project duration variance with increases in budget variance and observed that new construction projects and improvement projects generally performed better than replacement/reconstruction projects and further that certain project types generally performed better than others.

Next Steps: The team did not analyze changes in performance over reporting periods and suggested that a future analysis build on their work to analyze changes over time. The data set did not contain data to permit variance analysis of original cost and current forecasted cost, and the team suggested that the data collected be expanded to include original contract cost and the engineer's or designer's estimate to permit budget variance analysis along a greater number of project process points. The team also suggested that project location data might provide additional explanatory value.

Extent of Work and Type of Work (Budget Variance)



Extent of Work and Type of Work (Schedule Variance)



ADVANCED STATISTICAL INVESTIGATIONS INTO GOVERNMENTAL PROCESS- GENERATED DATA: PREDICTING CHANGE ORDERS

Objective: Auerbach investigated how cost overruns on public construction projects might be predicted from data collected by NYC DDC as a result of standard operation governmental management and control processes and procedures. This data set had been previously

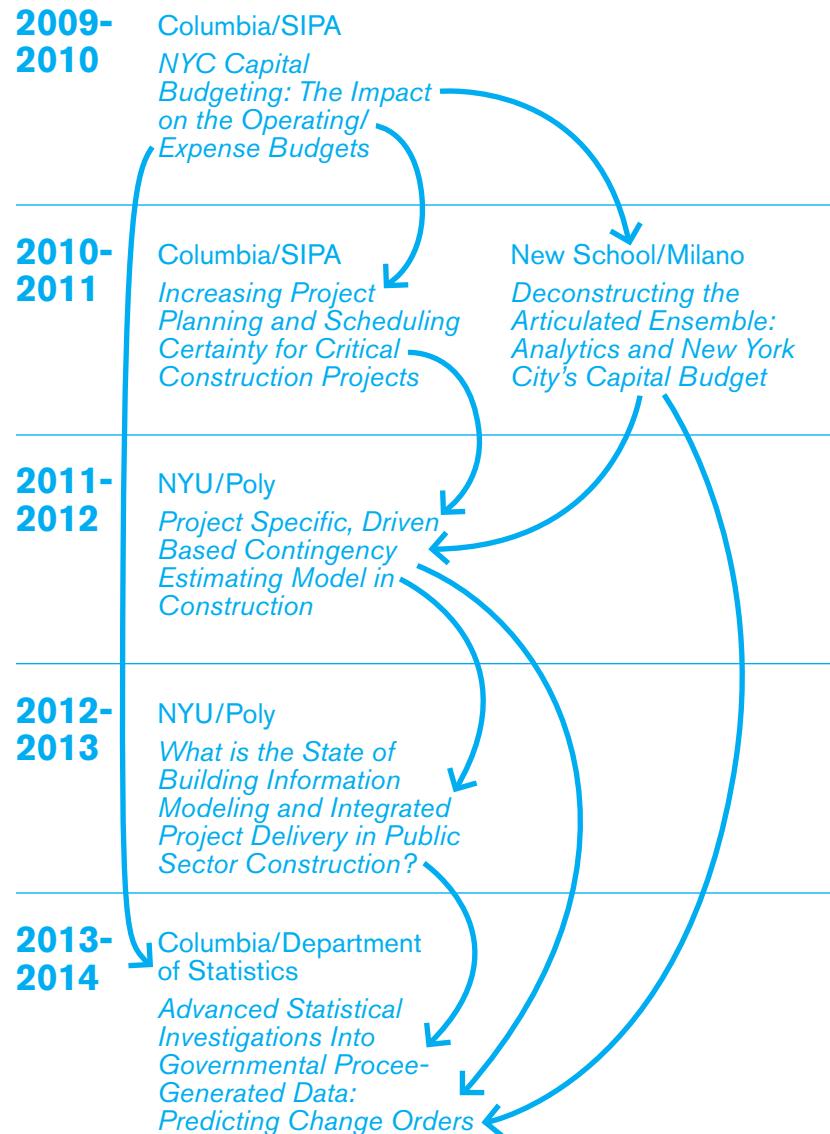
used in a completed Town+Gown project to develop a predictive model for project contingency amounts.

Methodology: The data set was generated from three separate but related processes—project management, contract control/auditing, and change order control/auditing. Of the four identified types of variables—date, factor, identification and numeric—the date variables represented when some aspect of the process went through a governmental “check-point”. Focusing only on those variables that would be known to a construction agency early in the construction process, Auerbach identified 27 out of 72 variables to use in the analysis. In addition, after ascertaining the relevance of certain milestone construction process dates, Auerbach used pair wise distance between dates to create nine indicator variables to assess the impact of delays during certain points in the process. Excluding interactions, the final data set used in the analysis contained 668 columns and 2,390 rows; with interactions, the number of columns increased to more than 220,000. Auerbach applied least absolute shrinkage and selection operator or “lasso” regression with stability selection methodology to the final data set. This methodology automatically eliminated variables that were less relevant, retaining those that were more statistically relevant, in order to identify features in the data set that could accurately predict the percent by which projects exceeded their initial contract costs. Identification of stable variables was thought to improve their predictive capacity when the existence of correlated variables within the data set was found.

Findings: Auerbach concluded that, even with incomplete records, the chosen methodology permitted analysis of construction project overruns. The procedure chose 24 non-zero variables when second order interactions were not included and 59 non-zero variables when they were included. Among the stable variables at the .95% confidence level, dates with the term “Other” appended to the end, and the year 1997 figured prominently. Of the variables selected, the lasso regression identified missing contract award date fields and missing contract registration date data fields as important variables. Auerbach reasoned that these variables could be important because they might reflect special projects with unique aspects, including bureaucratic accommodation. Comparing lasso results to results from other regression-based selection techniques, Auerbach found its predictive capabilities were similar to those of forward selection and an improvement over backward selection and regression, with all variables included. Auerbach’s analysis suggested that the nine created time-period variables are important, and that for some fiscal years, there are important relationships between project design completion and construction start while in other years there are none.

Next Steps: Auerbach suggested that future analysis could focus on the relationship of contracts among themselves since many contractors may work on several City projects over time. In addition, evidence suggesting that the time difference between project design completion and construction start is important for some fiscal years and could serve as a basis for

future analysis to consider interactions between these sorts of variables and to consider the relative position of each date *within* the city’s budget process.



The infographic above shows the relationship of the abstracted project with prior projects, suggesting an action research cycle.

OCCUPATIONAL INJURIES IN CONSTRUCTION

Objective: Lasiychuk, in an independent study project, conducted a preliminary data analysis under the broad research question *How to Improve Job Site Safety Practices?* An objective of built environment regulations is to ensure appropriate levels of safety performance on the construction job site. Lasiychuk conducted a comparative analysis of fatal and non-fatal occupational injuries focusing on nine states, including New York, which has the only statutorily mandated absolute liability standard imposed on project owners and general contractors for certain types of falls on construction jobs.

Methodology: Using Occupational Safety and Health Administration and the federal Bureau of Labor and Statistics (BLS) data, Lasiychuk analyzed fatal and non-fatal injuries in New York State (excluding and including New York City) and New York City over the most recently reported five-year period and analyzed fatal and non-fatal injuries in 2011, the last reported year

Town NYC DDC

Gown NYU/Poly,
Department of Civil
Engineering

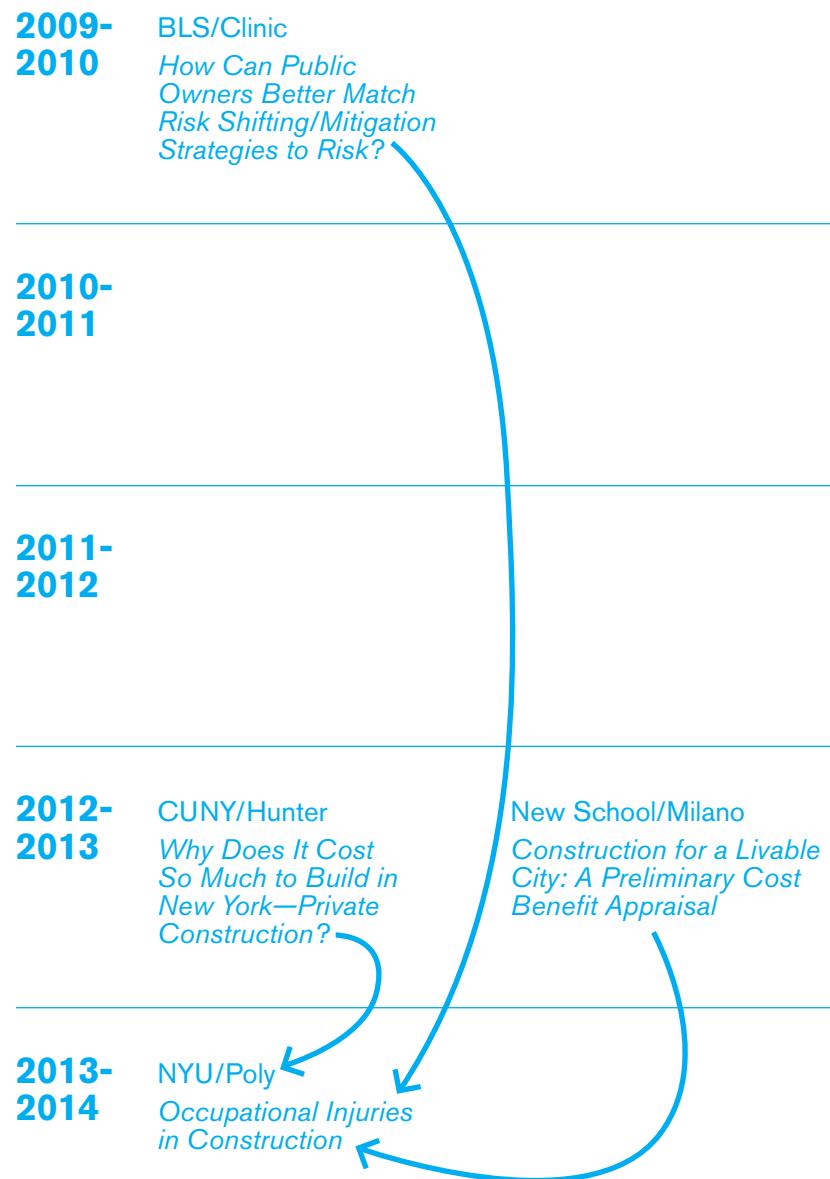
Researcher(s)
Stanislav Lasiychuk

at the time of the project, for New York and eight other states consisting of Connecticut, Maryland, Massachusetts, New Jersey, Illinois, Georgia, California and Texas.

Findings: Lasiychuk identified a number of data issues that make it difficult to analyze safety performance as a general matter and across jurisdictions. A two-year lag in posting safety data can impede understanding of current conditions, and some BLS data categories are reported either as numbers or rates but not both. Converting reported numbers into rates was further complicated by the use of hours worked in the formula for reported rates in conjunction with the absence of hours worked data that would permit turning numbers into rates comparable to BLS reported rates. During the time period, Lasiychuk found the number of fatalities decreased in New York State (excluding New York City) and increased in New York City, but, in the aggregate, the number decreased over the period, with 2009, the year following financial crisis in 2008, reporting the fewest number of fatalities. Rates of fatalities, not numbers, would better reflect safety since decreasing numbers may only reflect decreasing employment on decreasing number of active projects. With respect to the state comparative analysis, Lasiychuk was able to construct a rate of fatal accidents/worker, which was not comparable to other reported BLS rates, and observed a relationship between rate of non-fatal and fatal accidents, with states reporting the lowest number of fatal accidents having the highest number of non-fatal accidents. New York was among the top half of states with respect to non-fatal accidents and among the bottom half of states with respect

to fatal accidents. Lasiychuk postulated that this relationship may mean that states with more non-fatal accidents, but fewer fatal accidents, have better safety practices that prevent more accidents from becoming fatal.

Next Steps: This preliminary analysis of reportable injury rates, identifying data issues and suggesting relationships, would support future research projects to identify changes in New York law and regulations, as well as project owner practice, to improve project safety on construction projects.



The infographic above shows the relationship of the abstracted project with prior projects, suggesting an action research cycle.

NEW YORK CITY'S PARKS AND RECREATION DEPARTMENT: TREES AND SIDEWALKS PROGRAM

Objective: The research team sought to determine relationships among site ratings and tree characteristics, 311 complaints, neighborhood demographics and the urban forestry composition to develop predictive models for sidewalk damage and to optimize budget resources for NYC Parks' Trees and Sidewalks program (the T+S program). Since sidewalk trees pose risks of trip and fall

Town NYC Parks*

Gown Columbia/
SIPA

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Hyunjin Kim	Raimundo Atal

accidents due to uneven sidewalk pavements uplifted by growing sidewalk trees, and privately-funded repair work may pose a risk to the trees themselves, the T+S program schedules and prioritizes City-funded repairs to sidewalks damaged by adjacent trees.

Methodology: The research team analyzed available data related to the T+S program: data from NYC OpenData, 311 complaint data, T+S program operations data, as well as T+S program operation documents. From this data, the research team documented a four-phased work flow process. The research team also performed spatial and demographic analyses, using federal census data in order to assess the relationships among service requests, inspection scores, repair work orders and income.

Findings: The potential of data analytics techniques applied to public agency data to help agencies improve operations often meets gaps in data that have historically been collected in response to City-wide process data needs or to support operating practices. The research team identified a number of data issues that rendered the original research objective infeasible within the available time. The service request data from the 311 system was not standardized, reflecting insufficient standards or guidelines governing data input. There were numerous categories for work process fields and protocols for handling duplicate requests and dismissal of complaints for sites previously inspected. Analysis of inspection scores revealed the possibility of bias in rating damage at or above the repair threshold, which appeared to increase the backlog. Despite a process that

requires the inspection scores to drive work orders for repairs, the research team found several potential reasons leading to a multi-faceted discretionary prioritization process. These included the City's funding process based on funds available at the community district level, which the team thought may have a disproportionate impact on the work order prioritization process; age of the service request; proximity to an area with "slip and fall" claims; and proximity to residences of people with disabilities. The team concluded that these reasons would make predictive modeling insufficiently reliable. In addition, the research team identified operational protocols for auto-generation of work orders, which increase the "open" work order backlog, also making a predictive model insufficiently reliable.

Next Steps: The research team made a number of operational recommendations with respect to the T+S program data, which included data entry protocols, normalizing multiple and successive service requests for individual trees, collecting and using additional database variables and developing a quantitatively-based work order prioritization process, which might make possible the future development of predictive models for the T+S Program.

* Past volumes of *Building Ideas* have abstracted projects originating outside Town+Gown that relate to existing research questions or projects. Since projects like this can provide the foundation for future research projects within Town+Gown, they are captured in *Building Ideas*.

GEO- GRA- PHY

Geography includes several related fields, commonly placed under the rubric of Planning, such as urban planning, regional planning and placemaking, as well as land use practices, which is also covered under Law.

IMPACTS OF URBAN LAND USE: A COMPARATIVE ANALYSIS OF ENVIRONMENTAL IMPACT STATEMENTS

Objective: The research team sought to analyze the effectiveness of the City's Environmental Impact Statement (EIS) in estimating actual impacts as the basis for developing a model to accurately estimate and predict future environmental, financial and infrastructural impacts of new development and land use changes. Public and private owners of construction that requires certain discretionary

Town MOEC,
NYC DDC

Gown NYU/CUSP

Researcher(s)
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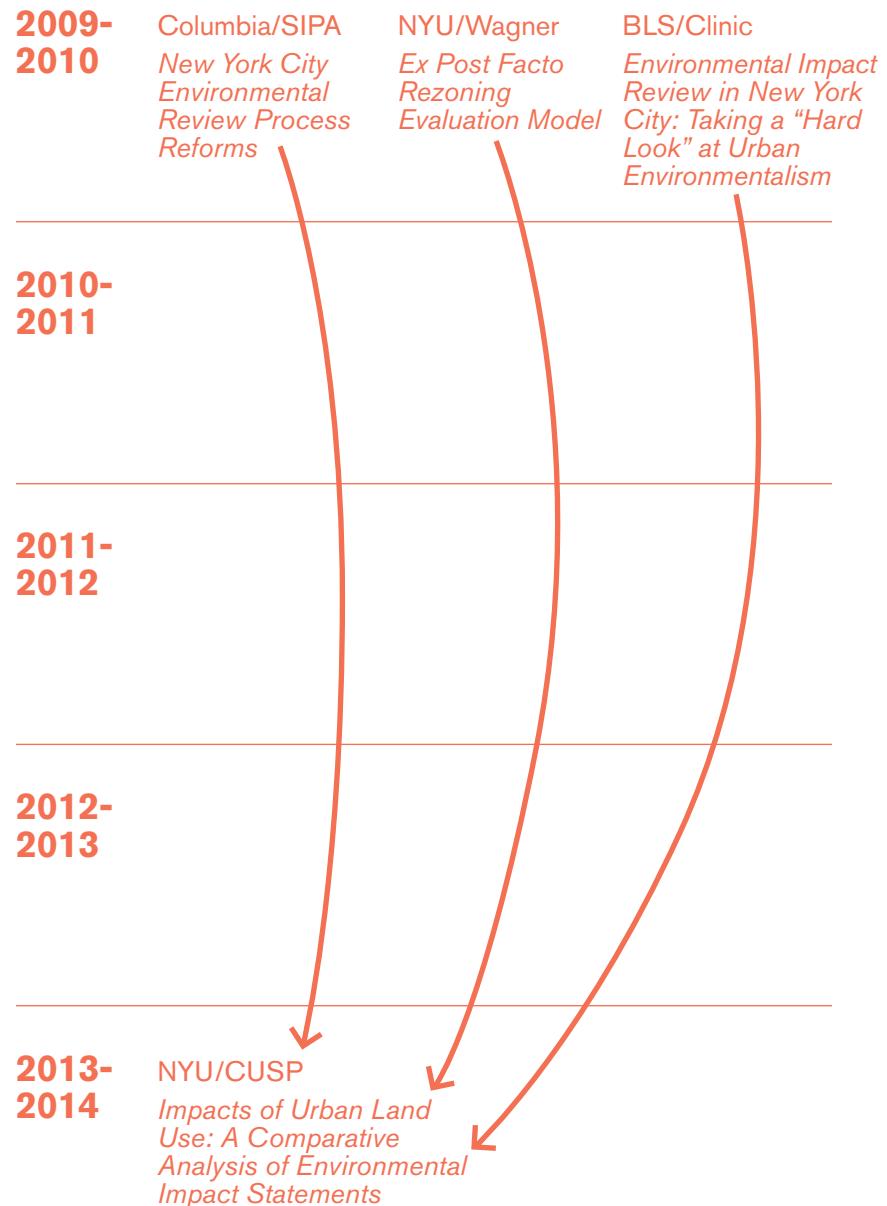
governmental action must submit an EIS as part of the City Environmental Quality Review (CEQR) process and the City's Uniform Land Use Review Process (ULURP). EIS practice has developed into a procedural public disclosure process driven by subject matter experts using various metrics and rules-of-thumb to establish the projected impacts to traffic, school enrollment, natural resources, infrastructure and visual sightlines of proposed construction projects.

Methodology: Beginning with the assumption that the EIS document is the product more of minimizing risk of later litigation than of science, the research team hypothesized that the lack of scientific evidence-based environmental impacts and mitigation analysis limited the effectiveness of EIS documents in estimating future conditions. The timing of the CEQR/ULURP process requires estimating possible environmental impacts at the earliest phases of a project, before project design is complete, which may exacerbate differences between the post-construction performance and earlier environmental impact estimates and proposed mitigations. Since the CEQR/ULURP process does not require *ex post* evidence-based evaluations of EIS estimates, there are no post-construction performance data to inform future EIS practice. From data in a small sample of final EIS documents and imported quantitative data from a variety of sources for socioeconomic, energy, air quality and noise impacts, the team created a model database of impacts to permit a comparison of estimated impacts and proposed mitigations to actual post-construction conditions. The model would serve to identify relevant project attributes and create a foundation for modeling techniques to

accurately predict actual impacts. In addition, using CartoDB, the team created a geospatial interactive visualization of estimated and actual impacts across EIS study areas.

Findings: Limitations imposed by the available EIS data constrained the team's ability to develop the full methodology to assess the accuracy of EIS estimates in predicting actual project impacts. While the small number of EIS documents available for the study was due to limited accessibility at that time, the PDF format of the documents further impeded analysis because the format does not easily permit electronic extraction. The team noted that EIS documents are not required to be filed in an accessible, standardized digital format, which adds complexity to data extraction for future analysis. The data elements in the EIS documents were also not consistent, which the team thought might be due to instructions in the CEQR manual, and they were not consistent across years due to changing public policy priorities.

Next Steps: This project joins a series of completed Town+Gown projects investigating an earlier research question entitled *How to Develop an Evaluation Tool for Environmental Assessment and Impact Surveys?*, all of which raised issues similar to those raised by this research team. Improved data availability, standardization and digitization would permit future research to evaluate EIS documents and identify ways to efficiently produce reliable science-based EIS estimates to inform public sector decision-makers and the general public.



The infographic above shows the relationship of the abstracted project with prior projects, suggesting an action research cycle.

URBAN ENVIRONMENTAL STEWARDSHIP AND CHANGES IN VEGETATIVE COVER AND BUILDING FOOTPRINT IN NEW YORK CITY NEIGHBORHOODS (2000-2010)

Town NYC Parks*

Gown Clark University, Columbia/Earth Observatory, University of Maryland

Researcher(s)
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K.L. King
D.H. Locke
J.W.T. Lu (NYC Parks)
C. Small
E.S. Svendsen

Objective: This multi-disciplinary research project explored relationships among changes in vegetation cover, local community-based environmental stewardship efforts and building footprints in New York City in order to focus on the role that local urban environmental stewardship efforts play in the City's physical landscape.

Methodology: The researchers applied a multi-disciplinary, spatio-temporal framework to investigate relationships within the complex, multi-scalar, socio-ecological system that is an urban city jurisdiction, using New York City as the case study. The researchers used a mixed-methods approach, incorporating social and ecological data, within an extensive-intensive framework, integrating quantitative vegetation cover and building footprint data and qualitative social data gleaned from surveys and interviews with local environmental stewardship groups. The researchers used Spectral Mixture Analysis (SMA) to create maps of vegetation cover for years 2000 and 2010, which was followed by layering building footprints for years 2001 and 2010 and vegetation change, which data were summarized at the neighborhood level in a GIS map, noting the limitations of SMA in detecting vegetation below the tree canopy or in deep shadows. Additionally, the researchers mitigated the modifiable areal unit problem that arises from the methodology of creating polygons to represent neighborhoods. They analyzed a layered GIS map after adding spatially explicit data of local environmental stewardship group activities, identifying relationships between such activities and changes in vegetation cover. In the last step, the researchers used qualitative data derived

from interviews with the local environmental stewardship groups to provide context for the identified relationships. Once the researchers identified a statistically significant relationship, they conducted a case study analysis to explore the relationship, describing how local stewardship activities within the civic and political spheres may influence changes in vegetation across neighborhoods over time.

Findings: While the researchers found no evidence of a linear relationship between vegetation change and the number of active stewardship organizations at the neighborhood level, they were able to identify a statistically significant difference (but not proof of causation) in the number of stewardship groups for those neighborhoods that either lost or gained vegetation during the study period—those neighborhoods with more active stewardship groups tended to experience vegetation increases during the study period. Further quantitative analysis of three case studies revealed patterns of stewardship organizational efforts in the context of categories of neighborhood change. Neighborhoods with increasing vegetation have more local stewardship organizations regardless of changes in the building footprints during the study period, and neighborhoods with vegetation losses and building footprint increases have more local stewardship organizations than neighborhoods experiencing losses in both vegetation and building footprints.

Next Steps: The researchers identified a shifting field where urban stewardship civic engagement together with change in building footprints at the local level appears to affect a neighborhood's

vegetation cover. This “shifting mosaic”, where urban stewardship activities may play a role in affecting land use development outcomes, sets the stage for future research to explore the relationships and add other biophysical and built environment variables that shape land use development, such as changes in zoning and land use, to the model.

* Past volumes of *Building Ideas* have abstracted projects that originated outside Town+Gown that relate to existing research questions or projects. Since projects like this can provide the foundation for future research projects within Town+Gown, they are captured in *Building Ideas*.

ECO- NOM- ICS

Projects that follow under Economics make it possible to see government acting in and on the built environment in the different roles it often plays simultaneously. Public capital programs are, in essence, work orders for facilities relating to “social” or “public” goods and to “mixed goods” that correct for negative and positive externalities. Yet, at the same time government participates in the built environment as an owner, it also operates in its other roles—economic catalyst and policy maker, regulator and financier—increasing the complexity of built environment systems and affecting the effectiveness and efficiency of public and private capital programs and projects.

FOUNDATIONAL ANALYSIS FOR HEDONIC REGRESSION

Objective: In connection with DDC's ongoing pursuit of difference-in-difference hedonic regression analysis to assess the economic impact of its capital projects, Lee performed several foundational research tasks to prepare for a research project to develop a model in the future.

Methodology: While the work of NYU/Furman Center over the past 15 years has set the standard for hedonic regression in the urban setting, it was necessary for Lee to conduct an extensive literature survey and produce an annotated bibliography document to support future work. In addition, it was necessary for Lee to update and clean NYC DDC's public building projects database for future work as well as create a subset of data for projects in Staten Island that were thought to be the most

appropriate for an initial effort at developing an hedonic regression model.

Findings: There were no findings associated with this project.

Next Steps: The work product generated by Lee would be available for a future research project to develop a difference-in-difference model using NYC DDC data.

Town NYC DDC

Gown St. John's/
Economics
Department

Researcher(s)
Jiseon Lee

LAW

Projects under Law focus on the impact of the law on built environment activities from the perspective of the archetypal participants—owner, designer, constructor and financier. Statutes and regulations, contractual forms and provisions, and related case law all affect the relationships among built environment participants, their expectations and their behaviors. Deconstructing the law in the context of its impact “on the ground” can provide powerful explanatory insight for the other disciplines analyzing built environment issues and provide a foundation for policy and practice change.

MEANS AND METHODS: SWORD OR SHIELD?

Objective: In the construction contract between owner and contractor, with the architect sometimes having a role, the term “means and methods” is a term of art and practice that is not defined in the contract but is used in practice by parties to advance and protect their respective interests. Researchers and practitioners have noted the adversarial nature of participants “on the ground” on a construction project, which is the result of risk shifting contract provisions as well as regulations and case law interpretations over the years. The historical movement away from the “master builder” into the modern specialized world of construction industry participants, many of whom have been professionalized and regulated, may also provide some explanatory context. Savalli undertook to unpack and analyze the various relationships on construction projects by subjecting “means and methods” contractual provisions to legal analysis in the context of historical practice, risk shift

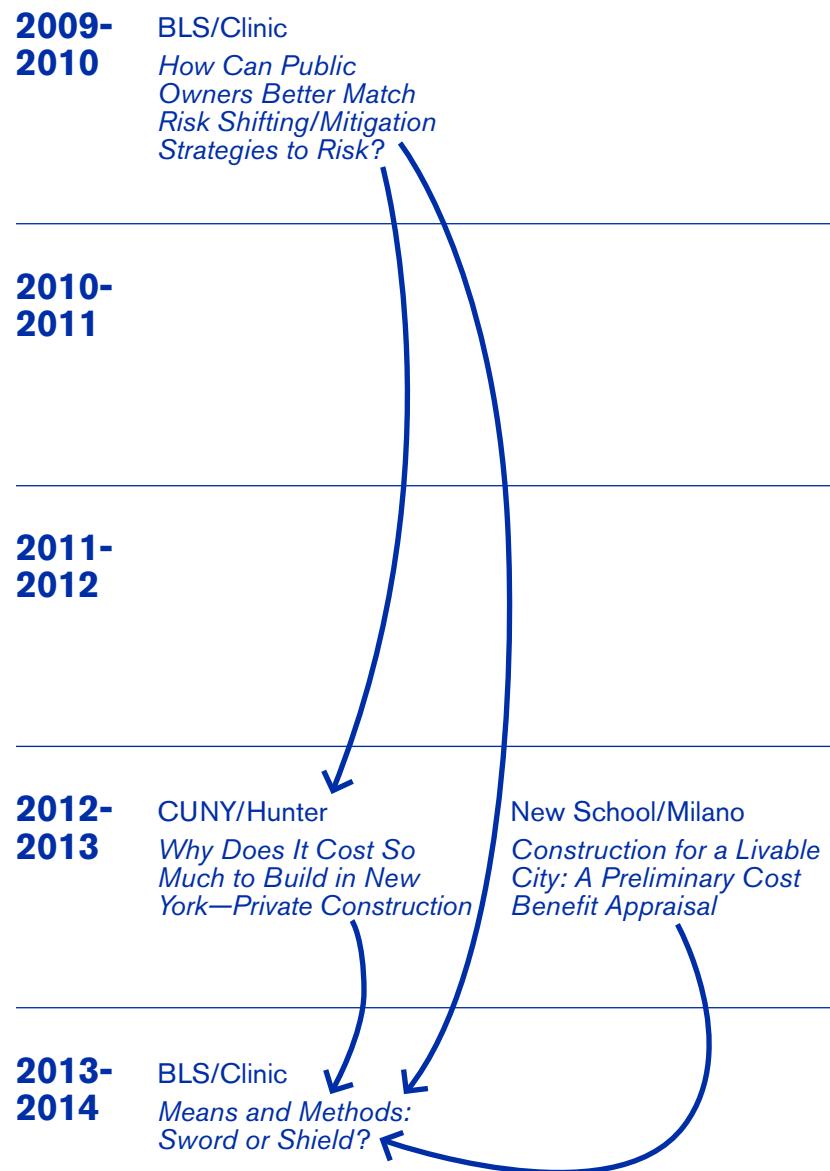
conventions, and regulation, in order to provide a foundation for future research projects related to risk analysis and management.

Methodology: Savalli conducted an historical legal analysis into the term “means and methods” beginning with the origin of the term from the days of the “master builder”, which found expression in the law of agency focusing on the nature of “independent contractor”. Savalli traced the early cases in tort law before enactment of state and federal worker safety laws as they evolved into contract law, with the professionalization of the architect and the promulgation of the early standard contracts by the American Institute of Architects. Savalli assessed the impact of the regulation of construction participants and workplace safety at both state and federal levels, which added another level of complexity, and also conducted interviews with construction industry professionals.

Findings: Savalli concluded that the sophistication of contracting has intentionally evolved, shaped by rational actors in the industry and the courts, and the continued use of the undefined term “means and methods” functions as a risk shifting device from which the owner appears to benefit the most. He concluded that whether “means and methods” provisions work as a shield or a sword appears to depend on the facts of the particular harm that resulted, so that analysis of case law revealed little conceptual explanation of the term. The increasing sophistication of contract forms and provisions linked with insurance products, in an environment of evolving advances in building technology and project service delivery methods and significant variance among state laws governing construction,

further hindered the ability to pin down a working definition of the term.

Next Steps: In view of the continued use of the undefined term and interview results that suggested that there is a need to define the term in light of dramatic inconsistencies of understanding of the term, Savalli prepared a survey instrument for distribution across the industry to explore further issues related to “means and methods”. Savalli also suggested that future analysis focus on how emerging building technologies, including building information modeling, the growth of modern service delivery methodologies and the introduction of environmentally sustainable designs and materials, impact the use of this term as a risk shifting device.



The infographic above shows the relationship of the abstracted project with prior projects, suggesting an action research cycle.

DESIGN

The projects under Design can focus on any one of the many aspects raised by design in this complex disciplinary field. Both public and private construction projects become part of the visible built environment and this aspect of Design includes both Architecture and Engineering. Within or surrounding built objects, several other design disciplines also operate and contribute significantly to the overall success of any built environment object. Interior design, lighting design, landscape design, service design, communications (or visual) design, digital design and product design comprise a suite of integrated design services that interface with Architecture and Engineering and are included under Design as well.

4D BIM EXPLORATIONS IN DESIGN AND CONSTRUCTION MANAGEMENT

Objective: Inspired by an earlier project based on building information model (BIM) technology, this architecture and construction management multi-disciplinary seminar explored the use of BIM technology by architects and construction managers during the design phase, which is conventionally thought to be the domain of the architect. Super Storm Sandy provided an opportunity to test a “kit of parts” pre-fabricated modular design, construction and procurement strategy to solve physical challenges for local government agencies providing an array of local services in neighborhoods affected by disasters during the medium-to-longer-term period after the event. When “place matters” for emergency

service provision, the ability to efficiently construct temporary facilities depends on developing a practicable methodology to mobilize after the immediate emergency by designing, in advance, a suite of building typologies with “off the shelf” components in a way that respects the neighborhood context and addresses constructibility and installation issues during design.

Methodology: This seminar simulated an interchange between the design process and the construction process, which are often distinct and serial, using virtual design and construction tools as the hub of all exchanges of information during the design phase. BIM permits a high level of interaction among members of the architect, engineer and contractor (AEC) team at an early point of the design process and can link together all AEC team members in a single work flow, resulting in greater accuracy and productivity in building execution. Using two use case study typologies—an administrative office in which human service agencies could co-locate and a muster and storage site for agencies providing infrastructure repair and restoration services—the student teams used several BIM programs to collaborate on the design, cost estimation, procurement, scheduling and installation of prototype temporary structures at vacant sites in Red Hook. BIM scheduling and cost modules incorporated data to increase installation efficiency, and BIM design modules permitted final designs to contain sufficient interior flexibility to accommodate other likely long-term uses.

Town NYC DDC

Gown Pratt/
Architecture

Researcher(s)
Students in ARCH
521B/CM 423P,
Spring 2014

Findings: Six student teams produced three designs for the human services facility and three designs for the infrastructure facility. The students

concluded that BIM-enabled multi-disciplinary collaboration permitted them to create more efficient and effective designs with realistic construction implementation methodologies embedded into the designs. The suite of completed designs, with associated schedule and cost data, also provided evidence of the feasibility for local government to create a kit-of-parts design and procurement strategy for post-emergency mobilization across a spectrum of public services in any neighborhood, with neighborhood context, fabrication and standard site issue solutions reflected in the designs.

Next Steps: Future research to advance public construction applications were raised in this seminar, as the use of BIM technology in the design and construction industry continues to expand.

2009-
2010

2010-
2011

2011-
2012

NYU/Poly
Information Systems in Construction: Curriculum Integration as a Research Methodology

2012-
2013

2013-
2014

Pratt / Architecture + Construction Management
4D BIM Explorations in Design and Construction Management

The infographic above shows the relationship of the abstracted project with prior projects, suggesting an action research cycle.

SUSTAINABLE COMMUNITIES: MAKING THE INVISIBLE VISIBLE

Objective: This seminar explored the use of communication design to make the “invisible” visible and communicate facts related to the public right of way (PROW). Millions of New Yorkers encounter infrastructure projects in the PROW every day as they navigate the City. These projects would benefit from further explanation since the intention of either the design and construction process or the physical manifestation of the project may not be directly visible to the passerby. These countless interactions represent moments of opportunity for the City to engage, inform and elicit feedback from its communities. Good signage, a definition explored during this seminar, can help provide this explanation and render casual, everyday interactions into teaching moments with the potential to increase

Town NYC DEP and
NYC DDC

Gown Pratt/
Graduate Center

Researcher(s)
Students in
Sustainable
Communities, Fall
2013

public awareness and stewardship of elements in the PROW.

Methodology: While the original intent of the seminar was to focus generally on signage for conventional infrastructure projects, the intervention of Super Storm Sandy on the case study neighborhoods—Red Hook, The Rockaways and Coney Island—moved attention away from construction-related communications toward comprehensive communications approaches for local planners to build and maintain sustainable communities in the context of likely environmental emergency situations. With assistance from City agencies and using the types of signage currently in place, the student teams generated prototype communication design projects aimed at increasing community outreach and educating with respect to sustainability in neighborhoods recovering from breaches in resiliency.

Findings: The Coney Island project used Kaiser Park as the site of an interactive signage system to communicate the need for coastal infrastructure due to the vulnerable nature of the shoreline and its effect on the community. The Red Hook project used NYC DOT’s “Look” campaign, a signage project aimed at increasing environmental awareness in crosswalks, as the foundation for their model to bring attention to green infrastructure projects in Red Hook, providing educational opportunities for communities to learn about how the City manages storm water during large scale rain events and how individuals can make changes in their everyday lives to ameliorate some of the negative impacts of rain events on the eco-system. The Rockaways project proposed a connected

network of interactive community information resource stations, which included way finding during emergencies and a linked governmental outreach and community engagement emergency response mechanism and with educational features, to make climate change preparedness visible and provide useful climate change-related information that supports community engagement.

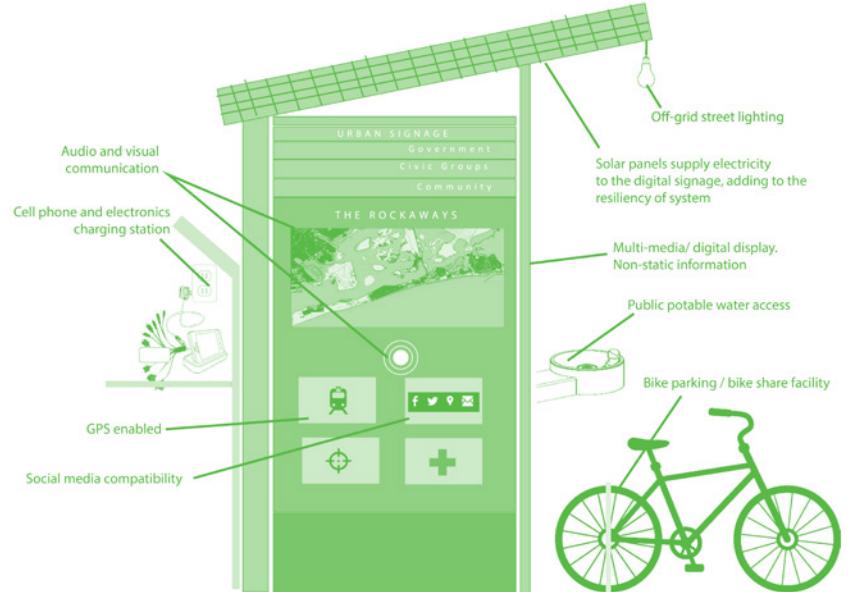
Next Steps: Future research, including subsequent iterations of this seminar, can focus on communication design to expand the ability of City agencies with PROW projects to communicate basic facts about the infrastructure projects as well as connect these projects to broader facts such as environmental sustainability and resiliency.

Making Climate Change Preparedness Visible

- Elevated kiosk stations
- Elevated kiosk stations
- - - Virtual Community Zones



The Kiosk



MAPPING RED HOOK/RED HOOK HUB: A CREATIVE PLACEMAKING PROJECT

Objective: AIGA/NY's *Design/Relief Red Hook HUB: A Creative Placemaking Project* was supported by research conducted by a communications design studio entitled *Mapping Red Hook*. The overall Design/Relief initiative piloted an experiment in community-centered, participatory design process, engaging with three waterfront neighborhoods, one of which was Red Hook, to demonstrate how designers can work with individual communities to enable them to imagine a more vibrant future as they moved to overcome the lingering impact of Super Storm Sandy.

Town AIGA-NY/
Amplifier/MGMT*

Gown Pratt/
Communications
Design

Researcher(s)
Students in Design
Advocacy: Creative
Placemaking,
Spring 2014

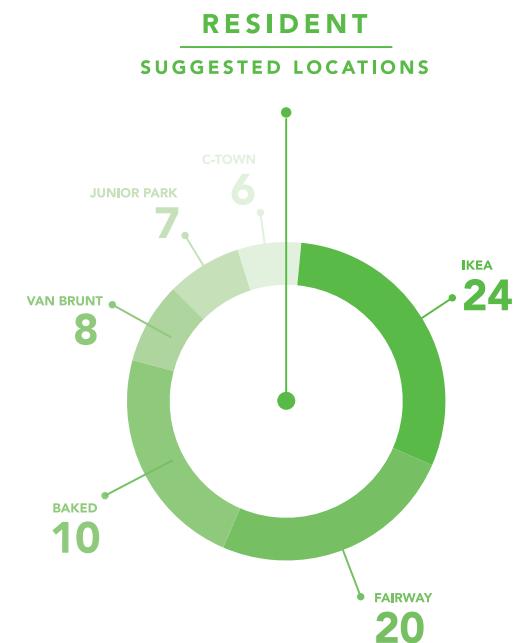
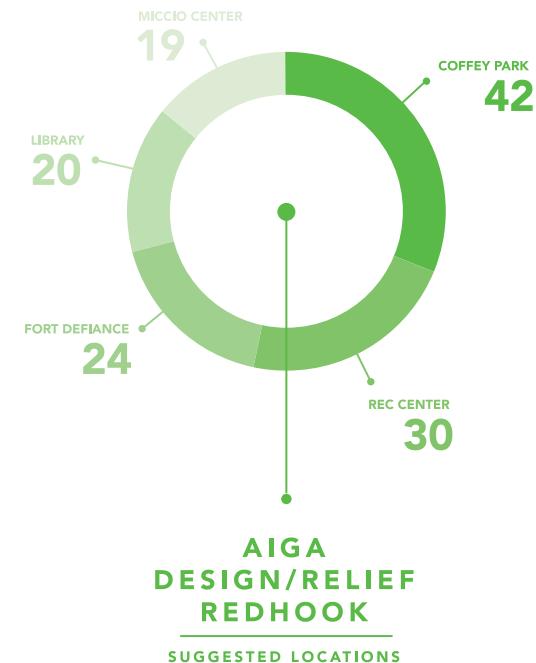
Methodology: The underlying hypothesis for both the initiative and studio is that increasing communications at the neighborhood level will lead to more resilient neighborhoods during and after an emergency situation. In order to investigate existing community assets in Red Hook that would increase communication and celebrate its strong neighborhood identity, the research team began to measure space and understand the neighborhood at a street level. Using a human-centered approach, the team strategically applied various methodologies, such as spatial patterns mapping, ethnographic research, prototyping, tracking/measuring user experience, water tables, automotive/pedestrian traffic data and interviews, in order to identify five Red Hook locations that were most likely to draw the highest number of people from its diverse demographic profile. Simultaneously, the *Design/Relief Red Hook HUB* team conducted its own research, team building and concept development processes in collaboration with community representatives, holding community design charrettes and workshops and engaging in numerous conversations with community members and stakeholders to develop a design, similar to the traditional bulletin board, for a community-centric and community-generated information system.

Findings: The *Mapping Red Hook* team identified five locations—NYCHA Miccio Center, the public library, another NYCHA recreation center, Fort Defiance and Coffey Park—that their research suggested would draw the highest number of Red Hook residents to the eventual communication infrastructure developed by the *Design/Relief Red Hook HUB* team. The *Design/Relief Red Hook*

HUB team designed a physical communication object—the *HUB*—in conjunction with a sustainable operational protocol that was intended to take in, filter and share information supplied by Red Hook residents. The design for the *HUB*'s public interface consisted of physical posting boards, split into sections, including a traditional bulletin board area and a curated posting area, digital displays and mini *HUBLEts* that would feature an edited selection of most important messages culled from the larger system. The *HUB* elements were designed, based on community identified needs, to function both during times of crisis and non-crisis, and a committee made up of designated partners undertook to oversee the *HUB*'s ongoing operations.

Next Steps: The *HUB* was fabricated and is located in front of the Miccio Center, one of the sites identified by the Mapping Red Hook Team. Its design contains elements with potential for adaption and incorporation as a communications tool on future Town+Gown projects. *Mapping Red Hook* also serves as open-source tool to support future research projects (mappingredhook.prattgradcomd.com/).

* Past volumes of *Building Ideas* have abstracted projects that originated outside Town+Gown that relate to existing research questions or projects. Since projects like this can provide the foundation for future research projects within Town+Gown, they are captured in *Building Ideas*.



TECHNOLOGY

Technology, including information technology, can assist project participants in managing construction projects. While technology can be analyzed in conjunction with management techniques and methodologies, technology has a sufficient number of additional aspects that it deserves special attention, and projects under Technology highlight one or more of these aspects. Large public owners also have an ability to advance technology innovation, as economic policy makers but also as collateral from their public capital programs by participating in research and development activities necessary for innovation in construction- and built environment object-related technology.

OPEN DATA FOR RESILIENCE: RESEARCH, ANALYSIS AND PROPOSED SOLUTIONS IN SUPPORT OF RESILIENT BUILDING DESIGN FOR NYC DDC

Objective: The research team used the question *How to Implement Innovative Information Technology Products in Construction Programs*, shortly after Superstorm Sandy, to focus on

Town NYC DDC

Gown CCNY/
Sustainability

Researcher(s)
John Druelinger
Christopher Sedita

increasing building resiliency in the face of likely extreme weather events. Since its creation in 1996, NYC DDC has published guidelines and manuals that represent best practices for its consultants and contractors. NYC DDC's 1999 *High Performance Building Guidelines* became an internationally recognized early "green building" resource. Damage from Sandy immediately generated an urgency to assess and disseminate best building practices to increase buildings' resilience to extreme weather conditions. The team focused on developing a technological solution to the challenge faced by static best practices materials in the context of rapidly changing science and technology.

Methodology: The team reviewed NYC DDC's on-line publications and other public databases that catalogue information about innovative "green building" strategies, and conducted a literature survey focusing on the psychology of environmental decision-making, information design strategies and building resilience issues and standards. The team also conducted background informational interviews with current and former City government staff involved in the City's "green buildings" initiatives, including those at NYC DDC who were involved with its earlier guidelines and manuals. The team researched information management tools that would be suitable for continuous "real time" internal information sharing and external communication of "best practice" building resiliency guidelines.

Findings: The research team concluded that the wiki—a web-based application that allows users to view or modify information in collaboration

with other users to support open information exchange to advance collective objectives—was the appropriate tool to solve the problem of “real time” identification and dissemination of best building practices within a public capital enterprise and externally to its consultants and contractors. The team created a prototype NYC DDC Building Resilience Database wiki based on its independent research on resiliency practices to illustrate how such a tool could be used by a public construction agency that continually manages public projects and publishes guidelines and manuals based on its experience. The team concluded that development of the wiki as a dynamic, shareable and easy-to-use resource for sharing knowledge within NYC DDC could create a database of synthesized experience to inform new guidelines and manuals, lead to more dynamic and relevant external communication of lessons learned on resiliency strategies, and serve as a source of collective institutional knowledge to promote awareness of successful design practices as they evolve.

Next Steps: The prototype wiki is available for preliminary evaluation and use as a solution to problem of continuous “real time” internal identification and sharing of best practices in building design and related external dissemination of such best practices.

NYC DDC Building Resilience Database: <https://DDC-resiliencedatabase.wikispaces.com/DDC+Building+Resilience+Database>

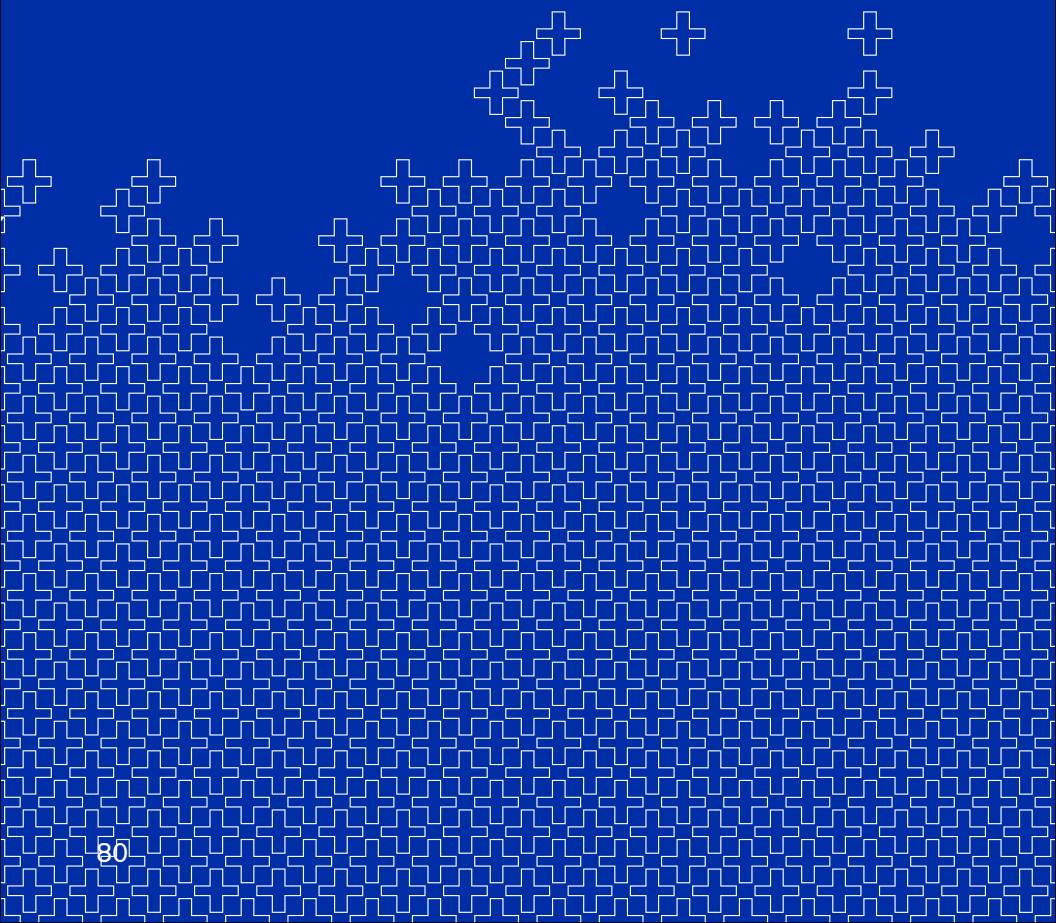
Evacuation Zones



SIRR Areas



Reflection: Proceedings from Symposium Events



The systemic action research methodology provides structure and support for stakeholders to use research results to help bring about changes in practice and policy in a complex and dynamic social system. In the built environment, where complex issues are embedded into its fabric, it is necessary to conduct research explicitly within its context. The action research methodology facilitates change through repeated cycles of research and reflection in small working groups aimed at eventual action, which the action learning community calls 'action learning sets'.

In Town+Gown, research results provide the foundation for activities aimed at making practice and policy changes based on these results. Since 2011-2012, Town+Gown has been using the symposium format as a space for reflection, where practitioner and academic participants, in an open-ended conversation focusing on particular completed project results, can move toward appropriate action. For these symposia, there no particular agenda other than what is suggested by the completed project or projects. They are simply research-based conversations within a broader context aimed at action.

The following summaries of symposium events held during 2013-2014 evidence the state of reflection on the completed projects that were subjects of the events.

Policy Meet Design

In collaboration with the AIANY/Center for Architecture and Public Policy Lab and presented in association with Archtober, Architecture and Design Month, New York City

October 10, 2013

Purpose: Policy, Meet Design was the fourth event in Town+Gown's ongoing exploration of Design. The first event explored the many meanings of design and focused on a single case study design project with several iterations, one of which included a service design project. The second event advanced this case study project to explore how design-based research methodologies and techniques turn data into knowledge in a cyclical process that includes policy recommendations, implementation and evaluation. The third event explored the meanings of design in a way that brought some of the engineering disciplines into the design conversation and discussed how the City's design-related academic institutions and public agencies can support the design sector of the local economy and concluded with a discussion about how City agencies can use design in their work.

Conversation: In the lead-up to NYCxDesign 2013, it was suggested that the City "become a much smarter client of design" through "a collective effort to implement better design citywide."⁶ In

addition to building channels to facilitate more design activities at agencies through increasing design awareness at city agencies and changes to budget and procurement practices, more specific suggestions included having policymakers focus more on user access and ease of use when implementing policy decisions, letting the preferences of users drive design decisions in addition to those of policy makers, and integrating the public into preliminary design processes (not just end-stage approvals). Building design, infrastructure design and urban design operate in fields familiar to public agency practitioners that directly participate in the City's capital program and planning processes. These fields are less familiar to those agency practitioners that only participate in the delivery of public services or goods funded by the expense budget, even though they are delivered in, on or through capital-funded built environment artifacts. Even less familiar to most public agency practitioners are the allied design fields—interior design, communications design, service design and industrial design. This event used a chart developed with the participants for this event—10 things public policy analysts should know about design and 10 things designers should know about public policy analysis—as the touchstone for the cross-disciplinary conversation to help both sides reach across the divide and increase cross-disciplinary collaborations.

⁶ Center for an Urban Future, *Growth by Design*, June 2011, p. 25.

Policy team

A PRIMER FOR POLICY ANALYSTS WORKING WITH DESIGNERS

Design

Design is the process of shaping ideas to become practical and attractive propositions for users or customers.

(Adapted from Sir George Cox)

01 Adding a designer to your team can help you clarify your proposition to your audience(s), and make it tangible.

02 Different types of design* are applicable to different issues.

* For example:
Graphic Design attracts attention & communicates your point.
Branding establishes your organization as credible & approachable.
Interior Design creates an atmosphere conducive for your goal.
Product Design helps users get the most from your product.
Service Design Improves the way your services are delivered.
Interior Design creates an atmosphere conducive for your goal.
Architecture and Engineering create the structures that house and shape public interactions.

03 Defining the GOAL of your audience interaction is the most important step. Who do you want to do what?

04 The design process roughly goes like this:



TOWN+GOWN

01 Policy analysis consists of *various qualitative and quantitative techniques*, within the efficiency criterion of choice paradigm,*† to support policy maker decision making.

(Adapted from Hank Jenkins-Smith)

* Under the "Efficiency Criterion of the Choice Paradigm" a change that makes at least one person better off without making anyone worse off is an acceptable standard for action.
† See point 07.

02 Working with policy analysts on projects will introduce you to an intersection of government and politics where the *potential for positively affecting the lives of people* is part of a complex balancing act.

03 Government plays several roles in any issue area—for example, it may provide services, regulate to protect public welfare, or enforce laws. Thus, government's role(s) in a particular area will determine the nature and goals of the design approach.

04 There are usually *hidden legal and operational complexities* behind any policy communication; understanding and navigating these is key to achieving meaningful and intended impact.

05 Prior to getting to design, the policy analyst will have gone through this process:

Question → Literature Survey → Working Hypothesis → Related Qualitative and Quantitative Data Analyses → Conclusions Supported by Analyses → Recommendations for Possible Action

06 Your policy partner *may* have data... and that data *may* be relevant and useful for the analysis and communication at hand.

(Not to mention the basis for some lovely infographics.)

07 Policy analysts use much topic-specific language, sometimes called *jargon*. If you don't understand what something means, your audience won't either. Ask and translate!

08 Move from an authorship model of design focused on *form*, to a participatory model focused on *service*.

09 Look for ways to *improve the systems* that your client is using for their mission. Help them to look holistically, since they may have been down in the details. Similarly, search out the substance within your client's work; they may take for granted what would enrich the public to know.

10 Laws designed to protect the public fisc mean that the wheels of public work grind slowly and not particularly fine. A city is a very complex organism that may seem to follow irrational rules. Be *patient*.

A PRIMER FOR DESIGNERS WORKING WITH PUBLIC POLICY

Design

meet

Policy

BIMapalooza

In collaboration with The General Society of Mechanics and Tradesmen of the City of New York

November 12, 2013

Purpose: *BIMapalooza* followed up on *BIMfest*, Town+Gown's inaugural exploration of building information modeling (BIM), which was based on completed projects in Town+Gown. NYC DDC, the practitioner partner for these projects, had issued its *BIM Guidelines* the previous winter to bring BIM to bear on DDC's public building design and construction processes, with the ultimate goal of expanding BIM use across its portfolio of projects as well as expanding the functionality of resulting BIM models to include post-construction occupancy activities, which dovetail closely with the City's environmental sustainability focus on building performance and its financial sustainability focus on life cycle operations and maintenance.

Conversation: The conversations focused specifically on issues related to potential research projects that had surfaced during *BIMfest*. In view of the potential for avoided costs from BIM implementation, there was a discussion about the types of project cost data that would be necessary to evaluate the impact of BIM on a project and measure avoided costs. Data that is available in either public or private project settings is often different from the data that would be useful for such evaluations. Highlighting a data gap is a first step to solving it going forward. There is an assumption that a BIM model from a

new construction project can continue to provide post-construction applications to building users. There was a discussion about the extent to which developing a BIM model, via "Laser Interferometry Detection and Ranging" (LIDAR) technologies, to existing structures, would generate benefits to building users at levels sufficient to warrant the cost, as well as to first responders in emergencies, such as fires. A life-cycle cost-benefit model would be a next step to address the feasibility of requiring BIM models on existing buildings for increased public safety. The last issue discussed was that of program interoperability to permit passing of data between and among the multiple BIM-enabled applications connected in a seamless way as a platform to support effective and efficient collaborations by design and construction teams on project activities. The speed of technological change and the market model for this technology in the context of minimal public owner and/or regulator awareness of the issue tend to make likely the continuation of interoperability issues in BIM technology and products.

Redesigning Neighborhood Change

May 13, 2014

Purpose: Town+Gown projects and symposium events have focused on issues of planning scale, which, in New York City, ranges from the citywide executive and legislative branches of government down to the smallest unit of government—the community board. We have deconstructed the concept of creating sustainable neighborhoods and focused on three powerful words—create, sustainable and neighborhoods. An earlier public policy and planning focus on creating sustainable neighborhoods through changes in energy policies and practice revealed a need to proceed simultaneously at all levels of government, from the federal and state regulatory levels down to the local and neighborhood levels. The design disciplines' contribution to this area in Town+Gown with three other projects focusing on neighborhoods was the subject of this symposium event.

Conversation: The question of how to create sustainable neighborhoods in earlier conversations raised the *a priori* question about *who* can create. One important “*who*” in New York City is the community board, which has charter-mandated roles in land-use planning and budgeting. The first project was a multi-disciplinary project that

focused on how process, analysis and design can empower the community board as it performs its functions and better communicate its role and activities to its neighborhood residents. The second project explored the role of communication design in helping to make “invisible” public right of way infrastructure “visible” and communicate facts about public infrastructure to the myriad numbers of New Yorkers who encounter it every day as they navigate the City. These projects would benefit from further explanation since the intention of either the design/construction process or the physical manifestation of the project is not directly visible to the passerby. These countless interactions represent moments of opportunity for the City to engage, inform and even elicit feedback from its communities. The last project advanced the hypothesis that local infrastructure to facilitate communication among residents can lead to a more resilient neighborhood during and after an emergency situation and resulted in the design and construction of a community-centric and community-generated electronic information system—the HUB—similar, in many ways, to a traditional bulletin board but that was supported by a “back-office” committee of designated partners to oversee its ongoing operations. All three projects demonstrated the expertise that communication design fields can contribute to shaping the built environment and the identity of places with measurable positive impact on communities. The conversation focused on how future Town+Gown projects could leverage these completed projects in future academic research projects.

Engineers Design

May 15, 2014

Purpose: This event picked up from a prior event that explored the many meanings of design, including how, when civil, structural, mechanical, electrical and environmental engineers solve problems in the built environment, they are also designing the built environment. This event used five case study engineering design collaboration projects to explore how engineers actually design building artifacts and the spaces they are located in.

Conversation: The engineering objectives for the infrastructure design of the permanent public spaces in Times Square consisted of upgrading crucial underground utility infrastructure and providing event infrastructure capacity for new and expanded public events, which collectively created a designed place that has become an iconic multi-functional public space reflecting the best of Times Square and New York City. The design and construction of the Purple Line, a 16-mile light rail transit project planned for an inside-the-Washington-Beltway corridor between Bethesda and New Carrollton, Maryland, wrestled with the need for a viable surface alignment that cut through two streets on the east side of downtown Silver Spring, over challenging grade and geometric conditions, with the planned siting of public library building in the middle. The engineers solved the infrastructural challenges in a way that accommodated the transportation alignment and incorporated a light rail transit station into the

building site, but also shaped the library building form and structure to create a landmark-quality gateway to the Silver Spring Central Business District. Both the Cornell University project design and the New NY Bridge design involved complex environmental sustainability engineering issues that impacted the visible designs that are intended to evidence sustainable design and practices. Finally, the Hudson Yards deck, which will physically support Hudson Yards, was designed as a structural steel platform with a reinforced concrete deck that bridges 30 working railroad tracks that limits the buildable areas to only 38 percent of the 26-acre site. The design of the individual visible buildings in Hudson Yards, which is also a new neighborhood place in New York City, was directly impacted by the engineering design of the platform that supports them. Despite discussing the direct impact of engineering challenges posed by each of the case study projects and the impact of the resulting engineering solution designs on the visible architectural designs and on the places or neighborhoods the projects are located in, many of the engineers expressed resistance to the ideas that solving built environment problems is design and that engineers in fact do design built artifacts and their surrounding spaces, deferring to the more widely accepted perception that architects and planners design and not engineers.

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