2012-2013
Action Research Agenda

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Icon Lexicon

Active Design 

Economics and Law 

Environmental Sustainability 

Financial Sustainability 

Infrastructure 

Innovation/Technology 

Risk Management 

New Question or Subquestion 

Index of Practitioner Partners

City of New York

- Department of Buildings . . . . . DOB
- Department of City Planning . . . . . DCP
- Department of Citywide Administrative Services . . . . . DCAS
- Department of Cultural Affairs . . . . . DCA
- Department of Design and Construction . . . . . DDC
- Department of Environmental Protection . . . . . DEP
- Department of Health and Mental Hygiene . . . DHMH
- Department of Housing Preservation and Development . . . . . HPD
- Department of Information Technology and Telecommunications . . . . . DoITT
- Department of Parks and Recreation. . . . . DPR
- Department of Sanitation . . . . . DSNY
- Department of Small Business Services . . . . . SBS
- Department of Transportation . . . . . DOT
- Design Commission. . . . . DC
- Landmarks Preservation Commission . . . . . LPC
- Law Department . . . . . Law
- Mayor's Office
  - Capital Project Development . . . . . CPD
  - Contracts Services. . . . . MOCS
  - Environmental Coordination . . . . . MOEC
  - Long Term Planning and Sustainability . OLTPS
  - Management and Budget . . . . . OMB
  - Operations . . . . . OPS

New York City Economic Development Corporation . EDC

New York City Health and Hospitals Corporation . . . . HHC

New York Chapter of Lean Construction Institute . . . . . LeanNYC

Metropolitan Transportation Authority

- Capital Planning Management . . . . . MTA CPM
- Environmental Sustainability and Compliance . . . . . MTA ESC
- Strategic Initiatives . . . . . MTA SI

Port Authority of New York and New Jersey . . . . PANYNJ

PREFACE

BACKGROUND:

Town+Gown embodies a pragmatic and integrated approach to research, known as "systematic action research", that will increase applied research in the built environment, focusing on the particular physical setting of the City. Research in built environment requires active attention to context, which happens to be a complex and dynamic social system. The systemic action research methodology addresses a continual need to integrate research within the broader context and provides a "learning architecture" in which system stakeholders can bring about change.[1] This methodology also supports practitioners and academics participating as equal partners in knowledge creation.

Town+Gown links academics and practitioners to collaborate on research projects, the results of which will generate discussion and follow-up research aimed at making appropriate changes in practices and policies. This *2012-2013 Research Agenda*, the program's fourth, is the primary mechanism for developing collaborations. At the end of each academic year, Town+Gown abstracts the results of all completed projects in its annual review, *Building Ideas*, for dissemination to the Town+Gown community. Following the release of *Building Ideas*, symposia events focus on topics raised by completed projects so that members of the Town+Gown community can collectively use research results to inform future changes in policy and practice.

FORMAT OF THE RESEARCH AGENDA

This *2012-2013 Research Agenda* is organized around the five academic disciplines—Management, Economics, Law, Technology and Design—that comprise the recognized multi-disciplinary field of the Built Environment.[2] We have modified this paradigm by combining the three engineering disciplines with architecture under the Design heading and by adding the Geography discipline to cover issues related to the urban planning field. The City's physical built environment can serve as an ideal laboratory for those working in the many disciplines and fields that overlap with the Built Environment disciplines, and productive academic research, informed by practitioner needs and skills sets, can occur in the Town+Gown program,

In order to highlight questions with multi-disciplinary potential under a single disciplinary heading, this *2012-2013 Research Agenda* uses "issues icons" designed to facilitate searches based on multi-disciplinary topics from Active Design to Risk Management.

HOW TO USE THIS RESEARCH AGENDA

Systemic action research contemplates a non-linear process, with multiple perspectives and research methodologies over time. For this reason, the questions in this *2012-2013 Research Agenda* function as umbrella research concepts, sufficiently flexible to permit multiple projects and multiple methodologies, under which the academic and practitioner can craft more defined project scopes and deliverables that reflect the project team's needs and skills sets.

INTERESTED IN A QUESTION?

If you are interested in working on one or more questions, please e-mail (matthewte@ddc.nyc.gov) or call (718-391-2884) Terri Matthews, Director,Town+Gown.

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

2. Paul Chynoweth, *The Built Environment Interdiscipline: A Theoretical Model for Decision Makers in Research and Teaching (Proceeding of the CIB Working Commission Building Education and Research Conference 2006), http://www.lawlectures.co.uk/bear2006/chynoweth.pdf*, pp.1-5.

MANAGEMENT

Research questions under MANAGEMENT primarily focus on construction projects from the perspectives of the archetypal participants—owner, designer and constructor. A critical objective for participants is to align their various interests in budget, schedule, safety and quality to make a project successful, all in an environment in which information asymmetries change during the pendency of the project. Participants adapt to "on the ground" changes in materials, building methods and information technology by using an evolving menu of service delivery methodologies as well as various management theories, techniques and tools, not dissimilar to those found in other industries or sectors. To the extent the research projects below involve public capital projects, separate analytical issues related to the public capital planning and budget processes will arise.

How Can Enterprise Risk Management Improve Practices?

BACKGROUND:

Risk management is not a new practice. The complexity of modern life and the inter-relation of risks in a complex environment have, however, transformed how organizations perceive and manage risk. The inter-related nature of risk in contemporary life increases the chance that failure, or dysfunction, in one area will have significant negative impacts in other areas. While not eliminating risk, modern risk management theory and tools can help an entity or enterprise acknowledge, evaluate and plan for the likelihood of malfunctions and mistakes. Private sector enterprises have been using increasingly sophisticated risk management techniques. While public sector enterprises do not operate in a less complex environment, their use of risk management tools beyond insurance for their capital programs is not common, perhaps because much of public sector construction is constrained by law and the absence of the direct incentive of the profit motive as well as indices of profitability can lead to certain institutional behaviors.

The planning, including financial planning, the design and construction, and the operation and maintenance of long-lived physical assets involve sets of relationships in a shifting environment of unequal information and imperfect understanding. The capital programs of large institutional owners—in both public and private sectors—serve as a setting to apply "enterprise risk management" or ERM, a strategic framework for owners to improve decision-making at all levels within the entity. ERM has been conceived as a multi-disciplinary approach by which an organization assesses—quantitatively where possible—controls, exploits, finances, and monitors risks from all sources for the purpose, in the private sector, of increasing its short- and long-term value. Applied in the public sector, ERM can expand and integrate traditional risk management approaches across sub-units within the public owner entity, leading to decisions that take into account all risks facing the organization and, most important, the inter-relation among those risks.

QUESTION(S):

What has been the history of risk management in the construction industry from the middle of the last century until the present?

How can a large institutional owner move from focusing on insurance, surety and traditional contractual risk allocation to an enterprise-wide approach to managing risk?

What lessons can a public owner learn from the private sector's application of large program governance techniques and individual project governance techniques? From hospital systems' application of healthcare risk management techniques?

What are best practices in enterprise risk management? What changes would be necessary for large institutional owners to implement such practices?

What would analyses of a large institutional owner's historical claims and litigation data suggest about long-term trends in construction-related risk? What types of things tend to go wrong on construction projects?

What might an enterprise risk management analysis suggest for an owner's job site safety practices?

Based on the analyses above, what constitutes successful outcomes in construction and what seem to be preconditions for success?

Focusing on traditional risk practices, what are the trends among owners with large capital/construction programs, including trends in owner-controlled insurance programs, contractor-controlled insurance programs; surety and insurance products; contingency practice; damages for delay provisions and other claims management tools?

NEW How might public owners identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, planning and budget processes to assist with reforming systemic practices in order to apply innovative risk management?

PRACTITIONER PARTNER(S):

HHC, Parks, DDC, Law, MTA ESC, MTA SI

Why Does It Cost So Much to Build in New York—Public Projects?

BACKGROUND:

New York City construction costs have historically been the highest among all U.S. cities. Public construction cost increases are driven by a combination of market conditions, statutory constraints, and construction-related practices. It has also been suggested that there is a premium for public construction projects. Public construction programs must continue despite market changes, whether positive or negative. Those components of cost increases related to policies and practices that are not mandated by law present opportunities for public owners to contain or reduce costs. Understanding what actions public owners can take to contain or reduce costs would be critical to manage
project budgets. Understanding the drivers of costs can help owners develop effective strategies to deal with turning points in the market when it changes from a buyer's market to a seller's market and then, as is inevitable, back again.

QUESTION(S):

After a literature survey on the drivers of construction costs, with a focus on public construction programs, the team would perform analyses of available cost data, including historical cost data at the agencies, to test hypotheses about the effects of public construction practices on construction costs.

What is the relation of City-derived actual cost data to pricing curves established with aggregate data such as national and regional accounts?

To the extent drivers of increased costs are within a public owner's control (e.g., discretionary processes and practices), how could a public owner reform its processes and practices and/or develop strategies to minimize or contain cost increases over time? To what extent do the simultaneously multiple roles of some public owners—in particular, as an owner and as a regulator—contribute to cost drivers?

NEW How might public owners identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, land use and budget processes to assist with reforming systemic practices that contribute to cost drivers?

For those cost drivers outside the public owner's control, how could the public owner develop risk management practices and feedback loops to eliminate or mitigate their impact on costs?

With a better understanding of the cost drivers, how could public owners in the City construct a City-specific model of construction costs for the capital budget planning processes to complement their appropriate general cost inflator for their respective capital plan/capital strategy periods?

How would insight from a public owner's actual costs enable estimators at a public owner to modify cost estimating practices to achieve better estimates?

PRACTITIONER PARTNER(S):

DEP, DPR, OMB, MOCS, DDC, Mayor's Office, PANYNJ

How Can Owners Better Match Risk Shifting/ Mitigation Strategies to Risk?

BACKGROUND:

The financial planning, the design and construction, and the operation and maintenance of long-lived physical assets—vertical structures or horizontal infrastructures—involve sets of relationships in a shifting environment of unequal information and imperfect understanding. Owners—in both private and public sectors—bear the ultimate responsibility for a capital project—from program definition to payment to commissioning and long-term operation and maintenance—and are concerned with budget, schedule, safety and quality, in a milieu that is the poster child for asymmetric information. Thus, a critical objective for participants is to align their interests in budget, schedule, safety and quality to increase the chances that a project will meet stated goals. Risk management methodologies, most often used by private sector enterprises to assess and manage risks across entire corporate operations, can be useful tools to help owners, in particular, identify opportunities to make their capital programs more efficient, beginning in the capital planning process, including the project development process, and ending with the project commissioning process. Risk management tools focusing on improving workplace safety on the construction job site can reduce the risk of harm to life and property as well as manage financial risk.

QUESTION(S):

What would a survey of risk management practices, in general and specifically in construction planning and execution, at large owner organizations, either public or private, reveal for owners?

What strategies can public owners use to better manage risk in construction, from planning to project operation and maintenance?

NEW The financial costs, for example, of failing to manage construction workplace safety risks can be significant in the context of owners' budgets as well as contractors' economic viability. What factors correlate strongly with safety records at owners' sites and at contractor entities? What strategies can owners and contractors use to improve job site safety practices on projects?

What options do the foregoing analyses suggest for government, as regulator, to improve job safety on all construction projects within a jurisdiction?

NEW How might public owners identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, planning and budget processes to assist with reforming systemic practices that better align risk shifting/mitigation strategies to risk?

PRACTITIONER PARTNER(S):

DDC, Law

What is the Relation of Variance in Public Construction Practices to Cost and Schedule?

BACKGROUND:

New York law constrains all public owners in varying degrees due to its historical disfavor of negotiation in construction service procurement and contracting. As a result, some project delivery methodologies and management methods, such as the Design-Build and Construction-Management-at Risk, commonly used by private owners, as well as public owners governed by different laws and regulations are not permitted on most public projects in New York.

While the 1979 Model Procurement Code influenced the City's procurement provisions in the Charter, State public construction law prevents the City from utilizing some of the more flexible procurement tools included in the Charter, and the City's construction-related procurement rules further integrate the Charter with State law. State-created authorities operating at the State level and at the local government level have different public procurement and contracting provisions, though most of them hue closely to the State's traditional public works methodology. Recent law, however, authorizes design-build for the horizontal infrastructure projects of a handful of state-level departments and authorities with such types of projects.

However, variations in construction contracting practice that fall squarely within the parameters of State law and local regulations may also have significant impacts on public owners' performance in project execution. These include variations in the roles played by construction managers and resident engineers, as well as variations in the use of pre-qualification, a tool that is now more widely available as a result of a recent change to State law. While several steps in the process are prescribed state and local law and regulations, internal operational approaches to execution can differ among agencies.

A survey of practices across the City and State, including those state-created entities operating at both levels, and at public owners in other jurisdictions, may provide insight into feasible ways to make processes more efficient, while still promoting the laws' articulated values. To the extent methods may require changes to State law, New York public owners have historically been hampered in their efforts to pursue greater flexibility under State law by the absence of reliable data and analyses concerning the savings and other benefits potentially to be derived from other methods.

QUESTION(S):

Working from the comparative analysis of City agency practice, what is the relation of agency practice to project performance—schedule and budget?

What are the variances in practice among City agencies that procure large-scale construction services?

What would a comparative analysis of operational practices in the contracting process reveal?

What would a survey of practices by other public owners that have adopted 1979 Model Procurement Code provisions reveal as possible options for consideration, either within the current legal framework or in the context of legislative reform?

PRACTITIONER PARTNER(S):

DCAS, DSNY, Parks, EDC, MOCS, DDC, Mayor's Office

How to Manage the Impact of Politics on Project Costs and Execution?

BACKGROUND:

Since there are many components of cost increases for public projects, one issue in evaluating cost increases is deciding when, during the capital-planning-to-project-execution continuum, it is appropriate to establish the baseline measure of cost estimates upon which to evaluate the increase in costs. Unlike the private sector, in which decisions about whether and how to do a project are completely private, in the public sector, the planning and execution of public projects take place in a public and politicized process.

The public capital budget process anticipates a post-adoption process of increasing understanding of the project, which often increases the project estimates figures, yet the public often views these increases as evidence of public sector incompetence, at best. But a process that permits more projects into the capital budget due to unrealistic initial cost estimates, for whatever reason, results in slowing them all down, on the margin, as funds to make up the difference need to be found, usually from other projects, resulting in the delay or elimination of projects which may by then have a public constituency. Further, agreements with the surrounding community about related amenities can exacerbate the upward slope of project costs. Moreover, some academics have suggested the politics of capital planning extend to the purposeful underestimation of costs and overestimation of benefits in order to obtain political buy-in from the taxpayer public.

Since it is not possible or desirable to eliminate the politics of capital planning and budgeting, developing a better understanding of the impact of politics on the capital program might, however, enable public owners to craft capital plans and budgets that better reflect the impacts.

QUESTION(S):

How can public owners develop a reference-class forecasting model for use in their existing capital program process?

What are the political forces and/or project characteristics that determine whether a project is included in the capital plan and/or budget?

NEW How might public owners identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, planning and budget processes to assist with reforming systemic practices that are vulnerable to the effects of politics and that contribute to cost drivers and schedule volatility?

What are the political forces and/or project characteristics that determine whether a project is executed through project completion?

By what characteristics can capital projects be grouped to determine patterns in over- or under-budgeting?

PRACTITIONER PARTNER(S):

DEP, OMB, DDC, EDC, PANYNJ

How to Increase Public Project Planning and Scheduling Certainty?

BACKGROUND:

Understanding the overall timing of a project – how long it will take a public agency to move from "idea" to "building" to "completion" – and what factors influence decision-making as well as actual project execution would help a public owner better estimate a project's schedule and better plan its capital program. Elected officials frequently make commitments to constituent groups to deliver certain projects – for example, libraries, firehouses, improved streetscapes, parks. Yet the insufficient level of understanding of project scope and client needs when the project first surfaces in public, often near budget adoption, results in unrealistic estimates of cost and schedule and corresponding unrealistic expectations that construction agencies are thus often in the position of not meeting. The complexity increases when projects involve more than one public entity or participation by other levels of government or private sector organizations.

A seminal study observed that, among the many factors that cause change in project schedule and costs, changes in the macro-environment of a project is a key determinant. The macro-environment for a project generally includes the political, economic and cultural environment, within which applicable laws and regulations, labor practices, and prices operate to impact schedule and costs. The study also noted that regulatory requirements imposed by government have a significant impact. For private projects, the "government" is always an external factor, but for public projects, the "government" is not always external and is, to some extent, controllable.

QUESTION(S):

Based on prior Town+Gown research and analyses that included a literature survey, interviews quantitative analyses identification of data gaps, process analysis and mapping, what are the next steps to create a risk simulation model to predict schedule and budget volatility?

NEW To what extent can reference-class forecasting methods be applied?

How might a public owner design a quantitative model to evaluate the impact of internal and external environment changes on project schedule?

What are best practices among public owners and large institutional private owners to manage schedule and cost volatility?

NEW How might public owners identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, land use and budget processes to assist with reforming systemic practices that contribute to planning and schedule volatility?

PRACTITIONER PARTNER(S):

CPD, DDC, OMB

What Is the Impact of Design and Materials Standards on Construction Costs?

BACKGROUND:

Large institutional owners have, from time to time, attempted to manage costs by imposing certain design and materials standards on their projects. In the public sector, the City has attempted this by city-wide construction standards and certain agencies with large numbers of a certain building type have implemented design and materials standards for some of their programs. There is the risk, however, in the bureaucratic environment of large institutional owners that standards once issued may not change quickly enough to take advantage of innovative design and construction techniques and new materials. The risk is that static standards may, at some point, fail to contain costs and lead to marginally more costly projects than were possible immediately after release of the standards.

QUESTION(S):

What would a literature survey on the use of design and construction standards in both public and private sectors suggest for large institutional owners?

What are best practices among public owners and large institutional private owners? To what extent do these best practices address the ability of a large public owner to change standards to respond to and reflect changes in technology, practices and materials?

NEW How can large institutional owners create protocols to assure standards evolve as "on the ground" reality changes?

To what extent do a jurisdiction's various building related regulations serve as default standards for both private and public owners?

In view of the City's practice with standards, it may be possible to conduct a quantitative analysis of the effects of standards on costs. Based on the qualitative analyses above, how might the City design a quantitative model to evaluate the impact of standards over time?

NEW To what extent can the International Organization of Standardization methodologies and tools be useful?

PRACTITIONER PARTNER(S):

CPD, DDC

How Do Other Cities Do It—Pro-active Infrastructure and Building Maintenance?

BACKGROUND:

The task of maintaining public infrastructure and buildings is technically difficult and subject to competing forces including the political benefits that accrue to visible new and expansion projects. On the technical side, however, some jurisdictions are using protocols and/or technology to inspect and evaluate existing infrastructure on a regular inspection cycle, using software to evaluate/compare previous inspection results and to estimate when repairs will be needed to prevent failures.

QUESTION(S):

What would a literature survey of infrastructure assessment techniques and technologies suggest to public owners?

How do agencies and local governments in the State and across the country evaluate infrastructure asset condition and what protocols do they follow?

What available technologies are best suited for infrastructure and building condition assessment?

How effective have these protocols been; specifically, how well have they projected rates of deterioration?

NEW How might public owners identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, planning and budget processes to assist with reforming systemic practices related to operation and maintenance of infrastructure and public buildings?

PRACTITIONER PARTNER(S):

DDC

How Can Owners Better Manage Scope Changes as Projects Evolve?

How might public owners identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, planning and budget processes to assist with reforming systemic practices that adversely impact projects by contributing to change?

PRACTITIONER PARTNER(S):

MOCS, EDC, DDC, Mayor's Office, OMB

BACKGROUND:

Change is an inevitable part of capital construction projects. Changes to projects have cost implications, rarely resulting in lower costs. Thus, it is especially imperative for public owners to understand and manage change at all times during construction. The capital budget processes of many public owners explicitly expect and establish mechanisms to accommodate change from project inception (at budget adoption) through the bidding process and beyond. For example, the City Charter includes a capital project "road map" with stages that each capital project must follow. This process expressly assumes that projects change over time, and it is in the interest of project budget and schedule to anticipate and manage such change.

Decisions made, or not made, during the planning and design phases have the greatest impact on final project costs, suggesting that what happens during these phases are critical to managing scope and, thus, final costs. The design phase is home to an alphabet soup of design management methods, often derived from those management methods in other industries, such as VE, FACD, TQM or Lean and ISO 9000; tools, such as BIM; service delivery methodologies, such as DB, DBOM and DBFOM; and contract forms, such as IPD.

QUESTION(S):

What is the menu of change management techniques in use and what has been their impact on cost and schedule?

What are best practices in both private and public sector construction and what would New York public owners need to do in order to adopt them?

How could a model be designed to evaluate the impact of various "alphabet soup" techniques, tools, methodologies and forms on project scope change and final project costs?

Future Workforce Needs and Development—Sources of Construction Professionals and Skilled Workers?

BACKGROUND:

There have been articulated concerns about the adequacy of the supply for all construction-related professions and trades. Demand for construction varies across jurisdictions and markets within the country, and across the globe, The sources of the construction workforce are thus subject to external demands as well as demographics. New York and the U.S. cannot continue to take for granted their earlier positions as attractive buyers of construction-related services. In addition, recent increases in environmental sustainability legislation across the country may be creating the need for new skills and increasing demand for existing skills.

What can public owners that are also regulators and economic development catalysts do to look ahead and work with the local professional and trades institutions to make sure that there is adequate pipeline of construction professionals and trades people available over the long term? How might public owners examine local supply and demand trends in the construction-related professions and trades, both past and forecasted, and identify steps necessary to plan for and insure maintenance of capital project excellence? What steps can such public owners take to match construction workforce supply with demand?

QUESTION(S):

What would a literature survey on the demand for and supply of construction professionals and trades suggest for public owners that are also regulators and economic development catalysts?

What do other agencies and local governments in the State and across the country do to attract and retain construction professionals and trades in the respective local economy, for both public and private projects? What are best practices?

What would a series of interviews at professional and trades schools suggest for public owners?

To what extent does an increase in "green" built environment regulation impact the supply and demand for construction professionals and skilled workers? Who needs to be trained to meet recent and planned environmental regulations and what is the current supply?

NEW How might public owners identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, land use and budget processes to assist with focusing on the connection between large public capital programs and regulatory initiatives on the local construction economy?

PRACTITIONER PARTNER(S):

DDC, MOCS, SBS, OLTPS

How to Bridge Organizational Divides to Create Culture of Innovation in Public Built Entities?

BACKGROUND:

It has become axiomatic that there is insufficient research in the built environment field. Problems in "informational transfer" abound, further complicating the ability to do effective research and development. Divides exist between academia and practitioners and within practitioner organizations. Focusing on the large public owners, one can see the divides that typically occur within large public bureaucracies, with vertical, hierarchical structures of command and control, applied to the built environment milieu. In addition, for public owners, divides between the "permanent government" and elected administrative apparatus over the long term can operate to dim institutional memory. The inability of knowledgeable agency staff to translate institutional memory effectively up the agency hierarchy and to elected officials every time an issue arises may be, in part, due to the complexity, the obscurity and technical nature of some issues, surrounded by a conventional wisdom that is as fragmented as is the state of formal analysis in this area.

QUESTION(S):

What are non-technological obstacles that prevent effective information transfers up and down the hierarchy within a public built environment agency and across a public owner entity that can then serve as a source of strategies to increase information transfers and make institutional memory more resilient?

What techniques are available to large government systems to bridge divides and move toward "smart" or "more informed" development and execution of capital programs?

NEW How might public owner entities identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, planning and budget processes to assist with reforming systemic practices that inhibit information transfer and retention of institutional knowledge?

PRACTITIONER PARTNER(S):

DDC

How to Evaluate Contractor Capacity to Undertake Public Projects?

BACKGROUND:

Despite the presence of large firms in the construction industry, the predominant business model for construction firms is the small business. There are two views on the prevalence of small businesses in construction. On the one hand, it may be socially beneficial to have small businesses, often emerging businesses, participate in the industry, growing over time. On the other hand, it may be viewed as an economically inefficient mode of industry organization. The organizational and capacity issues facing emerging and growing contracting firms are not unlike those facing emerging and growing not-for-profit service organizations. From the public owner's perspective, however, there are practical issues inherent in assessing the capacity of small businesses to work on large and/or complex projects. Further, under State law governing public construction procurement, while there are limits on how a public owner can disqualify a potential winning bidder, there is an ability to pre-qualify bidders.

QUESTION(S):

In view of current methodologies to analyze the capacity of organizations, the composition of the local construction market and the needs of projects in public capital program, how might public owners design tools to the assess the capacity, including financial capacity, of vendors to perform on various public projects?

PRACTITIONER PARTNER(S):

DDC, MOCS, SBS

What is the State of Building Information Modeling and Integrated Project Delivery in Public Sector Construction?

BACKGROUND:

Some design management techniques and project management tools emerged from the industrial design field and were applied to construction, while others emerged from the construction field itself. Despite their different origins, successful techniques share a basic precept that the earliest practicable and continuous application of these techniques, including all relevant participants and stakeholders in the process, works best for the project at hand. The newest entrants to the firmament consist of a technological tool—Building Information Modeling or BIM—and an innovative service delivery methodology—Integrated Project Delivery or IPD.

BIM originated from parametric solid modeling (PSM) software used in the automotive and aerospace industries, and as these software platforms evolved and became less expensive, they migrated into the field of physical structures. BIM can hold large amounts of data—spatial, schedule and cost—permitting users to explore various building designs at the earliest possible stage as well as the inter-relationships among design, constructability, schedule and price. Public owners have been using BIM, though their ability to fully exploit its benefits is limited when a public owner can only use the design-bid-build methodology which imposes a temporal divide between the designer and contractor.

IPD is an innovative relational contractual arrangement in which the owner, designer and contractor, manage project risk by contractually sharing, as early as possible in the life of a project, responsibility, risk and reward. Public owners constrained by public bidding requirements that preclude vendor selection based on value as well as contract negotiation, cannot use this innovative methodology in its pure state.

QUESTION(S):

What would a survey of large public owner's use of BIM and/or IPD reveal of public owner adoption of BIM/IPD?

What is the relation of BIM and IPD use in the public sector to existing tools and techniques currently in widespread use?

How do public owners constrained by law utilize features of either BIM or IPD? How do current laws impede adoption of IPD principles, and full use of BIM technology?

What has been the relation of BIM to IPD on public projects?

What has been the experience of owners—private owners and especially large public owners—that have embraced either or both BIM and IPD?

To what extent have the building professions and trades, embraced BIM and IPD?

NEW How can public owners better integrate BIM and its related design and construction software packages into the design process?

NEW What opportunities arise from the information exchange standards that bridge the gaps from design through construction to facility operation and management?

NEW To the extent public owners use BIM on projects, what are the "upstream" applications, if any, and related issues for pre-preliminary project planning?

NEW To the extent public owners use BIM on projects, what are the applications and related issues for project site safety?

NEW To the extent public owners use BIM on projects, what are the "downstream" applications and related issues for post-completion operation and management?

NEW How can public owners implement BIM, IPD and life-cycle operation and maintenance in a lowest competitive bid/design-bid-build statutory environment? How would public construction procurement law features operate on an IPD approach to using the project contingency allocation during construction as changes conditions appear?

NEW How might public owners identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, planning and budget processes to assist with reforming systemic practices to facilitate the use of BIM technology and the application of IPD principles to the extent practicable in a public capital program environment?

PRACTITIONER PARTNER(S):

DDC

What Can Public Built Environment Data Tell Us?

BACKGROUND:

Public owners as governmental entities collect data as part of the various processes they manage from the organic processes of government itself to the regulation of both public and private sector entities within their jurisdiction. Analyses of routinely collected data, especially data collected over a long period of time, can tell us things we did not think to study earlier. Analyzing data initially not collected for the purposes of research can be challenging, but, hidden in the trove of unexamined data may be treasures. The City's built environment data includes cost-related data and performance-related data. The City's various built environment regulators also collect process-related data that can be relevant to cost and performance analyses.

On the cost side of the divide, there is a panoply of studies that could be replicated using City project-specific data, once it has been catalogued and analyzed, identifying data gaps that might be compensated by proxies, outside data or specific surveys. For example, there are studies analyzing the relation of prices bid to predatory bidding as well as to the magnitude of change orders. There are studies analyzing the relation of original cost estimates to final costs, implicating elements of the politics of public construction. There are studies analyzing the relation of initial project and/or life cycle costs with service delivery methodologies. There are also studies analyzing the costs associated with negotiated construction methodologies and with auction-based construction methodologies, suggesting aspects of appropriate construction contract design to align principal and agent interests in a situation of incomplete information, the definition of a construction project.

Recently enacted and proposed environmental sustainability legislation has increased the need to understand the performance side of the divide. Once the data cataloguing has been completed, current legislation requires developing citywide standards for data the City collects on capital projects, buildings, energy use as well as possibly other sustainability metrics, as well as a meaningful centralized approach for tracking energy and sustainability data as the City complies with its sustainability laws.

QUESTION(S):

Focusing on either the City's built environment cost data or the performance data:

What would a survey and cataloguing of such data suggest?

Based upon the surveys above, what would the most effective strategy be the City to pursue to systematically analyze such data to illuminate the nature of its practices, policies and mandated processes?

After identifying data gaps to address analytical needs, how should the City deal with creating appropriate data going forward?

NEW How might public owner entities identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, land use and budget processes to assist with reforming systemic practices that generate and use data?

PRACTITIONER PARTNER(S):

DDC

"Rubber Meets the Road" Explorations—What Happens after Game-Changing Regulations Enacted?

BACKGROUND:

Over the last ten years, the City has set in motion a number of initiatives that have the potential to dramatically reduce the physical city's environmental impact on a local, regional, and global scale. DDC's Office of Sustainable Design stewarded green building pilot projects and published several sustainability-related design guideline handbooks and reports, all of which formed the basis for Local Law 86/2005, the City's first "green building" law, adopted before the City's comprehensive environmental sustainability policy initiative, PlaNYC, was released. Since then, PlaNYC has powered the concept of a pilot approach with related legislative packages. After Local Law 86/2005 was adopted, PlaNYC has led to the adoption of coordinated sets of legislation addressing issues identified in PlaNYC.

As these initiatives mature and agencies have experience administering their provisions and collecting data generated by their operation, there will be opportunities to evaluate them and possibly reform them over time. Specifically, in regard to Local Law 86/2005, the following questions have arisen as the Mayor's Office of Environmental Coordination, which is charged with administering the law, updates the regulations that guide the law's implementation. By focusing on actual technical issues that have arisen under Local Law 86/2005 and making specific recommendations, this project can also serve as a broader case study to inform the implementation of other environmental sustainability laws as they mature in implementation.

QUESTION(S):

Evaluate whether specific LEED points that are optional in LEED should be required under new rules being considered for Local Law 86/2005.

Evaluate whether LEED 2012 has any characteristics that would make it unreasonable for Local Law 86/2005 rules to require in capital building projects receiving City funds.

Investigate whether a LEED 2012 Gold requirement for all occupancies, instead of Silver 2012, would be reasonable to require in Local Law 86/2005 rules.

Investigate whether a LEED Silver rating level using LEED for Schools 2012 would be reasonable to require in new rules being considered for Local Law 86/2005 (current requirement for schools is LEED Certified under 2009).

Using case studies and existing precedents, investigate whether requirements in proposed rule revisions, especially for water efficiency and energy efficiency, are feasible and cost effective, but still ahead of the curve relative to NYC Code, assuming all Green Code Task Force proposals will be adopted.

Articulate the key differences in applicability/requirements between Enterprise Communities, LEED for Homes, National Green Building Standards, and LEED for Midrise.

Evaluate differences in level of energy efficiency required between various ASHRAE 90.1 standards adopted by New York State and New York City energy codes and by applicable LEED rating systems, with and without Appendix G.

PRACTITIONER PARTNER(S):

MOEC, DDC

How to Develop an Evaluation Tool for Sustainable Design and Construction Initiatives?

BACKGROUND:

Over the last ten years, the City has set in motion a number of initiatives that have the potential to dramatically reduce the physical city's environmental impact on the local, regional, and global scale. Many of these initiatives also have social and economic dimensions. Collectively, these efforts are typically referred to as "sustainable" initiatives, and have chiefly taken three forms: pilot projects, policy statements/plans and related legislative changes.

On the pilot project front, DDC's Office of Sustainable Design stewarded green building pilot projects and published several sustainability-related design guideline handbooks and reports, all of which formed the basis for Local Law 86/2005, the City's first "green building" law. Around that time, several other local "green" laws were passed, including laws addressing environmentally preferable purchasing in 2005 and addressing emissions from off-road construction vehicles in 2003. Since then, other agencies have begun making changes to standard practice that do not require legislation. For example, DOT developed, with many other agencies, its new street design manual, paving the way for changes to standard roadway reconstruction specifications allowing for sustainable practices.

The City's PlaNYC policy initiative, produced by OLTPS, powers the concept of a pilot approach with related legislative packages. While "green" legislation had been enacted before the release of PlaNYC, following its release, coordinated sets of legislation have now been adopted. The first set of bills, the Greater Greener Buildings Plan, was enacted in 2009, followed by a package of legislation related to water efficiency. Several initiatives related to open space requirements and goals were also included in PlaNYC, and a citywide effort to "green" infrastructure has gone into implementation. The City has also leveraged nonprofit organizations in order to meet the goals outlined in PlaNYC.

When these initiatives have matured in operation, it will become possible to evaluate their impact in order to inform future initiatives and tweak existing ones.

QUESTION(S):

What would a literature survey about evaluation tools for environmental sustainability initiatives suggest for the City? What evaluation tools outside the environmental sustainability area could be modified for use in evaluating environmental sustainability activities?

What are best practices in environmental sustainability activity evaluation across the country that would be suitable for large dense urban area such as the City? Do any of these best practices reflect the economic, environmental and equity paradigm? What data is required to be collected for such analyses? What monitoring systems need to be in place?

What different approaches would be necessary to evaluate the impact on the municipal portfolio and on the private sector?

Based on the above work, how might the City design an evaluation model/conceptual cost/benefit model for its various environmental sustainability programs?

Given that the economy of New York City is the biggest regional economy in the United States and the second largest city economy in the world, how could the City evaluate the extent to which these initiatives affected related markets?

Now that several of DDC's pilot projects been operational/occupied for many years, how would DDC evaluate how these completed pilot projects are performing from an environmental resource perspective?

PRACTITIONER PARTNER(S):

DDC, OLTPS, PANYNJ

How to Improve Job site Safety Practices?

BACKGROUND:

Mandating an appropriate level of safety—to the general public and to the construction participants—is an objective of many built environment regulations. The public and private owner's contract documents and the financing documents under which the private owner borrows also impose risk management requirements to manage the risk to life and property during the construction process. There is a cost to ensuring job site safety and a cost to failing to ensure job site safety, sometimes both occurring on the same project. The financial costs, for example, of failing to manage construction workplace safety risks can be significant in the context of owners' budgets as well as contractors' economic viability. In order to get a handle on the risk management of job site safety, it is important to understand the nature of job site safety practices and how to improve them for the participants on a job site and for the purposes of regulatory efforts.

QUESTIONS:

What construction safety practices have been shown to be most successful?

NEW What factors correlate strongly with safety results on project sites and within contractor entities? What is the correlation between construction site safety results and leadership effectiveness and safety focus of the owner and/or the owner's representative at the construction site? What are the most important leadership actions construction site personnel can take to avoid construction-related accidents? What is the most effective combination of training and experience that owners and contractors can invest in to maximize safety performance? What strategies can owners and contractors use to improve job site safety practices on projects?

To what extent are 'best practices' 'universal' in nature?

Are there particular practices of importance in certain kinds of project but not others?

What changes in current New York law and current New York regulations could be implemented that would encourage 'best practices'?

What would analysis of reportable injury rates data reveal for government as regulator and as owner?

What is the relationship of leadership to the application of best practices?

NEW How might the City revise regulations to increase the chances of best practices at both private and public projects and/or revise its construction contract to increase the chances of best practices on its own projects?

PRACTITIONER PARTNER(S):

DDC, Law

How Can Owners Keep Their Standardization Practices Current and Effective?

PRACTITIONER PARTNER(S):

MOCS, DDC

BACKGROUND:

Large institutional owners have turned to design and materials standards and, in particular, standard specifications contained in bid documents to attempt to manage costs and quality. There is the risk, however, in the bureaucratic environment of large institutional owners that standards, once implemented, may not change quickly enough to take advantage of innovative design and construction techniques and new materials. The bureaucratic tendency is compounded in an industry that has historically been slow to adopt innovative methods and materials. Failure to update standards increases the risk that static standards may, at some point, fail to contain costs and/or maintain a certain quality.

QUESTION(S):

What would a literature survey on the use of design and construction standards in both public and private sectors suggest for large institutional owners?

What are best practices among public owners and large institutional private owners in adopting and updating standards? To what extent do these best practices address the ability of large owners to change standards to reflect innovations in practices and materials?

To what extent would standard specification practices from the industrial design world be applicable to construction in general and to public construction in particular?

What is the relation of building regulations and standards practices at both public and private owners?

NEW How might public owners identify and then leverage various planning opportunities embedded into long-established, and to some extent legislatively mandated, planning and budget processes to assist with reforming systemic practices related to standardization of built environment elements?

How Can Public Owners Embrace Life Cycle Costing?

BACKGROUND:

To the untrained observer, it would seem that the public sector has historically turned a blind eye to life cycle costs. Outmoded conceptions of the construction product, participants and process inform existing public construction and finance laws and create disconnects in the practices at public owner entities. These outmoded statutory schemes are often not within the control of most public owners. For example, outmoded statutory schemes that control local government activities are often creations of higher state law, leaving public owners unable to change practice effectively. Other processes and practices are within the public owner's discretion, but historically politics have intervened and discouraged policy and practice improvements.

The rational public owner, and equally the rational taxpayer, should want the public owner, or government, to provide school buildings, road and bridges, drinking water and waste water treatment facilities and their related services over many years, necessarily implying and acknowledging that operation and maintenance costs after initial construction costs must be paid. Yet many factors conspire against the explicit and early assumption and planning for such life cycle costs, and debt service, as part of the initial public investment decision processes. First, some public procurement laws require a focus on initial costs only. Even the most sophisticated long-term financial planning systems project out, at most, five fiscal years, too short a period to effectively link the projected operation and maintenance costs to the expense budgets outside the plan period. The politics of capital projects may further conspire to overestimate benefits and underestimate the costs, whether initial or life cycle, of proposed projects. Finally, for existing infrastructure, the estimates of state of good repair activities, done correctly, may overwhelm capital budget resources, crowding out the politically popular new and expansion projects. Public finance techniques available to local governments may exacerbate capital program volatility. What's a public owner to do?

QUESTION(S):

What would a literature survey on large public owners, across the country and outside the U.S., related to financial sustainability concerns, suggest for public owners like the City?

What are best practices among large public owners, both across the country and outside the U.S.?

NEW What public finance vehicles, including the utility-fee model and the impact fee model, are in use across the country and to what extent do particular vehicles align with types of projects and uses?

Since legal and policy-based restrictions on the use of capital and concession-derived funds for life-cycle funding vary across jurisdictions, a separate analysis of such restrictions would be helpful.

What kinds of statutory changes—at both State and local levels—would be required for the City to implement these identified best practices?

NEW What elements of the public-private partnership methodology can be applied to the traditional processes of planning, financing, construction, operation and management of public capital projects and how?

What is the relation of systemic deferred maintenance investment and capital-funded renovation/expansion projects?

How can public owners effectively balance state of good repair capital needs with needs for new and expansion projects?

NEW What techniques and methodologies are available to bridge the temporal divide between capital program planning and budgeting and expense budget results from project operation, maintenance and debt service?

NEW How might public owners identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, planning and budget processes to assist with reforming systemic practices related to life cycle costing of built structures?

PRACTITIONER PARTNER(S):

DDC, OMB, MTA ESC, MTA SI

How Can the City Apply Life Cycle Costing to Its Street and Public Space Programs?

BACKGROUND:

The City is at the forefront of the nationwide shift to a more effective and holistic approach to funding, building, maintaining and managing streets. At the root of this transition is the recognition that every street serves a number of functions beyond the movement of vehicles. The reliability of any project assessment depends on the use of criteria that accurately reflect a street's particular functions while drawing on reliable cost and durability data for materials under consideration. At the same time, in the design and construction of its streets and public spaces, the City seeks to use materials that are high-quality, durable, and cost-effective. As the natural environment consists of various inter-related systems, the way the City thinks about its built environment and how it funds it must mirror such inter-related systems.

As the result of prior Town+Gown analyses, the City now has a model for life cycle costing of environmentally sustainable streets and public spaces as well as some data and identified cost data gaps. As a general matter, these data gaps arise from the City's organizational structure and budget process that do not support the cross-systems approach demanded by environmental sustainability. For example, cost data for post-completion maintenance expenses may be spread across a variety of agencies, with varying degrees of specificity, and not with the agency that constructed the infrastructure. The City's recent experience with cross-systems thinking on storm-water issues may serve as a model for other infrastructure types with similar environmental cross-systems aspects. But some of the data gaps could be filled immediately with follow-up research extrapolating from available data collected for other purposes. Projects undertaken for this question would take prior completed work to the next level.

QUESTION(S):

What useful data is already being collected and/or studied across the City agencies?

After identifying data gaps to address analytical needs, how should the City deal with creating the appropriate data going forward?

What options are available to the City to deal with data gaps? Would non-City data sources provide usable data? Are there proxies available in existing City data? What kind of survey techniques might be appropriate?

What already-available data could become more broadly useful through minor changes to current processes for gathering, cross-agency dissemination and analysis?

Since streets and public spaces are one example of the many cross-systems that exist, how should the City go about developing citywide standards for measuring operation and maintenance costs as well as project performance across agencies? What kind of measures would be appropriate for city-wide application?

NEW How might public owners identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, planning and budget processes to assist with reforming systemic practices related to life cycle costing of built structures?

PRACTITIONER PARTNER(S):

DOT, DEP, DDC

How to Modify the Practice of Pre-Qualification to Increase Quality in Construction?

BACKGROUND:

State law change in 2008 permits New York public owners to pre-qualify public works contractors prior to bidding. Putative benefits of pre-qualifying contractors, within the traditional competitively bid design-bid-build model, with the award to the bidder with the lowest price, include permitting the owner to consider qualifications, experience and past performance, prior to bidding, thus increasing the chance that selected contractors are capable of providing quality construction. In practice, however, instead of significantly raising the bar for quality contractors on a project, the practice of pre-qualification tends to merely assure a minimum threshold.

Across the country, however, there exists a wide variation in practice, in part reflecting the historical adoption of the various versions of the Model Procurement Code. The initial 1979 Model Procurement Code's embedded a statutory preference for competitive sealed bidding, but permitted variation when circumstances required it. The later 2007 Model Code for Public Infrastructure Procurement expressly eliminates this statutory preference and specifically authorizes multi-step sealed bidding within the competitive sealed bid context to provide flexibility in meeting public needs. These changes make it possible for public owners to focus on construction quality even within the competitive design-bid-build model.

QUESTION(S):

What would a survey of low-bid approaches across the country reveal?

Of the practices surveyed, what practices tend to increase the chances of raising the bar for quality contractors rather than establishing minimum qualifications?

What has been the experience of jurisdictions, such as Massachusetts, that make pre-qualification a central feature/active tool of their public construction procurement process?

How do other jurisdictions establish where to put the floor in order to raise the quality of construction work by raising the quality of those qualified to work on projects?

What would a survey of the pre-qualification practices at public construction agencies across the country reveal?

PRACTITIONER PARTNER(S):

MOCS, DDC

What Are Best Practices for Measuring and Evaluating Public Capital Project and Program Performance?

BACKGROUND:

Public owners that both finance and construct their capital programs measure the performance of individual projects as well as the capital program as a whole. The public's understanding of either the construction process or the capital budget process is limited at best, latching on to certain broad process measures that resonate with them despite the fact that these measures may obscure individual project issues or be at odds with project needs. For example, the City's current published citywide capital program data are process indicators. The commitment plan is a planning tool and most existing indicators, with exception of procurement indicators, relate to this planning document. The adage "what get measured, gets done" can sometimes serve as a warning. To the extent a public owner measures agency performance pegged to the overall capital program process, such as the "percentage of commitment plan completed" indicator, but not other project metrics such as cost, schedule, safety and quality, the other performance objectives may suffer. Measuring these other performance objectives in a meaningful way may help agencies improve practices to better manage what they can, exposing those variables due to external conditions beyond their control as well as those for which the owner, as regulator, may be responsible.

Finally, at a higher level, what constitutes a project's success or failure depends on the perspectives of the stakeholders who are being asked to evaluate it, or whose perspectives are deemed to matter from the professional manager perspective.

QUESTION(S):

What can case studies, told from multiple viewpoints, of completed, stalled and aborted public projects suggest to public owners about the broader context in which public programs and particular projects could be evaluated for success or failure? What are best practices for measuring individual construction project performance?

What are best practices for measuring capital program performance?

How do large, sophisticated public owners manage the relationship between the two types of performance measures?

In an attempt to move beyond metrics for individual projects, a set of projects from any particular administration or from any particular financial plan period or business cycle, what longer-term and broader metrics are available to take in the City as a whole? What longer-term and broader metrics should be included in future analyses of the City's capital program?

NEW How might public owners identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, planning and budget processes to assist with reforming systemic practices related to identifying measures of capital project and program success?

PRACTITIONER PARTNER(S):

DDC, MTA CPM

How to Bring the Municipal Workplace—Service Delivery and Administrative Spaces—into the 21st Century?

BACKGROUND:

The City has been developing an awareness that the design of workspace—as a place where City employees spend a significant portion of the week and as a place where the public interacts with government—has a direct relation to the provision of public services. Moreover, budget constraints have forced an awareness of publicly owned and leased spaces from a City-wide financial perspective. The City's sustainability agenda has generated both an awareness of the interconnectedness of human activity and the environment, further generating creative solutions to reducing greenhouse gases and carbon footprints. And, finally, computer technology is at a point where it can support a variety of organizational structures and permit flexibility within them so that bridging siloed sub-units within a large organization over a large geographical space, the scourge of organizational efficiency and effectiveness, is no longer science fiction, but is now possible. Private sector organizations have been making strides in all of these areas, oftentimes simultaneously. Yet, at least in the immediate local area, there has been no attempt to link these lines of development into a holistic vision of the municipal workplace in the 21st century.

QUESTION(S):

What would a literature survey of the relation of workplace design and performance in both public and private sectors suggest for a public employer and public owner such as the City?

What municipalities have experienced success in moving away from 20th century models of municipal workforce organization and service delivery in ways that are represented in built environment and in spatial terms? How did they achieve such success?

What are the real constraints—in statute and in practice (which may be related)—to adopting current private sector practices?

Linking the issues of workplace performance, enhanced service delivery, financial efficiency, environmental sustainability and existing technology, what could the municipal workplace look like in 20 years? What are the near-, intermediate- and long-term objectives for such an evolution? What appropriate strategies can the City pursue to achieve them?

PRACTITIONER PARTNER(S):

DSNY, DDC, DCAS

Who Does What on Construction Job Sites?

BACKGROUND:

The construction project is the poster child for information asymmetry—a complex process where the archetypal actors—owner, designer and contractor—attempt to cooperate while attempting manage risk, often by shifting risk away from themselves. Of the three archetypal actors, two—the designer and the contractor—are regulated with respect to the services they provide on the project. The state and local levels of government have various roles in the licensing scheme. Job site processes are influenced by historical practices as much as, if not more than, governmental regulation, so it is important to understand the origins and organizations of the trades and the professions. What happens on a job site may have roots in the master builder model from before the period of industrialization, as well as from the medieval guild model even further back in time. Past models and relationships may still be relevant and explanatory.

The most recent service delivery innovation, Integrated Project Delivery, requires the archetypal actors to manage risk on construction by contractually sharing, early in the life of a project, responsibility, risk and reward. Further, there has been greater interest in refining licensure regulations for safety purposes. Success in either endeavor requires understanding the differences among the licensing schemes, their historical antecedents and their economic implications. Building on a foundational legal analysis of the regulation of built environment participants in New York City, this project would focus on creating a reality-based taxonomy of who does what on construction sites. This taxonomy would permit a variety of analyses.

QUESTION(S):

What does a full taxonomy of who does what on construction job sites suggest for public policy?

What is the relation of actual jobs and responsibilities to the licensure pattern as well as to job safety regulations?

What are the historical antecedents to current job titles and functions?

PRACTITIONER PARTNER(S):

DDC, Law

Quantitatively-Based Investigations into Active Design

NEW How would introducing universal design change the analyses above?

PRACTITIONER PARTNER(S):

DHMH, DDC

BACKGROUND:

Historically, built environment design has achieved positive public health outcomes, from the public water and parks systems, the public sanitation program to housing and zoning laws. In the latter part of the 20th century, built environment design initiatives have ranged from developing pollution control features on factories (and cars) to eliminating toxic compounds from building materials such as asbestos and lead. At a time when the cumulative effect of contemporary planning and design have reduced the need for daily physical activity, public health researchers are now exploiting the relationship between built environment design and public health outcomes in the quest to reduce the incidence of obesity and its related chronic diseases. Physical activity has been found to prevent a host of chronic conditions. To illustrate, parks once provided respite from the week's strenuous labors, and now they must be designed to provide situations for physical recreation, because jobs are sedentary and people commute from home to jobs in a variety of powered vehicles. Contemporary building design—both commercial and residential—has reduced the number of opportunities for people to make up the slack in their physical activity. Active design principles in building design and in planning can increase the opportunities for daily physical activity that can help reduce the incidence of chronic disease.

QUESTION(S):

How would one design a cost-benefit model to test the impact of the City's Active Design Guidelines applied to various building typologies on building users' health status? What data exists to apply to the cost-benefit model described above? What data would need to be included in a survey to round out the necessary data?

How would one design a model to compare, over an appropriate time-frame, the cost-benefit paradigm for expense-funded wellness programs with the cost-benefit paradigm for capital-funded active design projects?

How to Evaluate the Co-Benefits Provided by Cross-Systems "Green" Infrastructure Projects?

BACKGROUND:

New York City's Green Infrastructure Plan to reduce combined sewer overflows by more than 12 billion gallons per year by 2030, or 40% from current levels, will employ various types of "green" infrastructure to achieve this goal. "Green" infrastructure such as Greenstreets projects, which are designed to manage storm water, blue roof detention systems, and green roofs, can be more cost-effective than standard wastewater treatment techniques and the benefit of these systems can be realized almost immediately.

The various green infrastructure systems manage storm water in different ways so that in certain circumstances some would perform better than others. For example, some existing buildings might be more suitable for blue roof systems than green roof systems based on the structural capacity of the existing building. By having a portfolio of techniques, the City will be able to address storm water management issues through a variety of responses. In order to assess the appropriateness of one green infrastructure technique over another, DEP takes into account many factors such as soil composition, depth to water table, configuration of existing structures, total cost, cost per gallon of storm water captured, location of the potential installation, and other baseline factors. This analysis helps DEP determine whether a particular green infrastructure technique is suitable and cost-effective for managing storm water in a particular location.

QUESTION(S):

How could the City expand the green infrastructure analysis described above in order to estimate and capture valuable co-benefits provided by green infrastructure across to other related systems?

How do other municipalities handle cross-systems approaches to green infrastructure? What are considered to be best practices?

How can the City estimate the technical cross-systems benefits, such as reducing energy used to cool and heat our buildings, reducing local air pollution, mitigating the impacts of greenhouse gas emissions, enhancing community livability, creating new biohabitats and increasing connectivity to support wildlife?

Of those benefits, how can the City estimate the costs/savings to the City budget that would be realized by other agencies?

NEW How might the City identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, planning and budget processes to assist with identifying, developing and managing other cross systems initiatives?

PRACTITIONER PARTNER(S):

DEP, DDC, OLTPS, DOT, Parks, MTA ESC, MTA SI

What Has Been the Impact of the City's Fiscal Crisis on Capital Program Practices and Policies?

BACKGROUND:

The City's fiscal crisis—the build-up to the crisis, the crisis itself and the legislated workout—is a well-studied and well-analyzed historical event. Typically, however, the analysis in prior work has been a high-level one. It is not immediately clear that any research has focused on the "inside baseball" impacts of the fiscal crisis, the impacts on the City government's institutional participants and day-to-day management practices. The capital program involves a good cross section of governmental processes against which to analyze the continuing impacts of events that took place as long as 36 years ago, with the actual fiscal meltdown and legislative solutions, and as long as 25 years ago, when the City emerged from a strict level of control by a State-controlled entity.

For example, when the crisis hit and virtually all construction came to a halt, the City's standard construction contract did not contain a provision to terminate the contract at the City's convenience. The absence of such a provision created a stream of construction claims that ended up at the Comptroller's Office for settlement. The Law Department, during the Koch Administration, created the Commercial Litigation Division, the job of which was to vigorously defend all existing provisions in the contract to staunch the flow of funds and monitor the contract to make sure that all appropriate risk shifting provisions were in the contract and revised as necessary.

Many of the various laws creating the City's planning and budget processes were informed by "systems theory" that was in vogue when those charged with establishing significant elements of such processes were considering alternatives. Aspects of systems theory in politics informed the basic structure of the budget that existed at the time of the fiscal crisis, the legislative reactions at the state and local level to the crisis and the major restructuring of government in 1989.

During the period between the creation of the legislative workout and the end of the control period, there was a close connection between the legal and budget objectives, policies and practices. During this time, the City's hallmark legislative initiative in construction—the campaign to repeal the Wick's Law—reflects the Program to Eliminate the Gap (PEG) mechanism, a quintessential feature of the budget practice imposed by the Fiscal Emergency Act. The campaign also reflects the reality the City found itself in as it emerged from a control period in 1986—having had to let most of the City's technical staff, especially engineers, go when there was no money to pay for projects, the City emerged from the control period with insufficient capacity to manage multiple prime contracts, which is required by state law. Further complicating matters, the state of building technology changed during the control period years, increasing the complexity of project management.

QUESTION(S):

What would an investigation of the impacts of the fiscal crisis and its workout on the policies and practices of all participants in the City's capital program from the time of the crisis to present time reveal to the City?

NEW How might the City identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, planning and budget processes to assist with understanding the impact of the fiscal crisis on the City's capital program practices?

NEW How can the systems theory methodologies be applied to analyze the existing processes to help understand the impact of the fiscal crisis on current practice?

PRACTITIONER PARTNER(S):

DDC

What Is the Impact of Less-Than-Perfect Levels of State-of-Good-Repair Investments—or Is Almost "Just-in-Time" Repair Good Enough for Infrastructure Systems?

BACKGROUND:

The City experiences impediments in planning for, and achieving, state of good repair investments. At the same time, the mismatch between long-lived capital assets and changes in the demand for the related services that inspired the project in the first place might argue against rigid application of planning, budgeting and execution rules that do not reflect such dynamics. Continuing evolving technology may also argue against rigid application of such rules, since replacing near or at the time of actual failure permits the replacement to take advantage of the latest technology. Further, there have been recent advances in applicable quantitative techniques such as hedonic place-in-place regression techniques for types of capital investment as well as engineering analytical techniques based on the epidemiological statistical modeling.

QUESTION(S):

What would a literature survey of capital asset condition assessment theory and practice and a complementary literature survey on recent innovative technology in asset evaluation techniques suggest to public owners such as the City?

How do the federal government as well as states and other local governments across the country evaluate asset condition and what systems do they follow to plan for, budget and execute such state-of-good-repair work? What are best practices?

Based on the literature review and survey of best practices, what elements should be in a public owner's state-of-good-repair standard that applies to and/or governs capital project planning, budgeting and execution?

What available technologies are best suited for asset condition assessment?

Based on the literature survey, how might the City design a quantitative methodology to evaluate the impact of less-than-perfect levels of investment in state-of-good-repair activities?

NEW How might the City identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, planning and budget processes to assist with understanding the multiple issues implied and implicated by the term "state of good repair"?

PRACTITIONER PARTNER(S):

DDC, OMB, MTA ESC, MTA SI

How Do Other Owners Do It—Systematic Planning for Services and Related Capital Assets?

BACKGROUND:

The planning of facilities and infrastructure related to programs/service delivery is often done by line agencies or departments in isolation from each other, making it difficult for system-wide planning to make optimal use of capital facilities. Theories on program performance and/or fiscal benefits from service delivery centralization or decentralization vary over time and with facts. But integrated systematic planning that focuses on both the service and the facility where it is delivered across the entire enterprise could yield improvements in service performance, optimization of related facilities and avoided costs.

Structures and infrastructure are no longer static items with fixed life spans. For large institutional systems, such as hospital systems and universities, the rapid change in technology has forced them to view their capital inventory more flexibly as combinations of systems with respective different useful lives that can be manipulated to meet anticipated and unanticipated needs. In addition, the current environmental sustainability agenda has increased interest in designing for sustainability over time as well as in adaptive reuse of existing assets. Further, recent trends in work standards, such as job sharing, telecommuting and flexible co-location of staffs from various offices across an organization also create tools for institutions to consider when dealing with future system needs.

QUESTION(S):

What would a literature survey suggest to public owners about the possibilities of integrated systematic capital planning?

What program performance and capital planning issues are raised by the concept of integrated systematic planning?

What are the various interests involved in and affected by such a methodology?

What types of integrated planning practices do other cities use to optimize their use of capital facilities?

What are best practices?

Based upon a model of the costs and benefits of the current methodology, what would the costs and benefits of possible alternative models be?

NEW How might the City identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, planning and budget processes to assist with understanding the multiple issues implied and implicated system-wide capital planning?

PRACTITIONER PARTNER(S):

OMB, DDC, DCAS

Technology Investigations into BIM: "Bottom Up" Analysis

BACKGROUND:

Some design management techniques and project management tools emerged from the industrial design field and were applied to construction, while others emerged from the construction field itself. Despite their different origins, successful techniques share a basic precept that the earliest practicable and continuous application of these techniques, including all relevant participants and stakeholders in the process, works best for the project at hand. The newest entrants to the firmament consist of a technological tool—Building Information Modeling or BIM—and an innovative service delivery methodology—Integrated Project Delivery or IPD.

BIM originated from parametric solid modeling (PSM) software used in the automotive and aerospace industries, and as these software platforms evolved and became less expensive, they migrated into the field of physical structures. BIM can hold large amounts of data—spatial, schedule and cost—permitting users to explore various building designs at the earliest possible stage as well as the inter-relationships among design, constructability, schedule and price. Public owners have been using BIM, though their ability to fully exploit its benefits is limited when a public owner can only use the design-bid-build methodology which imposes a temporal divide between the designer and contractor.

QUESTION(S):

How have owners handled issues related to the need for interoperability of various BIM programs among the participants?

What other technologies can be used in sync with BIM? How can data (surface and subsurface) obtained via 3-D laser scanning and other non-destructive technologies be integrated into BIM? Once such surface and subsurface data are integrated into the BIM program for a particular project, what are the opportunities for linking data in BIM to existing GIS databases? What are the opportunities for linking data in BIM and GIS databases on a system wide basis?

How can BIM (with GIS) technologies facilitate better/more successful operation and maintenance plans for public buildings and infrastructure? How can the transfer of information gathered during the design and construction process be facilitated for the lifecycle operation and maintenance of the completed project? How can the design and construction process under BIM be used to anticipate future operation and maintenance issues?

NEW Bearing in mind that the construction milieu is, from the management perspective, not dissimilar to that in other sectors and thus subject to the same analytical methodologies and perspectives, how would a public owner construct a model to evaluate:

- The cost benefit of introducing BIM at an owner—public or private
- What are all the variables, from training staff, investing in technology and training staff, to changing procurement policies and practices for contracted services, to use in operations and maintenance of the constructed building or infrastructure to extent owner also owns and operates?
- The differences in the cost-benefit model between a public sector owner and a private sector owner—what variables available in the private sector are not applicable in the public sector?

PRACTITIONER PARTNER(S):

DDC

Investigations in Managing Construction Projects

BACKGROUND:

As the construction industry emerged in the 20th century, from the "master builder" model to what we see as a complex system of production, industry participants have applied various management theories, techniques and tools, not dissimilar to those found in other industries or sectors, to their projects. Some emerged from the industrial manufacturing field and were applied to construction, while others emerged from the construction field itself. Despite differences in origins, management theories and techniques in construction are subject to analysis and evaluation as they are in the other sectors of the economy.

In construction, a critical aspect of management is "planning". Traditionally, this may be understood as the planning of budgets, schedules, resources and information flow. Once a project is initiated, management devotes itself to controlling the process and ensuring planned commitments are met while tracking results, identifying root causes when there are failures and taking corrective action where necessary. This approach to management focuses on project control rather than production control, which is the guiding principle in the case of industrial manufacturing. This project evaluates two approaches—the first is the application of lean production principles and the second is the application of risk management principles.

The first approach for this project would focus the application of lean production principles, first articulated as total quality management in the industrial manufacturing setting, to the construction project setting. Total quality management applied to construction, labeled "lean manufacturing", focuses on relating the principles of production control to construction. Conventional wisdom holds that manufacturing and construction are so different that the tools that work in manufacturing are not applicable to the construction project, which is essentially a "one off" every time. Extensive research has been done, which demonstrates that there are major components of the construction project that are very similar to manufacturing, and a range of tools and tactics have been developed to mitigate the variability of the remaining components. In fact, lean construction tools and tactics have been in use for years in other parts of the country and sectors of the market. This component of the project comprises an in-depth analysis of applied lean construction practices and an assessment of the potential for the application of these tools and tactics within the New York City construction market.

The second part of the project focuses on the application of risk management techniques used in a variety of settings to the construction project setting. Using the same approach for evaluating the application of lean manufacturing practices to construction, the second approach would focus on the application of risk management techniques, such as enterprise risk management, and tools, such as risk simulation models, specifically to public projects.

QUESTION(S):

What lean construction techniques and processes can be applied to projects in the city? To what extent would there be differences in application to public and private projects?

How would changes in productivity be measured? What, if any, would be the differences between public and private projects?

How do these techniques/processes improve productivity and eliminate waste?

What barriers exist to the adoption of lean construction on projects in the city? What are the differences between public and private projects?

What impact does use of technology, in particular building information modeling, have on application of lean construction?

PRACTITIONER PARTNER(S):

DDC. LeanNYC

How to Bridge the Divide between Public Capital and Expense Budgeting?

BACKGROUND:

The public capital budgeting process poses analytical challenges because even with a multi-year budget and financial plan protocol, a four-year forecast period is insufficient to account for the temporal realities of construction. The period covered in the investment decision methodology, which takes into account operation and maintenance during a project's life cycle and the debt service that finances the project, far outstrips any financial plan period, as do the real costs and benefits (negative and positive externalities) of construction. Moreover, actual construction of projects often span different political administrations, further attenuating the connection between the decision to invest and the budget consequences of such decision. If all that were not enough, the natural tendency of budgeting as a process of selective revelation is complicated by the construction process which, if not a process of selective revelation, is one in which the stakeholders collectively develop an increasing understanding of the project from the design phase onward.

QUESTION(S):

What mechanisms could be created to help public entities bridge the temporal divide between their capital and expense budgets in a public budget environment? For planning purposes? For educational purposes? For user entity accountability purposes? To align the interests of the public as principal and government as agent?

PRACTITIONER PARTNER(S):

DDC

GEOGRAPHY

In the questions that follow under GEOGRAPHY (formerly MANAGEMENT WITH AN URBAN PLANNING TWIST), some management issues are made more powerful when the owner is also a governmental entity with formal municipal planning powers. These questions are also of interest to planners working outside of government.

How Can Urban Planning Help Manage the Inevitable Mismatch between Static Capital Assets and Demographic Trends?

BACKGROUND:

Across the spectrum of public uses, there is always the potential for a mismatch over time between long-lived fixed capital assets and the demographic changes in populations that they were intended to serve as well as general changes in demand for such services. Demographic forecasting techniques are of limited predictive value. Public owners may find it difficult to change policies or practices quickly, especially in view of the practice of over-building public assets to assure they last "forever" in the face of historically insufficient maintenance after construction completion. This mismatch is further complicated in a highly built urban environment with little available land as a general matter and even less for public projects. Under such circumstances, currently underutilized public assets of many kinds might be considered as resources for future planned and/or unanticipated demand.

This topic has been the subject of two Town+Gown projects: one recommended developing plans for multiple compatible uses within underutilized structures, the other explored how two agencies might co-locate services within under-utilized structures. The idea that public structures, such as school buildings, can be shared productively by multiple human services agencies and groups providing social, educational, cultural and health services has been discussed since the early twentieth century. Difficulties in coordinating such efforts and allocating expenses and savings among separate agencies providing services have impeded implementation. Yet, the sustainability agenda has emphasized adaptive reuse of existing buildings, and trends in work standards have evolved to include job sharing, telecommuting and flexible co-location of staffs from various offices across an organization.

QUESTION(S):

How might the City improve on the long-term accuracy of demographic forecasting models underpinning the capital planning for all City agencies? What precautionary strategies could the City use to mitigate the inadequacies of demographic forecasting instead of playing catch-up when the mismatch between assets and demographics becomes obvious? Further, what planning techniques are available to the City to actively influence demographics instead of reacting to them?

Building upon prior work, how might planning strategies facilitate multiple compatible uses within underutilized structures of all types in order to optimize utilization of the City's existing capital assets?

NEW How might the City identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, planning and budget processes to assist with understanding and solving for this inevitable mismatch?

To what extent would requirements imposed by various regulations, including those governing agency operations and finance, impede co-location initiatives or other ways to reduce such mismatches?

PRACTITIONER PARTNER(S):

DDC, OMB, DCAS

How to Expand the Use of Cross-System Environmental Protection Methodologies?

BACKGROUND:

A pressing long-term issue facing the City's built environment is how to address climate change issues in a cost effective manner. As the natural environment consists of various inter-related systems, the City's built environment mirrors such inter-related systems, so that cross-system efficiencies may be possible. The most recent example of cross-systems thinking has been on storm-water issues. A related issue is determining the scale at which, or a combination of scales at which, a particular problem can most effectively and efficiently be addressed.

QUESTION(S):

Using the storm-water issue as the take off point, how should the City plan for and analyze other cross-system environmental protection options for future implementation?

NEW How might the City identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, planning and budget processes to assist with understanding and implementing cross-systems approaches?

PRACTITIONER PARTNER(S):

DDC

How to Promote More Sustainable Neighborhoods—Economically, Socially and Environmentally?

BACKGROUND:

The sustainability agenda has exposed the interdependence of all aspects of life, from the economy to the environment to human life, from the level of the social network to the level of individual health. Environmental sustainability requires accounting for the economy's negative externalities upon the environment, but once these negative externalities are identified, it becomes difficult to ignore related social externalities. The full cost accounting methodology, focusing on economic, environmental and equity issues (the 3 Es), provides a means to identify and assess the inter-related economic, social/health and environmental externalities from a proposed activity or action. Planning for development in an urban environment is a governmental action that results in economic activity that impacts both the social network—or neighborhood—and the environment.

QUESTION(S):

How might the urban planning function take advantage of the full accounting methodology to study the impacts of a proposed action on the neighborhood, and the wider jurisdiction, taking into account the economy, the social network and the environment?

How might the urban planning function use full accounting in an evaluation tool to measure the effects of a planning action within a neighborhood and within the jurisdiction as a whole?

NEW How might the City use the sustainable neighborhood concept to plan for more efficient and effective social services provision? How can both public and private sector actors collaborate within neighborhoods to integrate-both functionally and aesthetically-public services directly provided by government and those social goods subsidized by government?

NEW What is the relation of micro-scale infrastructure to macro-scale infrastructure? What is relationship of neighborhood level "buy-in" to system-wide performance? What is the relation of "bottom-up" thinking to innovative solutions at the neighborhood level? What types of incentive/accountability features at the neighborhood level should accompany macro-scale sustainability initiatives?

NEW What is the role/capacity of the neighborhood in planning activities? What could be the role of the neighborhood be?

NEW How can the full cost accounting methodology help define sustainability in a neighborhood context and the methods of evaluating/measuring it?

NEW What role can locational analysis play in evaluating micro-scale infrastructure performance vis-à-vis the whole infrastructure system, the impact of micro-scale projects at higher level system?

NEW How do regional realities of natural systems (those natural systems that do not match with any jurisdictional boundaries) compete with or complement the neighborhood perspective?

NEW How can focusing on full cost accounting sustainability at the neighborhood level Issue contribute to understanding of geographical/demographic distribution of infrastructure parts, especially those considered burdens on neighborhoods?

NEW How can a sustainable neighborhood focus inform the Interactions between people and built environment—the effects of built environment decisions on people, including issues such as displacement and health, and how they react to those decisions?

NEW To what extent can technical infrastructure materials and/or engineering technology provide a solution to some issues raised at the neighborhood level?

PRACTITIONER PARTNER(S):

DCP, DDC, MTA ESC, MTA SI

How to Repurpose Publicly-Owned Sites over Time: A Multi-disciplinary Investigation

BACKGROUND:

The City owns and manages a spectrum of properties across the City. The reasons for properties coming into City ownership and the uses to which such properties are put are almost as varied as the physical characteristics of the properties themselves. Further, these properties, with certain exceptions, are subject to a matrix of regulations. The Charter limits the methods by which the City may dispose of its property it deems no longer necessary. Whether to sell at public auction or to use as an economic development vehicle in a negotiated sale, the combination of prior use, land use restrictions and context and the local political context may conspire to make the disposal challenging, requiring a high level of creativity, drawing upon many disciplines, to repurpose the site.

As one example, the City has attempted several times to dispose of property it owns on Staten Island that was the site of the City's farm colony, the first welfare-to-work program for poor single men at the turn of the last century. In prior attempts to sell, the landmarked buildings on the site that are in various states of disrepair posed a problem for potential buyers. Further, the surrounding neighborhood has a variety of uses, but Staten Island has several land use/planning issues at the moment, including public opposition to randomly-placed residential projects (there is a growth management task force focusing on that issue). This property seems caught in a net of various regulations and programs as well as land use trends, and related backlash, on the Island, which has developed differently than the rest of the City.

QUESTION(S):

Focusing on the Farm Colony as a case-study and the issues raised by the history and regulated use of the site, the land use and political context of the site and the economics of real estate development in the City, what options might increase the number of potential buyers and/or the sale price to the City? The options should include new thoughts about how to repurpose the site as well as how to rethink prior attempts at sale. The components of the options should be evaluated for feasibility.

PRACTITIONER PARTNER(S):

DCAS, DDC, LPC

Urban Planning Investigations into Active Design

BACKGROUND:

Historically, built environment design has achieved positive public health outcomes, from the public water and parks systems, the public sanitation program to housing and zoning laws. In the latter part of the 20th century, built environment design initiatives have ranged from developing pollution control features on factories (and cars) to eliminating toxic compounds from building materials such as asbestos and lead. At a time when the cumulative effect of contemporary planning and design have reduced the need for daily physical activity, public health researchers are now exploiting the relationship between built environment design and public health outcomes in the quest to reduce the incidence of obesity and its related chronic diseases. Physical activity has been found to prevent a host of chronic conditions. To illustrate, parks once provided respite from the week's strenuous labors, and now they must be designed to provide situations for physical recreation, because jobs are sedentary and people commute from home to jobs in a variety of powered vehicles. Contemporary building design—both commercial and residential—has reduced the number of opportunities for people to make up the slack in their physical activity. Active design principles in building design and in planning can increase the opportunities for daily physical activity that can help reduce the incidence of chronic disease.

QUESTION(S):

How would one design a cost-benefit model to test the impact of the City's Active Design Guidelines applied to various building typologies on building users' health status? What data exists to apply to the cost-benefit model described above? What data would need to be included in a survey to round out the necessary data?

Using the Astor Place plaza as a potential case study, how would one design a model to measure the change in pedestrian use of street plazas pre- and post-construction?

How would one design a survey instrument to use for all constructed plazas in the program going forward?

NEW How would one design a survey instrument to evaluate the impact on health of proximity to parkland?

Physical activity has been shown to increase balance and cognitive functioning in elderly and tutoring in after-school programs has both physical and mental health benefits for seniors. Where are the senior centers and public schools with after-school programs that are within 1/4 mile from each other in the five boroughs? Are those streets sufficiently pedestrian-friendly to encourage seniors to volunteer in schools?

NEW How can public owners incorporate universal design principles in projects of all types going forward?

PRACTITIONER PARTNER(S):

DHMH, DDC, Parks

Studies in Healthcare: How Can Planning Help Manage the Inevitable Mismatch between Static Capital Assets and Technology Trends?

BACKGROUND:

Innovative technology can exacerbate the potential for a mismatch over time between long-lived fixed capital assets and the demographic changes in populations and service demand. Nowhere is this more evident than in the healthcare industry, where programmatic changes made possible by electronic technologies, which have been embedded in law by the recent federal affordable care law and American recovery and reinvestment acts, will have an impact on the physical infrastructure where healthcare is delivered. Advances in health information technology, notably the appearance and later mandated use of the electronic health record, has the potential for transforming not only the way healthcare is delivered but also the physical settings where it is delivered. Both government and the healthcare industry view the use of technology as central to changing the focus of payment methodology, shifting the focus from paying for procedures and the hard assets in which and by which they were delivered to paying for healthcare outcomes including maintaining community health. The image of the monolithic art deco hospital structure in 1950s movies, that gave way to the medical center model initiated in the 1980s, stands a very good chance of being rendered completely irrelevant as technology, in particular, health information exchange systems, transforms the way we think of healthcare and health, by making the practice of medicine possible across a continuum of care settings that will further change as health information exchange systems evolve over time, also informed by analyses of healthcare data collected by such exchanges.

QUESTION(S):

What does the future of healthcare delivery, facilitated by health information technology/exchange (HIT/E), look like “on the ground”? How can the future of health care delivery from a physical perspective be planned?

How is the development of HIT/E, in conjunction with other related healthcare trends such as federal financing initiatives, likely to impact the current inventory of healthcare physical assets? What other uses can be made of redundant or unnecessary physical assets?

How will HIT/E affect provision of healthcare viewed from a physical asset context? From a financing/reimbursement context? From a demographic context, including the aging of the population, the predicted physician shortage, trends in illnesses?

PRACTITIONER PARTNER(S):

DDC

Planning Investigations into Obduracy

BACKGROUND:

The urban built environment is composed of long-lived physical assets. Built artifacts have a tendency to become obdurate, to remain behind, sometimes with adverse impacts, when the conditions and theories that supported their creation have been eliminated or discredited. Built objects that form parts of systems become the subject of thinking about their nature in the larger civic project. Now we are concerned with environmental sustainability and economic development, 20 years ago our planning efforts had different ends and mean, and 20 years before that, still others. While an urban space is a work in progress, thinking about urban space continually changes. Yet the products of past theories and efforts remain in our physical space, creating obstacles for current and future theories and plans.

Moreover, many of the various laws creating modern urban land use and capital and budget processes were informed by "systems theory" that was in vogue when those charged with establishing significant elements of such processes were discussing and considering alternatives. Aspects of systems theory informed the basic structure of the land use processes as well as legislative reactions at federal, state and local levels to various social crises over the years.

Is it possible to study the evolution of infrastructure technology and planning theory from the various disciplinary perspectives to shed light on why objects remain in place when the animating needs and rationale disappear and are no longer valid. Is it also possible that quantitative analyses, looking at all manner of "on the ground" data, from construction to finance, can help shed light on this phenomenon?

QUESTION(S):

Different construction projects take dissimilar times to accomplish. The actual construction process is only one factor in the build-out period, with regulatory issues, financing, community engagement, bureaucratic consultation, and even weather also playing a role. Increasingly obvious is that the built environment itself also is a factor, whether it be the difficulty of rearranging underground infrastructure or the resistance of buildings to "easy" demolition. To what extent could a typology of difficulty be developed to aid in the scheduling of construction projects? To what extent can one predict obsolescence of various areas of the City based on the type of construction, the use, and the time during which the area was developed? Does where a building is located in the City—not just geographical space, but a space of growth/decline, investment/reinvestment/disinvestment—affect whether or not it is considered obsolete?

By now, several urban cities across the country have two statutory paradigms in effect—laws creating a process to impose mandated preservation of designated artifacts and laws aimed at improving the environmental sustainability of built artifacts. To what extent do the two paradigms support each other, to what extent do they work at cross purposes and, using them as a case study, how can they inform planning issues related to obduracy?

NEW How might an urban entity identify and then leverage land use planning and capital and budget planning opportunities embedded into its planning and budget processes to assist with understanding obduracy and resolve problems caused by obduracy?

NEW The federal interstate system changed American society. The resulting changes also changed the way Americans think about progress, the economy, the impact of what we do on the physical environment, the purpose and methodologies of planning, the urban-suburban-exurban-rural paradigm and a host of other ways to parse issues stemming from this transportation artifact. American demographics changed along with our conceptual changes and the physical assets kept on being used, expanded, maintained in various degrees, all the while effecting these changes and being affected by them. Using, as a case study, any particular interstate highway component artifact that has aged beyond the standard metrics of maintenance, what is/are the appropriate analytical paradigm(s) to assess what we should do with these artifacts? How should we set up the cost benefit analysis to reflect assets created under one set of imperatives that have aged into another?

PRACTITIONER PARTNER(S):

DDC

Estimating Human Impacts and Returns from Investment in Trees and Green Spaces

BACKGROUND:

PlaNYC set in motion a number of initiatives that have the potential to dramatically reduce the physical city's environmental impact on the local, regional, and global scale. As a result, the City has made and plans to continue making large investments in greening programs and public parks. Trees, green space, and the extent of tree planting efforts may be relevant to human health and well-being due to their effects on time spent outdoors and engagement in physical activity; affective and cognitive responses to views of or being surrounded by natural environments; and hands-on interactions through processes such as planting or gardening. As the PlaNYC-inspired initiatives mature and agencies have experience administering their provisions and collecting data generated by their operation, there will be opportunities to evaluate them and possibly reform them over time.

QUESTION(S):

At this point it would be helpful to get a sense of the types of research that can be conducted to provide policy makers with information about the ongoing impact of their investment in urban trees. Some specific questions are:

Do trees contribute to pedestrian comfort or safety?

How do culturally defined communities react differently to trees?

How do we construct environments that everyone responds well to?

How do views of/access to trees impact mental health, cognitive function, physical activity, absenteeism?

PRACTITIONER PARTNER(S):

Parks

The Capitol Revisited

BACKGROUND:

Inspired by the political disconnect between upstate and downstate, an architecture studio entitled "the Capitol" asked students to imagine the relocation of New York State's entire capitol ensemble to Long Island City, a site chosen for many reasons, including its location opposite that of the United Nations headquarters, the site of international governance. In view of recent large scale multi-use projects involving the bridging over of rail yards—one in Manhattan and one in Brooklyn—the bridging over of the Sunnyside rail yards is not as impossible as it was once thought to be. The establishment of the projects in Manhattan and Brooklyn reflect the use of many innovations ranging from finance techniques to socially-influenced zoning vehicles.

The physical reality of the rail yards helped nail the coffin shut on an innovative plan to move a creative industry from congested Manhattan to LIC in the 1980s. The location of Citibank's office town to LIC visually represented the beginning of modern LIC, but additional governmental intervention was necessary and in 2001, the City rezoned LIC to encourage mix-use development. Whether viewing the skyline from within LIC or outside of it, it is obvious that some of the hoped-for residential and commercial development has occurred. LIC is becoming a destination that rivals other outer borough destinations, lending doubt to the primacy of Manhattan in the minds of all New Yorkers. New York State government offices are scattered across the City, and State elected officials, including the Governor and Comptroller, have offices in the City as well.

QUESTION(S):

Creating a unified downstate ensemble to facilitate state government activities would serve to put a downstate face on the State, which works for all New Yorkers, and locating it in a place, important in New York City's and New York State's history, that is dynamically evolving at the present time, is the subject of this planning/urban design project.

- What lessons learned from the Hudson Yards and Atlantic Yards projects can inform the conceptualization of a Sunnyside Yards project? What lessons from past LIC plans and projects, those that worked and those that did not, should inform the conceptualization?
- What is the inventory of State programs and functions operating in the City? What is the ratio of State-owned facilities to leased facilities? How old are the State-owned facilities? Are there demographic trends that support the relocation of functions into an ensemble? Does this idea make sense?
- To what extent can creation of a government "anchor" support objectives of the 2001 rezoning, as well as other public policy objectives, such as full cost accounting sustainability?
- What would be needed to make such a plan economically feasible?
- Before completely dismissing the notion of moving the Capitol in its entirety downstate, under what conditions would such a move make Albany, New York City and the State all better off economically?

PRACTITIONER PARTNER(S):

DDC

NEW

How Do Continually Evolving Theories in the Urban Planning Field Impact Urban Planning Practice?

BACKGROUND:

What appears to be a cacophony when discrete planning activities and actions take place in the public sphere or when the political conversation touches upon elements of the physical built environment, may, in part, be the result of the process model known as collaborative strategic goal oriented programming, a goal-oriented planning process model that emerged in the late 1960s, which may be embedded in a certain land use-related laws enacted as the model took hold in theory and practice. Some current large scale planning and related zoning actions may reflect a rejection of the modernist approach to planning; they may reflect a belief that the physical environment affects human behavior, or a rejection of the implications of that belief; they may incorporate a sensitivity to the design of the urban fabric or its function; they may be intended to encourage various economic, social and environmental policy objectives embraced at one time or another. What we experience as planning objectives and tools that change over time are to some degree the result of a field that changes over time as well.

Urban planning is now a multi-disciplinary field that emerged as a conscious modern governmental function in the mid-19th century. On the disciplinary grid, from pure to applied and from hard science to the arts, planning is firmly within the applied and arts quadrant and may be one of the fields most receptive, or susceptible, to social trends. This broad multidisciplinary field includes study of its own history and techniques as well as topics from disciplines common to other multidisciplinary fields such as law and economics. Reflecting the multi-disciplinary nature of the field, public planning programs reside in schools of architecture, schools of public policy and administration, schools of design and geography departments. Those who are trained as planners work in and out of government, which is responsible for regulating land use within its jurisdictions, initially for public health and safety purposes. As planning has led to zoning codes and back to planning—comprehensive or less-than-comprehensive—in an iterative cycle to enable existing codes to reflect changes in current conditions and encourage those conditions hoped for, planning theories, practices and objectives keep evolving and influencing those doing the work inside government and advocating from outside government. In order to understand whether the cacophony is productive, it is first necessary to understand its historical origins as well as its source in law and practice.

QUESTION(S):

What has been the history of planning in the New York metropolitan area, with specific attention to the theories advanced by various schools whose graduates have populated the field locally and the initiatives formally adopted by government?

How do the elements of the City's land use planning process, embodied in past and current law, reflect the evolution of planning purposes and theories; where are/have been the gaps and what are possible reasons for them?

PRACTITIONER PARTNER(S):

DDC

ECONOMICS

An economic focus makes it possible to see government acting in and on the built environment in the different roles it plays often simultaneously. For example, it permits analysis of public owners when they act in their role of economic catalyst, economic policy maker, as regulator and as financier. The City builds, through its capital program, a significant portion of New York City's public realm. The public works or capital programs of all levels of government are, in essence, work orders for facilities relating to "social" or "public" goods and to "mixed goods" that correct for negative and positive externalities, and while engaging in such activities, the City acts in its role of economic policy maker. In its role of regulator, the City directs and regulates private capital participation in the public realm (e.g., utilities—telecommunication, electricity, gas) and regulates the safety of the construction process and the products of construction of both public and private owners. Moreover, the practices of large public owners within a regional construction market have impacts on such market. The City also acts in the role of financier when it funds, by the issuance of its own debt, the construction of such social goods, or when it provides subsidies in numerous forms to other entities to enable them to construct such social goods by reducing their overall cost, which, to some extent, may be impacted by regulation.

Future Workforce Needs and Development—What Are the Conditions for Construction Business Formation and Success?

BACKGROUND:

The fragmented construction industry contains many sub-markets within a local area and a wide spectrum of organizational forms. To some degree, the size and complexity of prevalent construction project types can define the nature of the local market. The local market for Manhattan, dominated by high-rise offices and housing structures, is quite different from the local market for Brooklyn, dominated by low-rise multi-family housing. Further, the industry is also a haven for small businesses. Despite some consolidation in the industry, after the several top national firms, the size and revenues of the remaining construction companies drop off sharply.

Research and analysis are necessary to understand the local construction marketplace(s) better in order to develop appropriate strategies to fill market gaps, to help support business capacity development, especially for small businesses, and to increase/preserve competition by reducing unnecessary barriers.

QUESTION(S):

What would a literature survey on the origins and life cycle of construction contractors and subcontractors, the sources and training of entrepreneurs, the internal and external barriers they face, and the components of success suggest?

What would case studies of several small construction businesses across the City suggest?

What do other agencies and local governments in the State and across the country do to increase small construction business capacity? What are best practices?

What would analysis of defaulted contractors and contractors in trouble during construction reveal about small business capacity issues and issues businesses face as they try to move from one level to the next?

After the qualitative work above, designing and conducting a survey for small businesses in a particular market may become feasible.

PRACTITIONER PARTNER(S):

SBS, DDC, MOCS

How Do Service Delivery Methodologies Increase Alignment between Principal and Agent?

BACKGROUND:

Modern methodologies permitting owners to match project needs with the services of construction professionals include design-build, design-build-operate-maintain, and design-build-finance-operate-maintain, and require "best value" selection criteria currently not permitted to many public owners. For the most part, New York State law prohibits public owners from using the modern successors to the traditional design-bid-build methodology that private owners have used for many years.

The various service delivery models allocate and manage risk among the owner, the designer and the constructor in different ways. The appropriateness of a particular service delivery model depends on the complexity of the project and the internal capacities of the parties. There is no one perfect service delivery model—the benefits and disadvantages of the models vary with the particulars of the project and the parties.

QUESTION(S):

What would a literature search on the relation between service delivery methodology and project schedule, budget, safety and quality suggest?

To the extent a literature review uncovers quantitative analyses of actual construction projects, how might a quantitative model be designed to permit analysis and comparison of service delivery methodologies by project type?

What are the quantitative and qualitative differences between publicly owned and operated construction projects and publicly owned but privately operated construction projects?

NEW The constructor is not a single entity but rather a complex of various functions and entities, typically with one single entity often referred to as the general contractor, at the apex. What would a typology map of constructor entities reveal about the complexity of functions and organizational structures within the term "contractor" or "general contractor"?

NEW The general contractor can self-perform (with its own staff) the services under contract to the owner or act as a "broker" and purchase the services it is obligated to perform, typically using a combination of both functions. What goes into the decision to self-perform and/or broker? What methodology is most effective and under what conditions? To what extent does each methodology contribute to the overall project alignment of principal and agent?

PRACTITIONER PARTNER(S):

DDC, MOCS

What Are the Impacts of Road Infrastructure Reconstruction?

BACKGROUND:

The City's diverse capital program rehabilitates, maintains, and expands the public infrastructure of a large and complex built urban center. Routine street reconstruction combining planned water and sewer reconstruction with planned upgrades of City streets, performed by DDC in conjunction with DOT and DEP, is an essential part of keeping the City's infrastructure in a state of good repair and likely has an impact on the economic vitality of business districts and property values of residential districts. The federal economic stimulus bill underscores the important relation of capital infrastructure projects to the economy. It is possible to evaluate various dimensions of the costs and benefits (internal and, to the extent possible, external as well) of capital street reconstructions over time, against a set of control data such as crash data, retail sales, property values or sales prices (as described in greater detail below), crime, environmental impacts and perception of residents/business owners/shoppers.

QUESTION(S):

What would a literature survey of the impacts of roadway construction on various indicators suggest to public owners with large capital roadway programs such as the City?

What would be the appropriate strategies to pursue/methodologies to use in analyzing the impacts of roadway reconstruction on the surrounding neighborhood?

Based on the results of the literature survey and using statistical techniques, including hedonic place-in-place regression, for other types of capital investment, what are the impacts of the City's roadway reconstruction projects on the surrounding neighborhoods?

PRACTITIONER PARTNER(S):

DDC, DOT

What Economic Factors Influence Costs and Project Efficiency on Roadway Projects?

BACKGROUND:

Owners, especially public owners, use in-house personnel and contracted consultants on projects in different ways and proportions in order to manage the schedule during the year. While consultants are initially more expensive than in-house personnel, agencies can remove consultants from projects as necessary, increasing overall program management flexibility.

The Comptroller's Office under two different Comptrollers (Goldin and Hevesi) conducted analyses of roadway resurfacing, comparing in-house and contracted cost performance. More recently, the American Council of Engineering Consultants commissioned a study comparing in-house and contracted cost performance on State roadwork. These studies come to surprisingly different conclusions, raising the possibility that broader economic conditions may be influencing the cost analysis.

QUESTION(S):

What are the various economic conditions that have a significant effect on the cost performance of in-house staff and consultants on roadway projects?

NEW How might public owners identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, land use and budget processes to assist with focusing on the connection between changing economic conditions and capital program efficiency?

PRACTITIONER PARTNER(S):

DDC

Why Does It Cost So Much to Build in New York—Private Projects?

BACKGROUND:

Year after year, in rising or falling markets, whatever the building type, construction costs in New York City top the listing of costs among major American cities. Unexamined state and local government laws and regulations may create regulatory complexities that operate as inadvertent barriers to effective competition in an already fragmented construction market. Risk shifting provisions in the private construction statutory schemes that do not permit changes in approaches to reflect different project types and project needs, much less the different local construction markets, may also operate as inadvertent barriers.

QUESTION(S):

What would a literature survey on the drivers of construction costs, with a focus on private construction, reveal to government as regulator?

NEW What would a database of regulations affecting the built environment, including real property taxes, building code provisions, licensure requirements, land use provisions (both substantive and process), reveal with respect to costs of construction? To costs of operation and maintenance?

To the extent drivers of increased costs are within the regulator's control, what changes to regulations would minimize cost increases or reduce costs over time? What countervailing public policy concerns would be affected by proposed cost reforms?

PRACTITIONER PARTNER(S):

DDC

What Are the Economic Consequences of Being a "Public Works"?

BACKGROUND:

In New York, the application of various public construction processes turns on whether a project is a "public works", which is defined by case law and not by statute. For local governments, the case law is derived not from one statute, but rather from two—the Labor Law and the General Municipal Law—and the case law is not necessarily identical. For the state government and applicable agencies, the two laws consist of the Labor Law and the State Finance Law. When certain conditions are present, the law deems a construction project to be a "public works" and certain mandated risk shifts and other requirements attach to the project.

QUESTION(S):

What are the economic consequences that flow from being deemed a "public works"?

What are the different economic consequences that flow from the mandated public construction process and the private construction processes?

As these laws are based upon various public policy objectives, what would a cost benefit analysis reveal?

PRACTITIONER PARTNER(S):

DDC

How to Increase Construction Research and Development?

NEW The City has, in the past, systemically sponsored research and development, and construction agencies have, from time to time, sponsored research and development. What would case studies of earlier City-wide efforts and efforts of individual construction-related agencies such as DDC, DEP, DOT and Parks reveal?

Based on examples of successful public sponsorship of research and development in general and/or use of innovative technology in construction, what strategies could public owners use to increase the application of innovative technology in their capital programs?

BACKGROUND:

Public entities have a dual role with respect to Built Environment research and development. As owners, they have an interest in the application of innovative technology on their projects, and, as large institutional owners and/or economic policy-makers, they have access to strategies to increase research and development generally within the local construction market. In order to understand the impact of having adopted innovative technology in construction in the past as a guide for future projects, it is necessary to evaluate the impact on efficiency and/or effectiveness of such technology. But the construction industry has historically been a conservative one, often referred to as "the industry that time forgot", partly as a result of the nature of construction projects, fragmentation of the construction industry and atypical pricing mechanics.

But despite insufficient levels of government-sponsored innovation, there have been successes in the past, at all levels of government, in sponsoring and using research and development for innovative technology. And, the Obama Administration has recently taken an active interest, at the federal level, in creating programs to increase levels of public and private innovation to enable the U.S. to remain competitive in the global economy.

QUESTION(S):

What would a literature survey of public sponsorship of innovation suggest for government?

What innovative construction practices/techniques developed over the last 30 years have resulted in cost reduction/containment, safety improvements and/or quality enhancements? Of these, which innovations had implications for urban policy, research strategies and business/professional practices? What were the respective roles of government, business and academia in developing/implementing the innovations?

PRACTITIONER PARTNER(S):

DDC

How to Expand Analysis of Asset Appreciation Attributable to Historic District Status?

BACKGROUND:

Anecdotal observations suggest that landmark activities, which contribute to the creation and maintenance a unique sense of place, neighborhood and density, also likely contribute to the appreciation of property values. While certain prospective property owners may purposely avoid purchasing property within a historic district, there often exists an abundance of potential purchasers who willingly pay a premium for properties that boast historic architectural features, and to which a rich historic narrative can be affixed. Moreover, for these property owners, the landmark regulator's oversight and regulatory monitoring provide a measure of certainty that the intrinsic character of the immediate neighborhood will remain intact, further preserving the values of individual properties.

To date, only one analysis, conducted by the City's Independent Budget Office, has attempted to evaluate the impacts of landmark status on a neighborhood. This analysis was limited by the nature of the question asked—whether there was any evidence that historic districting in New York City had constrained the appreciation in residential property values—the focus on six community districts in Brooklyn and the particular statistical techniques used. The conclusions were consistent with anecdotal observations. The prices of houses in historic districts were higher than those of similar houses outside historic districts and overall price appreciation from period studied was greater for houses inside historical districts than outside.

Preserving the City's history by preserving its buildings is a value embedded into the creation of the LPC. As the LPC enters its fifth decade, expanding upon the initial analysis to measure more widely the impact of landmark activities would be useful to inform future conversations about landmark activities.

QUESTION(S):

To what extent and in what manner is it possible to expand upon the initial analysis and conduct studies adding other types of properties and/or other areas and using other statistical techniques such as paired-sale appreciation analysis?

NEW In addition to top-down economic analyses of historic district status, what would be an appropriate model to estimate and evaluate incremental costs on individual properties resulting from such status?

PRACTITIONER PARTNER(S):

LPC

How to Estimate LEED Payback for New Construction?

BACKGROUND:

A prior Town+Gown research project explored whether the City could analyze the long-term savings associated with green building practice if the investment decision methodology took into account a longer-term horizon than current practice. This project conducted extensive research into existing cost/savings analyses focusing on long-term sustainability and then applied them to Local Law 86, the City's effort to bring all government buildings in line with LEED standards, generating an estimate of aggregate savings from productivity, health and waste reduction. Building on the foundation of this research, the next step is to develop a model to estimate the payback to the City for each of the points in LEED 2009 for new construction.

QUESTION(S):

How could the City develop a cost/savings estimate model for new construction complying with LEED 2009 standards?

How could the City test such model on a case-study project?

What available technologies are best suited for quantifying such payback?

PRACTITIONER PARTNER(S):

MOEC, DDC, MTA ESC, MTA SI

Investigations in Creating a Model of the Local Construction Market

BACKGROUND:

Attempts at predicting economic behavior in construction is a dicey affair in general and nowhere is it dicier than in New York City. Year after year, in every report of construction costs in major American cities, New York City tops them all. Yet, commercial report services for components of construction costs, which are disaggregated by region and are used by a diverse group, including economists and estimators on jobs to be bid, always make a disclaimer for the New York City region. Since the commercial regional reports are estimates themselves from aggregated data, they are not terribly reliable within the City market. They are top down, not bottom up, estimates. The national economic accounts, although recently updated to reflect changes in various industries, still do not account for the construction industry as one would want. It is aggregated in ways that are inappropriate for the fragmented industry that is construction. Further, since the demand for construction is a derived demand from the overall business cycle, upturns and downturns in construction lag behind overall economic trends, and construction industry cycles may be more volatile than the general business cycle.

The idiosyncratic nature of the New York City market argues for New York City-centric accounting of economic behavior. That would be a tall order, requiring the application of resources heretofore not devoted to one metropolitan area, notwithstanding its importance to the national economy, and is likely never to happen. One practical need for such an individual approach, however, would be the need for a public owner, such as New York City, whose capital program and practices affect the local construction market and its prices, to be able to predict changes in the construction market so that it can plan and budget more effectively. The City, as a public owner, has years of its own cost data that could be analyzed to determine the relation of project costs to variables, possibly enabling the City to construct a model of the city's construction economy to predict changes in construction activity and cost, much in the way it has constructed a model of the city economy to estimate future revenues for the budget. Further, such an analysis could identify components of construction that function as market indicators within the New York City area so that we might create a market basket of cost indicators to follow going forward to help our capital planning and budgeting efforts.

QUESTION(S):

NEW What is the relation of the large public capital programs (City, MTA and Port Authority) to the local economic/business/building cycles?

NEW To what extent can large public owners manage their programs to smooth out the volatility in the cycles? What are the tools available to manage their programs? From a public policy perspective, is this an appropriate public function?

NEW To what extent are large public owners subject to the market as are all owners? What can public owners do to manage those impacts on their programs and budgets?

How might the City, as a foundational research matter, approach the feasibility of creating its own model of the local construction market and a market basket for costs for the purposes of more effective capital planning and budgeting?

NEW How might the City identify and then leverage land use planning and capital and budget planning opportunities embedded into long-established, and to some extent legislatively mandated, planning and budget processes to assist with creating such a model?

NEW The national accounts focus on construction-related activities as they have conventionally or traditionally been perceived, making it difficult for policy and economic development analysis to look across the conventional accounting categories for various multi-disciplinary built environment initiatives. What methodologies are available to permit holistic built environment policy and economic development analyses?

PRACTITIONER PARTNER(S):

DDC, PANYNJ

How to Measure the Effects of Various "Green" Initiatives—Cost/Benefit Analysis of Building Sustainability Implementation?

BACKGROUND:

The implementation of sustainability measures in residential and office buildings is becoming more ubiquitous whether because of requirements to be phased in by law or a desire by building owners and developers to improve the operating efficiency of their buildings. The main reasons that are often given for the benefits of sustainability implementation can be compartmentalized into three fundamental categories:

Energy Efficiency: sustainability measures will decrease the operating cost of a building while simultaneously increasing the lifespan of operating systems and allow buildings to operate more efficiently than similar sized conventional buildings;

Building Value: whether residential or commercial, recent history has shown that developers/building management can charge more per square foot for buildings that are LEED or have certain sustainability measures implemented; in addition the tenant/resident perception is that because the building is 'green' it is elite;

Environmentally Friendly: sustainability measures are designed to decrease the carbon footprint of a building thus lessening both the urban heat-island effect as well as the impact on global warming.

QUESTION(S):

What are the economic and other tangible benefits of implementing sustainability measures in both new and existing buildings in New York City balanced with the cost of the implementation? In addition, how are the effects of sustainability measured to provide a clear indication of the benefits?

Provide an assessment of the sustainability practices in various jurisdictions outside New York City and the U.S., focusing specifically on:

- cost of implementation in both new and existing buildings in terms of financial outlay as well as level of effort
- tracking and accountability measures taken by these jurisdictions to ensure the implementation is providing the intended and desired economic benefits any required performance measurements used in these programs

Based on the survey of practices and requirements elsewhere, what practices should the City consider to better ensure that sustainability has an economic as well as environmental impact?

What available technologies are best suited for measuring effects?

PRACTITIONER PARTNER(S):

DOB, MTA ESC, MTA SI

How to Design Incentives for Sustainability Implementation?

BACKGROUND:

The City of New York along with a multitude of other cities across the nation and world over the last 5-10 years have been looking to implement sustainability measures in buildings and homes as a way to increase energy efficiency, decrease their carbon footprint, and in a broader way improve the quality of life of their citizenry. Some of the sustainability measures include the installation of white or green roofs, micro-turbines, solar panels, LED lighting, and gray-water systems, among a number of other available building technologies. Since there are relatively few laws on the books requiring sustainability implementation and a necessary phased-in approach in the laws that do exist, municipal governments and local jurisdictions have begun to incentivize these sustainability measures in an effort to increase their implementation in buildings where they might have a greater impact as well as across of a broader section of the building stock.

As a result of analyses performed during a prior Town+Gown project on this question, the City now has a comparative analysis of multiple cities, looking at best practices and standards across the full range of potential incentive structures, with recommendations on how different incentives could be applied to the City, showing risks, benefits, and challenges for each. The research also identified data gaps.

QUESTION(S):

What would modeling various incentive options for fiscal impacts reveal?

What are the effects of incentives on actual green building production?

PRACTITIONER PARTNER(S):

DOB, MTA ESC, MTA SI

What Are Best Practices for Public-Private Partnerships to Promote "Green" Projects?

BACKGROUND:

The scope of the contemporary sustainability agenda has extended to all aspects of the Built Environment. Some "green" projects using innovative technology related to types of infrastructure capable of being operated as a utility can be financed and constructed via the public-private partnership methodology which includes third-party financing. Other types of public structures are less obviously translatable to such construction/financing methodology, but may be possible.

QUESTION(S):

For the various "green" investments related to energy demand side operations and storm water management operations, what public-private partnership practices/vehicles have been used by public owners for investment in such technology as well as other types of projects?

Among the practices/vehicles identified, how could they work in the setting of a public owner—for both capital project development and life cycle operation and management—and what would the trade-offs from an application be?

What are the opportunities and impediments for public owners to use such practices/vehicles?

What are the best practices for energy savings and waste-water management investment in "green" projects?

What available technologies are best suited for quantifying and reducing greenhouse gases to improve urban air quality?

PRACTITIONER PARTNER(S):

DEP, DDC, MTA ESC, MTA SI

Landmarking in the 21st Century: What is the Impact of Commercial Landmarking on Economic Development?

BACKGROUND:

The City's expansion of landmarking commercial structures, from individual designation of commercial structures to commercial districts, raises the question of the impact of landmarking on economic development. While there have been some studies of the impact of residential landmarking, the area of commercial landmarking appears open. Apart from the value of historic preservation as historic preservation, it has been asserted that historic designation can be a tool for economic development. Yet historic preservation imposes a regulatory scheme on the buildings it covers in addition to the various other regulatory schemes that cover most or all buildings, such as the zoning resolution and related processes, environmental reviews, the building code containing safety regulations and environmental regulations. Moreover, the City has been enacting new laws, with associated regulations, aimed at environmental sustainability concerns. Historic regulation, in concert with all existing regulations, could exert a countervailing force on its impact as an economic development tool.

QUESTION(S):

To what extent can analytical methodologies for assessing the impact of residential landmarking be applied to commercial landmarking? What kinds of adaptations would be necessary to create a model for commercial landmarking impacts? Are there alternative analytical methodologies?

What is the relation of the structure and methodology of the City's zoning resolution, enacted over 50 years ago, to the demand for landmarking of commercial structures? In the design of new structures?

NEW In addition to top-down economic analyses of historic designation of commercial structures, what would be an appropriate model to estimate and evaluate incremental costs on individual properties resulting from such status?

What role does the aggregate cost of building construction and building operation regulations play in the design of new structures?

To what extent could the sustainability agenda, with its emphasis on re-use of existing resources, complement or even supplant part of the historic preservation function?

How would one design a model to test the impact of historic designation of commercial structures, in conjunction with the regulatory environment of which it would become a part, on economic development of the area surrounding the individually designated buildings, and in the case of district designation, economic development of the district and the greater area of which it may be a part?

Assuming access to commercial building data from areas where a number of individual designations exist and from historic districts of commercial buildings, what does the data applied to the model suggest?

PRACTITIONER PARTNER(S):

LPC

How Does the Environmental Sustainability Agenda Expose the Limits of Construction Industry and Governmental Organization?

BACKGROUND:

The traditionally fractured nature of the construction industry and the balkanized nature of sub-units within public owners and among public owners with overlapping jurisdictions have become newly highlighted as a result of the widely embraced environmental sustainability agenda. Much of what the environmental sustainability agenda seeks to accomplish is effected through the built environment and affects the built environment. As the environment does not respect jurisdictional boundaries, neither does the environmental sustainability agenda's intent to make explicit both positive and negative externalities—in particular imposing the true costs of modern activity on parties to economic transactions. Within this new paradigm, the realities of the traditionally fractured construction industry and the traditional hierarchical and often siloed and bureaucratic public sector entities present a challenge. Further, the realities of the environment present a challenge for effective governmental responses under existing jurisdictional boundaries.

QUESTION(S):

As a foundational analysis, how does the environmental sustainability agenda expose the current limits of the construction industry and governmental organization?

NEW To what extent can the "old chestnut" regionalism paradigm assist with the identified limits? To what extent do overlapping and/or competing regulations among the federal, state and local government levels contribute to and/or exacerbate the limits? To what extent do legal principles of higher level pre-emption and home rule contribute to and/or exacerbate the limits?

PRACTITIONER PARTNER(S)

DDC, MTA ESC, MTA SI

Investigations into Causes: The Incidence of Corruption Cases in Construction

BACKGROUND:

Anecdotally, there seems to be a relationship, within any jurisdiction, between the incidence of corruption cases initiated by law enforcement agencies and the economic cycle. There also seems, anecdotally, to be a relationship between such incidence and regulatory complexity. Moreover, governmental jurisdictions that do business with the same construction firms often follow significantly different practices in how they address incidents of past corruption in determining the responsibility of their potential vendors. To the extent analytic techniques can identify statistically significant relationships, and legal/policy research can identify the different approaches followed by various jurisdictions, there is a space for policy makers to pursue further analyses and possibly consider policy initiatives based on such analyses.

QUESTION(S):

As a foundational analysis, what appears to be the relationship between the incidence of corruption cases initiated by law enforcement agencies and various economic indicia, such as the business cycle, employment rates, regulatory complexity?

What types of analyses are possible to further investigate the apparent relationships?

When incidents of corruption occur, how do various governmental jurisdictions (other than the City) respond, and how do those differing responses affect competition, pricing and quality in public construction?

PRACTITIONER PARTNER(S):

DDC, MOCS

Investigations into the Nature of the Public and the Private Owner

BACKGROUND:

To say there are there are public owners and private owners, in the context of the archetypal construction participants, is simply the beginning of the analysis. While public and private owners share concerns, there are critical differences between them. Further, for government to regulate the industry efficiently and effectively, an understanding of variations in the private sector owner archetype—what they are functionally (owner-developers, build-to-own-and-operate-owners, owners as financing vehicles) and what their respective business forms and operating models are—is essential. It should not go without noting that government as regulator often regulates itself as owner. Finally, a public owner coterminous with a level of government is divided functionally into many operating/line agencies responsible for different built environment structures/functions and into oversight agencies responsible for discrete administrative functions with related institutional interests that may be at odds with each other at times as well as with the construction process.

QUESTION(S):

What issues are shared by public and private owners, qua owners?

What does a typology map of private owners reveal about the complexity of functions, business forms and models and organizational structures within the term "private owner"?

What does a typology map of public owners reveal about the complexity of functions and organizational structures within the term "public owner"?

PRACTITIONER PARTNER(S):

DDC

Investigations into the Nature of the Financing of Construction

BACKGROUND:

It is not unusual to reduce the complex world of construction into the archetypal participants of Owner, Designer (architect and/or engineer) and Contractor (as the party in contract privity with the Owner on the one hand and with the various sub-contractors on the other). Yet that paradigm tends to obscure the role that the financing party plays on each and every project. The fractured nature of the construction industry, which is mirrored to an extent in the academic disciplines and professional programs, tends to create a hard divide between the financing of construction projects and the actual construction of projects. Yet across public and private sector projects, the requirements imposed by the financing are hidden imperatives as forceful as the various applicable regulations that are more transparent and generally better understood by comparison. There are a menu of financing vehicles on the private side that appear to match up to the construction industry deconstructed along building type and builder organization type and related business model. It is critical to complete the construction paradigm by investigating and analyzing the nature of public and private construction financing and the impact that requirements imposed by financing, as a general proposition, have on the construction process and on the job site. Furthermore, recent "noise" in the public policy system arising from elements of the American Recovery and Reconstruction Act of 2009 have resurrected some "old chestnuts" in public finance, so that what's old is new again in the public finance conversation.

QUESTION(S):

What features are common across all construction finance structures? What features differ and how?

What is the impact of construction finance requirements on the construction process and on the job site?

To what extent and in what ways do standard finance provisions relate to standard construction provisions? To what extent do finance provisions require particular allocations of risk in the contract?

What are the differences among the financing vehicles, for example, between private credit loans and tax-exempt finance, and, within the private credit area, among the various forms of development and ownership models?

NEW What are the historical antecedents to the current policy ideas of infrastructure banks, public private partnerships and the use of pension funds for public infrastructure? What are the public welfare elements of these vehicles and when are they appropriate from a public welfare analysis? What is the appropriate role for tax expenditure programs such as tax-exempt finance at the state and local level, from both a public welfare perspective and a political "home rule" perspective?

PRACTITIONER PARTNER(S):

DDC

How Does New York's Regulatory Complexity in the Licensure of Built Environment Participants Affect the Efficiency of the Construction Industry?

BACKGROUND:

To the extent that unexamined State and local government regulations create regulatory complexity within the fragmented construction markets, they may operate as inadvertent barriers to effective competition and may unnecessarily limit the positive impact of construction on the economy. It is the realistic possibility of competition from other markets that mitigates the negative impacts of these fragmented local markets. In New York, licensure of built environment participants is split between the two levels of government. The State licenses what it considers to be professionals while it deems the licensure of those it does not deem to be professionals to be a matter of local concern and delegates such regulation to local governments. Regulatory complexity created by local regulation of the non-professional participants may, in conjunction with other factors, have a negative impact on market entry decisions, rendering local construction markets less competitive. As environmental sustainability does not respect local jurisdictions, neither does economic efficiency of the construction industry. Building on a foundational legal analysis of the regulation of built environment participants in New York City, this project would focus on the economic impacts of such a regulatory scheme on the markets affected by such regulation.

Further, there are additional unexamined built environment regulations such as those that mandate risk shifts and allocations in order to support various public policy concerns across a number of variables running from insurance (mandated types, mandated provisions) to compensation (mandated wage floors), These unexamined regulations may be outdated or counterproductive for modern construction and may operate to make the affected construction market less efficient or less competitive as a whole or at different parts of the economic/business/construction cycle.

QUESTION(S):

What public policy and economic issues are raised by such statutory schemes?

What is the relation of each such statutory scheme to the functioning of the construction market(s) so regulated?

PRACTITIONER PARTNER(S):

DDC

Multiple Investigations into Integrated Project Delivery and Building Information Modeling

BACKGROUND:

Some design management techniques and project management tools emerged from the industrial design field and were applied to construction, while others emerged from the construction field itself. Despite their different origins, successful techniques share a basic precept that the earliest practicable and continuous application of these techniques, including all relevant participants and stakeholders in the process, works best for the project at hand. The newest entrants to the firmament consist of a technological tool—Building Information Modeling or BIM—and an innovative service delivery methodology—Integrated Project Delivery or IPD.

BIM originated from parametric solid modeling (PSM) software used in the automotive and aerospace industries, and as these software platforms evolved and became less expensive, they migrated into the field of physical structures. BIM can hold large amounts of data—spatial, schedule and cost—permitting users to explore various building designs at the earliest possible stage as well as the inter-relationships among design, constructability, schedule and price. Public owners have been using BIM, though their ability to fully exploit its benefits is limited when a public owner can only use the design-bid-build methodology which imposes a temporal divide between the designer and contractor.

IPD is an innovative relational contractual arrangement in which the owner, designer and contractor, manage project risk by contractually sharing, as early as possible in the life of a project, responsibility, risk and reward. Public owners constrained by public bidding requirements that preclude vendor selection based on value as well as contract negotiation, cannot use this innovative methodology.

QUESTION(S):

How does application of BIM or IPD affect existing insurance and surety products?

How does application of BIM or IPD at any phase on a construction project affect the traditional allocation

Of risk in construction? How does it transfer risk among parties?

How does application of BIM or IPD affect existing insurance and surety products?

How does the current legal environment impede adoption of BIM or IPD on New York projects?

Can a public owner require designers and contractors bidding on projects to use BIM? The same BIM product? A BIM product that is interoperable with programs the City agencies use for post-completion operation and maintenance?

How would a model to evaluate the costs and benefits of requiring open standards on public construction projects be structured?

NEW Based on the types of production functions that co-exist on construction projects, what types of efficiency increases and waste reduction are possible? When BIM and/or IPD are added to the analysis, what types of efficiency increases and waste reduction are possible?

NEW Based on the types of productions functions that co-exist on construction projects how would the increasing application of BIM, in conjunction with off-site production and transportation capacities, change the economics and dynamics of the local construction market/industry?

PRACTITIONER PARTNER(S):

DDC

Regulatory Systems and New Regulation—How to Analyze and Evaluate?

BACKGROUND:

Just as the term "infrastructure", commonly in the form of the "infrastructure crisis", has emerged from obscurity into public view, so too the term "regulation", mostly in the form of "regulatory impact" has emerged into public view. Assessing the impacts of existing regulatory systems as well as proposed regulations, in complex and dynamic social systems, such as the built environment or regulated industries, with inter-related and inter-dependent components, requires a contextual approach and multiple methodologies. The field of regulatory impact analysis, not surprisingly, includes within its ambit a range of methodologies to systematically evaluate both negative and positive consequences regulation. The tools of regulatory impact analysis are intended to support and enhance governmental decision-making, from the perspectives of those who govern as well as those who are governed. Beyond the current focus on the budgetary impact of regulation on the government itself, expanding areas of regulation (e.g., environmental sustainability and preparedness) suggest the need for an enhanced ability to evaluate the broader impacts of existing regulatory systems and the incremental effects of proposed regulation.

QUESTION(S):

For those regulatory systems with sufficient periods of effectiveness to permit evaluation, it is first necessary to establish the appropriate evaluation model(s) and required data.

- What would a literature survey of regulatory impact analysis and evaluation suggest to the City as a pre-requisite to considering evaluation of any of its long-standing regulatory systems and related processes?

- How might the City, as regulator, design an evaluation plan/model for an ensemble of inter-related regulatory systems and processes? What would the related data needs be?

- To what extent would it be possible to evaluate any regulatory system and related set of processes in isolation from others? How would the City, as regulator, establish priority among various inter-related regulatory schemes?

Fiscal impact analysis of proposed legislation that does not acknowledge and account for the totality of regulatory costs on a regulated activity runs the risk that the legislation, if enacted, will have unintended negative consequences such as pricing out the regulated activity, and with that, the putative benefits of the regulation.

- What analytic methodologies are available to analyze incremental costs imposed by proposed regulations in the context of an existing regulatory framework so that sensitivity analyses can be performed to assess the likelihood of unintended negative consequences of such legislation?

What is the relationship between the level of regulation in a jurisdiction and the need for government to provide subsidies of various sorts to create social goods at desired levels or good as socially desired levels?

NEW What elements would be needed to construct a built environment regulation database to permit both comparative analyses among complex urban centers/jurisdictions as well as permit traditional cost benefit analyses and analyses of incremental costs imposed by proposed built environment regulations?

PRACTITIONER PARTNER(S):

DDC

Investigations into Labor in Construction

BACKGROUND:

In the world of construction project analysis, a large part of the cost data is labor cost data, simply because all of the on-site work is done by human beings instead of robots. Since construction is not inexpensive, the abundance of labor cost data relative to other cost data tends to point researchers into the direction of viewing and defining the problem as an issue of labor. All issues in the built environment, a complex and dynamic social system, must be considered and analyzed in a contextual manner because it is not possible to adequately understand issues, especially those that touch on labor costs, in isolation from the complex system of which they are a part. The complexity of the environment is compounded by complexity among the participants. For example, one reason for owners to understand the dynamics of labor costs is to discover the points where the application of management tools can reduce or contain avoidable costs. One reason for regulators to understand the dynamics of labor costs and the market is to discover the relationship between existing regulations and economic efficiency.

QUESTION(S):

As a foundational meta-analysis of labor and construction, what are the multi-disciplinary issues to be analyzed?

What issues correspond to what stakeholders?

What would be the priority of analysis of these issues?

PRACTITIONER PARTNER(S):

DDC, OMB

Estimating Economic Impacts: Quantifying Returns on Investment in Trees and Green Spaces

BACKGROUND:

PlaNYC set in motion a number of initiatives that have the potential to dramatically reduce the physical city's environmental impact on the local, regional, and global scale. As a result, the City has made and plans to continue making large investments in greening programs and public parks. As the PlaNYC-inspired initiatives mature and agencies have experience administering their provisions and collecting data generated by their operation, there will be opportunities to evaluate them and possibly reform them over time.

QUESTION(S):

At this point it would be helpful to get a sense of the types of research that can be conducted to provide policy makers with information about the ongoing impact of their investment in urban trees. Some specific questions are:

How can the economic impacts of urban green spaces be quantified?

What are the economic benefits of trees, using proxies such as real estate prices?

How do tree plantings impact how neighborhoods are seen in terms of development potential?

What are the social benefits of trees for human health, job development and community interaction?

Direct vs. indirect impacts, short-term vs long-term - how can value be assessed?

PRACTITIONER PARTNER(S):

Parks, DDC

Competition in Construction Law and Economics: Myth or Reality?

PRACTITIONER PARTNER(S):

DDC

BACKGROUND:

Historically, there have been direct connections between academia's economic models, our civic conversations that benefit from using and understanding these models and the law—both legislation and court decisions interpreting the laws and contracts litigated under those laws. Many construction-related laws were enacted when the prevailing economic model was based on the assumption of a market where free and open competition exists and price then becomes a determinative criterion. Economic theory has evolved since then, though most construction law has not, even in the face of analyses demonstrating that the construction industry is a local industry that is less than competitive due to a host of factors.

Focusing on public construction law, for example, one assumption behind the public construction solicitation methodology is that an open competitive process will assure a competitive market in an economic sense. Unexamined public construction laws, however, may create regulatory complexities that operate as inadvertent barriers to effective competition. Standard public construction contracts reflecting the statutory scheme may not permit variation in approaches to reflect different local construction markets, and may also operate as inadvertent barriers.

QUESTION(S):

Using the New York City construction market as a case study, what is the reality of competition from an economic efficiency perspective? From a public economics perspective?

What is the relation of the standard public low-bid requirement and project value (including life cycle costs) during the components of the economic/business/construction cycle?

How to Evaluate the Impact of Horizontal Infrastructure Projects on Local Businesses?

BACKGROUND:

Several public owners within the City's boundaries have large capital programs that rehabilitate, maintain, and expand the public infrastructure of a large and complex built urban environment. For example, DDC's Infrastructure Division is dedicated to roadway reconstruction, combining planned water and sewer reconstruction with planned upgrades of City streets. Routine street reconstruction is an essential part of keeping the City's infrastructure in a state of good repair and likely has an impact on the economic vitality of business districts and property values of residential districts. The recent federal stimulus bill underscores the important relation of capital infrastructure projects to the economy. There may be, however, some negative local economic consequences during construction that emerging technology might help mitigate.

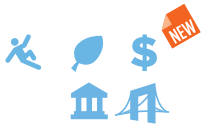
QUESTION(S):

What would a literature survey of the impacts of horizontal infrastructure construction on business activity during construction suggest to public owners in the City?

How might public owners design a quantitative analysis to evaluate the impacts on local businesses of horizontal infrastructure construction during project duration?

PRACTITIONER PARTNER(S):

DDC



How Can Public Owners Embrace State of Good Repair as Policy and Practice Goals?

BACKGROUND:

For some time now, there have been reports of a "crisis" in infrastructure. The American Society of Civil Engineers (ASCE) released its most recent report on the state of American infrastructure in March 2009; yet this report is the fifth in a series of infrastructure reviews since 1988. While the state of the nation's infrastructure is reported to be increasingly worse over time, the state of the nation's infrastructure was dismal over 20 years ago. The word "crisis" implies an acute episode. In the context of this country's long history of financing and building public works, however, any single crisis is but an acute episode of a chronic civic condition. The causes of any single moment of crisis are not particularly new nor are they unique to any particular jurisdiction. City Charter provisions enacted around the time of the first ASCE report, but undoubtedly responding to the reality of the years after the fiscal crisis when infrastructure maintenance was at its nadir, requires assessment of facility and infrastructure assessment but was intended to be of a limited nature. The "crisis" in state of good repair has appeared on the political radar screen periodically over the years, typically in reports by various elected officials and civic organizations, yet the City never has fully executed, and perhaps it should not be expected to execute, the aggregated state of good repair need generated by a statutory protocol that does not reflect the entire context.

QUESTION(S):

How do other large public owners in mature urban environments handle state of good repair evaluation and compliance for infrastructure and for public buildings? Are certain management techniques more appropriate for infrastructure as opposed to buildings and vice versa? What about management techniques used by public and private owners of large utility systems? How have owners used modern information technology to assist?

How can any state of good repair protocol be sensitive to the reality of conditions stemming from the obduracy of built artifacts in the face of changing needs and demographics and the limits of an owner's financial capacity, especially a multi-purpose public owner, not a public utility owner?

To what extent can public owners leverage the requirements of GASB 34 to support, or replace, existing protocols that few, within and without the public owner entity, seem satisfied with?

How can hedonic regression techniques assess the economic impact of "state of good repair" capital projects and other renovation/expansion projects not expressly touted as economic development projects? What can this analysis demonstrate about the economic impact of elements of the City's regular "bread and butter" capital programming? To what extent can this regular baseline capital programming be utilized to smooth out the volatility in the local economic/business/construction cycle? What methodologies can be used to determine the "job creation" impact of capital projects—first, from the perspective of the construction project itself, how can one determine which jobs are "new"; and from the perspective of the life of the project, how can one determine the impact of a project on the economy to which it relates?

PRACTITIONER PARTNER(S):

DDC, MTA ESC, MTA SI

LAW

Questions under LAW focus on the impact of the law on built environment activities from the perspective of the archetypal participants—owner, designer and constructor. Statutes and regulations, related case law, and contractual forms and provisions, which are the products of industry standard practice, governing law and past experience, all affect the relationships among the participants, their expectations and 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.

What Types of Construction Contract Provisions Would Increase Alignment between Principal and Agent?

PRACTITIONER PARTNER(S):

DDC, MOCS

BACKGROUND:

The various service delivery models allocate and manage risk among the owner, the architect and the contractor in different ways. The appropriateness of a particular service delivery model depends on the complexity of the project and the internal capacities of the parties. There is no one perfect service delivery model, and the benefits and disadvantages of the models vary with the particulars of the project and the parties. Certain service delivery models facilitate better alignment of the design phase with consideration of constructability issues. And certain service delivery models may facilitate better alignment of the owner's interests in budget, schedule, safety and quality with the interests of its agents—the architect and the contractor—in construction, especially critical in the construction milieu which is the picture of asymmetric information.

In addition, engineering and operations management methodologies and tools used in construction claims litigation also provide data and methodologies, which if they informed the planning processes of an institutional owner's program could help in the formulation of contract provisions that increase alignment and/or shift risk more appropriately (i.e., based on quantified experience).

QUESTION(S):

Building upon prior Town+Gown projects, what types of construction contract provisions would increase the alignment of principal and agent on particular types of projects?

NEW What types of engineering and operations management methodologies have been used in litigation, when are they appropriate in the litigation setting and how could these methodologies be incorporated into an owner's construction contracts going forward to facilitate more effective alignment and risk shifting/mitigation?

Are Differences Among Statutory Definitions of the Construction Project Explanatory?

BACKGROUND:

In New York, the divide between public construction laws and public finance laws appears quite broad. They share a common feature: the lack of definition in statutes leading to a panoply of case law. But the case law approaches to defining what is essentially the same thing—a public construction project—differ depending on whether the law is part of the constellation of public construction procurement and labor laws or part of the constellation of public finance laws.

QUESTION(S):

What are the differences in the nature of a public construction project under the public construction/labor laws and under the public finance laws?

What historical events and related public policies were behind such differences?

Focusing on public finance laws, what has been the historical development and evolution of public finance authorities in New York—first at the state-level and then at the local government level; then by project or infrastructure type?

How do the identified New York State patterns line up against other states and the federal government?

PRACTITIONER PARTNER(S):

DDC

What is the Relation between Land Use Law Techniques and Urban Design and Function?

BACKGROUND:

The urban design of cities represents a complex interaction between laws regulating land use, including zoning, and institutional arrangements, politics, economics, technology, and social conditions. In existence for little more than a century, these land use laws, especially zoning, are instruments of public planning and policy and directly impact the visual fabric and functioning of the City's built environment. As legal instruments imposing limits on the use of private property, they tend to be expressed in prescriptive form—setting forth permissible uses as well as site coverage, setback and height limits. As the municipal zoning instrument enters its second century of use, at a time of increasing conceptual complexity resulting from the sustainability agenda, an understanding of the relationship between land use regulations, including zoning, and both urban design and function would be useful.

This multi-disciplinary area exists in the midst of two different kinds of systems—static land use regulation systems, of which zoning is only one kind, and active systems, such as economic development programs with tools that include various types of subsidies. These two systems interact with each other and those interactions, in turn have impacts on various sectors of the economy?

QUESTION(S):

What can a survey of methodologies used by other jurisdictions in their land use regulations, including zoning, tell us about the relation of modern zoning tools and desired effects "on the ground", specifically the design and function of urban areas?

Looking at urban jurisdictions, including New York City, what can the evolution of tools permitted by the respective laws tell us about the relation of tools used by a jurisdiction and the jurisdiction's distinctive visual fabric, the history of its infrastructure development and the functionality of the jurisdiction's various systems?

How can government, acting both as built environment regulator (for public health, safety and welfare purposes) and as economic development policy maker, modulate the static and dynamic systems to achieve particular objectives that change over time? How can the more static systems, such as zoning, become more flexible to respond to unanticipated changes—from technology, from demographics and from re-ordered public policy priorities—without adversely affecting the benefits accruing to property owners from static provisions?

How can evaluation of past discrete zoning actions and tools help inform the development of new tools?

NEW In theory, comprehensive or master planning activities precede comprehensive rezoning and, since federal, state and local environmental review laws have achieved maturity, urban jurisdictions have gone through the comprehensive planning and rezoning exercise, some fairly recently. What has been the practice and results of those urban jurisdictions that have recently undergone comprehensive planning and rezoning in the context of a complex environmental regulatory scheme?

PRACTITIONER PARTNER(S):

DDC

How to Assure a "Green" Future—Green Building Regulations and Enforcement?

BACKGROUND:

Green building practices are becoming ever more prominent globally as building developers, owners, and occupants become more aware of their benefits. In order to advance the interest in achieving greater sustainability, many jurisdictions are beginning to allow or require certain green building practices. The Mayor's PlaNYC has outlined several initiatives that will result in new requirements for buildings in the City. DOB is interested in the results of a wide survey of green building practices elsewhere that assesses the spectrum from planning to regulation to enforcement.

QUESTION(S):

What have been the green building requirements and practices in various jurisdictions outside New York City and the U.S., focusing specifically on:

- specific building requirements and how they were developed
- enforcement of the requirements and operational measures taken by these jurisdictions to ensure the requirements are being followed and associated challenges, and
- any related performance measurements used in these programs?

Based on the survey of practices elsewhere, what practices should the City consider as it pursues implementing new regulations as part of PlaNYC?

PRACTITIONER PARTNER(S):

DOB, MTA ESC, MTA SI

How to Apply Relational Contracting Principles to the City's Lease Arrangements?

BACKGROUND:

The commercial real estate lease is typically the province of real estate lawyers specializing in the area of commercial real estate and it articulates the long-term relationship between a lessor/landlord/owner/developer and a lessee/tenant. While there may be variation among individual leases, the lease agreement structure has become fairly conventional and deviations from the standard set of provisions tend to require the calculation of costs.

The City, in addition to its role as an owner, also acts in the role of lessee, when it decides to lease the space it needs for agency programs instead of constructing and owning it. These leases can take the form of highly complex capital leases in which part of the rent consists of capital funds to pay for the build out of the space or of simpler landlord/tenant arrangements. The uses at City-leased spaces range from agency administrative functions, where few members of the public visit, to service provision functions, where significant numbers of the public interact with agency personnel each day, either for customer-based services or for sensitive human services needs.

The City, as regulator, generally legislates restrictions on building construction and post-construction building use, taxes property owners, and sometimes adds further mandates to achieve various social goods. The set of laws under which lessors operate give rise to some of the operation and maintenance costs against which tenant rents are assessed, which are also constrained by the state of the economy and the commercial rental market.

City-wide policies and practices, as well as individual agency policies and practices, change over time. Policy and practice changes that also require changes to physical spaces are easier to achieve in City-owned spaces than in leased space after execution. While standard lease agreements provide for amendment after execution, they invariable require the lessor's permission to make any changes affecting the structural integrity of the premises.

QUESTION(S):

The issues to be explored below concern how a private owner lessor and the City would draft a set of amendment provisions that expressly anticipate that the City will want to conform existing lease arrangements to some future changes in practices and policies. As conceptual case studies for this project, examples of changes include aspects of the City's sustainability agenda not included in regulations, advancing the City's active design agenda and efforts to improve the human services client experience:

How do other public owners with a significant leasing component, such as the federal General Services Administration, handle future and unanticipated policy changes in their amendment provisions? How do programs that provide funds for design and construction by others ensure certain standards for functionality and design? What other long-term relational contract types could serve as models for this type of amendment provision?

What would be the elements of the costs of (or savings from) expressly articulating and planning for the possibility of such changes in the future?

What categories of costs/savings would likely be involved in—and what party would be appropriate to bear the costs of/enjoy the savings from—the following case study changes to existing lease agreements:

- implementing non-statutory environmentally sustainable green practices
- advancing elements of the City's active design agenda, including universal design principles
- enhancing the social services experience for those seeking out the City's human services?

PRACTITIONER PARTNER(S):

DCAS, DDC

False Claims Laws and Quantitative Analyses of Cost Growth in Public Works Projects

BACKGROUND:

A significant body of research spanning the last two decades has focused on the causes of increased costs in public construction. In a nutshell, some of this work has demonstrated that public entities tend to overestimate benefits and underestimate costs across project types and owners. While, in earlier work, researchers ascribed intent to deceive on the part of public actors, most recent work points to techniques, such as reference class forecasting, for public owners to actively mitigate such observable conditions and trends.

There is also a significant set of laws that create the legal context for U.S. public works projects. The federal False Claims Act, initially adopted during the Civil War, has recently been amended in 2009 and 2010. Several states and, in some jurisdictions, local governments, have adopted similar laws. These laws apply to publicly funded programs and can include public works projects. As the law focuses on fraud "on the ground" and research has been highlighting the public sector's systemic failure to correct for known historical trends, it is important to get a handle on how these laws work in public construction.

QUESTION(S):

How do the various false claims laws apply to public projects in New York City and elsewhere in New York?

What has been the historical development of these laws?

How does New York's laws compare to those of other jurisdictions?

PRACTITIONER PARTNER(S):

DDC

Unpacking "Means and Methods": Is It a Sword or Shield or What?

BACKGROUND:

The simplest paradigm of a construction project—owner, designer and constructor—has some explanatory power for understanding what happens on a project site, but it is not able to go the whole way. The constructor is not a single entity but rather a complex arrangement of various functions and entities, typically with one single entity, often referred to as the general contractor, at the apex. This paradigm also does not convey the service delivery methodology and related contract (among several options) to which the constructor entity at the apex agrees. In such contracts, however, the term "means and methods", a term of art, most often not defined, is used by both parties to advance and protect their respective interests, Researchers and practitioners have noted the adversarial nature of participants "on the ground", which is the result of risk shifting contract provisions and regulations and case law interpretations over the years. The historical movement away from the architect as the "master builder" into the complex set of relationships, many of which participants having been regulated to some extent, may explain some of the bases for litigation and the adversarial nature of the industry. Unpacking and analyzing the various relationships within the constructor network, all reflected by a combination of standard contract provisions, historical practice, risk shift conventions and regulation, would go a long way to providing a foundation for future research projects related to risk analysis and management. To such ends, subjecting the term "means and methods" to legal analysis, informed by practice, would also be helpful.

QUESTION(S):

What are the various traditional relationships that exist under the "constructor" entity? What would a typology map of constructor entities reveal about the complexity of functions and organizational structures within the term "contractor" or "general contractor"? How do they change from the traditional service delivery methodology—design-bid-build—to the modern methodologies such as construction-management-at-risk, design-build, design-build-operate-and-maintain, and design-build-finance-operate-and-maintain? What fundamental contract provisions, especially risk shifting/mitigation provisions, are necessary for the different methodologies?

To what extent can the fragmentation of the original "master builder" into the various participants and their respective regulatory models explain some of the adversarial nature of the industry and risk shifting mechanisms and practices?

What does the term "means and methods" mean under standard contract provisions and as interpreted in case law (including variations among jurisdictions to the extent they exist)? What economic reality does the term intend to reflect? How does the term relate to fundamental risk shift/mitigation provisions among the various service delivery methodologies?

The general contractor can self-perform (with its own staff) the services under contract to the owner or act as a "broker" and purchase the services it is obligated to perform, typically using a combination of both functions. What goes into the decision to self-perform and/or broker? What methodology is most effective and under what conditions? To what extent does each methodology contribute to the overall project alignment of principal and agent?

PRACTITIONER PARTNER(S):

DDC

Investigations into Design-Build

BACKGROUND:

Before New York modernized, in small part, its public construction procurement law by authorizing the design-build methodology for certain types of projects—horizontal infrastructure—and certain public owners at the state level, the conversation, and related analyses, had been focused on the public procurement laws. Language in the recent authorizing legislation, however, raises issues with design-build from an education law and professional licensure perspective. While New York stands out as a state with antiquated construction laws on the whole, it is in fairly good company across the nation among states whose licensing requirements for architects and engineers prohibit, or are perceived to prohibit, design build.

QUESTION(S):

To what extent and how do the state education laws, regulations and related case law speak to the use of the design-build methodology in New York and in other jurisdictions?

What organizational arrangements with corresponding contract structures and provisions related to design-build would be permitted under such a licensing scheme?

What are the various public policy issues are implicated and how do they relate to each other?

PRACTITIONER PARTNER(S):

DDC

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 aspects apart from management that it deserves special attention. Large institutional entities have an interest in understanding technology solutions as owners of construction projects as well as in technology research and development. Large owners that are also governmental entities also have an ability to advance technology innovation, as an economic policy maker but also as collateral from its public capital program, by subsidizing the research and development necessary for innovation in construction technology.

How Might Technology Mitigate Negative Impacts of Horizontal Infrastructure Construction?

PRACTITIONER PARTNER(S):

DDC

BACKGROUND:

Several public owners within the City's boundaries have large capital programs that rehabilitate, maintain, and expand the public infrastructure of a large and complex built urban environment. For example, DDC's Infrastructure Division is dedicated to roadway reconstruction, combining planned water and sewer reconstruction with planned upgrades of City streets. Routine street reconstruction is an essential part of keeping the City's infrastructure in a state of good repair and likely has an impact on the economic vitality of business districts and property values of residential districts. The recent federal stimulus bill underscores the important relation of capital infrastructure projects to the economy. There may be, however, some negative local economic consequences during construction that emerging technology might help mitigate

QUESTION(S):

What would a literature survey of the impacts of horizontal infrastructure construction on business activity during construction and a complementary literature survey on recent innovative technology in horizontal infrastructure design and construction practices suggest to public owners in the City? What kinds of technology do other agencies and local governments in the State and across the country use to mitigate disruption during horizontal construction? What are best practices and technologies?

What planning techniques, if any, are available to mitigate negative impacts of horizontal construction?

Based on the results of the literature survey above, how might a public owner design a quantitative analysis to evaluate the impacts on local businesses of horizontal infrastructure construction during project duration?

What is the Impact of Innovative Technology on Project Performance and Budget?

BACKGROUND:

Public entities have a dual role with respect to Built Environment research and development. As owners, they have an interest in the application of innovative technology on their projects, and, as large institutional owners and/or economic policy-makers, they have access to strategies to increase research and development generally within the local construction market. In order to understand the impact of having applied innovative technology to construction projects in the past as a guide for future projects, it is necessary to evaluate the impact on efficiency and/or effectiveness of such past applications.

QUESTION(S):

As a case-study, what has been the impact on the efficiency and effectiveness of the water/sewer systems from the City's adoption of pipe lining technology for projects beginning in the 1970s?

What lessons can be learned from this earlier adoption of new technology?

PRACTITIONER PARTNER(S):

DDC

How to Implement Innovative Information Technology Products in Construction Programs?

BACKGROUND:

Public entities have a dual role with respect to Built Environment research and development. As owners, they have an interest in the application of innovative technology on projects, and, as large institutional owners and/or an economic policy makers, they have access to strategies to increase research and development generally within the local construction market. DDC has begun to require contractors to manually document the "as built" condition of completed projects, noting changes to the original project plans that occurred during construction as a result of unknown conditions below the surface, and DDC is considering the use of information technology in connection with this requirement. Yet, computer technology creates management challenges on the job and technical challenges posed by different data systems within at the reporting contractor and at the agency. Further, the reality of rapid change in the industry may make early adoption of technology seem unwise.

QUESTION(S):

What would a literature survey on management issues related to the adoption of innovative computer/information technology, with some emphasis on management of construction projects, suggest to public owners?

What strategies might a public owner use to efficiently and effectively implement the adoption of innovative computer/information technology in large capital construction programs?

NEW How and to what extent has the increasing adoption of building information modeling within the construction industry changing the landscape of implementing information technology products in construction?

PRACTITIONER PARTNER(S):

DDC

What Modern Mapping Technology Exists for Efficient and Effective Planning?

BACKGROUND:

The City has approximately 5,800 miles of streets, sidewalks, and highways, 789 bridge structures and six tunnels, managed by DOT. The City's street system is a vast network of streets, avenues, and boulevards. In view of the institutional process of street mapping described below, it is always challenging to determine the various characteristics of the status of City streets, such as whether they are mapped or unmapped, whether they are improved or unimproved and who owns them. Streets could be a mapped street, an unmapped street in all five City boroughs, a private street or sometimes a record street. The City's streets, arterials and some highways are generally mapped in the Final City Map and the ownership of these streets is shown in the Damage and Acquisition Maps (a.k.a. Title Maps), which are maintained by the Topographical Bureaus in each Borough President's office. During the last significant restructuring of City government in 1989, many legislative-type functions exercised by the office of the Borough President were modified to become advisory and mediating or, as Jane Jacobs described, locality coordination functions. One function that remained within each Borough President office is the topographical function, which has its origins from the period, before the 1936 and 1961 Charter revisions, when Borough Presidents played a more active role in building regulation and implementation of capital projects. Before the City became a fully built city, local expertise was critical, especially in the absence of today's geographic information system (GIS) technology. Difficulties DOT encounters in determining street status, coupled with advances in GIS technology, suggest the time has come to reconcile a localized function with current technology that permits centralized computer-based mapping, a possible outcome that could also improve public safety which requires a way to relate vanity addresses to actual locations. With a GIS-based street map, DOT could improve its planning activities, working with other agencies to better utilize mapped and City-owned streets that have not been improved for traffic purposes to, for example, create plazas, improve as a street, establish park-and-ride programs, use for parking purposes or lease to private entities.

The City also retains paper-based data on sub-surface conditions across the City gleaned as the result of past projects.

QUESTION(S):

What would a literature survey on topographical functions and techniques in dense urban environments and on current geographic information system (GIS) technology suggest for public owners like the City?

What have other large dense urban cities across the country done since the advent of GIS technology to improve the topographical functions in such cities? What are best practices?

Document a case study of a borough office topographical practice to support possible future plans resulting from the above analyses.

Would it be feasible for the City to add its sub-surface condition data to systems designed for topographical information or would a separate system be necessary?

NEW What do other public owners with horizontal infrastructure systems with elements similar to streets do?

PRACTITIONER PARTNER(S):

DOT, DDC

How Can the City Use Technology to Enhance Road Congestion Management?

BACKGROUND:

Among DEP's many roles is the responsibility to carry out the federal Clean Air Act rules and regulations. As tightening air quality standards loom in the future, technology can play a role in enhancing road congestion management as a method of complying with stricter standards.

QUESTION(S):

What lessons can be learned from other jurisdictions, in the U.S. and elsewhere, about:

- effective new technologies in managing road congestion opportunities and
- impediments in the City for the use of such technologies the cost/benefits of various successful programs

PRACTITIONER PARTNER(S):

DEP, DOT

Science, Technology and Society Studies of the City—Shared Metaphors, Models and Knowledge

BACKGROUND:

When a public owner is also a governmental entity with the power to regulate the built environment that is coterminous with its legal jurisdiction, in the form of building codes, restrictions on land use from zoning to preservation, and participant licensure schemes, the multi-disciplinary field of planning becomes one lens through which people can view the collection of built environment artifacts (a.k.a. the city). Planning is a multi-disciplinary field that includes geography, computer science, economics, architecture, law, sociology, political science and history, yet planning in action—public urban planning—is an exercise in politics.

Each of planning's disciplines and other multidisciplinary fields that overlap them also lay claim to a primary or unique understanding of the built environment artifact. For example, architects, in creating the public space on which we act out our public, or civic, lives, have a direct connection to the place of politics. The results of planning exercises and activity are legal instruments, creating rights and legal processes that exist within the intersection of law and politics. Economics has at least a dual role in planning in action, as a methodology to evaluate past planning actions and as an expression of aspirations in planning. The multiplicity of professions necessarily engaged in planning activities often results in a cacophony of multiple voices, each one valid within the confines of its own view of the urban space, with attendant ways of framing problems and solving them. To that cacophony, one can add interest groups, with culled supportive research results, focusing on specific aspects of the built environment artifact—transportation, housing, the natural environment. With all this noise in the system, how can a public owner with planning powers seek to respond to new realities revealed by new needs, changes in technology, and newly conceived aspirations, ideas and policies? How can a public owner/regulator mediate among the competing voices as it works to accommodate an urban artifact to changing conditions as they unfold and as they are projected to unfold?

Oddly enough, concepts and research from the emerging Science, Technology and Society (STS) field of study may provide this ensemble of professionals and members of the public with historical, analytical and metaphorical tools to help foster a common understanding and language for all to use as the urban artifact wrestles with 21st century issues.

QUESTION(S):

What would a literature survey of the STS field reveal to public owners/regulators as possible models and metaphors for a common language and approach to urban planning issues in the 21st century?

What would a survey of academics and public planning professionals on the various models and metaphors reveal for the feasibility of any particular set of approaches to inform policies and practices?

PRACTITIONER PARTNER(S):

DDC

The Brave New World of Public Participation and Information Technology

BACKGROUND:

All of the City's built environment processes, from the capital budget and land use processes to the administrative rulemaking process for built environment regulations are set forth in laws that attempt to preserve or promote metaphors of citizen participation in government with origins in the *polis* and the New England town meeting. Citizen participation, authorized and at the same time circumscribed by these laws, requires face-to-face encounters either in public meetings and hearings and in private meetings, with letter writing as an enhancement and open meetings—or sunshine—laws as a protection.

On the other hand, we have recently been greeted with public expressions extolling the benefits of transparency and the unloading of much public data that used to be quite difficult to obtain during the days of paper-based documentation. The ease of access to public data does not, in and of itself, increase the understanding of the data. The data obtainable to the public is still bounded by "freedom of information" type laws that balance the "knowledge is power" concept against privacy and confidentiality concerns.

Finally, as the capacity of electronic technology meets the dreams of systems management theorists and technology corporations alike, the number of issues expands to include basic political power questions of who should control what information and systems? For whom? And how?

QUESTION(S):

NEW How can this brave new world assist in re-aligning the principal-agency interests of citizen, as the ruler, and government, as the ruled, in the context of both representative government and the built environment? Specifically, to the extent existing built environment laws no longer align citizen-government interests as originally intended, how can a technology powered systems approach assist with realignment?

How can recent technology impact the public participation process as a technical matter? As a political matter?

What is the gap between the traditional civic models that underlay our current public processes and the brave new world of the plugged-in citizen?

How can recent technology help citizen participants to manage and understand the enormous amounts of data that are now available to them as a technical matter? What is the role of education?

NEW What values, legal principles and practical limitations apply to questions of who should control what information and systems? For whom? And how?

PRACTITIONER PARTNER(S):

DDC, MTA ESC, MTA SI

Technology Investigations into BIM: "Top Down" Analysis

BACKGROUND:

Some design management techniques and project management tools emerged from the industrial design field and were applied to construction, while others emerged from the construction field itself. Despite their different origins, successful techniques share a basic precept that the earliest practicable and continuous application of these techniques, including all relevant participants and stakeholders in the process, works best for the project at hand. The newest entrants to the firmament consist of a technological tool—Building Information Modeling or BIM—and an innovative service delivery methodology—Integrated Project Delivery or IPD.

BIM originated from parametric solid modeling (PSM) software used in the automotive and aerospace industries, and as these software platforms evolved and became less expensive, they migrated into the field of physical structures. BIM can hold large amounts of data—spatial, schedule and cost—permitting users to explore various building designs at the earliest possible stage as well as the inter-relationships among design, constructability, schedule and price. Public owners have been using BIM, though their ability to fully exploit its benefits is limited when a public owner can only use the design-bid-build methodology which imposes a temporal divide between the designer and contractor.

QUESTION(S):

How have owners handled issues related to the need for interoperability of various BIM programs among the participants?

What other technologies can be used in sync with BIM? How can data (surface and subsurface) obtained via 3-D laser scanning and other non-destructive technologies be integrated into BIM? Once such surface and subsurface data are integrated into the BIM program for a particular project, what are the opportunities for linking data in BIM to existing GIS databases? What are the opportunities for linking data in BIM and GIS databases on a system wide basis?

How can BIM (with GIS) technologies facilitate better/more successful operation and maintenance plans for public buildings and infrastructure? How can the transfer of information gathered during the design and construction process be facilitated for the lifecycle operation and maintenance of the completed project? How can the design and construction process under BIM be used to anticipate future operation and maintenance issues?

PRACTITIONER PARTNER(S):

DDC

DESIGN

Public capital programs generate public architecture that becomes part of the visible built environment. I.N. Phelps Stokes, who presided over the Art Commission under Mayor LaGuardia, echoed the Vitruvian paradigm when he noted that "[t]he production of beauty, especially by simple and inexpensive means is a very subtle problem and can be solved successfully only by a combination of ability, experience and care." The reality of scarce public resources applies to the design and construction of public architecture.

Not only is private construction part of the visible built environment, but it is also subject, like public construction, to the continual balancing of function, build quality and delight, all within some cost envelope. When public owners act as private owners, they are purchasers of design—architectural and engineering —services. When public owners also regulate built environment participants, processes and products, they impact private projects as well as public projects and the larger public space that is the built environment.

How to Incorporate "Long Life, Loose Fit, Low Technology" Design Principles for Public Buildings?

BACKGROUND:

Across the spectrum of public uses, there is always the potential for a mismatch over time between long-lived fixed capital assets (and their original design goals) and the changes in the demographics of populations that they were intended to serve as well as general changes in demand for such services. Demographic forecasting techniques are of limited predictive value for long-lived assets. Public owners find it harder than private owners to change policies or practices quickly. It becomes especially difficult for a public owner like the City with a practice of over-building public assets to last "forever" in the face of historical insufficient maintenance activities after construction completion.

This mismatch is further complicated in a highly built urban environment with little available land as a general matter and even less for public projects with certain uses perceived to be negative. Under such circumstances, currently underutilized public assets of many kinds might be considered as resources for future planned and/or unanticipated demand. In view of the limits of demographic forecasting, government needs other tools to help it manage periods when dynamic reality differs significantly with long-lived assets.

This topic has been the subject of prior Town + Gown projects: one recommended developing a strategy for flexible design of public buildings going forward. The idea that public structures can be shared productively by multiple human services agencies and groups providing social, educational, cultural and health services, has been discussed since the early twentieth century. Difficulties in coordinating such efforts and in allocating expenses for separate agencies providing services have impeded implementation. Since then, however, the sustainability agenda has placed a focus on "long life, loose fit, low technology" design, and trends in work standards have evolved to include job sharing, telecommuting and flexible co-location of staffs from various offices across an organization.

QUESTION(S):

Building upon prior work, how might a public owner implement the recommendation to design structures flexibly to permit multiple uses over time and at the same time in order to optimize utilization its capital assets?

Taking the implementation strategy to a more specific level, what specific public building typologies would lend themselves best to a "long life, loose fit, low technology" approach?

PRACTITIONER PARTNER(S):

DDC

What Are the Impacts of Workplace Design on Workplace Performance?

BACKGROUND:

The design and construction of workspace, where many spend most of their lives, impact us as individuals and as a society. All levels of government have been transforming their work environments to maximize the value of public office space as the result of earlier government re-engineering and downsizing efforts, the advent of telecommuting and family-friendly work environment initiatives, rapid changes in technology and the need for improved customer services and/or more effective programs serving clients, as well as budget efficiencies. The performance measurement focus in 1990s also created an impetus toward reforming office space planning as the connection between worker performance and the workspace became increasingly clear. At the federal level, linking the planned downsizing of offices with trends in alternative workplace design permitted a reduction in office space costs in ways that minimized the negative impact on agency performance of missions and tasks articulated during strategic planning processes.

Since then, the sustainability agenda has placed a focus on the impact of the environment—external and internal—on human health. Research conducted in the U.K. and U.S. has demonstrated that the most successful labor markets are reinforced by workplaces that are physically and conceptually supportive of their objectives, values and people. These studies have demonstrated that workplace projects can positively influence organizational performance and employee effectiveness, by increasing productivity, employee satisfaction and attractiveness to potential candidates and reducing absenteeism, employee turnover and use of health insurance benefits.

Most public owners do not currently evaluate the contribution of workplace design to agencies' performance, on either administrative or service provision ends of the spectrum, or the fiscal savings that derive from improvements in the workplace. Investigating the incremental increases in agency performance and fiscal savings as the result of such design interventions would enable public owners to evaluate future relocation strategies, consolidation efforts, planning initiatives, technological improvements, changes in management policies, and environmental designs.

QUESTION(S):

What would a literature survey of the relation of workplace design and performance in both public and private sectors suggest for public employers that are also public owners?

Based upon the review of the literature, and using the City's performance-based data, how could a quantitative evaluation model be designed to test the relation between recent renovation or expansion projects involving interior workplace improvements and related agency performance, on either administrative or service provision ends of the spectrum, as well as savings to the expense budget?

PRACTITIONER PARTNER(S):

DSNY, DCAS, DDC

Investigations into Active Design

BACKGROUND:

Historically, built environment design has achieved positive public health outcomes, from the public water and parks systems, the public sanitation program to housing and zoning laws. In the latter part of the 20th century, built environment design initiatives have ranged from developing pollution control features on factories (and cars) to eliminating toxic compounds from building materials such as asbestos and lead. At a time when the cumulative effect of contemporary planning and design have reduced the need for daily physical activity, public health researchers are now exploiting the relationship between built environment design and public health outcomes in the quest to reduce the incidence of obesity and its related chronic diseases. Physical activity has been found to prevent a host of chronic conditions. To illustrate, parks once provided respite from the week's strenuous labors, and now they must be designed to provide situations for physical recreation, because jobs are sedentary and people commute from home to jobs in a variety of powered vehicles. Contemporary building design—both commercial and residential—has reduced the number of opportunities for people to make up the slack in their physical activity. Active design principles in building design and in planning can increase the opportunities for daily physical activity that can help reduce the incidence of chronic disease.

QUESTION(S):

The City's Active Design Guidelines encourage adjacency between gym and playroom in residential buildings. The safety of children is a concern, since they may wander into the gym unsupervised and exercise equipment and weights could pose a hazard. What is the best separation design that would encourage adjacency and transparency while keeping children free of potential hazard?

Current studies of limited building types indicate that stairs need to be no more than 25 feet from the building entrance to provide an incentive for people to use the stairs. Does this metric for the distance between stairs and entrances hold for larger buildings (i.e. concert halls, hotel and large educational buildings) and occupancy, and if not, what are the appropriate metrics?

What are optimal design layouts for an office pantry based on the number of staff on shift to encourage healthy eating?

What are optimal design layouts for an exercise room at 800sf, 1000sf and 1200sf in an apartment building to encourage weight training and cardiovascular activities?

Interconnecting stairs in the workplace requires upfront investment. Are there quantitative building performance, productivity and health-related data that could be measured to evaluate the cost-benefit of this architectural design feature?

NEW How can public owners incorporate universal design principles in active design projects of all types going forward?

PRACTITIONER PARTNER(S):

DHMH, DDC

Investigations Into Designing the "Below-the-Roadway" Relationship of Public Owners/Utilities and Private Utilities?

BACKGROUND:

Beneath the asphalt on the roadways in many urban centers runs a transport network for private utilities—telecommunication, electricity, gas, steam—and public utilities—water and sewer. Public owners permit private utilities to occupy public space via several legal constructs, such as easements, rights of way or franchises. Since public roadways and the networks below them are dynamic infrastructure, the ongoing relationship must provide for responsibilities during construction, reconstruction and maintenance of the infrastructure as well as the utility elements below.

QUESTION(S):

What is the nature and degree of underground utility network complexity among the large densely populated urban areas?

NEW What would quantitative and GIS-based analyses of utility permit data reveal?

How do the public works agencies at other cities manage the interaction with private utilities for construction, reconstruction and maintenance activities?

NEW To what extent is the relationship governed by state law and/or public utility regulatory commission law and regulations and to what extent is the relationship governed by local law and/or agreement by the parties? How do these laws work, what is their historical development, how do they relate to public and private capital issues and how do they complement each other and/or work at cross purposes?

NEW What has been the experience with other dense urban jurisdictions that use/require dedicated utility corridors or tunnel under public streets? Specifically, what have been the physical design/technology used, the resulting performance and related finance mechanisms?

How do other cities structure the legal relationships between the public owner and the private utilities? How do public owners permit private utilities to occupy public spaces? What is the nature of the various relationships?

What technologies and design principles are available to resolve issues present in this complex area?

PRACTITIONER PARTNER(S):

DDC, DOT, OMB

Investigations into Design for Human Services Programs

BACKGROUND:

The design disciplines have demonstrated a connection between design of the physical environment—both interior and exterior and including physical space, space layout, fixtures and equipment as well as signage—and the functionality of the programs working within an physical environment—both those who work providing services and those who seek services. Surveys of public services spaces have revealed opportunities for agencies to apply design to their programs and spaces in a variety of interventions. These surveys have also revealed endemic Citywide process issues, ranging from funding complexity for certain types of human services programs, inadequate physical asset data including site conditions, physical maintenance needs and space plans and specifications, non-responsive leased-based relationships, a general lack of awareness of the potential for design interventions as part of program evaluation and improvement, and a lack of a systemic feedback loop into the budget process.

QUESTION(S):

What is the relationship been design of the physical environment and program functionality?

Based on existing analyses underway, what systemic Citywide processes create static conditions on the ground at odds with changing programmatic needs within human services programs?

What would a conceptual cost benefit model of various structural reforms look like?

PRACTITIONER PARTNER(S):

DDC, DCAS

Investigations into the Relation of Built Environment Design and Natural Phenomena

BACKGROUND:

The relationship of the built environment to all natural phenomena is much richer than the current environmental sustainability agenda's focus permits us to see and consider. For example, migrating birds fly into glass buildings at night on their flights up and down the coast. Canada geese, once migratory but now resident, are attracted to certain built environment features that conflict with public health and safety concerns and policies. Feral, free-roaming and stray cats thrive in certain built environment and landscape features. Public owners can take advantage of both science and design to improve outcomes for both humans and animals.

QUESTION(S):

For any type of human/built environment/animal interaction with current negative outcomes, what would a literature survey reveal?

For such type of interaction, what design strategies could improve the outcome? What other strategies would be necessary to support such design strategies?

What would a cost/benefit analysis of such interventions reveal?

NEW In what ways can biodiversity be viewed as both a response to and an indicator of other relevant environmental conditions in a particular built environment such as the city?

NEW What aspects of life in a complex urban environment, such as the City, does biodiversity influence?

PRACTITIONER PARTNER(S):

DDC, Parks

How Can "Long Life, Loose Fit, Low Technology" Design Principles Be Adapted for Institutional Facilities in This Age of Information Technology?

BACKGROUND:

In addition to the potential for a mismatch over time between long-lived fixed capital assets and the demographic changes in populations and service demand, innovative technology also creates the potential for a mismatch. Nowhere is this more evident than in both education and healthcare sectors, where programmatic changes made possible by electronic technologies will have an impact on the physical infrastructure where education and healthcare can be delivered. Advances in health information technology, notably the appearance and later mandated use of the electronic health record, has the potential for transforming not only the way healthcare is delivered but also the physical settings in which it is developed. The advent of distance learning also has similar implications for educational facilities.

QUESTION(S):

The development of information technology, in conjunction with other trends in healthcare and education, is likely to impact the current inventory of healthcare and educational physical assets. What design options are available to permit other uses of redundant or unnecessary physical assets in an environmentally sustainable manner?

What does the future of healthcare delivery or education, facilitated by technology, look like "on the ground"? How can the future of health care delivery or education from a physical perspective be designed?

PRACTITIONER PARTNER(S):

DDC, DCAS

Design Investigations into Management and Environmental Sustainability Issues

BACKGROUND:

Many disciplines claim the built environment as their own domain, none more than architecture. Yet management theories and tools capture the construction process and those that include a design management aspect also include the design phase. And, the growing list of laws adopted to increase the environmental sustainability of built environment objects and process will continue for the foreseeable future as we continue to understand the relation between the built environment and the natural environment. With so many other disciplines involved in the regulation of the built environment, the need for the architect to assess the impact of these non-design interventions on aesthetic and design imperatives will continue to grow. Over time, unintended negative consequences will become apparent, first to the architect and later to the other disciplines and the general public. The architect's ability to analyze design consequences will enable the design sensibility to inform public policy debates on subsequent built environment legislation.

QUESTION(S):

What impact does the use of Building Information Modeling have on the design process and end results?

How are the changing environmental requirements impacting the design process and end results?

PRACTITIONER PARTNER(S):

DDC, MTA ESC, MTA SI

How to Increase Design-Focused Research and Development?

BACKGROUND:

Public entities have a dual role with respect to Built Environment research and development. As owners, they have an interest in the application of innovative technology on their projects, and, as large institutional owners and/or economic policy-makers, they have access to strategies to increase research and development generally within the local construction market. In order to understand the impact of having adopted innovative technology in construction in the past as a guide for future projects, it is necessary to evaluate the impact on efficiency and/or effectiveness of such technology.

The difficulties associated with increasing research and development, as a general matter, in the historically conservative and fragmented construction industry are multiplied when considering how to increase research and development—in particular, hard building research sensitive to design imperatives—within the architecture academe.

QUESTION(S):

What would a literature survey of architecture-led research and development suggest for public owners such as the City?

Based on examples of successful architecture-led public sponsorship of research and development, what strategies could public owners use to increase the incidence of architecture-led research and development?

PRACTITIONER PARTNER(S):

DDC

How Do Other Cities Do It—Design Oversight of Public Realm?

BACKGROUND:

Established in 1898 as the Art Commission, New York City's design review agency was renamed the Design Commission in July 2008, to better reflect its mission. The Design Commission reviews permanent works of art, architecture and landscape architecture proposed on or over City-owned property. Projects include construction, renovation or restoration of buildings, such as museums and libraries; creation or rehabilitation of parks and playgrounds; installation of lighting and other streetscape elements; and design, installation and conservation of artwork. As the City's mature built urban environment moves forward into this 21st century, issues related to the aesthetics of the public realm to which both public and private projects contribute are bound to come up, making this an optimum time to begin some threshold analyses.

QUESTION(S):

What are the aesthetic issues for mature built urban environments?

What are the various interests involved in and affected by aesthetics of the public realm?

What do governments coterminous with other mature urban environments do to raise and manage aesthetic issues?

How might the City shape and oversee these issues?

Based upon a model of the costs and benefits of the current scheme, what would the costs and benefits of possible alternative models be?

PRACTITIONER PARTNER(S):

DC, DDC