

Resilient People Places and Projects

November 3, 2022

Pratt



RP3.1x

Event	Participants
10/31/18 , Resilient Public Spaces and Communities: Data Driven Explorations	NYC agencies, academics, practicing architects and community groups
11/18/19 Resilient Public Spaces and Communities.2	NYC agencies, academics, practicing urban planners and community groups
07/23/20 Research Project Draft release	RP3 WG (NYC capital agencies and researchers)
09/23/20 Research Project Kick Off Meeting	RP3 WG (NYC capital agencies and researchers)
09/18/20 Capital Project identification exercise for mapping from publicly available budget documents	RP3 WG (researchers)
Request to NYC capital agencies for Red Hook projects to map	
11/17/20 NAS methodology map exercise #1 for Red Hook; RP3 WG determined Red Hook not appropriate case study neighborhood	RP3 WG (NYC capital agencies and researchers)
NYC DDC to identify neighborhoods with all 3 aspects of resiliency deficiencies (urban heat island, inland flooding and coastal flooding)	
01/12/21 Meeting to discuss and select new case study neighborhoods—South Bronx and Greenpoint Community Districts were selected	RP3 WG (NYC capital agencies and researchers)
Request to NYC capital agencies for two case study neighborhood projects to map	
05/20/21 NAS methodology map exercise #2; RP3 WG determined insufficient project data for cluster analysis of case study Community Districts	RP3 WG (NYC capital agencies and researchers)
Request to DCP for additional case study neighborhood projects to map	
07/15/21 NAS methodology map exercise #3; RP3 WG determined insufficient project data for cluster analysis of case study Community Districts	RP3 WG (NYC capital agencies and researchers)
Waiting for DCP to release new Commitment Plan Map; T+G analysis of case study neighborhood Community Boards Registers by Borough revealed temporal gap in local knowledge transmission during capital planning process	

RP3.1

Resilient Public Spaces and Communities: Data Driven Explorations on October 31, 2018 (RP3.1)

Overview

- Focused on the Red Hook neighborhood
- Pilot Town+Gown working group format
- Red Hook served as the case study
 - Establish knowledge base
 - Explore and contextualize resilience in the built environment
 - Focus on public space and communities
 - Identify issues for future research within Town+Gown

Questions:

- What allows public space to function as community resiliency asset in both disaster and everyday life
- how to move from qualitative data analysis to quantitative data analysis.

Key Outcomes:

- Discussions raised issues posed by the City's capital budget process.
- Proposed research to focus on the City's capital budget process.
- Focus on interventions during the post-adoption design stage was inadequate.
- Refocus on the annual capital budget planning period.

RP3.1

Resilient Public Spaces and Communities 2 on November 18, 2019 (RP3.2).

RP3.2 brought the planning discipline's focus on community explicitly to bear on the complex issues raised by the research project.



Methodology Snapshot

CATEGORY	PROPOSED IMPACT AREA	PROPOSED RESEARCH	PROPOSED INDICATORS
ED ECONOMIC DIVERSITY	1. Improve Local Business Success	Local Business Analysis	# of Businesses by type / ownership
	2. Local Jobs Growth and Training	Existing Jobs Analysis	# of Businesses by type / ownership
	3. Increase Housing Diversity	Housing Analysis	# of units by type
LU LAND USE	1. Improve Development Balance	Land Use Mix Analysis	Uses by GSF
	2. Increase Density Distribution Balance	Density Analysis	GSF per acre
	3. Character Conservation	Existing Building Character	Existing buildings preserved
TR TRANSPORTATION	1. Increase Mobility Choice	Mobility Analysis	Trips by mobility type
	2. Reduce Logistics Trans. Impact	Logistics Analysis	Trips by logistics type, route distances, etc.
	3. Increase Neighborhood Access	Street Connectivity Analysis	Increased intersections, miles of sidewalks.
EN ENERGY	Reduce Resource Usage	Performance-Based Guidance	Per Capita energy & water usage / waste production, TBD
	Increase Port Electrification	Power Distribution and Usage at Port	
	Increase Renewable Energy	Energy Production by Type	Percentage of energy by production type
WA WATER	Increase Coastal Protection	Surge Analysis	Volume surge relief
	Expand Green Infrastructure	Open Space Analysis	Percent of open space by type
	Improve Environmental Performance	Monitoring System	Water quality

RP3 “In House” Research Project.

The participating **City agencies** and academics from **Pratt** and **AREA Research** within the **RP3 WG** (the Study Group) continued to develop the research project.

Focus:

- The capital budget planning period
- Optimize infrastructure investments in neighborhoods
- Increase community resiliency
- Explore ways the “community” can participate in that process more effectively.

Goals:

1. Apply the Neighborhood Activation Study (NAS) methodology
2. Apply the Envision framework
3. Apply AREA Research’s life cycle cost benefit analysis (LCCBA)
4. Build on the “proof of concept” analysis results

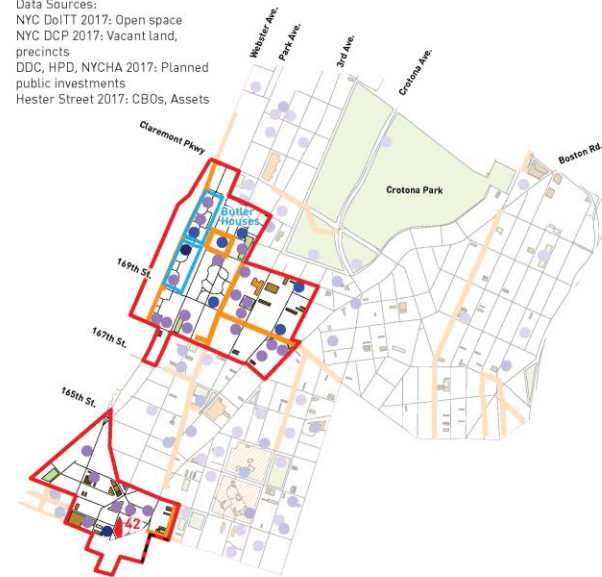
1. Apply the Neighborhood Activation Study (NAS) methodology, changing the policy objective from reducing crime to **increasing infrastructural and community resiliency**, to analyze case study **clusters** of routine capital infrastructure projects in a holistic manner during the capital budget planning period to identify ways to **rethink them together** to increase their infrastructural and community resiliency. This became known within the Study Team as the **“cluster” analysis**.

Where to focus? – Focus Area Selection

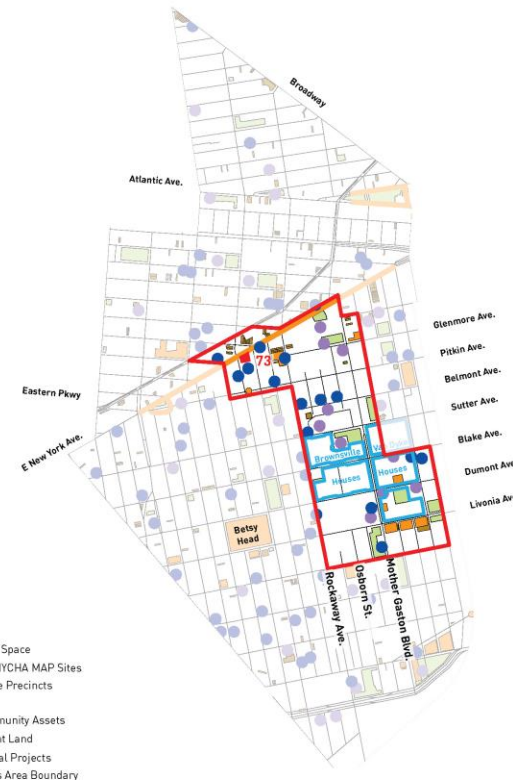
Selected Focus Areas

With residents, specialists, and agencies, Studio Gang uncovered areas of density and overlap between the focus site selection criteria and located focus area zones where targeted action will reverberate throughout the neighborhood.

Data Sources:
NYC DoITT 2017: Open space
NYC DCP 2017: Vacant land, precincts
DDC, HPD, NYCHA 2017: Planned public investments
Hester Street 2017: CBOs, Assets



Morrisania (42)



Brownsville (73)

Studio Gang



In Atlanta's Old Fourth Ward neighborhood, flooding from nearby Clear Creek has always been an issue. In the late 1980s and early 90s, **the city drafted a \$40 million plan to dig a massive underground tunnel** in order to channel excess stormwater to a processing plant, where it would be cleaned and discharged into the Chattahoochee River.

Eisenhauer believed that a solution utilizing green infrastructure could provide more benefits to both the ecosystem, and local residents. Eisenhauer created a plan for Historic Fourth Ward Park, a recreational area surrounding a 5-acre stormwater retention pond.

The new plan, **costing only \$23 million**, was noticed by local architect Markham Smith. Smith helped Eisenhauer organize stakeholders, including the Trust for Public Land and the Atlanta BeltLine, who purchased the declining industrial property next to the former Sears warehouse, where Eisenhauer had hoped new park would be housed.

The stormwater drainage pond, which is set deeply into a bowl below the water table, is capable of holding up to **4 million gallons of water** and slowly transporting them to the city's sewage treatment plant, enabling the park to handle a **500 year flood**.

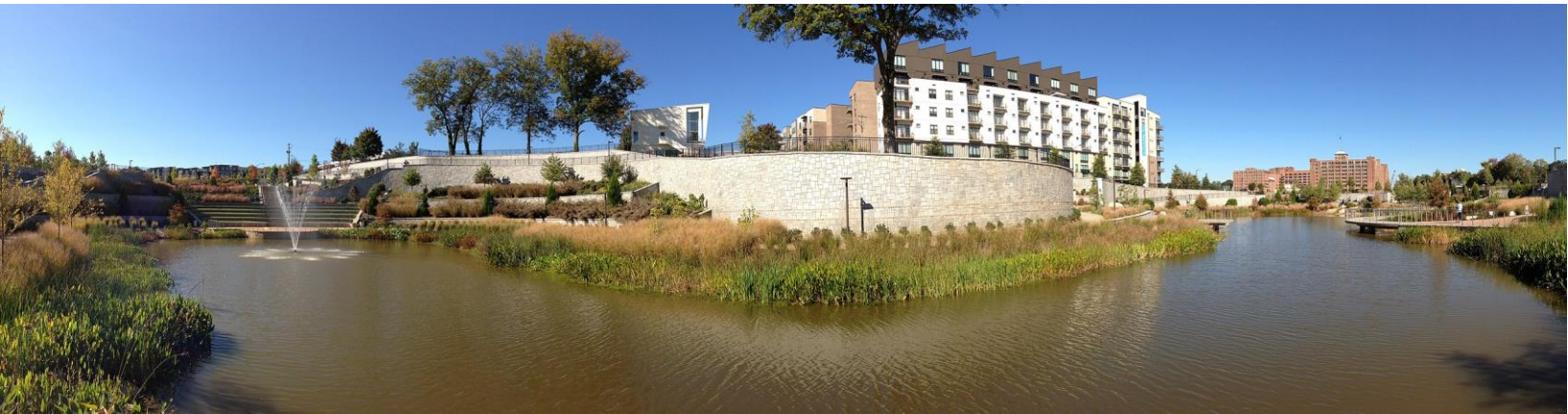
2002 Site Aerial



2022 Site Aerial



Site Photos



The NAS methodology uses a collection of **place-based planned capital investments** within neighborhoods to identify **potential synergies** among them where collaborative planning can strengthen ongoing community initiatives and agency efforts

The methodology suggested **collaborative capital project planning** and design as a tool for to achieve policy objectives, noting that multiple NYC agencies should coordinate their projects among themselves and with the communities. The NAS focused on the **post adoption design phase**, when collaborative changes to project clusters are likely to increase costs and delay schedules, representing a **significant weakness of implementing the NAS methodology in practice**.

2. Apply the Envision framework, which is a holistic framework for **evaluating and rating** the community, environmental, and economic **benefits** of all types and sizes of infrastructure projects and permits project owners to evaluate, grade and give recognition to infrastructure projects that use transformational, **collaborative approaches to assess** the sustainability **indicators** over the course of the project's life cycle, to determine how ideas emanating from the application of the NAS methodology could form the basis of Envision credits, especially innovation credits, and possibly further refine the holistic rethinking of the case study project begun under the NAS methodology.



Energy

Distribution
Hydroelectric
Coal
Natural Gas
Wind
Solar
Biomass



Water

Treatment
Distribution
Capture / Storage
Stormwater
Flood Control
Nutrient Management



Waste

Solid waste
Recycling
Hazardous
Waste
Collection & Transfer



Transportation

Airports
Roads / Highways
Bikes / Pedestrians
Railways
Transit
Ports
Waterways



Landscape

Public Realm
Parks
Ecosystem Services
Natural Infrastructure
Environmental Remediation



Information

Telecom
Cables
Internet
Phones
Data Centers
Sensors

3. Apply AREA Research's life cycle cost benefit analysis (LCCBA) model to these rethought clustered case study projects to **quantitatively analyze** the ability of interagency collaboration during the capital budget planning period to **maximize/optimize the level of total return on City capital investments** within a neighborhood and quantify potential capital budget savings opportunities. Steps (1) through (3) became known within the Study Team as the **"proof of concept"** analysis.

Run Analysis through the "Machine"

STEP 1:
INDICATORS / METRICS

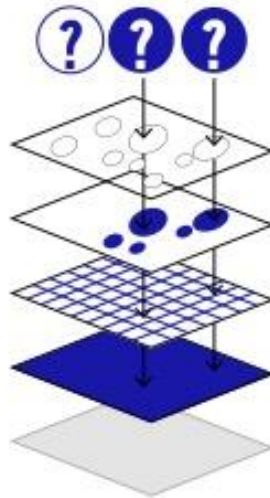
STEP 2:
DATA COLLECTION

STEP 3:
MAPPING

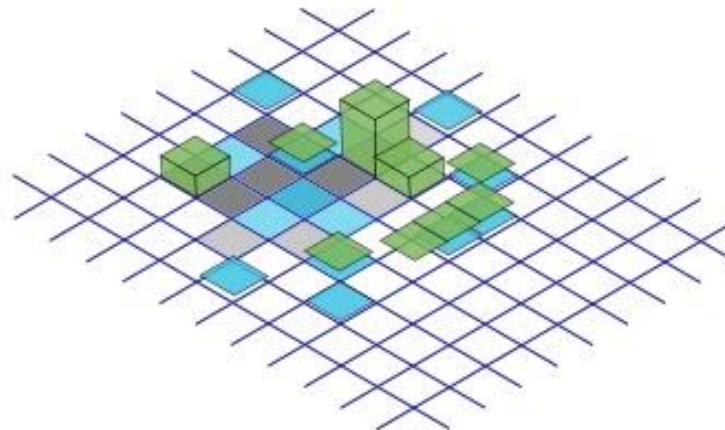
STEP 4:
GRID

STEP 5:
ANALYSIS "MACHINE"

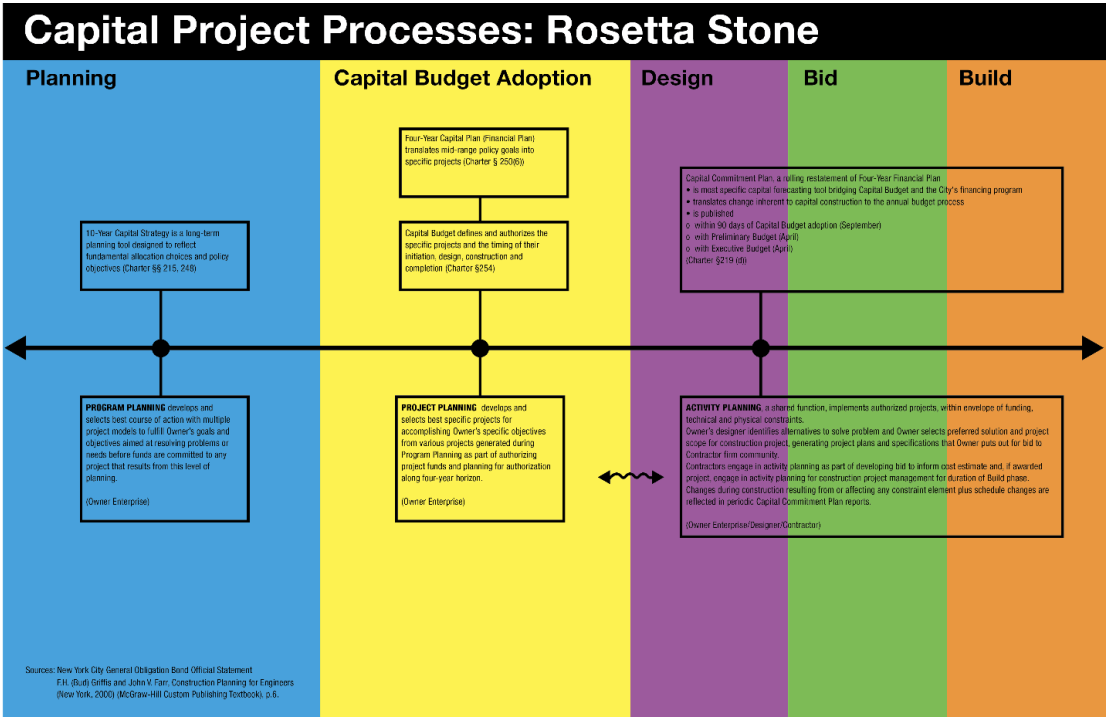
STEP 6:
OUTPUTS AND DESIGN



- **Aggregate and disaggregate data:** Inputs can be aggregated to the grid and stored in GIS analytical platform to inform future analysis.
- **Create weighting system:** scales of aggregation vary depending on spatial unit targeted (block, neighborhood, etc.)



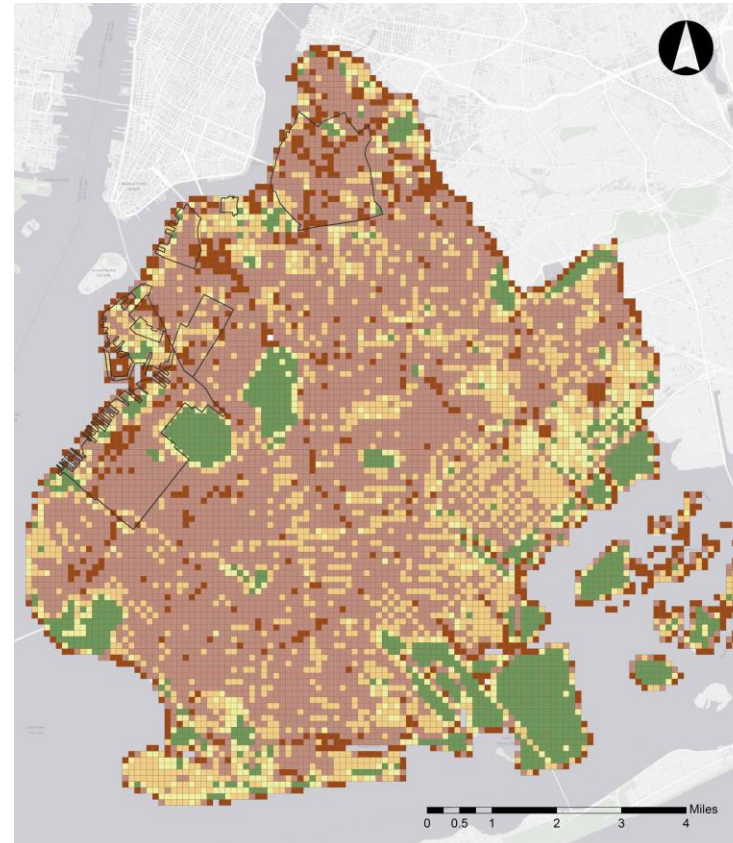
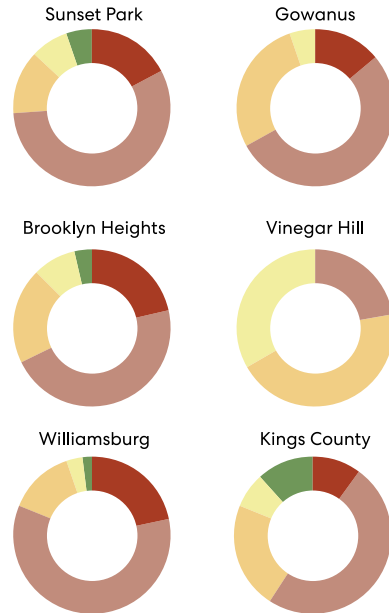
The identification, planning and implementation of City capital projects is a **complex process** and the City's capital process typically assigns execution of **stand-alone projects** through **individual agencies that have sector-specific criteria** for project performance and desired outcomes.



Applying the LCCBA model to the synergistically rethought **clustered case study projects** in Phase 1 would determine quantitatively the extent to which it is possible to **collectively enhance clusters of closely co-located projects** within neighborhoods to provide the **highest level of return** from an infrastructural and community resiliency.

4. Build on the “proof of concept” analysis results to analyze the institutional community board process to identify opportunities to bring community infrastructural and community resiliency deficit **knowledge to bear during the capital budget planning period**. This phase of the research project would apply urban hazard mitigation principles to leverage **state of good repair** capital infrastructure projects to optimize infrastructural and community resiliency.

WA Impervious Surface
Benchmarks



Preliminary Research Results from RP3 “In House” Research Project.

Phase 1 of the project—**Identification of Study Projects and Application of NAS Methodology and Envision Framework**—was planned for Summer and Fall 2020. The Study Group agencies **reviewed their agency capital plans** and programs and other projects in the City's budget documents to identify case study projects that would be mapped for application of the NAS methodology and Envision framework to the case study projects to identify potential points of convergence to support increased infrastructural and community resiliency and generate synergistic ideas for these case study projects for

Phase 2—Application of AREA Research **LCCBA** Model to Case Study Projects.

ANALYSIS METHODOLOGY:

Step 1: Objective. Research question?
Evaluate existing (insert project) proposals and (phasing) process.

Step 2: Define principle: FEASIBILITY.
Which is the principle driving the development of (project)?

Step 3: Identify Criterion and Evaluation Methodology.
Highest Return on Investment for (Project) Investment Strategy

Step 4: Define variables.
VARIABLE 1 : (Main Variable Set)

- Description
- Variable One
 - Variable Two
 - Etc...

VARIABLE 2: (Secondary Variable Set)
Variable Criteria

Step 5: Correlation Analysis between the two variables. Regression Analysis.

ECONOMICS

Multiple regression, for value models

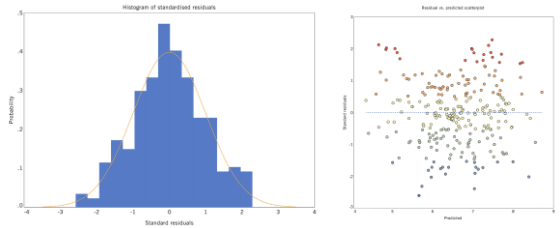
Model 5 explains 68% of variation in land values via 9 variables that are statistically significant. The equation is:

$$\ln(\text{LandValue}) = 5.858 + .034 (\text{AvgAge}) + .001 (\text{AvgInc}) - .280 (\text{HHSIZE}) + .395 (\text{FlatRt}) + 1.228 (\text{WkplRt}) + 0.45 (\text{DistWater}) - 0.59 (\text{DistMarma}) - .112 (\text{DistMetro}) - 0.28 (\text{DistTram})$$

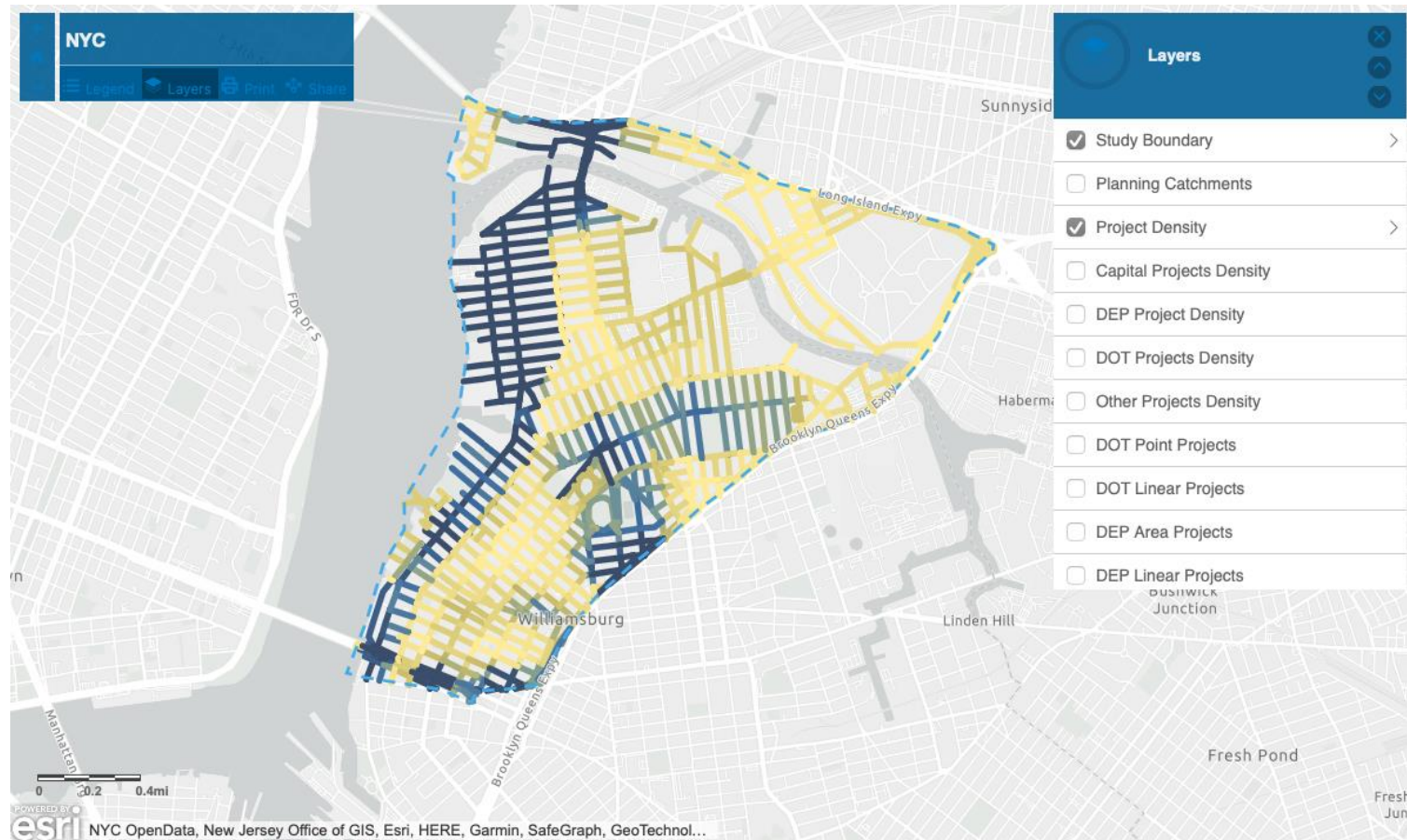
F(9,258) = 64.066, p<.0005, R2 = .681.

Coefficients of independent variables of the regression equation from Model 5 (N=268)

Variable	Unstandardized Coefficients	Std. Error	Std. Coeff's	t	Sig.	VIF
(Constant)	5.858	.620		9.454	.000	
AvgAge	.034	.014	.155	2.505	.013	3.193
AvgInc	.001	.000	.292	6.554	.000	1.662
HHSIZE	-.280	.076	-.180	-3.685	.000	1.991
FlatRt	.395	.197	.088	2.002	.046	1.411
WkplRt	1.228	.345	.130	3.558	.000	1.118
DistWater	.045	.017	.136	2.664	.008	2.183
DistMarma	-.059	.011	-.214	-5.394	.000	1.852
DistMetro	-.112	.017	-.302	-6.466	.000	1.816
DistTram	-.028	.006	-.218	-5.058	.000	1.557



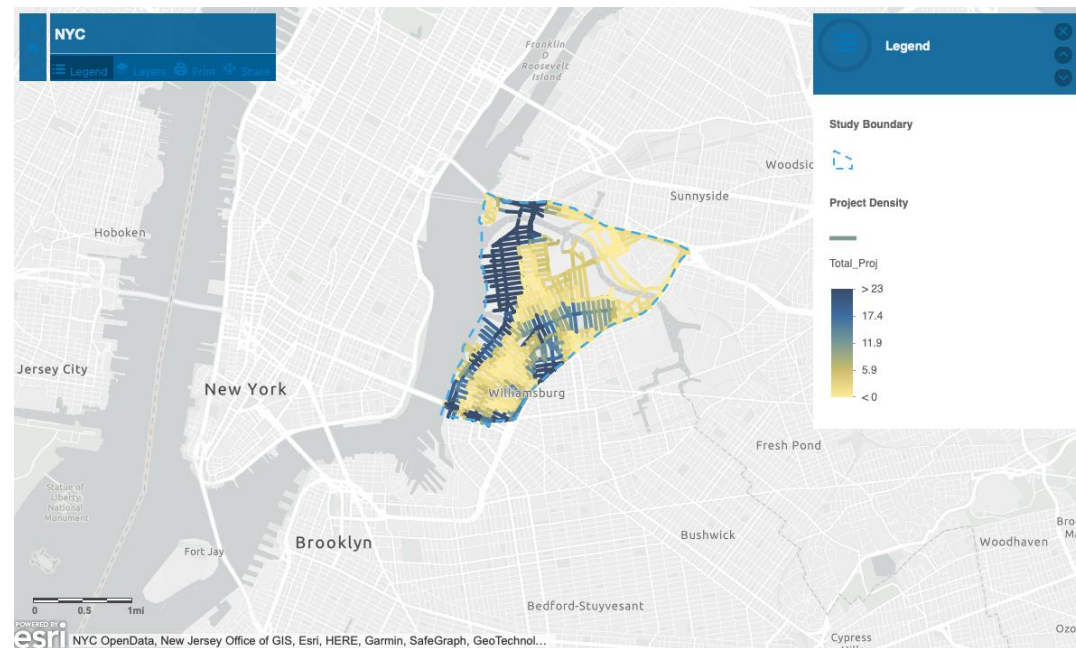
The Study Group has been working on Phase 1 since Fall 2020, with four separate exercises, which included a change in case study neighborhoods in early 2021. During the NAS methodology map exercise #4 using the recent Department of City Planning map of Commitment Plan projects for pre-selected case study Community Districts, the RP3 WG determined **there was insufficient density of project data for cluster analysis for the case study Community Districts.**



The last RP3 WG discussion

- (1) Concluded that **pre-selecting case study neighborhoods for cluster analysis did not work** and that it would be necessary to look at the entire city to identify Community Districts with sufficient project density for cluster analysis, which would require some funded academic assistance, and
- (2) Confirmed **absence of effective interagency collaboration** during capital budget planning period.

The Study Team's case study exercises, which assumed a level interagency collaboration practice during the capital budget planning period, discovered that NYC's existing capital budget process based on Charter provisions **does not require this type of interagency collaboration during the capital budget planning period and that there is currently no effective mechanism to facilitate such collaboration.** The

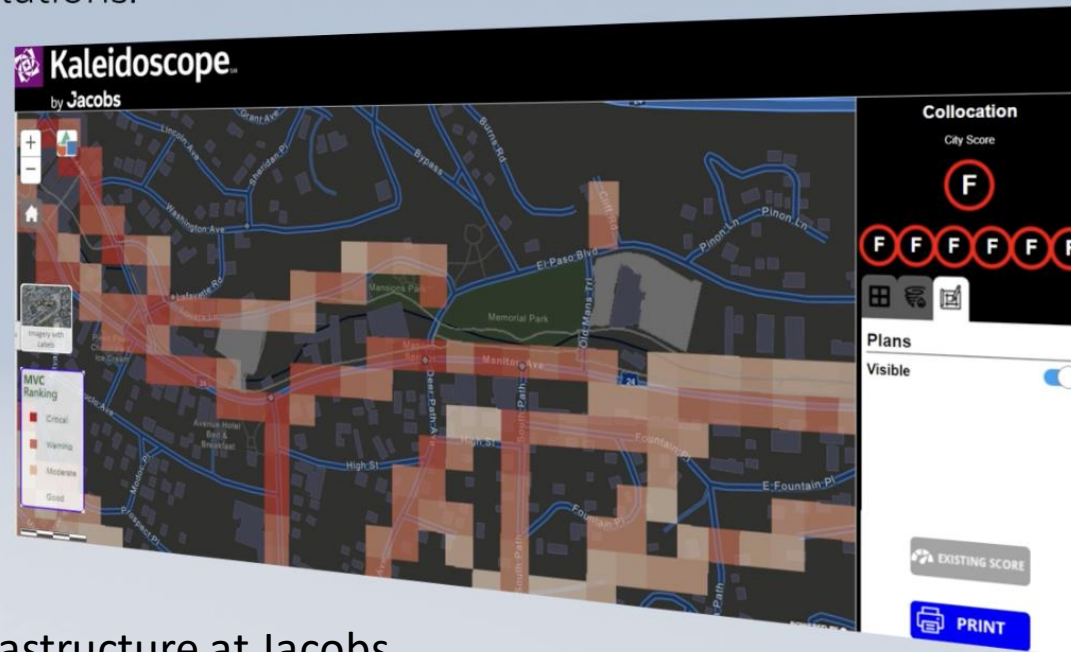


Proposed Platform

Study Group raised the idea of a **platform to support interagency collaboration**, which platform would also support transmission of community observed infrastructure and community resilience deficit knowledge. Please see the chart below for the Study Group's work on its "in house" research project.

Development Plans

Once an infrastructure vulnerability baseline has been determined, a community's development plans can be overlaid quickly to surface unforeseen issues or find opportunities for synergistic solutions.

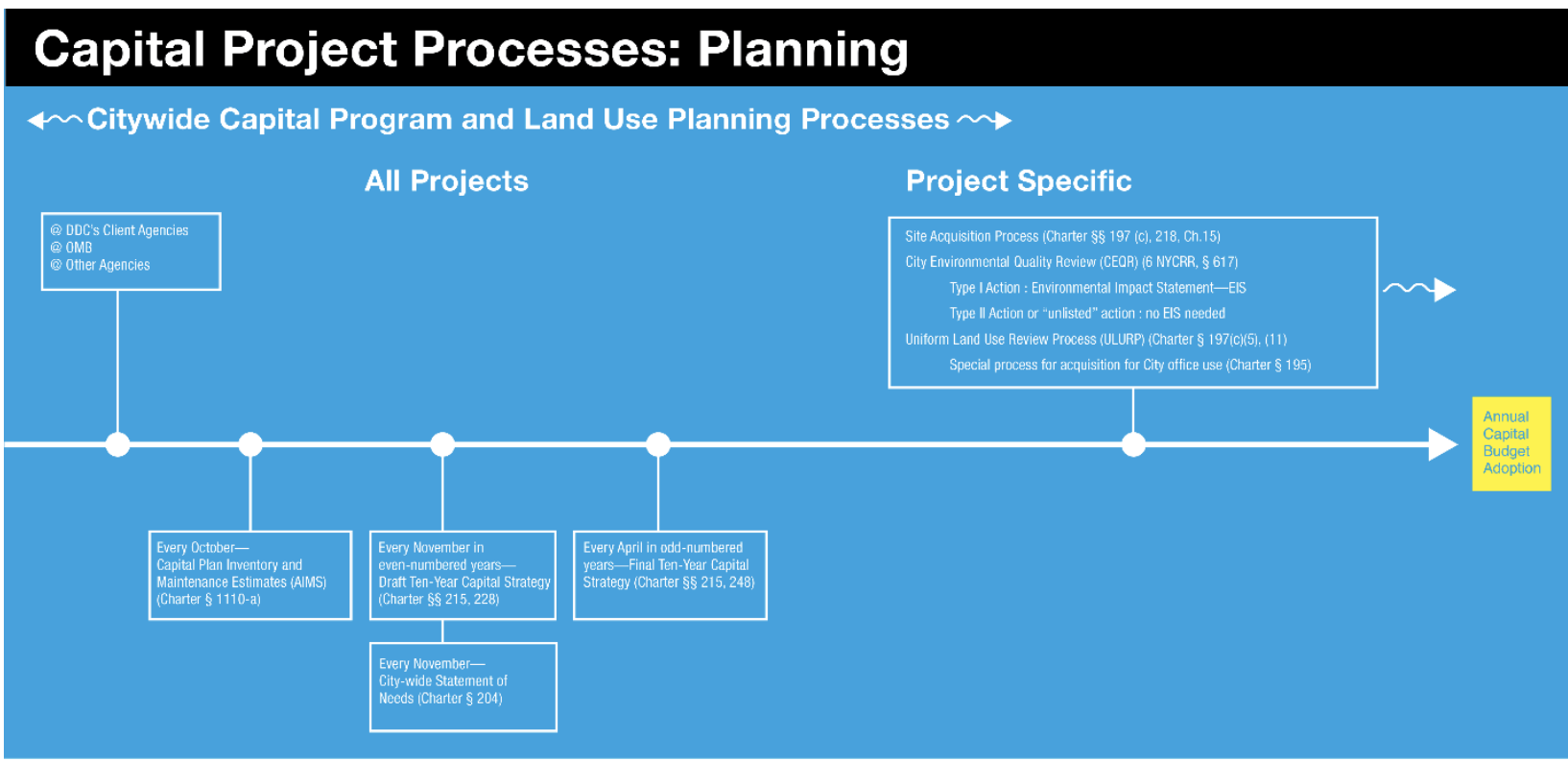


Mark Reiner
Kaleidoscope's creator and Director of Resilient Infrastructure at Jacobs

Translating Preliminary Findings to the Capital Budget Planning Process.

The NAS suggests that **multiple agencies can coordinate their projects within neighborhoods** among themselves and with the communities as a way to optimize stated policy objectives within a neighborhood.

The weakness of the NAS methodology is its **focus on the post budget adoption design phase**, when collaborative changes to project clusters are likely to increase costs and delay schedules.



The RP3 WG in-house research project identified the following **knowledge transfer gaps** during the **capital budget planning** period, which highlights the weaknesses of the NAS methodology and points to ways to address them during the capital budget planning period.

The two knowledge transfer gaps discussed below together constitute the **structural capital infrastructure project planning gap**.

1. Public **agencies do not collaborate** closely with each other on planned capital projects that are closely co-located within neighborhoods during the capital budget planning period. NYC's existing capital budget process outlined in the **City Charter does not require this type of interagency collaboration** during the capital project planning period and there is currently no mechanism to support it. This is the **interagency knowledge transfer gap** during the capital budget planning period.
2. The Community Boards' observed local infrastructural resiliency deficits within the capital portions of their Capital Needs Statements **do not reach the agencies** during the capital budget planning period in a way **that can inform or influence** agencies' planning for infrastructure projects within neighborhoods. This is the **local community knowledge transfer gap** during the capital budget planning period.

Key Conclusion:

Solving the structural capital infrastructure project planning gap during the capital project planning period will increase the likelihood of **optimizing closely located planned project investments** in neighborhoods with a cumulative budgeted cost that likely will not require additional post adoption funding because **collaboratively rethinking clustered projects during the capital budget planning period provides agencies with an opportunity to capture value across all clustered projects**, so that each single project might be able to simultaneously solve parts of the other projects' problems, collectively generating long-term cost savings and increased value (across a broad spectrum of value) for neighborhoods and the City in general.

Way Forward

Public agencies do not collaborate closely with each other on planned capital projects that are closely co-located within neighborhoods during the capital budget planning period. NYC's existing capital budget process outlined in the City Charter (see Exhibit 1) does not require this type of interagency collaboration during the capital project planning period and there is currently no mechanism to support it. This is the interagency knowledge transfer gap during the capital budget planning period.

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The interagency knowledge transfer gap is structural and primarily the result of the City's implementation of the Charter provisions. The departmental estimate basis of budget formation (see Exhibit 1) forces agencies working with OMB during the capital budget planning period to function primarily on a siloed basis. While the biennial Ten-Year Capital Strategy provides all agencies with information about the capital plans of other agencies to theoretically permit interagency co-located capital project planning, this document generally does not include granular project-level detail and the exigencies of the budget formation process during the short capital budget planning period, when OMB is engaged in three budgets at any single time (budget formation leading to budget adoption, budget administration during the fiscal year aimed at avoiding an end of fiscal year gap of more than \$100,000 (see Exhibit 2) and the post fiscal year audit process) makes location-based interagency collaboration and knowledge transfer during the capital budget planning period unlikely. An infrastructure-based exception does, however, occur during the capital budget planning period when OMB sees DEP water and sewer rehabilitation projects and DOT street reconstruction projects planned for the same street segments and combines them as part of budget adoption to head eventually to DDC to manage the design and construction of these co-located street-based infrastructure projects.

The Community Boards' observed local infrastructural resiliency deficits within the capital portions of their Capital Needs Statements do not reach the agencies during the capital budget planning period in a way that can inform or influence agencies' planning for infrastructure projects within neighborhoods. This is the local community knowledge transfer gap during the capital budget planning period.

The local community knowledge transfer gap is also structural and primarily the result of the City's historical implementation of the Charter provision related to NYC's 59 community districts' operation through community boards, which are the smallest level of government with Charter-defined roles in citywide capital planning process when, in theory, community members can officially inform and influence city-wide capital planning and budgeting with local perspectives. One goal for community boards is to increase "... the participation of... the people in the things that affect their lives," and 1989 Charter changes sought to enhance the ability of community boards to participate in citywide processes.⁹ That goal reflects Jane Jacobs's belief that professional urban planners, versed in techniques, theories and services, need to know "the terms of the precise and unique places in a city with which they are dealing" by turning to "the people of the place" who "understand thoroughly" the specific place.¹⁰ Jacobs' term "locality coordination" describes a vertical communications mechanism that captures place-based expertise for "locality knowledge in planning, whether the planning is creative, coordinating or predictive,"¹¹ which NYC's community boards are intended to fulfill.

Each year during the capital budget planning period, community boards submit their Community Board Budget Priorities or District Needs Statements that reflect, to some extent, real time capital asset assessments reflecting infrastructural and community resiliency deficiencies.¹² The community boards and other community organizations working within and outside the official community board process are widely known to feel frustrated in their attempts to inform and influence city-wide capital investment decisions. The OMB-agency process observed as part of the “in house” research with respect to these community board submissions¹³ during the capital budget planning period suggests systemic timing lags in community-based knowledge transfer of local infrastructural and community resiliency deficiencies during this period.¹⁴ While NYC agencies and OMB must act for the City as a whole and balance multiple needs in excess of resources, resolving identified systemic impediments at the community board level due to poorly designed interfaces within NYC’s capital planning process would optimize the impact of public capital investments to enhance peoples' access to essential public resources and services where these capital investments would significantly improve neighborhood quality of life and community resilience to disruptions caused by a shock or disaster.

Community boards originally functioned as a decentralized version of 311 that imparted local knowledge and navigated the bureaucracy at operating agencies and the central budget and planning offices on behalf of community members. Many of the promises from the 311 system, such as agency and citywide data-driven analytics to inform operations, planning and budgeting, have been realized, but agency reliance on 311 data for operations and capital planning purposes has drawbacks. Not only does the 311 system tend to bypass community boards' local knowledge at all points in the city-wide processes, including service district agency meetings, but also known biases in 311 use, along with 311 data primacy at agencies for operations and capital planning purposes, can translate into biased outcomes in agency decisions, leaving some vulnerable and underserved neighborhoods with underestimated and unaddressed needs, including infrastructural and community resiliency needs.¹⁵ It is possible to address the existing practice interfaces to comply with Charter requirements (see Exhibit 1), without changes in law but with tools to support the locality coordination function during the capital budget planning period, which permit development of a methodology within the institutional community board function for optimal transmission of important community knowledge, expressed, with training to be less like complaints and more like professional infrastructural and community resiliency deficits, to City agencies to support capital project effectiveness in increasing infrastructural and community resilience on an equitable basis by correcting for 311 reporting biases

The structural capital infrastructure project planning gap can lead to missed opportunities for the City to optimize infrastructural and community resiliency within neighborhoods and advance city-wide resiliency policy objectives. Without solving for the structural capital infrastructure project planning gap during the capital budget planning period, the resulting inability to optimize infrastructural and community resiliency within neighborhoods can result in less-than-optimal collections of closely located planned project investments in neighborhoods, which is a form of financial “waste.” Applying the NAS methodology to these projects after budget adoption will likely increase costs and delay schedules from what had been previously authorized, thus discouraging efforts at post-adoption change.¹⁶