New York City's Forgotten Industrial Waterway:
Assessment, Goals, and Indicators for Long-term Sustainability of the Newtown Creek

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Abstract

This policy paper suggests a strategy towards sustainable development of the Newtown Creek – an industrial waterway in New York, NY. The Newtown Creek was transformed from a meandering and flooding river into an industrial corridor made of channels and bulkheads. Yet, in the past 50 years, industry in New York City has undergone massive retrenchment. Left behind is a waterway that serves the scant remaining industrial functions, hosts waste transfer and sewage treatment facilities, provides current and potential habitat for birds and fish, offers developable waterfront space, and provides recreation and education opportunities. Given these extremely diverse functions, there is disagreement over the vision for the future of the Newtown. The sustainable development and environmental justice challenge for the Newtown lies in balancing water-dependent industrial uses that serve citywide populations with the need for local public space and economic development. A vision of the Newtown as a "green working waterfront" provides opportunity for public, private, and civil society collaboration towards a new, more vibrant future for this industrial waterway. In pursuit of that vision, this paper advances four main goals, with concurrent policy suggestions, and proposed indicators to monitor progress towards these goals.

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Sustainable Development of the Newtown Creek: Assessment, Goals, and Indicators

This policy paper suggests a strategy towards sustainable development of the Newtown Creek – an industrial waterway in New York, NY. In order to develop that strategy, I first present a description of historic and existing conditions of the Creek and the immediate surrounding neighborhoods. It is necessary to understand how the Newtown Creek came to be the most contaminated waterway on the East Coast of the United States, situated within very vocal environmental justice communities (*1*). Following the historic and geographic overview, I analyze the key current stakeholders from the public, private, and civil society sectors that have an interest in the future of the Newtown. Other models of industrial waterway redevelopment are briefly considered before suggesting a sustainable development strategy of a "green working waterfront" organized around selected goals, policies, and indicators.

I. Methods

The research for this work[1]consisted of a review of secondary literature and primary materials, key informant interviews, and more comprehensive, semi-structured, organizational staff interviews. The semi-structured, protocol-led interviews focused on understanding organizational values, resources, networks, strategies, tactics towards other actors, strategy change around critical points of transition in waterway restoration and redevelopment, and outcomes. Interviewees were selected for their influential role in civil society organizations. For the Newtown Creek case, a total of 9 formal interviews that lasted from one to four hours were conducted over the course of summer 2005 and winter 2006. During this time I also attended a number of public meetings and events held by the organizations. Finally, additional newspaper articles, brochures, and reports were used to corroborate and refine interview-based information. The process of data analysis consisted of listening to recorded interviews; taking time-logged

[1] This paper draws on one of three cases that were part of my Massachusetts Institute of Technology (MIT) master's thesis on civil society strategies in the restoration of industrial waterways. It was originally written as a final exercise for the Harvard University Kennedy School of Government course ENR 410 taught by William Clark in the spring 2006. The opinions and recommendations reflect solely the views of the author; any factual inaccuracies are my own responsibility.

notes; reviewing and typing up field notes; and organizing information by theme to identify patterns in the data. Immediately after conducting each interview, I wrote summary reflections of main points and surprising findings. Then, I created a series of matrices to visually organize key information that emerged as salient from the field notes. Finally, I conducted one follow-up interview in spring 2007 to update the work for UNCSD.

II. Description of the creek and surrounding neighborhoods

The Newtown Creek runs between the Brooklyn, NY neighborhoods of Greenpoint-Williamsburg and the Queens, NY neighborhoods of Long Island City and Maspeth. It is 3.8-miles long with five tributaries: English Kills, East Branch, Maspeth Creek, Dutch Kills, and Whale Creek. As the aerial photo and land use map show (see Appendix 1A and 1B), the creek is surrounded by active and vacant industrial use along its length, with residential neighborhoods set back a few blocks. The only significant open space that appears on the infrared image (Appendix 1C) is the Calgary Cemetery. The inaccessibility of the Creek from the neighborhoods presents both an organizing challenge and helps to explain why it had not previously been a focus of community pressure for open space development.

Figure 1: Industrial use (left) and vacant property (right) on the Newtown Creek

The existing conditions include vacant and contaminated sites that are clustered along the Newtown, pollution within the Creek itself, and polluted groundwater due to historic spills. Currently 36% of land in Greenpoint-Williamsburg is devoted to industry and 5.1% of land is vacant, with much of it clustered along the waterfronts (*2*). Queens Community District 2 is

29.8% industrial and 6.2% vacant (*3*). Current uses include bulk oil storage, solid waste handling, and wholesale distribution (*4*). Jason Corburn describes the environmental injustices, with the neighborhood hosting 30 solid waste transfer stations, a radioactive waste storage facility, 30 facilities that store hazardous wastes, 17 petroleum and natural gas storage tanks, 96 above-ground oil storage tanks, and as of 1987, the largest concentration of industries reporting to the EPA Toxic Release Inventory (*5*). The Newtown Creek faces a number of pollution problems, most prominent of which are the 20+ (combined sewer overflow) CSO events that discharge over 2.7 billion gallons of stormwater and raw sewage into the creek each year (*6*). In addition, a historic 17-million gallon oil spill has spread underneath 55 acres of Greenpoint and may be tied to incidences of diseases like Lupus. This spill was caused by Exxon-Mobile's

Figure 2: Pollution (left) and wildlife (right) coexisting on the Newtown Creek

corporate predecessors and is the subject of several lawsuits (*7-9*).

The neighborhoods surrounding the Newtown can be considered environmental justice communities, due to the presence of pollution and NIMBY (Not In My Back Yard) facilities in a low income and minority area. The EPA Region 2 standard for environmental justice communities in New York State is 24% poverty level or higher and/or 48.5% minority in urban areas—and all of the communities considered here meet those criteria (*10*). Greenpoint-Williamsburg has a substantial working class population, with rapid gentrification changing the composition of the area. Thirty-four percent of the community's adults live in poverty. The district is 48% white (a significant portion of which include Polish-speaking immigrants and Polish Americans), 5.5% black, and 37.7% Hispanic (*11*). Queens Community District 2, which includes Sunnyside, Woodside, and Hunters Point, is 30.8% white, 2% black, 26.7% Asian, and

36.4% Hispanic. The area of Long Island City, Astoria, and Sunnyside[2] is 20% in poverty (*12*). See Appendix 2 for more demographic information.

Figure 3 Oil storage (left) and oil pollution remediation (right) on the Newtown Creek

III. History of industrial use

In the early 20th century, New York City was an industrial center, with Newtown Creek serving as one of the key arteries. It was a site for copper smelting, chemical production, oil and sugar refineries, brick production, and lumber and coal yards (*13*). Eventually the cost of real estate, insurance, property tax, and labor began to decrease New York City and Newtown Creek's desirability as an industrial site. The 1960s containerization of shipping and the movement of the commercial uses on the Brooklyn waterfront to New Jersey further exacerbated this process (*14*). Reporter Andy Newman concisely captured this history of the creek:

> At one time, Newtown Creek was a proper stream, draining the uplands of western Long Island. But by the late 1800s, the bulkhead-bordered creek had been walled off from its sources of fresh water and was lined with petrochemical plants (including the first kerosene refinery, opened in 1854), fertilizer and glue factories, sawmills and paint works, and jammed with commercial vessels…the little creek moved more cargo than the lower half of the Mississippi. This brisk commerce—combined with the untreated sewage of hundreds of thousands of New Yorkers—created staggering amounts of smoke, stench, and sludge.
>
> Over the last 50 years, though, as city, state, and federal officials bickered about whose job it was to keep the creek navigable, shipping traffic left for deeper ports. Commercial traffic is down to a couple of dozen boats a day at most—barges of scrap metal, gravel or garbage, or the odd oil tanker. The businesses along its banks now include a plumbing-fixture showroom, the Dry Ice Corporation and what may be the

[2] The neighborhood divisions used by the Department of Health and Mental Hygiene and those used by the Department of City Planning do not coincide. This is why slightly different areas must be used to give statistics on the neighborhoods of concern.

> city's only waterfront adult bookstore. Most of the dumping has stopped, too, and while the sewage treatment plant, built in 1967, is primitive, it has been a vast improvement over nothing. (*15*: B1)

Despite the massive economic changes, some active firms still remain, as does the regulatory framework that supports industry. It is a federally navigable waterway under the jurisdiction of the Coast Guard and the channel must be maintained for shipping purposes; aside from the rezoned portions, the entire waterfront is zoned M3 for heavy manufacturing and industrial uses (*16-17*). Thus, for the past century and continuing on to today, the Newtown Creek has been treated first as a piece of industrial infrastructure and much less a part of the natural landscape.

IV. Challenges for sustainable development

The first sustainable development challenge for the Newtown lies in balancing water-dependent industrial uses that serve citywide populations with the need for local public space and economic development. Generally, there are several environmental justice issues related directly to working waterways, with marine waste transfer station siting being one key issue in New York City. Recently, environmental justice advocates have pointed out that Manhattan does not have a functioning waste transfer station while all of the other boroughs have them. A joint editorial published in an online newspaper by three civil society groups describes the problem,

> Our coalition [Organization of Waterfront Neighborhoods] includes representatives of the three New York City neighborhoods that bear the brunt of the city's current waste management system: Greenpoint-Williamsburg, the South Bronx and Southeast Queens. The current system, cobbled together after the Fresh Kills Landfill was closed, sends over two-thirds of the city's garbage to these three neighborhoods and much of this garbage comes from Manhattan. This system is almost entirely reliant on truck transport and it transfers waste at facilities that are often substandard — lacking sufficient odor, noise and dust control, and lacking space for trucks to queue on site (much less indoors), causing them to idle on city streets. This over-reliance on trucks increases congestion from truck traffic and air pollution throughout all areas of the city. Truck traffic levels are extremely high in those neighborhoods that are home to the majority of waste transfer stations. In these neighborhoods, the substandard transfer stations and the hundreds of incoming and outgoing trucks per day create constant noise and odor, low air quality and high asthma rates, damaged infrastructure and an overall environment that diminishes quality of life and impedes community development (*18*).

This challenge is inherently an issue of environmental justice, as the low income and minority neighborhoods abutting the Creek have born the brunt of industrial uses and NIMBYs that serve the needs of the entire city.

Environmental justice is defined by the New York State Department of Environmental Conservation (DEC) as "the fair treatment and meaningful involvement of all people regardless of race, color or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies" (*19*: 3). Bullard and others have demonstrated over the past 15 years the nationwide trend of environmental injustice in terms of the inequitable distribution of noxious facilities (*20*). The term has also grown to include the consideration of inequitable distribution of environmental amenities, such as public open space. Finally, Schlosberg notes that there are three elements underlying environmental justice: equity, recognition, and participation. He states, "inequitable distribution, a lack of recognition, and limited participation all work to produce injustice, and claims for justice can—some would say *must*—be integrated into a comprehensive political project" (*21*: 87). Thus, even apart from the potential environmental and health impacts of living in proximity to noxious or polluting facilities, there are inherent, rights-based reasons to promote improvement of the conditions on the Newtown.

A second, related challenge for the Newtown comes from the changing nature of the city's economy. Simply allowing the waterfront and waterway to languish in the form that supported early 20th century uses does not aid the city of New York in remaining globally competitive. As the Newtown becomes less used, with vacant properties on its shore, the shipping channel silting-up, and little action from responsible public agencies and private firms, a legacy of pollution and irrelevant infrastructure is being left for future generations. There is a need to incubate industries that can thrive locally and that will use the resources of a skilled workforce and financing for private sector projects that exist in New York City. An industrial ecology approach, new takes on recycling, green building, and cradle to cradle design are just a few of the techniques that should be considered for the Newtown. Finally, mixed use development that brings commerce, retail, and residents into the proximity of the waterfront, where appropriate, safe, and inviting, is a proven technique for adaptive reuse.

There are a myriad of other issues affecting the fate of the Newtown Creek that are not addressed in this document, such as: the potential creation of the Cross Harbor Tunnel, the ongoing impacts of the East River Rezoning (see map in Appendix 1D), and the Sewage Treatment Plant Upgrade. While all of these important issues will have an effect on the creek, the purpose of this document is to step back from site-specific changes and develop an

overarching sustainable development plan for the area, focusing specifically on remediation, green industry, and an accessible, working waterfront.

V. Goals for sustainable development

The Newtown has the potential to be incorporated in a more central way into the lives of New York City citizens. The following four goals build from a notion of sustainability that includes the three prongs of social, environmental, and economic development, with a deliberate focus on how development affects the lives of local residents:

1. Land and water cleanup/restoration

Water quality needs to be improved, due to the problems of CSOs and pollution from historic and active firms (*22*). It is an area where targeted short term action at particular sites and systems as well as low cost innovations can have a major impact.

2. Provision of public waterfront and on-water access

For the most part, public access to the waterway is very limited. With the rapid build-out of sites available for development in the city, the water represents one of the last remaining open space and potential recreation areas (*23*). This goal can be pursued in the short term through creating point-access at street ends. A long term, coordinated strategy is needed to promote a more continuous greenway and/or to connect to existing greenway development efforts.

3. Innovative redevelopment of vacant and underused parcels.

Another goal is the clean up and redevelopment of existing vacant, brownfield, and Superfund sites. In some cases, continued industrial use should be instituted and in other cases, conversion to commercial or residential use will be appropriate. Redevelopment presents an opportunity for innovation through green building and/or green industry. This is a long term goal for the whole area that can be phased in, depending on the availability of sites and resources.

4. Revitalization without causing displacement

Doing all of this revitalization without displacing existing residents is a core concern for which immediate provisions must be made. Waterfront redevelopment and reinvestment must be done hand in hand with affordable housing provision, tax assistance, and other

safety net efforts to ensure that these attempts to rectify past environmental injustices are not simply shifting the geographic location of the problem.

VI. Stakeholder Assessment

The political and economic interests on the Newtown Creek can be considered in terms of civil society, the public sector, and the private sector. (For a chronology of recent activity on the creek, see Appendix 3).

Civil Society

The population of Greenpoint-Williamsburg has a history of environmental justice organizing that is oriented towards *opposition to* environmental dis-amenities—as opposed to advocacy for proactive change (*24*). Those dis-amentities include a whole roster of NIMBYs, most prominently a large incinerator that was protested heavily throughout the early 1990s (*25*). Some of the most significant first steps taken by civil society specifically on the Newtown Creek have similarly been oppositional and litigious in nature. These efforts have been led by the regional environmental nonprofit, Riverkeeper, which was founded in the 1970s by Robert Kennedy but only in the last five years has developed an interest in the Newtown Creek. They utilize watchdog boat patrols, notices of intent to sue, and media events to raise awareness and promote behavior change amongst polluting firms on the creek (*26*). Local civil society representatives with scant resource are partnering with the legal experts of Riverkeeper to gain leverage over local to multinational polluting firms on the creek. Since Riverkeeper brought its initial lawsuit against Exxon-Mobile, the private law firm of Giardi and Keese has also brought its own suit, as has the New York State Attorney General Andrew Cuomo. These legal actions may serve not only to force firms to change behavior, but also to generate press and public awareness about the Newtown that could potentially be engaged in other efforts (*27*).

The Newtown Creek Alliance (NCA) is an informal alliance founded in 2002 by Riverkeeper, local community groups, and the New York City Council Waterfronts Committee. It serves as a forum for cooperative action on the Creek (see Appendix 4 for an organizational diagram of the NCA). Right now the group is fledging, with only about 15 members, no bylaws, board, or 501c3 status. It includes long-time neighborhood activists, such as members of the Newtown Creek Monitoring Committee and Greenpoint Williamsburg Association for Parks and Planning. It also involves members of newer stewardship-based groups like the Long Island City

boathouse and the East River Apprenticeshop. The involvement of Paul Parkhill of the Greenpoint Manufacturing and Design Center gives the group an interest in industrial development (*28-30*). The NCA is committed to improving water quality, providing waterfront access, developing on-water programming, and industrial retention; it therefore has a number of goals that coincide with those outlined above (*31*). Future efforts at revitalization should simultaneously work to support the efforts of this group and increase its capacity for action. There may be other, smaller and less visible groups that are not yet engaged with the NCA who should be sought out, identified, and invited into cooperative action. The individuals in the group can also serve as access points to broader neighborhood networks as this committee seeks to implement participatory planning.

Public Sector

There were a number of government-initiated efforts to clean up portions of the Newtown Creek that predated Riverkeeper's involvement and the existence of the NCA. In the early 1990s, New York State declared that Newtown Creek was not meeting water quality standards for dissolved oxygen and fecal coliform levels under the Clean Water Act (*32*). The state DEC also came to a consent decree agreement with Exxon Mobile to clean up its 17 million gallon underground, historic oil spill, though the slow response on the part of the firm is what later led Riverkeeper to initiate advocacy against the firm (*33*). Similarly, in 1999, cleanup of another massively contaminated site—the former Phelps Dodge copper smelting plant—began. Also starting in 1997, the city made plans to spend billions of dollars in the technical upgrade of the Newtown Creek sewage treatment plant, with some small open space concessions on the waterfront—a process that was encouraged and monitored over time by the citizen group, Newtown Creek Monitoring Committee. However, each public agency was working in isolation on distinct sites and issues and no single group was considering the entire creek as a body, a trend that the NCA is trying to change (*34*).

Since 2002, the NYC City Council Waterfronts Committee has shown leadership on the issue of the Newtown Creek, particularly through the activities of chairman David Yassky (Brooklyn) and member Eric Gioia (Queens). These two councilmembers have worked with civil society partners and the New York District Attorney to draw attention to pollution problems on the creek. They have raised public awareness as well as become involved in cases against polluting firms on the Creek. They are co-founders of the NCA and Yassky has taken the lead

on a number of policies and actions related to waterfront revitalization. The council committee and its staff should continue to be engaged in planning, though they are constrained by being an issue-specific committee rather than a standing committee, with relatively less influence at the council level (*35*). The two-year turnover in council member terms is also something to consider in the long-term strategy of planning and coalition building.

This water body has not attracted the degree of attention from state or federal level politicians in the way that other New York City waterways—such as the Bronx River—have. The most significant federal involvement came from Senator Charles Schumer, Representative Anthony Weiner, and Representative Nydia Velasquez, who gave funding to study the environmental effects of the Greenpoint oil spill (*36*). In terms of ongoing public agency involvement: the state DEC and the city DEP have regulatory authority over monitoring pollution compliance; the Dockmasters are responsible for maintaining bulkheads; and the shipping channel is under the jurisdiction of the Coast Guard. EPA also has authority over water quality standards and remediation of the several Superfund sites on the creek. Finally, the National Parks Service Rivers and Trails program has shown some preliminary interest in assisting the NCA with urban trail development (*37-38*). The Creek is currently governed by a number of different regulations and policies, including the Department of City Planning (DCP)'s "New Waterfront Revitalization Program" and the DEP's Long-Term Control Plans for stormwater management (*39-40*). All of these agencies will need to be engaged as planning proceeds; and the innate institutional barriers to cooperation, overall declining resources for environmental protection, and the frequent lack of entrepreneurial public leadership should be addressed. The current NCA coordinator of the noted a recent shift in public agency involvement through the DEP and the DEC; they expect even greater engagement under the leadership of Governor Elliot Spitzer, a Democrat. The involvement of the Attorney General in the legal strategy is also a noted turning point. The NCA, Riverkeeper, and their partners continue to advocate for further federal, state, and local support through improved enforcement; funding for restoration and maintenance of the Creek; and research and implementation of innovative projects (*41*).

Private Sector

The private sector surrounding the creek consists of a varied set of local to multinational firms focusing on everything from car shredding, to bulk oil storage, to gravel and concrete

processing. For the most part these firms are concerned with minimizing further increases in operation costs and complying with environmental regulations. Some firms have expressed interest in greater provision of public space on the waterfront, particularly for their workers to enjoy lunch-time breaks (*42-43*). Other firms, such as Exxon Mobile, could be cast as a community adversary, due to their historic 17 million gallon underground oil spill that they have been extremely slow to remediate. The specific interests of each firm will need to be assessed on an individual basis and generalizations across industries and firms should be avoided. Besides industrial firms, there are a few real estate developers that have expressed interest in the NCA due to the new developments along the East River and at the mouth of the Creek in both Brooklyn and Queens. Although the Newtown Creek itself will never be a residentially-lined waterway, it is seen as an important local environmental amenity for new neighborhood residents (*44*). Alliances with these new stakeholders will need to be carefully negotiated in developing a green working waterfront.

VII. Other Waterfront Revitalization Models

The Bronx River provides a local example of successful industrial waterway restoration. A collaboration of over 60 civil society and public sector groups was assembled starting in 1996, as catalyzed by the NYC Department of Parks and Recreation (DPR) and the NPS Rivers and Trails program. The group has garnered over $100 million in federal, state, local, and private resources to create hundreds of acres of new parkland on the Bronx River Greenway. Further, it has formalized as the public-private partnership, the Bronx River Alliance (*45-46*). This clearly demonstrates the importance of coalition building, the development of political alliances, and the balance of long term planning with on-the-ground, short term results.

The successful restoration of working waterfronts, such as New Bedford, MA, illustrates that economic development can be pursued through investment in industrial heritage, infrastructure, and ecological restoration. New Bedford has been the beneficiary of the National Oceanic and Atmospheric Administration (NOAA)'s and EPA's Portfields program. This infusion of resources has allowed for the dredging of the waterway, brownfields redevelopment, public access development, pier and bulkhead enhancements, and habitat restoration. These efforts have been steered by a regional Portfields Development Committee (*47*). The New Bedford waterfront is a designated port area that has requirements on water-dependent public

uses, but the city has managed to creatively revitalize the port to support mixed use, with waterfront developments ranging from a new greenhouse facility to a health club currently taking place (*48*).

Green development has been pursued vigorously in Germany, the Netherlands, Sweden, Japan, and increasingly even in China. There are numerous models from the parcel or building specific scale, to the neighborhood scale, to the city or even regional scale. Many of the scientific principles have been demonstrated -- such as "cradle to cradle" designing, as are the building techniques and standards (see, for example, *49-50*). The challenge comes in trying to import models from abroad that operate with very different levels and types of intergovernmental support, or in scaling up local models from beyond the site specific scale to that of an entire water body. New institutional frameworks will need to be created and cooperation with the private sector will need to be used to adapt to the context of New York City. For example, the successful Leadership in Energy and Environmental Design (LEED) program that has been applied to both individual buildings and new suburban developments should be considered as a model and a tool that can be adapted to urban restoration and redevelopment efforts. The concept of a green working waterfront is a true innovation that brings together the best practices from these cases, using cross-sector alliance-building, economic development, and green industry to create a one-of-a-kind reuse for a historic New York City waterway.

VIII. Process and Policies for Sustainable Development

The successful restoration of Newtown Creek must involve representatives from all of the stakeholder groups previously outlined. The existing civil society-public sector collaboration, the NCA, provides a starting point for building broader involvement, but it is in need of a strategic public agency partner. The City of New York – through its new Mayor's Office of Sustainability as well as through its long-time agencies such as the DCP and the DPR should be that partner, taking a lead in organizing, increasing the capacity, attracting resources, and formalizing the NCA, all while ensuring that citizen participation remains high. The goal should be the creation of a robust, new, boundary spanning institution that can truly focus on planning and remediation creek wide and can be a forum for citizens, natural resource management agencies, and economic development agencies. One potential venue for seeding and developing this cooperation is through the Mayor's Office of Sustainability's support for an interagency Best

Management Practices council focused on water quality, with focus on piloting BMP innovations (*51*). If this concept could be applied to the Newtown Creek some exciting pilot innovations could be instituted and monitored over time – but it should be noted that there are other issues of key importance on the Newtown Creek beyond water quality. The Bronx River case provides a number of organizational strategies and tactics that can be adapted to the Newtown to ensure successful grassroots participation and ownership. Negotiating with the private sector will need to be taken on more of a case-by-case basis, once citizen priorities are clear. Some polluting firms may be brought under compliance through negotiation, increased enforcement, or threat of litigation, while some may be more interested in proactive planning and may wish to join the NCA.

As the institution grows, it would benefit from the creation of working teams in order to pursue the various goals outlined above, to ensure that expert and local knowledge are both respected, and to allow smaller groups to focus on their areas of interest. In terms of policy change, a special "green development zone" should be created on the Newtown Creek by the DCP. A thorough community and expert planning process will need to further shape and define that zone, but some potential areas of work for the NCA-DCP working group that are consistent with the outlined goals are identified here.

- Goal 1: aim to collectively set water quality targets and timelines; work on voluntary compliance agreements with existing firms; use low cost urban design solutions to address the CSO problem, such as creation of swales or tree planting
- Goal 2: use participatory design principles to identify priority areas for street-end point access; negotiate linkages for public walkways on all new developments; work with existing landowners to assess potential for open space development on their sites; connect to existing greenway efforts (such as the Brooklyn Waterfront Greenway)
- Goal 3: focus on developing vacant and underutilized sites through the use of New York State brownfields programs; and use other incentives to try and attract new development. A market study as well as research into green industrial innovations will help to further define the sorts of uses the group ought to attract.
- Goal 4: a number of different measures exist for offsetting gentrification impacts. Revisions to the state and local tax code could be sought for "waterfront revitalization

areas" to offset gentrification impacts; inclusionary zoning could be implemented; and a fund for small business assistance could be created. Any of these strategies will require significant political will to be developed and financial resources to be garnered.

IX. Indicators of sustainable development and mechanism for adaptive management

For Goal 1 (set water quality goals), it will be necessary to monitor the number and degree of CSOs per year at each of the sewer outfall sites on the Creek. Water quality and soil quality should be monitored at least annually using an index of scientifically sound measures. Enough sites should be used to get a sense of the entire creek ecosystem. Monitoring should be carried out by existing agencies with responsibility for this area (DEP, DEC), but information should be made available to the public in an accessible form (i.e. websites, public meetings).

For Goal 2 (public use and access), indicators include the number of acres of public open space along the water and the number of miles of greenways/bike paths within some distance from the waterfront, both of which should be monitored by the DCP and displayed visually through GIS mapping. Also, the number of on-water recreation people-trips/year and the number of participants in educational ecology programs/year should be collected by all public and civil society groups running these programs. The NCA could be a body that gathers and reports on these stewardship statistics and sets targets for improvement.

For Goal 3 (development of vacant and underutilized sites), the ratio of vacant, brownfield, and superfund sites to "productive" sites by different categories of uses (residential, commercial, industrial, green industrial), by square footage should be mapped and monitored by the DCP. It will also be important to measure the number of jobs (monitored by the New York State Department of Labor) and the number of LEED certified buildings (monitored by EPA Region 2) within some distance from the creek.

For Goal 4 (offset gentrification), it is necessary to monitor the ratio of affordable to market rate housing and the amount of displacement due to gentrification. This monitoring would best be overseen by the DCP in cooperation with neighborhood based community development corporations (CDCs) that are familiar with the specific real estate climate and turnover in their areas. Mechanisms for information sharing among CDCs and between CDCs and the DCP should be developed. To best monitor changes in human capital (improvement of education, health) and well-being, long-term, longitudinal, quantitative and qualitative studies of

the populations surrounding the waterways would be necessary. This will require a partnership with an academic or other research institution, such as the US Forest Service NYC Urban Field Station, to establish long-term monitoring and data collection.

Although responsibility for measuring and reporting on various indicators will fall upon different agencies and groups, it is recommended that the New York City Council Waterfronts Committee and the Mayor's Office of Sustainable Development compile and analyze all of the statistics on an annual and 5-year basis to track the overall progress towards sustainable development and adjust short term goals. This provides a platform of shared information that can be used in support of adaptive management. The costs of various projects can be compared with the impacts that are being achieved. It is also expected that as new stakeholders become involved in the project, new indicators will be deemed necessary for monitoring. Finally, efforts should be made to translate statistics into "hot" indicators that have broad resonance with the public (see, for example *52-53*). This document serves as a framework for building a collaborative vision of creative reuse for the Newtown Creek. The specific programs and policies will be driven by the engaged stakeholders. By identifying areas of work as well as potential indicators and a process for collaboration, city leaders can begin to catalyze and initiate change.

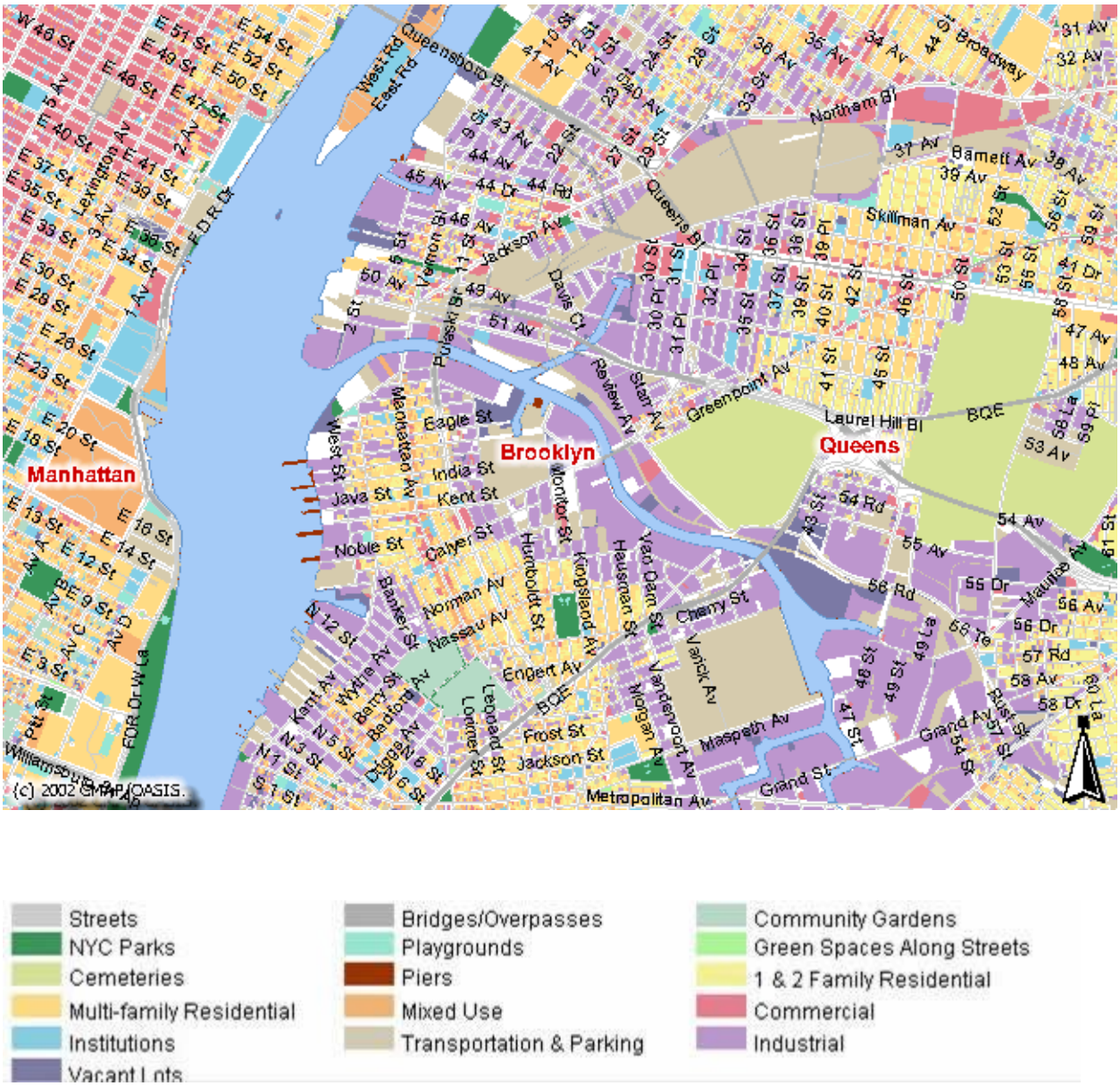
Appendix 1: Maps

1A. Newtown Creek Neighborhood Aerial Photo

map made by author using Open Accessible Space Information System (www.oasisnyc.net)

1B. Newtown Creek Land Use Map

map made by author using Open Accessible Space Information System (www.oasisnyc.net)

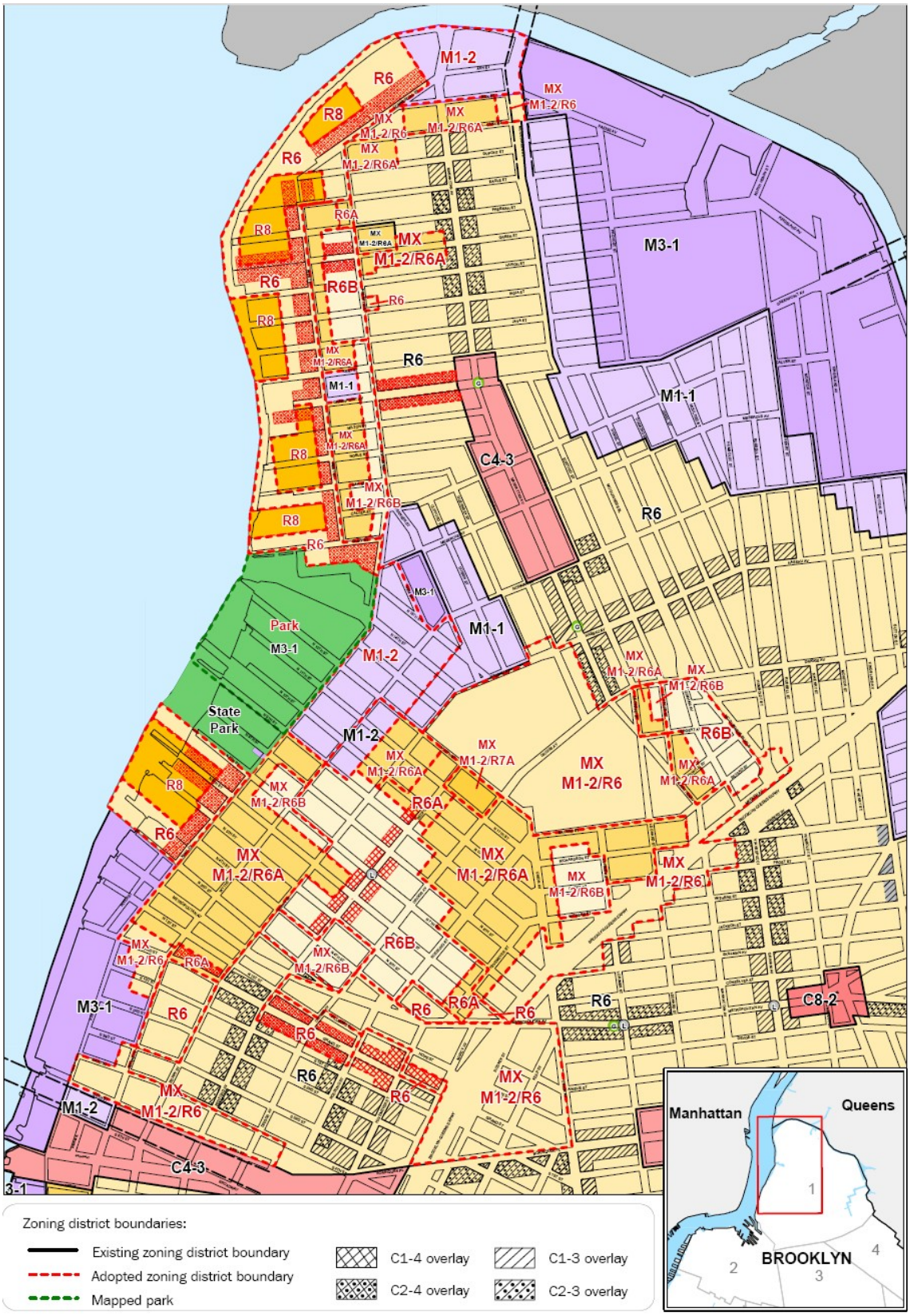


1C. Newtown Creek Infrared Image

map made by author using Open Accessible Space Information System (www.oasisnyc.net)

1D. East River Rezoning Map from New York City Planning Commission

http://www.nyc.gov/html/dcp/pdf/zone/map13a.pdf



Appendix 2: Neighborhood background

Greenpoint-Williamsburg has a substantial working class and immigrant population, with rapid gentrification particularly in Williamsburg changing the composition of the area. Brooklyn community district one has 46.7% of its population on some sort of income assistance (*54*). Thirty-four percent of adults live in poverty and 40% did not graduate high school. Average household size in the area is 2.86 (*55*). As another indicator of wealth, just 13.6% of units are owner-occupied. The district is 48% white, 5.5% black, and 37.7% Hispanic, though it should be noted that a significant portion of the white residents in Greenpoint include Polish Americans (*56*). Indeed, 34% of the population of Greenpoint is foreign born, with the top three countries of origin being Poland, the Dominican Republic, and Mexico (*57*). Greenpoint has been slower to gentrify than Williamsburg, perhaps because of the entrenched ethnic communities or because it has worse subway access to Manhattan.

Queens Community District 2, which includes Sunnyside, Woodside, and Hunters Point, is 30.8% white, 2% black, 26.7% Asian, and 36.4% Hispanic. It has 25.4% of its residents on some form of public assistance. Average household size is 2.63 people and units are 23.5% owner-occupied (*58*). The area of Long Island City, Astoria, and Sunnyside[3] is 51% foreign born, with the top three countries of origin being Greece, Bangladesh, and Ecuador. Twenty percent of the population there lives in poverty and 29% did not graduate from high school (*59*).

Currently, the Brooklyn waterfront is the exemplar of rapid, market-led economic change following decades of environmental devastation. The 2005 Greenpoint-Williamsburg rezoning will literally change the shape of the East River waterfront and the mouth of the Newtown from an underutilized, industrial edge to a series of luxury high rise developments with some hard-won linkages of developer-provided affordable housing. It is important to note that the rezoning only affects the very mouth of the creek to the Pulaski Bridge, and the Creek continues roughly three miles inland. On the Long Island City/Hunters Point side, sweeping rezoning has not taken place, but high profile luxury developments like Queens West (and New York City's failed bid to host the Olympics in 2012 with the athlete's village located in Long Island City) have posed similar challenges and opportunities to the community. The inaccessibility of the Creek from the neighborhoods presents both an organizing challenge and helps to explain why it had

[3] The neighborhood divisions used by the Department of Health and Mental Hygiene and those used by the Department of City Planning do not coincide. This is why slightly different areas must be used to give statistics on the neighborhoods of concern.

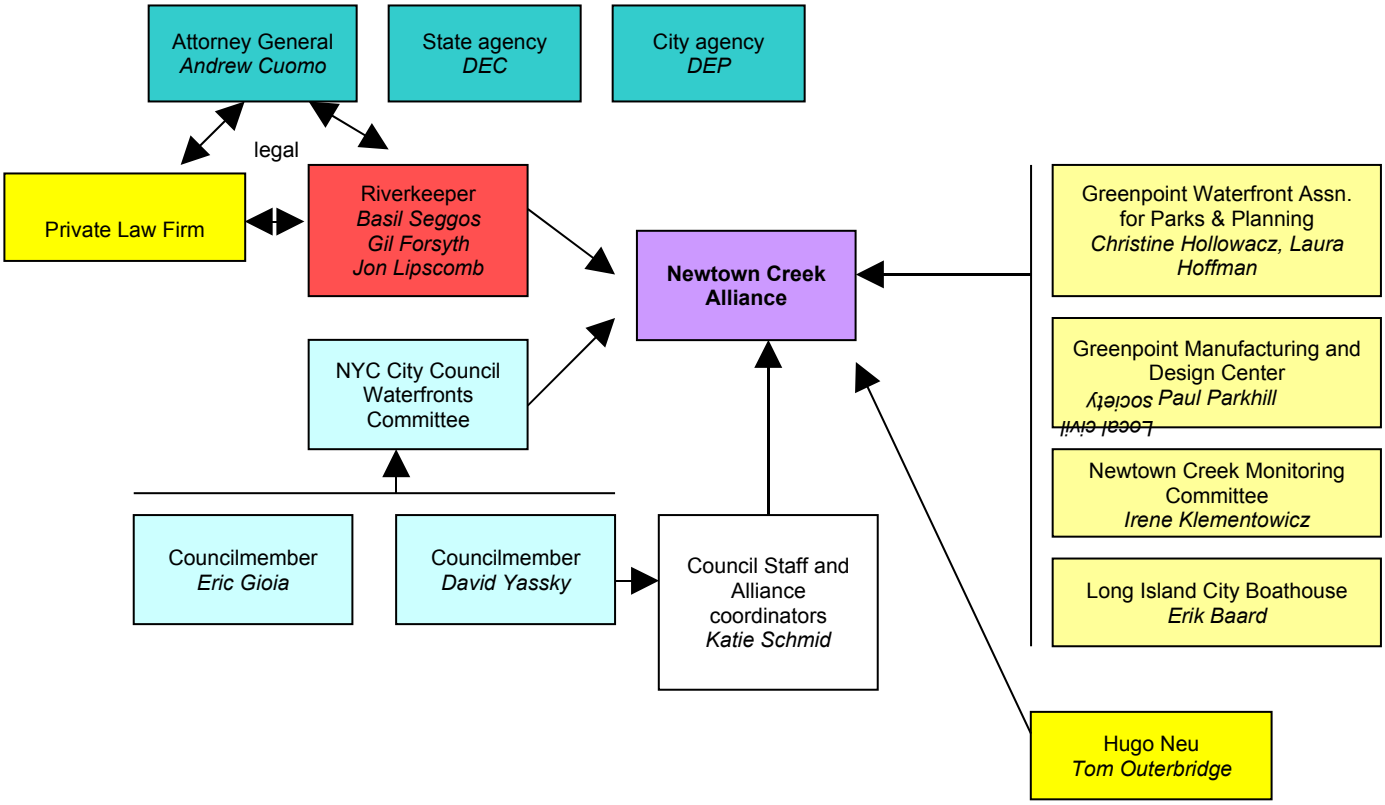
not previously been a focus of community pressure for open space development, while the East River has been.

Appendix 3: Chronology of action on Newtown Creek in the recent years:

1988	New York State (for EPA) sued New York City to clean up the creek
1990s	DEC and Exxon Mobile make agreement (consent decree) to clean up largest urban oil spill in history (17 million gallons from refineries along creek)
1997	Newton Creek Monitoring Committee formed (citizens)
1998	City Planning Department makes plan to upgrade sewage plant, clean creek, and create possible greenways along the waterfront
Nov 1999	City to spend $2 billion to upgrade sewage treatment plant and create waterfront promenades by 2013
	Photographers go on boat cruise of creek
Sept 1999-June 2000	First cleanup of Phelps Dodge site
Dec 2002	DEC hearings on cleanup at Phelps Dodge site, Maspeth community boards wants $229 million cleanup standard
Feb 2002	DOT wants to close Grand Street swing bridge (would mean no more big ships, end of industrial era)
Mar 2002	Cost of sewage plant upgrades increases to $2.8 billion due to state and federal requirements
June 2002	Queens City Planning Department gets $75,000 from the state to improve public access on creek at street ends
July 2003	Brooklyn Waterfront Greenway Task Force bike tour
Oct 2003	Riverkeeper threatens lawsuit vs. Quality Concrete and 4 other businesses for violation of Clean Water Act
	TransGas Power Plant finds Exxon site too contaminated and won't locate there
Dec 2003	Alloco Recycling and Marjam Supply Co. come into federal compliance, still named in Riverkeeper suit that they are trying to avoid
Jan 2004	Riverkeeper initiates lawsuit against Exxon Mobile for being too slow on cleanup
April 2004	Councilmen David Yassky and Eric Gioa join Riverkeeper lawsuit, host boat tour, take water samples

May 2004	Proposed rail-truck transfer to connect to proposed cross-harbor tunnel on 160 acres in Maspeth, EDC studying it through two-year, $20 million impact study, construction could begin 2008 to complete in 2025
Aug 2004	"Who Cares About Newtown Creek?" high school film with Riverkeeper
Oct 2004	Plan to build pipeline underground to transfer sewage from Newtown Creek to Wards Island, construction would begin 2010 or 2011
Nov 2004	City Council Waterfront Report
Jan 2005	District Attorney vs. Quality Concrete on 22 felony counts and 20 misdemeanor counts; Yassky considers running for District Attorney
Feb 2005	Workers building a park hit underground toxic sludge; 2012 has already identified this as potential site for Olympic village
March 2005	Yassky and Gioia want creek cleaned up regardless of 2012; 400th meeting of NCMC re: sewage plant cleanup
July 2005	London gets Olympic Bid for 2012

Appendix 4: Newtown Creek Alliance Organizational Chart



LEGEND

- Public Agency
- Citywide Nonprofit
- Community Group
- Elected Official
- Individual
- Informal Alliance
- Private Firm

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