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Eye for an Icon: Icon for an Eye

An analysis of Manhattan's ecology and subsequent destruction during the era of icon-building in the mid-1800's to the Great Depression. How this era led to progressive public policy and ultimately a greener, greater, New York City.

New York City is often called the center of the universe. The city is the cultural and commercial capital of the United States. From its enduring and storied history New York City today is safe, sanitary, and has become one of the greenest major cities in the U.S. How does America's largest city with over 8.4 million citizens (and growing) accomplish and perpetuate such rankings? Does New York owe its progress to avant-garde leadership? Or has the past mobilized New York and instilled it with a forward-looking nature? In this paper we consider New York from its tenure as an ecological haven to its subjugation in the name of growth and commerce. This paper will assess infrastructure projects that took place from the 1800's to the Great Depression and altercate what effects this era of icon-building and expansion had on health and humanity. Lastly we'll try to discern what, if any influence these projects had in greening New York and ultimately what it will take to return New York and specifically Manhattan to a modern Mannahatta where people and nature can coexist. To truly comprehend the magnitude of greening Manhattan back to a nature-friendly habitat, we must quantify the change of transforming Manhattan from green to concrete, and attempt to conclude if its metamorphosis foreshadowed a return to nature through trends in sustainable building. Both claims and

counterclaims of Mayor Bloomberg's PlaNYC will be analyzed to determine if the plan is far reaching enough. Post analysis, this paper will propose further explication and direction for both the public and private sector to shepherd programs fostering both a greener future and a globally competitive one.

Pre-development Mannahatta

> The risk is that in this era of unprecedented population and consumption, with the resulting climate change, species extinctions, and habitat destruction, we are overwhelming the same planetary systems that made our achievement possible in the first place. – Eric W. Sanderson, *Mannahatta*

In the 2009 book, *Mannahatta*, author Eric W. Sanderson referred to Manhattan's natural resources, "What makes Mannahatta wealthy beyond imagination is its crowning position atop an estuary. An estuary is to biodiversity what a mint is to money." Manhattan's 20 miles of concrete, superstructures, tunnels, and sidewalks used to be 20 miles of biodiversity. We know this city was paved for economic advancement and population growth, but at what cost? The depopulation of species such as beavers, birds, fish, and even bears was compulsory along with colossal public and private works. But not only were the lives of animals divested, people were maimed or killed on what became an island of modern marvels. Was today's commercial capital worth the upheaval of species, razing of hills, eradication of forests, and loss of human lives?

Springs, streams, hills, valleys, forests, and ponds once covered the island. Lenape Native Americans and early New York settlers used take in the view near Bayard's Mount of the Collect Pond. Bayard's Mount was one of the tallest hills on Manhattan. In fact, the Lenape called Manhattan, "Island of Many Hills". Using modern topography and bathymetry, Sanderson recreated a digital elevation model showing 573 hills in Manhattan. But where are the hills now?

New York's first modern engineering marvel: The Grid

At the end of the Revolutionary War, New York had much of its original topography. Around this time the city had roughly 30,000 citizens. As the temporary capital of the United States, the city was growing. By 1807 the City Council wanted to steer development of New York established a commission to layout the ulterior of New York's streets. The grid as it came to be known was planned and later certified in 1811. It would consist of 12 wide north-south avenues and be bisected with streets starting with 1st St. According to an article in the New York Times, *Are Manhattan's Right Angles Wrong?* by Christopher Gray, the stated goals of wide avenues and right angled intersections were to create "a free and abundant circulation of air" in order to prevent disease. This is ironic, because the same grid conspired by the commission eventually came to shoulder heavy, carbon dioxide emitting cars. Opponents of the grid at this time felt the city's natural assets would have to be eliminated to develop the grid. In Clement Clark Moore's *A Plain Statement*, he attested, "These are men who would have cut down the Seven Hills of Rome". In *Mannahatta*, Sanderson educates us that at one time there were 55 ecological communities on the island. These 55 communities obstructed the grid, of course, and were expunged. Modern advocates of New York's grid system have only revisited the positive connotations recently. Gray's article reviewed above mentioned Reuben Skye Rose-Redwood's master thesis, *Rationalizing the Landscape: Superimposing the Grid Upon the Island of Manhattan*. Despite Rose-Redwood's concurring that much of the environmental variation on the island was "obliterated", the grid offered symmetry and because of this New York City became a proficient model for urban society. But is the symmetrical design of the grid really a model for sustainable urban planning? To answer this, one has to look at the highest and best

uses of the grid today. Are we maximizing the grid's use? Is the closeness of buildings promoting collaborative use of elevated square footage and acres? This paper will acknowledge these questions later. The process of environmental decimation permanently impacted much of Manhattan's natural wonders. What became of Bayard's Mount and the Collect Pond? The Collect Pond, once New York's solitary source of water became polluted with the augmentation of industry on its shores. Bayard's Mount was leveled. Bayard's Mount was located where Little Italy is today. The Collect Pond was located where today's City Hall area is (See Fig 1):

Fig 1. The Collect Pond

Even the area where Central Park is located was perilously reshaped by man. Through my research I found out it was anything but. Consider the below quote by Egbert Viele, one of the engineers competing for the winning design of the park.

> The hills, the valleys and the streams are nature's penciling on the surface of the earth rivaling, in their pictured grace, the most beautiful conceptions of the finite mind; to alter them would be desecration; to erase them, folly! Upon a proper understanding of these features, and a property appreciation of their beauty, depends the unity of the design.
> – Egbert Viele

In the competition for the design of Central Park, Egbert Viele's plan called for retaining the area's natural environment as much as possible. Instead Frederick Law Olmstead's plan was chosen. He was Viele's subordinate and his plan called for a natural look. In order to procure obtain this 'natural' look much excavation and TNT was used. Despite not keeping Central Park natural, city leaders had the foresight to acquire the 700 acres of land (for $5 million) and place it in a conservancy. The result is the quintessential urban oasis, right? But even New York's iconic Central Park is merely the tread of the human tire of development. As the city of New York grew in size, more than just hills were leveled; 20% of Manhattan became concrete streets and sidewalks, most of the other 80% today supports superstructures. Human predominance to tame rivers, pipe in water, and usher millions of people every day to work was next. The island of Manhattan was the greatest ecological asset the region possessed and ultimately the fact that it was an island became justification for littering its shores with links to the mainland, ports, and piers. In the end, human influence on a massive scale was required in order to make it 'livable'.

Pressure on a Geographically Constrained City

In 1814, as the grid brought population further uptown in Manhattan, Brooklyn, once a sleepy town near New Amsterdam, became the first suburb in America. Brooklyn's transfiguration was a direct result of steam ferry service connecting it to New York (Jackson). New York City at the time was comprised of just Manhattan and a small section of the Bronx. By the mid 1800's New York City had grown to nearly 700,000 people and Brooklyn nearly 400,000. The region was the center for commerce in the U.S. Until the mid-1800's few major infrastructure projects beyond the grid existed. The Croton Waterworks was completed in 1840

bringing water from Westchester County to Manhattan. The Croton Waterworks was already antiquated due to the city's rapid expansion. New York required better connection points for transportation and water, and it needed them expeditiously. An idea connecting the island of Manhattan with Brooklyn via a bridge was tendered to alleviate crowding in Manhattan. Brooklyn had vast amounts of land at its disposal and at the time was more rural than urban (Anderson). A bridge was the only detail preventing a population explosion in Brooklyn. Building a bridge became a solution to commuters. At the time, destruction of ecology wasn't a thought and even if it was, the boom taking place would have overwhelmed demands to preserve Manhattan as an island approachable only by boat.

Renowned bridge-maker John Roebling forged the plan for the new expanse. He had already designed suspension bridges along the Delaware, the Niagara, and Ohio Rivers. But the city governments of Brooklyn and New York failed to find the plan worth promoting. Roebling and Brooklyn businessman William Kingsley took Roebling's plan to the New York Legislature and received the endorsement of the state senator and former Brooklyn mayor Henry Murphy. Murphy drafted a bill allowing the newly formed New York Bridge Company to construct and maintain a bridge spanning the East River. The company was permitted issuance of stock of which the city of Brooklyn purchased $3 million dollars and New York purchased $1.5 million dollars. Roebling silenced doubters of the bridge by declaring that the projected growth of the Brooklyn and New York would demand at least 2 more bridges over the east river (Williamsburg and Queensboro). In June, 1869 the New York City Council and Army Corp of Engineers approved Roebling's design and bridge work commenced.

The bridge wasn't the only connection to Manhattan sought at the time. Tunnels were needed under the Hudson River bringing New York badly required rail connections.

Unfortunately the geography of the region with islands and water proved challenging and the sale of the infrastructure needed was massive compared to projects previously undertaken anywhere. In the face of engineering challenges, engineers like Elisha Otis were more inventive than ever. In 1853 Otis created the first elevator. This single invention would create a new sort of Bayard's Mount in New York; the skyscraper. It would consent building to expand beyond the 4 or 5 floors that people were willing to climb and result in cities having a skyline (Invent.org). Despite modernisms such as the elevator, a suspension bridge the size of what was needed across the East River seemed impossible. To erect a connection point to soar over the East River would require a suspension bridge 50% larger than anything previously constructed. John Roebling developed a plan that would do just that. Notwithstanding the negative environmental impact all of this new infrastructure would have, it demonstrated New York's progressive society. To illustrate that the colossal scale of the projects taking place one has to consider the toll these projects took on humanity. For the first time in the modern era, infrastructure projects became larger than humanity itself resulting in adverse health issues and often death.

Infrastructure's toll on humanity

Counterclaims from preservationists regarding projects such as the Brooklyn Bridge were remote. The modus operandi at the time was "build what is necessary in the name of progress and industrialization". Commerce ruled and preservation was an afterthought. Unfortunately for many the counterclaims of the era didn't come in the shape of protests or demonstrations. Counterclaims were presented in the form of compression sickness, paralysis, and death. In fact, the same month the plan for the Brooklyn Bridge was approved, John Roebling was standing on one of the ferry slips when the tip of his boot was crushed caught in a knot in one of the piles. An approaching ferry crushed the tip of his boot and toes. Roebling collapsed due to the pain on

June 28th, 1869. He was hurried to the doctor where an immediate amputation was prescribed. Roebling refused anesthesia and bound the resulting wound himself. Tetanus set in shortly thereafter. Roebling ignored doctors' recommendations and fired them. By July 22nd 1869, just 3 weeks later, Roebling would be the first casualty of the Brooklyn Bridge construction (McCullough 91-93). But during that era a bridge was not considered safe unless the omen of a death during construction occurred. The *Brooklyn Eagle* wrote:

> He who loses his life from injuries received in the pursuit of science or of duty, in acquiring engineering information or carrying out engineering details, is as truly and usefully a martyr as he who sacrifices his life for a theological opinion, and no less honor should be paid to his memory. Henceforth we look on the great project of the Brooklyn Bridge as being baptized and hallowed by the life blood of its distinguished and lamented author (Brooklyn Eagle).

From that point forward Roebling's son Washington Roebling took over the construction of the bridge. Building the bridge would require many engineering feats; including the caissons. Caissons were sunk into the East River bed where excavations took place and later when they reached bedrock, the caissons were with concrete and served as the bridge's foundation. The required caissons were larger than any attempted. The caissons were 168 ft. long by 102 ft. wide. They were one half the size of St. Patrick's Cathedral. The bottom of the caissons would be open to the seabed floor allowing for excavation work. Because of the open bottom the excavators would be working in compressed air (See Fig 2).

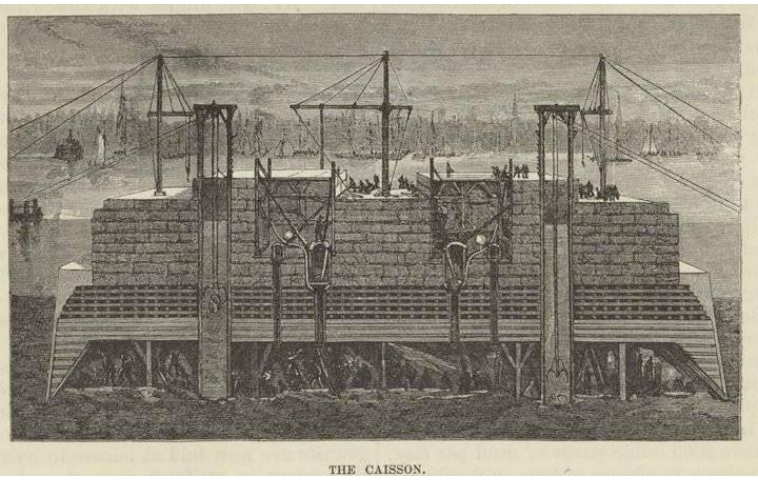

Fig. 2, *The Caisson*

There were a few instances of working in compressed air prior to this and at least 2 reported deaths in France. The men working on the Brooklyn Bridge in compressed air encountered short term paralysis, pain in their joints, and painful stomach cramps. As the caisson submerged to new depths, shifts diminished from 8 hours to 4 hours, to 3 hours, and finally 2 hours. Some workers experienced no illness, others death. As one of the caissons reached 70 feet, it took its first casualty, James Riley. Riley worked only for 2 hour shift, came up feeling fine and collapsed dead 15 minutes later, gasping for breath. From that point on the deaths rose. Death as a cost of progress was still worth it. Men walked off the job at a rate of a hundred a week, but more always showed up looking for work. Washington Roebling suffered paralysis himself from the compressed air.

Washington Roebling's wife Emily who had studied mathematics became his steward of the project after Washington Roebling's injury. She received commands from the younger Roebling and the Brooklyn Bridge was inaugurated on May 24, 1883; 13 years after the project commenced. In all 27 men lost their lives building the Brooklyn Bridge. At the time of its

completion it was the longest suspension bridge in the world. Projects such as the Brooklyn Bridge not only demonstrated New York's ability to construct modern marvels but the resulting progressive culture ushered in more innovation next in growth of New York City outward, downward, and upward.

Consolidation drives the next generation of progress

> This is not even a city in the sense which we [Europeans] understand the word. This is a table of contents of unique character. It is so colossal, it encloses so formidable an accumulation of human efforts, as to overpass the bounds of the imagination.
> – Paul Bourget, French Academy

After the opening of the Brooklyn Bridge infrastructure was just kicking off in New York. The above quote by Paul Bourget reflects the colossal changes happening in New York near the turn of the century. Tunnel boring efforts were still new and in 1871 a disaster 1200 below the Hudson halted that project (Revell). A tunnel under the Hudson to connect New York by rail to the mainland had settled in disaster and financial failure. Another company attempted to complete the same tunnel, ending 600 feet further than the prior due to a capital shortage. These failed attempts illustrated just how large and capital intensive infrastructure projects were in New York at the time. The failures also depicted that the private sector alone could not build New York. As these tunnel projects failed, New York was bursting at the seams and the pressure to build connections grew. By 1888 New York had quintupled its population since 1828 and had become one of the busiest cities in the world. Horse drawn trolleys, carriages, pedestrians, and rickshaws crowed the streets. In Andrew Santella's *Building the New York Subway,* a New Yorker was quoted as saying, "Look up street and down street, and see what carts and carriages are upon you, and then run for your life (Santella 9)." The Brooklyn Bridge was a success and by 1898, 143 million people crossed the East River each year, 50 million of them used the Brooklyn Bridge, the only direct link from Brooklyn and Queens to Manhattan. Still the bridge

wasn't sufficient. At this time that New York needed much more infrastructure to expand and accommodate the nearly 20,000 immigrants coming each week. Water, bridges, tunnels, bigger buildings, and a subway were necessary to extend New York's unbridled growth. Unfortunately New York was its own municipality as was Brooklyn and 40-some odd other cities in the area. Manhattan was an island and in order to create the numerous transit and water infrastructure demands, colloboration would be required. The next phase of irreprable ecological harm would need more than just one municipality. To accomplish this harm and 'progress', it would require a mashup of private and public sector and the enjoining of many municipalities.

"Rich, hemm'd thick all around with sailships and
steamships, an island sixteen miles long,
solid-founded,

Numberless crowded streets, high growths of iron,
slender, strong, light, splendidly upward rising toward
clear skies

Immigrants arriving, fifteen or twenty thousand in
A week

A million people-manners free and superb-open
Voice-hospitality-the most courageous and
Friendly young men,

City of hurried and sparkling waters! city of spires
and masts!

City nested in bays! my city!"
– Walt Whitman, Mannahatta

Though Walt Whitman passed in 1892, these verses from his poem *Mannahatta* celebrated the progress and prosperity in Manhattan (published in 1867), and foreshadowed the public policy challenges New York and Brooklyn faced. The challenges they faced were

amplified because they were competing municipalities. In 1898, Manhattan would join Brooklyn (the 3rd largest city in the US at the time) and 40 other municipalities to become Greater New York. The consolidation had sweeping effects on the city including re-shaping the port district to public health issues such as water. The plea for consolidation dated back to the 1830's when Brooklyn attempted to become a city and New York (at the time Manhattan and part of the Bronx) objected. Brooklyn's municipal incorporation would create 2 competing cities versus one unified metropolis. In 1837 the state combined Brooklyn and New York's police and fire department, effectively engaging the two cities. Brooklyn and New York began collectively planning bridges and sewers together. In 1898 the 2 cities officially married. William Randolph Hearst led the consolidation festivities; Mayor Strong wanted to throw a funeral for the passing of the old city (Burrows & Wallace 1219). Did a newly consolidated Greater New York foster a much needed collaborative environment?

Everyone in the newly consolidated area relied on transit, water, sewage, and land use-systems; therefore the theory was that everyone would benefit from a coordination of public and private resources (Revell 12). Consolidation offered citizens a number of immediate benefits: one parks commission to ensure space would be kept green, one police command for everyone, collaborative water, and uniform transit. Forty fewer municipalities meant fewer utility companies, fewer welfare offices, and less corruption. But did consolidation effectively solve the challenges Greater New York was facing? Can we learn anything from looking at today's New York about its consolidation 114 years ago? Did consolidation influence more than the colossal infrastructure projects it has been able to christen over the years? Could consolidation have been the single defining force majeure that has allowed New York to maintain the cultural and economic capital of the U.S.?

Pressure on Infrastructure

By the time of consolidation, Greater New York was faced with many infrastructure challenges including; transportation, water, zoning, and planning. These issues invariably affected public perception of New York and more importantly public health. An unregulated boom in skyscrapers occurred, that by 1929, would leave the city with 2,479 buildings over 10 stories tall, 2000 more than Chicago (birthblace of the skyscraper). The Croton Waterworks was built in the 1840's and couldn't keep the pace with the expansion of the city. Skyscrapers demanded as much as 20 times the water of their predecessors, each housing the populations of small towns. The new demand left many buildings without sufficient pressure to get water above basement level. The endless mountains of paperwork at banks and other financial institutions rendered many buildings tinderboxes. Sewage was another byproduct of breakneck growth. By the turn of the century the city dumped 300 million gallons of sewage per day into surrounding rivers. City health officials closed beaches due to raw sewage lapping against Long Island's shores.

> There were, in fact, very few taps, and they were in the homes of the rich, fed by water tanks erected on the roofs of their private fortresses. For all others, water was still drawn from parched wells and did not run into bathtubs or sinks or toilets; it was dipped, splashed, heated on hearths. It did not run as the rivers ran…. "This is New York," one editor said. "This is the way it is. If people are so desperate for a bath, let them move to Boston (Hamill p. 313-314)."

In the mid 1800's the water situation in New York was desperate. Citizens depended on well water, often palatable only by adding alcohol to it. Unsanitary conditions caused widespread disease such as cholera and yellow fever. One such epidemic caused over 3500 deaths. It is estimated 1 in 39 people died from water-related illness in 1830. Deficiency of

water also caused fires to burn uncontrollably, including the Great Fire of 1835. Public outcry called for a simple cure: water. New York answered with the Croton Aqueduct Project. The project brought water 41 miles from the Croton River in Westchester County to Manhattan by force of gravity. The water brought hygiene to the city for the first time. Health allowed the city to grow, and grow it did. By 1890 a second Croton Aqueduct was built parallel to the old one, still it wasn't enough. In order to satiate New York's appetite for growth, the newly-minted Greater New York would have to coordinate something grander in scale, something that Manhattan or Brooklyn alone couldn't have tackled alone. According to an article in the *New York Times*, "an aqueduct longer by thirty-five miles than the longest built under the Roman Empire." It would consist of a string of dams and a reservoir 12 and half miles long and a half mile wide. The nine aqueducts of imperial Rome supplied 84 million gallons of water per day. New York's would supply 500 million gallons per day (*New York Times*). In 1915 the New Catskill Aqueduct was completed. The project resulted in great upheaval of species and habitats, but it was the human toll which earned headlines at the time. Though it was difficult to find the exact amount of human casualties to provide Greater New York a clean and consistent supply of water, one account was 10 out of every 100 workers died on the project (Sigmund). Another account was in 1 year alone over 100 workers died, many were untrained foreigners handling explosives (Duff 38). New York's thirst for safe drinking water overshadowed safety of construction. One could argue that if Greater New York could build something more substantial than the great Roman Aqueducts, surely they could have built it safely and probably with a low impact on the environment. Of course this was not the case. The forward-marching city had conquered another one of its social ills for now, but at what cost? The Catskill Aqueduct wasn't

the only project taking workers' lives under the streets of New York. The New York Subway was under construction at the turn of the century too.

In 1900 August Belmont was awarded the first contract to build, maintain, and operate the new railroad exclusively for 50 years. The city paid him $36.5 million to commence. Many said the scheme was foolish; it lacked good sense. But the concept of a subway wasn't foolish or even new. By this time, Boston's subway system was already well received. The *Boston Globe* reported in 1898, "Cheers were given for the motorman, for the conductor, and three times three, many times repeated for Allston." In fact 111,000 people rode that train in the first 6 hours! Back in New York, 77,000 workers helped construct the first subway. Its workers consisted of bricklayers, contractors, carpenters, muckers, and miners. Rather than tunneling the entire system, Belmont's Interboro Rapid Transit or IRT primarily used the cut-and-cover method. This method required a large trench dug up in middle of the street. Track was then laid along with steel support. The trench was then covered up. Inconsistency in New York's bedrock at times required tunnels to be burrowed through it. From 158th Street to 191st Street a tunnel was cut 180 ft. below ground (New York's deepest subway tunnel). Miners were ushered in from the Western United States for their expertise in blasting through rock. Pressure was put on these men to meet deadlines. Tight deadlines resulted in explosions. One such explosion caused a 300-ton boulder to fall and kill 10 miners. Death in the tunnels was unexpected and sudden. In Gray Jacobik's *The Accident* death is best described as, "Never having died before, the panic-stricken are at once realistic and incredulous: So this is dying, and This can't be happening entwined in the thread's final knot (Jacobik 257)." Accidents, explosions, and cave-ins resulted in thousands injured and 44 known fatalities during construction of the initial subway lines.

On opening day, October 27th, 1904, 150,000 people visited the newly minted subway. Just 4 years later 800,000 rides took place on the subway daily. By 1913 more contracts were awarded as an expansion was called for to unite Brooklyn and Queens to Manhattan. Brave men called 'sandhogs' built 8 new tunnels under the East River. The sandhogs did the most dangerous work. One such danger was ventilation. Under the river ventilation was an issue with tunnel-building. In non-river construction holes could simply be cut in the street above providing ventilation. For the sandhogs burrowing under the river fans would circulate pumped in air. The use of dynamite to cut through the rock was dangerous often sparking fires. Fires could shut down the ventilation system. Dynamite was necessary though because tunnel boring machines (TBMs) didn't exist at the time. The job of a sandhog is both dangerous and necessary. Sandhogs stick together and the job becomes passed down through generations. Cases exist today of 5 generations of sandhogs in families (Fisher). The photo below by Gina LeVay, part of *The Sandhog Project* was shown at her expedition in Grand Central Station in 2006 is timeless (see Fig 3).

Fig. 3, The Sandhog Project

Sandhogs have built the subway tunnels, the foundation for the Brooklyn Bridge, the water and sewer systems of New York.

Progress continued next in the form of a New York City to New Jersey connection. In Keith Revell's *Building Gotham*, Vice President of the Pennsylvania Railroad, Samuel Rea, was quoted saying, "The railroad situation at New York is unique: A parralell does not exist. Here is a great seaport, with an aggregate population and of commercial importantce second to none in the world, separated by the navigable waters of a river from all the rail transportations of its country, but with a single exception, namely, the New York Central system." By 1910 Rea's railroad,the Hudson & Manhattan Railroad, Hudson Tunnel Company, Brooklyn Rapid Transit, and the Long Island Railroad brought to fruition a number of tunnel projects which assisted in doubling commuter traffic to 295 million people between Long Island and Manhattan. During this process many men lost their lives trying to solve the engineering quandries of linkage through bedrock, underwater, and over water. Constructing the Holland Tunnel, a connection between New York and New Jersey alone cost 13 men their lives. Without the coordinated efforts of both private and public companies this extensive transporation network would not have been possible.

New York grows up

> Workers' fatalities were a fact of life in construction. That these were the days before the now-obligatory safety gear-goggles and hard hats-increased the dangers that went with the job. The average life span of an ironworker after he started working in the profession was ten years. Their motto was "We do not die; we are killed. (Sparberg Alexiou 94)"

While work was commencing to build water and rail under the streets of New York, the city was growing in a different direction, up. Skyscrapers would forever change the sky above the human scale of New York in the late 1800's. Not only would they change the look, but hey

would change the engineering field itself. Buildings soaring over 4 and 5 storied became engineer challenges and proved deadly for construction workers. Every year people risk their lives to erect structures. Consider this, during the planning stages of the 102-story Empire State Building; planners estimated 1 person per floor would die during construction (Emporis.com). In reality the official number was 14 (though many sources put this number much higher). The 1 death-per-floor of construction was typical of the era when New York's iconic structures were being built. In addition to deaths of construction workers was a forever changed environment. Building a 3 story building where trees once stood didn't seem as permanent as the larger than life superstructures taking place everywhere in turn-of-the-century New York.

The pursuit of money by highly-competitive companies such as The Fuller Company (known as the skyscraper trust) at the turn of the century pushed for velocious building completions. The Fuller Company's resume included Macy's Department Store in Herald Square, The Plaza Hotel, Pennsylvania Station, The New York Times Building, and the Flatiron. Competition was truculent for these projects as were the potential profits. Some of the board members of The Fuller Company included Tammany Hall members, Charles Schwab, Cornelius Vanderbilt, et al (Sparberg Alexiou 34-36). Much of this building boom was made possible by Elisha Otis' invention, the elevator in 1853 (Invent.org). Within 80 years of the invention of the elevator the Empire State Building would stand 102 stories above the ground.

With all of this competition to build taller and faster, came human casualties. Construction workers of the late 1800's and early 1900's had little-to-no safety practice. Workers had no modern harnesses, cables, hard hats, goggles, and ropes. These people risked their lives hundreds of feet in the air to erect buildings. The culmination of the elevator, cheap steel, lack of space, and a booming New York construction industry demanded they do so.

Ironworkers new to the construction site were called ‘snakes’ because working with them was dangerous, while experience workers were called ‘roughnecks’ (Cheong). Workers would walk on steel beams with no protection against a fall at heights that included high winds; it was truly a balancing act. A famous photo of Charles C. Ebbetts comes to mind of workers having lunch on the 69th floor of Rockefeller Center’s GE Building (see Fig 4):

Fig 4. *Lunch atop a Skyscraper, 1932* (Ebbetts)

Lunch atop a Skyscraper is available as a poster for sale virtually anywhere in New York and nearly any frame shop in the US. However it doesn’t portray the danger experienced in the industry. Bravery, fear of heights, and insanity often come to mind when one sees this iconic photo, but what about another of Ebbetts’ photos of 30 Rockefeller Center (see Fig 5)?

Fig. 5

The men are taking a nap on the same GE Building at 30 Rockefeller Center as above. One can visualize the danger and death at one false, unaware twitch of the body.

Lack of Oversight

At the turn of the century there were few agencies and little federal oversight of the construction industry. It is estimated that around 1900 there were 25-35,000 deaths and over 1 million injuries per year in industrial jobs, including construction (Sage). This volume of death happened 70 years before The Occupational Safety and Health Administration (OSHA) was formed (OSHA.gov). Only after a tenement fire took place in 1860 were New York City's building laws revised and strengthened. A Superintendent of Buildings position was created and later a Buildings Department in 1892, now known as the New York City Department of Buildings (NYC.gov). Unfortunately for the workers, the Department of Buildings was (and by many accounts still is) corrupt. In 1871 the Department of Buildings was mentioned in New York Times story, *Disgraceful Corruption in the Department of Buildings* and later in 1876, *The Building Department: Its Rottenness Exposed* (Feuer). Bribers were paid to the department for

projects being fast-tracked, often with safety measures being completely ignored. But something else challenged new building titans; labor. Labor slowed down the 2nd industrial revolution in the U.S. by forcing employers and builders to listen to their workers. As we consider the impact labor had on commerce, it's important to observe if labor really affected worker safety or if it merely improved wages.

Labor

> By one estimate, one hundred or more Americans died on the job every day in the booming industrial years around 1911. Mines collapsed on them, ships sank under them, pots of molten steel spilled over their heads, locomotives smashed into them, exposed machinery grabbed them by the arm or leg or hair and pulled them in (Von Drehle, loc. 138).

During this industrial boom time there were few workplace safety regulations, and workers compensation was considered socialist. Labor was organizing but was still being met with fierce resistance from business leaders. The earliest recorded strike was in 1768 when journeymen tailors in New York protested a wage reduction. The first organized union in the US was the Federal Society of Journeymen Cordwainers in Philadelphia in 1794 (Brody). By 1886 Samuel Gompers, a cigar maker became a key figure in American labor by forming the American Federation of Labor (AFL). Organized labor's stated goals were better wages and better working conditions. But did labor's dual mission become clouded by dollars? Did the organization of labor emphasize improved working conditions on equal or better footing than that of wages and benefits? Or did death in the workplace lead to better conditions?

> "I like to fight. It is nothing after you've risked your life bridge-riveting at $3 a day…..In organizing men in New York I talked with them nice and pleasant, explaining how they could be better off in a union. Some did not believe unions would be good for them; and I gave them a belt on the jaw. That changed their minds. Lots of men can't be moved by any other argument" – Fighting Sam Parks.

Even some of labor's more iconic figures were known more for economic improvements than safety improvements. The above quote was by the famous 'Fighting' Sam Parks of the Local 2 International Association of Bridge and Ironworkers. Parks fiercely battled to double the rate of pay for working an 8 hour day to $3.76 in 1901 over the prior year. Within 1 year of the above quote, all of New York's 4500 ironworkers joined the union. Unfortunately Sam Parks was brought to New York by William Black of the Fuller Company to strike at all of his competitors' constructions sites so Black could gain an advantage over his competitors. Parks was paid off to not strike at the Fuller Company's projects. Eventually Parks went to prison for accepting bribes (Sparberg-Alexiou 92). Figures that used physical force to motivate such as Parks did little to help worker safety needs. Realistically how could one 'fight' to improve safety on the job site? Parks and others like him focused on wage increases. Another famous labor figure, Samuel Gompers, founded and served as president of the AFL from 1886 to 1894. Gompers pushed for out-of-work benefits, sick pay, and death benefits for union members in good standing (Manadel). Gompers also ran the union like a business. In the Pulitzer Prize winning *Gotham, A History of New York City to 1898*, authors Burrows and Wallace discuss how Gompers followed examples of British trade unions and prepared the AFL for a long struggle. He charged high dues and built up a tough self-sufficient organization with ample reserves for strike funds and sick benefits (Burrows and Wallace 1090). Finding evidence supporting labor leaders having a primary objective of safer working conditions proved difficult. Further no evidence could be found of labor's involvement in protecting the environment. The environment remained in the background of a rapidly changing New York around the turn-of-the century.

Disaster

> The "Triangle" company…With blood this name will be written in the history of the American workers' movement, and with felling will this history recall the names of the strikers of this shop-of the crusaders (Jewish Daily Forward).

This quote was written January 10th, 1910, over one year before the deadly Triangle Shirtwaist Factory Fire. Factory owners Max Blanck and Isaac Harris became notorious for hiring strikebreakers (basically thugs) to beat up strike leaders. They also were the owners of the Triangle Company, a blouse maker in New York with an office located in the Asch Building at 23-20 Washington Place (now the Brown Building and part of NYU).

One year later, March 25th, 1911, 146 garment workers died in what became the deadliest industrial disaster in the history of New York. The fire originated on the eighth floor of the factory. The eighth floor was crammed with 278 sewing machines on large tables. The owners Blanck and Harris had the factory configured to allow for only one exit (to prevent theft). At this singular exit was a gate which workers walked through one at a time to ensure no one was stealing. Because of single exit the other exits were locked and people were unable to exit while the fire spread quickly throughout the fabrics. It was suspected that the fire ignited from one of the cutters who were smoking. Though smoking wasn't permitted because of the highly flammable environment, the cutters, usually male, would often smoke uncontested because they were amongst the highest paid and most valuable of the workers.

The fire escape balconies could only handle a few people at a time, vastly inadequate in an emergency involving hundreds of people. The fire occurred at quitting time when 250 people were jockeying to leave though the exit gate. While the eighth floor was jammed with sewing machines and little room to maneuver, the ninth floor (also part of the Triangle Company) was filled with cutting tables and sewing machines. On the ninth floor was also a big box in which to hide the child workers when inspector arrived. The alarms didn't work so people lost valuable

escape time. The majority of the victims were immigrant women ranging from age 14-48, 50 burned to death, 19 fell into the elevator shaft, 20 died when the fire escape failed, and 53 jumped or fell from windows (The Economist). Where was labor while this unsafe environment persisted before the fire?

Changes in Safety and Labor Accomplishments

According to AFCME, Labor's Top 10 Achievements are:

1. Founding of the Committee for Industrial Organization, later the Congress of Industrial Organizations or CIO (1938) – Achievement: mobilizing labor
2. Passage of the Social Security Act (1935) – Achievement: unemployment insurance, aid to dependent children, and rehabilitation for physically disabled, improvement of public health and pensions to workers in their old age
3. National Labor Relations Act (1935) – Achievement: granted unions the right to organize and obligated employers to collective bargaining
4. GM Sit-Down Strikes (1936-1937) – Achievement: $.05 cent per hour raise and an agreement to rehire strikers and recognize the union.
5. Civil rights Act / Title VII (1964) – Achievement: prohibited discrimination by employers on the basis of race, national origin, color, religion, or gender
6. Public Sector Organizing (1962-1980) – Achievement: recognized the rights of federal employees to join unions.
7. Fair Labor Standards Act (1938) – Achievement: established the minimum wage and the 8-hour work day, providing overtime, and prohibiting the use of child labor in all business engaged in interstate commerce
8. "Bread and Roses" Strike (1912) – Achievement: better working conditions
9. World War II Support – Achievement: no strikes during WWII
10. Occupational Safety & Health Act (1970) – Achievement: Established OSHA and expanded and refined safe protections for all workers

Of the top 10 achievements only numbers 8 and 10 focus specifically on safety while the others were more about organizing, and economic benefits. But labor also secured workers' compensation benefits. Organized labor had additional achievements in safety and working conditions including winning workers compensation benefits for injured workers (WorkersLife.org) and the development of training programs to educate workers about safety and health hazards they face on the job. Labor also offered training to employers to help them

mitigate those hazards (aflcio.org). Data was culled from the ALFCIO website section Union Contributions to Safety to build the following table of declared achievements by unions (see Fig 6);

Union Workplace Safety Achievements (by Year)			
1969	Coal Mine Health and Safety Act	1978	Grain Handling Facilities
1969	Construction Safety Act	1979	Control of Hazardous Energy
1971	Walh-Healy Act (Asbestos)	1981	Formaldehyde
1971	Noise Exposure	1983	Hazard Communication Right-to-Know
1973	Carcinogen Standards	1983	Ethylene Oxide
1974	Vinyl Chrloride	1983	Bloodborn Pathogens
1974	Coke Oven Emmissions	1986	Hazardous Waste
1975	Cotton Dust	1986	Commercial Motor Vehicle and Safety Act
1976	Commercial Driving Operations	1987	Field Sanitation
1977	Mine Safety Act	1988	Mechanical Power Press
1977	DBCP	1988	Drug and Alcohol Proceedures for DOT
1978	Benzene	1990	Ergonomics
1978	Inorganic Arsenic	1998	Postal Worker Safety
1978	Acrylonitrile	1999	Motor Carrier Safety Improvement Act
1978	Lead	2001	Occupational Injury Recordkeeping

Fig. 6. Union Workplace Safety Achievements

A quick look at the data shows there is a big gap. Organized labor has existed in the US since 1794, yet in labor's words its achievements in safety begin 175 years later. Regulations in safety would be left up to local and national government.

The Triangle Fire galvanized reforms in working conditions. Within a few years the city and state had adopted 36 new laws, the country's most comprehensive set of labor rules and public safety codes. The New York State Legislature created its New York state Factory Investigating Committee to investigate factory conditions. Objectives of the committee included: preventing hazard or loss of life among employees through fire, unsanitary conditions, and occupational disease. An article in the *New York Times* quoted Abram L. Elkus "Occupational diseases, poisoning, and industrial consumption have practically been permitted to go unchecked," said Abram L. Elkus, council for the commission. Men are permitted to handle

arsenic without gloves, to breathe ammonia and turpentine fumes without protection, and to fill their lungs all day long with dust and other harmful substances." In addition other reforms enacted by the committee included:

> Accident prevention: guarding of machinery, inspection of factories
> Danger due to insanitary conditions: ventilation, lighting, and seating arrangement
> Occupational diseases: industrial consumption, lead poisoning, bone disease (*New York Times Archives*)

New York became the model for other states' laws and codes. According to an article in *The Economist* on the 100th anniversary of the fire, it said, "Prior to the Triangle Shirtwaist Factory fire labor had to deal directly with owners itself. After the fire, labor had the law on their side."

In March of this year on the 100th anniversary of the Triangle fire, I walked by the Brown Building as the anniversary event was just wrapping up. I paused to reflect. At the time I had no idea of the profound impact the fire had on working conditions. Unfortunately, disasters such as the Triangle Shirtwaist Factor Fire have done more to make the workplace safer than labor accomplished in 175 years of existence. Up until that point labor's main achievements were those of economic means versus significantly safer working conditions. During the research process I began to learn that two themes were synonymous with progress in the commerce and competitiveness of New York: death of humans, and destruction of the ecology and environment of Manhattan. I began to wonder, could these be part of a cycle? To achieve true progress and a sustainable competitive business environment, a higher level of achievement must take place. A city cannot continue to destroy its environment and the citizens who attempt to convert it into a metropolis.

Improvements in Safety Allow for Progress

> You don't ever want to die," he said, "because you're tired. Or because you've been wounded in your fighting arm. Each arm must have equal strength. And one other thing: If you think you'll get tired, then you will get tired. If you think you'll lose, you will lose (Hamill 61).

Moving 1.6 billion people per year, the New York Subway is fast, efficient, and affordable. It is a symbol of prosperity and progress. Unfortunately there's a deadly side of the subway too. It has claimed an estimated 300 lives of the very people who have built and maintained it during its century long residency in New York. The litany of death that has tracked the subway over the last 100 years begs the question, "Has subway safety worker safety improved over the last century?" More importantly; "Have innovations in safety kept pace with the evolution of the subway?" In order to answer these questions it is necessary to take a look at the past, present, and future of the subway as well as the technologies of each era, and how human error influences 'safety'.

> "He sees a psychiatrist and a psychologist, takes psychiatric medication, and attends group-therapy sessions for motormen and conductors who were involved in "12-9s"-transit code for instances in which a train hits somebody (Gonnerman)."

Today the subway has grown to 660 miles of subway tracks. The total Metro Transit Authority (MTA) moves 8.5 million people every day. Mega projects are moving forward including the Second Avenue Line and the expansion of the Long Island Rail Road to Grand Central Station, (the 2 largest transit projects in the US). Though it's important to note that almost no expansion of the subway has occurred between 1954 and today (Wikipedia Commons). The MTA Capital Program has $18 billion budgeted for project safety and reliability; more than the Total GDP of Afghanistan! Despite the money dedicated to safety, real human lives are taken every year just in maintaining the subway. Since 1946 over 230 lives have been taken in maintaining the existing subway infrastructure.

In 2008 a survey found that 49% of subway track workers had experienced a "near miss where they thought they came close to being seriously injured or killed"; 19 percent said they had experience such an incident at least 3 times as reported in the New York Magazine article *Blood on the Tracks* (Gonnerman). For those driving to work every day, one could easily count the near misses. If you drive you can probably attest to dozens of near misses being behind the wheel. Take for example the quantity of people who are hit by trains each year. On an average year nearly 2 people per week are hit by trains. The majority hit is jumpers are suicides; nearly 50% are fatal (Haddon). From 1998-2008 just 10 lives were lost in maintaining the tracks. These were often due to errors in judgment and miscommunications rather than unsafe working conditions. Take the case of Marvin Franklin. He was crushed by a train after his flagman left his post (flagmen should never leave their post) to help them move some heavy equipment across live tracks. When Marvin's co-worker saw a light, he thought it was the flagman's flashlight when in fact it was a train. It was deemed the men could have carried the equipment up the platform staircase to the opposite platform, avoiding the tracks altogether. When asked, the head of the Transport Workers Union said, "Ten out of ten people will not do that (Gonnerman)." To exacerbate the situation, they were working on unfamiliar track, trying to clock overtime. In this incident the employees avoided the safety rules. Not following procedure in multiple instances was enough to terminate Marvin Franklin's life early.

> ……the worst tragedy of all is when one of their own is killed, when one of their own is killed, when someone starts his shift like everyone else, wearing an orange vest and a helmet, and ends it inside a body bag (Gonnerman).

The quote above offers a raw look at the potential for danger each and every day in the tunnels. Looking more closely, a few words stand out that represent how far safety has come, "orange vest", "and helmet". These two items may sound standard and routine today but they

are innovations of safety. Considering all of the 660 miles of track are walked every day in five miles at a time increments, while the trains run 24/7, the number of transit worker fatalities seem awfully low. Much has been improved since the system was first launched in 1904. Groups of men work together on sections of a track, called gangs, and typically stick together for years on familiar stretches of track. They now use 115lb rubber mats which are draped over the 3rd rail (the one carrying the electricity). Today the Occupational Safety and Health Administration (founded in 1971) exist as well as numerous other agencies overseeing worker safety. As mentioned in the prior section, $18 billion dollars are allocated for MTA safety. Training facilities exist and everyone from MTA workers to Verizon phone line worker demo their training in the tunnels with live trains roaring by them. Fatalities of subway workers have been reduced to less than 1 per year, much less than the 50 or so killed from jumping in front of trains. Because of subway expansion plateauing in the 1950's, due to maturation of New York's growth, safety has had the option to catch up with the innovation. Today safety innovation exceeds subway innovation. However as the TBMs start working their way down 2nd Avenue for the new T Train, improvements in safety may once again be in the spotlight. Regardless, one can conclude if the rules are followed, maintaining the subway is safe.

Despite the improvements in subway worker safety one fact remains; for an office worker, an error in judgment might lead to an email sent to the wrong person, for a subway worker, it might lead to death. But without the disasters and death that followed building New York's infrastructure and economy around the turn of the 20th century, New York could be stuck in the quagmire of bureaucracy many municipalities are today. New York's bigger; better, faster mentality at the turn of the century became an economic driver of right place, right time. The new 2nd Avenue T line is being built at an estimated cost of $2 billion per mile. What if New

York was laying out a subway plan for the first time ever today? Based on financial and environmental constraints it is doubtful the subway would move beyond the planning stages. Unfortunately it seems more efficient to have built the infrastructure of the subway 100 years ago with limited safety and limited environmental concerns.

Safety in the subway has improved dramatically. The main driver of safety in the subways is its centralized system with government oversight. Contrast a government run workplace safety operation to private sector high rise building and the difference is notable. Since the private sector builds buildings, the barrier of entry is lower and there are many projects in many places being built at one time. This fragmentation makes oversight very difficult. Take for example the case of developer Tommy Huang. For decades he's been fined, cited, and convicted violating building codes. In 1997 he illegally bulldozed the landmarked grand staircase of RKO Keith's movie palace in Flushing. At the same site Huang caused a catastrophic oil spill. This resulted in Huang pleading guilty to a felony but it didn't stop him from building. In 1999 he was banned from selling condos and co-ops and has racked up more than 300 violations in the last 10 years. In 2011, a 20 foot concrete wall collapsed on immigrant Hedilberto Sanchez at a building site where Huang had already received over 20 building violations (Gearty and Kates). Oversight exists but isn't sufficient to prevent deaths like that of Sanchez from occurring.

Immigrants in New York have are particularly prone to construction accidents. Immigrants comprise of much construction industry in New York and are less likely to comprehend safety warnings (Salazar). Many of the immigrants who perished during New York's 2006 construction boom were not wearing safety equipment and received limited training. In that year 43 construction workers died in New York. Sole breadwinner and Indian

immigrant Sucha Ram fell 15 feet off a roof in Queens in 2010 and wasn't wearing any safety equipment. Hearing stories like Ram's causes one to think we're in turn of the 20th century New York again. OSHA found that Ram received no health and safety training from the contractor he worked for. In that case the contractor was fined only $8,625 for the infraction (Salazaar). Despite New York's progress and with a 130-year history of building skyscrapers, penalties are not stiff enough.

One can conclude that despite improved safety measures, the formation of OSHA and the New York Department of Buildings, societal issues such as greed, corruption, and lack of education still exist as they did in the turn of the 20th century. Today, greed, corruption, and lack of education factors might be less pronounced but remain part of the vertical fabric of New York. Unfortunately for those in the industry, the ultimate price is often paid for the benefit of the contractors and future owners or tenants of the buildings they erect.

With all the death and human sacrifice surrounding infrastructure and economic prosperity in New York, what influences resulted? Using cultural observations, one can conclude that the influence did more than facilitate easier transportation, taller buildings, and a larger economy. New York is unique symbol of progress and prosperity, unlike anything the world had ever seen. Some of the most brilliant minds in American literature were inspired by the events taking place near the turn of the 20th century.

> How many dawns, chill from his rippling rest
> The seagull's wings shall dip and pivot him,
> Shedding white rings tumult, building high
> Over the chained bay waters of Liberty –
>
> Then, with inviolate curve, forsake our eyes
> As apparitional s sails that cross
> Some page of figures to be filed away:
> Till elevators drop us from our day…

- *To Brooklyn Bridge*, Hart Crane

To doubt the influence of icons such as Brooklyn Bridge on society is to doubt the existence of society itself. Hart Crane, unknowingly at the time lived in the apartment that once housed Washington Roebling, overlooking the bridge. The excerpt from the above poem shows how timeless the bridge is and the poem itself became central to his work, *The Bridge. The Bridge* was a book length series of poems which started out with his ode *To Brooklyn Bridge*. The Brooklyn Bridge foreshadowed the coming marriage of New York and Brooklyn in 1898. According to the article *Poetry Landmark: The Brooklyn Bridge in New York City*, Walt Whitman returned in 1878 and saw the bridge nearly finished. He declared, "the best, most effective medicine my soul has yet partaken—the grandest physical habitat and surroundings of land and water the globe affords—namely, Manhattan island and Brooklyn, which the future shall join in one city—city of superb democracy, amid superb surroundings.(American Society of Poetry)." The connection spurred runaway growth in Brooklyn quickly growing it to Americas 3rd largest city. By the 1930's Brooklyn's population exceeded that of Manhattan. Today the population of Brooklyn is 2.5 million versus Manhattan's 1.5 million (US Census). While the Brooklyn Bridge acted as a conduit for growth in Brooklyn it did not have the desired effect of stemming overcrowding in Manhattan. In the early 1900's the growth in Manhattan continued and with the advent of the skyscraper it went vertical. Today Greater New York has over 2000 bridges and tunnels serving as connection points. The Brooklyn Bridge spurred an era of growth and bridge-building in the area.

Despite cultural and economic influences, one could argue that the road infrastructure development paved the way to a polluted society. Car traffic on the Brooklyn Bridge's 6 lanes exceeds 120,000 every day, nearly 44 million per year, or close to 5 billion in the last 100 years

(New York City Department of Transportation). But roads weren't the only polluters of turn of the century New York. In a study conducted by Sol Pincus and Arthur Sterne in 1937, *A Study of Air Pollution in New York City* found that the Greater New York area was burning 5% of the coal in the U.S. and 20% of the nation's anthracite, primarily from the burning of soft coal. While the study discusses automobile pollution it found results inconclusive at the time, further proof that environmental impact is still a relatively new consideration. The study is summarized as recommending a full scale investigation into New York City's pollution. One thing is for sure, the network of 2000 bridges and tunnels fostered more traffic and forever changed the natural landscape of the Greater New York area.

New York City: 2011

> Urban density is probably one of the great misnomers of being against green, but in fact the carbon footprint of someone who lives in New York City is a lot smaller than the resident of the countryside who has a car and is driving everywhere.
> – Chad Oppenheim

In light of being the largest city in the US, 8.4 million people with a metro area of nearly 20 million, New York, ranks only 21st out of the top 25 polluting cities in the US, according to the report by the American Lung Association, *Half of Americans still affected by dangerous pollution levels*. And according to an article by Nicki Kipen, New York, Portland, and Chicago are among the greenest US Cities, "More than 80 per cent of NYC residents use public transportation, something that earns the city bragging rights. In fact, New Yorkers burn gasoline at the rate the US did in the 1920's (Kipen)." She goes on to call New York, the Big Green Apple. The Brooklyn Bridge helped provide an adequate connection for pedestrians, following it was the development of the Williamsburg Bridge (1903), the Manhattan Bridge (1909), and Queensboro Bridge (1909). Numerous tunnels followed which allowed the young subway to

stretch out and eventually bring its ridership up to the nearly 5 million per day it carries today. Because of this infrastructure development, one can argue that not only is New York more progressive when it comes to greening the city, it 'should' be more progressive because of its early development of super structures such as the Brooklyn Bridge.

A quick look at the New York of 2011 and one can quickly see the efficiency of New York. New York is in stark contrast to most urban centers of America. In New York the pedestrian rules, not the car. Love it or loathe it, New York has become one of the most progressive cities on earth. A quote from O. Henry, paraphrased by the *New York Times* sums it up, "While all cities say the same thing, New York says it first." While 114 years ago the challenges New York faced included overcrowded tenements, safe drinking water, transit issues, and pollution, today's New York seems to recently have quelled issues of crime, and has moved on towards greening the city and making people live longer. Because of the group think of Greater New York, public health problems are addressed efficiently with impressive results.

Citizen Health

While many cities in the U.S. are just beginning to address auto pollution, New York is addressing pollution and health issues resulting from smoking. In 2002 smoking was deemed to be the number 1 cause of preventable death in New York. The city appointed Dr. Thomas Freiden as its health commissioner to address the smoking problem. The city hiked taxes on cigarettes, created aggressive ad campaigns, and banned smoking in public places (most recently Times Square). Since 2002 the number of adult smokers has decreased 300,000 in the city. While still combating smoking the city now has sugary beverages in its crosshairs. Mayor

Bloomberg recently attempted to ban people from buying sodas and sugary drinks with food stamps. Campaigns like the following image appeared on subway ads (see Fig 7).

Fig. 7

Despite the campaign, Federal officials rejected Bloomberg's proposal. *Gothamist* reported Bloomberg's response, "We think our innovative pilot would have done more to protect people from the crippling effects of preventable illnesses like diabetes and obesity than anything else being proposed anywhere in the country – and at little or no cost to taxpayers." Smoking and sugary beverages are just two examples of social issues that can only be addressed when major issues such as safe water, transit, crime, and sanitation are resolved. This progression is comparable to a Maslow's Hierarchy of Needs for a city. Once the major societal issues are resolved, the city can focus on the more advanced needs of its citizens.

A Return to Ecology and Survival: PlaNYC

A flight attendant going by the screen name 'waqyum' posted the following query on a message board run by Aardvark Travel, "I love greenery and I wish to know the greenest city in

the USA to enjoy my summer vacation." He or she must have been startled by another flight attendant's response, "Hi…..New York, Portland, and Chicago are considered to be the greenest cities in the USA."

While New York may have cemented its position as one of the greenest cities in the US, it needs to incorporate what its rival cities in the US are achieving as well as look beyond American borders to maintain its position as a competitive city in the world. Further to perpetuate its position as a capital of the world, New York must make decisions that are not only livable but functional from an economic and competitive perspective; enter PlaNYC. The plan calls for a "greener and greater New York", but is the plan addressing the concerns of creating a competitive greener New York?

PlaNYC

PlaNYC is Michael Bloomberg's legacy. The 2007 plan's function is to prepare the city for one million more people, improve the economy, fight climate change, and make New York City more livable. Simply put, the goal of PlaNYC is a greener, greater New York. PlaNYC is substantial in size and requires the coordinated efforts of 25 city agencies. To date it has claimed many achievements and is lauded as the first of its kind in the U.S. But not everyone agrees that the plan has New York's best intentions in mind and some believe the mayor's plan doesn't go far enough.

PlaNYC is large in scope and scale and covers housing, parks and public space, brownfields, waterways, water supply, transportation, energy, air quality, solid waste, and climate change. Before we can look at the opposing viewpoints, one must consider that the existence of such a plan this comprehensive for a city the size of New York is a bold endeavor. Why had a plan such as PlaNYC not been proposed before? Was New York not ready for it?

Just 10 years ago the city was dealing with the World Trade Center crisis and before that it was solving the ills of high crime and homelessness. The timing of the plan comes as humanity is embracing the concept that climate change is real. Further, the plan addresses the population growth that New York forecasts for the next 2 decades. With many of the social issues that other large cities face somewhat solved, New York looked ahead towards the next chapter in its long history.

Because PlaNYC's goals are so comprehensive, some of the stated goals seem difficult to comprehend. Take for example the stated goal of all New Yorker's living within a 10-minute walk of a park. Will the city manufacture parks in order to achieve this? Many of the goals are gargantuan. Let's take a look (see Fig. 8):

PlaNYC	Stated Goals
Housing and Neighborhoods	Create homes for almost a million more New Yorkers while making housing and neighborhoods more affordable and sustainable
Parks and Public Space	Ensure all New Yorkers live within a 10-minute walk of a park
Brownfields	Clean up all contaminated land in New York City
Waterways	Improve the quality of our waterways to increase opportunities for recreation and restore coastal ecosystems
Water Supply	Ensure the high quality and reliability of our water supply system
Transportation	Expand sustainable transportation choices and ensure the reliability and high quality of our transporation network
Energy	Reduce energy consumption and make our energy systems cleaner and more reliable
Air Quality	Achieve the cleanest air quality of any big U.S. city
Solid Waste	Divert 75% of our solid waste from landfills
Climate Change	Reduce greenhouse gas emissions by more than 30%.

Fig. 8, *Stated Goals of PlaNYC*

According to NYC.gov, to date PlaNYC successes include a reduction in greenhouse gas emissions of 13%, to below 2005 levels, two thirds of the 2009 milestones achieved, and the 'preservation' or construction of 64,000 units of housing. The Mayor's office also released a study by the International Council for Local Environmental Initiatives (ICLEI) titled, *The Process behind PlaNYC*. The report depicts the Mayor's plan as a step towards a long-term sustainable community. However Hunter College student Brian Paul disagrees in his paper, *PlaNYC: A model of Public Participation or Corporate Marketing?* Paul states, "The entire tone and content of the report reads like a public relations fluff piece for Mayor Bloomberg rather than an objective account of the PlaNYC process." Paul goes on to state how findings show a reduction in affordable housing since Bloomberg became Mayor instead of an expansion as PlaNYC states. These findings are based on an NYU Furman Center Report titled, *Key Findings on the Affordability of Rental Housing from New York City's Housing and Vacancy Survey 2008*. Further, Paul discusses that flaws exist in the plan, because while it states that it is a collaborative effort of the public and private sector, the plan was already being written before public sector outreach efforts began. In a past essay, *Public Policy*, I discussed that consolidation led to a more collaborative effort of the public and private sectors. Without mass collaboration, many of the infrastructure projects completed by the city would not have seen the light of day. What makes the City of New York think they can undertake such a plan without significant influence and agreement of the public sector? Where will all the parks be built? How will the aggressive goals of affordable housing be met? Gentrification seems just too tempting for developers. How will we fight climate change?

Others don't believe PlaNYC goes far enough. Take Staten Island Borough President, James P. Molinaro and his proposal on earth day 2011, "My wish for Earth Day 2011 is that we have a wind farm operating at Fresh Kllls by Earth Day 2014. All that stands in our way is the common sense understanding of government agency approval." Molinaro says he can deliver a wind farm at no cost to the tax payer that will contribute to the energy needs of the city. Wind is currently not part of PlaNYC. Of course everyone has their wish list for what a greener, greater New York means. But with major players like Molinaro not getting a say in what PlaNYC does, the collaborative efforts seem to fall short.

For many New Yorkers the plan seems merely focused on green space as it is one of the most recognizable changes. Many of the infrastructure projects taking place hundreds of feet below the surface seem obtuse and typical government-at-work. But the plan does have its benefits; New York is visibly greener. The city has more public space, more bike lanes, trees, eco-friendly buses, farmers' markets, and has created a more livable city. Despite these improvements in livability, the jury is still out if PlaNYC will make New York greater. Not only will its residents have high expectations, the world will be watching New York as it always does. Will New York become a model for the greening of urban centers throughout the world?

PlaNYC is an example of a higher tier of addressing citizen needs. In fact the purpose of the PlaNYC is to prepare New York for an additional 1 million citizens by 2030, while fighting climate change, and improving the quality of life for New York's citizens. The plan covers, housing, parks, brownfields, waterways, transit, water supply, energy, air quality, solid waste, and climate change. In the updated plan, released in April 2011, the mayor boasted the plan's accomplishments in the first 4 years: 200 new acres of parkland, 64,000 units of affordable housing, more transportation choices, and a 13% reduction of greenhouse emissions

(now below 2005 levels). Some of the more noticeable improvements include: a pedestrian-friendly Times Square (which is about to be improved again), the High-Line, 250,000 new trees planted, start of the 7-Train subway expansion, start of the 2nd Avenue subway line and 500 new street vendors selling fresh fruits and vegetables. The quality of life focus that is at the forefront of Bloomberg's PlaNYC, are a testament to the progress the city has made. The green movement of New York requires in depth research as there are many viewpoints, claims, and counter claims to evaluate. .

Green Opportunities

In the past, New York City placed its economy before its people, ecology, and environment resulting in an island of concrete. Today many of the issues that plague urban societies have been managed to a controllable level in New York. Because of societal achievements the city has become a model for a green urban society everywhere. Even the beaver is aware of the progress. In 2007 a beaver returned to the Bronx River (without humans placing him there). It was the first time a Beaver has lived in the region in 200 years! In 2010 a coyote was spotted in Central Park. In 1984 the New York Parks Department founded the Natural Resources Group with the aim of fostering environments conducive to native wild plants and wild animals in the city. If one considers that 10% of the land within 100 miles of Central Park is pasture or agriculture, 26% is forest, and 8% is open space and parks, then the fact that 56% is used for structures, roads, and concrete doesn't seem egregious. Consider the following poem:

> "Now you are through
> Watering geraniums and now you go
> To the roof edge to survey the real estate
> Of architectural air-tense forms wrought up,
> Torn down, replaced, to be torn down again…

So much like us. Your head against the sky
Is topped by a tower clock, blocks away,
Whose two black hands are closing on the hour,
And I look down into the street below,
Rinsed fresh this morning by a water truck,
Down which a girl, perky in highheels,
Clops by, serenely unaware of us,
Of the cables, gas lines, telephone wires,
And water mains, writhing underfoot."

- from *The Roof Garden*, Howard Moss

The above poem by Howard Moss evokes the livability that green space provides New York's concrete landscape and forest of high rise buildings. What is it about green space that allows us to pause for a moment and experience the city both audibly and visually? Green space is on the rise in New York City today. Take for example the High Line. The Inc Magazine article *High Line New York* by Judith Ohikuare discussed the recent success of the High Line, New York's railroad-to-park conversion. Over 100,000 plants of 35 different species were grown by the Plant Group a wholesale nursery in Franklin, CT. Ohikuare states, "The plants evoke the wild flora that flourished on the railway during decades of disuse." Green space fosters livability and in real estate livability translates to economics. In addition to creating a walkable park, the High Line did something else; it spurred a real estate boom. The High Line has now become its own submarket in the greater Chelsea real estate market with property values soaring on buildings adjacent to it.

The roof of Chicago's City Hall is nearly half an acre of shrubs vines, and small trees, 11 stories about Lasalle Avenue. The green roof reduces the amount of energy needed to cool buildings in the summer, captures rainwater during rainstorms, reducing pressure on storm sewers, and combats the heat island effect. Temps are 10-15 lower than adjacent black tar roof buildings. In the summer, temps can be 50 degrees cooler. My research led me to the article titled; *Green Roofs are Starting to Sprout in American Cities* in Yale's Environment 360 by

Bruce Stutz. Stutz shows that green roofs are taking off in New York. The largest green roof in New York City is the 2.5 acre green roof on the James Farleu Post Office building. The green roof isn't watered, weeded, or fertilized and has survived extreme heat, deep winter freezes, and heavy rain downpours. Water runoff has been reduced by 75% on this building and it is estimated that the green roof has reduced the heating and cooling expense by $30,000 per year (see Fig 9).

Fig 9. James Farleu Post Office Building

Green roofs like this are already commonplace in Europe. In the U.S. the economic benefits will likely drive the demand for green roofs. New York's member ship in The Large Cities Climate Group Leadership Group allows the city to learn about what other cities are doing around the globe to green. The group is comprised of 58 cities around the world. Other cities in the U.S. are Seattle, Portland, New Orleans, La, Houston, Austin, and San Fran, Chicago. Goals vary but they are congruent on several issues including: hybrid and electric taxis, reducing trash, and converting waste into energy. At the minimum the group creates a dialogue that allows cities to

learn about innovative green programs. At the maximum, cities like New York can see what economic incentives greening their city offer.

In his New York Magazine article, *What New York Can Steal from Hong Kong*, Justin Davidson argues against bike lanes and pedestrian friendly planning. Davidson quotes Columbia University's Vishaan Chakrabarti, "The emphasis on the Copenhagen/Amsterdam model is a distraction. We have a lot more in common with Hong Kong and Tokyo. Our counterparts are dense, mixed, financial-service cities, not cute European towns." Chakrabarti is a proponent of density. In the article Davidson goes on further to discuss Chakrabarti's ambitions of increasing density to reduce dependence on cars. "When I go to P.S.1, I get out of the subway-there are four lines converging there-and all I see is one-and two story buildings. There's way too much blue sky, declares Chakrabarti. But can a greener New York also be denser? A denser New York will certainly be a more profitable and efficient New York.

One can argue that New York City will shift its unquenchable thirst for progress not only for environmental purposes but to maintain competitiveness in the global economy. In their paper, *The Economics of Green Building,* Piet Eichholtz, Nils Kok, and John M. Quigley found that tenants enjoy lower utility bills and higher employee productivity. For investors, "Buildings with green ratings in 2009 command rental rates that are substantially higher than those of otherwise identical office buildings." Further they noted, "The selling prices of green buildings relative to comparable buildings nearby are higher by more than 13%." And finally they concluded that "small improvements in the sustainability of buildings can have large effects on energy efficiency in the economy (Eichholtz, Kok, and Quigley)."

If the resulting effects of development for economic purposes are the re-greening of Manhattan, than New York's citizens should be happy to live with that. The term gentrification

often has negative connotations. It leads to the displacement of citizens in the name of progress. If gentrification is in the name of environmental progress than its effect on the displaced populace is overshadowed by the celebration of climactic impact.

Economic growth through green building, a better solution

In this paper a brief history of New York's progress from ecological haven to financial and commerce center of the U.S. has been analyzed. One can conclude that New York has come a long way from destroying its environment in the name of progress to a focus on making the city green and livable. The public sector has been the steward of making New York greener and greater. However the next level of progress must come from the public sector. Government can do its part to initiate an environment for greening the city, but ultimately the public sector is required to innovate and make an industry sustainable and viable for the long term. Space is a good example. NASA has dominated the space program and now private industry is stepping in as the government is unable to sustain the incredible expenditures the space program requires. Greening New York City is much the same. PlaNYC is ambitious but it largely address only what the City is doing to impact the greening of New York rather than what we all can do.

We can do better

Popsci used U.S. Census Bureau and the National Geographic Society's Green Guide to score cities and see which are greenest. Popsci's model focused on 4 categories: electricity, transportation, green living, and recycling and green perspective. The categories were rated 0-10 with 10 being the highest and zero being the lowest. In this model, New York scored low in all but the transportation category (where it led the U.S. and received a perfect 10). Electricity came in at 2.8, green living 3.4, and recycling/perspective 2.0. Green living included the number of

green buildings in the city certified by the U.S. Green Building Council, as well as devoting areas for green space. Green living can be impacted by green buildings and green buildings also can affect the electricity by promoting renewable sources to power buildings. Further, recycling and perspective are naturally higher when people are living and working in green energy efficient buildings. According to an article by Brian Clark Howard in the Daily Green, *The Top 10 U.S. Cities with the Most Green Buildings* utilizes the EPA's Energy Star Program to candidates for his list. New York is not mentioned in the article. The article states that 30% of the $202.3 billion spent on energy by America's 4.8 million commercial and industrial buildings is wasted due to inefficient technology. Just a 10% reduction would be the equivalent of taking 30 million cars and trucks off the road!

Cushman & Wakefield released a study in 2010 titled, *Green Building Opportunity Index*. The study ranked the top 25 markets where the largest opportunity existed for green buildings. Of the top 25 markets, Midtown Manhattan was ranked third and Downtown was ranked 7. The study compared a specific market's relative position to its peers in six categories: office market conditions, investment outlook, green adoption and implementation, local mandates and incentives, and state energy initiatives and green culture. Uwe Brandes, Vice President of Initiatives at the Urban Land Institute had this to say about the index, "This index marries real estate economics with green design metrics and is a constructive next step in shedding light on the triple bottom line of sustainable development." When Cushman & Wakefield talk, industry drivers listen. Indices such as the Green Building Opportunity Index need to be part of an integrated educational endeavor the city must create within the green building space.

GreeNYC: public and private sector collaboration, private sector driven

Green building must present an opportunity not only for the cities but for the developers and would be at the forefront of my plan, *GreeNYC*. We learned in *The Economics of Green Building* that tenants have lower utility bills and higher productivity, while landlords command higher rents and sales prices are 13% higher. Another study reported by Chris Palmeri of Business Week in his article, Green Buildings: Fewer Sick Days, Higher Rents, certifies that green plays a major role in economics. The study conducted by the University of San Diego and CB Richard Ellis Group revealed 2.88 fewer sick days in a company's current green office over its prior non-green office space. In the same study, 55% of respondents indicated that productivity had increased. The impact of the fewer sick days translates to nearly $5 per foot per year. Productivity estimates were an additional $20 per foot. Also green buildings had a 3.5% lower vacancy rate. The study was based on a 154 buildings and 51.6 million square feet of space. Green buildings were defined as those with LEED or EPA Enegry Star certifications. Studies have proven that green buildings are more profitable. This also represents an opportunity to prevent developers and landlords with poor track records from participating in the profits. Developers such as Tommy Huang who have run up books of violations on safety, building codes, and have a poor reputation would be disallowed from any green project. In truth they should be disallowed from any project anyway, which leads me to an overhaul of the building department. Why not create a green building board which consists of private and public parties and hold green building standards to the highest? Only builders with strong track records and new builders who've completed substantial education on green building in either LEED certification or Energy Star certification should be allowed to build green New York.

Green building must be at the forefront of GreeNYC. Bike lanes and open space in the city are of definite importance, but ensuring that the cities structures are green is paramount. After all the superstructures of New York City are its new hills and will likely be here for decades or even centuries. Take for example the renderings of proposed high-tech campuses on Roosevelt Island by Stanford and Cornell. Cornell has proposed a building that would angle towards the sun's arc to capture solar energy (see Fig 10). Cornell estimates its model will generate up to 1.8 megawatts a day, which is enough energy to supply 1400 homes per day. Cornell's design also would generate thermal heat by creating 4 acres worth of thermal wells underground. Stanford's plan is less green-friendly.

Fig 10. Cornell's proposed campus rendering

Based on the logic in GreeNYC, requests for proposals would mandate all new buildings in the city meeting either LEED or Energy Star certification. Stanford would have to up its ante or Cornell would be awarded this coveted real estate.

While many green builders are opting out of LEED or Energy Star certification they are missing out on the competitive benefits the certification supplies. Even builder Tony Malkin balked at LEED certification during his $550 million retro-fit of the Empire State Building. But in the end he realized the benefit of having the certification. Now the 2.9 million square foot icon features better insulated windows and a new air-conditioning system, resulting in 38% less energy consumption. An additional by-product was LinkedIN leasing the entire 25th floor of New York's most famous office tower. LinkedIN wasn't just shopping for office space; the social networking site was shopping for LEED office space.

For New York to remain competitive economically and environmentally building green office space isn't a choice, it is a requirement. In developing GreeNYC, green buildings are a critical component of the plan.

Green Roofs – New York's new canopy

Enterprise Community Partners requires eight categories of standards to be met including: integrative design, location and neighborhood fabric, site improvements, water conservation, energy efficiency, materials beneficial to the environment, healthy living environment, operations and maintenance. Its criteria matches LEED certification ensuring the top green standards are used in building public housing. According to an article in the Economist titled, *The big green apple, environmentally sound homes for the poor are a model for everyone else*; an example of green public housing exists at Fox Point in the Bronx. The 47-

unit public housing project has a boiler-room with a micro-turbine system. The system captures otherwise-wasted heat re-generates electricity and heat. Examples like Fox Point allow green buildings to have lower operating costs after a slightly higher cost of construction (usually around 2%).

PlaNYC calls for the preservation and expansion of affordable housing, stating that only 64% of housing is affordable for median-income New Yorkers. One of the goals of PlaNYC is to "increase the sustainability of City-financed public housing". GreeNYC calls for privatization and greening of all public housing. All public housing would be constructed and managed by private industry and would meet Enterprise Community Partners green standards. The City could eliminate the expense of housing subsidies and replace them with green subsidies. Also it would generate extra cash flow by leasing City-owned land to private developers. The private developers would construct green public housing on the City-owned land or demo defunct structures and replace them with LEED, Energy Star, or Enterprise Energy certified buildings. Bloomberg is actually calling for Enterprise's standards to be met on housing, but the city is currently funding its construction costs. Another requirement in GreeNYC is a mandate of green roofs on all new public housing buildings, including Fox Point (see Fig. 11 and 12).

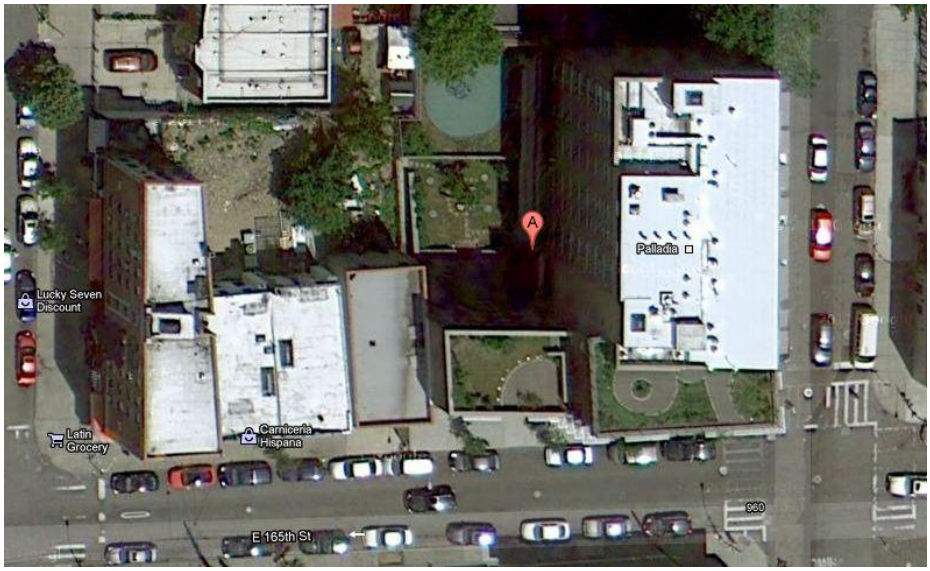

Fig. 11, Fox Point today (above)

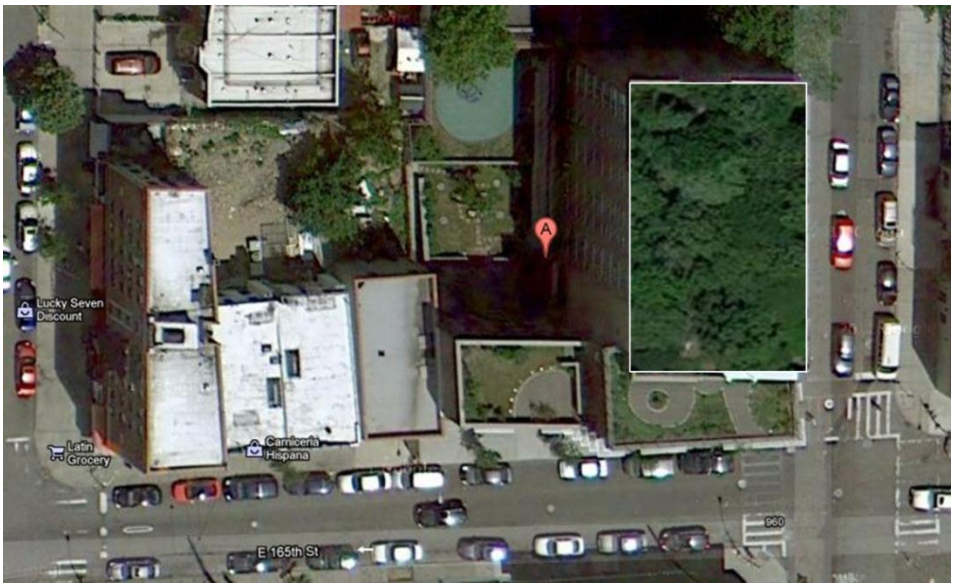

Fig. 12, Fox Point (with green roof)

Earlier James Farleu Post Office building was used as an example of what a green roof can accomplish: reduction of water runoff, lower utility costs, a reduction of the heat-island effect, and the creation of wildlife habitats. By creating places that foster wildlife, the city can do its part to return to the ecological paradise it was 400 years ago. GreeNYC would go a step

further and set a definitive timeline of 10 years, requiring all government buildings to have green roofs. This impressive conversion would create a lead-by-example effort by government agencies and likely foster competition for contracts and promote cost-compression.

Unfortunately the cost of building a green roof today is substantial. Because green roofs are relatively new, the environmental effects are difficult to quantify. When one compares the cost of a green roof to that of a normal tar roof on a building, the construction costs can appear prohibitive. In their paper, *The Cost of Green Roofs vs. Conventional Tar Roofs*, members of the Worcester Polytechnic Institute (WPI) discovered that the typical payback period based on today's costs is around 300-400 years. Their findings were based on a material and construction cost of $224 per square foot. Contrary data exists on Green-buildings.com where the cost was estimated at $25-100 per square foot. By those calculations the payback would be reduced to 30-200 years. However incentives put in place by the City of New York allow for roughly 25% of the cost to be offset by tax credits. In the WPI paper, the cost of replacing a conventional tar roof was not considered. Green roofs tend to be permanent as the protective membrane shields the roof from the elements which cause roofs to wear in the first place. Fortunately NYC.gov has real data we can harvest on green roofs. According to its site, the tax abatement and incentives add up to around $4.50 per square foot or 35% of actual cost of installing a green roof. This was corroborated by a blog titled, *Green Roof Tax Abatement* on City University's Institute for Sustainable Cities Blog.

The assumption is the cost of green roofs will decline over time just as solar panels, hybrid cars, and other green-friendly products and programs have. For the private sector, cool roofs could be a stepping stone to green roofs (white vs. black). However considering New York has nearly 945 billion square feet of roofs, a tremendous opportunity exists to create a new tree

canopy in the city, fostering ecological impacts beyond a reduction of energy. This economy-meets-ecology could have profound impacts on commerce by attracting more creative class workers to the city and an enormous generation of corporate good will. For example, a new species of bee was recently discovered in the Brooklyn Botanic Gardens as reported by Jessica Daily in the Inhabitat blog, "Officially – and appropriately! – named, "Lasioglossum gotham," the new insect is one of four new bee species discovered in the greater New York area." What if New York made the decision to officially transform the 945 billion square feet of roofs into a green environment? What if the new bee species was found on the roof of the loathsome Verizon building in Lower Manhattan instead of the Brooklyn Botanic Gardens? To remain a world capital, New York must become a sustainable city. LEED certified buildings and green roof mandates are one of them. Green roofs have limited maintenance and are just the source of goodwill that industries such as finance need to generate in the public eye.

The greening of New York in the private sector will happen only when it is economically beneficial. We've already discussed higher rents in green buildings, but the private sector must cope with the costs of construction. Will the landlord of a 4-floor walkup understand that replacing that black tar roof with a green roof save the next generation more money, and allow for them to increase rents? This quandary leads us to the biggest problem facing green industry: education. Only when people understand the benefit of green alternatives will it shift from taboo to reality. A hallmark of GreeNYC plan would be green education. Green education would cover both the private and public sector and classes pertaining to green roofs would offer high level education to property owners, developers, and decision makers in government. Education at the top would foster a collaborative environment which will popularize the use of green roofs in the practice. And while tax incentives exist, finding additional monetary encouragement is a

necessity to see significant growth in the number of green roofs. One idea is to allow the City of New York to issue green bonds. The bond issue would create a financing facility for property owners to easily qualify for financing a green roof over a 20-30 year term. The city could enforce the loans with property liens in event of default which would offer security to the bond holders. This financing facility could also spinoff as a Green Small Business Administration. How about the Green Business Administration? If green industry such as green roofing companies could receive favorable loan to go into business, the result will be green product alternatives. Proposals naturally need careful underwriting and ongoing audits (think Solyndra). Once this facility and the education programs are in place, the cost of construction would decline. With lower costs, financing and education programs in place, what reasons would prevent property owners from joining the movement? Let's go one step further. Assuming it takes half a decade to kick these programs off; the city should implement a tar tax. Smoking has dropped to record low levels in New York because it is simply too expensive to do so. Once a tar roof is more expensive than a green roof, tar roofs will fade into obscurity. By combining education, encouragement, and incentive, we can build a new canopy for New York and a greener, greater city.

Our Duty to the Island

Others will see the islands large and small,
Fifty years hence, others will see them as they cross,
The sun half an hour high,
A hundred years hence, or ever so many hundred
Years hence, others will see them,
Will enjoy the sunset, the pouring in of the flood-tide,
The falling back to the sea of the ebb-tide.
…..
Just as you feel when you look on the river and sky,
So I felt,
Just as any of you is one of a living crowd, I was one

Of a crowd

- Walt Whitman, *Crossing Brooklyn Ferry*

The above excerpt is from Walt Whitman's *Leaves of Grass* written in 1860. The poem is timeless and is recycled for Eric Sanderson's *Mannahatta* in the chapter named "Manhattan 2409". In order to maintain the timelessness of Whitman's work, we must preserve the very island that hosted it. Preservation of New York's history is paramount in the consideration of a greener and greater New York. Wouldn't it be cheaper to demo all the old buildings and build LEED and Energy Star structures in their place? Thankfully we have proponents of historical preservation. However building a greener, greater, and more competitive New York, is not only a natural next step in the city's progress, it is duty of the city's leadership and populace. Manhattan was once an ecological mecca, teeming with wildlife and biodiversity. It can become an ecological miracle and a modern wonder of the world for future generations to prosper and enjoy from. Green roofs and LEED or Energy Star certified buildings are a small step in the right direction. Data suggest that people feel better when working and living in green buildings. Green roofs foster bio-diversity, counter the heat-island affect, and create nature where steel and concrete dominate. When trees, bike lanes, and pedestrian friendly areas are added and cars removed, New York is more livable. Health is a priority of New York and creating a healthy environment is one way to impact the lives of those who call the city home.

Creating this environment will take collaboration on a monumental scale. Building a greener, greater, and more competitive New York, takes more than just building a new canopy, planting trees, and building green structures. To achieve a next generation New York, it will take every citizen doing his or her part. Each person must make conscious decisions to recycle, reuse, reduce their environmental impact, and preserve the beauty of this scion of western

civilization. In order to achieve this, GreeNYC culminates in 3 major programs developed for its populace: education, incentive, and sin taxes.

An educated populace who understands the city's stated goals and why the goals exist will do its part to help achieve them. Educational programs focused on conserving energy along with incentives to reduce consumption would foster participation among citizens of New York. If the average New Yorker could see understand the impact of energy efficient light bulbs and was given them as part of a green welcome kit whenever they moved, wouldn't use of such a bulb skyrocket? Currently less efficient bulbs are cheaper and many people don't understand the cost savings over a horizon. What about recycling? Could we provide incentives for those who recycle on a consistent basis? Trash reduction incentives could also be put in place. Dare we introduce a trash tax? This leads to larger questions such as, "Could we re-think packaging?" When environmentally-friendly product alternatives exist, traditional products in the market place could be treated with a sin tax, such as the successful campaign against smoking in the city. For example, people use disposable diapers because they are relatively cheap, easy, time-saving, and available anywhere. In reality they are deplorable for the environment, pile up in landfills, and cost thousands more than washable diapers in a child's lifetime. Could we create incentives where families who use washable diapers receive financial rebates in order to do so? How about a creating a diaper tax? If the city provided educational material to mothers showing the landfill impact of disposable diapers, this also might sway opinion. In doing so we could encourage hospitals and other massive polluters and other non-recycling institutions to recycle. Disposable but biodegradable must replace disposable alone.

Tree planting must be more aggressive. We've discussed building a new canopy on top of buildings with green roofs. Nearly 20% of Manhattan is sidewalk and street. Nearly 20% is

an astonishing amount of space being underutilized. Bloomberg's one million tree goal is laughable. In Memphis, Tennessee the city's largest green space, Shelby Farms is planting one million trees. If a city of 600,000 can plant one million trees shouldn't a city of 8.4 million do better? Granted the park in Memphis is 4500 acres versus Central Park's 843 acres. But with all of the concrete available, an opportunity exists to make New York much greener. What if the city built 10 million or 100 million trees? I believe this is doable. A tree might cost $80-200. The city could easily convert its army of citizens to tree planters. New Yorkers could leverage the pride in their neighborhood or block and buy a tree wholesale and plant it. In exchange the city could sponsor tree planting days where block leaders and city workers could coordinate planting efforts. For a $100 cost to a New Yorker, they could plant a tree on their block and a plaque could be installed on that tree commemorating that New Yorker. A tree-planting effort of this scale would be monumental. I would gladly plant multiple trees on my old block of Irving Place and 17th street near Washington Irving High School. Currently it is large non-green government structure. Irving is a beautiful street but would be more beautiful if it were filled with trees. With the planting of 100 million trees come more birds, more nature, and a reduction of the heat-island effect. This volume of trees would no doubt reduce cars. To properly allow space, additional car lanes would need to be removed and replaced with bike lanes. Squares are a great place to start and car lanes could be removed entirely from places like Madison Square, Times Square, Union Square, and others. The busy (and loud) north and south avenues could have a 50% reduction in cars through lane removals, higher commuter taxes, and moratoriums on new parking construction in Manhattan and Downtown Brooklyn.

The citizens of New York must be able to live, walk, and breath clean air. The mayor's plan calls for every citizen to be 10 blocks from a park. What if citizens were 10 steps from a

tree? New York can be denser in population but it must be denser in green space and trees. A green New York will counter pollution in the city and further reduce carbon emissions. More importantly the air will be clean to breath allowing New Yorkers to enjoy their city. Animals too will enjoy the greener New York. It is no coincidence that the beaver returned to New York in 2007 after a 200 year absence.

Food will also be essential in the next generation New York. The city's promotion of Green markets is already having a profound effect. What if builders could get exemptions for tar roof taxes if they were creating gardens for growing food? The gardens could be for the tenants or the roof could be cash rented to farmers who are experts in growing vegetables to feed the city. On green roofs additional water runoff could be collected and recycled for drinking water. Another exception to the tar tax could be wind power generating turbines that would harness energy to be sold back to the city's grid.

With regards to transit, the city is pushing forward with the 7 train extension and the 2nd Avenue T train construction. The latter will relieve capacity issues on the 4, 5, 6 train which is at capacity. However the other lines have excess capacity. Congestion taxes should continue to rise to promote the use of the excess capacity that trains carry. This could be especially commodious in Brooklyn and Queens where stops exist near low rise buildings. Developers could co-op with the public sector to foster population growth abutting transit in these areas. Eric Sanderson recommends trolleys in Mannahatta as a cheaper alternative to additional subways, light rail, or highways. I agree with him. Streetcars cost $12-15 million per mile, light rail $30-50 million, subways $150-200 million, and highways, up to $1 billion per mile. Why not blanket the city with streetcars on the major avenues and create several new cross town routes? The subway only exists east west on 42nd and 14th. This could be the perfect opportunity

to create a street car on Canal, Houston, St. Marks – 8th St, 23rd, 34th, 57th and so on. The outer north south avenues such as 1st and 10th could also benefit and dare I suggest 5th Avenue? Streetcars could also be very useful in the boroughs as well.

GreeNYC is a course of action for the populace. It is a plan to shield New York's history of icon building and bring New York City back to human scale city with broad participation in making it more livable and competitive. Is New York's progress just the result of current leadership, happenstance, or is there a deeper nexus of New York's progressive nature and its past? One could dispute that if the communities of Greater New York didn't consolidate, New York City would be still fixating on issues that innumerable other US cities face. While other cities are engaging crime, New York is upholding its prestige as a safe big city. Others declare that the drop in crime was cyclical and the outcome of having 10,000 more officers on the street than the city had in the early 1990's. The recent article, *Police Commissioner Ray thinks budget cuts could turn back time to 1990 in NYPD* in the Daily News states the number of officers is set to drop to 32,817 (Colangelo). That number is the lowest since 1990 when the city was plagued with crime.

In the face of budget cuts, New York is focused on prolong the lives of its citizens now through health campaigns, green building, and erecting interesting public spaces. Further, the engineering triumphs that were executed by people who built the infrastructure for this vertical city were only achieved through a marriage of public and private efforts. Most cities will probably be focused on green issues in the future, but as O. Henry said, New York is doing it first. With some cities having a past but few having the history New York does, the city 'should' be a leader. The city should be as close to a utopia as we have in America. With the world being more competitive than ever, new financial capitals are challenging New York's position.

London, Hong Kong, Dubai, Mumbai, and Sao Paulo are courting geopolitical power. New York no longer has an option to be the forward-looking and dynamic metropolis it has been. It must be.

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