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**Committee on Environmental Protection**

Hon. Costa Constantinides, Chair

**November 25, 2019**

**Oversight - Effectively utilizing water resources for energy**

**generation, safety and conservation**

**Int. No. 417:** By Council Members Cohen and Yeger

**Title:** A Local Law to amend the administrative code of the city of New York, in relation to incentivizing water leak reporting

**Administrative Code:** Amends section 24-316

**Int. No. 419:** By Council Member Constantinides

**Title:** A Local Law to amend the administrative code of the city of New York, in relation to generating, capturing and utilizing energy from city’s water supply, wastewater treatment systems and natural bodies of water

**Administrative Code:** Amends subdivision d of section 24-366

**Int. No. 834:** By Council Member Constantinides

**Title:** A Local Law to amend the administrative code of the city of New York, in relation to use of potable water hoses in all department of environmental protection capital projects

**Administrative Code:** Amends section 24-305

**Int. No. 1182:** By Council Members Constantinides, Brannan, and Ampry-Samuel

**Title:** A Local Law to amend the administrative code of the city of New York in relation to identifying all vacant and underutilized municipally-owned sites that would be suitable for the development of renewable energy and assessing the renewable-energy generation potential and feasibility of such sites

**Administrative Code:** Amends chapter 8 of title 24 by adding a new section 24-806

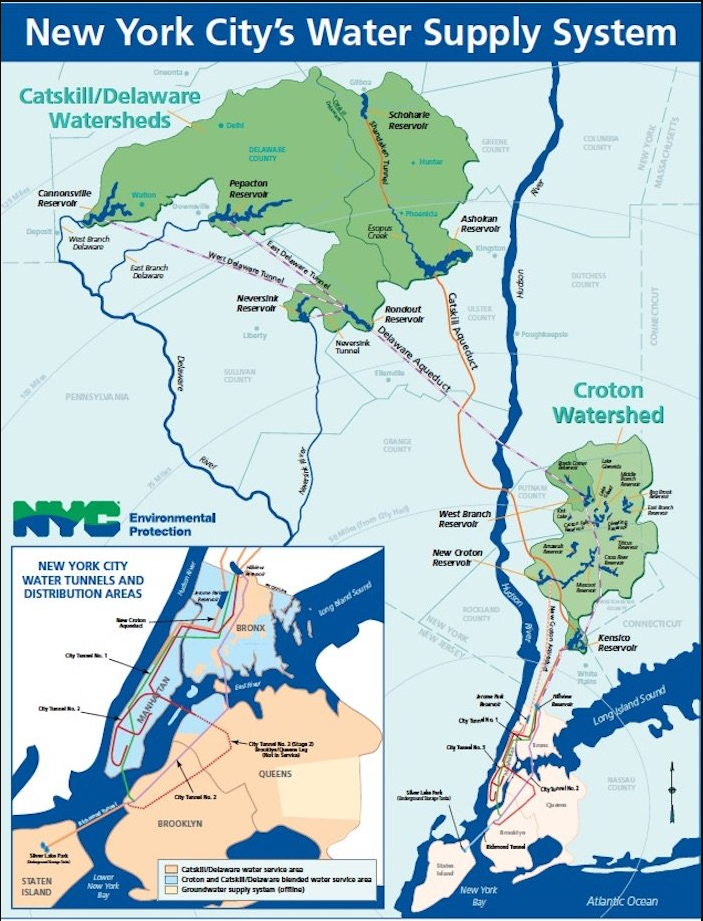
1. **Introduction**

On November 25, 2019, the Committee on Environmental Protection, chaired by Council Member Costa Constantinides, will hold a hearing on Int. No. 417, in relation to incentivizing water leak reporting, Int. No. 419, in relation to generating, capturing, and utilizing energy from the city’s water supply, Int. No. 834, in relation to the use of potable water hoses in all department of environmental protection capital projects, and Int. No. 1182, in relation to identifying all vacant and underutilized municipally-owned sites that would be suitable for the development of renewable energy and assessing the renewable-energy generation potential and feasibility of such sites. The Committee expects to receive testimony from the New York City (NYC) Department of Environmental Protection (DEP), environmental advocates and interested members of the public.

1. **New York City’s Potable Water Infrastructure**

New York City’s drinking water infrastructure comprises 19 reservoirs and three controlled lakes across a 2,000 mile watershed.[[1]](#footnote-1) These resources are located across the Hudson Valley and Catskill Mountains,[[2]](#footnote-2) which are as far as 125 miles north of the city, and convey approximately 1 billion gallons of water a day to New York City residents and over 1 million gallons a day to parts of Westchester, Putnam, Orange, and Ulster Counties.[[3]](#footnote-3) The system is gravity-fed and conveyed to residents via a network of 7,000 miles of mains, tunnels and aqueducts, some of which date back to the 1870s.[[4]](#footnote-4) Water is stored at the Hillview Reservoir in Yonkers, New York, before being sent via three large conveyance tunnels that feed the smaller series of pipes and mains that distribute water throughout the five boroughs.[[5]](#footnote-5) Water Tunnel No. 1 was completed in 1917.[[6]](#footnote-6) From the Hillview Reservoir, it runs under central Bronx, the Harlem River, down the island of Manhattan, and under the East River, where it connects to Water Tunnel No. 2. Tunnel No. 2 was completed in 1935, and runs from the Hillview Reservoir, under the Bronx, the East River, Western Queens, and Brooklyn, where it meets Tunnel 1, and the Richmond Tunnel to Staten Island.[[7]](#footnote-7) Construction on Water Tunnel No. 3 began in 1970, and was broken into phases, with major portions completed in 1998, 2001, and 2008.[[8]](#footnote-8) Construction is expected to be complete in 2020.[[9]](#footnote-9) Once complete, it will allow for inspections and repairs to be initiated on Tunnels 1 and 2.[[10]](#footnote-10) Other necessary repairs include addressing portions of the Delaware Aqueduct that have been leaking 10 to 36 million gallons of water daily, depending on the water level in the aqueduct.[[11]](#footnote-11) This leak was discovered in the late 1980s.[[12]](#footnote-12)

Since the Hillview Reservoir is approximately 300 feet above sea level, a number of valves and regulators are required to dispel excess pressure in order to prevent and reduce the likelihood of pressure spikes causing leaks or damaging mains.[[13]](#footnote-13) Currently, the excess energy from the water pressure is released as heat,[[14]](#footnote-14) but a number of technologies now exist that allow for excess water pressure to be converted into electricity.[[15]](#footnote-15) Upcoming repairs to New York City’s extensive water supply infrastructure present an opportunity to examine the feasibility of incorporating in-conduit generation technology into the city’s municipal water delivery system.

Figure 1: New York City’s Water Supply System[[16]](#footnote-16)

1. **New York City’s Wastewater Infrastructure**

New York City’s wastewater system comprises 7,500 miles of sanitary, storm, and combined sewer lines that handle approximately 1 billion gallons of wastewater on a dry day, with the capacity to treat twice that during inclement weather events.[[17]](#footnote-17) The wastewater is treated at 14 facilities across the five boroughs, where solids are mechanically removed, excess nutrients metabolized through biological processes, and pathogens eliminated through chemical processes before the treated water is discharged into local waterways.[[18]](#footnote-18)

1. **WATER LEAKS AND SERVICE LINES**

There are at least 836,000 service lines connecting individual buildings to New York City’s municipal water infrastructure.[[19]](#footnote-19) According to the United States Environmental Protection Agency (EPA), approximately 12 percent of the water used in the United States annually is lost to leakage.[[20]](#footnote-20) In New York City, residents are responsible for maintaining their water and sewer service lines, which are located underground and run between the buildings and the city owned mains. On average, it costs New York City property owners between $3,000 and $5,000 to repair water line breaks and between $10,000 and $15,000 to repair sewer line breaks.[[21]](#footnote-21) DEP promotes the American Water Resources as a preferred vendor for service line protection plans,[[22]](#footnote-22) but concerns have been raised about what American Water Resources covers as part of their protection plan, and what is not covered.[[23]](#footnote-23) According to American Water Resources’ terms of service, the company will not cover anything they deem to have happened before the effective service date, anything not the result of normal wear and tear, and a number of other disqualifying circumstances.[[24]](#footnote-24) The expanse scope of the potential grounds for denial have led some to question the actual utility of the protection plan, with some New Jersey customers even going so far as to seek the certification of a class for a class action lawsuit, with claims of breach of contract and fraud.[[25]](#footnote-25)

1. **Opportunities For Energy Reclamation From NYC’s Water Infrastructure**

Harnessing energy from water is one of the oldest ways that humans have produced power.[[26]](#footnote-26) Energy that results from water flows with significant force, or that falls from a high elevation to a lower one, can be harnessed for electrical generation.[[27]](#footnote-27) Additionally, municipal water treatment processes and water distribution infrastructure present a variety of opportunities for energy reclamation and generation.

New York City currently has one wastewater treatment plant equipped with anaerobic digesters to harvest methane gas from bio-solids collected from the sewage treatment process.[[28]](#footnote-28) The Newtown Creek Wastewater Treatment Facility has biogas digesters that turn sewage sludge, food waste, and organic waste into pipeline quality methane gas.[[29]](#footnote-29) The facility produces enough methane to heat 5,000 area homes, with the added benefit of keeping organic waste out of landfills.[[30]](#footnote-30)

Another means of energy reclamation from wastewater infrastructure involves the removal and storage of heat energy for use in heat exchange based climate control systems.[[31]](#footnote-31) This technology can be scaled for individual home use, or implemented on the municipal/district scale, and can be used to extract and store both heat and cool energy.[[32]](#footnote-32) Connecting heat exchange pumps with thermal storage devices can result in a portion of the energy required for a building or district’s needs to be reclaimed from wastewater infrastructure, thereby reducing the amount of any additional energy that would be required to bring an interior space to a desired temperature.[[33]](#footnote-33) For example, a district wastewater heat reclamation system in Vancouver, Canada that provides sufficient heating to address the needs of 60 townhomes, with similar projects being implemented in conjunction with Tokyo’s Ochiai wastewater treatment plant, and others throughout Europe.[[34]](#footnote-34)

Hydroelectric power generation is promoted as a reliable means of carbon neutral energy generation.[[35]](#footnote-35) Advocates point out that due to its consistent nature, it can supply a stream of power on-demand,[[36]](#footnote-36) unlike solar- and wind-based generation technologies that require battery storage to address differences in peak production times, peak usage times, and periods when power is not being generated.[[37]](#footnote-37)

Evidence suggests, however, that traditional hydropower’s reputation as carbon neutral or emissions free is misleading.[[38]](#footnote-38) The flooding of terrestrial habitats for the construction of dams and reservoirs leads to the release of carbon dioxide, methane, and nitrous oxide that would otherwise remain sequestered in the soil, [[39]](#footnote-39) and causes significant degradation and alteration of riparian habitats and loss of terrestrial habitats, resulting in negative habitat consequences for animals that rely on those ecosystems for survival.[[40]](#footnote-40) In-conduit hydropower enables municipalities to reap the benefits of hydropower while avoiding the worst of its environmental impacts by utilizing existing water conduits, such as tunnels, canals, pipelines, aqueducts, flumes, ditches, or similar means of conveyance, for hydroelectric generation.[[41]](#footnote-41) Extracting energy from water that has previously been diverted from natural resources produces negligible additional environmental impacts.[[42]](#footnote-42) When retrofitting generating turbines into existing water distribution lines, in many cases, construction takes place entirely within existing buildings.[[43]](#footnote-43)

Placing generation turbines into a municipal potable water infrastructure also enables additional value to be extracted from necessary functions that must be included for the long term safety and reliability of the system. Excess pressure from New York City’s gravity fed water supply system must be properly dissipated in order to keep it from damaging the network of pipes and mains,[[44]](#footnote-44) but the pressure reducing valves currently used to accomplish this task simply dissipate this excess energy as heat.[[45]](#footnote-45) In-conduit turbines convert that excess pressure into electricity that can be fed back into the grid, or used to offset part of the electrical load for the municipal facilities.[[46]](#footnote-46) While comprehensive studies of potential for in-conduit hydropower at the national level are lacking, the United States Department of Energy has estimated that 2,000 megawatts of power, approximately equivalent to the Hoover Dam’s generating capacity, could be generated from conduit hydropower across the United States.[[47]](#footnote-47)

In-conduit generation technology is mature, with a number of plug and play options already on the market, with proven track record of use in other municipalities.[[48]](#footnote-48) Portland, Oregon began installing in conduit turbines manufactured by Lucid Energy in 2015, and has expanded the program to 50 pipes, generating approximately 1,100 megawatt hours annually, enough to power 110 homes.[[49]](#footnote-49) Similar projects exist in Hawaii, Utah, Nova Scotia, and in Europe, in both water supply and wastewater infrastructure.[[50]](#footnote-50) The installation of in conduit turbines at the Keene Water Treatment Plant in Cheshire County New Hampshire has enabled it to become the first energy neutral water treatment plant in the United States.[[51]](#footnote-51)

1. **Potable Water Hoses**

Potable water hoses are hoses that have been designed to standards meant to reduce the likelihood of contamination of the water that they convey, thus ensuring that the water is safe for consumption.[[52]](#footnote-52) Hoses not designed for use with potable water can sometimes leach heavy metals, neurotoxins and endocrine disruptors into the water they convey.[[53]](#footnote-53) Hose fittings are often made of brass, which can contain up to 8% lead, and there are no regulations pertaining to acceptable bisphenol A levels in hoses not specifically designed for use with potable water.[[54]](#footnote-54) An Eco Center study of hoses labeled drinking water safe compared to those that were not so labeled, found those manufactured to drinking water standards had low levels of contaminant leaching, and were free of significant lead, bromine, antimony, and tin contamination.[[55]](#footnote-55) Hoses that were not manufactured for use with drinking water were often found to contain elevated levels of lead, bromine, antimony, and phthalates.[[56]](#footnote-56) Seven of 24 PVC hoses tested were found to contain lead levels ranging from 100ppm to 68,000ppm. Hoses that were not manufactured for drinking water use were also often found to contain recycled PVC e-waste, as evidenced by the presence of flame-retardants, lead, tin, and phthalates.[[57]](#footnote-57) These contaminants were not found in any significant quantities in hoses that had been manufactured for use with drinking water.[[58]](#footnote-58)

1. **City Owned Property and Renewable Energy Generation**

According to the Living Lots project, a community gardens advocacy group, there are currently 930 acres of vacant public land on 1,304 individual properties across the five boroughs.[[59]](#footnote-59) According to the United States National Renewable Energy Laboratory, a large fixed-tilt photovoltaic solar power plant that produces 1,000 megawatt-hours per year requires, on average, 2.8 acres for the solar panels,[[60]](#footnote-60) while small single-axis photovoltaic systems require an average 2.9 acres per 1,000 megawatt-hours.[[61]](#footnote-61) This figure increases to 3.8 acres when considering the spacing requirements of the photovoltaic arrays.[[62]](#footnote-62)

According to the United States Department of Energy’s Office of Energy Efficiency and Renewable Energy, small wind turbines are ideal for use in areas where tall buildings potentially obstruct wind flow, for sites of 1 acre or larger.[[63]](#footnote-63) Turbines suited for small applications range in size from 400 watts to 100kw, and a typical 2kw wind turbine operates at a noise level of approximate 55dB at 50 feet away. At this level, it requires a conscious effort to isolate the sound from ambient noise under most conditions.[[64]](#footnote-64)

Considering the potential for local variability in site suitability across the city, a comprehensive assessment of generation potential of vacant and underutilized municipally owned sites would provide necessary context in assessing generation capacity under real world conditions.

1. **Legislation**

**Int. No. 417**

Int. No. 417 would grant the Commissioner of DEP discretionary authority to offer rewards to the public for reporting water leaks in taps or service pipes. This local law would take effect 120 days after it becomes law, except that the commissioner of environmental protection shall take all actions necessary for its implementation, including the promulgation of rules, prior to such effective date.

**Int. No. 419**

Int. No. 419 would require that future construction, upgrading, or maintenance of the city's in-city water supply system infrastructure include an evaluation of whether underground vaults, internal drops, or high pressure pipes exist that can accommodate the construction or installation of a hydroelectric power project and if such installation can be done when the department is undertaking a water supply infrastructure improvement, then it shall be undertaken to capture and use the electricity either on site or through connection to the grid. This local law would take effect immediately.

**Int. No. 834**

Int. No. 834 would mandate that DEP capital projects, including repair activities, use potable water hoses. This local law would take effect immediately.

**Int. No. 1182**

Int. No. 1182 would require the DEP to review the opportunities to generate solar or wind energy from vacant and underutilized sites including closed and capped landfills and brownfields. This local law would also require that the DEP undertake a feasibility study, including a cost benefit analysis. If there are no recommendations made with respect to the opportunities to generate solar or wind energy from vacant and underutilized sites the DEP would be required to undertake another study in three years to examine this issue again and ascertain whether generation of solar or wind energy from vacant and underutilized sites including closed and capped landfills and brownfields in New York City is more feasible at that time. This local law would take effect immediately.

Int. No. 417

By Council Member Cohen

..Title

A Local Law to amend the administrative code of the city of New York, in relation to incentivizing water leak reporting

..Body

Be it enacted by the Council as follows:

Section 1. Section 24-316 of chapter 3 of title 24 of the administrative code of the city of New York is amended to read as follows:

§ 24-316. Leaking tap or service pipe to be repaired; rewards.

a. As used in this section:

1. “tap” means a connection made between a city-owned pipe or main supplying water and a service pipe.

2. “service pipe” means a pipe used to carry water from a tap to a house control valve, a building or other enclosure or a point at which the water supply is fully metered.

b. When a test made by the department of environmental protection indicates that there is a leak at a tap or in a service pipe, if conditions permit, a notice shall be served by a representative of such department upon the owner or occupant of the premises being supplied by such tap or service pipe. The notice shall direct that all necessary repairs be made to stop the leak.

c. In the event that a tap is shut off by the department because of a leak, the owner or occupant of the affected premises shall be notified that the tap has been closed and that a licensed plumber should be engaged to make the necessary repair and take charge of the street excavation. If the owner or occupant fails within three days after notice, excepting emergencies as determined by the commissioner to engage a licensed plumber, the tap shall remain closed and the department of environmental protection shall backfill the excavation.

d. The commissioner of environmental protection may offer rewards to any person who provides information to the department that leads to the test and detection of a leaking tap or service pipe pursuant to this section. No such reward may exceed $1,000. Such rewards may be offered only if there exists an unexpended appropriation therefor.

§ 2. This local law takes effect 120 days after it becomes law, except that the commissioner of environmental protection shall take all actions necessary for its implementation, including the promulgation of rules, prior to such effective date.

ARP

LS 5505/Int 1246-2016

1/31/18 3:20PM

Int. No. 419

By Council Member Constantinides

..Title

A Local Law to amend the administrative code of the city of New York, in relation to generating, capturing and utilizing energy from city’s water supply, wastewater treatment systems and natural bodies of water

..Body

Be it enacted by the Council as follows:

Section 1. Subdivision d of section 24-366 of the administrative code of the city of New York, as added by local law number 24 for the year 2012, is amended to read as follows:

d. [The] A resource assessment, technological review and economic analysis shall be completed [within eighteen months of the effective date of the local law that added this section] by December 1, 2012, and by December 31 in every tenth year thereafter, and shall be submitted to the mayor and the speaker of the council.

§ 2. Section 24-366 of the administrative code of the city of New York is amended by adding a new subdivision e to read as follows:

e. For each site identified in a resource assessment developed after December 1, 2012 where the department determines that generating electricity would be economically viable and would not negatively impact the safety of drinking water, the department shall promptly undertake appropriate measures to generate, capture and utilize energy from such site through the use of turbines or other equipment, provided that such turbine or other equipment is certified safe for drinking water in accordance with National Sanitation Foundation (NSF) standard 61 or 372 or a standard developed or adopted by the department, except that the department may elect to undertake such measures when undertaking an improvement or substantial repair at such site.

§ 3. This local law shall take effect immediately.

SS / BM

Int. 1674-2017 / LS 4497

LS# 136

1/5/2018 2:54PM

Int. No. 834

By Council Member Constantinides

..Title

A Local Law to amend the administrative code of the city of New York, in relation to use of potable water hoses in all department of environmental protection capital projects

..Body

Be it enacted by the Council as follows:

Section 1. Section 24-305 of the administrative code of the city of New York is amended to read as follows:

§ 24-305 Pollution of or interference with water supply. a. It shall be unlawful, within the city, to bathe in or go into the water of any water supply reservoir or any part of a city aqueduct, or to throw stones, chips or dirt or any other material or substance whatever into any gate-house, ventilator, fountain or basin. It shall also be unlawful to injure or disfigure any part of the water works system of the city.

b. All department of environmental protection capital projects must use potable water hoses. Temporary water service lines to customers during main repair activities must be disinfected prior to use. Such potable water hoses shall meet the NSF/ANSI 61 certification for potable water use.

§ 3. This local law takes effect immediately.

SS LS 4,593

3/14/18 4:59PM

Int. No. 1182

By Council Member Constantinides

..Title

A Local Law to amend the administrative code of the city of New York in relation to identifying all vacant and underutilized municipally-owned sites that would be suitable for the development of renewable energy and assessing the renewable-energy generation potential and feasibility of such sites.

..Body

Be it enacted by the Council as follows:

Section 1. Chapter 8 of title 24 of the administrative code is amended by adding a new section 24-806.1 to read as follows:

§ 24-806.1 Renewable energy generation on vacant city-owned lots. On or before December 31, 2019, and every three years thereafter, the department shall submit to the mayor and council a report identifying all vacant and underutilized municipally-owned sites that would be suitable for the development of renewable energy. Such report must contain an assessment of the feasibility of renewable energy generation, including a cost-benefit analysis of solar or wind energy generation on such sites, including consideration of all vacant and underutilized municipally-owned sites, closed- and capped-solid waste landfills and brownfields. A draft of such study shall be submitted to the mayor and the speaker of the council no less than ninety days before the submission of the final report. In the event that the study concludes that no greater use may be made from vacant and underutilized sites, including closed and capped landfills and brownfields the department shall explain its reasons therefor. For every report for which there are no recommendations made with respect to the opportunities to generate solar or wind energy from vacant and underutilized sites including closed and capped landfills and brownfields in New York City, the department shall undertake another study in three years to examine this issue again and ascertain whether generation of solar or wind energy from vacant and underutilized sites, including closed and capped landfills and brownfields in New York City is more feasible at that time.

§2. This local law shall take effect immediately.

LS # 1643 SS

October 13, 2018 11:06 a.m.

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