

Stop the Blocks: Unclogging NYC Sewers

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ENVIRONMENTAL PROTECTION (DEP)

MARCH 26, 2018

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I. Executive Summary

You tasked us with investigating the policy issue “How can DEP reduce clogs in New York City (NYC) sewers caused by inappropriate residential materials?” We presented our findings to you in a briefing on Tuesday February 27, 2018.

Recommendation

We recommend that DEP implement a media campaign as it will bring awareness and visibility to all of NYC regarding the need to reduce clogs in NYC sewers. To carry out this recommendation, we suggest that DEP contact Outfront Media as it is the primary advertisement agency for the Metropolitan Transit Authority. Implementing this alternative will bring awareness to 8.2 million New Yorkers through subway and bus advertisements.¹As we mentioned, the London regional campaign, ‘*Bin it, don’t block it*’ saw a 26% reduction in sewer blockages.² The Northumbrian regional campaign, ‘*Love your Drain*’, attained a 46% net reduction in blockages³.

During our briefing, you asked questions concerning labels on wipes packages and signage in bathrooms. We also promised to address your request for clarification on legislative versus litigation strategies and information about how to influence the way wipes packages are labeled – see “Questions That Arose During the Briefing” on page 2.

Our Approach

We began by identifying the key challenges DEP faces in its efforts to encourage residents not to flush materials outside the Four P’s-- *Pee, Poop, Puke, and Toilet Paper*. Inappropriate residential materials include: wipes, fat, oil, and grease (FOG), condoms, feminine hygiene products, pharmaceuticals, paper towels, cigarettes, cotton swabs, and syringes. We developed alternatives that should divert inappropriate residential materials from NYC’s sewer system. Then we established a set of criteria to assess each alternative and determine their viability as a solution to the problem.

Criteria

1. **Maximize Feasibility:** Ease of implementation, stakeholder buy-in, and level of coordination required across stakeholders. Each strategy is scored High (2 or less stakeholders), Medium (3 to 5 stakeholders), or Low (More than 5 stakeholders). For example, the Media Campaign requires only DEP buy-in as no other stakeholder is required to implement the alternative therefore it would score a High.
2. **Maximize Reach to NYC Residents:** Expected number of NYC residents that can be influenced by each of the alternatives. Each alternative is measured by the absolute number of residents influenced. This is used as a proxy for effectiveness.
3. **Maximize Durability:** Number of necessary modifications over time. Each solution is scored High (requires little to no modifications), Medium (requires some modifications), or Low (requires significant modifications).

¹ The MTA Network, Accessed March 14, 2018, Retrieved from <http://web.mta.info/mta/network.htm#statsnyc>

² “Reducing Blocked Pipes by Reversing Ingrained Habits.” *Thames Water Case Study*, 23red, 2016. www.23red.com/thames/

³ “Dwayne Pipe / Love Your Drain Campaign.” *The Masters of Marketing Awards 2018*, Festival of Marketing, 2018. www.festivalofmarketing.com/book-of-the-night-2017/dwayne-pipe-love-your-drain-campaign.

Alternatives

1. **Education Campaign** for children as it creates awareness and develops civic responsibility at an early age. This alternative aims to address the issue within the context of children, families, and schools.
2. **Legal Action** is divided into two parts, litigation and legislative. Litigation refers to lawsuits brought against wipes manufacturers by individual consumers or water treatment plants. Legislative action refers to efforts from local legislatures to enact laws changing package labeling and/or prohibiting the sale of wipes that are labeled flushable and/or sewer/septic safe.⁴
3. **Media Campaign** aims to increase awareness and visibility of the issue to all of NYC residents.

Questions That Arose During the Briefing

These were some questions that came up during the briefing:

How do you categorize stakeholder “buy-in”? What level of approval is needed from those who support the measure versus oppositional “push back”? Is there a difference between the two and does it matter?

When measuring the level of feasibility, stakeholder buy-in considers the total amount of parties involved in the action. The total number is the sum of both the number of parties from which approval is needed and the number of oppositional parties expected to push back. The difference between the two is the strength of individual parties and how much influence they have on the implementation of the recommendation. We debated this concept internally and realize that it is difficult to put too much quantitative analysis forward here, but we think it is important to consider and one cannot go through the decision process without taking these factors into consideration.

How would you develop a curriculum on the appropriate disposal of non-recyclable residential waste habits for children? Would this be included in a general sustainability module, or is this a standalone? Why or why not?

The target population for this education campaign includes children during their early childhood – between one and eight years old. This is based on the Early Childhood Environmental Education (ECEE) approach⁵ which considers children as citizens that can contribute not only in the future, but also in the present to a more sustainable society. ECEE develops research with the main objective of training children to take part in sustainable development and understand sustainable development as an equilibrium between environment, economy, and society. Considering that the entrance of wipes and other inappropriate materials to the sewer system has consequences not only on the infrastructure, but also on public health and the environment of the city, ECEE’s approach can provide a framework to develop a successful education campaign for children.

One of the possible actions to pursue is incorporating the contents of flushable and drainable elements campaign in the formal school curriculum or after-school programs. The inclusion of interactive material can be accomplished by the development of an interdisciplinary approach where environmental education could complement other class subjects such as language arts, math, or science. This approach brings environmental education into the school curriculum by enriching other classes. For more information, see Alternative 1 on page 12.

⁴ The issue of litigation versus legislative action came up during our briefing.

⁵ UNESCO, “The Contribution of Early Childhood Education to a Sustainable Society”, 2008

Can a distinction be made between legislation and litigation? What is that, and which is more effective?

The distinction between legislation and litigation is an important one to make. Legislative action is pursued by local legislatures to enact laws that will change package labeling and/or prohibit the sale of wipes that are labeled flushable or sewer/septic safe. A change in the law would give lawmakers more leverage in holding manufacturers accountable when their products, primarily wipes, clog city sewer systems. To date, Washington, DC is the only location where legislation has been successfully passed, but not yet implemented. A more detailed discussion on this action can be found in the section labeled Alternative 2, Legal Action on page 19. Litigation refers to lawsuits brought against wipes manufacturers by individual consumers or wastewater treatment plants.

Litigation is often initiated by the consumer and focuses on the false advertising claims made by manufacturers. Litigation is effective when dealing with single manufacturers and can cause that company to change a practice, however to date no litigation effort has affected the whole industry. Litigation is the more effective means of enacting change since lobby groups backed by the wipes industry make legislation difficult to enact. For more information, see Alternative 2 on page 18.

II. Introduction

Central Policy Issue

How can DEP reduce clogs in New York City sewers caused by inappropriate residential materials?

When residents of New York City flush inappropriate materials down the toilet, they cause blockages in sewer systems and at Wastewater Treatment Plants (WWTPs). These inappropriate materials are not dissolvable. Blockages in sewers and debris caught in a WWTP's machinery can be reduced by New Yorkers only flushing the Four P's-- *Pee, Poop, Puke & Toilet Paper*. Inappropriate residential materials include: wipes, fat, oil, and grease (FOG), condoms, feminine hygiene products, pharmaceuticals, paper towels, cigarettes, cotton swabs, and syringes. All of the listed materials have been identified by DEP as items causing sewer blockages throughout the City.

In the past 10 years, wipes sales have increased on a global level. It is speculated that the evolution of peoples' sensibilities and aggressive industry marketing fueled the product's rise.⁶ The issue surrounding wipes is not the increase in sales, it is the labeling, marketing, and promulgation of these items as "flushable" -- something that is currently contested by wastewater officials, municipalities, and the wipes industry who set their own testing guidelines without the input of wastewater utility professionals⁷.

Once they enter the sewer, wipes combine with congealed FOG and other inappropriate residential materials to create a mass called a fatberg, which in time leads to massive sewer clogs. Fatbergs are quickly becoming a global epidemic caused by inappropriate residential materials that are disposed of by residents into local sewer systems. In 2013, London had a fatberg that weighed more than 140 tons and was declared the biggest example of a fatberg in British history.⁸ The lack of awareness about this issue is creating potential points of failure within city sewers and WWTPs worldwide.

Department of Environmental Protection Background and Policy Environment

⁶ Wet Wipes Box Says Flush. New York Sewer System Says Don't. (2015, March 13) Retrieved from <https://www.nytimes.com/2015/03/15/nyregion/the-wet-wipes-box-says-flush-but-the-new-york-city-sewer-system-says-dont.html>

⁷ Nonwoven Disposable Products- Advertising and Labeling. (2017, March 15) Retrieved from <http://www.nacwa.org/docs/default-source/resources---public/2017-03-15mdemtest.pdf?sfvrsn=4>

⁸ Wet Wipes Box Says Flush. New York Sewer System Says Don't. (2015, March 13) Retrieved from <https://www.nytimes.com/2015/03/15/nyregion/the-wet-wipes-box-says-flush-but-the-new-york-city-sewer-system-says-dont.html>

The Department of Environmental Protection is a New York City agency that collects and treats 1.3 billion gallons of wastewater produced by the 8.5 million New Yorkers through its 14 wastewater treatment plants daily. Over the past five years, DEP has spent more than \$18 million on debris removal across all of their WWTPs. \$3 million of that \$18 million is earmarked specifically for clearing wipes from its system and transporting them to landfills.⁹ DEP distributes 1 billion gallons of clean drinking water to homes and businesses throughout the five boroughs daily. It employs 6,000 workers which includes 1,000 employees in the upstate watershed. DEP maintains 7,500 miles of sewers that transfer sanitary waste generated by NYC residents to the 14 WWTPs.¹⁰ The sewers combine waste flows with stormwater runoff before sending the combined flow for treatment. When there are rain events, a mixture of waste and stormwater create an excess that results in a combined sewer overflow (CSO) into the NYC Harbor. The 1.3 million gallons of wastewater that is produced every day undergoes five major processes: preliminary treatment, primary treatment, secondary treatment, disinfection, and finally sludge treatment. Primary and secondary treatments remove about 85% to 95% of pollutants from the wastewater before the treated wastewater is disinfected and discharged into local waterways. Sludge, the byproduct of the treatment process, is then digested for stabilization and dewatered for easier handling. The resulting material, known as biosolids, is applied to land to improve vegetation and processed further as compost or fertilizer.¹¹

Key Actors

In addition to DEP, there are three other key actors that are involved in the issue of clogs in New York City sewers caused by inappropriate residential materials.

NYC Residents are they key source of inappropriate residential materials being flushed into NYC sewers. Residential behavior change is the goal of this project.

The **Wipes Industry's** products and aggressive marketing influences consumers flushing behavior due to labels on wipes packages that artificially qualify them as flushable and septic safe (see appendix C1). This includes manufacturers, such as Kimberly Clarke and Procter & Gamble, and interest groups, such as the Association of the Nonwoven Fabrics Industry (INDA), that help determine industry standards.

⁹ DEP Mandate, Accessed March 4, 2018

¹⁰ DEP Mandate, Accessed March 4, 2018

¹¹ DEP Mandate, Accessed March 4, 2018

National Association of Clean Water Agencies (NACWA) is an environmental group whose advocacy on behalf of the municipal clean water community covers a broad range of issues. They are key to the issue of blockages and wipes as they modernize the Clean Water Act to account for the challenges of today and the years to come.¹²

¹² Issues In Depth, Accessed March 4, 2018, Retrieved from <https://www.nacwa.org/issues-in-depth>

III. Research Methodology

To understand current waste disposal issues in New York City, and identify potential solutions we used the following methods:

Literature Review

For our literature we reviewed a series of local, national, and international briefs all discussing the ability to change public behavior around waste and sustainability through informative campaigns and education. *GreeNYC* was very useful to understand New York City's current ability to create, develop, implement, and collect data on local behavior change programs. Also, *GreeNYC* was helpful in understanding New York City residents' behavior and measures of effectiveness. A paper co-produced by the Department of Life Sciences and the Centre for Environmental Policy from the Imperial College of London highlighted the long-term effects of childhood environmental education and the level of influence children exert on their individual households¹³. News articles¹⁴ covering the growth of wipes sales/usage and increased blockages due to the presence of fatbergs were used to gauge public awareness and visibility.

- "Insights from GreeNYC: The City of New York Behavior Change Program"
- "Contributions of Early Childhood Education to a Sustainable Society"
- "Child Oriented Education Influences Households"

Expert Interviews

We interviewed a variety of experts ranging from media specialists, environmental advocates, Department of Environmental Protection employees, and a lobbyist.

- Mikelle Adgate, Senior Advisor for Strategic Planning for NYC Department of Environmental Protection supplied us with the background information and current initiatives by DEP to handle the rise in blockages and required maintenance of the sewer system.
- Matt Schutzman, Outfront Media Account Executive supplied blueprints for current and potential media campaigns for New York City via the MTA.

¹³ National Association for the Development of Young Children, "Developmentally Appropriate Practice in Early Childhood Programs Serving Children from Birth through Age 8", 1996

¹⁴ see Flengenheimer 2015; Samson 2017

- Cynthia Finely, Director of Regulatory Affairs at NACWA, gave context to the ongoing efforts to coordinate legal and legislative actions concerning flushability standards nationwide.
- Frank Loncar, Newtown Waste Station Manager, walked us the Newtown Wastewater Treatment Facility explaining the daily operations and difficulties workers faced due to blockages.

Case Studies

We reviewed sewage blockage and environmental sustainability case studies from both local, New York City, and international locations, London, England, and Buenos Aires, Argentina. These studies illustrated steps to take to effectively change public behavior through a series of different modules.

- *'Love Your Drain'* Campaign (United Kingdom)
- *'Bin it, don't block it'* Campaign (United Kingdom)
- *GreenNYC* (New York City, New York)

Key Legal Actions

The following were used to demonstrate U.S. based legal actions being taken by consumers and municipalities to combat the negative effects on septic and sewer systems from flushing inappropriate materials such as wipes.

- Non-Woven Disposable Act of 2016 (Washington, DC)
- David Machlan v. Procter and Gamble (California)
- Kurtz v Kimberly- Clark Corp, The Procter & Gamble Company, Costco Wholesale Corporation & Nice-Pak Products (New York)
- City of Perry, Iowa on behalf of itself and all others similar situated v. Procter & Gamble Company; Kimberly-Clark Corporation; Nice-Pak Products Inc.; Tufco Technologies Inc.; and Rockline Industries

Site Visit

A site visit to New York City's biggest and newest waste station was conducted as a way to see the daily maintenance and operational requirements to deal with blockages due to wipes in filtration screens.

- Newtown Wastewater Treatment Facility (Brooklyn, New York)

Data Collection and Field Research

The gathering of label information was done by comparing labels of different types of wipes currently available for purchase. See Appendix C1 for label types.

Limitations and Assumptions

Our research had significant limitations. For example, financial data specific to the growth of wipe sales in the US prepared by workgroup Smithers Pira, was not able to be referenced at the time of this report as the cost of accessing that information is \$5,500.

Based on the comparable population sizes of both London and New York City the amount of wipes being purchased in London is assumed to be the same as New York City. From this we assumed that any campaigns that were pursued in London will yield similar results using identical preventative measures.

Secondly, we found that we were unable to identify any clear metric to measure the success of a campaign in the examples we used. In our case we used Criterion 2 (Maximizing Reach), as a proxy. The assumption going forward is the more people reached, the higher the level of change achieved.

IV. Criteria

The following criteria were developed to evaluate how well an alternative addresses DEP's current issue of reducing sewer clogs caused by inappropriate residential materials:

1. Maximize Feasibility
2. Maximize Reach to NYC Residents
3. Maximize Durability Over Time

While considering the best alternative that DEP can implement right now, there was no indication that any one criterion should be more heavily weighted when making a final recommendation. The end goal for DEP is to be able to roll out an initiative and eliminate any potential obstacles that could affect implementation.

Maximize Feasibility

This criterion was developed to measure the ease of implementation by taking into consideration the amount of coordination required from a variety of stakeholders, specific to each alternative. When measuring the level of feasibility stakeholder buy-in is considered as the total amount of persons or parties involved in the action. The total number is the sum of both the number of parties from which approval is needed and the number of oppositional parties expected to push back. The difference in the two is the strength of the individual parties and how much influence they have on the implementation of the recommendation. The scale for such is below, High: 2 or less stakeholders, Medium: 3-5 stakeholders, and Low: more than 5 stakeholders total.

Table 1: Maximize Feasibility Ranking

	High	Medium	Low
Maximize Feasibility	Buy-in:	Buy-in:	Buy-in:
	Pushback:	Pushback:	Pushback:
	Total: 2 or less	Total: 3 - 5	Total: 5 or more

Maximize Reach to New York City Residents

All recommendations will address how to change the behavior of NYC residents to promote better waste disposal habits. There are currently 8.5 million people in the five boroughs and ideally the best choice in alternative will affect close to that number.

Maximize Durability Over Time

This criterion assesses the expected number of modifications that will be required to keep the suggested recommendation current and influential over time. Modifications could range from minor website updates, to large curriculum overhauls, to quarterly assessments of continued financial sustainability and necessity. The scale for such will be High, Medium, Low. High requires little to no modifications, Medium requires some modifications, and Low requires significant modifications over time.

Table 2: Maximize Durability Over Time Ranking

Maximize Durability Over Time	High	Medium	Low
	Little to no Modifications	Some Modifications	Extensive Modifications

V. Alternatives

Our initial set of proposed alternatives included technology options such as grease traps for all residential buildings, changing the grates leading in to WWTPs to sort out grease and wipes more efficiently, and increasing the number of DEP employees to enter the sewer system and break up clogs; a FOG risk map for more targeted inspections and preventative maintenance of clogs; restroom signage in locations such as restaurants, schools, and businesses similar to “Employees must wash hands” signs; an education campaign; a media campaign; and legal action. We did not continue with the technology options and risk map because they do not address the core of the issue - residents’ poor behavior of inappropriately disposing of the listed residential materials in Section II. This alternative represents putting a band-aid on the problem instead of going to the source. We did not include signage in restrooms because those signs are regulated by FDA food code.

The driving force of our three remaining alternatives centered on all of them providing a means to address the root cause of the clogs -- inappropriate residential materials entering the sewer system. Additionally, each alternative strives to achieve long-term change in residents’ behavior. As we conducted our research we aimed to identify potential models for each alternative that address why efforts outside of NYC were successful, or why they failed. Assembling these models aids us in steering DEP in the right direction with their chosen alternative.

Alternative 1: Education Campaign

The first alternative consists of an Education Campaign for children with the objective of creating awareness and civic consciousness. This alternative is designed to develop interactive, visible, and accessible content for children, families, and teachers where the importance of not draining or flushing inappropriate residential materials is explained. On the Department of Environmental Protection’s website, there are varied materials and resources that help to introduce children to different water-related topics in the school curriculum. Some examples of material DEP already developed and shared with the NYC community¹⁵ include the New York City Water Saver’s Workbook, a suggested reading list, and different activities regarding rainstorms, watersheds, and the value of water. However, to incorporate

¹⁵ Department of Environmental Protection, NYC. Environmental Education section:
http://www.nyc.gov/html/dep/html/environmental_education/index.shtml

this new topic about materials that should not be drained or flushed, we consider alternative approaches that are more appealing for children. In addition to DEP's educational resources, the NYC Department of Education (DOE) offers a list of Offices and Programs¹⁶ that tracks education topics the DOE addresses. Environmental education is not a subject mentioned by DOE, and we think this topic should be added to give it more visibility.

Target Population

Our proposed education campaign focuses on children because they are agents of change that can have a positive impact on their household's behavior¹⁷. Our target population are children during their early childhood, this is the period between one and eight years old. Early childhood is considered by research and literature as the stage where skills, values, and attitudes are formed and developed. At this life stage children also exhibit a high interest in nature and the environment¹⁸. This is also the stage where snowballing effects begin, meaning that knowledge created at this time will continue evolving over a person's life. The Early Childhood Environmental Education (ECEE) approach¹⁹ considers children as citizens that can contribute not only in the future, but also in the present to a more sustainable society.

As a model, ECEE develops research with the main objective of training children to take part in sustainable development and understand sustainable development as an equilibrium between environment, economy, and society. Considering that the entrance of inappropriate materials to the sewer system has consequences not only on the infrastructure but also on public health and the environment of the city as a whole, ECEE's approach can provide a framework to develop a successful Education Campaign for children. For more information regarding ECEE, please see Appendix B1.2b.

Education Actions

A successful Education Campaign is considered as a package of actions that could be promoted by DEP that take place in different scenarios and contexts.

¹⁶ Department of Education, NYC. Offices and Programs section: <http://schools.nyc.gov/Offices/default.htm>

¹⁷ Damerell, P., Howe, C. and Milner-Gulland, E. J., "Child-orientated environmental education influences adult knowledge and household behavior", *Environmental Research Letters*, 2013. (p. 1-7)

¹⁸ UNESCO, "The Contribution of Early Childhood Education to a Sustainable Society", 2008.

¹⁹ UNESCO, "The Contribution of Early Childhood Education to a Sustainable Society", 2008.

A. Birdie from GreeNYC

In 2007, New York City launched *GreeNYC*, a plan to make NYC greener and more sustainable. The plan included the creation of Birdie, a mascot with the objective of educating and informing the NYC population about green initiatives such as recycling. According to a behavioral impact study²⁰, more than 50% of New Yorkers are familiar with Birdie's image. A course of action for DEP to consider is introducing Birdie as the official mascot for the Education Campaign. Birdie's persona could make DEP's education materials more attractive and approachable for young children.



Figure 1 Birdie of GreeNYC
Source: GreeNYC

B. Development of Educational Products

The core element of this campaign consists of the design and development of more interactive and user-friendly material. A more interactive approach to this topic should be provided because “play is an important vehicle for children’s social, emotional, and cognitive development, as well as a reflection of their development”²¹. Based on research and case studies conducted involving educational materials available online from other entities, DEP should upgrade and update their currently available material while incorporating the non-flushing or non-draining materials content. This new design should try to address not only children, but families and teachers as well.

Below is a list of educational material highlights and their respective agency.

a) National Geographic²²: Varied materials such as teaching guides and activities are available. The classrooms’ materials are organized into activities, lessons or units, allowing teachers to choose the way to address different topics. Game-based learning is also available for children, with an interactive approach to nature and environmental contents.



Figure 2: Sesame Workshop with Sesame Street characters visiting school

b) Sesame Street²³: Videos, games, and activities explaining everyday situations are available online.

²⁰ “Insights from GreeNYC: The City of New York’s Behavior Change Program.” Mayor’s Office of Sustainability, 2017. (p. 7)

²¹ National Association for the Development of Young Children, “Developmentally Appropriate Practice in Early Childhood Programs Serving Children from Birth through Age 8”, 1996. (p. 8)

²² National Geographic, <https://www.nationalgeographic.org/education/>

²³ Sesame Street, <https://www.sesamestreet.org/>

- c) Sesame Workshop²⁴: Creates different projects for use around the world. Their approach includes visits of the different characters of Sesame Street to different spaces making educational topics more attractive to children. This can be used as a model to plan Birdie's role in the campaign.
- d) Climate Kids, NASA (National Aeronautics and Space Administration)²⁵: To explain topics such as recycling or climate change in an interactive way, they developed educational games and activities that are available online. One activity includes a virtual recycling game, children must appropriately sort their trash in five bins to win.
- e) Love Your Drain Campaign²⁶ (United Kingdom): The Northumbrian Water company developed this media and education campaign, which includes the introduction of a mascot called *Dwaine Pipe*. Two children's book have been designed and developed to explain the importance of not draining or flushing inappropriate residential elements.
- f) National Environmental Education Foundation (NEEF)²⁷: Activities and educational material that are available online for children and teachers to teach and learn Science, Technology, Engineering and Math (STEM).



Figure 3: Climate Kids, NASA recycling game
Source: NASA

See Appendix B3 for more visual depictions of these Education Campaign models.

C. Public Schools

A large component of this campaign would rely on public schools, where the content of flushable and non-flushable elements could be included in the formal school curricula and after-school programs²⁸. As the official mascot of the campaign, Birdie could visit schools and explain the importance of not draining or flushing inappropriate materials making it more appealing to young children. To successfully incorporate this content, coordination is required between DEP, DOE, and school staff. Providing training to teachers is a cornerstone for a successful education campaign, where they will be able to understand the content from a technical point of view and apply it to class. The inclusion of interactive material can be

²⁴ Sesame Workshop, <http://www.sesameworkshop.org/>

²⁵ NASA, <https://climatekids.nasa.gov/>

²⁶ Love Your Drain, <https://www.nwl.co.uk/your-home/your-services/Dwaine-Pipe.aspx>

²⁷ NEEF, <https://www.neefusa.org/>

²⁸ See Appendix B2

accomplished through the development of an interdisciplinary approach where environmental education complements other class subjects such as language arts, math, or science. This approach applies environmental education to the formal school curriculum, enriching other classes without requiring the carve out of a new class in an already tight school schedule.

When implementing this alternative, it is important to consider that some research studies and experiences²⁹ report certain unwillingness from teachers to incorporate environmental education into their classes due to lack of time or resources. This is a main reason why a coordinated work effort between DEP, DOE, and school staff is necessary. The coordination helps DEP understand how their new materials can successfully integrate into the curriculum while requiring limited additional time or resources on school staff's behalf.

Support from teachers needs to be complemented with family support. Parents need to promote children's learning and interest in nature and the environment. The ECEE approach considers that teachers should work in "collaborative partnerships with families"³⁰ so children can maximize their learning by incorporating the different subjects taught at school and developing their environmental consciousness.



Figure 4: Ideas for Public Signage
Source: www.etsy.com

Lastly, the incorporation of signage in restrooms could be promoted in public schools. Public signage can help to reinforce the Education Campaign at schools and the knowledge acquired in the classroom. Studies³¹ have shown that the promotion of health and environmental campaigns through the establishment of public signage is quite effective to give them more visibility and create consciousness. Visually appealing information can also remind young children about the importance of not flushing inappropriate materials.

²⁹ See Appendix B1

³⁰ National Association for the Development of Young Children, "Developmentally Appropriate Practice in Early Childhood Programs Serving Children from Birth through Age 8", 1996 (p. 14)

³¹ Mackert, M., Liang, M., Champlin, S., "Think the Sink: Preliminary evaluation of a handwashing promotion campaign", American Journal of Infection Control: N 13, 2013

D. External Learning Modules

The installation of permanent exhibitions in educational spaces such as museums around the City could complement DEP's message by giving more visibility in a playful way. In Argentina, the Children's Museum of Buenos Aires includes different scenarios and installations that allow children to experience multiple aspects of city life. The public agency in charge of the water supply and treatment for the Metropolitan Area



Figure 5: Toilet exhibit at Museo de los Niños de Buenos Aires
Source: Museo de los Niños

of Buenos Aires installed a giant toilet with slides where children can understand the water cycle and the importance of the sewage system. A potential location for this kind of exhibition in NYC is the Brooklyn Children's Museum³² which already provides installations focused on nature and environmental topics.

Analysis

Table 3: Analysis of Alternative 1 Education Campaign

Education Campaign	Feasibility	Reach to NYC Residents	Durability Over Time
	Medium		
	Buy-in: DEP, DOE, Teachers, and School Principals Pushback: 0	500,000 to 1 million residents	Medium

Feasibility: Medium. To assess this criterion, four stakeholders are considered: Department of Environmental Protection, Department of Education, teachers, and school principals. Although a minimal level of pushback may occur from teachers, this is considered negligible relative to the entire Education Campaign. A high level of coordination is required across the four stakeholders to ensure success of this alternative. A larger number of stakeholders increases the level of coordination required for implementation, which correlates to a higher probability of failure.

³² Brooklyn Children's Museum, <https://www.brooklynkids.org/exhibits/>

Reach: 500,000 to 1 million residents. Based on the number of NYC’s public school students between 1 and 8 years old³³ plus one caregiver per child.

Durability: Medium. To guarantee success, the Education Campaign needs to be sustained over many years. As with any educational material, the curriculum will require updates over the years. Over those years budgets, political and social landscapes, and leadership can change. As those aspects change the probability for DEP’s educational material to fall to the wayside (which can include being removed) or have no updates made, rendering the material inaccurate.

³³ NYC Department of Education, Statistical Summaries, <http://schools.nyc.gov/AboutUs/schools/data/stats/default.htm>

Alternative 2: Legal Action

This alternative recommends using legal action to enact changes to the way wipes are labeled and marketed to consumers. Although there have been some recent changes, (i.e., the removal of the term “flushable” from *Kandoo* baby wipes in the *Machlan v. Procter & Gamble* lawsuit) in many non-woven, pre-moistened wipes, labels continue to assure users the product is “flushable”, “sewer and septic safe” signaling that it is safe to flush these items down toilets instead of putting them into trash bins (see Appendix C1). Some packages give no direction at all and leave the decision to flush up to the consumer. The resulting damage to private septic systems and municipal water treatment plants has prompted individuals and cities to pursue legal recourse through class action lawsuits and legislative amendments, respectively.

During the briefing we were asked to clarify the difference between litigation and legislative action. Litigation refers to lawsuits brought against wipes manufacturers by individual consumers or water treatment plants. Legislative action refers to efforts from local legislatures to enact laws changing package labeling and/or prohibiting the sale of wipes that are labeled flushable and/or sewer/septic safe.

Litigation

A. Consumer Success – False Advertising

The *Machlan v. Procter & Gamble*³⁴ (2015) class action lawsuit (San Francisco, California) pursued a false advertising strategy focusing on package labels and whether the wipes worked as advertised. Their legal strategy relied on the California Consumer Legal Remedies Act³⁵ (CLRA, 1970) and argued that the wording on baby wipes labels violated the California Civil Code in that it “marketed the wipes as flushable and sewer safe when they...don’t disintegrate and clog pipes”³⁶ essentially arguing that the company engaged in “false advertising.” The case was settled before going to trial, at the request of Procter & Gamble. Judge Donato, acknowledged that the customer would not have flushed the wipes if the package did not say “flushable” and “sewer/septic safe.” Under the terms of the settlement, *Nehemia* (a product licensee of P&G and manufacturer of *Kandoo* wipes) [had to] remove phrases such as ‘sewer safe’ and ‘septic safe’

³⁴ Northern District of California. *MACHLAN V. PROCTER & GAMBLE CO.* 7 Jan. 2015. *Casetext*, casetext.com/case/machlan-v-procter-gamble-co.

³⁵ United States, Congress, *California Consumer Legal Remedies Act*. 1970

³⁶ Atkins, Dorothy. “No Snags In Sight For P&G Deal Over Toilet-Clogging Wipes.” *Law 360*, 2 Dec. 2016, www.law360.com/articles/868761/no-snags-in-sight-for-p-g-deal-over-toilet-clogging-wipes.

from its products and add a disclaimer that the wipes can only be flushed one or two at a time in ‘well-maintained toilets, drain lines, sewer lines and septic tanks.’³⁷

B. Consumer Failure – Prohibiting Sales

The *Belfiore v. Proctor & Gamble* (2015), *Kurtz v. Kimberly-Clark* (2015) and *Armstrong v. Costco* (2015) (New York, NY)³⁸ lawsuits, along with six other cases were merged together in the Eastern District Court of New York. The plaintiffs claimed that the wipes were not flushable or sewer/septic safe and accused popular retailers like Costco, Walmart, Target et al., for false advertising. Although the *Machlan v. P&G* case in California provided a model for legal strategy on the basis of false advertisement, the judge hearing the case, Judge Jack Weinstein, was concerned that the claims against retailers went too far, to “...enact local standards on...an item, characterizing the effort as an impermissible restriction on interstate commerce.”³⁹ Additionally, the Federal Trade Commission (FTC) was simultaneously investigating similar consumer claims of false advertisement about the flushability of wipes. As the federal agency with the “...broad power to regulate advertising...”⁴⁰ Judge Weinstein, determined it would be best for the FTC to rule on the case. In November 2015, the FTC announced its ruling against *Nice-Pak Co.* saying the company violated the law by advertising their wipes as flushable and sewer/septic safe. Judge Weinstein also left open the possibility for the plaintiffs to seek legal damages from Kimberly-Clark. This action is still ongoing.

C. Municipal Action – Lack of Data

*The City of Perry Iowa v. Procter & Gamble Company; Kimberly-Clark, Corporation; Nice-Pak Products, Inc., Professional Disposables International, Inc.; Tufco Technologies Inc.; and Rockline Industries, (2015)*⁴¹ class action lawsuit contested the claims of “flushability” printed on package labels arguing that the wipes did not disperse fast enough after flushing and eventually clogged water treatment plant filters. The city dropped the lawsuit in August 2017 because 1) it observed a significant decrease in clogs to the system after filing the lawsuit and 2) officials there were unable to match the wipes caught in the sewer system to its specific manufacturer. David Rousse, president of The Association of the Non-Woven Fabrics

³⁷ Atkins, Dorothy. “No Snags In Sight For P&G Deal Over Toilet-Clogging Wipes.” *Law 360*, 2 Dec. 2016, www.law360.com/articles/868761/no-snags-in-sight-for-p-g-deal-over-toilet-clogging-wipes.

³⁸ Eastern District of New York. *Kurtz v. Kimberly-Clark*. 27 Mar. 2017. *DocketBird*, www.docketbird.com/court-cases/Belfiore-v-The-Procter-Gamble-Company/nyed-2:2014-cv-04090

³⁹ Sampson, Elizabeth. “When States Backtrack on Flushable Wipes, Quality of Life Suffers.” *The Hill*, 20 Apr. 2017, thehill.com/blogs/pundits-blog/state-local-politics/329722-when-states-backtrack-on-flushable-wipes-quality-of.

⁴⁰ FTC. “FTC Approves Final Order Requiring Wet Wipe Manufacturer to Substantiate ‘Flushability’ Advertising Claims.” *Federal Trade Commission*, 2 Nov. 2015, www.ftc.gov/news-events/press-releases/2015/11/ftc-approves-final-order-requiring-wet-wipe-manufacturer.

⁴¹ Southern District of New York. *The City of Perry Iowa v. Procter & Gamble Company; Kimberly-Clark, Corporation; Nice-Pak Products, Inc., Professional Disposables International, Inc.; Tufco Technologies Inc.; and Rockline Industries*. 13 Oct. 2015. *SDNY Blog*, www.sdnblog.com/files/2015/10/15-Civ.-8051-2015.10.13-Flushable-Wipes-Complaint.pdf.

Industry (INDA) said in a statement after the case was dropped, “the settlement terms of the Perry litigation corroborate what years of testing and field collection studies have shown: that flushable wipes are not causing municipal clogs or increased maintenance...to date ...there is no evidence from any wastewater agency proving that flushable wipes are causing clogs or maintenance issues.”⁴²

Legislative Action

In 2016, the Washington, DC City Council passed the *Non-Woven Disposable Products Act (2016)*, the first piece of legislation in the country to successfully force manufacturers to label products “‘flushable’, ‘safe to flush’, ‘safe for sewer systems’, or ‘safe for septic’ only if they meet the Council’s flushability standards. Using the guidelines put forth by the National Association of Clean Water Agencies (NACWA), the council defined flushability as “a disposable product that ‘disperses in a short period of time after flushing in the low-force conditions of a sewer system; is not buoyant; and does not contain plastic or any other material that does not readily degrade in a range of natural environments.”⁴³ The addition of the phrase “does not contain plastic” is particularly crucial because it created a broad-based definition that encompasses most of the wipes produced.

Additionally, the law does not seek to punish retailers and therefore does not inhibit their sales. This approach significantly reduces pushback from retailers in both litigation and legislative efforts.

The law should have gone into effect January 1, 2018 but Kimberly-Clark, a major wipes manufacturer, filed a lawsuit against the DC City Council and was granted an injunction⁴⁴. The case is currently pending in the U.S. District Court for the District of Columbia.

Recommendation for Legal Action

Pursuing legal action, whether legislatively or through litigation, comes with advantages and drawbacks. The cases described earlier demonstrate the difficult landscape that consumers and water agencies face in trying to make change. For consumers, using lawsuits to accuse wipes manufacturers of false advertising has had some impact in raising awareness about the plumbing problems wipes cause and in the case of *Machlan v. Procter & Gamble*, forcing *Kandoo* baby wipes to remove the language “sewer/septic safe”

⁴² INDA. “The City of Perry, Iowa Settled Lawsuit Claiming Damages from Flushable Wipes.” [Http://www.inda.org](http://www.inda.org), 10 Aug. 2017, www.inda.org/flushable-wipes-class-action-lawsuit-dropped/.

⁴³ “D.C. Finalized Nonwoven Disposable Product Labeling Requirements.” [Http://www.bureauveritas.com](http://www.bureauveritas.com), 27 Jan. 2017, www.bureauveritas.com/home/about-us/our-business/cps/whats-new/bulletins/dc-nonwoven-disposable-product-labeling#.

⁴⁴ United States District Court for the District of Columbia. *Kimberly-Clark Corp v. The District of Columbia Et Al.* 22 Dec. 2017. [Http://nsglc.olemiss.edu](http://nsglc.olemiss.edu), nsglc.olemiss.edu/casealert/jan-2018/kimberlyclark.pdf.

from its package labels. However, this change only applied to this specific product and did not have the state wide affect plaintiffs had hoped for. The lawsuit brought forth by the City of Perry Iowa made a similar argument, but lacked sufficient data to support their claim. The Perry Iowa case highlights an important reality for water treatment agencies - without definitive data about the types of wipes that cause blockages in treatment plants, lawsuits brought forth by water agencies will more than likely be dismissed. With such a high bar of proof, we recommend that DEP continue collecting data to help consumers and water agencies gather the evidence needed for court proceedings. DEPs research findings can be shared on the agency website as well as through the Federal Trade Commission consumer complaint portal, *Consumer Sentinel*.

A legislative approach could have far reaching impact, as demonstrated in the Washington, DC *Non-Woven Disposable Products Act*. Although difficult to achieve, a change in the law would empower not only water agencies, but also consumers and city and state legislatures to hold manufacturers accountable if they marketed a product as sewer/septic safe when in reality it was not. However, DEP needs to consider the strength of industry lobbyists and manufacturers and their ability to undermine efforts aimed at changing the law – the current injunction preventing the DC law from going into effect was brought by Kimberly-Clark, a major manufacturer.

Lastly, we recommend supporting the work of the National Association of Clean Water Agencies (NACWA) and the International Water Services Flushability Group (IWSFG). Their work will be crucial in pushing for legislative changes (DC used NACWAs standard to write the Non-Woven Disposable Products Act) as well as aiding consumers that bring false advertising lawsuits.

Analysis

Table 4: Analysis of Alternative 2 Legislative Action

	Feasibility	Reach to NYC Residents	Durability Over Time
Legal Action	<p>Low</p> <p>Buy-in: DEP, NACWA, IWSFG, Department of Consumer Affairs (DCA), NYS Department of Environmental Conservation (NYS DEC), Environmental Protection Agency (EPA)</p> <p>Pushback: Industry lobbyists & Manufacturers</p> <p>Unknown: City Council, State Legislators</p>	8.5 million	High

Feasibility: Low. This alternative receives a low for feasibility because it requires a significant amount of buy-in and legal coordination from large, complex organizations. Additionally, the expected pushback from stakeholders like industry lobbyists and trade organizations stand to undermine success both legislatively and through litigation. The buy-in or pushback of stakeholders in the final category is unknown because in our research, legislators have expressed support as well as opposition to legislative efforts.

Reach: 8.5 Million New Yorkers. This is based on 2016 Census data and covers all of NYC residents. This metric is used because all New York City residents are subject to any changes in local law. Efforts that are successful in changing the law have a low chance of being overturned and provide a blueprint for future action in other cities and states. Additionally, successful litigation or legislative action can trigger changes in the law and provide precedence for future plaintiffs.

Durability: High. This alternative receives a high for durability because it requires no modifications. As mentioned earlier, once a law has been enacted or a lawsuit has been successfully upheld the impact is wide reaching and affects everyone within that jurisdiction. It is highly unlikely that the law or court ruling would need to be modified or continuously updated once in place.

Alternative 3: Media Campaign

This alternative is designed to increase visibility regarding sewer clogs and inform residents a problem exists so they will take steps to adjust their behavior. Currently, DEP operates an education/media hybrid campaign entitled '*Cease the Grease*' to raise awareness among residents about how to properly dispose of cooking grease. The campaign does not include information regarding any of the other inappropriate residential materials mentioned in Section II. '*Cease the Grease*' utilizes a systems approach, explanation of the full New York City water cycle, to illustrate where problems fit in the cycle and the resulting effects. This campaign lacks effectiveness because sewer blockages continue to rise, it fails to provide context for residents or essential information, and residents remain unaware a problem exists. See Appendix D1 for a fuller review of '*Cease the Grease*'.

To address the shortcomings of the existing campaign we provide six options in a tiered approach to launch a comprehensive and robust media campaign. The tiered approach is ranked easiest to hardest for implementation based on money, time, and potential DEP protocols or rules that would need addressing. DEP does not need to implement these options in the order listed. These options are modeled after a combination of three existing campaigns: *GreenNYC* from NYC, '*Bin it, don't block it*' from the London region, and '*Love Your Drain*' from Durham which lies in northern England. See Appendix D2 for a review of each campaign.

Tier One

A. Add campaign information on billing statements.

The NACWA campaign, '*Toilets are not Trashcans*' has designed a logo for municipalities to use free of charge and can be accessed from their website. DEP can also develop their own logo or a short



Figure 6 'Toilets Are Not Trashcans' logo
Source: NACWA

informational text box potentially focusing on the Four P's. Billing statements are another potential avenue into households to familiarize residents with the problem. Unfortunately, they are limited to home owners as renters do not receive the water bill. This option acts as a filler to the larger options. On its own it does not capture many residents or provide enough information about the problem, but in conjunction with other options it can reinforce DEP's messaging and marginally expand reach to New Yorkers.

B. Put informational blurb or link on DEP's homepage.

As NYC residents remain unaware a problem exists, they do not know to look for information about the problem. DEP needs to make that information easier to find. See Appendix D3.2 for an example. This option acts as a filler to the larger options. On its own, it does not bring more residents to the DEP website, but in conjunction with other options it can get residents to the '*Cease the Grease*' webpage where they can learn more about how to properly dispose of residential materials. We assume that minimizing the number of clicks it takes to go from DEP's homepage to the '*Cease the Grease*' webpage will increase the number of people that click all the way through to the '*Cease the Grease*' page.

Tier Two

A. Establish a social media presence.

This can be achieved in one of two ways. One, DEP could partner with existing social media campaigns in the city, such as Birdie for *GreeNYC* or the Teenage Mutant Ninja Turtles for NYC & Company. This can be challenging due to interagency coordination, developing a partnership with NYC & Company, and determining if DEP's message aligns with either campaign's persona. Two, DEP can develop its own social media platform. An example is the '*Love Your Drain*' social media accounts with their mascot Dwaine Pipe. The social media accounts highlight clogs in WWTs, water campaigns, water refill stations, and local



Figure 7 Dwaine Pipe
Source: '*Love Your Drain*'

artists using trash found on the beach from sewers to name a few topics. DEP can also consider re-posting content from other organizations such as NACWA and Riverkeeper. If this option is selected, DEP would need to consider who will administer the accounts and the persona of the campaign. The key aspect of DEP's social media presence is including a mascot. This makes the campaign relatable and tangible for followers while providing a unified persona for all media campaign messages.

B. Revamp DEP 'Cease the Grease' campaign content.

The first part of this option should include adding information to the campaign about how to dispose of all the residential materials listed in Section II. Providing residents with the full knowledge of residential material disposal will aid them in fully correcting their behavior. The second part should include a campaign structure change that embraces the three core elements of a successful behavioral change

campaign: *actionable, relatable, and simple*⁴⁵. ‘*Cease the Grease*’, in its current form, does not embody these three elements. To include them we recommend mimicking either the ‘*Bin it, don’t block it*’ campaign or ‘*Love Your Drain*’ campaign. Both provide interactive materials such as quick learning games, eye catching infographics, and short videos that shift the context for residents. Regarding shifting the context for residents, these campaigns move away from the systems approach DEP employs with the water cycle. Instead the focus is on negative effects residents can incur from sewer clogs relating to personal financial loss, public health, or environmental health.

‘*Love Your Drain*’ goes a step further with interactive materials by adding their mascot *Dwaine Pipe*, publishing two children’s book, and including a gamification portion. An example of the aforementioned material is the Flushable Challenge from ‘*Bin it, don’t block it*’ (Appendix D3.4.). In the challenge, residents fill a water bottle with water, put the item they are considering flushing down their toilet in the filled bottle, shake it for a minute, and review their results. If the item in question dissipated or broke down within the minute of shaking, then it could be flushable. If not, the item should be properly disposed of in the trash. The ‘*Bin it, don’t block it*’ campaign even provides a button on their website that people can click to post their results to social media with a logo and link for the campaign.

Tier Three

A. Subway and bus advertisements for all of NYC.

To accomplish this, DEP needs to hire the marketing agency Outfront Media. Outfront Media controls all advertisements for the MTA, except those placed on the back of Metrocards. After conversations with Matt Schutzman, an account executive of the company, he constructed a skeleton advertising campaign. Schutzman explained that advertisements could cover subway and bus systems with both print media and mobile banners for all of NYC to ensure the campaign reaches the maximum number of residents. Mobile banner ads are advertisements that appear in mobile applications such as Facebook. Mobile banner ads are important for two reasons; 1) They reinforce the primary messaging seen in the subway and bus ads, and 2) Outfront Media can track an individual’s interaction with this type of ad the best. Tracking the ads provides feedback to Outfront Media and DEP on how to fine tune the campaign. See Appendix D4 for more information on Outfront Media’s metrics.

⁴⁵ “Insights from GreenNYC: The City of New York’s Behavior Change Program.” *The City of New York*, Mayor’s Office of Sustainability, 2017. https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/GREENYC_LESSONS_2017_online_v2.pdf.

In short, the advertising option consists of four campaigns in total, each lasting four weeks with an overall advertising time of one year. This means doing one four-week campaign, taking a twelve-week break, beginning the next four-week campaign, taking a twelve-week break, and repeating the process until all four campaigns have run. The approximate cost of this advertising option is \$922,000⁴⁶. We recommend mimicking the *'Bin it, don't block it'* and *'Love Your Drain'* campaigns when designing the NYC ads. See Appendices D3.5 to D3.8 for examples.

Regarding the advertising portion for *'Bin it, don't block it'*, targeted areas saw a 26% reduction in sewer blockages and 70% of residents reported changing their behavior on fat and wipes disposal⁴⁷. The *'Love Your Drain'* campaign's advertising portion set a goal of reducing blockages by 10% in its northern customer area and 20% in 'hotspot' areas. It achieved a 46% net reduction in blockages⁴⁸. For both campaigns, our team was unable to ascertain exactly how they determined the reduction in blockages due to a lack of digital information and appropriate contact information. If DEP chooses to implement the advertising option, then it should ensure the graphics Outfront Media develops are used across all options in the media campaign DEP chooses to maintain continuity.

B. Revamp 'Cease the Grease' website.

The current *'Cease the Grease'* webpage is visually unappealing (Appendix D3.9). An attractive website gets people to engage with it. We know DEP is in the process of updating its website and believe the *'Cease the Grease'* webpage will look like the NYC Department of Design and Construction's education website (Appendix D3.10). If DEP wishes to do more updates it could mimic the *'Love Your Drain'* website (Appendix D3.11). This is a simpler step of adding better graphics and descriptions for links. If DEP wants to go even further, it can mimic the *'Bin it, don't block it'* website (Appendix D3.12). This would require an overhaul of graphics and web layout to promote a higher level of interactivity.

⁴⁶ Whiteside, Racheal. "Outfront Media Advertising Strategy for NYC DEP." 7 Feb. 2018.

⁴⁷ "Reducing Blocked Pipes by Reversing Ingrained Habits." *Thames Water Case Study*, 23red, 2016. www.23red.com/thames/.

⁴⁸ "Dwaine Pipe / Love Your Drain Campaign." *The Masters of Marketing Awards 2018*, Festival of Marketing, 2018. www.festivalofmarketing.com/book-of-the-night-2017/dwaine-pipe-love-your-drain-campaign.

Analysis

Table 5: Analysis of Alternative 3 Media Campaign

Media Campaign	Feasibility	Reach to NYC Residents	Durability Over Time
	High	8.2 million	Low
	Buy-in: DEP		
	Pushback: 0		

The media campaign is evaluated under the assumption that DEP would implement all six options within the three tiers. The ‘*Cease the Grease*’ website update option is assumed at the basis of DEP’s planned updates.

Feasibility: High. This alternative only requires buy-in from one stakeholder, DEP, meaning at a macro level coordination is easier and pushback is significantly decreased. Within DEP this would require a high level of coordination and some pushback may occur as with any agency-wide effort. However, due to the pressing nature of the issue it is expected that DEP could successfully implement this alternative.

Reach: 8.2 million residents. This is based on 2017 MTA ridership data of NYC⁴⁹ subways and buses and stems from the advertising option. The team selected this metric because it carries the strongest empirical evidence for it out of the six options. If DEP did not use all six options within the three tiers, this would change the reach result.

Durability: Low. This alternative provides a short-term response to the problem. Theoretically the media campaign could exist indefinitely, with all three tiers, if DEP is willing to pay \$922,000 per year to continue the advertising portion. However, all three tiers would require frequent updates to retain residents’ attention. Advertisements would need updates in the form of different graphic designs four times a year, once for each iteration as there are four cycles. Social media would require daily updates. DEP’s website and campaign content would need limited large-scale changes. However, both require content updates to insure the information remains accurate as new knowledge is gained and new content additions to maintain resident engagement. Billing statements do not need to change because DEP would want to maintain consistency, but residents may think less about the campaign information given or become

⁴⁹ “Public Transportation for the New York Region.” *The MTA Network*, Metropolitan Transportation Authority, 31 Dec. 2017, web.mta.info/mta/network.htm#statsnyc.

willfully blind⁵⁰ as repetition increases. Without these updates residents stop paying attention, forget about the problem, and the solution collapses. This does not mean DEP sees no improvement regarding the amount of inappropriate residential materials introduced to the sewers. If successful, some portion of residents would change their habits, but there is a limit to that success.

⁵⁰ Willful blindness includes “deliberate ignorance, conscious avoidance, purposeful avoidance, willful ignorance, deliberate shutting of the eyes, and conscious purpose to avoid the truth” (Marcus, p. 2231). This is related to the banner blindness phenomena where “Internet users avoid looking at or paying attention to ad banners inserted on webpages” (Hervet and Gue, p. 708).

VI. Summary Analysis, Recommendation, and Next Steps

Table 6: Analysis of Alternatives 1-3

Criteria	Alternatives		
	Education Campaign	Legal Action	Media Campaign
Maximize Feasibility	Medium Buy-in: 4 Pushback: 0 Total Stakeholders: 4	Low Buy-in: 6 Unknown: 2 Pushback: 2 Total Stakeholders: 10	High Buy-in: 1 Pushback: 0 Total Stakeholders: 1
Maximize Reach	500,000 to 1 million residents	8.5 million residents	8.2 million residents
Maximize Durability	Medium	High	Low

Alternative 1: Education Campaign

Feasibility: Medium. Although we expect minimal pushback and enough buy-in from all stakeholders, as the number of stakeholders increases the level of coordination for implementation increases which correlates to a higher probability of failure.

Reach: 500,000 - 1 million. Based on the number of children in the targeted age bracket (1 to 8 years old) and one caretaker.

Durability: Medium. As with any educational material the curriculum will require updates over the years. Over the years budgets, political and social landscapes, and leadership can change. As those aspects change it increases the probability for DEP's educational material to fall to the wayside (which can include being removed) or have no updates made rendering the material inaccurate.

Decision: Although the education campaign provides direct access to residences with the potential for a significant impact over generations, it has a relatively small reach in the present which is why we did not select it for the final recommendation.

Alternative 2: Legal Action

Feasibility: Low. Many stakeholders would need to coordinate for this to be implemented and we expect substantial push back particularly from the wipes industry.

Reach: 8.5 million residents. Based on the total number of NYC residents because our proposed routes for legal action would affect everyone.

Durability: High. A successful court ruling or change in local law sets a precedent for the future with little chance of being overturned and would likely not need any updates.

Decision: Although legal action can provide long-term and permanent changes in residents' behavior, we do not recommend it at this time because of the high level of pushback expected from the wipes industry.

Alternative 3: Media Campaign

Feasibility: High. Only requires buy-in from one stakeholder, DEP, meaning at a macro level coordination is easy and pushback does not exist.

Reach: 8.2 million residents. Based on 2017 MTA ridership data of subway and bus systems.

Durability: Low. Requires frequent updates to retain residents' attention.

Recommendation

For these reasons we select the media campaign as our final recommendation. Although this is a short-term solution, if modeled correctly it is an effective method for increasing awareness of the problem, thereby informing residents this problem exists so they can adjust their behavior.

Next Steps

Moving forward with this recommendation we suggest seven next steps broken in to short and long-term actions. Within the next three months:

1. Contact NACWA to gain access to their campaign logo.
2. Determine how to build your social media presence.
3. Contact Outfront Media to begin designing the advertising portion.
4. Decide to what level you are willing and able to redesign your website.

Within the next six months:

1. Pursue proper analysis and data collection around the issue to fine tune the campaign which can include number of clogs in WWTPs, consumer complaints about clogs, and how much money DEP is spending to remove clogs.
2. Design a method to measure the number of clogs removed or money spent to remove clogs from start of campaign to track its effectiveness.
3. Consider pursuing legal action and/or the education campaign to address durability limitation.

VII. Appendices

Appendix A: Potential metrics of success

Below is information about how DEP can measure success for the Education Campaign and Media Campaign. This addresses the limitation of our Maximize Reach to NYC Residents criterion as a proxy for success.

A1. Education Campaign Metrics

To assess Education Campaign success, the literature review reveals it is necessary to develop tools that allow DEP, DOE, or the governmental agency involved in the implementation of this campaign to know what the impact of environmental education in the population is as a whole. Focus groups and questionnaires could be administered to get a sense of the knowledge developed in each child. They can also measure the Education Campaign's impact on their parents and families' behavior and attitudes towards the environment. A case study in a school in the Bronx borough helps to understand how this procedure could be pursued. This study is further described in Appendix B1.3b.

A2. Media Campaign metrics recommended by Vision Flourish in their guidebook "Marketing for Action: A Guide to Marketing Fundamentals for Urban Sustainability Offices" (p. 74-82)

Vision Flourish is a marketing consultancy dedicated to working with municipal governments and nonprofits to develop strong, sophisticated, and successful marketing programs. Their services include research, marketing strategy, brand development, messaging, and media planning and buying.

Roya Kazemi, Vision Flourish President and former Director of GreenNYC (2007-2017)

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Monitoring and evaluating tools should be identified during planning stages of a behavioral change campaign and embedded into marketing materials. Monitoring involves following the campaign while in progress, tracking residents' engagement, and collecting data to measure performance. Use campaign goals to determine desirable metrics. A typically strong metric is public response which can be measured by the number of people taking an online pledge, subscribing to a newsletter or campaign alerts, or signing a petition. Web analytics of residents' response to the campaign can include web traffic or click-through rates. While monitoring the campaign should be adjusted where possible to maximize effectiveness and reach. Once a campaign ends do an evaluation of it to inform future efforts.

Four groups of metrics exist to determine a campaign's effectiveness; impressions, engagement, attitudes, and environmental impact. Impressions represent the number of times people are exposed to advertisements. Engagement represents how many people interact with a campaign and how often. Examples include clicking a link or signing a pledge. Resident attitudes can be attained through surveys or social media scans. Surveys should be done before a campaign to develop a benchmark, during to measure progress and provide course corrections if needed, and after the campaign closes to determine results. Question to include are ones specific to a campaign, general environmental attitudes, and how the environment ranks as priority over other urban concerns such as affordable housing. Social media scans involved looking for keywords associated with the campaign on social media platforms. Environmental Impact includes measurements like tons of GHG emissions reduced. Kazemi includes an Implementation Worksheet to analyze campaign effectiveness in the guidebook.

Read the full guidebook for more information on how to develop a behavior change media campaign.

Appendix B: Education Campaign

B1. Literature Review for Education Campaign

B1.1. Children's Influence in Household Behavior

- a) Title: "Child-orientated environmental education influences adult knowledge and household behavior"

Authors: Damerell, P., Howe, C. and Milner-Gulland, E. J.

Source: Environmental Research Letters, 2013, p. 1-7

This study suggests that Environmental Education can be transferred between generations and that it can impact behavioral changes. To make their point, Damerell, Howe and Milner-Gulland focus on the case Wildlife Club Seychelles (WCS), a school that includes different nature topics such as wetland conservation. The study consisted of self-administered questionnaires to collect data from children and parents. The results showed that "children are learning about their environment and are passing this information on to their parents, influencing household behaviors", which shows a successful transfer of environmental knowledge.

- b) Title: "Impact of an Environmental Education Program on Students' and Parents' Attitudes, Motivation, and Behaviours"

Authors: Legault, L. and Pelletier, L., University of Ottawa

In the analysis of an environmental education program, Le Projet des écoles vertes Brundtland in Canada, the authors established that children can impact their parents' behavior. These results are also complemented with the knowledge acquired by children regarding ecological topics. The study assessed the transfer of knowledge from children to their families through the development of questionnaires that evaluated attitudes and behavior towards the environment.

B1.2. Early Childhood Education in Sustainable Societies

- a) Title: "Developmentally Appropriate Practice in Early Childhood Programs Serving Children from Birth through Age 8"

Source: Position statement of National Association for the Education of Young Children, July 1996

Below are some established points and best practices that should be considered when developing and implementing environmental education.

- Considering childhood as a unique stage of life, where children's lives should be valued in the present, not only in their preparation for the future.
- Positive or negative experiences during childhood can have powerful "snowballing" effects.
- Children are active learners.
- Play is a supportive context for the development of learning.
- Teachers are fundamental actors to enhance development and learning.
- It is necessary to establish reciprocal relations between teachers and families.

- b) Title: "The Contribution of Early Childhood Education to a Sustainable Society"

Source: UNESCO, 2008

This publication is the result of an international workshop called “The Role of Early Childhood Education for a Sustainable Society” that took place in Sweden in May 2007. It includes articles of different specialists from different countries that analyze the importance of sustainable development education in young children.

Some ideas for consideration to design a successful education campaign include:

- Education for sustainability should begin in early childhood. This is the stage where children develop values, attitudes, and habits which will be long lasting.
- Families have a central role in educating children for sustainable development.
- Young children’s learning should be part of daily life and play.
- The three pillars of Sustainable Development: Environment and ecology (awareness of natural resources); Economy (limits and potential of economic growth); and Society and culture (understanding of social institutions and their role in change and development).
- Activities could be built around the 7 Rs: reduce, reuse, repair, recycle, respect, reflect, and refuse.

B1.3. Environmental Education

a) Title: “Deschooling Environmental Education”

Author: Weston, A.

Source: Canadian Journal of Environmental Education, Vol 1, 1996, p. 35-46

Weston critiques the way environmental education is taught in schools and emphasizes the importance of developing a broader understanding of Environmental Education. To do this, he proposes shifting from “environmental education” to “environmental practice”, promoting the engagement with the larger living world.

b) Title: “Incorporating Environmental Education into an Urban After-School Program in New York City”

Authors: Bruyere, B., Wesson, M., and Teel, T.

Source: International Journal of Environmental and Science Education, April 2012, p. 327-341

Bruyere, Wesson and Teel analyzed how an Environmental Education program could be incorporated in an after-school curriculum. The case study is an after-school program in the Bronx borough which served 140 students between first and eighth grades, for three hours a day, five days per week. The study specifies the different barriers that teachers face when incorporating Environmental Education in the curriculum. Barriers include conceptual barriers (lack of consensus about definitions and goals of environmental education; teachers’ perceptions of nature), logistical barriers (time and resources), educational barriers (teachers may not have enough ecological knowledge), and attitudinal barriers. It is important to note, the focus group methodology implemented in the study showed that there is a high interest by parents and instructors in Environmental Education and that Environmental Educational training provides positive outcomes in students and their families.

B2. After-school programs in NYC that could be considered for implementing an education campaign.

B2.1. Existing NYC led after-school programs

a) Title: Beacon Programs

Source: <http://www1.nyc.gov/site/dycd/services/after-school/beacon-youth-programs.page>

These programs are available for children between 6 and 18 years old. Through different activities, typical programs are intended to build academic enhancement, life skills, career awareness, civic engagement, recreation, health and culture.

b) Title: Teen Action Programs

Source: <http://www1.nyc.gov/site/dycd/services/after-school/teen-action.page>

Participants, who are in grades 6th through 12th grade, are provided an opportunity to develop life skills while making a meaningful contribution to their community. The Programs goals are to foster engagement in school and the community while promoting responsible behaviors.

B2.2. New York State Department of Environmental Conservation (DEC) led program

a) Title: After-School Conservation Club (ASCC)

Source: <http://www.dec.ny.gov/education/38184.html>

ASCC is a partnership with United Neighborhood Houses (UNH), The After School Corporation (TASC), and DEC. It is a curriculum for established after school programs to expose their elementary-aged students to the wonder of the natural environment. The mission of the ASCC program is to bring environmental education to and foster a sense of stewardship in inner-city elementary-aged children involved in after-school programs. ASCC is set up as a two-part program: hands-on curriculum and a stewardship project. For the Fall 10-week session, students learn general environmental concepts such as what is conservation, what is a watershed, using resources wisely, and environmental ethics. During this time, they also learn about and do a stewardship project focused on recycling and composting. During the Spring 10-week session, students focus on the Hudson River Estuary, NY/NJ Harbor, water, and fish ecology, focusing on what is in their specific watershed, the anatomy of local fishes, and how humans impact the water ecosystems around New York City. The spring stewardship project usually focuses on creating habitat for local pollinators, including creating a native butterfly garden at their site.

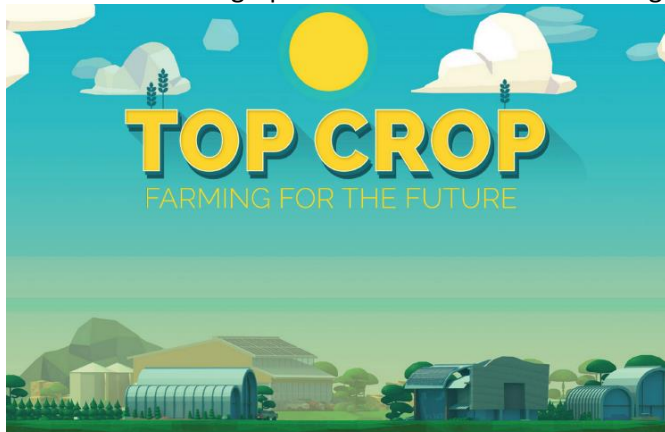
B3. Education Campaign Figures

B3.1. Birdie, mascot for GreenNYC



Source: New York City Mayor's Office of Sustainability, GreenNYC

B3.2. National Geographic: Educator Guide for Farming




EDUCATOR GUIDE

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Source: National Geographic Website, 2018, <https://www.nationalgeographic.org/education/>

B3.3. National Geographic: Activities for Introducing Biodiversity

 NATIONAL GEOGRAPHIC | SOCIETY | EDUCATION ▾

Introducing Biodiversity and BioBlitz


Why is biodiversity important? How can a bioblitz help us learn about local biodiversity?

Activity Overview

Students prepare for BioBlitz by defining biodiversity and examining the characteristics of various plants and animals as examples of taxonomic groupings. Students learn about the number of species identified globally in key taxa and use this information to make predictions about the biodiversity they may observe during their local BioBlitz.

EXPLORE THE RESOURCES FOR THIS ACTIVITY BELOW

Photograph by Chris A. Johns/National Geographic





1 hour
Grades 4-8
Ages 9-14

Related Materials

Do More With This Resource ▾
Find More Resources ▴


≡ Activities

**Protecting the Ocean**
Grades 9-12

**Field Investigations**


Source: National Geographic Website, 2018, <https://www.nationalgeographic.org/education/>

B3.4. Sesame Street video explaining doctor's appointments.



NOW PLAYING

D is for Doctor



Source: Sesame Street Website, 2018, <https://www.sesamestreet.org/>

B3.5. Sesame Street educational games about animals



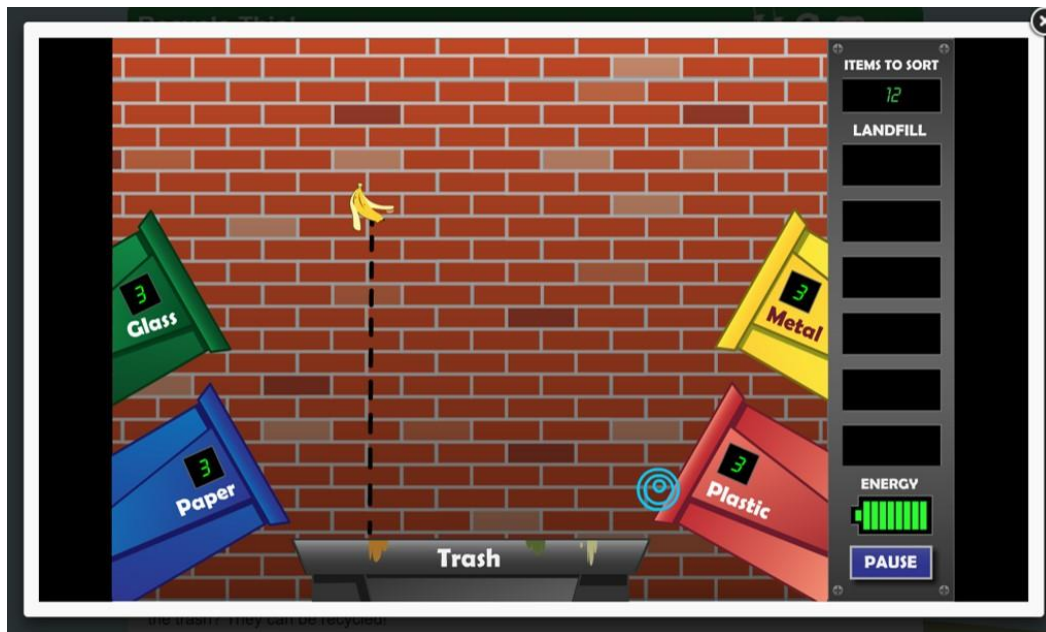
Source: Sesame Street Website, 2018, <https://www.sesamestreet.org/>

B3.6. Sesame Workshop with Sesame Street characters for school visits.



Source: Sesame Workshop Website, 2018, <http://www.sesameworkshop.org/>

B3.7. Climate Kids, NASA recycling game



Source: NASA Website, 2018, <https://climatekids.nasa.gov/>

B3.8. 'Love Your Drain' campaign children's book

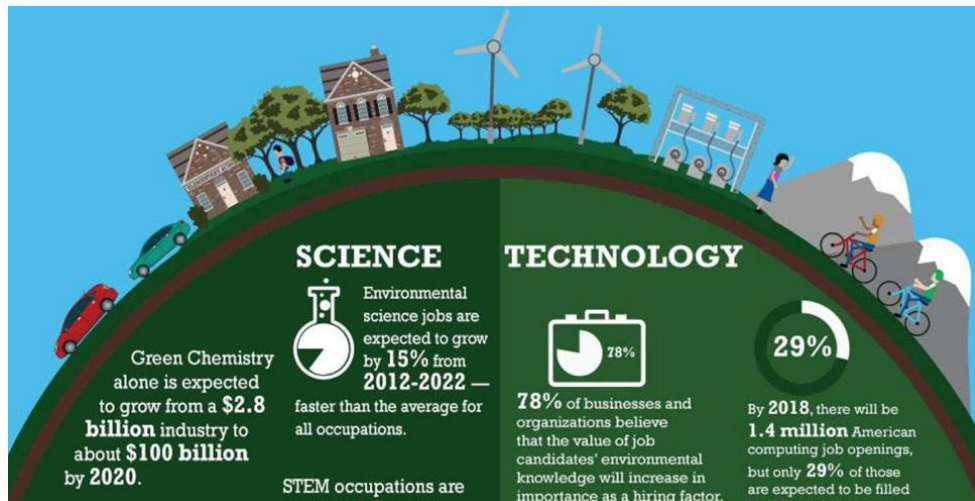


Dwaine Pipe
in
Down the loo or in the bin?

By Simon Andrew Tuck Illustrated by Alan Brown

Source: <https://www.nwl.co.uk/your-home/your-services/love-your-drain.aspx>

B3.9. National Environmental Education Foundation: Infographic explaining relation between STEM and environmental knowledge



Source: <https://www.neefusa.org/>

B3.10. Example of public signage in school restrooms



Source: Etsy, 2018

B3.11. Toilet exhibit at Museo de los Niños de Buenos Aires



Source: Museo de los Niños de Buenos Aires, 2018. <http://www.museoabasto.org.ar/>

Appendix C: Legal Action

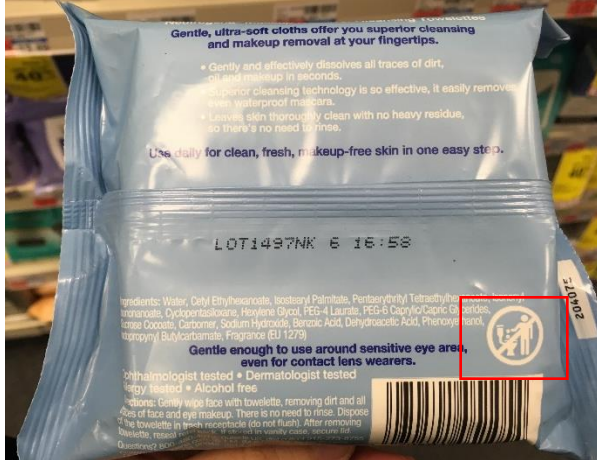
C1. Sample of data collection for wipes product labeling. Research conducted on January 31, 2018.

Locations:

1. CVS Pharmacy, 65 5th Avenue, New York, NY, 10003
2. Whole Foods, 4 Union Square E, New York, NY, 10003
3. Duane Reade, 1 Union Square E, New York, NY, 10003

Makeup Wipes:





Baby Wipes:



Appendix D: Media Campaign

D1. Review of NYC DEP's '*Cease the Grease*' campaign and related educational materials relative to *GreenNYC*, '*Bin it, don't block it*', and '*Love Your Drain*'.

Website: http://www.nyc.gov/html/dep/html/environmental_education/cease_the_grease.shtml

DEP provided material includes a '*Cease the Grease*' education module and hands-on activities for students. The hands-on activities reflect the value of water but includes nothing about wipes or the Four P's and only one worksheet about grease specifically. Within the education module there is a brochure available in English, Spanish, Korean, Chinese, and Russian. The brochure is kept simple but unfortunately remains visually unappealing and provides limited context for residents in terms of negative effects from sewer blockages. DEP also provides residential guidelines on the '*Cease the Grease*' website regarding grease and motor oil disposal tips but it elicits the same result as the brochure.

Regarding classroom specific materials, DEP provides a '*Cease the Grease*' PowerPoint presentation for teachers. Unfortunately, the section on grease causing sewer clogs is minimal, the entire presentation could be easily forgotten, and it provides no direct impact or connection to students. As with other '*Cease the Grease*' materials this presentation also lacks context. If someone looked at the PowerPoint without hearing the presentation it would be highly difficult to understand. To sum up, the '*Cease the Grease*' campaign in its existing form is sparse, easily dismissible and forgotten, not user friendly or child oriented, and takes a largely general approach to the problem of sewer blockages.

D2. Review of three campaigns studied to design Media Campaign Alternative

D2.1. *GreeNYC*

Location: Mayor's Office of Sustainability in New York City, New York

Size: Targets all 8.5 million residents of New York City

Implementation Year: 2007

Contact: Melanie Ho, Policy Advisor at NYC Mayor's Office of Sustainability,
<https://www.linkedin.com/in/melanie-ho-94542778/>

Website: <https://www1.nyc.gov/site/greenyc/about/about.page>

"As the official green mascot for the City, I help highlight easy steps residents can take to use less energy, make smart decisions about transportation and make less waste. It's surprisingly simple how taking a few easy steps can have a big impact on improving the environment of our city." -Birdie⁵¹

GreeNYC is NYC's behavioral change program to engage and mobilize New Yorkers to take simple yet meaningful steps to reduce their energy use, generate less waste, and lead more sustainable lifestyles. It is guided by data and marketing driven strategies with key components of strategic partnerships with external groups and strong brand adoption across city agencies. *GreeNYC* believes investment in behavior change can strengthen existing policy initiatives and act as complementary units where policy gaps exist. If crafted correctly, behavior change campaigns can yield high-impact, fast-acting, and long-lasting results⁵². Messages designed by *GreeNYC* are carefully crafted to trigger resident motivations, such as health benefits or convenience, while addressing barriers, such as uncertainty or cost, to change behavior. The program operates by hosting events with things to use (ex: reusable water bottles) not providing more reading material. This fosters hands-on engagement with residents.

A cornerstone of the program is its mascot, Birdie. The idea behind Birdie is to make him relatable to the average New Yorker. Birdie does not talk down to others and is learning what works best like everybody else. This is a movement away from the authoritarian perspective which garners wide appeal and resonance with residents. In 2017, "over half of New Yorkers were familiar with Birdie's image and with *GreeNYC*⁵³." Birdie also maintains his own social media presence via Twitter, Instagram, and Facebook.

For campaign metrics, *GreeNYC* focuses on environmental impact and resident attitudes. Listed below are environmental impact highlights from selected campaigns⁵⁴.

- Stop Junk Mail: 20 million pounds of paper waste reduced
- B.Y.O (Bring Your Own): 300 million+ plastic bags not consumed

To determine attitudes, *GreeNYC* draws upon surveys asking residents about their environmental attitudes and how the program makes them feel. In 2015, almost 50% of New Yorkers believed the power

⁵¹ "About Birdie." *GreeNYC*, New York City Mayor's Office of Sustainability, 2018, www1.nyc.gov/site/greenyc/about/about-birdie.page.

⁵² "Insights from *GreeNYC*: The City of New York's Behavior Change Program." *The City of New York*, Mayor's Office of Sustainability, 2017, p. 5. https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/GREENYC_LESSONS_2017_online_v2.pdf

⁵³ "Insights from *GreeNYC*: The City of New York's Behavior Change Program." *The City of New York*, Mayor's Office of Sustainability, 2017, p. 7. https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/GREENYC_LESSONS_2017_online_v2.pdf

⁵⁴ "Insights from *GreeNYC*: The City of New York's Behavior Change Program." *The City of New York*, Mayor's Office of Sustainability, 2017, p. 8. https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/GREENYC_LESSONS_2017_online_v2.pdf

to improve environmental health was by residents and local government⁵⁵. This was up from close to 33% in 2010. A 2017 survey revealed *GreeNYC* campaigns make residents feel informed, happy and thankful⁵⁶. Both surveys are completed with a data pool of 2,149 NYC residents over 18 years of age.

GreeNYC already partnered with the NYC Parks Department for a campaign called MulchFest to increase composting of Christmas trees. The campaign was successful and reinforces the feasibility of *GreeNYC* partnering with DEP. A possible connection with DEP can be done through Birdie's 'Drink NYC Tap Water' campaign. As *GreeNYC* broadly aims to shift residents toward more sustainable lifestyles, DEP could capitalize on the environmental impact angle. An example thinking in terms of Birdie as a common resident, Birdie could make social media posts of hanging out at the beach but a fatberg intruding from the sewer system. The core elements learned from *GreeNYC* that should transfer to '*Cease the Grease*' are keeping the campaign relatable, actionable, and simple. This aids resident engagement and digestion of information.

D2.2. 'Love Your Drain'

Location: Northumbrian Water (water services company) in Durham, England, United Kingdom

Size: 3,000 employees supply water and sewerage services to 4.4 million people

Implementation Year: 2011

Contact: Paul White, (0191) 301-5325

Website: <https://www.nwl.co.uk/your-home/your-services/love-your-drain.aspx>

This campaign contains targeted material for residents and restaurants. It provides interactive materials such as educational games, short videos, and children's books. A main attraction for '*Love Your Drain*' is the mascot Dwaine Pipe. Beginning with digital content there are short informational boxes on the website about who is responsible for fixing drains, helping the environment, and what new parents should do with wipes. The main game is 'Dwaine Dash' a mobile application where Dwaine Pipe explores the sewer system from two perspectives, going down the sink and the toilet. For the sink Dwaine must collect soap, water, and dish soap while avoiding dirty plates, food, and grease. For the toilet Dwaine must collect pee, poop, and toilet paper while avoiding diapers, toys, and medicine. Regarding the short videos, there exist two one-minute cartoons done in catchy verse about what to put in the drain, what not to put in the drain, and what happens if you don't follow the rules.

Regarding social media, the primary platforms used include Facebook and Twitter with Dwaine Pipe as the persona. The mascot largely retweets Northumbrian Water which covers clogs in WWTPs, water campaigns, water refill stations, and local artists using trash found on beach from sewer systems. Outside of digital content, '*Love Your Drain*' also does poster and radio advertisements. Another part of outreach involves visiting schools and community events with Dwaine Pipe. At schools '*Love Your Drain*' provides two children's books; "Dwaine Pipe in Would You Like to Eat That?" and "Dwaine Pipe in Down the Loo or In the Bin?".

'*Love Your Drain*' won the 2017 Masters of Marketing Awards for the category of Telecoms, Energy, and Utilities. The judges' comments about the campaign included, "Funny, comprehensive and impactful. A

⁵⁵ "Insights from GreeNYC: The City of New York's Behavior Change Program." *The City of New York*, Mayor's Office of Sustainability, 2017, p. 11. https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/GREENYC_LESSONS_2017_online_v2.pdf

⁵⁶ "Insights from GreeNYC: The City of New York's Behavior Change Program." *The City of New York*, Mayor's Office of Sustainability, 2017, p. 13. https://www1.nyc.gov/assets/sustainability/downloads/pdf/publications/GREENYC_LESSONS_2017_online_v2.pdf

great, effective and well-targeted campaign⁵⁷.” This awards presentation is part of the annual Festival of Marketing, the largest global event dedicated to brand marketers. The Festival holds more than 200 speakers, workshops, awards, experience rooms, and trainings.

D2.3. ‘Bin it, don’t block it’

Location: Thames Water (water services company) in Reading, England, United Kingdom

Size: 5,000 employees supply water and sewerage services to 15 million people with 687 million gallons of drinking water each day to 9 million people

Implementation Year: 2009

Website: <http://binit.thameswater.co.uk/>

The website is broken into three categories: Are wipes flushable, What really happens, and Fatberg fighting tips. It provides interactive materials such as quick learning games, eye catching infographics, and short videos. One learning activity is the at home ‘flushable challenge’, a one-minute test to determine if a material can be flushed. Another activity is the ‘no drainer test’, a 30 second quiz with 16 questions about household products that should be trashed or flushed. The website also includes a large, interactive infographic about what really happens when people put inappropriate residential materials down the drain. Another attractive part of the campaign is a collection of videos that span topics such as wipes not going in the toilet, fat not going in the sink, and cautionary Christmas carols. Overall, the web portion of the campaign is attention grabbing and informative. Regarding social media, the primary platforms used are Facebook, Instagram, and Twitter with the lead catchphrase being #WipesBlockPipes. Outside of digital content, ‘Bin it, don’t block it’ spread their information via direct mail, posters, and Google and Facebook advertisements in hotspots. The campaign did incorporate a residential fat trap at one point but information about it remains unattainable.

⁵⁷ “Dwaine Pipe / Love Your Drain Campaign.” *The Masters of Marketing Awards 2018*, Festival of Marketing, 2018.
www.festivalofmarketing.com/book-of-the-night-2017/dwaine-pipe-love-your-drain-campaign.

D3. Media Campaign Figures

D3.1. NACWA 'Toilets Are Not Trashcans' campaign logo



Source: "Toilets Are Not Trashcans." NACWA, National Association of Clean Water Agencies, 19 Nov. 2015, www.nacwa.org/advocacy-analysis/campaigns/toilets-are-not-trashcans.

D3.2 Northumbrian Water homepage



Northumbrian Water launched the 'Love Your Drain' campaign. On their homepage they include a large infographic and link, pictured at the bottom, to their media campaign.

Source: "Homepage." Northumbrian Water- Living Water, Northumbrian Water Limited, 2018, www.nwl.co.uk/.

D3.3 Dwaine Pipe, 'Love Your Drain' mascot



Source: "Dwaine Pipe." *Learn About Water*, Northumbrian Water Limited, 2011, www.nwl.co.uk/your-home/your-services/Dwaine-Pipe.aspx.

D3.4 Flushable Challenge from 'Bin it, don't block it'



Source: "Are Wipes Flushable?" *Bin It - Don't Block It*, Thames Water Utilities Limited, 2018, binit.thameswater.co.uk/are-wipes-flushable/.

D3.5. 'Bin it, don't block it' advertisement



Source: "Cooking Fat." *Reducing Blocked Pipes by Reversing Ingrained Habits*, 23red, 2015, www.23red.com/thames/.

D3.6 'Bin it, don't block it' advertisement



Source: "Wet Wipe." *Reducing Blocked Pipes by Reversing Ingrained Habits*, 23red, 2015, www.23red.com/thames/.

D3.7. 'Love Your Drain' advertisement



Source: "Dwaine Pipe Says." *Glen McNamee*, Glen McNamee, 11 Oct. 2016, blog.glenmcnamee.com/2016/10/the-zoella-of-sewage/.

D3.8. 'Love Your Drain' advertisement



Source: "Dwaine Pipe's Top Tips." *Northumbrian Water- Living Water*, Northumbrian Water Limited, 2016, www.nwl.co.uk/media-centre/611_6686.aspx.

D3.9. DEP 'Cease the Grease' webpage

NYC

NYC Rec

NYC Environmental Protection

NEWSLETTER SIGNUP PRINTER FRIENDLY

שיתוף

TRAN

[Home](#)

Customer Services

- [Pay Online](#)
- [Ways to Pay Your Bill](#)
- [eBilling](#)
- [Account Information](#)
- [Customer Assistance](#)
- [Service Line Protection Program](#)
- [Water Rates](#)
- [Property Managers & Trade Professionals](#)

Water Utilities


- [Drinking Water](#)
- [Wastewater](#)
- [Stormwater](#)
- [Harbor Water](#)
- [Long Term Control Plan](#)

The Watershed

- [Watershed Protection](#)
- [Watershed Recreation](#)

Citywide Initiatives

- [Environmental Education](#)
 - Water Resources Art & Poetry Contest
 - Visitor Center at Newtown Creek
 - Educational Resources for Students & Teachers
 - Guide to Supplemental Water Education Programs
 - Activities
 - Great Books & Web Sites
 - New York City Water Saver's Workbook



Cease the Grease Education Module

What happens to my used water once it goes down the drain? What about the grease after I am done cooking and cleaning? Should I pour it down the drain or dispose of it in the trash? Learn about the New York City sewer system and how we can protect the pipes as we "Cease the Grease."

Interactive, multi-disciplinary, STEM lessons and activities, introduce students and educators to the hidden world of thousands of miles of pipes, hundreds of valves and regulators, and other infrastructure with the power to transport our drinking water and our wastewater, with your help.

Background Information

- [Blue Man Group PSA](#)
- [Cease the Grease PowerPoint presentation](#)
- [Glossary](#)
- [Harbor Literacy Points](#)
- [NYC Wastewater Drainage Areas and Wastewater Collection Facilities Map](#)
- [Secrets of New York: The Sewers video](#)

Source: "Cease the Grease Education Module." *NYC Environmental Protection*, New York City Department of Environmental Protection, 23 Jan. 2018, www.nyc.gov/html/dep/html/environmental_education/cease_the_grease.shtml.

D3.10. NYC Department of Design and Construction education webpage



STEAM



We know that the next generation of great architects, engineers, and builders is just a classroom away.

In 2014, we created the STEAM Initiatives program to establish a diverse and inclusive pipeline for New York City's youth to engage in architecture, construction, and engineering (ACE) industries. Our customized outreach programs enhance student awareness of these fields, beginning in middle school through high school and college. This further enriches the broader goals of STEAM: to bring awareness to the importance of science, technology, engineering, art/architecture and mathematics in our educational system.

We support schools in providing a holistic educational approach. We introduce students to the broad range of STEAM careers, encouraging empowerment and confidence in students' performance in math and science. Above all, we believe in equal access to information, resources, and communication tools as it relates to STEAM programs and careers.

Quick Links

- [Download the STEAM brochure](#)

Source: "STEAM." NYC DDC: Department of Design and Construction, New York City Department of Design and Construction, 2018, www1.nyc.gov/site/ddc/steam/steam.page.

D3.11. 'Love Your Drain' website

NORTHUMBRIAN WATER *living water*

About Us | Careers | Contact Us | Log in | Register | Search Northumbrian Water

Your home | Business | Landlords | Developers | Retailers

Your account | **Your services** | Leisure | Saving water | Learn about water

Can you love your drain like Dwaine?

Our sewerage services | Love your drain | Sewer flooding | Private drains and sewers | Misconnections | Rainwise

Love your drain

Hello, my name is Dwaine Pipe. I'm here to help you learn what can go down your toilet and sink and what should go in the bin.

Sometimes people put things down their loo and sink which block me up and make me very poorly.

It can be very unpleasant and stinky and can even cost a lot of money to unblock me. I like to feel happy and healthy and you can help me by following my top tips below:

- Only toilet paper, pee and poo go down the loo; pop nappies, cotton buds, cotton wool, wipes and other bathroom waste into a bin.
- Scrape your plates into a bin before rinsing them, grease and fats can also make me poorly so pop any food scraps or leftovers into a bin instead of down the sink.

Play the Dwaine Pipe game

Now you can learn about the things that should and shouldn't go down the loo and sink by playing my exciting new game. Dash as fast as you can through the sewer and dodge the oncoming pipes.



Help me eat toilet paper, pee and poo but avoid nasty nappies, teddy bears and medicine. The more good stuff I eat the higher your score. Work your way up the leader board and win some great prizes!

Dwaine Dash is available to download from the App Store and Google Play by clicking the links at the top of the page.

Get your FREE family baking kit

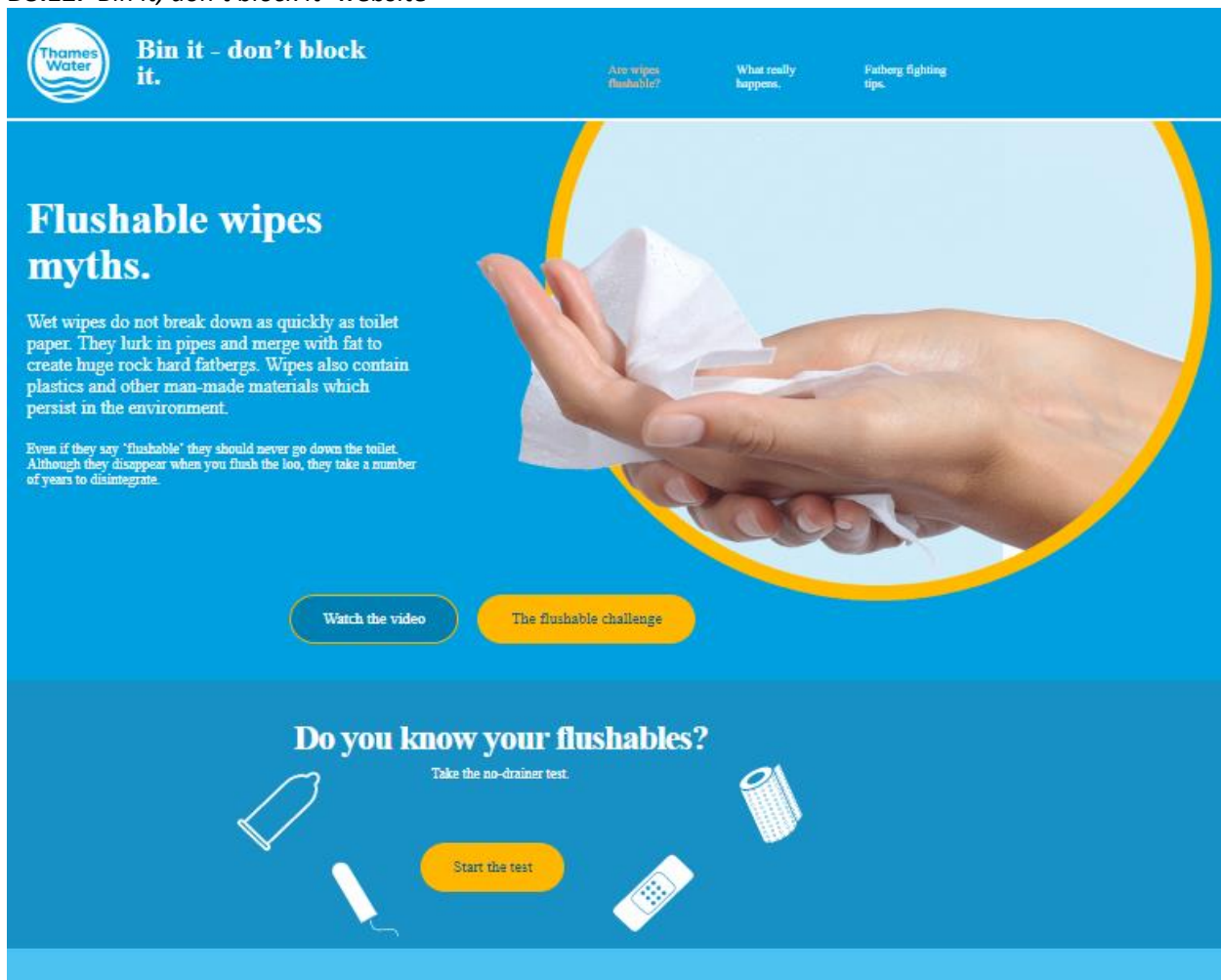
Have you had a repeat blockage leaflet?

Advice for businesses



Source: "Love Your Drain." Northumbrian Water, Durham, England, 2011. <https://www.nwl.co.uk/your-home/your-services/love-your-drain.aspx>.

D3.12. 'Bin it, don't block it' website



Source: "Bin it – don't block it." Thames Water, London, England, 2009. <http://binit.thameswater.co.uk/>.

D4. Interview with Matt Schutzman an Account Executive of Outfront Media conducted on February 7, 2018 by Racheal Whiteside

Phone: (212) 297-6483

Email: matt.schutzman@outfrontmedia.com

405 Lexington Avenue, New York, NY 10174

Summary: A top tier media campaign includes subway, bus, and mobile ads that does four rounds of advertising for four weeks each. This would cost about \$922,000.

RW: To give you a little background I am a master's student at The New School studying for my Environmental Policy degree. For one of my classes I work with a live client on a real problem. My team is consulting NYC DEP. The main issue is that people are flushing wipes and pouring grease down drains which creates congealed masses in the sewer system called fatbergs. These fatbergs block up the sewer which DEP then has to divert resources to break them up. This costs them about \$3 million annually. To solve this problem one of our options is launching a media campaign around behavioral change and environmental education aimed at all NYC residents.

MS: That's pretty expensive. It's interesting to think that some wipes say they're flushable on the package, but they cause such a big problem.

RW: Yes and if you think about it anything is flushable, even a golf ball, but that doesn't mean it's good for the system. Wipes manufacturers have used industry working group guidelines to allow them to put flushable on the package. Changing that labeling is another one of our options. A different team member is leading the legislative charge while I'm exploring a media campaign.

Knowing that I am a student consultant for DEP do you have any issues with making this a formal interview or allowing my team to put your professional opinion in a report?

MS: That shouldn't really be a problem, but I will need to review our policy in terms of this interview going in to a report. I'm not sure about making it public.

RW: The report will not be made public. It will only be distributed to our client in DEP, remain a city agency document at this time. I can even send you a copy of the interview after we've concluded to allow you to review and approve it before it's included in any documentation.

MS: That would be great. I'd love to see a copy and we shouldn't have a problem.

RW: Great. Moving on to the campaign, could you elaborate more on mobile advertising? How does that work? What does that cost?

MS: The mobile advertising is new for Outfront Media, it began last year. We operate it through our Outfront Mobile Network. The most general product is a proximity product. That works by inputting a latitude/longitude coordinate and then covering a five-mile radius within that area with a geofence. Any person that enters the geofence radius will be sent a mobile banner ad that would pop up through existing apps that phone users have. For example, I use the ESPN app. If I entered the geofence while on the ESPN app the banner ad would pop up.

To measure this we send weekly reports to the client about how many banner ads are sent, how many people click the ad, and what do people do after they click the ad. For example, they may go to Facebook, Instagram, click on a phone number given in the ad, or watch an embedded education video. We can also track how long people watch the video. The mobile ads extend underground [subway] messaging and reinforce the messaging.

This type of campaign can be scaled to budget. It's based on purchasing a CPM which stands for cost per views. For example, one type of CPM could cost \$8.09 to distribute 1,000 banner ads. Physical ads stand out the most and are most impressionable. Phone ads reinforce the physical ads and are measurable.

RW: Are the costs you emailed me minimums for all four campaigns or one four-week campaign?

MS: The emailed costs are given for one four-week campaign. For four weeks you can get 1000 ads in subway cars roaming the city which translates to 1 in 6 cars having ads.

RW: In the email you used an acronym, OOH. What does it mean?

MS: This stands for out of home. The industry, which includes billboards and transit displays, uses this for any media consumed outside of the home making it OOH media.

RW: On your website there are many case studies about past campaigns. I looked through them to see if there are any comparable to what DEP envisions but wasn't quite sure which to pick. Do you know of a case study that is comparable for effectiveness?

MS: There are a lot of case studies and it can be difficult to match one to what a new client wants. I will look into it more. Some are close but not quite right. I will check and email you back with one if I find one.

RW: You talked about this with the mobile campaign but how else do you measure effectiveness for subways and buses? What is your criteria?

MS: There are some technical terms you will need to know. For mobile, there are impressions which are used for most forms of media. An impression measures how many people viewed the ad. Going back to the example CPM, you pay \$8.09 per 1000 impressions. Another term is CTR or click through rate. This is out of the total number of impressions how many people clicked the ad. Another term is SAR which is secondary action rate. This explains what people do after clicking the ad. It is the most telling function because it reveals intent.

For print there are also impressions. They are measured and monitored by an auditing bureau which uses equations that include factors of circulation, size of an ad, and ad distance from people to calculate an answer. This is background methodology which can be explored further at geopath.org. The auditing bureau is the auditor for all of OOH media. Before impressions we used circulation based on the number of MTA riders. Two more measurements are reach and frequency which determines how effective a campaign will be to cover a market.

Every market in the US is broken into DMAs. The NYC DMA includes the five boroughs, northern NJ, CN, LI, and West Chester. This DMA is the largest in the country with 16.5 million people. A DMA serves as the measuring base for campaigns. Within the NYC DMA for a minimum buy of 1000 subway ads over a four

week campaign the reach is 9%, calculated based on the number of ads published relative to DMA population, and frequency is 5.6 times, calculated from the number of ads repeatedly seen by a person.

Returning to CPMs, subway media is closer to \$5 for CPM. A smaller CPM means a campaign has a cheaper cost while reaching more people. OOH media is more effective based on CPM relative to radio campaigns. OOH CPMs are on average lower than, not just radio, but TV and most other forms of media.

RW: Do the costs given yesterday include graphic design or only printing/posting?

MS: Graphic design service is of no extra cost as it's an in-house service. We may impose some charges if there's a tremendous amount of back of forth between the designers and a client where the client wants many changes. This fee would maybe be \$100.

RW: This is a big ask and you can choose not to answer if you prefer, but what do you think the cost of a premier media campaign would be? This includes the four campaigns lasting four weeks each with subway, bus, and mobile ads.

MS: I would propose 2,000 interior ads for the subway which is \$100,000 for four weeks. Times four to do all campaigns the subway is \$400,000. A citywide bus campaign would be the same, \$100,000 for four weeks translating to \$400,000 for this campaign. For mobile the rule of thumb is 15% making it \$120,000. I'm coming in at \$922,000 for citywide subway interiors, buses, and mobile banners covering NYC for one year.

RW: That seems highly reasonable considering the problem costs DEP \$3 million annually. That's all of my questions, do you have any final comments?

MS: I do want to express my desire to speak with someone at DEP directly. I feel it's most beneficial for both parties to start working on details and establish a connection. At minimum a linking of us to DEP. Outfront wants to work with its clients directly to get more details and create a suitable campaign.

RW: I understand completely. I have a meeting with my client next week and can bring it up then.

Appendix E: Additional contact information

NYC & Company

New York City's official marketing, tourism and partnership organization. The not-for-profit quasi-agency's mission is to maximize opportunities for travel and tourism in New York City, build economic prosperity and spread the dynamic image of New York City around the world.

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National Association of Clean Water Agencies (NACWA)

NACWA is the only organization whose sole purpose is to represent the interests of all public clean water utilities. Our mission, "**Every Utility a Member**," speaks to a vision of a strong, unified voice for clean water agencies achieving robust, sustainable policies that will shape the entire clean water sector, and to a powerful community of peers, sharing strengths to ensure the growth of all.

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