Draft MS4 Stormwater Annual Report

2017

Available for public comments

Please address all comments to

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By February 17th, 2018

ENGINEERING DEPARTMENT

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Toni N. Harp
Mayor

December 20th, 2017

Christopher Stone, PE
Stormwater Permit Co-ordinator, Bureau of Water Management, Permitting and Enforcement Division
Department of Energy & Environmental Protection
79 Elm Street
Hartford CT 06106-5127

Re MS4 Stormwater Permit
Draft Annual Report for 2017

Dear Mr. Stone,

This letter forms our progress report for 2017. As many tasks are in progress on a multi-year basis, much of the text of this report replicates that used in previous annual reports. In consequence, changed text is printed in red to emphasize what is new this year.

Introduction & Overview

As with previous reports this one reviews progress on each of the best management practices in turn. The biggest problem during the year has been the State's inability to set a budget until November. The City is highly dependent on State funding, hence a moratorium on non essential activities was imposed to preserve the City's financial position between August and November. During this four month period street sweeping was significantly reduced, and catch basin cleaning was restricted to emergency issues causing flooding. Consequently this hiatus has significantly reduced the amount of good housekeeping undertaken during 2017 compared to 2016. On a more positive note, an additional $50,000 was allocated for stormwater management during 2017-2018.

The following amounts have been included in the city's budget during each of the fiscal years listed below, which run from July 1st to June 30th :-

2014 - 2015	Allocated	$351,000	Expended	$351,000
2015 - 2016	Allocated	$475,000	Expended	$415,000
2016 - 2017	Allocated	$550,000	Expended	$520,000
2017 – 2018 (current)	Allocated	$600,000	Expended to date	$150,000

The above funds are expended primarily on catch basin cleaning, CCTV work as part of the IDDE program, and water testing. Street sweeping is included in the Department of Public Work's budget, and is estimated to cost approximately $500,000 annually. Additionally, the bio-swale program which commenced in 2015 is expected to use $2,500,000 provided by a CDBG-DR grant

There have been no changes in the situation regarding the City's proposal to form a Stormwater Authority. It was voted down by the Board of Alders in 2010 due to significant opposition from the general public as the proposed user fees were viewed as an additional form of taxation. The completed draft study that was prepared by Malcolm Pirnie (now Arcadis) awaits finalization, but this is not an urgent issue. Although there has been a change in administration in the city since 2013, there are no current plans to re-visit this issue

Chapter 26 of the City's code of ordinances, which covers illicit discharge detection and elimination, was adopted by the Board of Alders on June 6th, 2016.

BMP 1. Public Education

As indicated in previous reports we have found the standard EPA outreach materials to be ineffective when put on passive display to the public. Although we tried to counter this by circulating stormwater information with re-cycling information, this approach ceased on a large scale in 2006 when the city's full time re-cycling co-ordinator was laid off. Informational documents are kept in the City Engineer's offices for public reference, but there have been very few inquiries.

The city has now produced an all encompassing 'green' pamphlet that covers many things the city's residents can do to protect the environment. It includes a few easily understood actions on storm water protection.

The EPA web site has been researched for public education materials, and the City will provide links from its web site to these.

Public education during 2016 has consisted primarily of outreach work with some of the public interest groups mentioned in the next section.

BMP 2. Public Participation

a. Catch Basin Stenciling

As in previous years new catch basin stencils have appeared in various parts of the city. It is not known who is doing this. It could be one group of citizens, or several operating independently. In the early years of the MS4 permit it was noted in these annual reports that the stencils only have a lifespan of a few years. Overall, at that time it was not considered an effective BMP. At that time the stencils were provided free by DEP to any interested volunteer group. However, the volunteers doing the stenciling now have to pay for the stencils themselves. In view of this degree of public interest the City has changed its opinion of stenciling as an effective BMP. In consequence, the update to the Stormwater Management Plan has included an objective of stenciling all the city's catch basins over a three to four year period. It is hoped that if younger people and school children are involved then it will also have an educational effect.

b. Public Interest Groups

As indicated in previous years public interest groups within the city have continued their activities throughout 2016, though most of them work entirely independently of the City.

There are a number of active interest groups within the City, though for the most part they function completely independently. Yale School of Forestry and Environmental Studies (Yale FES) seems to act as a catalyst as its students are active in many of these groups.

One group within the city, the Friends of Beaver Ponds, has joined forces with Yale FES students to undertake a major, ongoing study of one of the City's watersheds. One of its major objectives is to improve water quality by either eliminating or substantially reducing the amount of trash entering the ponds at Beaver Park. These drain in to Long Island Sound via the West River. One of the recommendations of the report was to remove a dam that retains water in the ponds and convert them back to wetlands. This would then allow trash to be removed where the drainage system enters the wetlands. At the present time all the outlets into the ponds are below water level, preventing trash removal. Yale FES is now undertaking a hydrographic study of the impacts of this proposed conversion. If this public interest group initiative goes ahead, it will have a significant effect in improving water quality by reducing floatables and silt entering Long Island Sound. At best, it will take several years to come to fruition, particularly as there is a lack of consensus within the Friends of Beaver Ponds group.
Some of its members would prefer to keep the ponds as they are now.

Due to strong lobbying by the Friends of Beaver Ponds the city constructed a large overflow structure with trash racks on one of the major storm drains entering the ponds. Experience so far suggests that it has not been successful during heavy rainstorms, as turbulence lifts trash above the screens, and flushes it out into the ponds.

Another active group has been the Mill River Association. This was formed in the late 1990s to ensure that the Regional Water Authority's new treatment plant at Lake Whitney had no detrimental effect on water quality in the Mill River. The RWA continues to monitor water quality and other environmental parameters, and publishes the results on their website.

The sluice gates in the West River tide gates have now been operational for several years. This project was sponsored by Save the Sound. There has been a noticeable reduction in the amount of phragmites upstream of the tide gates, indicating the effectiveness of this project by allowing additional flushing of the watercourse with salt water.

The West River Watershed Coalition is an active group of volunteers focused on connecting adjacent communities with the West River and improving ecological, physical and economic health of its watershed. Coalition members span the four municipalities that the West River runs through. In addition to a monthly general meeting, the Coalition has a number of sub-committees that meet independently including Steering, Access, and Outreach Committees. The Coalition worked with a local consultant to develop a Watershed Management Plan that was completed in the fall of 2015. Outreach continues related to achieving the goals set forth in the plan. Staff from the City's Engineering Department presented to the coalition about stormwater management and green infrastructure twic this past year.

We feel that New Haven has a healthy public interest in clean water issues, as in addition to the above mentioned groups, there are a number of other less active groups. One of the problems is

that there is no co-ordination between these groups, and many of them work in a vacuum. This reduces their effectiveness. Even within the larger, more organized groups there is a lack of consensus between members which prevents them from being effective in setting and achieving goals.

BMP 3. Illicit Discharge and Detection

As part of their audit the EPA undertook PPCP (Pharmaceutical and Personal Care) testing on samples taken at the locations where the City undertakes its annual MS4 sampling. These indicated the system had illicit connections. Although previous sampling had indicated E-coli to be present, it had been thought it was from wildlife, as there are large bird populations around the Quinnipiac estuary. There are also abundant populations of mammals in the City's parks, including many clusters of endangered species. During 2017 the City undertook it's own PPCP testing, which is discussed further in the 'Monitoring' section of this report.

On review of the EPA testing results in 2014 the City commenced CCTV inspection work in 2015. $100,000 was spent this activity during 2017. Of this amount approximately $60,000 was spent on pipe cleaning so that the CCTV cameras could pass through pipes. CCTV work was chosen as the most appropriate methodology for three reasons :-

(i) The great majority of the City's outlets are tidal, and access is difficult, as they are either partially or completely submerged, even at low tide.

(ii) The City has good records of connections to its sanitary and storm systems, these having been kept for many years. Comparing these with CCTV footage will indicate suspect connections, which can then be eliminated or confirmed by dye testing.

(iii) CCTV work is relatively cheap, the City having a contract for this work at $1.00 per linear foot, and it is also fast, as up to 2,000 linear feet of piping can be filmed in a day.

The following is the intended sequence of work.:-

1. CCTV trunk storm lines.
2. Review CCTV and still photographs and compare to the City's record drawings to determine potentially illicit connections.
3. Undertake field inspections to verify or eliminate suspect connections.
4. Dye test suspect connections from the property, and verify at the nearest downstream manhole.
5. Take enforcement action and remove illicit connection.
6. When all illicit connections on a network have been eliminated, sample at the outlet to check on the effectiveness of the removals.
7. Review and repeat the above process if not fully effective, or devise other Methodologies if necessary.

During 2017 the City instructed 60,000 linear feet of pipe to be CCTVed, representing approximately 6% of its total storm sewer system. By the end of the year only 40,000 linear feet had been completed as a result of many of the pipes needing cleaning prior to undertaking the CCTV work.

To date 4,800 linear feet have been fully reviewed, and six dubious connections have been detected. These have been checked out and every indication is that they are from roof leaders. The outlet from the network concerned will be tested during 2018 to verify this conclusion.

Although a significant amount of CCTV footage is now to hand covering several drainage networks, no one networks has been completed. The primary reason for this is lack of access, as many manholes have been paved over.

One thing that has been noted is extensive seepage through pipe joints due to the relatively high water table that exists throughout much of the city. This indicates that dry weather inspections coupled with field testing, per the EPA protocol, would be problematic, as the ground water flows would suggest illicit connections when they are not present. Equally, groundwater ingress could dilute flows from illicit connections such that the extent of problems may not be recognized.

BMP 4. Construction Site Run-off Control

At the present time construction work can be divided roughly into three categories :-

1. Major developments in the downtown area. These are large enough to require the DEEP's general permit for Stormwater and Dewatering Wastewater from Construction Acitivities.

2. Major highway construction on I-95. ConnDOT has its own stormwater management plan.

3. Residential construction. As the city is already highly developed virtually all new residential construction is on lots of less than a quarter of an acre with little run off. As the city is mostly underlain by fine alluvial sand, rainfall permeates into the ground, rather than running off it when it is disturbed during construction work.

BMP 5. Post Construction Run-off Control

.In general, the city is pretty much 100% developed within its municipal boundaries with a fully developed stormwater collection system that has been in place for over a century. Section 60 of the New Haven Zoning Ordinance requires that a stormwater management plan shall be included as part of any application for zoning approval, coastal site plan review, or an inland wetlands permit where :-

1. The application pertains to a development or construction disturbing one-half or more acres of total land area on a site; or

2. The application pertains to any siter with one half acre or more of existing and/or proposed impervious cover; or

3. The application proposes new residential development of three or more units; or

4. The applicant pertains to any new or expanding industrial or commercial use which increases the amount of on-site impervious surface by more than 500 square feet; or

5. The application pertains to any site within the coastal boundary as defined in section 22a-94 of the Connecticut General Statutes;

6. The commission which has jurisdiction over the application has required submission of a stormwater management plan pursuant to written findings by the commission that the activity proposed in the application has the potential to cause significant non-point source pollution to groundwater or surface water drinking supplies, or to Long Island Sound, or any other waters of the state.

This plan includes a provision that stormwater management systems shall be designed to collect, retain, and treat the first inch of rain on-site so as to trap floating material, oil and litter. This requirement has led to many installations of infiltrator systems and other green infrastructure technologies on private property.

BMP 6. Good Housekeeping

1. Street Sweeping

During 2017 street sweeping continued on an 'as required' basis, at a reduced level from 2016 due to the abovementioned four month budget freeze.. Between April and August most streets were swept about 2 or 3 times, with a further work in late November and early December to remove fallen leaves. The City's leaf pick-up operation in the fall was more effective than in 2016, with more residents bagging their leaves for pick up.

Although regular street sweeping has always been undertaken, its value in keeping the drainage system clear of detritus has not been as high as it should be. Poor paving practices over the years have resulted in many catch basin gratings being depressed by six to eight inches below the adjacent road level. As the street sweeper's brushes cannot reach into these recesses, they collect trash, which then washes straight in to the catch basins when it rains. Also there were an extreme number of potholes over the 2015-16 winter, with the dislodged bituminous concrete tailings being washed into the storm drainage system.

2. Catch Basin Cleaning

The catch basin cleaning contract for 2017-18 was renewed with McVac Environmental after going through a competitive bidding process. The price per cleaning increased to $115.00 from $98.50 under the previous contract. The hiatus caused by the budget freeze has reduced the number of catch basins cleaned during 2017, but the contractor has made a determined effort to catch up on the backlog during late November and December.

2014	3,500 CBs
2015	3,900 CBs

2016 3,625 CBs
2017 2,975 CBs

McVac has been much more conscientious than previous contractors in both cleaning and recording locations of catch basins which do not accord with city maps. Although the city has copious records of its storm water infrastructure, much of it has not been updated since the early 1970s. At some stage, funds being available, a significant updating effort will be required. Until this is done it is expected that the total catch basin estimates will vary from year to year by several hundred.

In 2017 a few un-mapped catch basins were found, down significantly from previous years. However, many more manholes have been found to be paved over, which makes access for CCTV work problematic in some areas, as discussed above.

The current estimate of the total number of catch basins now stands at 2,200 in the combined systems and 5,650 in separated areas, for a total of 7850. This estimate is the same as 2015, due to few un-mapped catch basins being found, and no combined sewer separation work being progressed.

Emergency catch basin cleaning continued during 2017 and was required at approximately 40 locations, up from 90 locations during 2016. This is believed to be due to less road sanding being done in winter. Records for all catch basins cleaned indicate the amount of debris removed during 2017 reduced to an average of 0.3 cu yds compared to 0.45 cu yds in prior years.

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There are now a number of known locations that are problematic. In general terms frequent clogging of catch basins occurs from four main causes, and in some locations cleaning has been required two or three times during the year. These causes are:-

(a) At the bottom of hills, where either winter de-icing sand, or to a lesser extent, eroded soil, accumulate.

(b) On streets that are densely tree lined, where leaves are a problem, and to a lesser extent dead blossom in the early summer.

(c) In the vicinity of shops and strip malls, where litter and trash are dropped.

(d) Design and/or construction deficiencies.

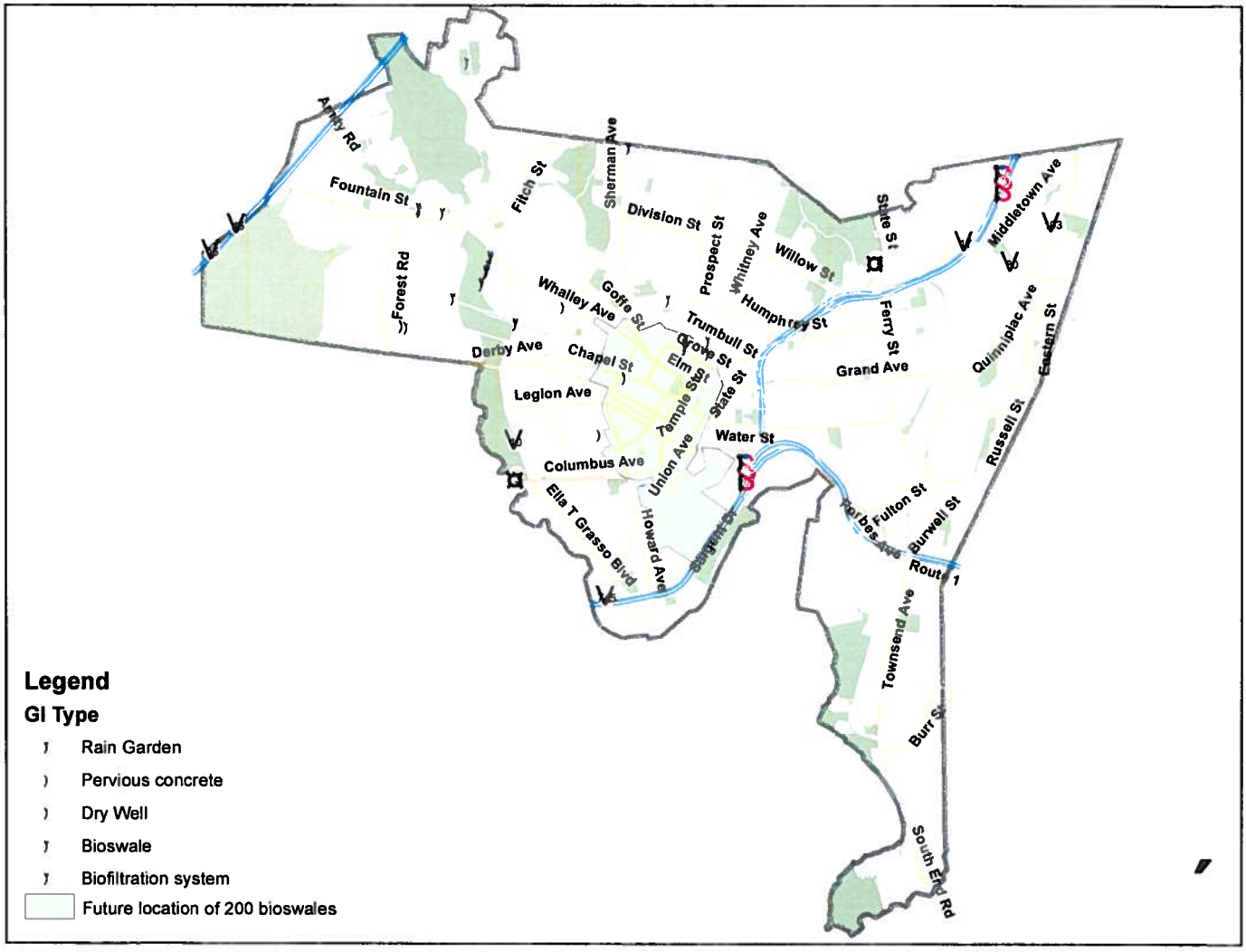
3. Trash

Trash continues to be a major problem in some areas of the city. However, these are predominantly combined sewer areas, so the effects on surface waters, such as Long Island Sound and the Quinnipiac, are minimal. To address the illegal dumping and trash issues the Mayor started the "Clean City Initiative" in 2016. Increased outreach, community service, partnerships with business districts, and efforts from the City's Department of Works resulted in over 427,000 pounds of trash collected from the City's downtown neighborhood alone. In addition, the City uses Click-Fix, a web based

citizen's reporting portal. It has proved to be very effective as a tool in dealing with this problem. These initiatives have continued during 2017.

4. Green Infrastructure

The City of New Haven seeks to utilize green infrastructure on publicly owned property, wherever possible, to address flooding and drainage related issues, and to improve water quality. To date, the City has installed 36 bioswales, 3 rain gardens, and 9 dry wells within the public right of way and parkland to capture runoff from streets and sidewalks. The City has worked with its non-profit partners, namely Save the Sound and Urban Resources Initiative, on some of these projects. Additionally, the City installed a bioinfiltration project at a local library, capturing runoff from the roof and parking lot and infiltrating it in nearby parkland. Funding has been secured by the City for the installation of up to 200 bioswales and other infiltration-based green infrastructure throughout a 600-acre drainage area in Downtown New Haven. This installation will occur over the next two years through 2018. The map below highlights the project locations.



Ordinances

.As indicated above, an IDDE ordinance was adopted during 2016

Monitoring

The City awarded a contract to Analytical Consulting Technology of Waterbury to undertake some further water sampling at catch basins to determine the level of pollutants entering its storm drainage system. The results and the City's comments are included in Appendices 1 thru 9 to this report. The main finding is that there are elevated levels of bacteria entering the system from natural sources such as wildlife. Further testing will be undertaken in this respect, though it was delayed by the budget freeze. Requests for proposals for this work were circulated in early December, and it is expected to be undertaken in the spring of 2018.

Review

During 2017 work continued on BMPs at the same level as to 2016, except during the four months of the budget freeze. The budget for stormwater management was increased by $50,000, but these funds were unfortunately diverted to other uses mid-year. As always, feedback from the DEEP on this report would be most welcome

Personnel

The Director of the City Plan department, Karyn Gilvarg, retired in November. This department is responsible for implementing BMPs 4 and 5. A successor will be appointed in January of 2018.

Objectives for 2018

Work during 2018 will consist the continued application of the following BMPs :-

(i) Data collection and updating of the City's storm water mapping
(ii) Review of the City's ordinances in relation to the new MS4 permit requirements
(iii) Catch basin cleaning (approximately 3,800 to 4,000)
(iv) Street sweeping (5 or 6 times per annum)
(v) Illicit discharge and detection using CCTV in compromised storm sewer networks (70,000 linear feet of storm sewer planned, but dependent on the amount of pipe cleaning required)
(vi) Liaison with public interest groups
(vii) Sampling and testing 20% of outlets for bacteria, nitrogen and phosphorus, together with the pollutants required by the IDDE protocol.
(viii) Implementation of the new MS4 permit requirements.
(ix) Increase the amount of information on the City's web site
(x) Continue construction of bioswales and similar green infrastructure

Yours Truly,

Giovanni Zinn, PE
City Engineer

cc Dawn Henning Chrons File 17-163-01