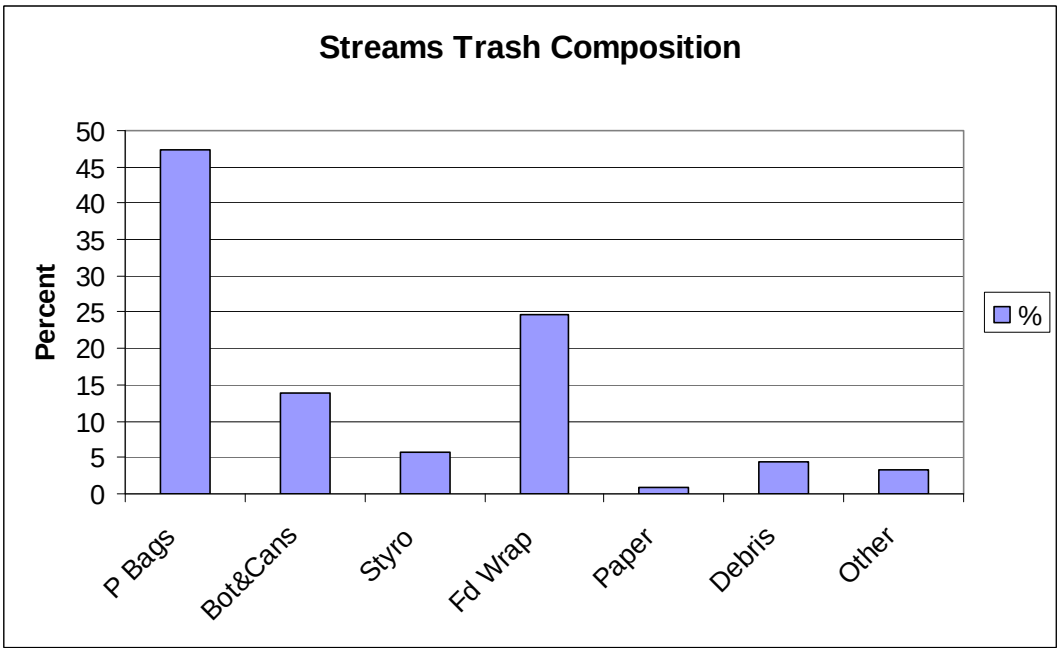
CHAPTER 4
BEST MANAGEMENT PRACTICES

Introduction

There are many Best Management Practices (BMPs) such as structural devices and management techniques available to reduce the amount of trash reaching streams and rivers. Trash can be sorted into four components for BMP evaluation purposes. There are floatables such as plastic drink bottles, foam cups and clamshells and woody debris which are about 15 percent of the trash (Figure 4.1). There are high density sinking objects such as glass bottles, and aluminum beverage cans which are about 15 percent. There is a very minor fraction of degradable objects such as paper bags and newspapers. Finally, some 70 percent of the trash that is observed in the streams is neutrally buoyant objects such as plastic bags and snack wrappers which will float under quiescent conditions while clean, but are more likely to be entrained by velocity currents.

Figure 4.1
Streams – Trash Composition



Best management practices need to be able to remove all components of the trash. Additionally, all studies have found that at least 50 percent of captured material is going to be leaves, sticks, and twigs. Because there are TMDL related pollutants to be reduced, it is beneficial if a device or practice can not only remove trash but also the other pollutants.

Stormwater Management BMPs

The District of Columbia water pollution control laws require all new development and redevelopment to install BMPs to control the runoff of pollutants from the site during construction and after construction. The Watershed Protection Division of DDOE maintains design criteria and manuals for the BMPs and they are updated as new techniques become available. The program has been in place for 20 years and there are many BMPs installed throughout the District. The regulations require that the BMPs be maintained.

Some of these BMPs are very effective in removing trash as can be seen in the new storm water pond serving a housing subdivision located in the East Capitol MS4 drainage basin.

Figure 4.2
Stormwater pond serving a housing subdivision

DDOT installed a stormwater management pond at the interchange serving New York Avenue and Rhode Island Avenue. It captures trash and other pollutants from the interchange.

Figure 4.3
Stormwater management pond at the interchange serving New York Avenue and Rhode Island

Catch Basins

The DDOE, WASA and DDOT have reached consensus on a new design of a standard catch basin for road construction projects (Figure 4.4). The new design has three chambers and under normal rainfall events will remove oil and grease, floatable trash and debris as well as settleable solids. It is not designed to remove neutral buoyancy material. This type of catch basin will be installed as the roads are reconstructed, although if there are opportunities and funds available, low impact development (LID) techniques may be used. The new type is a significant improvement over the old standard design. Depending on sizing, it may remove 25 – 50 percent

of the suspended solids as well as capturing floatables and oil and grease. A few of them should be modified to have a mesh screen across the second opening to remove neutral buoyancy materials.

Figure 4.4
New catch basin standard design

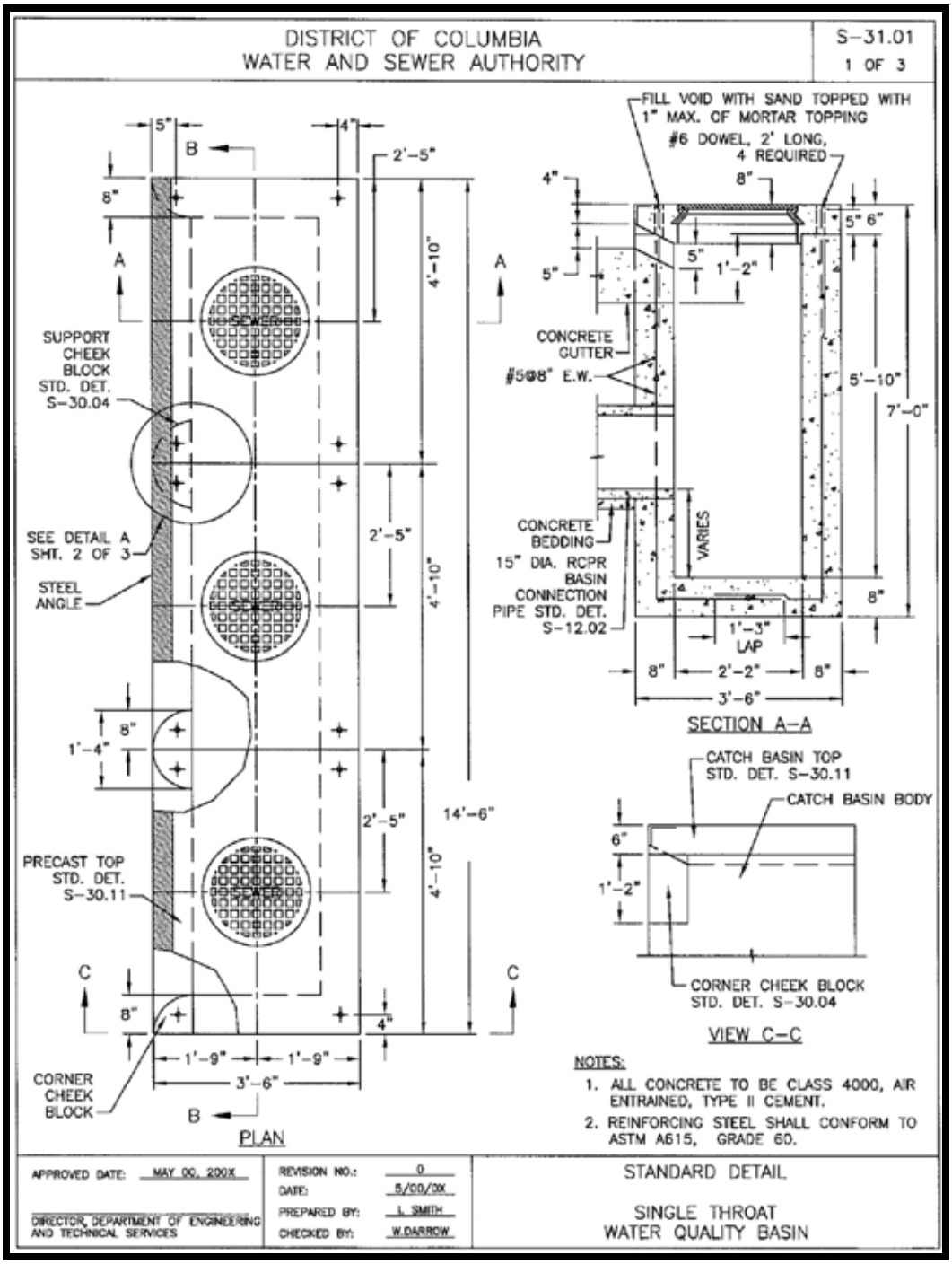
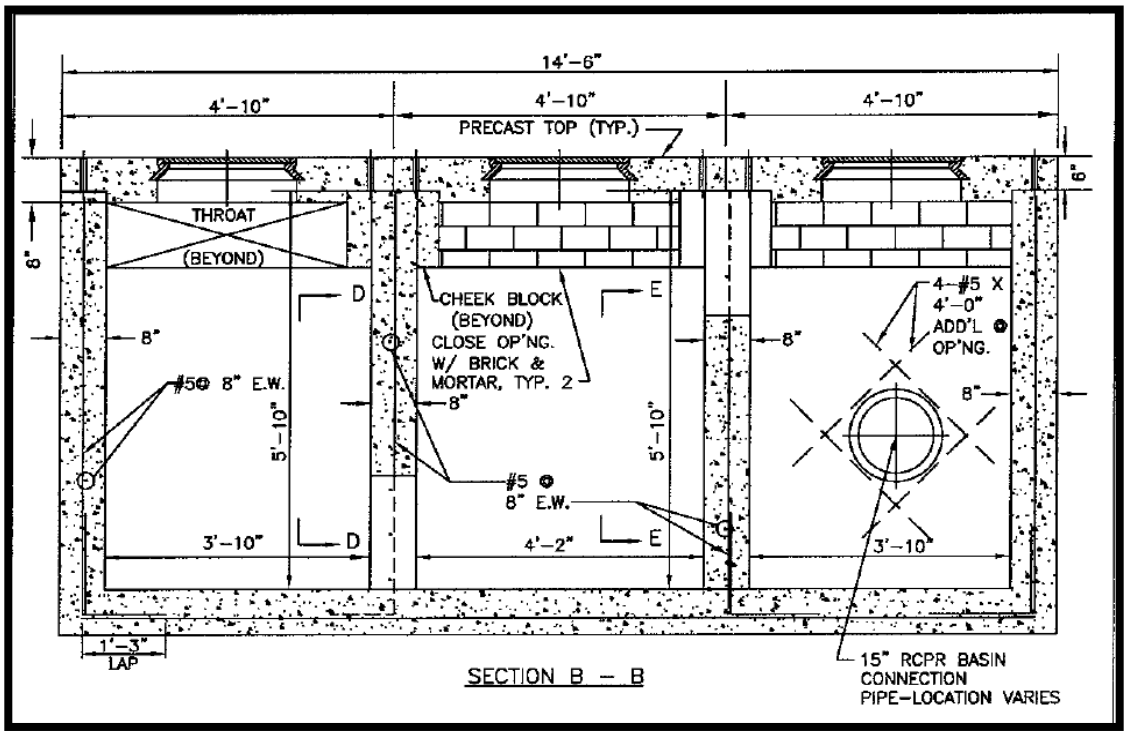


Figure 4.5
New catch basin standard design



Low Impact Development

The DDOE design manual is currently being revised to include more Low Impact Development (LID) techniques such as this curb cut in the Ely MS4 drainage basin (Figure 4.6). The BMPs in the manuals need to be reviewed to determine if the BMPs can be enhanced to remove even more trash. Most LID BMPS are effective at removing the Anacostia TMDL pollutants.

Figure 4.6
Curb cut in the Ely MS4 drainage basin

Rain Gardens such as the one shown below (Figure 4.7) provide flow detention as well as infiltration up to design flow.

Figure 4.7
Rain Garden

Existing Inlet Grates and Screens

There are a lot of inlet grate designs and they are present in many locations. For an inlet grate, the bar spacing is the most critical aspect in preventing trash from entering the storm sewer. Maintenance of the grates and screens is required to prevent clogging and flooding.

The inlet grates used at Langdon Park, shown in the photo below (Figure 4.8), have about a 2 inch spacing while those at the James Creek Marina have a one inch spacing. James Creek Marina staff remove trash daily as a requirement of their concession contract with the NPS.

Figure 4.8
Inlet grates used at Langdon Park

The grates at RFK stadium have a two inch spacing and cans and bottles will pass through once they are crushed a little by vehicular traffic (Figure 4.9). These particular grates have treatment so the trash does not actually escape to Kingman Lake. The grates on the Pennsylvania Avenue Bridge have a three inch spacing.

Figure 4.9
The grates at RFK stadium

Screens over the catch basin inlet must be maintained or else they will clog and the water will create problems. The screen at the multifamily housing complex in Fort Stanton has clogged with dirt and some dirt was removed for the photograph to demonstrate the problem. Water from this clogged screen is diverted to another area of the parking lot and flows down hill creating erosion problems for the adjacent landowner. A screen with no maintenance can be worse than no screen.

Figure 4.10
Catch basin screen clogged with dirt

There are several types of screens that can be placed at the inlet of storm sewer catch basin. Some are static and some will open under high flow events and allow the trash to go into the catch basin. Obviously, if trash only floats down the gutter during high intensity events, then the flow activated bypass will allow most of the trash to go into the storm sewer, defeating the purpose of the screen. Fixed screens may clog and cause localized flooding. Grating size will effect the operation of the

screens. Los Angeles found that screens were suitable in places where there was regular maintenance such as street sweeping (Figure 4.11).

There are no known installations of catch basins screens in areas prone to snow and ice. The effect of snow plow operations is unknown and needs to be tested. Screens and grates installed as stand alone BMPS are not effective at removing the Anacostia TMDL pollutants.

Figure 4.11
Screen grating in Los Angeles

No Mow Buffer Zones

No Mow buffer zones are effective for catching and retaining trash. The picture demonstrates the amount and types of captured trash (Figure 4.12). Some of the highest land use counts in this study were the no mow buffer zones near heavily used recreational fields. Wild and natural vegetation barriers prevent trash from getting to the streams. This was encountered repeatedly during the windshield counts that large amounts of trash accumulate at the edge of the mowing zone on streets such as Pennsylvania Avenue. The Fort Davis tributaries have very low trash counts while being in very close proximity to high use roads, because the streams have vegetative buffers.

Figure 4.12
No mow zone

Education

There are a large number of education programs that touch on littering as stewardship of the environment. Programs are operated by the Alice Ferguson Foundation and the Anacostia Watershed Society. DC government agencies have numerous education programs and brochures. The photo shows a DDOE Don't Dump sticker at the James Creek Marina grate (Figure 4.13).

Figure 4.13
DDOE Don't Dump sticker at the James Creek Marina grate

Booms

Booms have been used on the Anacostia River for decades. They are only effective once the trash has actually reached the river and are only effective for buoyant objects. They need a mechanism for removing the trash such as by skimmer boat, which in this case WASA performs the required removal. They do not prevent the other Anacostia TMDL pollutants ftom reaching the river.

Figure 4.14
Trash Boom

Catch Basin Inserts

There are many varieties of inserts available ranging from socks, boxes, screens and trays. Some inserts are made from absorbent material and will remove oil and similar pollutants. Montgomery County has investigated catch basin inserts and found them to be very high maintenance (Figure 4.15). They tend to clog easily and begin to bypass trash. This was also found to be the case in California. The picture is of the White Oak Mall, Md. test insert. Most inserts have a small volume and will fill quickly requiring frequent maintenance.

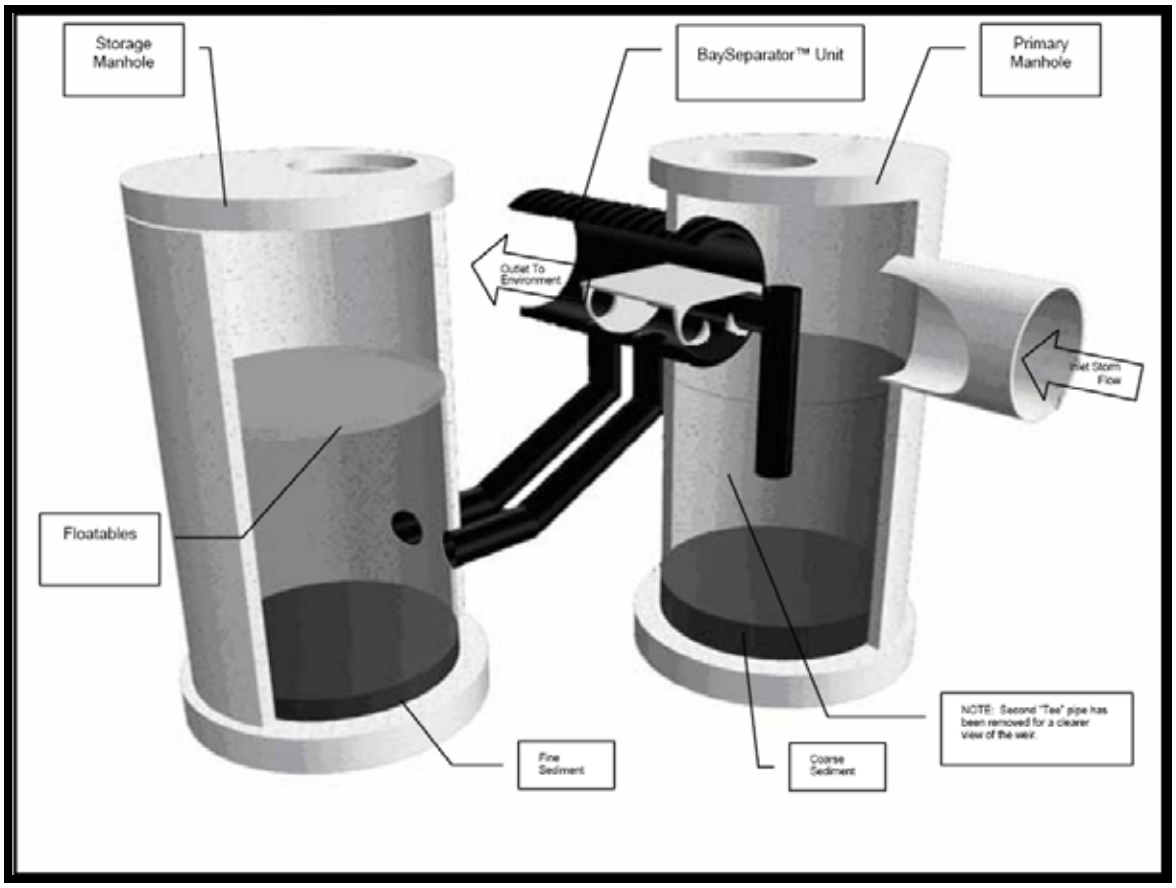
Figure 4.15
Catch basin inset

Bay Saver

A Baysaver is a multi chambered stormwater treatment device that functions as a hydrodynamic particle separator and has been used extensively in the District and the Anacostia basin (Figure 4.16). The device has been tested and certified by New Jersey Corporation for Advanced Technology and will meet the state requirements for suspended solids removal. There are no known tests of trash removal. The manufacturer does not claim it will remove neutral buoyancy items. It has an advantage that during flows over design criteria, the bypass does not scour the material out of the second chamber, although trash may be lost from the first chamber. The device can be used either inline or at end of pipe. Because it will remove oil and grease and particulate matter it is applicable to the needs of removing other TMDL pollutants.

A Bay Saver unit has been selected to be used for treatment of the stormwater at Hickey Run in the National Arboretum The principle components to be removed are trash and oil and grease. In order to remove the trash component a separate device will be installed ahead of the Baysaver.

Figure 4.16
Baysaver

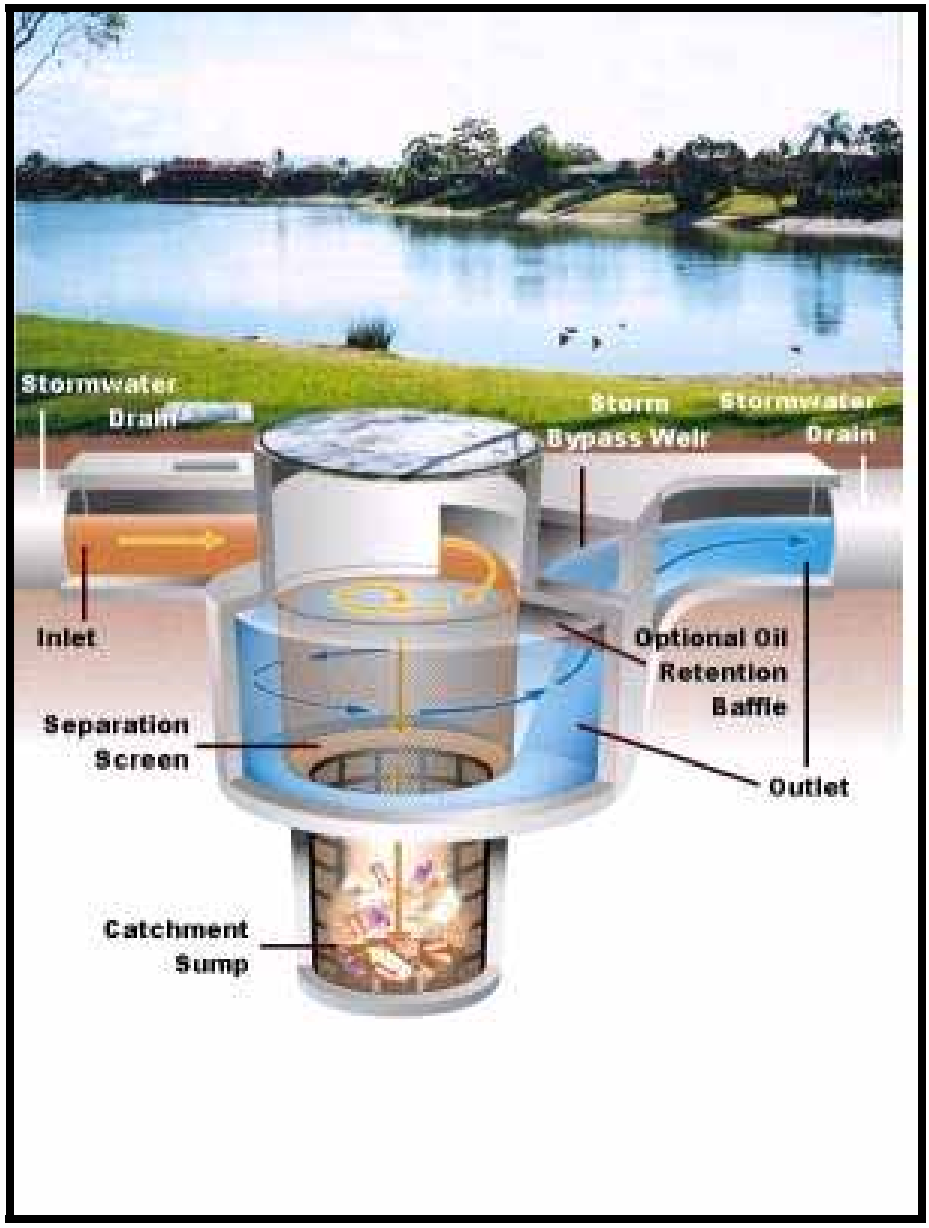


Continuous Deflection Separation Technology

The Continuous Deflection Separation Technology (CDS) units are a proprietary device for removing suspended and floating material (Figure 4.17). The solids and material are hydrodynamically separated from the water by the swirl action as well as a screen. The ability to capture entrained neutrally buoyant material such as plastic bags and snack wrapper is an important consideration. Two CDS units were tested by the California Department of Transportation over a two year period and were found to remove about 85-92 percent of the gross solids (trash). The manufacturer's claims for suspended solids removal have been verified by New Jersey Corporation for Advanced Technology. The device is suitable for end of pipe treatment of large flows. A problem has been observed by DDOE that when flows exceed design criteria, the previously captured material may be released with the bypass. Because it will

remove oil and grease and particulate matter it is applicable to the needs of removing other TMDL pollutants.

Figure 4.17
Continuous Deflection Separation Technology



Trash Nets

WASA is currently using a Fresh Creek Trash net at CSO outfall #18. The device was monitored by MWCOG and they concluded it had a capture efficiency of 83 %. The nets will capture floating sink and neutral buoyancy trash. However they are not effective for removing other TMDL pollutants and they require vehicular access to the site for maintenance. They can also be installed inside storm sewers.

Mechanically Cleaned Bar Screens

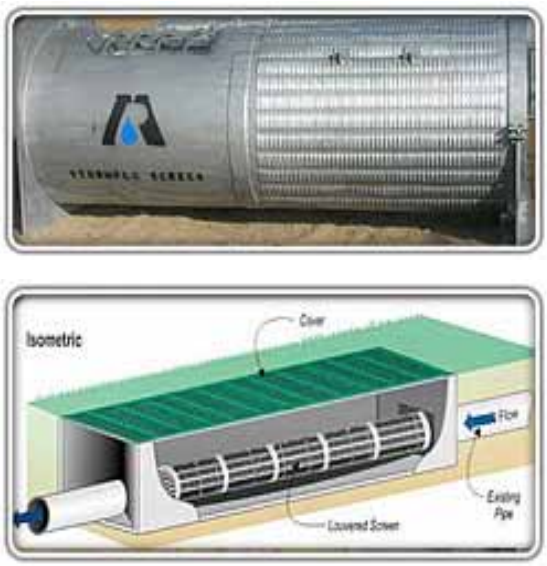
Prince Georges County has installed mechanically cleaned bar screens at two storm water pump stations for removing trash. Mechanical clean screens require a significant amount of site work for installation. They must be maintained regularly.

Static Screens

California Department of Transportation evaluated two types of static screens, (linear radial and inclined) for trash removal and they were both in excess of 95% efficient.

Linear radial gross solids removal devices such as the ones manufactured by Roscoe Moss Company (Figure 4.18) have been used in California for trash removal and are a certified full capture device. They accumulate trash inside the drum for a period and are cleaned using a vacuum truck.

Figure 4.18
Linear Radial, Gross Solids Removal Screens



Inclined screens are installed in vaults and are sized to store the solids remove inside the vault. Solids removal is by vacuum truck.

These devices are not effective for removal of other Anacostia TMDL pollutants.

BMPs Costs

The costs of Best Management Practices (BMPs) were investigated in the *Anacostia TMDL Implementation Plan* for the parameters of concern. The installation costs per acre as well as the maintenance costs were developed. Present worth was calculated as well as the cost per pound of pollutant removed as shown in Table 4.1. The Anacostia TMDL pollutant that is most prevalent is Total Suspended Solids (TSS).

Table 4.1
Cost Benefit Analysis of BMPs for Removal of Total Suspended Solids in the Anacostia River Watersheds

Cost Benefit Analysis of BMPs for Removal of Total Suspended Solids in the Anacostia River Watershed

BMP	Useful Life (yrs)	Present Worth per Impervious Acre	%Removal	Present Value ($) per Pound Removed
Catch Basin Cleaning	10	$279	61	$0.12
Vacuum Sweepers - 1/month	10	$2,139	93	$0.62
Bay Saver	20	$10,397	88	$2
Aqua Swirl	20	$9,527	80	$2
Vortex Sentry	20	$9,722	80	$2
Continuous Deflective Separation (CDS)	20	$13,353	90	$2
Downstream Defender	20	$13,494	85	$2
Environment 21	20	$12,203	70	$2
Stormceptor	20	$16,356	91	$2
Grass Swales, Grass Strips, Grass Corners	10	$10,464	77	$4
Extended Detention Shallow Wetland Stormwater Wetlands	10	$29,972	69	$12

The street sweeping and catch basin cleaning are very low cost and very effective methods. It should be noted that the cost for vacuum sweepers is based upon once per month sweeping. Using the end of pipe structures is more expensive. Constructing LID facilities such as extended detention wetlands is the most expensive. The present worth of the curb screens is about $800 per impervious acre using the same factors as used in the *Anacostia TMDL Implementation Plan.*

CHAPTER 5
EXISTING PROGRAMS

Introduction

Litter and trash has been a problem for centuries and there are many programs that have evolved over that time and have an impact of on the amount of trash. These include land based programs as well as water based programs. Because most of the trash that reaches the river comes through the storms drains, the programs that prevent it from reaching the storm drain inlets or capture it at the storm drain are critical. Capturing it once it is in the water should be a last resort.

MS4 TMDL Implementation Plan

The MS4 permit issued by EPA required the development of the *Anacostia TMDL Implementation Plan*. This plan was submitted by the District to EPA and was approved. It is now a legally enforceable component of the permit. A summary table from the document lists the activities being performed to reach the allocations for each TMDL pollutant.

Table 5.1
Summary table of the activities being performed to reach the allocation for each TMDL pollutant

Pollutant	Source Control	Public Outreach	Standard Structural Device	Street and Catch Basin Cleaning	Inspection and Enforcement
Fecal Coliform Bacteria	X	X	X	X	X
BOD	X	X	X	X	X
Nitrogen	X	X	X	X	X
Phosphorus	X	X	X	X	X
TSS	X	X	X	X	X
Oil/Grease	X	X	X	X	X
Zinc	X	X	X	X	
Lead	X	X	X	X	
Copper	X		X	X	
Arsenic	X	X		X	X
PAH1	X		X	X	
PAH2	X		X	X	
PAH3	X		X	X	
Chlordane			X	X	

Pollutant	Source Control	Public Outreach	Standard Structural Device	Street and Catch Basin Cleaning	Inspection and Enforcement
Heptachlor Epoxide			X	X	
Dieldrin			X	X	
DDD			X	X	
DDE			X	X	
DDT			X	X	
Total PCB					

The current activities submitted to EPA list the following:

In FY 2007 – FY 2008, DDOT plans to install LID facilities to capture runoff from the bridge and adjacent roadway at Watts Branch Crossing (49th Street, Division Avenue, 55th Street, and61st Street). This project is tied to the related bridge construction.
In FY 2009, DDOT plans to install:
• A vegetated swale at the intersection of Texas Avenue, SE, and Ridge Road, SE (working with DDOE)
• A vegetated swale at the intersection of Ridge Road, SE, and Burns Street, SE (working with DDOE)
• A combination of various LID techniques along the 1.5 miles roadway of Nannie Helen Burroughs. DDOT recently initiated construction of the Watts Branch Bicycle Trail. A portion of the project will remove paved surfaces and install BMPs. Total cost of the construction is $3.1 million.

Under a separate contract, DDOE is providing for stream bank restoration.

The *Anacostia TMDL Implementation Plan* states:

During FY 2008, the existing sweeping schedule throughout the District will be evaluated and adjustments will be made as possible to improve removal of pollutants of concern from the Anacostia MS4. These adjustments will be made within the constraints of current budget, manpower levels, and service requirements of the citizens.

The District has a 10-year street sweeping equipment replacement schedule and budget. The current replacement budget funds the purchase of additional mechanical sweepers. The FY 2008 budget includes an additional $490,000 from the Enterprise Fund to fund the difference in the purchase price between mechanical sweepers and the more efficient vacuum assisted or regenerative air sweepers, and $60,000 for any additional O&M costs associated with operating the newly purchased sweepers. To continue funding the difference in purchase price of high efficiency sweepers, the projected FY 2009 budget is $290,000. The $60,000 additional O&M is also budgeted for FY 2009. Operation of these sweepers will be focused on the Anacostia MS4.

As part of the street sweeping route and schedule evaluation, additional sweeping may be recommended in the Anacostia MS4 area to optimize the reduction of pollutants of concern based on the cost benefit analysis. This analysis will be completed by the end of FY 2007, and any additional sweeping will be implemented in FY 2008 or later depending on the results of the analysis. In FY 2008 and FY 2009, an additional $90,000 has been earmarked for the cost of implementing the recommendations of the sweeping analysis. The need and amount of funding will be dependent upon the results of the sweeping analysis and the cost benefit comparison of additional sweeping versus other stormwater pollutant reduction activities.

The Anacostia TMDL Implementation Plan will be effective for trash removal and the Anacostia Trash TMDL will be completed by 2010. Once the TMDL is complete the waste load allocation to the MS4 system will become an enforceable provision of the permit.

Trash Collection

At individual residences trash is collected once a week using supercans. Recyclable material is also collected in wheeled containers with lids. This is a highly effective means of controlling trash. Trash collection at businesses and multifamily dwelling is done by private contractors. Trash dumpsters can be a localized source of trash depending upon the maintenance staff and whether they regularly clean the area.

DPW has installed trash cans at many locations where there are large amounts of litter. There were trash cans observed along the park side of the Texas Avenue stream and Ft Chaplin stream and there were large quantities of dumped trash within 10 feet of the can.

Street and Highway Trash Removal

The DPW sweeps the streets and use crews to perform manual litter pickup along the highways and streets. The National Park Service also performs manual trash pickup along the roads that are under their responsibility.

The District sweeps nearly 4,000 "lane miles" of city streets every month. DPW uses tractor-sized street sweeping machines to clean those residential streets that receive a high volume of pedestrian traffic and litter or are near neighborhood commercial streets. Since these are residential, not commercial streets, the residents must agree to move their cars from the curbside during posted sweeping hours, or risk ticketing and towing.

Mechanical street sweeping is a weekly service in heavily trafficked residential sections of Wards 1, 2, 4, 5, 6, 7 and 8. In other residential areas, unscheduled cleaning takes place on an "as needed" basis—generally monthly or quarterly. Street and Alley Cleaning crews also respond to individual requests for one-time street cleaning. Commercial areas' cleaning cycles range from daily to weekly.

Street-sweepers operate by spreading a thin layer of water under their rotating brushes before sweeping debris into a large hopper under the machine. To prevent potentially icy conditions,

street cleaning is temporarily suspended each winter, when temperatures traditionally drop below freezing. Parking restrictions related to street sweeping are lifted during the suspension.

According to DPW, each mile swept mechanically removes 10 pounds of grease and oil; three pounds of nitrates and phosphates; and, one to two pounds of heavy metals.

According to the Federal Highway Administration publication *Stormwater Best Management Practices in Ultra-Urban Setting: Selection and Monitoring*:

The effectiveness of streetsweeping programs depends on several factors, including:

***Type and operation of equipment used**: Vacuum-assisted and regenerative air sweepers are generally more efficient than mechanical sweepers at removing finer sediments, which often bind a higher proportion of heavy metals (Table 18). The performance of sweepers can be enhanced by operating them at optimal speeds (6 to 8 mi/h), ensuring that brushes are properly adjusted, and ensuring that appropriate rotation rates and sweeping patterns are used. Tests conducted on the newer vacuum-assisted dry sweepers have shown they have significantly enhanced capabilities to remove sediment compared to conventional sweepers, with projected reductions of up to 79 percent in total suspended solids loadings from urban streets. In addition, these sweepers are extremely effective at removing respirable (PM-10) particulate matter (particles with an aerodynamic diameter less than or equal to 10 microns) compared to conventional sweepers (Table 19) and are designed to help meet National Ambient Air Quality standards.*

Table 18
Efficiencies of mechanical (broom) and vacuum-assisted sweepers

Efficiencies of mechanical (broom) and vacuum-assisted sweepers		
Constituent	***Mechanical sweeper efficiency (%)***	***Vacuum-assisted sweeper efficiency (%)***
Total Solids	*55*	*93*
Total Phosphorus	*40*	*74*
Total Nitrogen	*42*	*77*
COD	*31*	*63*
BOD	*43*	*77*
Lead	*35*	*76*
Zinc	*47*	*85*
Source: NVPDC (1992), as cited in Young et al. (1996).		

Table 19
PM – 10 Particulate removal efficiencies for various sweepers

PM-10 Particulate removal efficiencies for various sweepers	
Sweeper type	***Removal Efficiency (%)***
Mechanical - Model 1	*-6.7*
Mechanical - Model 2	*8.6*
Regenerative Air	*31.4*
Vacuum-assisted wet - Model 1	*40.0*
Vacuum-assisted wet - Model 2	*82.0*
Vacuum-assisted dry	*99.6*

Sweeping frequency and number of passes*: To achieve a 30 percent removal of street dirt, the sweeping interval should be less than two times the average interval between storms. To achieve 50 percent removal, sweeping must occur at least at least once between storms. Generally two passes per run should be conducted, which will result in the removal of up to 75 percent of total solids present before sweeping. Certain conditions may warrant increased sweeping frequencies. These include streets with high traffic volumes in industrial areas and streets with high litter or erosion zones. In addition, the sweeping frequency should be increased just before the wet season to remove sediments accumulated during the summer.*

Climate*: Sweeping appears most effective in areas with distinct wet and dry seasons.*

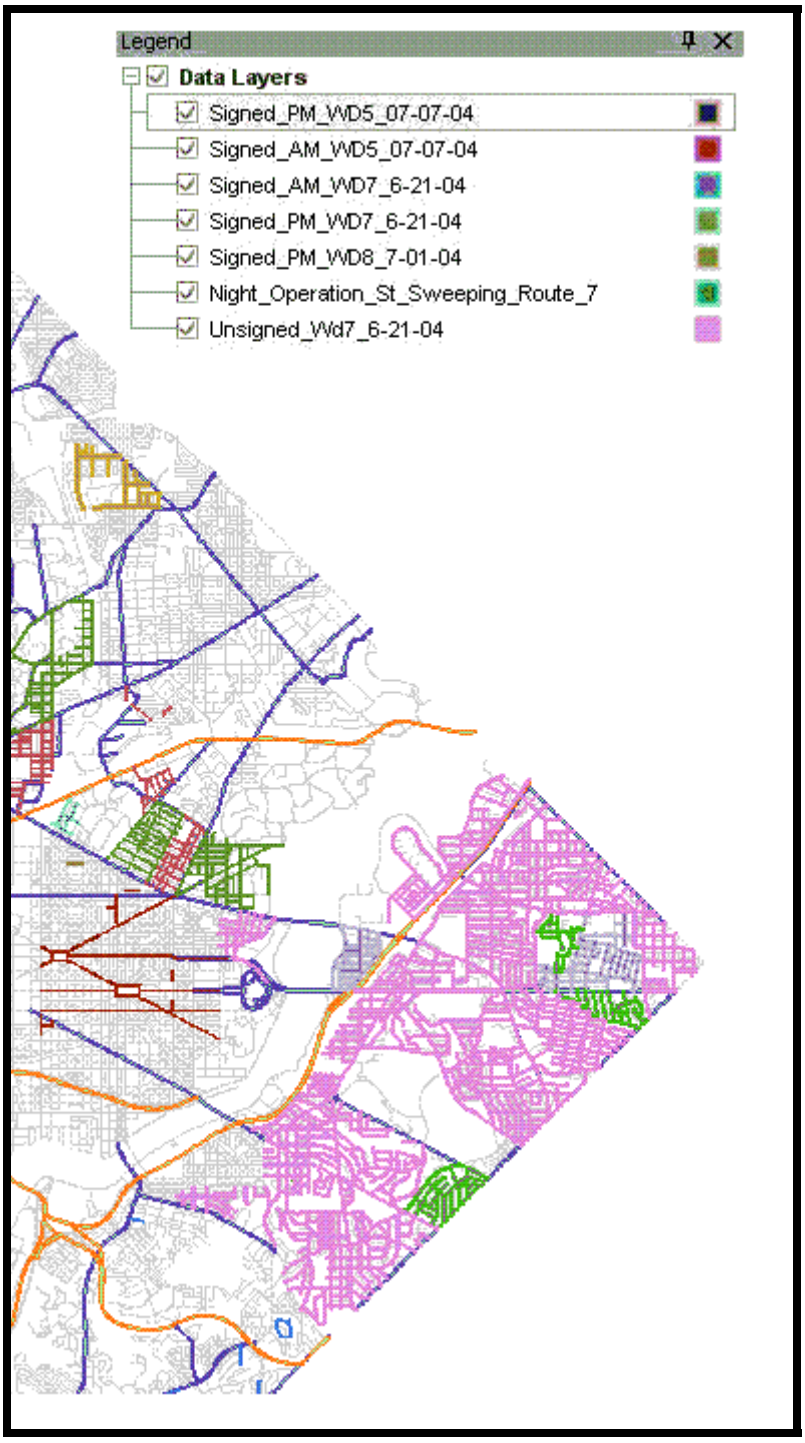
Factors that limit the overall effectiveness of street sweeping programs include:

- *Presence of parked cars and traffic congestion during sweeping.*
- *Poor road surface and curb conditions.*
- *Presence of construction projects nearby.*

Vacuum assisted sweepers are extremely efficient for the TMDL parameters in the Anacostia Basin.

A map of the areas that are swept in Anacostia is shown below (Figure 5.1). The green and blue streets are swept weekly during the sweeping season and cars must be moved out of the way. The pink streets are swept on an unscheduled basis and cars do not have to be moved. As can be seen there are very few streets in t he study area that receive weekly cleaning.

Figure 5.1
Map of the areas that are swept in the Anacostia



DPW is moving to sweeper mounted cameras to take pictures of illegally parked so that parking enforcement tickets can be mailed to the owners. This will be much like the red light cameras

and speeding cameras. It will increase compliance with vehicle removal and will therefore increase the amount of trash removed from the streets.

Catch basin cleanout

WASA is required by the MS4 permit to cleanout every storm sewer catch basin annually. Once a catch basin has filled up it loses its ability to trap pollutants and trash. A special study was supposed to be performed to investigate whether enhanced cleaning would improve performance, but funding was not available.

WASA CSO Longterm Control Plan

WASA has been running skimmer boats on the Anacostia River as a part of the Nine Minimum Controls (Figure 5.3). They remove approximately 400 tons of trash per year. During FY03 and FY04, the CSO inflatable dams were removed for repairs. The amount of trash captured in the river increased significantly while the inflatable dams were out of service (Figure 5.2). This indicates that the inflatable dams are effective in preventing trash from reaching the river. The trash captured by the skimmer boats is only the component that floats.

Figure 5.2
WASA Floatables Program

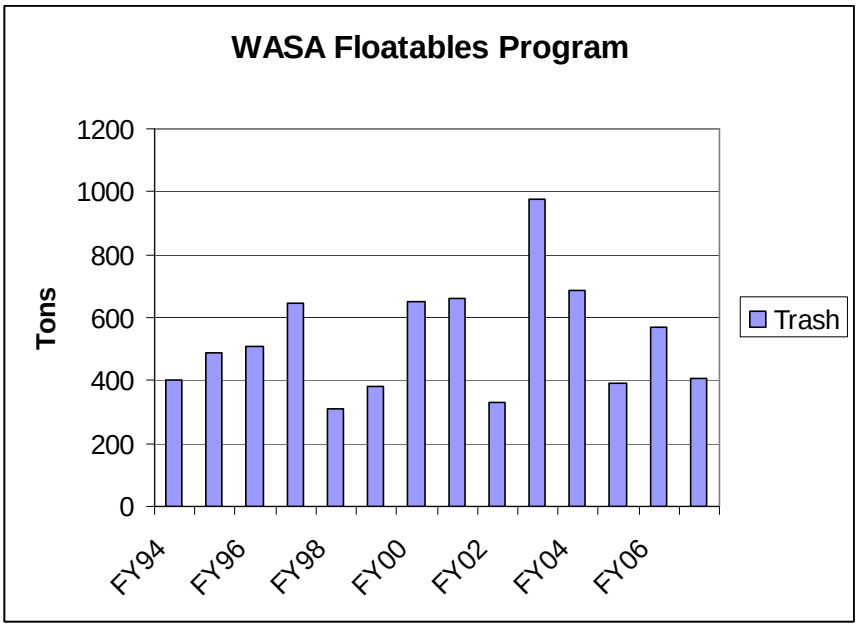


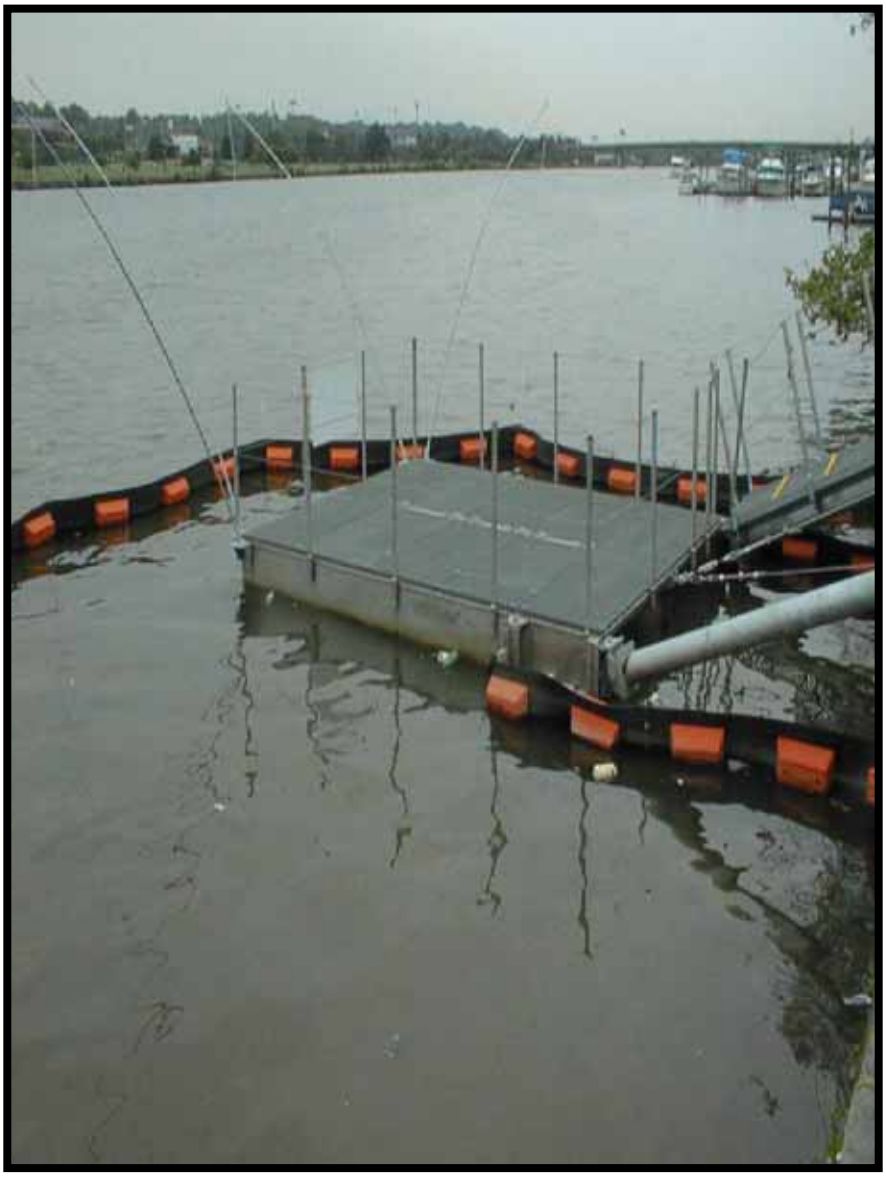
Figure 5.3
Skimmer Boat

There are a set of booms at the railroad bridge and the skimmer boats remove the trash captured by the booms (Figure 5.4). The booms help keep trash from the marina and from the DDOE boat launching ramp. Figure 5.4 shows the booms and the sand bar from the outfall of Pope Branch. The density of trash on the sand bar is very high.

Figure 5.4
Trash boom

WASA also has a Fresh Creek netting system on the Anacostia River at CSO outfall #018 that removes about 400 – 1,000 pounds of trash and leaves per rain event. This system was estimated by MWCOG to be about 83 % efficient in capturing floatable trash.

Figure 5.5
WASA Fresh Creek netting system



WASA is not satisfied with the netting system because of their difficulty in maintaining it. Staff and equipment resources are high. They prefer to have facilities that use existing techniques such as vacuum trucks.

Department of Transportation

The District Department of Transportation (DDOT) replaces existing catch basins with "water quality" catch basins during road reconstruction projects. These catch basins are much more effective at removing trash and other pollutants in the storm water runoff. A reconstruction project is when a road is completely rebuilt from the base up. Catch basins are not replaced when curbs and gutters are replaced nor when a simple repaving is done.

In the Anacostia Basin, DDOT operates two storm water pump stations.

The DDOT is also responsible for the design specifications of the grates on bridges over the rivers. Obviously, the grate spacing is an important determinant in the amount and size of trash that is discharged from the bridge to the river. Figure 5.6 is one of the East Capitol Street Bridge downspouts and one of the channels that takes the stormwater and trash to the Anacostia River without treatment.

Figure 5.6
East Capitol Street Bridge downspouts

Parks

Both the US National Park Service and the DC Department of Parks and Recreation use summer workers to manually pickup trash in the parks. This is performed only in the mowed areas. Trash is not routinely removed from the no-mow buffer zones and is not removed from streams. There does not appear to be any attempt to enter the wooded areas of the parks and clean up debris and trash.

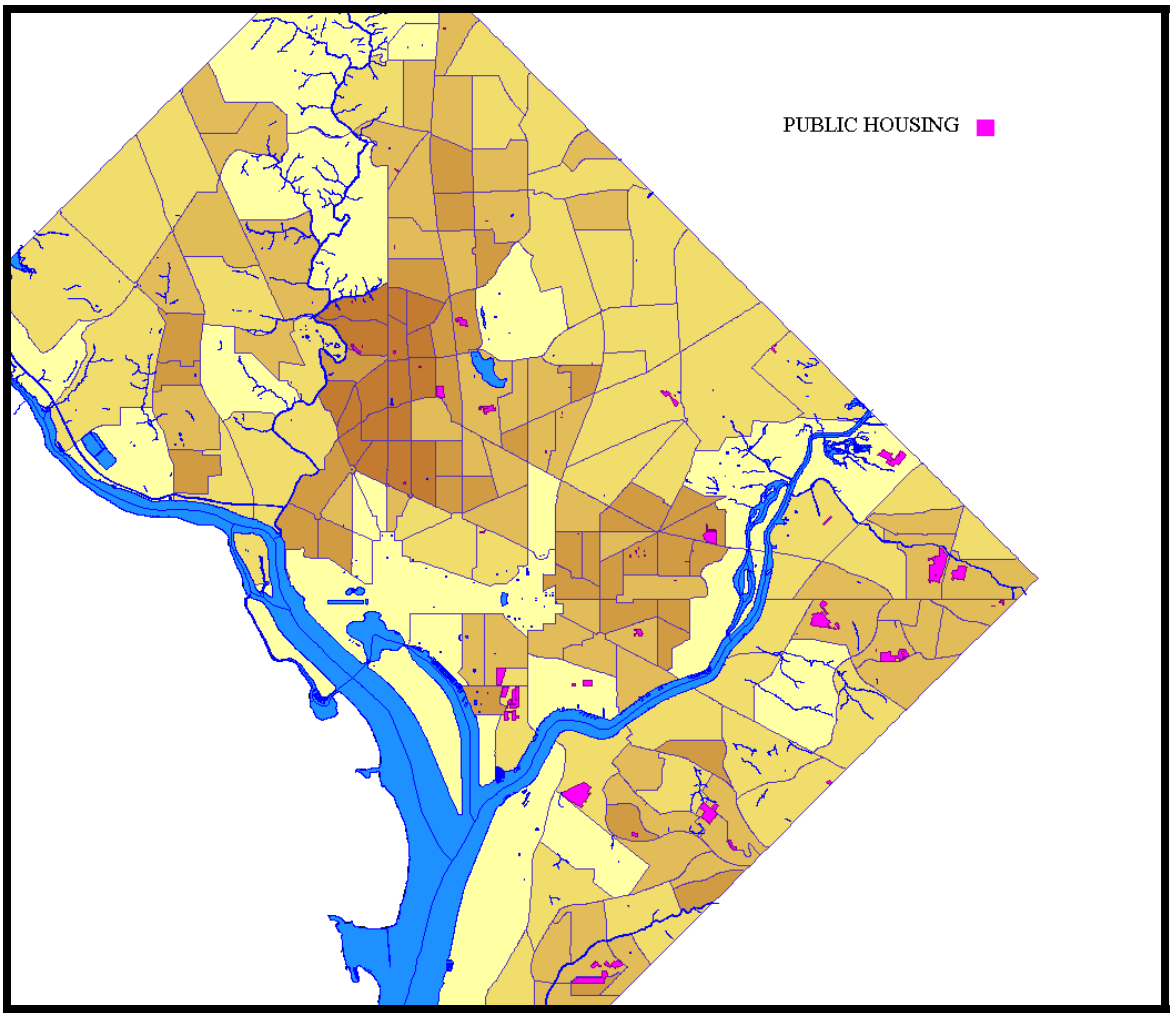
Figure 5.7 is a buffer zone along Watts Branch in Kenilworth Park. It shows that the mowed area is clean; but, there is a tremendous quantity of trash in the buffer zone.

Figure 5.7
Buffer Zone Along Watts Branch in Kenilworth Park

District of Columbia Housing Authority

The District of Columbia Housing Authority operates a number of housing complexes in the drainage basins. They are shown in Figure 5.8. The maintenance staff are responsible for maintaining the exterior and usually do a very good job of keeping the trash cleaned up.

Figure 5.8
Location of public housing in the District of Columbia



District Inspection Activities

There are five District agencies which perform inspections and enforce litter laws and six agencies if Metropolitan Police Department (MPD) is counted.

Department of Public Works – litter enforcement

There are about three inspectors per ward who enforce dumping, litter and trash laws. Each inspector has an assigned area which is covered on a monthly basis as well as responding to complaints in the area. The civil infraction ticket process is used and numerous of tickets are written.

Department of Consumer and Regulatory Affairs - Housing Inspections

All property owners are responsible for their frontage and grounds. The multifamily dwellings have maintenance staff who are responsible for cleaning up the side walk and street in front of the building. The Department of Consumer and Regulatory Affairs inspects these units and the relevant items on the inspection sheet are:

- ***Cleanliness:*** *All walks must be free of dirt, garbage, litter, rats, mice, and insects. The grass must be cut.*
- ***Trash:*** *Waterproof plastic or metal covered trash cans must be provided. Grounds and walks must be free of junk, trash, and litter.*
- ***Walkways:*** *Walkways must be free of obstructions and trash. Holes in the sidewalk are not permitted.*

About 10% of the violations and enforcement actions reported by DCRA involved trash and/or weeds.

Department of Transportation – Public Space Permits

The DDOT public space permits have the following condition:

> *3. Improper housekeeping violations on job sites relating to dirt and debris in the public space shall be grounds for a fine of $500.00 per block/per day and/or revocation of this permit.*

Department of Health - Food Establishments Inspections

The Department of Health inspects food establishments and checks for improper trash disposal. They also inspect for rodent infestation which is often associated with improper trash disposal.

DCRA & DDOE - Construction Sites Inspections

DCRA and DDOE and DDOT inspect construction sites. The larger construction sites will often use chain link fences. These fences catch a lot of trash on the street side.

Clean City Coordinator - Citywide Cleanliness Assessment

According to the Clean City Coordinator Website:

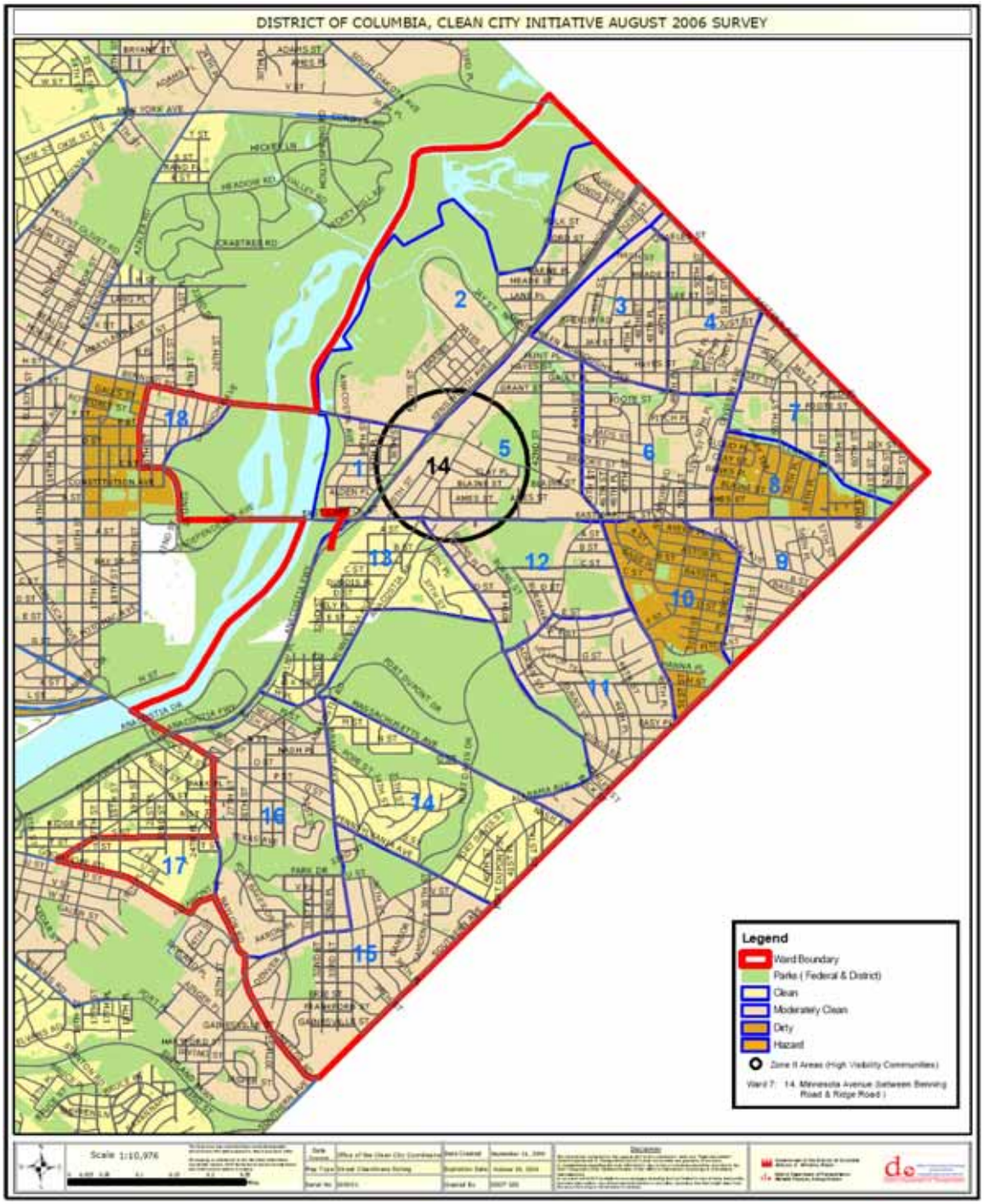
Every three months cleanliness assessment teams survey the corridors/interstate highways, high-visibility communities, residential streets and alleys, and industrial areas within each of the city's eight wards, and rate the cleanliness level of each area. The 16 National Highway System major routes are surveyed once a month.

Site Surveys are conducted by Rating Teams of six people and cover four Rating Zones. Surveys require a maximum of six hours and rate the cleanliness of the area (1 - Clean, 2 - Moderate, 3 - Dirty, 4 - Hazardous). Responses are recorded on PDAs with the Cleanliness Computer Application Program installed for easy processing (training provided). Once all of the data is collected, the information is reviewed and analyzed by the Senior Program Manager, who compiles a summary and prepares the charts for mapping. One of the summary vehicles is a series of maps depicting the cleanliness levels of each of the city's eight wards.

The clean city summary ratings and a detailed report on the findings are provided to the City Administrator, Department of Public Works, Department of Transportation, DC Council, and the Office of Neighborhood Services for their information and use. The District utilizes this information to allocate resources where they are most needed.

The last available survey is shown below.

Figure 5.9
District of Columbia, Clean City Initiative August 2006 survey



Nonprofit Organizations

The analysis of the monitoring data demonstrates that the nonprofit organizations are having a significant impact on the levels of trash in some streams and areas. The Earth Day clean up by AWS and AFF reduced trash levels dramatically in the areas of the cleanup. Organizations and community groups such as Washington Parks and People, and the volunteers at the Kenilworth Aquatic Gardens have localized beneficial affects. Both DPW and DDOE will provide support to community and stream cleanups.