



Description

Good housekeeping consists of best management practices (BMP) utilized to control pollutant discharges, and to ensure that the BMP functions according to the designer’s intentions. Common pollutants include automotive fluids, paints, pesticides, herbicides, litter, cement, and yard wastes. The objectives are to keep rain from contacting pollutants and to keep storm conveyance structures from coming into contact with pollutants. Proper maintenance and repair of existing drainage systems will greatly improve water quality and allows the storm drainage system to function at peak levels and reduce flooding. Properly designed catch basins and detention basins allow for easy removal of accumulated sediments at relatively minor cost.

Selection Criteria

Some of the most considerable nonpoint source pollution impacts in urban areas are a direct result of littering, collection of debris, deposition of contaminants, and improper waste disposal on roadways and parking lots. As a result of this pollution, stormwater catch basins become affected with debris and contaminants that have washed off of the roads and parking lots, which can lead to flooding and/or contamination of receiving waters.

Selection of these measures depends on the maintained area. Common BMPs involved in housekeeping processes include pavement cleaning, catch basin cleaning, litter control, waste disposal, materials storage, training, and equipment / vehicle cleaning.

Pavement Cleaning

This management measure involves employing pavement cleaning practices such as street sweeping on a regular basis to minimize pollutant export to receiving waters. These cleaning practices are designed to remove from road and parking lot surfaces sediment debris and other pollutants that are a potential source of pollution impacting urban waterways.

In particular, urban municipalities with a central gathering/metropolitan district, athletic/concert stadiums or arenas, fairgrounds, or shopping malls should be especially interested in the benefits of street and catch basin cleaning because of the high potential for the intense volume of accumulated debris and contaminants following special events and daily activities. Areas with high traffic volumes should also be targeted because of atmospheric deposition of exhaust emissions and litter that is thrown from automobile drivers and/or passengers. The street cleaning should focus on, but not be limited to, those roadways that border urban streams and most parking lots.

It should be stressed that street cleaning that involves washing down the road or

parking lot does not improve the situation and can actually make the pollution problem worse. Street washing actually induces the movement of debris and other contaminants towards and into the storm drain network, rather than removing the pollutants from the urban surfaces. Any cleaning procedure necessarily involves gathering and properly disposing of pollutants.

Following are some additional notes on this practice:

~~ES~~ Sweep parking lots and other paved areas periodically to remove debris. Dispose of debris in the garbage.

~~ES~~ If outdoor pavement cleaning with detergent is required, collect wash water and dispose in indoor sinks or drains for discharge to the sanitary sewer. Contact your local wastewater treatment agency.

~~ES~~ Use the most sophisticated sweepers available. Innovations in sweeper technology have improved the performance of these machines at removing finer sediment particles, especially for machines that use vacuum-assisted dry sweeping to remove particulate matter. By using the most sophisticated sweepers in areas with the highest pollutant loads, greater reductions in sediment and accompanied pollutants can be realized.

~~ES~~ Regulate parking. The ability to impose parking regulations in densely populated areas and on heavily traveled roads is essential.

~~ES~~ The frequency and location of street sweeping is another consideration for any program. This is usually determined by the program budget and the desired level of pollutant removal. In turn, this will be a governing factor of the number of street sweepers required.

~~ES~~ Street cleaning twice a week has been found effective in removing a large portion of floatable pollutants from urban roadways and parking lots.

~~ES~~ Street cleaning programs require a significant investment of capital and a yearly operation and maintenance budget. The operation and maintenance costs for two types of sweepers are included in Table NS-04-1.

Table NS-04-1

Estimated costs for two types of street sweepers

Sweeper Type	Life (Years)	Purchase Price (\$)	O&M Cost (\$/curb mile)	Sources
Mechanical	5	75,000	30	Finley, 1996 SWRPC, 1991
Vacuum-assisted	8	150,000	15	Finley, 1996 Satterfield, 1991

Limitations to pavement cleaning include the high cost of current sweeper technologies, the potential inability to restrict parking in urban areas, the need for sweeper operator training, and the lack of solid evidence regarding the expected levels of pollutant removal. Proper disposal of swept materials might also be a limitation.

A benefit of street sweeping is that it is a preventative measure. By capturing pollutants before they are made soluble by rainwater, the need for structural storm water control measures might be reduced. Structural controls often require costly added measures, such as adding filters to remove some of these pollutants and requiring regular manpower to change-out filters. Street sweepers that can show a significant level of sediment removal efficiency may prove to be more cost-effective than certain structural controls, especially in more urbanized areas with greater areas of pavement.

Catch Basin Cleaning

Routine cleaning of catch basins can limit the amount of collected sediment and debris from entering and potentially clogging the storm drain network or ultimately discharging into downstream waterways. In general, by preventing the entrainment of pollutants in stormwater runoff through catch basin cleaning, flooding problems due to the clogging of storm drain networks and the nonpoint source contamination of receiving waters can be greatly reduced.

Litter Control

This practice involves the reduction of intentional littering. Litter is often washed into storm structures and streams before it can be gathered and disposed properly.

Examples of effective programs and practices to reduce and control litter are as follows:

- ~~•~~ Provide an adequate number of trash receptacles for your customers and employees. This helps keep trash from overflowing the receptacles.
- ~~•~~ Empty full trash receptacles immediately. This keeps trash from accumulating around the receptacle and being dispersed.
- ~~•~~ Pick up litter and other wastes daily from outside areas including storm drain inlet grates.
- ~~•~~ Post signs along roads and in public areas reminding of the penalty involved for littering. This will reduce the amount of purposeful littering.
- ~~•~~ Organize frequent “Clean-up Days”. This promotes good-feeling around the community and allows for a survey of the condition of existing storm structures.

Limitations to litter control include the allocation of man-hours to accomplish this task. Picking up trash needs to become a job for the entire community.

A benefit of litter control is that it is a preventative measure. By gathering litter before it is carried away by surface runoff, clogging of storm drain structures can be prevented.

Waste Disposal

This practice involves the proper disposal of waste products. Often, wastes are carelessly disposed in areas that affect the local streams.

Programs to control waste should promote the following practices:

~~ES~~ Inspect dumpsters and other waste containers periodically. Repair or replace leaky dumpsters and containers.

~~ES~~ Cover dumpsters and other waste containers.

~~ES~~ Never dispose of waste products in storm drain inlets.

~~ES~~ Recycle wastes or dispose properly.

~~ES~~ Do not dispose of waste products in unapproved areas, such as sinkholes.

Limitations to waste disposal include the inconvenience of transporting wastes to proper disposal sites. Another limitation is lack of education in the community of the effects of wastes on the watershed.

A benefit of proper waste disposal is that it is a preventative measure that can lead to increased water quality in the watershed.

Materials Storage

Improperly stored materials can have a dramatic impact on local waterways. Soluble materials exposed to rain or surface water will affect water quality.

Covering hazardous materials and areas where such materials are handled reduces potential contact with storm water and wind. Storage areas, outdoor material deposits, loading and unloading areas, and raw materials should all be covered or enclosed. Priority should be given to locations of the most hazardous substances.

Maintenance of hazardous material storage areas consists mostly of inspection and employee training. Storage spaces and containers should be routinely inspected for leaks, signs of cracks or deterioration, or any other signs of release.

Some practices to control hazardous materials are given as follows:

~~ES~~ Store materials such as grease, paints, detergents, metals, and raw materials in appropriate, labeled containers.

~~ES~~ Store household hazardous wastes until they can be disposed properly.

~~ES~~ Make sure all outdoor storage containers have lids, and that the lids are adequately closed.

~~ES~~ Store stockpiled materials inside a building, under a roof, or covered with a tarp to prevent contact with rain.

~~ES~~ Ensure sufficient aisle space to provide access for inspections and to improve the ease of material transport.

~~ES~~ Store materials well away from high-traffic areas to reduce the likelihood of accidents that might cause spills or damage to drums, bags, or containers.

~~✓~~ Stack containers in accordance with the manufacturers' directions to avoid damaging the container or the product itself.

~~✓~~ Store containers on pallets or equivalent structures. This facilitates inspection for leaks and prevents the containers from coming into contact with wet floors, which can cause corrosion. This consideration also reduces the incidence of damage by pests (insects, rodents, etc.).

~~✓~~ Delegate the responsibility for management of hazardous materials to personnel trained and experienced in hazardous substance management.

Training

In-house employee training programs are established to teach employees about storm water management, potential sources of contaminants, and BMPs. Employee training programs should instill in all personnel a thorough understanding of their Storm Water Pollution Prevention Plan (SWPPP), including BMPs, processes and materials they are working with, safety hazards, practices for preventing discharges, and procedures for responding quickly and properly to toxic and hazardous material incidents. Training on storm water management and BMPs can be incorporated into these programs. Employees can be taught through 1) posters, employee meetings, courses, and bulletin boards about storm water management, potential contaminant sources, and prevention of contamination in surface water runoff, and 2) field training programs that show areas of potential storm water contamination and associated pollutants, followed by a discussion of site-specific BMPs by trained personnel.

Effective elements of employee training involve programs to:

~~✓~~ Training employees regularly on good housekeeping practices.

~~✓~~ Assigning a person to be responsible for effective implementation of BMPs.

~~✓~~ Promoting a clear identification and understanding of the problem, including activities with the potential to pollute stormwater.

~~✓~~ Identifying solutions using BMPs and available technologies.

~~✓~~ Ensuring strong commitment and periodic input from senior management.
Communicating frequently to ensure adequate understanding of SWPPP goals and objectives.

~~✓~~ Utilizing experience from past spills to prevent future spills.

~~✓~~ Making employees aware of BMP monitoring and spill reporting procedures.

~~✓~~ Developing operating manuals and standard procedures.

Obstacles to an employee training program include: Lack of commitment from senior management; Lack of employee motivation; Lack of incentive to become involved in BMP implementation.

Advantages of an employee training program are that the program can be a low-cost and easily implementable storm water management BMP. A training program is also flexible and can be adapted as a facility's storm water management needs change over

time.

Equipment/Vehicle Cleaning

Outdoor car washing has the potential to result in high loads of nutrients, metals, and hydrocarbons during dry weather conditions in many watersheds, as the detergent-rich water used to wash the grime off of cars flows down the street and into the storm drain.

Pollution from vehicles can be reduced in the following ways:

- ~~CA~~ Maintain equipment and vehicles regularly. Check for and fix leaks.
- ~~CA~~ Use drip pans to collect leaks or spills during maintenance activities.
- ~~CA~~ Wash equipment/vehicles in a designated and/or covered area where the wash water is collected to be recycled or discharged to the sanitary sewer. Contact your local wastewater treatment agency.
- ~~CA~~ Wash cars on gravel, grass, or other permeable surfaces.
- ~~CA~~ Block off the storm drain or using an insert to catch wash water.
- ~~CA~~ Pump soapy water from car washes into a sanitary sewer drain.
- ~~CA~~ If pumping into a drain is not feasible, pump car wash water onto grass or landscaping to provide filtration.
- ~~CA~~ Use hoses with nozzles that automatically turn off when left unattended.
- ~~CA~~ Use only biodegradable soaps.
- ~~CA~~ All vehicle washing should be done in areas designed to collect and hold the wash and rinse water or effluent generated. Wash water effluent should be recycled, collected, or treated prior to discharge to the sanitary sewer system.
- ~~CA~~ Pressure cleaning and steam cleaning should be done off-site to avoid generating runoff with high pollutant concentrations. If done on-site, no pressure cleaning and steam cleaning should be done in areas designated as wellhead protection areas for public water supply.
- ~~CA~~ On-site storm drain locations should be mapped to avoid discharges to the storm drain system.
- ~~CA~~ Spills should be immediately contained and treated.

The biggest limitation to implementing residential car wash best management practices may be the lack of knowledge regarding the impacts of polluted runoff. Another limitation is the inconvenience of proper disposal of vehicle wash water.

Staffing and materials represent the largest expenditure for local governments seeking to administer a nonpoint source education program. Car wash outreach programs are relatively inexpensive to staff and often require only a limited outlay for materials (brochures, training videos, etc.), and staff time devoted specifically to car wash education can be less than 5 percent of an employee's time. The purchase of wash

water containment equipment is often a one-time expense, and this equipment is often used for a number of years.

Routine housekeeping measures, in all urban settings, can reduce the amount of floatable litter and contaminants that would otherwise be entrained in runoff and discharge to receiving waters or clog the drainage network. In addition to reducing pollutant discharges to downstream waterways, these measures can have major aesthetic benefits to an area typically in desperate need for cosmetic enhancements. Overall, the implementation of an intensive housekeeping program can improve the quality of urban receiving waters and reduce the potential for localized flooding under minimal storm events due to a reduction of the storm sewer system's hydraulic capacity. It should be clear, though, that the quantifying the overall effectiveness of a housekeeping program is difficult because of variations of the build-up of pollutants and the characteristics of storm events.

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